User's Guide

PowerChute® *plus*

Versions 4.2.*x* - 4.5.3 for UNIX™

APC

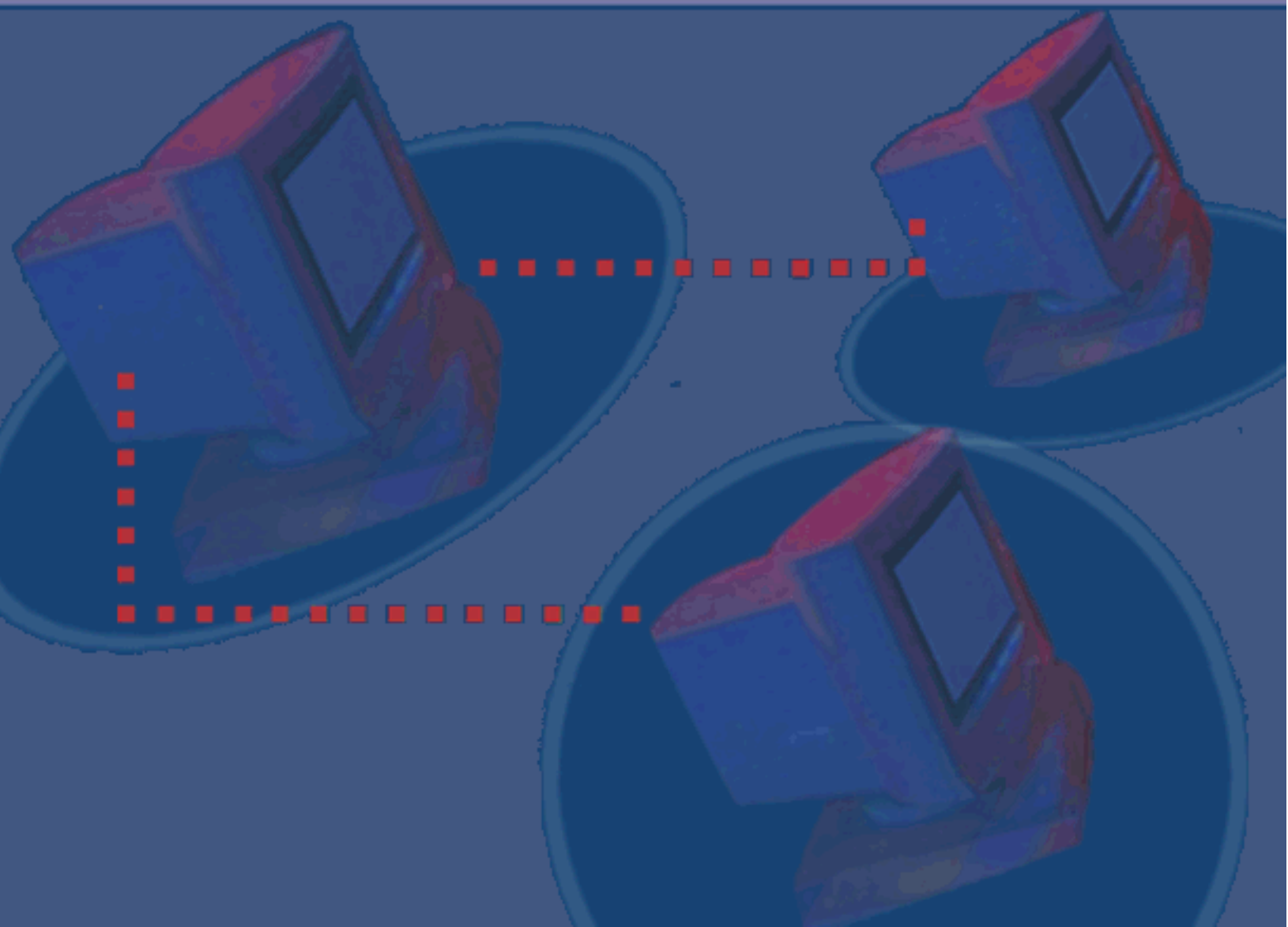www.apcc.com

POWER**C**HUTE® *PLUS* FOR **U**NIX™
POWER**C**HUTE® *PLUS* VERSIONS **4.2.***X* **- 4.5.3**

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About this User's Guide

This guide explains how to use PowerChute® *plus* with an Uninterruptible Power Supply (UPS) manufactured by American Power Conversion (APC).

This guide contains the following chapters and appendices:

Chapter 1, How to Start Monitoring a UPS:
Describes the components of and how to start using PowerChute *plus*.

Chapter 2, How to Test PowerChute *plus* Operation:
Describes how to verify that the UPS and PowerChute *plus* are operating correctly.

Chapter 3, PowerChute *plus* Main Screen:
Describes the part of PowerChute *plus* which you first see and use: the Main Screen.

Chapter 4, How to Configure PowerChute *plus*:
Describes the configuration procedures you must perform immediately after installing PowerChute *plus*, and how to use the **Configuration** menu to configure the following:

- UPS operating parameters

- System-shutdown parameters

- FlexEvents

- Measure-UPS® parameters

- Monitoring-preference settings

Chapter 5, How to Configure FlexEvents:
Describes how to use FlexEvents to do the following:

- Log system events

- Notify users or administrators using on-screen messages, e-mail, or a pager

- Run an external executable file before shutdown

- Shut down your operating system

Chapter 6, System Monitoring and Shutdown:
Describes how to use the **System** menu to do the following:

- Monitor other servers using PowerChute *plus*

- Schedule daily or weekly shutdowns

- Perform an immediate shutdown

Chapter 7, How to Log Events and Data:
Explains how to use the **Logging** menu to control recording UPS and site-power data in the PowerChute *plus* logs:

- The Event Log file, which logs FlexEvents

- The Data Log file, which logs data about a site's power quality

Chapter 8, How to Perform UPS Diagnostics:
Describes how to use the **Diagnostics** menu to do the following:

- Test a UPS

- Perform a runtime calibration

- Put a Matrix-UPS™ or Symmetra™ *Power Array*™ into bypass mode

- Schedule UPS self-tests and calibrations

Chapter 9, How to Configure System Shutdown and Restart:
Describes how to ensure that when a power failure occurs, PowerChute *plus* has enough time to shut down the system before the system's UPS can no longer use battery power to keep the system running.

Appendix A, FlexEvents Reference:
Describes the FlexEvents that can occur.

Appendix B, Initialization (.ini) File:
Describes how to edit the initialization file and identifies the PowerChute *plus* parameters that you can modify only by editing the initialization file.

Appendix C, How to Select a Language for Event Text:
Describes how to use the PowerChute *plus* initialization file to select the language you want PowerChute *plus* to use for event text and notification messages: English (the default), Spanish, French, German, or Italian.

Appendix D, Apache Shutdown Utility:
Describes the use of APC's special utility to configure the automatic shutdown of Apache HTTP Server software.

Chapter 1: How to Start Monitoring a UPS

This chapter describes briefly the components of PowerChute *plus* and explains how to start using the product.

The following topics are discussed:

- **PowerChute *plus* Components and Functions**
- **Executable Files**
- **How to Start PowerChute *plus***
- **X-Window/Character Displays on UNIX Platforms**

Note:
Also read the following chapters: Chapter 2, How to Test PowerChute plus Operation and Chapter 4, How to Configure PowerChute plus.

PowerChute *plus* Components and Functions

PowerChute *plus* has two main components:

- **User Interface Module**: this front-end provides the interface between you and PowerChute *plus*
- **UPS Monitoring Module**: this back-end communicates both with the system's UPS and with the User Interface Module

The UPS Monitoring Module is on the machine connected with the UPS. When you start the User Interface Module, you see a list of machines on your network that have a UPS Monitoring Module running (see **How to Start PowerChute *plus***). If your UPS is attached to your own machine, then both modules are on the same machine.
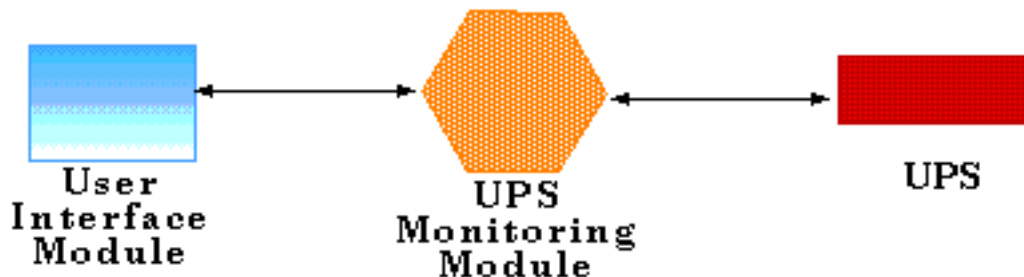
Together these modules provide for the following:

1. The *orderly shutdown* of the computer system on which the PowerChute *plus* application is running if an extended AC power failure occurs
2. *Notification* of users and network administrators of impending shutdowns
3. Recording *FlexEvents* and power data in log files
4. Automatic *restarting* of the system when power returns
5. Conserving UPS *battery power*
6. Scheduling *shutdowns*
7. Interactive, scheduled *battery testing*
8. Real-time *bar-graph displays* of output voltage, UPS load data, and utility line voltage, as well as battery runtime remaining, battery capacity and battery voltage

Executable Files

PowerChute *plus* uses the following executable files to start the UPS Monitoring Module and the User Interface Module:

	UPS Monitoring Module	**User Interface Module**
Character-based:	upsd	powerchute
X-Window:	upsd	xpowerchute

Not every UNIX platform has both character and X-Window interfaces: for this reason some platforms will not have both the User Interface Module executables **powerchute** and **xpowerchute**. See **X-Window/Character Displays on UNIX Platforms**.

How to Start PowerChute *plus*

The UPS Monitoring Module, **upsd**, starts automatically when you boot the computer on which PowerChute *plus* is installed.

The User Interface Module can be displayed in two different modes: Character-based and X-Window-based. The latter is a graphical user interface, allowing you to use a mouse. APC recommends using the X-Window-based where possible.

X-Window/Character Displays on UNIX Platforms informs you which mode can be used with different UNIX platforms.

To use the User Interface Module — character-based or X-Window-based — to monitor a UPS, do the following:

1. Log into your system as the `root` user.

2. Change to the PowerChute *plus* installation directory.

3.

For Character-Based UNIX	**For X-Window-Based UNIX**
Type `powerchute` and press **Enter**	Type `xpowerchute` and press **Enter**

The "Monitor Server" dialog box identifies the servers you can access. You can monitor a server's UPS only if the server is running a PowerChute *plus* back-end, a UPS Monitoring Module, and it connects directly to your system's subnetwork.

4. Select a listed server to open the PowerChute *plus* main screen for that server's UPS, and press **Enter**.
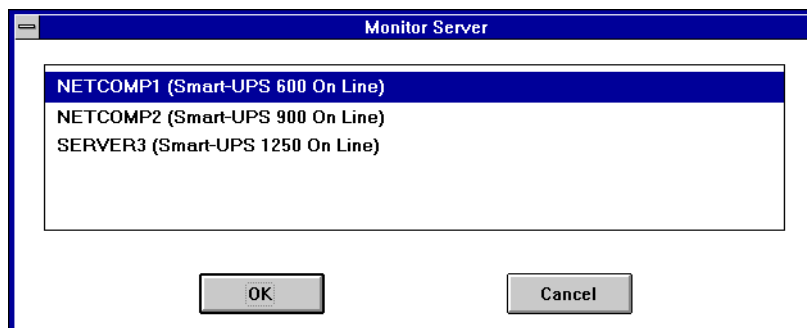
5. At the "Password" dialog box, type the password for the **pwrchute** user account, and click **OK**. (The person who installed PowerChute *g* created the **pwrchute** user account and assigned the password.)

See **Chapter 3, PowerChute** *plus* **Main Scree**n for a description of the main screen.

X-Window/Character Displays on UNIX Platforms

The following table lists UNIX platforms and the displays of PowerChute *plus* they support. Please note that the standard graphical interface for X-Window applications is called **motif**.

Operating System	Supported Versions	
IBM AIX	X-Window	Character
Solaris (SPARC)	X-Window, OpenWindows	Character
SunOS 4.1.3 and Solaris for Intel (X86)	-	Character
SCO OpenServer	X-Window	-
NCR UNIX	-	Character
SCO UnixWare 2.1.3	X-Window	-
SCO UnixWare 7	X-Window	-
Unisys UNIX	-	Character
HP-UX	X-Window	Character
SGI Irix	X-Window	-
Olivetti System V, Release 4	-	Character
SINIX/RM series	-	Character
Compaq Truc64 (formerly DEC OSF/1)	X-Window	-
Linux	X-Window	-

Chapter 2: How to Test PowerChute *plus* Operation

To test whether PowerChute *plus* and the UPS operate correctly together, perform the following steps:

1. Unplug the UPS power cord. PowerChute *plus* should do the following:

    a. Change the main screen's UPS status message from `On Line` to `On Battery`.

    b. List `UPS on battery` in the event log.

    c. Show the event text `UPS on battery` in the **Last Two Events** window at the bottom of the main screen.

    d. Send the message `UPS on battery power` to the users you defined in the "Notify Administrators" dialog box (if you enabled the **Notify Administrators** event action for the **UPS On Battery** event) or in the "Notify Users" dialog box, (if you enabled the **Notify Users** event action for the **UPS On Battery** event). PowerChute *plus* sends the message after waiting the initial message delay period for the notification (by default, 30 seconds).

        Note:
        *See **Chapter 5, How to Configure FlexEvents** for information about event actions, including information about how to use the **Notify Administrators** and **Notify Users** event actions.*

2. Plug in the UPS power cord. PowerChute *plus* should do the following:

    a. Change the main screen's UPS status message from `On Battery` to `On Line`.

    b. Record the event text `Normal power restored: UPS on line` in the event log.

    c. List `Normal power restored: UPS on line` in the **Last Two Events** window.

    d. Send the message `Utility power restored` to the users you defined in the "Notify Administrators" dialog box (if you enabled the **Notify Administrators** event action for the **Power Restored** event) or in the "Notify Users" dialog box (if you enabled the **Notify Users** event action for the **Power Restored** event). PowerChute *plus* sends the message after waiting the initial message delay period for the notification (by default, 30 seconds).

If PowerChute *plus* did not respond correctly, do the following:

1. Make sure the UPS cable is connected securely and correctly at the computer and at the UPS.

2. Reboot the system.

3. Repeat the test.

If PowerChute *plus* still does not operate correctly, uninstall and then reinstall PowerChute *plus,* as described in the *Installation Guide*. If problems persist, contact APC **Technical Support** as listed in the *Release Notes*.

Chapter 3: PowerChute *plus* Main Screen

This chapter describes the Main Screen features of the PowerChute *plus* User Interface Module. For information on PowerChute *plus* components and starting the application, see **Chapter 1, How to Start Monitoring a UPS**.

The Main Screen provides five drop-down menus, including a **Help** menu, and displays information about your UPS and the computer system the UPS is monitoring.
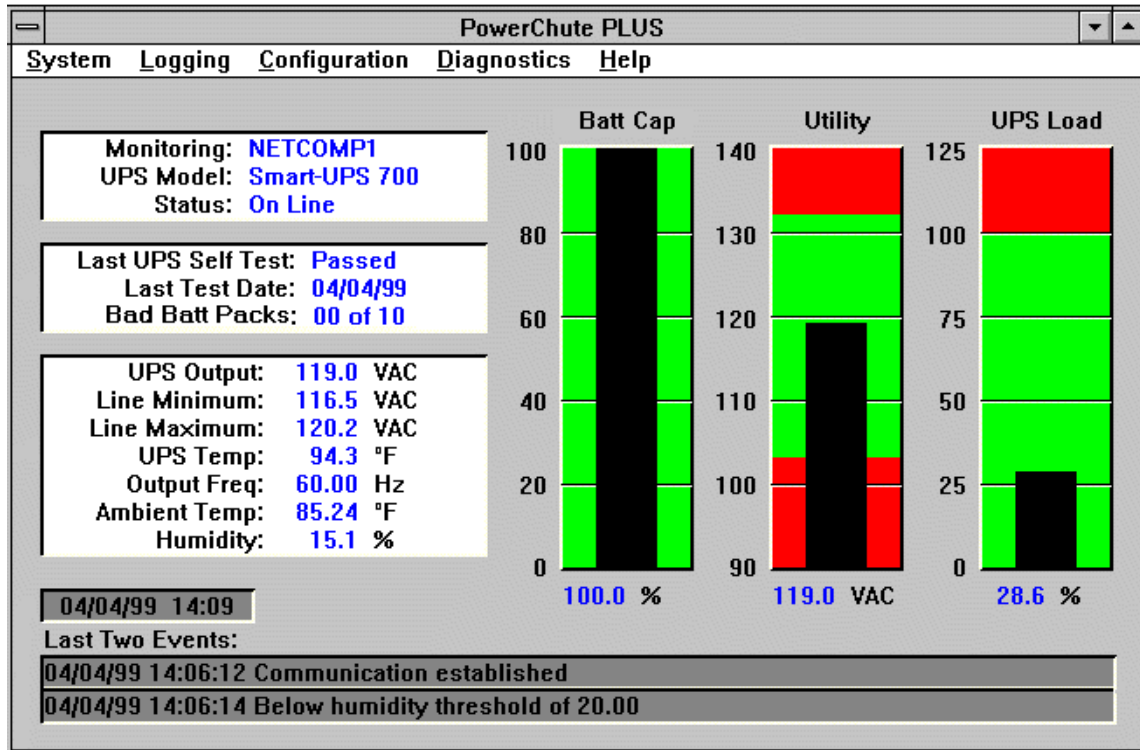
- A **Menu Bar** provides system, logging, configuration, diagnostic, and help options.

- The following windows provide status and other information about the UPS you are monitoring:

  Hardware and Status Window
  Self-Test and Battery Information Window
  Data Fields Window
  Host Computer Date and Time Window
  Last Two Events Window

- A **Bar Graph Area** displays three bar graphs. Note that only the left-most bar graph is configurable.

The information displayed in the Main Screen can vary depending on the UPS you are monitoring, and the field names **Monitoring:** and **UPS Model:** are **Server:** and **UPS:** in some of the latest versions of PowerChute *plus*.

Screen Navigation in Character-based PowerChute *plus* explains how to navigate PowerChute *plus* using only your keyboard, and **Radio Buttons and Check-Boxes in UNIX** explain how to use on-screen buttons and check-boxes.
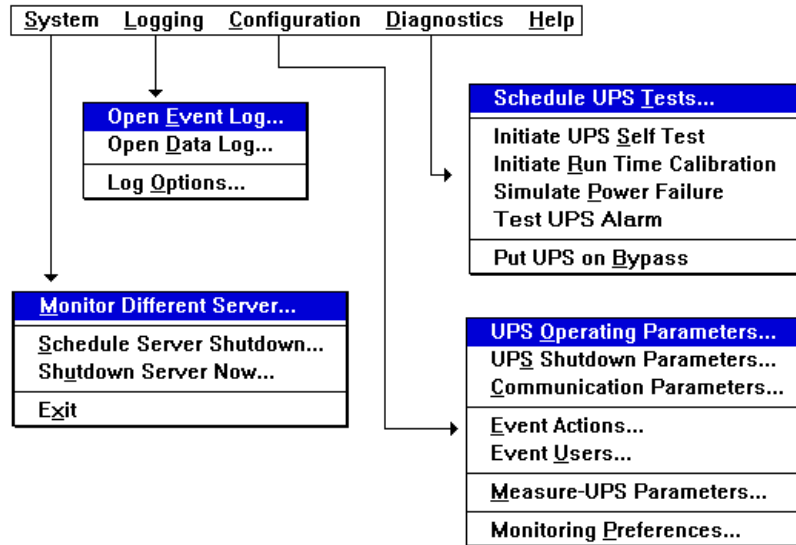
Menu Bar

The menu bar at the top of the Main Screen has the following four main menu options and an on-line help option.

Menu	Functions
System (See **Chapter 6, System Monitoring and Shutdown**.)	Do any of the following: • Monitor a different server • Schedule server or host computer shutdown times and dates • Shut down a server immediately • Exit PowerChute *plus*.
Logging (See **Chapter 7, How to Log Events and Data**.)	View the event log or data log, and set log options
Configuration (See **Chapter 4, How to Configure PowerChute plus.**)	Perform the following tasks: • Set UPS operating parameters (except for a Back-UPS) • Configure UPS shutdown parameters • Configure communications parameters • Configure event actions • Configure event users • Set Measure-UPS parameters (if a Measure-UPS is attached) • Select monitoring preferences (except for a Back-UPS)
Diagnostics (See **Chapter 8, How to Perform UPS Diagnostics**.)	Perform the following tasks (except for a Back-UPS): • Initiate UPS self-tests, runtime calibration, and UPS alarm tests • Simulate a power failure • Put the UPS in bypass mode (if you are using a Symmetra *Power Array* or Matrix-UPS)

The following figure shows the menu bar with all its drop-down menu options.

System Logging Configuration Diagnostics Help

Open **E**vent Log...
Open **D**ata Log...
Log **O**ptions...

Schedule UPS Tests...
Initiate UPS **S**elf Test
Initiate **R**un Time Calibration
Simulate **P**ower Failure
Test UPS Alarm
Put UPS on **B**ypass

Monitor Different Server...
Schedule Server Shutdown...
Sh**u**tdown Server Now...
E**x**it

UPS Operating Parameters...
UP**S** Shutdown Parameters...
Communication Parameters...
Event Actions...
Event **U**sers...
Measure-UPS Parameters...
Monitoring **P**references...

Hardware and Status Window

Monitoring: NETCOMP1
UPS Model: SMART-UPS 700
Status: On Line

The Hardware and Status window, located to the left and below the menu bar of the Main Screen, displays the following fields

Label	Description
Monitoring: (or **Server:** on some platforms)	Names the host computer for which you are viewing UPS data. On a network, you can be logged into one host computer while viewing the status of another host computer's UPS.
UPS Model: (or **UPS:** on some platforms)	The model name of the UPS being monitored by PowerChute *plus*.
Status:	The current status of the UPS. See **UPS Status Indicators**.

UPS Status Indicators

The table below lists the status indicators that PowerChute *plus* can display in the **Status:** field:

UPS Status	Description
Alarm Test	Selecting **Test UPS Alarm** from the **Diagnostics menu** displays this status indicator.

UPS Status	Description
Battery Discharged	The UPS is on-line but its battery capacity is too low to support connected equipment.
	This condition may occur after a runtime calibration (which always results in a deep discharge of UPS battery power) and after an extended power failure during which the UPS operated on battery power.
Bypass: User-Initiated or **Byp Maintenance** (character-based platforms)	The user put the Symmetra *Power Array* or Matrix-UPS into bypass mode to conduct maintenance.
	In Bypass mode, the Symmetra *Power Array* or Matrix-UPS acts only as a voltage conditioner, and the connected equipment is protected from power surges but not brownouts or blackouts.
Bypass: UPS Failure or **Byp Mod Failure** (character-based platforms)	Your UPS is on bypass.
	• For a Symmetra *Power Array*, the cause may be an overheated battery or an overload condition.
	• For a Matrix-UPS, the cause is an internal malfunction. Contact APC **Technical Support** as listed in the *Release Notes*.
UPS Power Supply Failure or **Byp Supply Failure** (character-based platforms)	Your Matrix-UPS auxiliary power supply failed.
	Contact APC **Technical Support** as listed in the *Release Notes*. If you attempt to put the UPS in bypass mode while the UPS has a failed auxiliary power supply, you lose all power to supported equipment.
Calibrating	The UPS is executing a runtime calibration.
Low Battery	The UPS is running on battery power, and the UPS runtime remaining is at the **UPS Low Battery Signal Time**. As a result, a low battery shutdown is about to begin.
No Comm	There is no communication between the UPS Monitoring Module and the UPS.
	Ensure that the interface cable is securely connected and that the COM port selected through PowerChute *plus* is enabled and matches the COM port connected to the cable.
No Server	The User Interface Module has lost or failed to establish contact with the UPS Monitoring Module running on the selected host computer.
	This status indicator may mean that the host computer is not currently running.
On Line	The UPS is running on utility power, AC.
On Battery	The UPS is providing battery power to connected equipment.
Replace Battery	A UPS battery is no longer usable. If your *UPS Owner's Manual* indicates that the battery is user-replaceable, replace it. Otherwise, contact APC **Technical Support** as listed in the *Release Notes*.
Resetting Port	You have selected a COM port different from the currently selected port.
	You can select COM ports by using the **Communication Parameters...** menu option on the **Configuration** menu.
Self Test	The UPS is undergoing a user-initiated or scheduled self-test.
	For more information, see **Initiate UPS Self Test** and **Schedule UPS Tests... in Chapter 8**.

UPS Status	Description
SmartBoost	The Smart-UPS brownout correction feature, SmartBoost™, is ON.
	SmartBoost corrects for low utility line voltage without switching the UPS to battery power. See **High and Low Transfer Points in Chapter 4** for information on Smart-Boost.
UPS Overloaded	For a Symmetra *Power Array*, the equipment load exceeds the total load capacity of the UPS modules installed.
	For any other smart-signalling UPS, the equipment load on the UPS exceeds its rated load capacity.
	Reduce the load by unplugging some equipment from the UPS, and perform a UPS self-test, using the **Initiate UPS Self Test** option in the **Diagnostics** menu. If the UPS still indicates overload, contact APC **Technical Support** as listed in the *Release Notes*.

Self-Test and Battery Information Window
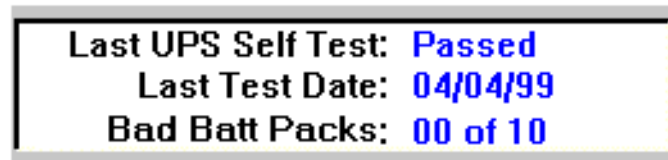
Located immediately below the Hardware and Status window on the Main Screen, the Self-Test and Battery Information window displays information about the last UPS self-test and about the state of UPS battery packs.

Label	Description	Action
Last UPS Self Test:	The result of the last self-test.	-
	Passed UPS passed its most recent self-test.	**-**
	Failed UPS failed its most recent self-test due to a bad battery.	Charge the battery for eight hours and perform the self-test again. If it fails again, and your UPS has a user-replaceable battery, see the UPS owner's manual for information on battery replacement.
	Invalid Test The state of the UPS prevented a valid test from being performed.	Attempt to perform the test again. If the condition persists, contact APC **Technical Support** as listed in the *Release Notes*.
	Unknown When you first install PowerChute *plus*, the status is Unknown until the first self-test is performed. PowerChute *plus* saves self-test information, even when you stop and start PowerChute *plus*. However, if you uninstall and reinstall PowerChute *plus*, the self-test status is again Unknown.	Perform a self-test.
Last Test Date:	The date of the last UPS self test.	-
Bad Batt Packs:	(Symmetra or Matrix-UPS only) The number of depleted battery packs and the total number of battery packs. For example: `Bad Batt Packs: 00 of 10` In the preceding example, none of the ten battery packs is depleted, i.e. bad. The information displays with a white background. If any are depleted, the background is red.	If the number of depleted battery packs is greater than zero, check the battery indicator lights to identify the bad battery packs, and replace them. (Call APC **Technical Support** as listed in the *Release Notes* to obtain replacements.)

Data Fields Window

```
         UPS Output: 117.6 VAC
       Line Minimum: 113.7 VAC
       Line Maximum: 119.6 VAC
          UPS Temp:  96.8 °F
       Output Freq: 60.00 Hz
       Ambient Temp: 85.24 °F
          Humidity:  15.1%
```

Below the Self-Test and Battery Information window on the Main Screen, the Data Fields Window displays voltages, UPS temperature, and output frequency. If you have a Measure-UPS environmental measuring accessory, the Data Fields window also displays ambient temperature and humidity.

By default, PowerChute *plus* polls the UPS for these values at 4 second intervals. For information on resetting the polling interval, see **[UPS] in Appendix B**.

The Data Fields window displays the following fields:

Label	Description
UPS Output:	The voltage output of the UPS to the attached equipment.
Line Minimum:	The lowest utility line voltage recorded since you started the User Interface Module this session.
Line Maximum:	The highest utility line voltage recorded since you started the User Interface Module this session.
UPS Temp:	The internal temperature of the UPS. • Typical temperature with a charged battery is approximately 40°C/ 104°F. • When the battery is charging heavily, the temperature can be as high as 50°C/ 122°F. • At the end of a heavy load discharge, the temperature can be as high as 65°C/ 149°F. • A temperature over 75°C/ 167°F indicates a failed fan, blocked ventilation, or other malfunction. To configure temperature at Celsius or Fahrenheit, see **Monitoring Preferences... in Chapter 4**.
Output Frequency:	The frequency of the UPS output voltage in Hertz, to the nearest .25 Hz.
Ambient Temp:	The temperature, measured by the Measure-UPS device.
Humidity:	The humidity, measured by the Measure-UPS device.

Host Computer Date and Time Window

```
2/28/99    18:51
```

The Host Computer Date and Time window on the Main Screen, located immediately above the **Last Two Events** window, displays the date and the time setting of the host computer you are monitoring.

Last Two Events Window

```
3/30/99 18:13:20 UPS on battery: Simulated power failure
3/30/99 18:13:20 Normal power restored: UPS on line
```

The **Last Two Events** window, at the bottom of the PowerChute *plus* Main Screen, displays the last two events, in the order they occurred, as recorded in the PowerChute *plus* event log.

Note:
Double clicking anywhere on this window opens the event log, as if you selected the **Open Event Log...** *option from the* **Logging** *menu.*

Bar Graph Area

The PowerChute *plus* Main Screen displays three bar graphs (except if your UPS is a Back-UPS, for which the Main Screen displays no bar graphs). The middle bar graph display **Utility** voltage and the right bar graph displays **UPS Load data**. By default, the left bar graph on the Main Screen displays **Battery Capacity** data, but you can configure the left bar graph to display other data.

See **Monitoring Preferences... in Chapter 4** for more information on changing the bar graph display.

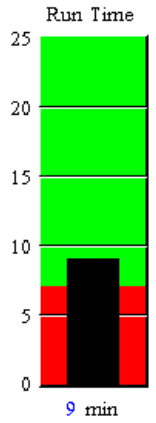The following example of the bar graph area shows the default bar graphs.
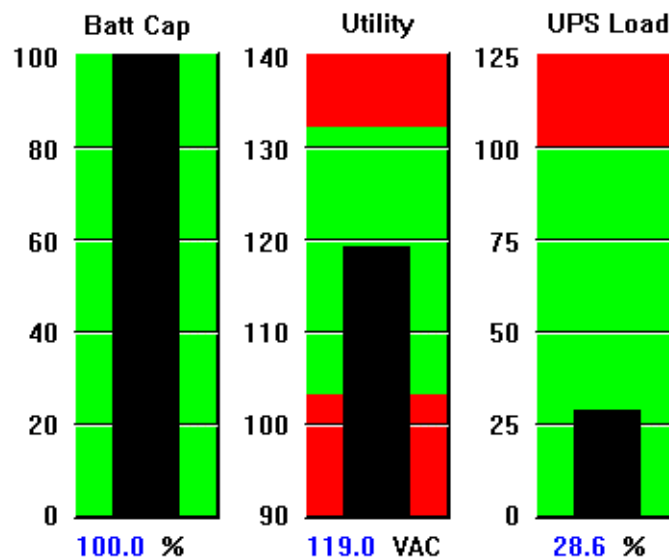
The three default bar graphs shown in the preceding example are explained in the following table:

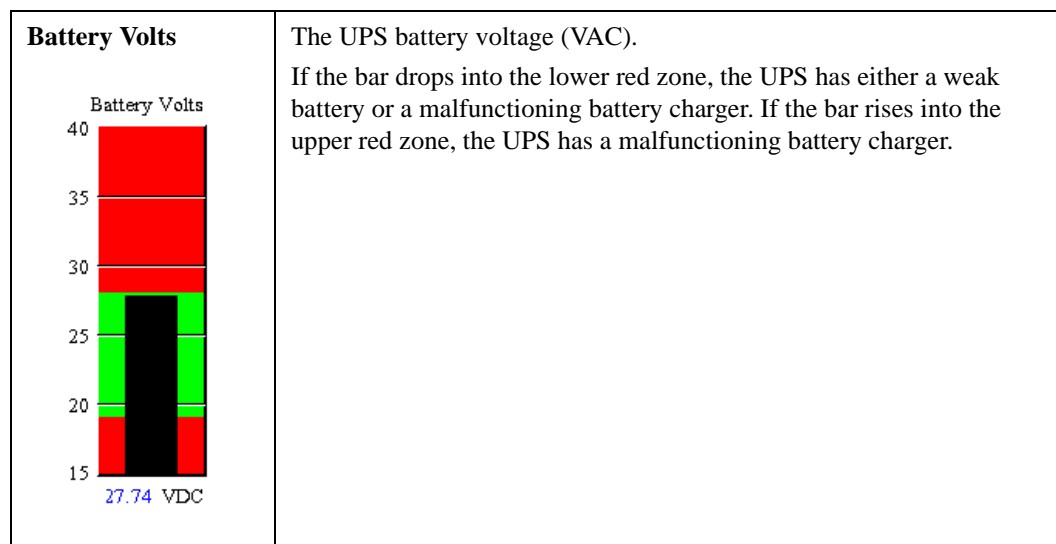| Bar Graph	Description
Battery Capacity	The percent of battery capacity remaining. To perform a runtime calibration, battery capacity must be at 100%.
Utility	The utility line voltage, i.e. the AC voltage entering the UPS from an electrical outlet. The graph also shows the High and Low Transfer Points. The bottom of the upper red area, the High Transfer Point, shows the highest line voltage the UPS will accept without switching to battery power. The top of the lower red area, the Low Transfer Point, shows the lowest line voltage the UPS will accept without switching to battery power or, with Smart-UPS and Back-UPS Pro models, without activating the SmartBoost brownout correction feature. See **High and Low Transfer Points in Chapter 4** for information on configuring the High and Low Transfer Points.
UPS Load	The load, as a percentage of total capacity, currently placed on the UPS.

The two configurable alternatives to the **Battery Capacity** bar graph are the **Run Time** and **Battery Volts** bar graphs:

Bar Graph	Description
Run Time 	The number of minutes the UPS can support the current load when running on battery. The red area is the **UPS Low Battery Signal Time** and can be configured by the user.

Battery Volts Battery Volts 40 35 30 25 20 15 27.74 VDC	The UPS battery voltage (VAC). If the bar drops into the lower red zone, the UPS has either a weak battery or a malfunctioning battery charger. If the bar rises into the upper red zone, the UPS has a malfunctioning battery charger.

Screen Navigation in Character-based PowerChute *plus*

On character-based UNIX platforms, use the following keystrokes to move the cursor, select items, and perform operations in the menus, dialog boxes, and screens accessible from the PowerChute *plus* Main Screen.

Key	Action
Arrow Keys	Move within a field
Tab	Move from field to field
Enter	Select the **OK** button on the screen.
Spacebar	Activate the current radio button or field selection
Ctrl+g	Select pull-down menus
Ctrl+l	Refresh the screen

Radio Buttons and Check-Boxes in UNIX

Radio buttons are a group of screen buttons within which you can select only one. When you select one button, all the others are automatically deselected. The Pulse and Tone buttons in **Communication Parameters...** form a radio button group.
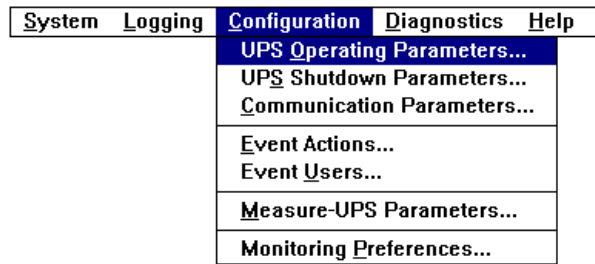
Check-boxes on a screen can be chosen individually. You can select or deselect each box regardless of the state of other check-boxes. The **Actions for Selected Events** boxes in **Event Actions...** are examples.

This standard radio button and check-box terminology is used in this User's Guide even though the UNIX version of PowerChute *plus* has buttons and boxes that are slightly different in appearance from those for other operating systems.

Chapter 4: How to Configure PowerChute *plus*

The **Configuration** menu options on the Main Screen allow you to tailor PowerChute *plus* parameters to your own requirements.

Selecting the **Configuration** menu from the Main Menu displays the following drop-down menu:

System	Logging	Configuration	Diagnostics	Help

UPS Operating Parameters...
UPS Shutdown Parameters...
Communication Parameters...

Event Actions...
Event Users...

Measure-UPS Parameters...

Monitoring Preferences...

This chapter describes these options under the following headings:

- **UPS Operating Parameters...**

- **UPS Shutdown Parameters...**

- **Communication Parameters...**

- **Event Actions...**

- **Event Users...**

- **Measure-UPS Parameters...**

    Note: This option is disabled if the Measure-UPS accessory is not attached.

- **Monitoring Preferences...**

UPS Operating Parameters...

The **UPS Operating Parameters...** option on the **Configuration** menu displays the "UPS Operating Parameters" dialog box.

The option is available only when monitoring a smart-signalling UPS, not a simple-signalling UPS such as the Back-UPS.

Note:
Values vary for different UPS models and operating voltage; the values shown may not match those on your system.

Some of the fields in the dialog box are display-only and some can be edited, as shown in the following table.

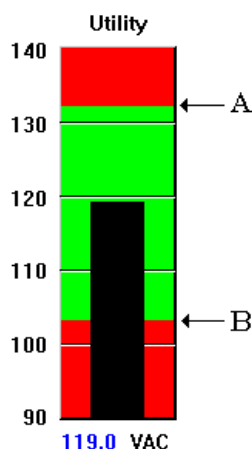| Field	Type	Description
Firmware Revision	Read-only	Revision number for the firmware the UPS uses
UPS Serial Number	Read-only	UPS serial number
UPS Manufacture Date	Read-only	The date on which APC finished manufacturing your UPS
High Transfer Point	Accepts Input	Highest acceptable input voltage. See **High and Low Transfer Points**.
Low Transfer Point	Accepts Input	Lowest acceptable input voltage. See **High and Low Transfer Points**.
Sensitivity	Accepts Input	UPS reaction to input voltage distortions
Nominal UPS Output	Accepts Input	UPS output voltage when on battery
UPS ID	Accepts Input	A unique name for your UPS. Use up to 8 alphanumeric characters.
Last Battery Replacement	Accepts Input	Last date the battery was changed. When you change a UPS battery, enter the date here.

High and Low Transfer Points

These transfer point values, available through **UPS Operating Parameters...**, define the range of input voltage that a UPS will accept for on line operation.

The following example of the Utility bar graph shows the transfer points:

- A = High Transfer Point

- B = Low Transfer Point

Input voltage level	UPS action
At or above the High Transfer Point value	The UPS does one of the following:[a] • A Back-UPS Pro or Smart-UPS uses SmartTrim™ to reduce the voltage to a level that the UPS can use. However, if the voltage increases to 12% or more above the **High Transfer Point** value, the UPS switches to battery operation. • All other UPS models switch to battery operation.
At or below the Low Transfer Point value	The UPS does one of the following:[b] • A Back-UPS Pro or Smart-UPS uses SmartBoost to increase the voltage to a level the UPS can use. However, if the voltage drops to 12% or more (or 30% or more for a Back-UPS Pro, Smart-UPS 420 or Smart-UPS 620) below the **Low Transfer Point** value, the UPS switches to battery operation. • All other UPS models switch to battery operation.

a. PowerChute *plus* generates no event when a UPS switches to SmartTrim and a **UPS On Battery** event when a UPS switches to battery power.
b. PowerChute *plus* generates a **UPS Enabling SmartBoost** event when a UPS switches to SmartBoost, and a **UPS On Battery** event when a UPS switches to battery power.

If your equipment can tolerate a **wide voltage range**, you may want to change the transfer point values to increase the voltage range your UPS accepts for on line operation. Do this by increasing the **High Transfer Point** value and, for a Smart-UPS or Back-UPS Pro, by decreasing the **Low Transfer Point** value.

A wider voltage range helps conserve the UPS battery by reducing the number of times the UPS switches to battery operation, especially in the following types of locations:

- locations that experience frequent peaks and dips in the input voltage levels

- locations with chronically high or low line voltage.

Note:
You cannot change the **Low Transfer Point** *for a Matrix-UPS model or a Symmetra Power Array. The UPS uses an Automatic Voltage Regulator.*

See **Sensitivity** for information about how to further decrease the number of times your UPS switches to battery operation.

Sensitivity

The **Sensitivity** parameter, available through **UPS Operating Parameters...**, defines how your UPS reacts to input voltage distortions, such as those caused by electromagnetic interference and radio interference.

At `High`, the default, the UPS switches to battery more often than for `Medium` and `Low`. For Matrix-UPS and Symmetra *Power Array* models, which adapt automatically to the quality of the input voltage, you can select only `Auto Sensitivity`.

If your UPS frequently switches to battery, try changing the **Sensitivity** value:

1. Make sure the UPS-supported equipment has no open applications.

2. Change the **Sensitivity** value to `Medium` or `Low`.

3. Test the new setting by removing the input power from the UPS.

   Note:
   If your system does not reboot, the new setting is satisfactory. If the system reboots, reset **Sensitivity** *to* `High.` *The equipment cannot tolerate more input line distortion.*

See also **High and Low Transfer Points** for additional information on how to control the number of times your UPS goes on battery.

Nominal UPS Output

This parameter, available through **UPS Operating Parameters...**, defines the output voltage level generated by the UPS when it is supplying battery power.

A 120 VAC UPS uses a fixed, `115`-volt value. All other UPS models allow you to select the value from a model-specific set of values.

For best results, set it to a value that matches or almost matches the typical AC utility input voltage so that no major voltage change occurs when the UPS switches to battery.

See also **Matrix-UPS and Input Voltage**.

Matrix-UPS and Input Voltage

You can set up a Matrix-UPS to use a different *input* voltage, as explained in the manual provided with the UPS. For example, you can change the UPS to use 208V instead of 240V.

If you change a Matrix-UPS to use a different input voltage, make sure you change the **Nominal UPS Output** value to a value that matches:

- For input voltage of 240V, you can set Nominal UPS Output Voltage to `220`, `230`, or `240`

- For input voltage of 208V, you can set Nominal UPS Output Voltage to `208`

UPS Shutdown Parameters...

The **UPS Shutdown Parameters...** option on the **Configuration** menu defines how a UPS reacts when utility power fails and also when utility power returns after a power failure.

The menu option is available only with a smart-signalling UPS, not with a simple-signalling UPS such as a Back-UPS.

Note:
The values shown in the sample dialog box are for a Smart-UPS 700 model.

The following table describes the fields.

Field	Description
UPS Low Battery Signal Time	Determines when PowerChute *plus* generates a **Low Battery Condition** event or a **UPS Battery is Discharged** event.
UPS Turn Off Delay	Determines how long a UPS waits, in seconds, from the time PowerChute *plus* tells the UPS to shut down to the time the UPS turns off power to the supported equipment. Make this delay long enough to allow for the complete shutdown of the operating system.
UPS Wakeup Delays: Time and Capacity	Ensure that the UPS has enough battery capacity to reboot and support connected equipment.
UPS Audible Warning	Determines when the UPS sounds a warning beep.
Automatic Reboot	When this box is checked (enabled), the UPS automatically reboots when power is restored after a shutdown. Unchecking this box prevents a UPS from turning its supported equipment on and off repeatedly when utility power is unstable, such as during an earthquake or in geographic areas where frequent power outages occur.

UPS Low Battery Signal Time

This parameter in the "UPS Shutdown Parameters" dialog box specifies when PowerChute *plus* will create one of the two events explained in the following table:

UPS Operational State	Event Generated at UPS Low Battery Signal Time	Example
On battery (supplying battery power)	**Low Battery Condition** event	If **UPS Low Battery Signal Time** is 10, PowerChute *plus* generates this event when the battery has 10 minutes of runtime remaining. *Note PowerChute plus always initiates a shutdown after a **Low Battery Condition** event.*
On line (using utility power	**UPS Battery Is Discharged** event	If **UPS Low Battery Signal Time** is 10 and the UPS is on line, PowerChute *plus* generates this event when the battery has 10 minutes of runtime remaining. Because the UPS is on lineon line, PowerChute *plus* by default does not shut down the system in response to this event. (See **Event Actions...**)

The following **Run Time** bar graph shows a red area indicating a **Low Battery Signal Time** value of 7 minutes (marked with an arrow in the example).
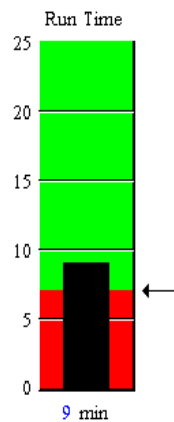
Note:
*By default, the main screen does not display the **Run Time** bar graph. See **Monitoring Preferences...** for information about how to select which bar graphs the main screen displays.*

UPS Wakeup Delays: Time and Capacity

The values in these two fields of the "UPS Shutdown Parameters" dialog box define when a UPS turns on after a power failure if **Automatic Reboot** is enabled; if **Automatic Reboot** is disabled, these fields are irrelevant.

- **UPS Wakeup Delay (Time)** allows you to delay turning on your UPS for a specified number of seconds.

  For example, if you need other equipment running before your UPS restarts, use this setting to delay the UPS turning on its power outlets.

- **UPS Wakeup Delay (Capacity)** specifies what percentage of the total UPS battery capacity your UPS must have before it restarts.

  Use this value to make sure the UPS has enough battery capacity to supply power to its supported equipment if another power failure occurs.

The diagram below shows the sequence of events related to these values when power returns:
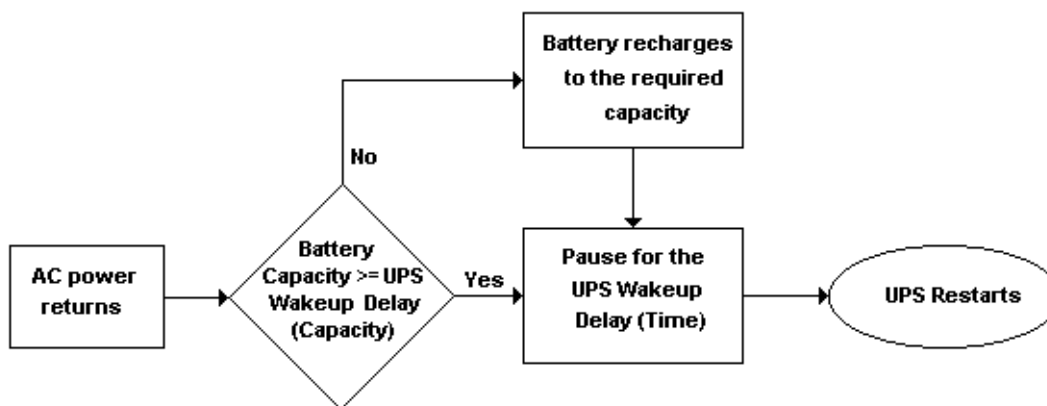
Note:
*With a Matrix-UPS the **UPS Wakeup Delay (Capacity)** field is disabled. To make sure a Matrix-UPS can support its equipment if a subsequent power failure occurs, increase the **UPS Low Battery Signal Time** value to reserve sufficient battery capacity when the Matrix-UPS shuts down.*

UPS Audible Warning

Use this parameter in the "UPS Shutdown Parameters" dialog box to define when you want the UPS to use an audible alarm in response to power problems.

If power interruptions occur frequently, use one of the last three values in the following table to reduce the number of alarms sounded or to disable the alarms:

Possible Value	Function
Power Fail	The UPS beeps when a power failure occurs, and periodically while on battery.
Power Fail + 30	The UPS beeps only when a power failure lasts for 30 seconds, and then periodically while on battery.
At Low Battery	The UPS beeps only when a **Low Battery Condition** occurs (the default).
Never Beep	The UPS never beeps.

Communication Parameters...

The **Communication Parameters...** option of the **Configuration** menu enables you to configure communication parameters and paging parameters.

See the following sections for information about how to use the two areas in the dialog box:

- **UPS Communications Options**
- **Paging Modem Options**
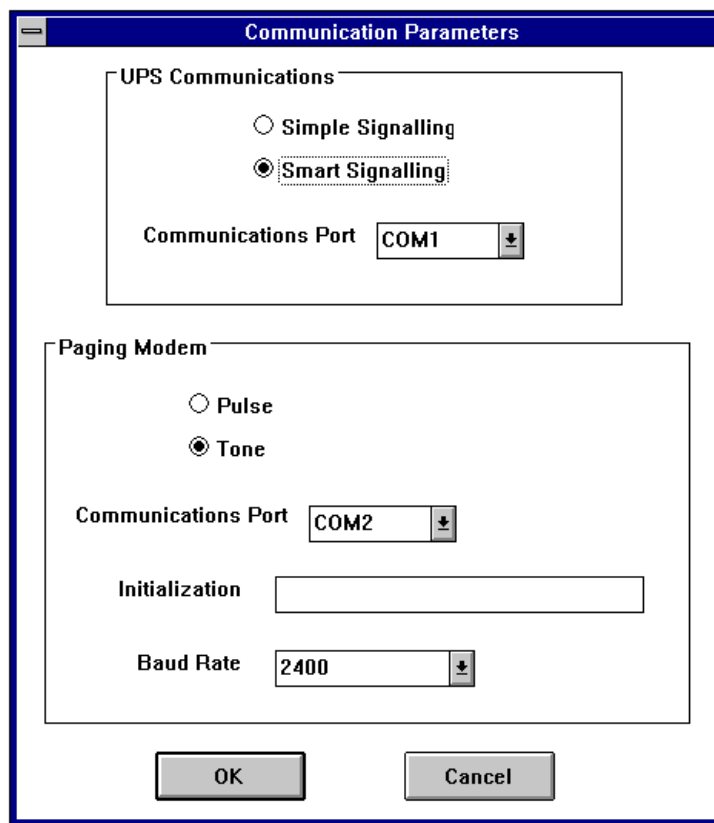
UPS Communications Options

If you indicated the correct UPS model during installation, the **Simple Signalling** or **Smart Signalling** radio button is already set by default. Do not change this selection without consulting APC **Technical Support** as listed in the *Release Notes*.

Signalling Type	UPS Types
Simple	Back-UPS
Smart	All other supported UPS models

In the **Communications Port** drop-down list box, select the serial port that connects the UPS to your computer.

Note that for this serial port, your UNIX platform settings should be configured as follows:

Parameter	Setting
Settings dialog:	
Baud Rate	2400
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Xon/Xoff
Advanced dialog (available through Settings dialog)	
FIFO Enabled check box	This should be disabled.
Interrupt Request Line (IRQ)	4 when using COM1; 3 when using COM2

Paging Modem Options

If you have a paging modem, PowerChute *plus* can use the modem to notify users about events. Configure these fields to affect how the paging modem operates:

1. Select the **Pulse** or **Tone** radio button depending on what type of dialing your telephone uses.

2. Select the communications port to which the modem connects.

3. If your modem is not Hayes-compatible, enter in the **Initialization** box the initialization string used by the modem. Refer to your modem manual for information on initialization strings and Hayes-compatibility.

4. Choose you modem's **Baud Rate** from the options: 300, 1200, 2400, 9600, 14400, and 19200.

For information on the next setup steps in paging users, see **How to Page Users**.

Event Actions...

The **Event Actions...** option of the **Configuration** menu defines how PowerChute *plus* responds to FlexEvents, which are events related to the UPS or to a Measure-UPS device (if one is connected to the UPS).

Note:
When the UPS uses simple-signalling (for example, a Back-UPS), PowerChute plus provides only a small number of FlexEvents.
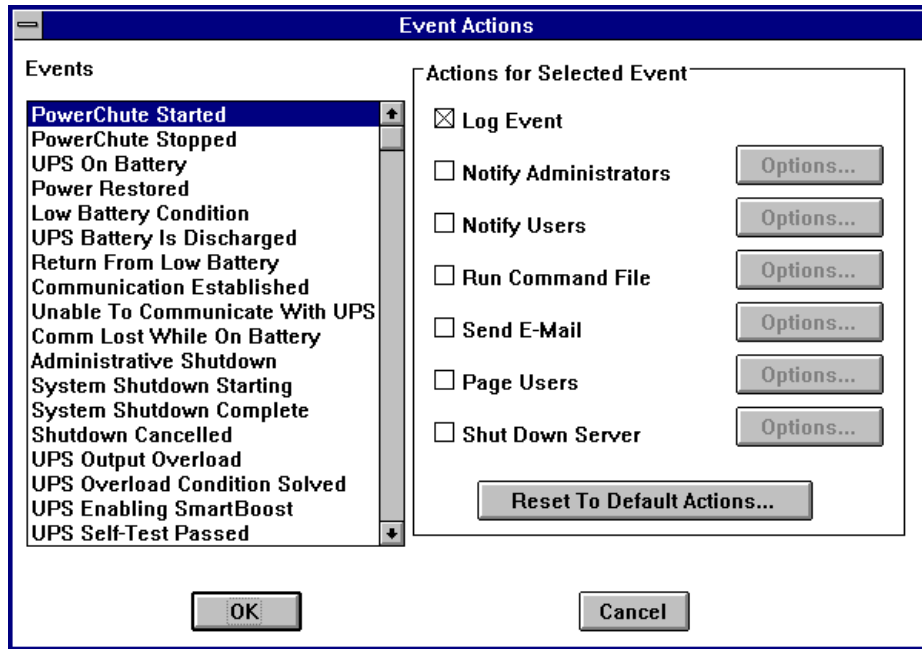
Other parts of this guide explain the "Event Actions" dialog box in detail:

- For more information on using this dialog box to configure FlexEvents, see **Chapter 5, How to Configure FlexEvents**

- For a description of each FlexEvent listed under **Events** in this dialog box, see **Appendix A, FlexEvents Reference**.

Event Users...

The **Event Users...** option of the **Configuration** menu lets you specify whom to notify when specific FlexEvents occur and how to notify them.

FlexEvents and notification of users are explained in detail in the following sections of this guide:

- For instructions on using FlexEvents, see **Chapter 5, How to Configure FlexEvents**

- For specific information on this dialog box, see **How to Set Up Event Users in Chapter 5**.

Measure-UPS Parameters...

The **Measure-UPS Parameters...** option of the Configuration menu opens the "Measure-UPS Parameters" dialog box. Use this dialog box to configure an external stand-alone Measure-UPS or a SmartSlot Measure-UPS II to monitor and report ambient temperature, relative humidity, and the state of external contact closures of safety and security devices such as smoke, heat, and humidity detectors; tamper switches; motion detectors; or magnetic contact sensors (such as door closure detectors).

You can use a Measure-UPS device with a Smart-UPS (except models 420 and 620), Symmetra *Power Array*, or Matrix-UPS. If no Measure-UPS is attached to your system, PowerChute *plus* disables the **Measure-UPS Parameters...** option.

Note:
*If your Measure-UPS or SmartSlot Measure-UPS II is not recording data, or if the Measure-UPS values are not displayed on the Main Screen, see the [Devices] section of the **powerchute.ini** file to be sure that the* MeasureUps *parameter value is* Yes.

With a SmartSlot Measure-UPS II, you can use PowerChute *plus* in the following manner:

- You can monitor or set thresholds for ambient temperature and humidity for the first probe only.

- You can monitor or configure settings for one sensor for each of the four contact sensor zones. If you configure SmartSlot Measure-UPS II for multiple sensors for a contact zone (i. e. if you mix normally open and normally closed settings for the same zone), PowerChute *plus* recognizes the first sensor only.

The following sections describe the fields in the "Measure-UPS Parameters" dialog box (shown below):

- **Thresholds**

- **Contacts**

> *Note:*
> *The **Firmware Revision** field identifies the firmware used by the Measures-UPS.*

```
┌─────────────────────────────────────────────────────────────┐
│  ▬                    Measure-UPS Parameters                  │
├─────────────────────────────────────────────────────────────┤
│     Firmware Revision:  4Gx                                   │
│                                                               │
│   ┌─Thresholds──────────────────────────────────────────┐    │
│   │ ☒ Low Temperature  │20.00│ °C   ☒ High Temperature │80.00│ °C │
│   │                                                      │    │
│   │ ☒ Low Humidity     │20.00│ %    ☒ High Humidity    │80.00│ %  │
│   └─────────────────────────────────────────────────────┘    │
│                                                               │
│   ┌─Contacts──────────────────────────────────────────────┐  │
│   │              Normal State       Description            │  │
│   │  ☒ Contact 1  │Closed ▼│  │Contact 1: Computer Room Door│ │
│   │                                                        │  │
│   │  ☒ Contact 2  │Closed ▼│  │Contact 2: Data Center Door │  │
│   │                                                        │  │
│   │  ☒ Contact 3  │Open   ▼│  │Contact 3: Smoke detector - Main hallway│ │
│   │                                                        │  │
│   │  ☒ Contact 4  │Closed ▼│  │                            │  │
│   └────────────────────────────────────────────────────────┘ │
│                                                               │
│            [  OK  ]              [ Cancel ]                    │
└─────────────────────────────────────────────────────────────┘
```

Thresholds

The **Thresholds** section of the dialog box displays upper and lower thresholds for the ambient temperature and relative humidity values. The Measure-UPS device uses these thresholds to determine whether the current temperature and humidity are within acceptable limits.

Note:
*See **Monitoring Preferences...** for information about how to choose Celsius (the default) or Fahrenheit to display the Measure-UPS temperature values on the main screen. The "Measure-UPS Parameters" dialog box always displays the temperature values in Celsius. To convert a Celsius temperature to a Fahrenheit value to use for a temperature threshold, use the following formula:*

$$F = \left(\frac{9}{5}C\right) + 32$$

The following table identifies the default threshold values:

Low Temperature	20 degrees Celsius (68.00 degrees Fahrenheit)
High Temperature	65 degrees Celsius (149.00 degrees Fahrenheit)
Low Humidity	20.00% relative humidity
High Humidity	80.00% relative humidity

To change an enabled threshold value, type the new value into the data field for the threshold. See the user's manual for your Measure-UPS or SmartSlot Measure-UPS II for the temperature and humidity ranges that your Measure-UPS device can measure.

If the environmental temperature or humidity goes out-of-range, PowerChute *plus* generates an out-of-range FlexEvent: **Ambient Temp Out Of Range** or **Humidity Out Of Range**.

When the environmental temperature or humidity returns to an acceptable range, PowerChute *plus* generates an in-range FlexEvent: **Ambient Temp in Range** or **Humidity In Range**.

PowerChute *plus* also displays ambient temperature and humidity in the Data Fields window of the main screen. If ambient temperature or humidity is outside the range of the low and high thresholds, the data for the corresponding field on the main screen is displayed in red.

Contacts

Each Measure-UPS device has four sets of sensor zones, also known as contact closures, shown in the following figure.
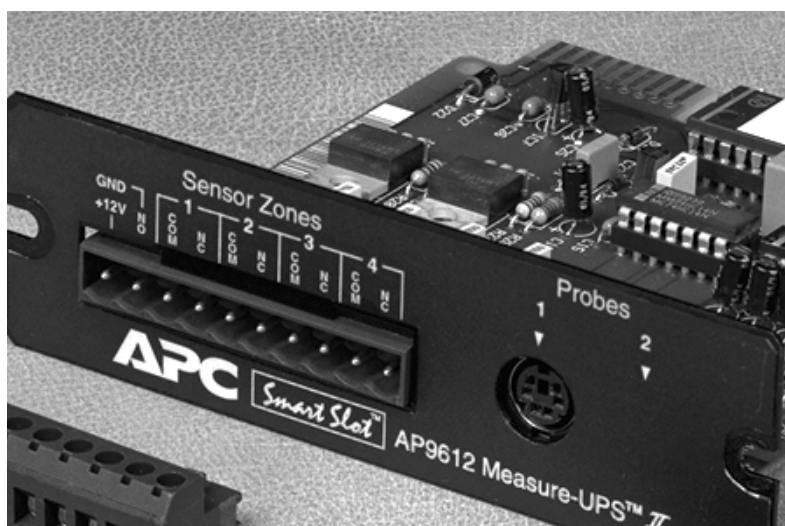
The **Contacts** area of the "Measure-UPS Parameters" dialog box defines the normal condition for each closure, `Open` or `Closed`.

1. To redefine the position to use as the normal state, select `Open` or `Closed` in the **Normal State** drop-down list box of the **Measure-UPS Parameters...** dialog.

2. You can also enter a description value for each contact closure. The description is included in the text of any notification messages or data log entries.

For example, if you attach a contact to the door of a remote data center and name the contact as `Contact 1` and its state as normally `closed`, PowerChute *plus* generates an **Abnormal Contact Position** event when anyone opens that door. When the door closes again, PowerChute *plus* generates a **Contact Normal** event.

Monitoring Preferences...

The **Monitoring Preferences...** option of the **Configuration** menu is available only when you are monitoring a smart-signalling UPS, not a simple-signalling UPS such as a Back-UPS.
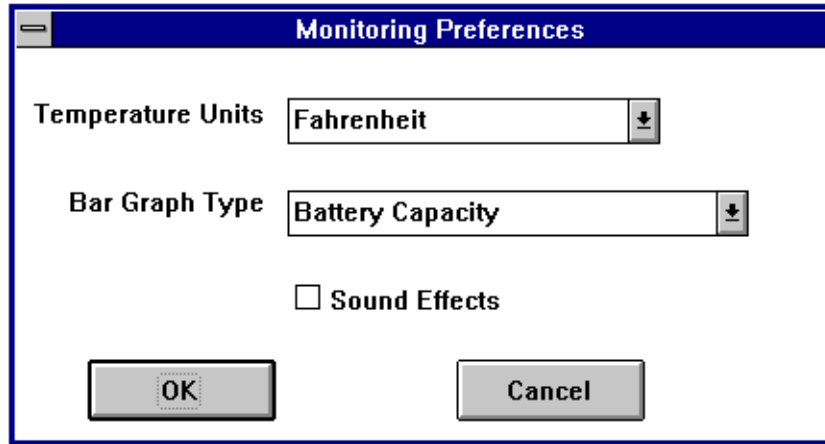
The following table describes the options:

Field	Description
Temperature Units	The value you select for **Temperature Units** (Celsius or Fahrenheit), determines how the Main Screen displays temperature data.
Bar Graph Type	Use this list box to change the left bar graph on the Main Screen.
Sound Effects	With **Sound Effects** enabled (checked), PowerChute *plus* beeps when it polls the UPS and Measure-UPS for data every four seconds.

Bar Graph Type

By default, the main screen uses the bar graphs shown here to display UPS data for smart-signalling UPSs:
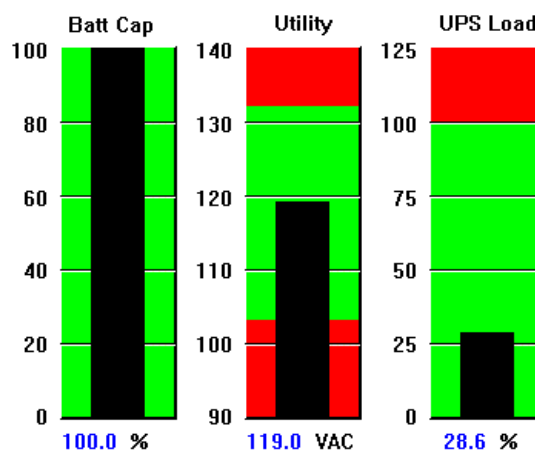
You can use the following additional values for **Bar Graph Type** to change the data displayed by the left-most graph, which defaults to `Battery Capacity`:

- `Run Time Remaining`
- `Battery Voltage`

For more information on the bar graphs, see **Bar Graph Area in Chapter 3**.

Note:
Bar graphs are not displayed for simple-signalling UPSs, such as Back-UPS.

Chapter 5: How to Configure FlexEvents

The topics in this chapter define FlexEvents and describe how to configure them to respond to information:

What are FlexEvents?   Briefly explains FlexEvents and their use.

How to Configure Actions   Explains how to configure FlexEvent actions through the **Event Actions...** option of the **Configuration** menu.

How to Set Up Event Users   Explains how to specify users to be informed of events. You specify users through the **Event Users...** option of the **Configuration** menu.

What are FlexEvents?

FlexEvents are events that are related to your UPS or Measure-UPS and for which you can configure actions (responses).

- **Events** are occurrences related to your American Power Conversion UPS system. They range in severity from informational events such as **PowerChute Started** to critical events such as **UPS on Battery**.

  See **Appendix A, FlexEvents Reference** for descriptions of the events generated by PowerChute *plus.*

- **Actions** are responses by PowerChute *plus* to these events and can be configured to suit your requirements. An action can log an event, notify users or administrators, run a command file, or shut down the system

  See **How to Configure Actions**.

Together, events and actions enable you to configure how PowerChute *plus* reacts to information it obtains from UPS monitoring.

You can configure any of the following actions for most events:

- Log an event in the PowerChute *plus* event log

- Notify administrators and other users

- Run a command file

- Page users

- Send e-mail to users

- Shut down the system

  Note that for Linux, SCO UnixWare 7, and SCO UNIX platforms you cannot configure informational-only events to use the **Shut Down Server** *action.*

How to Configure Actions

The following sections describe how to use the "Event Actions" dialog box to define the actions PowerChute *plus* takes in response to a FlexEvent:

- **Components of the "Event Actions" Dialog Box**

- **Overview of Available Actions for Events**

- **How to Notify Administrators**

- **How to Notify Users**

- • **How to Run a Command File**

- • **How to Send E-Mail**

- • **How to Page Users**

- • **How to Shut Down a Server**

Components of the "Event Actions" Dialog Box

The **Event Actions...** option of the **Configuration** menu allows you to configure how PowerChute *plus* responds to UPS and Measure-UPS events.
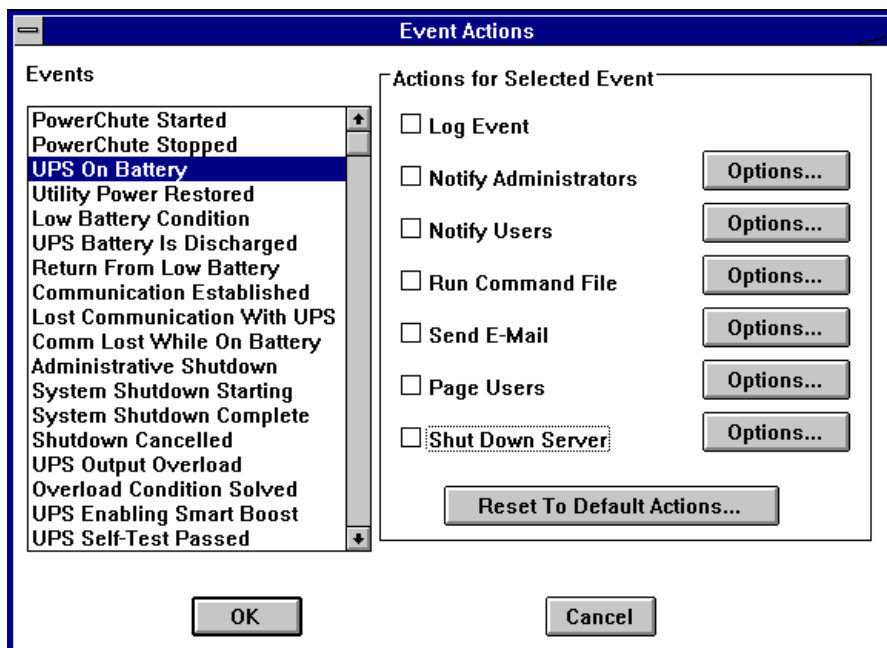
The dialog box has the following components:

Component	Action
Events	Select the event to configure.
Actions for Selected Event	Define what actions PowerChute *plus* performs when the selected event occurs. To define an action for an event, do the following: 1. Configure the action, i.e., mark the check-box. 2. Click **Options...** for the action. 3. Use the displayed dialog box to configure the action. 4. Click **OK** to return to the "Event Actions" dialog box.

Component	Action

Reset to Default Actions...
    Note:
    *For a Symmetra Power Array only the **System Shutdown Starting** and **Low Battery Condition** events have the **Shut Down Server** action enabled by default.*
	Open a dialog box that allows you reset actions to their default conditions.
	• Click **This One**, to reset the selected event's actions.
	• Click **All**, to reset the actions for all events.
	• Click **Cancel** to exit the dialog box without resetting the actions for any event.

Overview of Available Actions for Events

The following table briefly describes how PowerChute *plus* responds to each action you configure for an event in the "Event Actions" dialog box.

Note:
When in doubt, use the default actions to see if those actions meet your needs.

Action	Response by PowerChute *plus*
Log Event	Logs the event in the PowerChute *plus* event log file. See **Chapter 7, How to Log Events and Data** for information on the Event Log file.
Notify Administrators	Sends a broadcast message to the administrators listed in the "Notify Administrators" dialog box as **Administrators to Notify**. See **How to Notify Administrators**.
Notify Users	Sends broadcast messages to the users listed in the "Notify Users" dialog box as **Users to Notify**. See **How to Notify Users**.
Run Command File	Runs the external executable command file specified in the "Run Command File" dialog box. See **How to Run a Command File**.
Send E-Mail	Sends an e-mail message to the users listed in the" Send E-Mail" dialog box. See **How to Send E-Mail**.
Page Users	Pages the users listed in the "Page" dialog box as **Users to Page**. See **How to Page Users**.
Shut Down Server	Initiates a server shutdown when an event lasts longer than the delay time defined for the **Shut Down Server** action. See **How to Shut Down a Server**.

Notification of Administrators and Users

The **Notify Administrators** action in the "Event Actions" dialog box differs from the **Notify Users** action in the following ways:

	Notify Administrators	**Notify Users**
Notify Whom?	Selected administrators	Selected users or all users
How Many Times?	Once	Once or repeatedly

See also **How to Notify Administrators** and **How to Notify Users**.

How to Notify Administrators

The **Notify Administrators** action enables PowerChute *plus* to send broadcast messages to selected administrators when a specific event occurs. You select this action as a check box option in the "Event Actions" dialog box.

Use the following steps to configure the **Notify Administrators** action for an event.

1. From the **Configuration** menu, choose **Event Actions...**, and highlight the event in the **Events** list in the dialog box.

2. Mark the check-box for the **Notify Administrators** action.

3. Click **Options...** next to **Notify Administrators** to open its dialog box.

4. Configure which administrators to notify when the event occurs:

   - To specify an administrator to notify, highlight a user in **Notifiable Users** (users already configured to be eligible for notification), and click **<<Add<<**.

   - To remove an administrator from the notification list, highlight the name in **Administrators To Notify**, and click >>**Remove**>>.

- Click the **Edit Users...** button to configure new users to be eligible for notification. See **How to Set Up Event Users**.

5. To change the message, edit the **Notification Message** text.

   Note:
   *Changing the **Notification Message** text has no effect on the default message text in the [PopupText] in Appendix B or [EventText] in Appendix B section of the PowerChute plus initialization file.*

6. Use the **Wait** field to define how long PowerChute *plus* waits before notifying administrators (5 seconds by default).

   Note:
   *PowerChute plus notifies administrators only when the event lasts for the defined **Wait** period. For example, for a setting of 10, administrators are not notified if the event lasts less than 10 seconds.*

7. Click **OK** to save your changes and exit the dialog box.

See **Notification of Administrators and Users** and **Format of a Notification Message** for more information.

How to Notify Users

The **Notify Users** action enables PowerChute *plus* to send broadcast messages to selected users whenever a specific event occurs.

Use the following steps to configure an event's **Notify Users** action:

1. From the **Configuration** menu, choose **Event Actions...**, and highlight the event in the **Events** list in the dialog box.

2. Mark the check-box for the **Notify Users** action.

3. Click **Options...** next to **Notify Users** to open its dialog box:

4. Configure which users to notify when the event occurs:

    a. Select **All Users** to have PowerChute *plus* send the notification message to all network users.

    b. Select **Specific Users** to send the notification messages to individual users:

        •   To specify a user to notify, highlight the name in **Notifiable Users** (users already configured to be eligible for notification), and click **<<Add<<**.

        •   To remove a user, highlight the name in **Specific Users**, and click >>**Remove**>>.

        •   Click the **Edit Users...** button to configure new users to be eligible for notification. See **How to Set Up Event Users**.

5. To change the message, edit the **Notification Message** text.

    Note:
    Changing the **Notification Message** *text has no effect on the default message text in the* **[PopupText] in Appendix B** *or* **[EventText] in Appendix B** *section of the PowerChute plus initialization file.*

6. Use the **Wait** field to define how long PowerChute *plus* waits before notifying users (5 seconds by default).

    Note:
    PowerChute plus notifies users only when the event lasts for the defined **Wait** *period. For example, for a setting of* 10, *administrators are not notified if the event lasts less than 10 seconds.*

7. Select how often you want the message sent.

    -   To send a message only once, select **Notify Once**.

    -   To send a message repeatedly while the event lasts, use the **Notify Every** *number* **Seconds** field to define how often to send the message (30 seconds by default).

8. Click **OK** to save your changes and exit the dialog box.

See **Notification of Administrators and Users** and **Format of a Notification Message** for more information.

Format of a Notification Message

A PowerChute *plus* event message, whether to an administrator or user, has two lines of text.

```
Message from PowerChute@NETCOMP1 to * on 4/27/98 12:35PM

NETCOMP1 is running on battery power. NETCOMP1 shutdown in 29 min 0 sec
```

The message lines have the following meaning:

•   The top line in the message identifies which system sent the message (NETCOMP1 in the example) and when the message was sent.

•   The second line, the message line, provides the event message; and when the event includes the **Shut Down Server** action, also identifies how much time remains *before* PowerChute initiates a shutdown.

    One event, **UPS On Battery**, always identifies how much time remains before a shutdown begins, as follows:

    -   With **Shut Down Server** enabled (the default), it uses the delay specified in the dialog box for that action.

    -   With **Shut Down Server** disabled, it uses the **UPS Low Battery Signal Time** setting.

UNIX platforms log all events in the **syslog** file. Depending on your system configuration, notification messages may be broadcast by PowerChute *plus*, and by **syslogd**. In those broadcast by **syslogd**, the process ID is enclosed in brackets [ ].

For more information on notification messages, see **Text Used in Notification Messages**.

<u>**Text Used in Notification Messages**</u>

The [PopupText] section of the PowerChute *plus* initialization (**.ini**) file defines the default notification message text for nine FlexEvents. (The text in the [EventText] section is used to log information in the Event Log.)

You can edit the initialization file directly to change an event's message. You can also use the "Notify Administrators" or "Notify Users" dialog box and change the **Notification Message** field. Changes made to the **Notification Message field** *do not affect* the [PopupText] or [EventText] sections of the PowerChute *plus* initialization file.

Note:
See [PopupText] and [EventText] in Appendix B for more information about event messages. See also How to Notify Administrators and How to Notify Users.

How to Run a Command File

The **Run Command File** action, available through **Event Actions...** on the **Configuration** menu, enables PowerChute *plus* to run an external, executable file when an event occurs. For example, for the **Administrative Shutdown** event, you might want to stop a running process, or run a batch file or a script.

See your UNIX system's documentation on how to set file permissions.

Use the following steps to configure an event's **Run Command File** action.

1. In the "Event Actions" dialog box, select the event from the **Events** list.

2. Mark the check-box for the **Run Command File** action.

3. Click **Options...** for the **Run Command File** action to open the "Run Command File" dialog box.
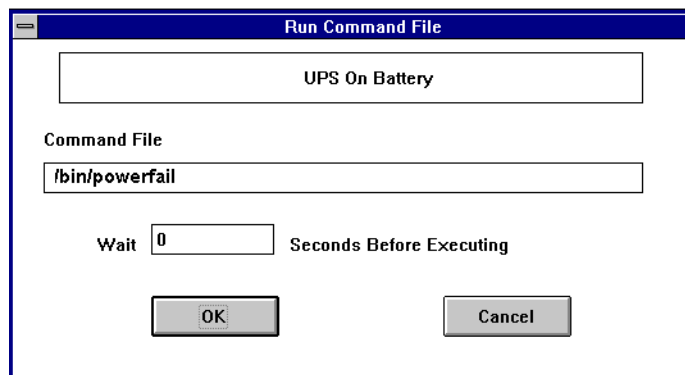
4. In the **Command File** field, enter the complete path and name for the script you want to run when the event occurs.

   In the preceding example, the **/bin/powerfail** script will run every time the **UPS On Battery** event occurs.

5. Use the **Wait** field to define how longPowerChute *plus* waits before running the command file (by default, 0 seconds).

   Note:
   *PowerChute plus runs the command file only when the event lasts for the defined **Wait** period. For example, for a setting of 10, administrators are not notified if the event lasts less than 10 seconds.*

6. Click **OK** to save your changes and exit the dialog box.

How to Send E-Mail
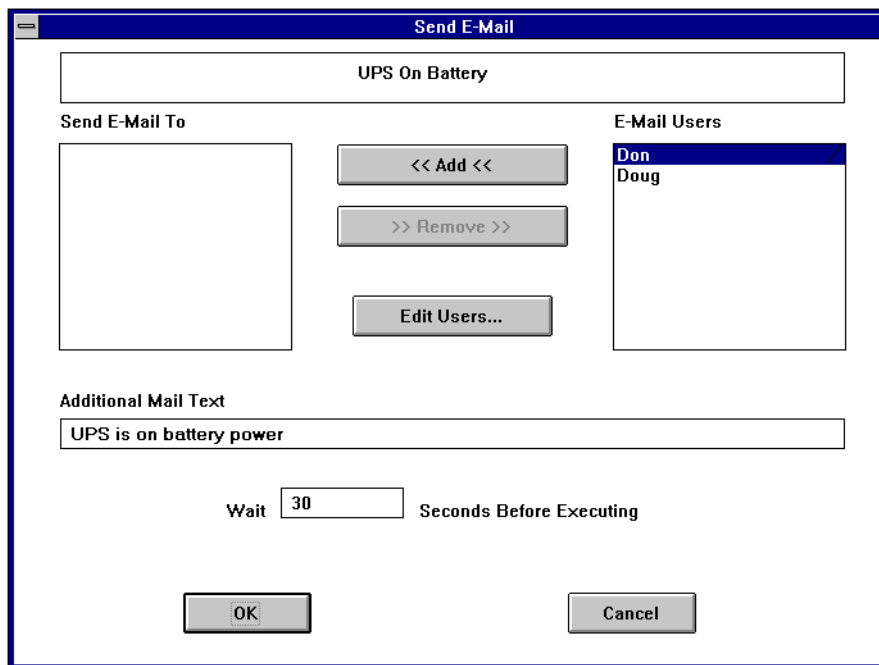
The **Send E-Mail** action, available through **Event Actions...** on the **Configuration** menu, enables PowerChute *plus* to send an e-mail message to selected users when an event occurs.

Use the following steps to configure e-mail notification:

1. In the "Event Actions" dialog box, select the event from the **Events** list.

2. Mark the check-box for the **Send E-Mail** action.

3. Click **Options...** for the **Send E-Mail** action to open the "Send E-Mail" dialog box.

4. Configure which users will receive e-mail when the event occurs:

    •   To specify a user to notify, select that user in **E-Mail Users** (those already configured to be eligible to receive e-mail from PowerChute *plus*), and click **<<Add<<**.

    •   To remove a user from the list of users to be notified, select that user in **Send E-Mail To**, and click >>**Remove**>>.

    •   Click **Edit Users...** to configure new users to be eligible to receive e-mail. See **How to Set Up Event Users**.

5. To add to the standard event message text, edit the **Additional Mail Text** field.

6. Use the **Wait** field to define how long PowerChute *plus* waits before sending e-mail.

    Note:
    *PowerChute plus sends e-mail only when the event lasts for the defined **Wait** period. For example, for a setting of 10, administrators do not receive e-mail if the event lasts less than 10 seconds.*

7. Click **OK** to save your changes and exit the dialog box.

How to Page Users

The **Page Users** action, available through **Event Actions...** on the **Configuration** menu, enables PowerChute *plus* to page selected users when an event occurs.

Use the following steps to configure the **Page Users** action for an event:

1. In the "Event Actions" dialog box, highlight the event from the **Events** list.

2. Mark the check-box for the **Page Users** action.

3. Click **Options...** for the **Page Users** action to open the "Page" dialog box:

4. Configure which users to page when the event occurs:

    -   To specify a user to notify, highlight a user in **Pageable Users** (users already configured as eligible to receive a page from PowerChute *plus*), and click **<<Add<<**.

    -   To remove a user for the list of users to be paged, select that user in **Pageable Users**, and click >>**Remove**>>.

    -   Click **Edit Users...** to configure new users to be eligible for paging. See **How to Set Up Event Users**.

5. Use the **Wait** field to define how long PowerChute *plus* waits before paging users.

    Note:
    *PowerChute plus pages users only when the event lasts for the defined **Wait** period. For example, for a setting of 10, users are not paged if the event lasts less than 10 seconds.*

6. The value in the **Message** field must be numerical. The default and recommended value is the unique ID code for the selected event. The first number of the ID code identifies the event's severity level:

    -   Severe problems (code 3)

    -   Warnings (code 2)

    -   Informational messages (code 1)

7. Click **OK** to save your changes and exit the dialog box.

Note:
*APC recommends that you configure paging only for code 3 (severe problem) events. See **Events with Their ID Codes, Severity, and UPS Support in Appendix A**.*

*For information on setting up a pager service, see **How to Use the "Pager Services" Dialog Box**.*

How to Shut Down a Server

The **Shut Down Server** action, available through **Event Actions...** on the **Configuration** menu, enables PowerChute *plus* to shut down the server when an event occurs.

Note:
Because of fault tolerance, and longer available runtime, by default, a Symmetra Power Array uses the **Shut Down Server** *action for the* System Shutdown Starting *and* Low Battery Condition *events only.*

By default, for UPS models other than Symmetra *Power Array*, the following events initiate the **Shut Down Server** action:

Events That Use the Shut Down Server Action by Default	Shut Down Server Action Can Be Disabled
Base Module Fan Failure (Matrix-UPS only)	Yes
Base Module Power Supply Failure (Matrix-UPS only)	Yes
Comm Lost While On Battery	Yes
Low Battery Condition	No
UPS On Bypass: Failure	Yes
UPS Output Overload	Yes
System Shutdown Starting	No
UPS On Battery[a]	Yes

> a. *Caution: If you disable the* Shut Down Server *action for the* UPS On Battery *event, the UPS runs on battery and waits for a* Low Battery Condition *event before PowerChute plus starts to perform a shutdown. See* Chapter 9, How to Configure System Shutdown and Restart, *for more information.*

Perform the following steps to configure the **Shut Down Server** action for an event:

1. In the "Event Actions" dialog box, highlight the event from the **Events** list.

2. Mark the check-box for the **Shut Down Server** action.

   Note:
   By default, the **Shut Down Server** *action is enabled for all events with a severity code of 3. See* Events with Their ID Codes, Severity, and UPS Support in Appendix A *for information about severity levels.*

3. Click **Options...** for the **Shut Down Server** action to open the "Shutdown Server" dialog box.
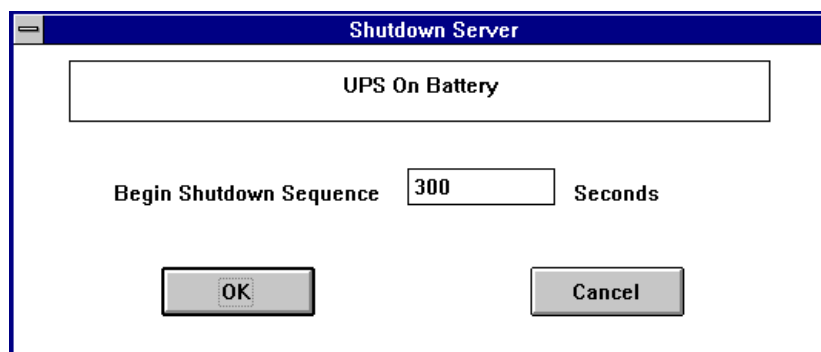
4. Use the **Begin Shutdown Sequence** field to define how long PowerChute *plus* waits before starting a shutdown.

    The default is 300 seconds for the **UPS On Battery** event, 60 seconds for the **System Shutdown Starting** event itself, and 30 seconds for all other events.

    PowerChute *plus* begins the shutdown *only* when the event lasts for the defined wait period. For example, for a setting of 10, PowerChute *plus* does not begin the shutdown if the event lasts less than 10 seconds.

    Note that for the **System Shutdown Starting** *event, you cannot set the value for this field to be greater than the* UPS Low Battery Signal Time *parameter. This ensures that PowerChute plus will shut down the system while the UPS can still support the attached load during the shutdown.*

    Caution:
    Do not change the values in the **Begin Shutdown Sequence** *field for the* Low Battery Condition *or* System Shutdown Starting *event unless you understand how these delays interact with other shutdown parameters. See* Chapter 9, How to Configure System Shutdown and Restart *for more information.*

5. Click **OK** to save your changes and exit the dialog box.

The **Shut Down Server** action initiates the **System Shutdown Starting** event only if the condition that caused the event lasts for the number of seconds specified for the **Shut Down Server** delay value. However, when a shutdown begins, you cannot stop it.

How to Set Up Event Users

You can use e-mail, paging, or broadcast messages to notify users that an event has occurred. Use the "Event Actions Users" dialog box to specify which users to notify.

You can open the "Event Users" dialog box in either of the following ways:

- Select the **Event Users...** option on the **Configuration** menu.

- Click **Edit Users...** in one of these dialog boxes:

  - Notify Administrators (See **How to Notify Administrators**.)

  - Notify Users (See **How to Notify Users**.)

  - Send E-Mail (See **How to Send E-Mail**.)

  - Page (See **How to Page Users**.)

Note:
Use the "Event Users" dialog box only to configure individual users. To notify all network users, see **How to Notify Users***.*

The following table describes how to use the "Event Users" dialog box.

To Do This Task	Perform These Actions
Add a user to the list.	1. Type the new user name in the data entry box at the top right. 2. Click **Add**.
Change a listed user name.	1. In the list box at the top left, select the user. 2. In the data entry box at the top right, edit or replace the name. 3. Click **Rename**.
Delete a user from the list.	1. In the list box at the top left, select the user. 2. Click **Delete**.
Enable PowerChute *plus* to send broadcast messages to a selected user.	1. In the list box at the top left, select the user. 2. Select **Messaging**. (Mark the **Messaging Enabled** box.) 3. Use **Notification Address** to specify the selected user's network address.
Enable PowerChute *plus* to page a selected user.	1. In the list box at the top left, select the user. 2. Select **Paging**. (Mark the **Paging Enabled** box.) 3. Enter the **Access Number** (telephone number) for the paging service. 4. Enter the **Access Code** for the selected user's pager. 5. Select the **Pager Service**. (Click **Edit Services...** to use the "Pager Services" dialog box to add or change a paging service. See **How to Use the "Pager Services" Dialog Box**.)
Enable PowerChute *plus* to send e-mail to a selected user.	1. In the list box at the left, select the user. 2. Select **E-Mail**. (Mark the **E-Mail Enabled** box.) 3. Enter the **E-Mail Address** for the selected user.
Save changes.	Click **OK** to exit the dialog box.
Cancel changes.	Click **Cancel** to exit the dialog box.

How to Use the "Pager Services" Dialog Box

The "Pager Services" dialog box enables you to add and edit services that provide electronic paging. You can access this dialog box only through the "Event Users" dialog box. See **How to Set Up Event Users**.

The paging feature uses a modem to send information to numeric pagers only. (PowerChute *plus* cannot receive information from a pager.)

Note:
To use the paging feature on UNIX platforms, you must have UUCP installed and running on all computers running PowerChute plus for UNIX.
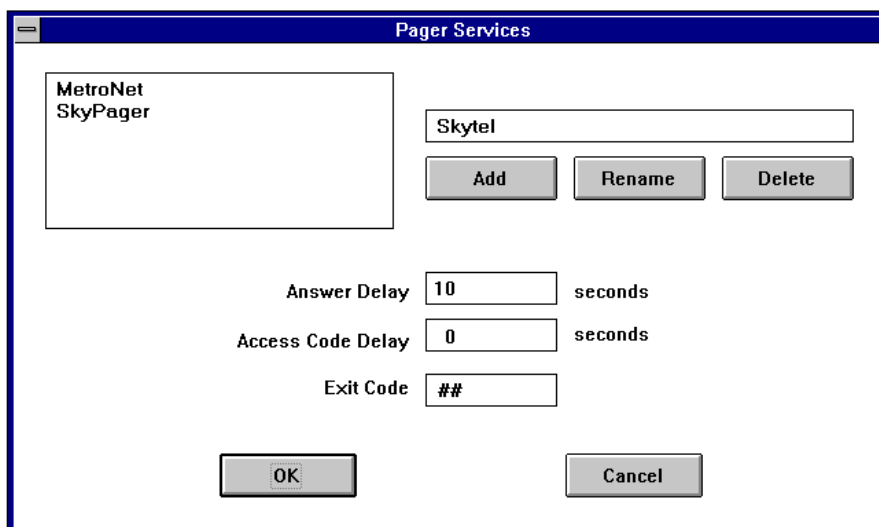
The following table explains how to use the dialog box. See also **How to Page Users**.

To Do This Task	Perform These Actions
Change delay or exit code parameters for a service.	Type in new values for any or all of the following: • **Answer Delay**, the time PowerChute *plus* waits to give the receiving unit enough time to respond to the page. • **Access Code Delay**, the time PowerChute *plus* waits after sending the access code until it sends the message. • **Exit Code**, a code that allows the modem and pager to disengage properly.
Add a service	1. Type the new service name in the text box at the upper right. A service name cannot be the same as an existing user name. 2. Click **Add**. 3. Use the other fields in the dialog box to define the service's **Answer Delay**, **Access Code Delay**, and **Exit Code** values.

To Do This Task	Perform These Actions
Change a listed service's name	1. Select the listed service. 2. Type the new service name in the text box at the upper right. 3. Click **Rename**. 4. Use the other fields in the dialog box to define new values for **Answer Delay**, **Access Code Delay**, and **Exit Code**, if needed.
Delete a service	1. Select the listed service. 2. Click **Delete**.

Chapter 6: System Monitoring and Shutdown

This chapter describes the PowerChute *plus* **System** menu options, with which you select a server to monitor, perform or schedule shutdown, and exit PowerChute *plus*.

System	Logging	Configuration	Diagnostics	Help
Monitor Different Server...				
Schedule Server Shutdown...				
Shutdown Server Now...				
Exit				
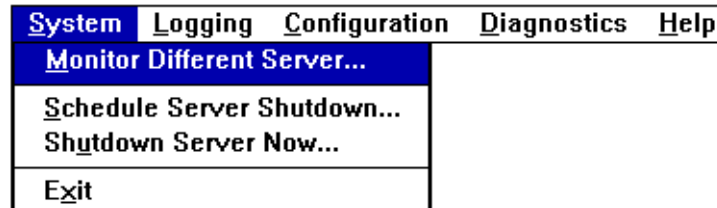
Selecting the **Exit** option from the **System** menu closes the PowerChute *plus* User Interface Module. The background program, UPS Monitoring Module, continues to monitor the UPS and log data.

The other options are described in the following sections:

- **Monitor Different Server...**

- **Schedule Server Shutdown...**

- **Shut Down Server Now...**

Monitor Different Server...

If you have a workstation that is not part of a network, the **Monitor Different Server...** option is dimmed and unavailable to you.

Note:
On UNIX systems, TCP/IP must be installed for client workstations to monitor servers. On PC-based UNIX systems, if no network card is present, you will be able to monitor only the local system.

If your workstation is part of a network and you have the necessary authorization, perform the following steps to monitor an APC UPS connected to another server.

1. Choose **Monitor Different Server...** from the **System menu** to display the Monitor Server dialog box:

> **Monitor Server**
>
> NETCOMP1 (Smart-UPS 600 On Line)
> NETCOMP2 (Smart-UPS 900 On Line)
> SERVER3 (Smart-UPS 1250 On Line)
>
> [OK]   [Cancel]
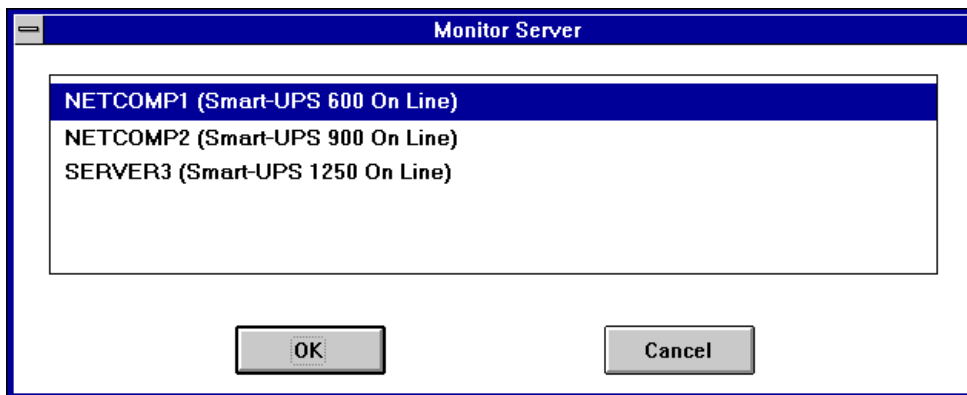
2. Select a server from the list of servers. The list displays servers on the same UNIX subnetwork as the machine on which you are logged in.

3. Click **OK**.

4. Type the password for the **pwrchute** user account, and choose **OK**. (The password was assigned by the person who installed PowerChute *plus*.)

   Note
   Passwords are case-sensitive.

Schedule Server Shutdown...

You can configure PowerChute *plus* to shut down your server periodically. From the **System** menu, choose **Schedule Server Shutdown...** to display the dialog box:

The dialog box has two main areas:

- Use **Daily Shutdown Parameters** to schedule or disable daily shutdowns.

- Use **Weekly Shutdown Parameters** to schedule or disable weekly shutdowns.

Weekly shutdown parameters always take precedence over daily shutdown parameters.

For example, if you configure daily shutdown for 5:30 P.M. and weekly shutdown for Friday at 5:00 P.M., your system shuts down at 5:00 P.M. on Friday and at 5:30 P.M. on every other day.

To schedule a shutdown, perform the following steps:

1. Mark the check-box for **Daily Shutdown** or **Weekly Shutdown**.

2. Enter a shutdown time and reboot time for the type of shutdown you selected, and select AM or PM.

3. If you enabled **Weekly Shutdown**, choose a day for shutdown and a day for reboot from the drop-down list boxes.

4. Specify a value in the **Shutdown Delay** field to set the time period between the first shutdown warning message and the beginning of the shutdown.

5. Specify a value in the **UPS Turn Off Delay** list box to set the time period the UPS waits after server shutdown before going into sleep mode. (In sleep mode, the UPS conserves energy by turning off its power outlets and no longer supplies power to connected equipment).

6. Click **OK** to save the new values or **Cancel** to exit without saving any changes.

Note:

*During the shutdown delay before a scheduled shutdown begins, you can cancel the shutdown by using the **Cancel Server Shutdown** option of the **System** menu. This menu option is available only when a shutdown is about to begin.*

Shut Down Server Now...

The **Shut Down Server Now...** option enables you to shut down your server immediately. This option does not put your UPS into "sleep mode." To restore power to your system, you must turn on the UPS manually.

Choosing **Shut Down Server Now...** from the **System menu** displays the following warning box.

```
┌─────────────────────────────────────────┐
│ ▭          *** WARNING ***               │
├─────────────────────────────────────────┤
│                                          │
│        This function will shutdown        │
│                                          │
│              NETCOMP1                     │
│                                          │
│        and then turn off the UPS.         │
│                                          │
│                                          │
│    Afterwards you will need to manually turn │
│                                          │
│    the UPS back on to restore power to the │
│                                          │
│    system.                               │
│                                          │
│   ┌────────┐      ┌──────────────────┐   │
│   │   OK   │      │  Cancel Shutdown │   │
│   └────────┘      └──────────────────┘   │
└─────────────────────────────────────────┘
```
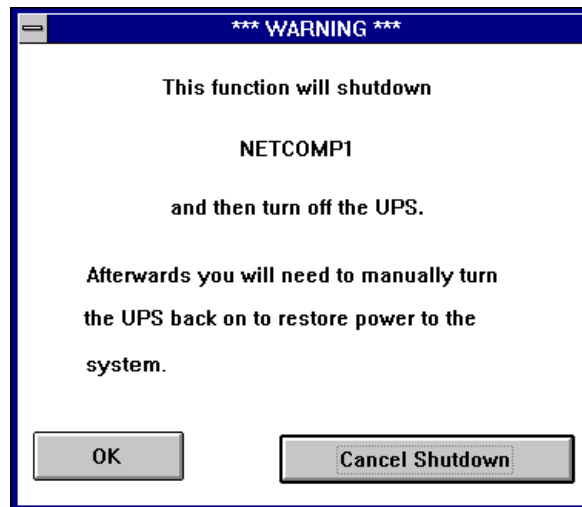
To shut down the server or workstation named in the warning message, perform the following steps:

1. Click **OK** to display the "Shut Down Server" dialog box (or cancel the shutdown before it starts by clicking on the **Cancel Shutdown** button.)

```
┌─────────────────────────────────────────┐
│ ▭           Shut Down Server             │
├─────────────────────────────────────────┤
│                                          │
│  Shutdown Delay  ┌──────┐                │
│                  │ 900  │    seconds      │
│                  └──────┘                │
│                                          │
│  UPS Turn Off Delay ┌──────┬──┐          │
│                     │ 180  │ ± │ seconds  │
│                     └──────┴──┘          │
│                                          │
│   ┌────────┐      ┌──────────────────┐   │
│   │   OK   │      │  Cancel Shutdown │   │
│   └────────┘      └──────────────────┘   │
└─────────────────────────────────────────┘
```
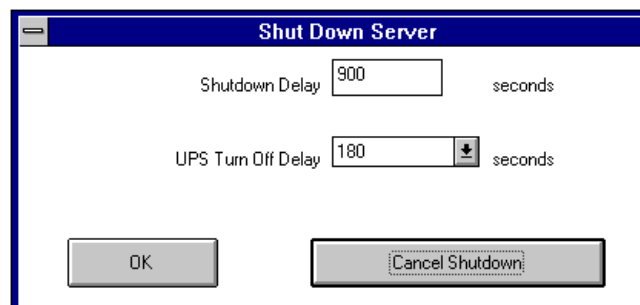
2. In the **Shutdown Delay** field, enter the time period PowerChute *plus* will wait before generating the **System Shutdown Starting** event. The default is 900 seconds (15 minutes). This shutdown delay provides time for notification messages to be sent to users.

Note:
This shutdown delay is not the shutdown delay configured for the **System Shutdown Starting** *event itself, a delay that allows time for shutdown-related activities such as the running of a command file.*

3. Choose a value for **UPS Turn Off Delay** from the drop-down box.This is the time that PowerChute *plus* waits after sending a shutdown instruction before turning off power to attached equipment.

Note:
Changing the **UPS Turn Off Delay** *here also changes it in the "UPS Shutdown Parameters" dialog box.*

Caution:
Increasing the UPS Turn Off Delay without considering other configured delay periods could cause PowerChute plus to use all available run time without fully shutting down your system. See *Chapter 9, How to Configure System Shutdown and Restart* **for information on configuring delay periods.**

4. Click **OK** to proceed with the shutdown, or click **Cancel Shutdown** to cancel the shutdown.

   If you click **OK**, the **Shut Down Server Now...** option changes to **Cancel Server Shutdown**, providing another opportunity to cancel the shutdown while the operating system is still running.

Chapter 7: How to Log Events and Data

This chapter describes the options on the **Logging** menu.

System	Logging	Configuration	Diagnostics	Help
	Open Event Log...			
	Open Data Log...			
	Log Options...			
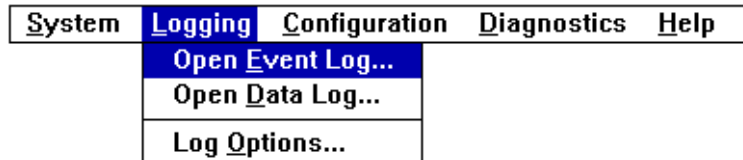
These menu options allow you to view a record of FlexEvents that occurred and data that was received from the UPS and from a Measure-UPS. You can also enable or disable either type of logging and specify the maximum sizes of the log files.

The menu options are discussed in the following sections, beginning with **Log Options...** as an introduction to how to use log files.

- **Log Options...**

- **Open Event Log...**

- **Open Data Log...** (not available for Back-UPS)

Log Options...

Selecting **Log Options...** from the **Logging** menu displays the "Log Options" dialog box, in which you can set the parameters for how PowerChute *plus* logs event text and UPS data. You can also open the dialog box by clicking **Options...** in either the "Event Log" or "Data Log" dialog box.

Overview of the Event and Data Logs discusses the log files.

Configuring the Event and Data Logs shows the "Log Options" dialog box and explains the parameters.

Overview of the Event and Data Logs

The **Event Log** records event text for FlexEvents related to the UPS, Measure-UPS, or PowerChute *plus.* For example, PowerChute *plus* logs the text for the **UPS on Battery** event when the UPS switches to battery operation. All events are logged by default. For more information on FlexEvents, see **Appendix A, FlexEvents Reference**.

The **Data Log** records information about the state of the UPS, Measure-UPS, and AC power source (for example, minimum input voltage). PowerChute *plus* polls the UPS for data at a frequent time interval (every 4 seconds by default) and records the data at a time interval that you specify.

The following table compares how information is recorded in the Event Log and the Data Log:

Event Log	Data Log
Records event text only when an event happens	Records data during a specified time interval.
You can configure what to record	You *cannot* configure what to record

Note:
*In the **Last Two Events** window on the Main Screen, PowerChute plus displays the event text of the two most recent events logged.*

Configuring the Event and Data Logs

Choose **Log Options...** from the **Logging** menu to display the "Log Options" dialog box.

Use the fields in the **Event Log Configuration** area of the dialog box to configure the logging of events.

- Event logging is `enabled` by default. (To disable the logging of all events, unmark the **Enable Event Logging** check-box).

- In the **Event Log Filename** field, enter the path and file name for the PowerChute *plus* event log file. The default file name is **powerchute.log**. The default location is your PowerChute *plus* directory

- Enter the **Log File Maximum Length** value in bytes. (The default is `50,000` bytes.)

    For Linux platforms, the field will not accept any value greater than 750,000 bytes.

Use the fields in the **Data Log Configuration** area of the dialog box to configure the logging of data.

- Data logging is `enabled` by default. (To disable all data logging, unmark the **Enable Data Logging** check-box).

- In the **Data Log Filename** field, enter the path and file name for the PowerChute *plus* data file. The default file name is **powerchute.dat**. The default location is your PowerChute *plus* directory.

- Enter the **Log File Maximum Length** value in bytes. The default is `50,000` bytes, which is large enough to hold approximately a week of data recorded at 10 minute intervals.

    For Linux platforms, the field will not accept any value greater than 750,000 bytes.

- Enter the **Data Recording Interval** value in seconds. (The default is 600 seconds, and the minimum allowed value is 5 seconds). The value in this field controls how quickly the data log fills. The data log file usually fills much more quickly than the event log file, which receives new entries only when events are generated.

Click **OK** to save your changes and close the dialog box.

When a log files reaches its maximum length, PowerChute *plus* deletes the first one-third of the file (containing the older event text or data) and continues logging.

Turning off Event and Data Logging

To disable (turn off) event logging, unmark the **Enable Event Logging** check-box in the "Log Options" dialog box as described in **Log Options...**.

If you disable event logging, PowerChute *plus* stops logging events, including those for which the **Log Event** action is configured. To disable logging of individual events, see **Event Actions... in Chapter 4**.

To disable (turn off) data logging, uncheck the **Enable Data Logging** check box in the "Log Options" dialog box as described in **Log Options...**.

Open Event Log...

To view the event log, choose the **Open Event Log...** option from the **Logging** menu. To view portions of the log not initially displayed, use the scroll bar.

	Event Log

Date	Time	Event
04/04/99	11:33:31	Communication established
04/04/99	11:33:32	Below humidity threshold of 20.00
04/04/99	12:09:51	Communication established
04/04/99	12:25:43	Ambient humidity back within thresholds
04/04/99	12:29:06	Below lower ambient temperature threshold of 80.00
04/04/99	12:32:07	User initiated UPS self-test passed
04/04/99	12:32:18	Below humidity threshold of 20.00
04/04/99	12:32:34	Ambient temperature back within thresholds
04/04/99	12:33:00	User initiated UPS self-test passed
04/04/99	12:33:20	User initiated UPS self-test passed
04/04/99	12:34:42	UPS unable to perform run time calibration: Capacity < 100
04/04/99	12:35:12	UPS run time calibration initiated
04/04/99	12:36:05	UPS run time calibration cancelled by user
04/04/99	12:36:47	UPS on battery: Simulated power failure
04/04/99	12:36:49	Normal power restored: UPS on line
04/04/99	13:06:51	User initiated UPS self-test passed
04/04/99	13:06:52	UPS unable to perform run time calibration: Capacity < 100
04/04/99	14:06:07	UPS run time calibration initiated
04/04/99	14:06:12	UPS run time calibration cancelled by user
04/04/99	14:06:12	Below humidity threshold of 20.00
04/04/99	14:06:13	Ambient temperature back within thresholds
04/04/99	14:06:47	User initiated UPS self-test passed
04/04/99	14:07:49	User initiated UPS self-test passed

Erase...   Done   Options...

The event log contains the date, time, and event text of each event that occurred.

Use the buttons in the dialog box as follows:

Button	Function
Options...	To display the "Log Options" dialog box as described in **Log Options...**
Erase...	To delete the contents of the event log
Done	To return to the Main Screen

You can use one of the following alternative methods to view the event log:

- Double-click on the **Last Two Events** window on the PowerChute *plus* Main Screen.

- Use any ASCII text editor to open the file.

- Use the UNIX more command in the following form.

        more powerchute.log <Enter>
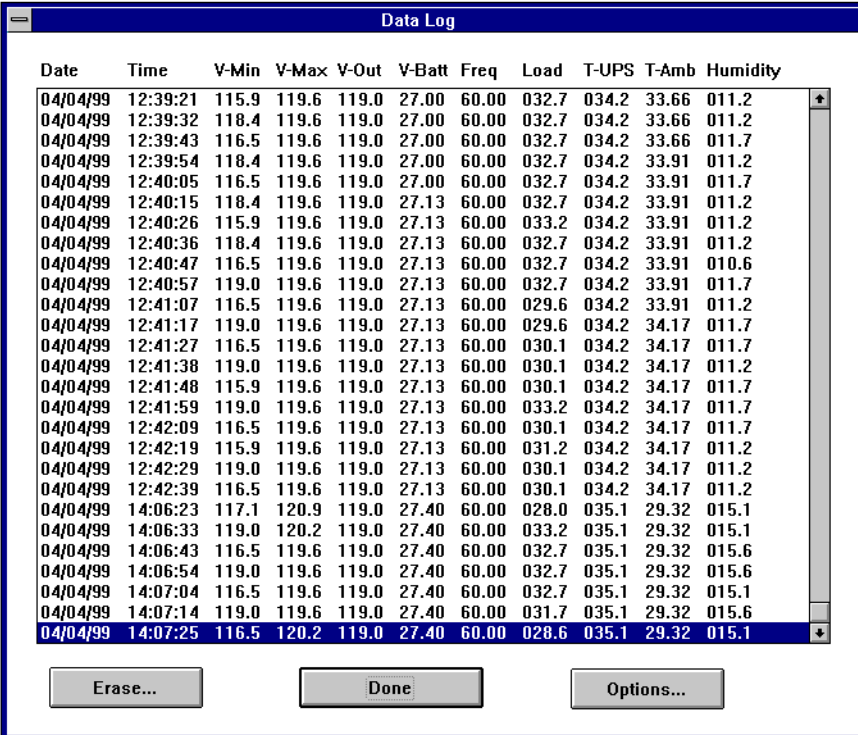
For more information on event logging see the following:

- **Overview of the Event and Data Logs**

- **Configuring the Event and Data Logs**

- **Turning off Event and Data Logging**

Open Data Log...

To view the data log, choose the **Open Data Log...** option from the Logging menu. To view portions of the log not initially displayed in the dialog box, use the right-hand scroll bar.

The **Open Data Log...** option is not available with Back-UPS.

Data Log

Date	Time	V-Min	V-Max	V-Out	V-Batt	Freq	Load	T-UPS	T-Amb	Humidity
04/04/99	12:39:21	115.9	119.6	119.0	27.00	60.00	032.7	034.2	33.66	011.2
04/04/99	12:39:32	118.4	119.6	119.0	27.00	60.00	032.7	034.2	33.66	011.2
04/04/99	12:39:43	116.5	119.6	119.0	27.00	60.00	032.7	034.2	33.66	011.7
04/04/99	12:39:54	118.4	119.6	119.0	27.00	60.00	032.7	034.2	33.91	011.2
04/04/99	12:40:05	116.5	119.6	119.0	27.00	60.00	032.7	034.2	33.91	011.7
04/04/99	12:40:15	118.4	119.6	119.0	27.13	60.00	032.7	034.2	33.91	011.2
04/04/99	12:40:26	115.9	119.6	119.0	27.13	60.00	033.2	034.2	33.91	011.2
04/04/99	12:40:36	118.4	119.6	119.0	27.13	60.00	032.7	034.2	33.91	011.2
04/04/99	12:40:47	116.5	119.6	119.0	27.13	60.00	032.7	034.2	33.91	010.6
04/04/99	12:40:57	119.0	119.6	119.0	27.13	60.00	032.7	034.2	33.91	011.7
04/04/99	12:41:07	116.5	119.6	119.0	27.13	60.00	029.6	034.2	33.91	011.2
04/04/99	12:41:17	119.0	119.6	119.0	27.13	60.00	029.6	034.2	34.17	011.7
04/04/99	12:41:27	116.5	119.6	119.0	27.13	60.00	030.1	034.2	34.17	011.7
04/04/99	12:41:38	119.0	119.6	119.0	27.13	60.00	030.1	034.2	34.17	011.7
04/04/99	12:41:48	115.9	119.6	119.0	27.13	60.00	030.1	034.2	34.17	011.7
04/04/99	12:41:59	119.0	119.6	119.0	27.13	60.00	033.2	034.2	34.17	011.7
04/04/99	12:42:09	116.5	119.6	119.0	27.13	60.00	030.1	034.2	34.17	011.7
04/04/99	12:42:19	115.9	119.6	119.0	27.13	60.00	031.2	034.2	34.17	011.2
04/04/99	12:42:29	119.0	119.6	119.0	27.13	60.00	030.1	034.2	34.17	011.2
04/04/99	12:42:39	116.5	119.6	119.0	27.13	60.00	030.1	034.2	34.17	011.2
04/04/99	14:06:23	117.1	120.9	119.0	27.40	60.00	028.0	035.1	29.32	015.1
04/04/99	14:06:33	119.0	120.2	119.0	27.40	60.00	033.2	035.1	29.32	015.1
04/04/99	14:06:43	116.5	119.6	119.0	27.40	60.00	032.7	035.1	29.32	015.6
04/04/99	14:06:54	119.0	119.6	119.0	27.40	60.00	032.7	035.1	29.32	015.6
04/04/99	14:07:04	116.5	119.6	119.0	27.40	60.00	032.7	035.1	29.32	015.1
04/04/99	14:07:14	119.0	119.6	119.0	27.40	60.00	031.7	035.1	29.32	015.6
04/04/99	14:07:25	116.5	120.2	119.0	27.40	60.00	028.6	035.1	29.32	015.1

Erase...	Done	Options...

For information on the meaning of the column headings in the "Data Log" dialog box, see the following table.

Column	Content
Date	The date of the event (month, day, and year) in *MM/DD/YY* format.
Time	The time at which the event occurred, in 24 hour format (*HH:MM:SS*)

Column	Content
V-Min	Minimum voltage, in volts (AC), recorded during the recording interval
V-Max	Maximum voltage, in volts (AC), recorded during the recording interval
V-Out	Output voltage, in volts (AC), that the UPS is supplying to attached equipment
V-Batt	UPS battery voltage in volts (DC)
Freq	UPS output frequency in Hertz
Load	Percentage of the UPS rated load that attached equipment used during the recording interval.
T-UPS	UPS internal temperature in Celsius. The internal temperature of the UPS. • Typical temperature with a charged battery is approximately 40° C (104° F). • When the battery is charging heavily, the temperature can be as high as 50° C (122°F). • At the end of a heavy load discharge, the temperature can be as high as 65°C (149°F). • A temperature over 75°C (167°F) indicates a failed fan, blocked ventilation, or other malfunction.
T-Amb	Ambient environmental temperature in Celsius. (If you are not using a Measure-UPS, the data log omits **T-Amb** data.).
Humidity	Relative humidity, which is the recorded humidity as a percentage of total humidity. (If you are not using a Measure-UPS, the data log omits **Humidity** data.

Use the buttons in the dialog box as follows:

Button	Function
Options...	To display the "Log Options" dialog box as described in **Log Options...**
Erase...	To delete the contents of the data log
Done	To return to the Main Screen

For more information about data logging, see the following:

- **Overview of the Event and Data Logs**

- **Configuring the Event and Data Logs**

- **Alternative Ways to View the Data Log**

- **Turning off Event and Data Logging**

- **How to Graph the Data Log**

Alternative Ways to View the Data Log

Instead of using the **Open Data Log...** option, you can use one of the following methods to view the data log.

- Use any ASCII text editor to open the file.

- Use the UNIX more command in the following form.

    more powerchute.dat <Enter>

When you use one of these methods, the records are displayed similar to the following:

    04/04/99,11:45:00,119.0,120.2,119.6,27.40,60.00,033.2,033.7,28.81,014.5
    04/04/99,11:46:00,119.0,120.2,119.0,27.40,60.00,033.2,033.7,28.81,015.1

The data items in each record are separated by commas and are in the same order as the columns in the "Data Log" dialog box. See **Open Data Log...** for information on the column names and their explanations.

If you do not have a Measure-UPS on your system, the last two fields in each record are blank, as in the following example.

    04/04/99,11:48:00,119.0,120.2,119.0,27.40,60.00,032.7,033.7,   ,

How to Graph the Data Log

You can use a spreadsheet application such as Microsoft Excel to graph the data log to analyze the power quality for a site. In the application's documentation, use the instructions for graphing comma-delimited data.

Chapter 8: How to Perform UPS Diagnostics

This chapter describes the options available through the **Diagnostics** menu of the PowerChute *plus* Main Screen, which enable you to test any APC UPS and perform maintenance of a Matrix-UPS or Symmetra *Power Array*.

System	Logging	Configuration	Diagnostics	Help
			Schedule UPS Tests...	
			Initiate UPS Self Test	
			Initiate Run Time Calibration	
			Simulate Power Failure	
			Test UPS Alarm	
			Put UPS on Bypass	
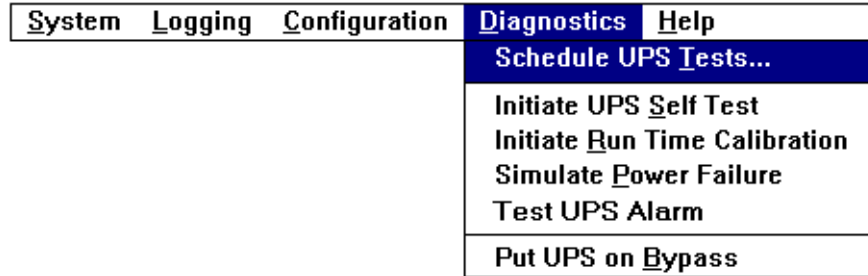
See the following sections for more information:

- **Schedule UPS Tests...**

- **Initiate UPS Self Test**

- **Initiate Run Time Calibration**

- **Simulate Power Failure**

- **Test UPS Alarm**

- **Put UPS on Bypass**

Schedule UPS Tests...

Use the **Schedule UPS Tests...** option of the **Diagnostics** menu to set when PowerChute *plus* performs UPS self-tests or runtime calibrations.

The following sections discuss the two areas of this dialog box:

- **Self Test Period**

- **UPS Run Time Calibration**.

Self Test Period

In the **Self Test Period** area of the "Schedule UPS Tests" dialog box, you can disable UPS self-tests or set when they occur. APC recommends periodic self-tests to ensure that the UPS is working correctly.

Button	Function
Off	Turns off automatic self-tests
At Turn On	Schedules a self-test only when the UPS turns on
Daily	Schedules a daily self-test. Below **Daily**, specify the time of the test. Enter the hour in the first box and the minute in the second box, and select **AM** or **PM**.
Weekly	Schedules a weekly self test schedule. Below **Weekly**, specify the day and time for the test to occur. Select the day in the drop-down list box, enter the hour in the second box, enter the minute in the third box., and select **AM** or **PM**.

UPS Run Time Calibration

A UPS runtime calibration calculates the battery runtime available to support the current UPS load over time.

Choose the **Schedule UPS Tests...** option of the **Diagnostics** menu to displays a dialog box that enables you to schedule automatic calibrations.

Note:
A runtime calibration is lengthy, deeply discharges the UPS battery, and temporarily reduces runtime until the UPS battery recharges. Battery capacity must be at 100%. to begin a calibration.

In the **UPS Run Time Calibration** area of the "Schedule UPS Tests" dialog box, select from two radio buttons:

Button	Function
Off	Turns off automatic calibration.
Monthly	Schedules monthly runtime calibrations.
	Below **Monthly**, specify the day and time of the monthly calibration. Select the day in the drop-down list box, enter the hour in the second box, enter the minute in the third box, and select **AM** or **PM**.
	PowerChute *plus* performs the scheduled runtime calibration each month on the first occurrence of the day you select. For example, if you choose Monday, a runtime calibration starts on the first Monday of each month at the time you specify.

To ensure that the UPS has sufficient battery runtime to protect your system, APC recommends scheduling a runtime calibration once every month.

Initiate UPS Self Test

Use the **Initiate UPS Self Test** option of the **Diagnostics** menu to switch the UPS briefly to battery power and perform internal diagnostics to test the UPS.
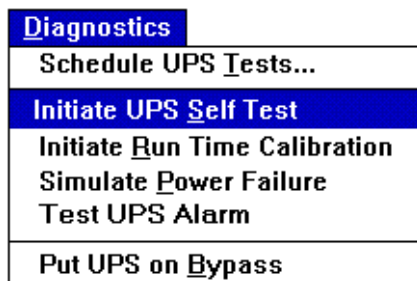
During a self-test, the **Status** field on the Main Screen displays Self Test.

Below the **Status** field, PowerChute *plus* displays the result of the self-test. See **Self-Test and Battery Information Window in Chapter 3**.

Note:
You can use this menu option to perform an immediate UPS self-test even if you turned off scheduled self-tests in the "Schedule UPS Tests" dialog box. See Self Test Period

Initiate Run Time Calibration

Use the **Initiate Run Time Calibration** option of the **Diagnostics** menu to initiate a UPS runtime calibration, which determines the UPS battery runtime available to support the current UPS load over time.

A runtime calibration is lengthy, deeply discharges the UPS battery, and temporarily reduces UPS runtime until the battery recharges. Battery capacity must be at 100% to perform a runtime calibration. During the calibration, the battery capacity shown on the Battery Capacity bar graph on the Main Screen decreases.

After you select the **Initiate Run Time Calibration** option, the menu option changes to **Cancel Run Time Calibration**, enabling you to cancel the calibration.

Note:
You can use this menu option to perform an immediate UPS runtime calibration even if you turned off scheduled runtime calibrations in the "Schedule UPS Tests" dialog box. See **Self Test Period**

During a runtime calibration, the **Status** field on the Main Screen displays `Calibrating`.

See **Appendix A, FlexEvents Reference** for descriptions and message text for the following three events associated with calibration:

- **UPS Run Time Calibration Initiated**

- **UPS Run Time Calibration Completed**

- **Cancel Battery Calibration**

Simulate Power Failure

Use the **Simulate Power Failure** option of the **Diagnostics** menu to switch the UPS briefly to battery power, testing the UPS's capability to perform such a switch if utility power fails.

When the UPS switches to battery power, PowerChute *plus* generates the **UPS On Battery** event and issues the message `UPS on Battery: Simulated Power Failure`.

When the UPS resumes non-battery operation, PowerChute *plus* generates the **Power Restored** event.

Test UPS Alarm

Use the **Test UPS Alarm** option of the **Diagnostics** menu to cause the UPS to light its front panel lights briefly and emit a beep.
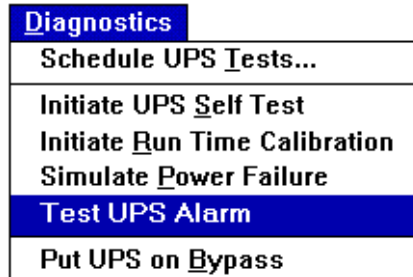
Use this test to ensure that PowerChute *plus* is communicating with the UPS or to locate the UPS in a crowded machine room. Performing an alarm test generates no events.

If you are monitoring a Symmetra *Power Array*, this option is disable because a Symmetra *Power Array* has no alarm.

Put UPS on Bypass

Use the **Put UPS on Bypass** option of the **Diagnostics** menu to put a Symmetra *Power Array* or Matrix-UPS into bypass mode so that you can perform maintenance. In bypass mode, the UPS functions only as a voltage conditioner and provides protection from power surges but not power sags, brownouts, or blackouts.
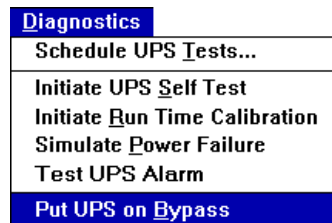
After you select it, the menu option changes to **Take UPS off Bypass** so that you can return the Symmetra *Power Array* or Matrix-UPS to normal operation when you complete the maintenance.

If your Symmetra *Power Array* is running with a main intelligence module only or with a redundant intelligence module only, you can use PowerChute *plus* to put your UPS in Bypass Mode to replace that part while briefly relying on utility power only. (If your Symmetra *Power Array* is running with both a main intelligence module and a redundant intelligence module, you can replace either part while the UPS continues to support the attached equipment.)

Caution:
To support its equipment load in bypass mode that you initiate through PowerChute plus, a Symmetra Power Array must have either a functioning main intelligence module or a functioning redundant intelligence module. Only if you use the manual switch to put a Symmetra Power Array into bypass mode can you safely remove both the main intelligence module and redundant intelligence module at the same time for maintenance.

Chapter 9: How to Configure System Shutdown and Restart

This chapter provides the following information:

- How to configure the events that enable the UPS to provide battery power while PowerChute *plus* shuts down the operating system, workstations, and server computers

- How to make sure that the total of all cumulative delay periods does not exceed the remaining UPS runtime so that PowerChute *plus* can complete an orderly shutdown

- How to configure the "Wakeup" delays that control when your system restarts after a system shutdown

This chapter also provides two examples of how PowerChute *plus* shuts down a computer system.

These topics are:

- **Configuring Shutdown and Wakeup Delays**

- **Case 1: Power Failure with Enough UPS Runtime Remaining**

- **Case 2: Power Failure with UPS Run Time = Low Battery Signal Time**

Note:
*This chapter assumes you have already read **Chapter 5, How to Configure FlexEvents**, and **Chapter 4, How to Configure PowerChute plus**.*

Configuring Shutdown and Wakeup Delays

In an extended power failure, PowerChute *plus* takes actions that shut down the operating system before UPS battery runtime is depleted. The shutdown and restart process, including the configurable delay periods, is as follows:

Situation	Response	Configuration
A power failure occurs.	PowerChute *plus* does the following: 1. Generates the **UPS On Battery** event. 2. Pauses for a delay time specified for the **UPS On Battery** event. The default delay is 300 seconds (5 minutes).The delay allows time for PowerChute *plus* to notify users about the impending shutdown and to cancel the shutdown if power returns during the delay.	Use the **Event Actions...** option of the **Configuration** menu, and select the **UPS on Battery** event. • Use the **Shut Down Server** action to configure the delay time. • Use the **Notify Users** action to configure notification of users. See **How to Configure Actions in Chapter 5**.

Situation	Response	Configuration
The delay time for the **UPS On Battery** event expires.	PowerChute *plus* does the following: 1. Generates the **System Shutdown Starting** event The system shuts down after this event is generated even if power returns. 2. Pauses for the delay time specified for the **System Shutdown Starting** event. (30 seconds by default). 3. Generates the **System Shutdown Complete** event and permits no further processing.	Use the **Event Actions...** option of the **Configuration** menu; then configure the **Shut Down Server** action for the **System Shutdown Starting** event.
The delay time for the **System Shutdown Starting** event expires.	1. PowerChute *plus* generates the **System Shutdown Complete** event and permits no further processing. 2. The UPS waits the time configured for the **UPS Turn Off Delay** parameter[a] 3. Any APC UPSs except Back-UPS turns off its outlets and waits in sleep mode for power to return. Back-UPS turns off	No actions can be configured for the **System Shutdown Complete** event except to log it. Use the **UPS Shutdown Parameters...** option of the **Configuration** menu to configure the **UPS Turn Off Delay**. (See **UPS Shutdown Parameters... in Chapter 4**.)

a. PowerChute *plus* initiates the **UPS Turn Off Delay** from within the shutdown script. The time needed for the **UPS Turn Off Delay** depends on when the shutdown script initiates the delay. On UNIX platforms where the delay occurs early in the shutdown script, you may need 180 seconds; on others where it occurs near the end of the script, you may need only 20 seconds. A Back-UPS has no **UPS Turn Off Delay**.

For the UPS to provide continuous power from its battery until the **UPS Turn Off Delay** time expires, the following formula must be valid. See the preceding table for information on the terms in the formula. To display the Run Time graph, use the **Monitoring Preferences...** option of the **Configuration** menu.

UPS on Battery delay time	+	System Shutdown Starting delay time	+	UPS Turn Off Delay time	must be less than or equal to	Run Time bar graph time

The following table explains how the different UPS types restart after a shutdown, if **Automatic Reboot** is enabled in the "UPS Shutdown Parameters" dialog box.

Model	Process for Restarting
Matrix-UPS or Symmetra *Power Array*	The UPS waits the time specified as **UPS Wakeup Delay (Time)**, switches on its power outlets, and allows the system to reboot. **UPS Wakeup Delay (Capacity)** is not a supported parameter.
Back-UPS	Sleep mode is not supported with a Back-UPS. You must turn the UPS back on manually
All other APC UPSs	The UPS checks its battery capacity. • If the percentage of battery capacity is greater than or equal to the **UPS Wakeup Delay (Capacity)**, the UPS waits the time specified as **UPS Wakeup Delay (Time)** before switching on its power outlets and booting the system.[a] • If the percentage of battery capacity is less than the **UPS Wakeup Delay (Capacity)**, the UPS waits until battery capacity recharges sufficiently, and then waits the time specified as **UPS Wakeup Delay (Time)** before switching on its power outlets and booting the system

a. See **UPS Shutdown Parameters...** for information on **Wakeup Delay (Time)** and **Wakeup Delay (Capacity)**.

Recommendations for Timing Shutdowns

APC recommends the following procedures to configure delay times accurately and ensure orderly shutdown.

Recommendation	Notes
Perform a runtime calibration monthly to ensure accuracy of the reported runtime. *Note* *For a Back-UPS, you cannot perform runtime calibration*	Perform runtime calibration when the UPS is supporting its usual load. Do not unplug equipment normally plugged into the UPS.
To calculate and configure the time necessary for a shutdown-related command file to run, perform the following steps. 1. Record the time necessary for the command file to execute under normal load conditions. 2. Add the delay time set for the **Run Command File** action to the time you just recorded. 3. Specify this total time as the shutdown delay time for the **System Shutdown Starting** event.	See **Overview of Available Actions for Events in Chapter 5**
If your system is complex, and the **UPS Turn Off Delay** is lower than 180 seconds, check your shutdown script to determine what shutdown-related tasks occur after the delay begins. Then time those tasks during a manual shutdown to determine whether to increase your delay.	See the *Installation Guide: PowerChute plus for UNIX* for the name of the shutdown file (script) that PowerChute *plus* modifies or creates on each supported UNIX platform.

Case 1: Power Failure with Enough UPS Runtime Remaining

This example describes a power failure occurring when the UPS has enough battery run time remaining to shut down the system safely. The example assumes the following delay times are configured:

Event or Parameter	Configuration.	Delay Time
UPS On Battery	In the "Event Actions" dialog box, click **Options...** for the **Shut Down Server** action	**120 seconds (instead of the default value, 300 seconds)** Shutdown begins 120 seconds (2 minutes) after the UPS switches to battery power, unless normal power returns.
System Shutdown Starting	In the "Event Actions" dialog box, click **Options...** for the **Shut Down Server** action.	**60 seconds** This shutdown delay allows time for a user-specified command file to execute.
UPS Turn Off Delay	Select **UPS Shutdown Parameters...** from the **Configuration** menu.	**20 seconds** PowerChute *plus* instructs the UPS to wait this period of time before it turns off power to its outlets. (This cannot be configured for a Back-UPS.)

In addition, the example assumes that other relevant events and parameters are configured as follows:

Event or Parameter	Configuration	Delay Times
UPS on Battery event notification	Use the "Notify Users" dialog box for the **UPS on Battery** event.	Wait 5 seconds before notifying. Notify every 30 seconds
Run Command File (See **How to Run a Command File in Chapter 5**.)	Use the "Run Command File" dialog box for the **System Shutdown Starting** event	Wait 5 seconds before executing
UPS Wakeup Delay (Time) and **UPS Wakeup Delay (Capacity)**	Use the **UPS Shutdown Parameters...** option of the **Configuration** menu.	**UPS Wakeup Delay (Capacity)** is configured as 15%, and the **UPS Wakeup Delay (Time)** is 0.

See **Narrative of the Case 1 Shutdown** for the sequence of events and actions during the shutdown.

Note:
For recommendations concerning the situation described in this section, see **Recommendations for Timing Shutdowns**.

Narrative of the Case 1 Shutdown

Figure 1, Timeline of Shutdown Steps shows a typical shutdown and restart due to utility power failure. Following is an analysis of the timeline of events.

1.   At 0 seconds, power fails and the UPS starts providing battery power. PowerChute *plus* generates the **UPS On Battery** event and begins the 120 seconds of pre-shutdown delay configured for that event.

2. At 5 seconds, PowerChute *plus* broadcasts the first shutdown message to users. At 30 second intervals, PowerChute *plus* broadcasts the message again until the **System Shutdown Starting** event occurs.

3. At 2 minutes, PowerChute *plus* generates the **System Shutdown Starting** event and starts the 60 second delay configured for that event.

4. At 2 minutes 5 seconds, a user-specified command file executes.

5. At 3 minutes (after the command file has run), the following events occur.

   a. PowerChute instructs the operating system to shut down.

   b. PowerChute generates the **System Shutdown Complete** event.

   c. PowerChute *plus* issues the **UPS Turn Off Delay** instruction from within the UNIX shutdown script. During the **UPS Turn Off Delay** period, the operating system completes the remaining portion of the shutdown procedure. Because the **UPS Turn Off Delay** is issued from within the shutdown script, a brief additional delay may occur before the **UPS Turn Off Delay** begins, which briefly delays the turnoff of the UPS

6. The UPS, unless it is a Back-UPS, turns off its outlets and goes into sleep mode.

To complete all the events in the timeline in this example, the UPS must run on battery power for at least 200 seconds (3 minutes and 20 seconds). Therefore, for the UPS to complete the shutdown procedure properly, the UPS runtime shown on the **Run Time** bar graph must be greater than or equal to 200 seconds.

UPS on Battery delay	+	System Shutdown Starting delay	+	UPS Turn Off Delay	must be less than or equal to	Run Time bar graph time
120 seconds	+	60 seconds	+	20 seconds	<=	200 seconds.

UPS on Battery event

1 min.

Notify Users messages:
1st after 5 secs,
then every 30 seconds

System Shutdown Starting event

2 min.

Command file executes after 5 second delay

System Shutdown Complete event

3 min.

Message to UPS to turn off its outlets

UPS Turn Off Delay expires

20 sec

"Sleep" mode

Power restored to UPS

UPS Wakeup Delay (Time) & UPS Wakeup Delay (Capacity)

Computer system reboots
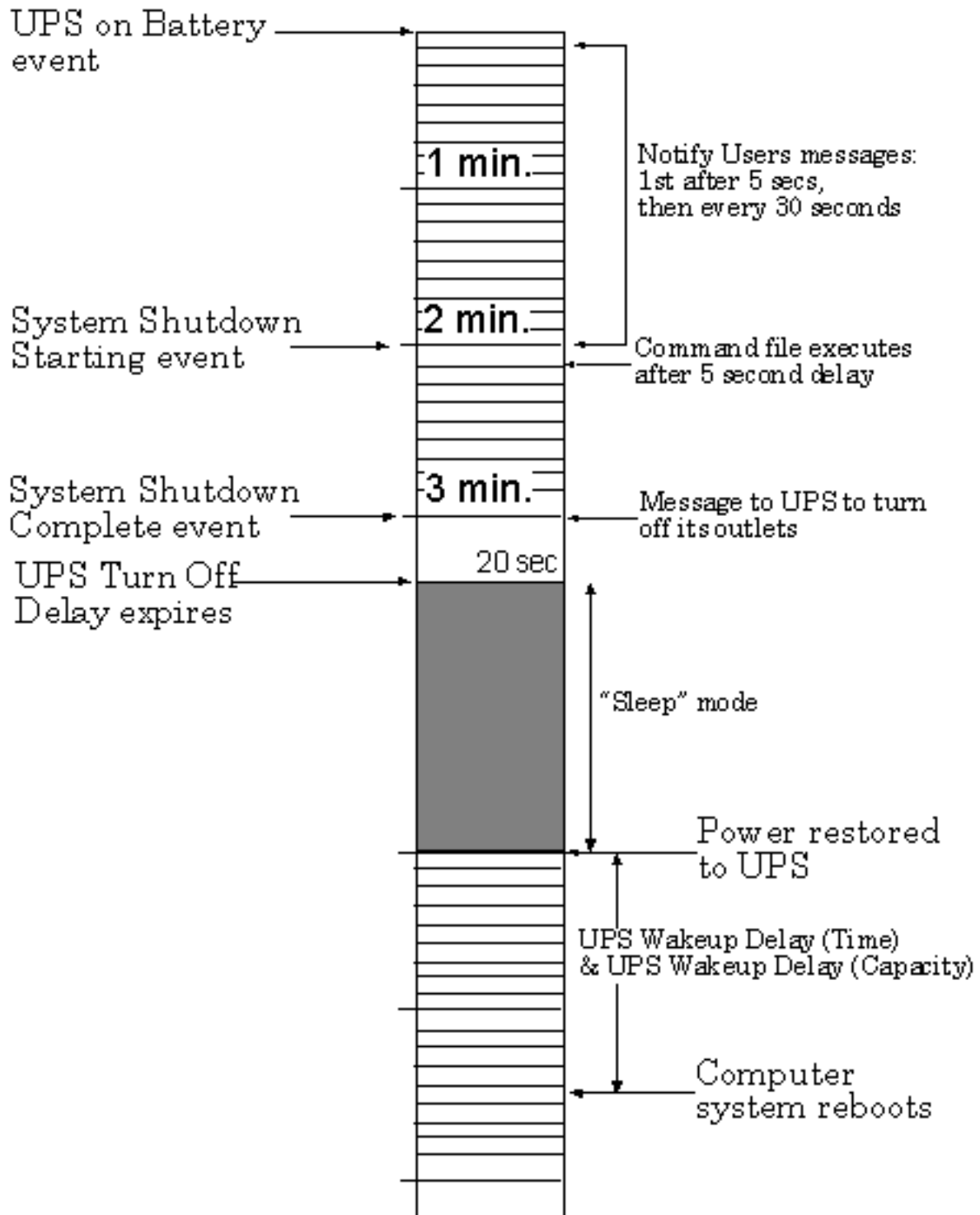
Figure 1: Timeline of Shutdown Steps

Case 2: Power Failure with UPS Run Time = Low Battery Signal Time

When the UPS is supplying battery power to the connected computer system during a power failure, PowerChute *plus* detects when remaining UPS battery runtime equals the **UPS Low Battery Signal Time**. When this occurs, PowerChute generates a **Low Battery Condition** event and begins shutting down the system.

The **UPS Low Battery Signal Time** parameter ensures that PowerChute *plus* will shut down the system while the UPS can still support the attached load during the shutdown. You configure **UPS Low Battery Signal Time** through the **UPS Shutdown Parameters...** option of the **Configuration** menu.

Case 2 assumes the following delay times are configured:

Event or Configurable Delay	Configuration	Delay Time
Low Battery Condition event	In the "Event Actions" dialog box, select the **Low Battery Condition** event, and click **Options...** for the **Shut Down Server** action	**30** seconds Begin shutdown 30 seconds after the Low Battery Condition occurs.
System Shutdown Starting delay	In the "Event Actions" dialog box, select the **System Shutdown Starting** event, and click **Options...** for the **Shut Down Sever** action.	**60** seconds This shutdown delay allows time for a user-specified command file to execute.
UPS Turn Off Delay	Select in **UPS Shutdown Parameters...** on the **Configuration** menu	**20** seconds PowerChute *plus* instructs the UPS to wait this period of time before it turns off power to its outlets. (This cannot be configured for a Back-UPS.)

See **Narrative of the Case 2 Shutdown** for the sequence of events and actions during the shutdown.

Narrative of the Case 2 Shutdown

Following is an analysis of t **Figure 2, Timeline of Shutdown on Low Battery**, which shows the timeline of events that occurs during a power outage when remaining battery run time reaches the **UPS Low Battery Signal Time**.

1. At 0 seconds, PowerChute *plus* detects that the UPS runtime equals the **UPS Low Battery Signal Time**. PowerChute *plus* generates the **Low Battery Condition** event and begins the 30 second shutdown delay configured for that event.

2. At 30 seconds, PowerChute *plus* generates the **System Shutdown Starting** event and begins the 60 second shutdown delay configured for that event.

3. At 1 minute, 30 seconds, PowerChute *plus* does the following:

   a. Instructs the operating system to shut down.

   b. Generates the **System Shutdown Complete** event.

   c. Issues the **UPS Turn Off Delay** instruction from within the UNIX shutdown script. During the **UPS Turn Off Delay** period, the operating system completes the remaining portion of the shutdown procedure.

Because the **UPS Turn Off Delay** is issued from within the shutdown script, a brief additional delay may occur before the **UPS Turn Off Delay** begins, which briefly delays the turnoff of the UPS

4. The UPS, unless it is a Back-UPS, turns off its outlets and goes into sleep mode.

To complete all the events in the timeline in the preceding example, the UPS must run on battery power for 110 seconds (1 minute and 50 seconds) or slightly longer. Therefore, for the UPS to complete the shutdown procedure properly, the **Low Battery Signal Time** is set to the default (and lowest allowable) value of 2 minutes.

Low Battery Condition delay	+	System Shutdown Starting delay	+	UPS Turn Off Delay	must be less than or equal to	Run Time Bar graph time
30 seconds	+	60 seconds	+	20 seconds	<=	The total, 110 seconds (1 minute, 50 seconds), must be less than or equal to the runtime.
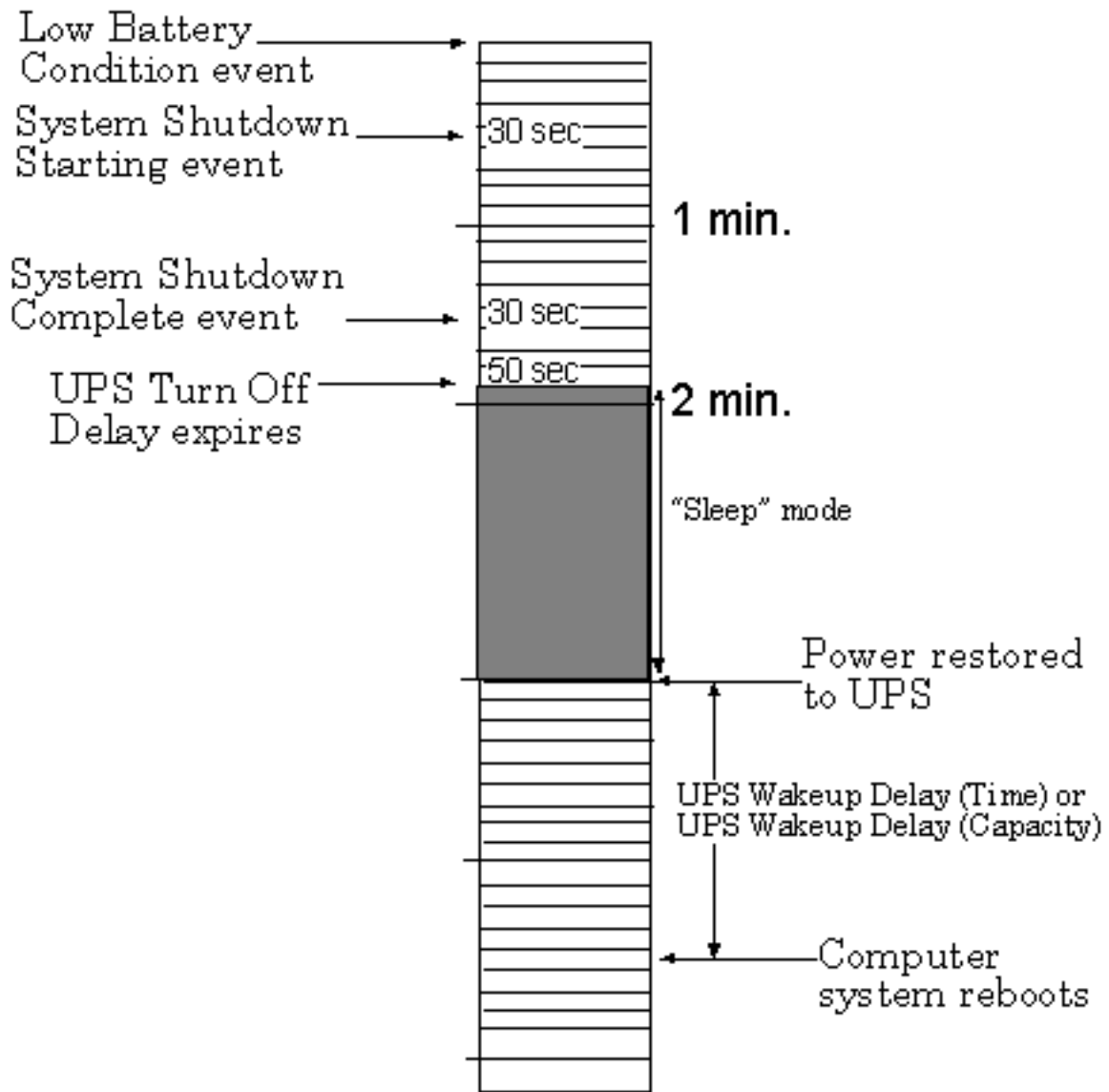
Figure 2: Timeline of Shutdown on Low Battery

Appendix A: FlexEvents Reference

PowerChute *plus* generates events, called FlexEvents, for supported UPS and for Measure-UPS devices manufactured by APC:

This appendix provides FlexEvent reference information as follows:

- **Event Text, Popup Texts, and Variables in the .ini File**

- **Event Descriptions**

- **Events with Their ID Codes, Severity, and UPS Support**

For information on configuring FlexEvents, see **Chapter 5, How to Configure FlexEvents**, and for information on the Measure-UPS, see **Measure-UPS Parameters... in Chapter 4**.

Event Text, Popup Texts, and Variables in the .ini File

Event texts are the messages that PowerChute *plus* logs in the event log when events occur. Some events have only one text; others have more. For example, the **UPS Self-Test Passed** event has four associated event texts:

```
UPS self-test passed
Scheduled UPS self-test passed
User-initiated UPS self-test passed
Self-test at UPS passed
```

In the example, the specific event text tells you what type of self-test generated the event

Popup texts are notification messages sent to specified users. To use non-default messages, see **Text Used in Notification Messages in Chapter 5**.

The PowerChute *plus* initialization file (**powerchute.ini**) defines event texts and popup texts and associates them with events. Some event texts and popup texts use variables, which are replaced by values when the text is logged or displayed. Variables appear in the **.ini** file as #*variable_name*#.

- For information on variables, see **Variables in [EventText] and [PopupText] in Appendix B, Initialization (.ini) File**.

- For information on the initialization file and how to edit it, see **Appendix B, Initialization (.ini) File**.

Event Descriptions

This section lists alphabetically all events that PowerChute *plus* can generate and includes the following information for each event:

Event Name	Description	ID code	Event Text
The name of the event as it appears in the "Event Actions" dialog box.	What the event means and when it is generated.	The numerical identifier of the event. The first digit is the severity code. See **Events with Their ID Codes, Severity, and UPS Support**.	The text displayed in the **Last Two Events** window of the Main Screen and logged in the Event Log file. See **Event Text, Popup Texts, and Variables in the .ini File**.

Appendix A: FlexEvents Reference
Event Descriptions

This section describes these events:

- **Abnormal Contact Position**
- **Administrative Shutdown**
- **Ambient Temp in Range**
- **Ambient Temp Out Of Range**
- **Base Module Fan Failure**
- **Base Module Power Supply Failure**
- **Battery No Longer Needs Replacing**
- **Cancel Battery Calibration**
- **Check Smart Cell Signal**
- **Comm Lost While On Battery**
- **Communication Established**
- **Contact Normal**
- **Humidity In Range**
- **Humidity Out Of Range**
- **Low Battery Condition**
- **Power Restored**
- **PowerChute Started**
- **PowerChute Stopped**
- **Return From Bypass**
- **Shutdown Cancelled**
- **Smart Cell Signal Returned**
- **System Shutdown Complete**
- **System Shutdown Starting**
- **Unable To Communicate With UPS**
- **UPS Battery Is Discharged**
- **UPS Battery Needs Replacing**
- **UPS Enabling SmartBoost**
- **UPS On Battery**
- **UPS On Bypass: Failure**
- **UPS On Bypass: Maintenance**
- **UPS Output Overload**
- **UPS Return From Low Battery**
- **UPS Run Time Calibration Completed**
- **UPS Run Time Calibration Initiated**
- **UPS Self-Test Failed**

- **UPS Self-Test Passed**

- **UPS Overload Condition Solved**

Abnormal Contact Position

When PowerChute detects a change from the normal state of a Measure-UPS contact (for example, when the contact is configured as normally open and PowerChute detects it as closed), it generates the **Abnormal Contact Position** event.

The Measure-UPS accessory has four contacts that you can use to monitor the operation of security, environmental control, or fire protection equipment. You configure the state of each contact as either normally open or normally closed.

See also **Contact Normal**, the event generated when a contact returns to its normal state.

ID Code	Event Text
3006	`Contact #CONTACT_NUMBER# fault (#CONTACT_POSITION#): #USER_COMMENT#`

Administrative Shutdown

The server or host computer is shutting down for administrative purposes. PowerChute *plus* generates this event at the start of either of the following kinds of shutdown:

- User-initiated server or system shutdown.

  You initiate a shutdown by selecting the **Shut Down Server Now...** option from the **System** menu.

- Scheduled server or system shutdown.

  You schedule shutdowns by selecting the **Schedule Server Shutdown...** option from the **System** menu.

ID Code	Event Texts

1005	`Administrative shutdown started`
	`Administrative shutdown: User initiated`
	`Administrative shutdown: Weekly shutdown`
	`Administrative shutdown: Daily shutdown`

Ambient Temp in Range

The ambient temperature recorded by the Measure-UPS is back within the range of the upper and lower thresholds configured through the **Measure-UPS Parameters...** option of the **Configuration** menu. The event occurs only after the **Ambient Temp Out Of Range** event.

ID Code	Event Text
1100	`Ambient temperature back within thresholds`

Ambient Temp Out Of Range

The ambient temperature recorded by the Measure-UPS is above the high threshold or below the low threshold configured through the **Measure-UPS Parameters...** option of the **Configuration** menu.

ID Code	Event Texts
3100	Below lower ambient temperature threshold of #LOW_THRESHOLD# Exceeded upper ambient temperature threshold of #HIGH_THRESHOLD#

Base Module Fan Failure

The Matrix-UPS senses a faulty fan in the Isolation Unit.

ID Code	Event Text
3014	Base module fan needs repair

Base Module Power Supply Failure

The Matrix-UPS bypass power supply is malfunctioning; the UPS is unable to go to bypass mode.

ID Code	Event Text
3015	Base module bypass power supply needs repair

Battery No Longer Needs Replacing

A **UPS Battery Needs Replacing** event has been corrected, either by replacing the depleted UPS battery or by replacing the UPS that contained the non-functioning battery.

ID Code	Event Text
1009	UPS batteries no longer need replacing

Cancel Battery Calibration

Runtime calibration could not begin, was canceled, or was interrupted. The following circumstances cause the event:

- You explicitly cancel runtime calibration.

- A power disturbance, such as low voltage, high voltage, or power failure, interrupts runtime calibration.

- Run time calibration cannot start because battery capacity is less than 100%.

ID Code	Event Texts
2004	UPS run time calibration cancelled UPS run time calibration cancelled by user UPS run time calibration cancelled by power failure UPS unable to perform run time calibration: Capacity < 100

Check Smart Cell Signal

A Matrix-UPS has reported zero battery packs. (A Matrix-UPS needs battery packs to operate). The cause of this event is usually a loose cable connection between the Matrix-UPS and its battery packs.

ID Code	Event Text
3010	Check installation of Smart Cell signal cable

Comm Lost While On Battery

Communication with the UPS has been lost while the UPS is on battery. By default, PowerChute *plus* immediately begins shutting down the system. The event can result from a loose communication cable or, rarely, by a software conflict, e.g. an application blocking PowerChute *plus* from monitoring the serial port while the UPS is on battery.

ID Code	Event Text
3004	Communication lost while on battery

Communication Established

Communication with the UPS is successfully established, either for the first time or after being lost.

ID Code	Event Text
1002	Communication established

Contact Normal

PowerChute *plus* detects that a Measure-UPS contact returned from an abnormal contact position. This event occurs only after an **Abnormal Contact Position** event.

ID Code	Event Text
1010	Contact #CONTACT_NUMBER# normal (#NORMAL_POSITION#): #USER_COMMENT#

Humidity In Range

The humidity is back within the upper and lower humidity threshold range, as configured through the **Measure-UPS Parameters...** option of the **Configuration** menu.

ID Code	Event Text
1101	Ambient humidity back within thresholds

Humidity Out Of Range

The humidity is above the high threshold or below the low threshold configured through the **Measure-UPS Parameters...** option of the **Configuration** menu.

ID Code	Event Texts
3101	`Below humidity threshold of #LOW_THRESHOLD#` `Exceeded upper humidity threshold of #HIGH_THRESHOLD#`

Low Battery Condition

The UPS runtime remaining equals the **UPS Low Battery Signal Time**. For example, configuring the **UPS Low Battery Signal Time** to 10 minutes causes PowerChute *plus* to initiate low battery shutdown when the UPS is on battery and only 10 minutes of runtime remain.

On a Back-UPS, set the **UPS Low Battery Signal Time** using dip switches located at the back of the UPS. For all other APC UPSs, set the **UPS Low Battery Signal Time** by using the **UPS Shutdown Parameters...** option of the **Configuration** menu.

ID Code	Event Texts
2003	`Low battery condition` `Low battery condition: #BATTERY_CAPACITY#`

Power Restored

The UPS is running on utility power after being on battery power due to a power failure.

ID Code	Event Text
1003	`Normal power restored: UPS on line`

PowerChute Started

PowerChute *plus* has started monitoring the UPS.

ID Code	Event Text
1000	`*** PowerChute plus Version version_number started ***`

PowerChute Stopped

PowerChute *plus* stopped monitoring the UPS because the PowerChute *plus* daemon (the background process) has been killed.

ID Code	Event Text
1001	`*** PowerChute plus stopped ***`

Return From Bypass

The Matrix-UPS or Symmetra *Power Array* is no longer in bypass mode. (See **UPS On Bypass: Failure** and **UPS On Bypass: Maintenance** events for more information on bypass mode.)

ID Code	Event Text
1017	UPS returned from bypass

Shutdown Cancelled

A user cancelled a shutdown that was initiated with either the **Shut Down Server Now...** option or the **Schedule Server Shutdown...** option of the **System** menu

ID Code	Event Texts
1006	Shutdown cancelled User initiated shutdown cancelled Weekly administrative shutdown cancelled Daily administrative shutdown cancelled

Smart Cell Signal Returned

The cause of the **Check Smart Cell Signal** event is resolved, and the Matrix-UPS is connected with its battery packs (Smart Cells).

ID Code	Event Text
1018	Smart Cell signal restored

System Shutdown Complete

All shutdown processing is complete, and the system is shutting down.

ID Code	Event Text
2001	System shutdown

System Shutdown Starting

The system is shutting down because an event occurred for which the **Shut Down Server** action is enabled. For more information, see **How to Shut Down a Server in Chapter 5**.

ID Code	Event Text
1016	Shutdown started

Unable To Communicate With UPS

PowerChute *plus* attempted to establish communication with the UPS and could not, or communication that was established was lost.

ID Code	Event Text
3000	`Unable to communicate with UPS`

UPS Battery Is Discharged

The UPS is not supplying battery power, but its battery capacity is low. If power fails, PowerChute *plus* shuts down the system immediately.

ID Code	Event Texts
3003	`UPS battery is discharged` `UPS battery is discharged: #BATTERY_CAPACITY#`

UPS Battery Needs Replacing

One or more UPS batteries are heavily discharged and cannot retain a full charge. If utility power fails during this condition, a Matrix-UPS, Smart-UPS, or Back-UPS Pro runs for less than half its normal run-time. A failed battery in a Symmetra *Power Array* reduces normal run-time in proportion to the number of batteries the system contains.

ID Code	Event Text
3016	`UPS battery needs replacing`

UPS Enabling SmartBoost

The Smart-UPS activated its brownout correction feature, SmartBoost, which maintains adequate voltage to attached equipment during times of low utility line voltage without switching to battery power.

ID Code	Event Text
2002	`UPS enabling SmartBoost`

UPS On Battery

The UPS has switched to battery power due to one of the following situations:

- High input line voltage: The current line voltage is greater than the voltage limit set as the **High Transfer Point**. See **High and Low Transfer Points in Chapter 4**.

- Low input line voltage: Due to a temporary but severe reduction of line voltage (such as a brownout), the current input line voltage is lower than the low voltage limit set as the **Low Transfer Point.** See **High and Low Transfer Points in Chapter 4**.

- Blackout: The UPS is receiving no AC power.

- Small or deep momentary power sag.

- Small or large momentary power spike.

- Simulated power failure. The **Simulate Power Failure** menu option of the **Diagnostics** menu was selected.

ID Code	Event Texts
| 2000 | ```
UPS on battery
UPS on battery: High input line voltage #MAX_VOLTAGE# V
UPS on battery: Brownout #MIN_VOLTAGE# V
UPS on battery: Blackout #MIN_VOLTAGE# V
UPS on battery: Small momentary sag #MIN_VOLTAGE# V
UPS on battery: Deep momentary sag #MIN_VOLTAGE# V
UPS on battery: Small momentary spike #MAX_VOLTAGE# V
UPS on battery: Large momentary spike #MAX_VOLTAGE# V
UPS on battery: Simulated power failure
``` |

UPS On Bypass: Failure

Your Matrix-UPS or Symmetra *Power Array* batteries have been bypassed, and the UPS is serving only as a voltage regulator. Contact APC **Technical Support**, as listed in the *Release Notes*.

Any of the following conditions cause your UPS to go into bypass mode:

- Internal temperature over limit

  The internal UPS temperature of a Matrix-UPS exceeds the acceptable limit,

  Note
  If a Symmetra Power Array has an overheated battery, the event text UPS internal temp over limit *is logged, but the UPS does not go into bypass mode.*

- Battery charger failure

  The Matrix-UPS battery charger failed and needs repair.

  Note
  If the battery charger of a Symmetra Power Array fails, the event text UPS battery charger failure *is logged, but the UPS does not go into bypass mode.*

- Severe DC imbalance overload

  The Matrix-UPS inverter needs repair.

- Output voltage outside limits

  The output voltage of the Matrix-UPS is outside safe limits.

- Top module fan needs repair

  The Matrix-UPS fan in the top module is faulty.

ID Code	Event Texts
| 3013 | ```
UPS on bypass: internal temp over limit
UPS internal temp over limit
UPS on bypass: battery charger failure
UPS battery charger failure
UPS on bypass: severe DC imbalance overload
UPS on bypass: output voltage outside limits
UPS on bypass: top module fan needs repair
``` |

UPS On Bypass: Maintenance

Your Matrix-UPS or Symmetra *Power Array* is in maintenance mode.

If your Symmetra *Power Array* is running with a main intelligence module only or with a redundant intelligence module only, you can use PowerChute *plus* to put your UPS in Bypass Mode to replace that part while briefly relying on utility power only. (If your Symmetra *Power Array* is running with both a main intelligence module and a redundant intelligence module, you can replace either part while the UPS continues to support the attached equipment.)

Caution:
To support its equipment load in bypass mode that you initiate through PowerChute plus, a Symmetra Power Array must have either a functioning main intelligence module or a functioning redundant intelligence module. Do not remove both.

You can put your Matrix-UPS or Symmetra *Power Array* into bypass mode in any of the following ways:

- Use the manual switch. On a Matrix-UPS, this switch is at the rear of the UPS; on a Symmetra *Power Array*, this switch is on the front of the frame, at the bottom. If you use the manual switch to put a Symmetra *Power Array* into bypass mode, you can safely remove both the main intelligence module and redundant intelligence module at the same time for maintenance.

- Use the Matrix-UPS software via the Matrix-UPS front panel.

- Select the **Put UPS on Bypass** option of the PowerChute *plus* **Diagnostics** menu.

ID Code	Event Texts

2013	`UPS on bypass: user set via software or panel`
	`UPS on bypass: user set via rear switch`
	`UPS system is in maintenance bypass set by switch`

UPS Output Overload

For Symmetra *Power Array*, the UPS load exceeds the total load capacity of the UPS modules installed.

For other APC UPSs, the equipment load on the UPS exceeds its rated load capacity.

Reduce the load by unplugging some equipment from the UPS, and then run a self-test.

ID Code	Event Text
3001	`UPS output overload`

UPS Overload Condition Solved

The load on the UPS has been decreased, or (for a Symmetra *Power Array* only) the number of UPS Modules has been increased, so that the UPS is no longer overloaded.

ID Code	Event Text
1013	`UPS overload condition solved`

UPS Return From Low Battery

The UPS has recharged its battery or batteries sufficiently to return from a low battery condition.

ID Code	Event Texts
1007	UPS returned from low battery condition UPS returned from low battery condition: #BATTERY_CAPACITY#

UPS Run Time Calibration Completed

Runtime calibration has been completed.

ID Code	Event Text
1015	UPS run time calibration completed

UPS Run Time Calibration Initiated

A user-initiated or scheduled runtime calibration started. Calibration calculates the available UPS battery runtime.

ID Code	Event Text
1014	UPS runtime calibration initiated

UPS Self-Test Failed

The UPS failed a self-test for one of the following reasons.

- Bad Battery: the battery is discharged or defective. Allow the UPS to recharge for several hours and then retest the UPS.

  Invalid Test: The UPS is not in a condition to complete a meaningful test — for example, when the load is greater than 105% of battery capacity or, for a Symmetra *Power Array*, in any of the following cases:

  - A UPS Module has failed.

  - A self-test is attempted when no batteries are installed.

  - The Symmetra *Power Array* is in Bypass mode

  - The Symmetra *Power Array* is in the midst of a runtime calibration or simulated power failure.

- For an overload condition, unplug some equipment that is not in use, and try the self-test again.

  If the situation persists, contact APC **Technical Support**, as listed in the *Release Notes*.

ID Code	Event Texts

3002	`UPS self-test failed`
	`Scheduled UPS self-test failed`
	`Scheduled UPS self-test failed: Bad battery`
	`Scheduled UPS self-test failed: Invalid test`
	`User-initiated self-test failed`
	`User-initiated self-test failed: Bad battery`
	`User-initiated self-test failed: Invalid test`
	`Self-test at UPS failed`
	`Self-test at UPS failed: Bad battery`
	`Self-test at UPS failed: Invalid test`

UPS Self-Test Passed

The UPS passed its self-test.

ID Code	Event Texts

1004	`UPS self-test passed`
	`Scheduled UPS self-test passed`
	`User-initiated UPS self-test passed`
	`Self-test at UPS passed`

Events with Their ID Codes, Severity, and UPS Support

The following table lists all FlexEvents by ID Code, showing severity levels and the UPS products to which the events apply. **Severity Codes** are explained following the table.

Note:
Smart-UPS DP, which is not listed in the table, supports the same events as a Matrix-UPS, except **Check Smart Cell Signal**, **Smart Cell Signal Returned**, **Put UPS on Bypass**, *and* **Take UPS Off Bypass**.

Note:
You can view ID codes in the **powerchute.ini** *file; see* *Appendix B, Initialization (.ini) File*.

ID Code	FlexEvent Name	Measure-UPS	Matrix-UPS	Symmetra *Power Array*	Smart-UPS	Back-UPS Pro and Power-stack	Back-UPS
1000	PowerChute Started	-	X	X	X	X	X
1001	PowerChute Stopped	-	X	X	X	X	X
1002	Communication Established	-	X	X	X	X	X
1003	Power Restored	-	X	X	X	X	X
1004	UPS Self-Test Passed	-	X	X	X	X	-

Appendix A: FlexEvents Reference
Events with Their ID Codes, Severity, and UPS Support

ID Code	FlexEvent Name	Measure -UPS	Matrix -UPS	Symmetra *Power Array*	Smart-UPS	Back-UPS Pro and Power-stack	Back-UPS
1005	Administrative Shutdown	-	X	X	X	X	-
1006	Shutdown Cancelled	-	X	X	X	X	-
1007	UPS Return From Low Battery	-	X	X	X	X	-
1009	Battery No Longer Needs Replacing	-	X	X	X	X	-
1010	Contact Normal	X	-	-	-	-	-
1013	UPS Overload Condition Solved	-	X	X	X	X	-
1014	UPS Run Time Calibration Initiated	-	X	X	X	X	-
1015	UPS Run Time Calibration Completed	-	X	X	X	X	-
1016	System Shutdown Starting	-	X	X	X	X	X
1017	Return From Bypass	-	X	X	-	-	-
1018	Smart Cell Signal Returned	-	X	-	-	-	-
1100	Ambient Temp In Range	X	-	-	-	-	-
1101	Humidity In Range	X	-	-	-	-	-
2000	UPS On Battery	-	X	X	X	X	X
2001	System Shutdown Complete	-	X	X	X	X	X
2002	UPS Enabling Smart Boost	-	-	-	X	X	-
2003	Low Battery Condition	-	X	X	X	X	X
2004	Cancel Battery Calibration	-	X	X	X	X	-
2013	UPS On Bypass: Maintenance	-	X	X	-	-	-
3000	Unable to Communicate with UPS	-	X	X	X	X	-
3001	UPS Output Overload	-	X	X	X	X	-
3002	UPS Self-Test Failed	-	X	X	X	X	-
3003	UPS Battery Is Discharged	-	X	X	X	X	-
3004	Comm Lost While On Battery	-	X	X	X	X	-
3006	Abnormal Contact Position	X	-	-	-	-	-
3010	Check Smart Cell Signal	-	X	-	-	-	-
3013	UPS On Bypass: Failure	-	X	X	-	-	-

ID Code	FlexEvent Name	Measure -UPS	Matrix -UPS	Symmetra *Power Array*	Smart- UPS	Back- UPS Pro and Power- stack	Back- UPS
3014	Base Module Fan Failure	-	X	X	-	-	-
3015	Base Module Power Supply Failure	-	X	X	-	-	-
3016	UPS Battery Needs Replacing	-	X	X	X	X	-
3100	Ambient Temp Out Of Range	X	-	-	-	-	-
3101	Humidity Out Of Range	X	-	-	-	-	-

Severity Codes

The first digit of the FlexEvent ID code indicates the severity of the event. For example, 3014 has a severity of 3.

The table below explains the three severity levels:

Severity	Explanation
3	**Severe problem** requiring your immediate attention. Unless resolved, most events with severity code 3 cause incorrect operation of the UPS, the equipment connected to the UPS, or the PowerChute *plus* software, or cause loss of UPS protection during a power failure.
2	**Warning** indicating serious conditions that cause PowerChute *plus* to take protective action. You need to address the cause of a severity 2 event to prevent conditions from worsening, but the need is not immediate. For example, when PowerChute *plus* generates the **Low Battery Condition** event, you have a limited amount of battery runtime remaining
1	**Informational message** providing status information concerning UPS operation, including notification of a return from an abnormal condition.

Appendix B: Initialization (.ini) File

When PowerChute *plus* starts, it first reads the initialization file, **powerchute.ini**, which contains information on the local configuration of the UPS and PowerChute *plus* system.

When you set parameters through the menus and dialog boxes of PowerChute *plus*, this file is automatically updated, but you can modify the file directly by using any ASCII text editor.

The following sections explain how to edit the PowerChute *plus* initialization file to configure parameters that you cannot configure through the menus and dialog boxes of the User Interface Module.

- **Formatting of Elements in the INI File**
- **Initialization File Settings**
- **Variables in [EventText] and [PopupText]**

Caution:
Before you edit the initialization file, save a backup copy with a different file name. APC recommends that, whenever possible, you make initialization file changes through the PowerChute plus menus and dialog boxes.

Formatting of Elements in the INI File

Each initialization file section consists of a heading (keyword) and one or more related parameter values, as follows:

Format	Example
[*keyword*] *parameter=value*	[Devices] MeasureUps=Yes

The following table describes the elements and provides rules on using them:

Element	Description and Rules
Keyword	The heading of a section, enclosed in brackets. • Make sure that a keyword does not already exist in your **.ini** file before adding it. • Place keywords in any order within the initialization file. • Enter keywords exactly as shown in this appendix, including the case (upper or lower). • Enclose keywords (section headings) in brackets [ ]. • Do not include any spaces in a keyword.
Parameter	The label that identifies a value. • Place parameters in any order below the keyword to which they apply. • Do not include any spaces in a parameter. • Enter parameters exactly as shown in this appendix, including the case (upper or lower).
Value	A variable, often one of a system-defined set of values but in some cases user-defined. • When entering multiple values for the same parameter, separate the values with commas but no spaces. • Use no spaces at the end of the line. • Enter system-defined values exactly as shown in this appendix, including the case (upper or lower). • User-defined values cannot contain the number sign, #, except to enclose the names of standard PowerChute *plus* variables, as described in **Variables in [EventText] and [PopupText]**.

Initialization File Settings

The following sections, listed by keyword, describe the parameters and values that can be set only by directly editing the initialization file. All other parameters and values can be set through the PowerChute *plus* user interface.

- **[Devices]**
- **[ErrorLogging]**
- **[EventText]**
- **[PopupText]**
- **[Shutdown]**
- **[UPS]**

Note:
*Your initialization file may not have every .**ini** file keyword, parameter, and value documented in this appendix.*

[Devices]

If your Measure-UPS or Smart Slot Measure-UPS II is not recording data, or the Measure-UPS values are not displayed on the Main Screen, check to be sure that the MeasureUps parameter value in the [Devices] section is Yes.

```
[Devices]
```

```
MeasureUps=Yes
```
Allowed values are `Yes` and `No`.

If you set this value to `No`, PowerChute *plus* does not display Measure-UPS data on the Main Screen or log Measure-UPS data in the Data Log.

[ErrorLogging]

This section of the **.ini** file enables or disables error logging and sets the name and maximum size of the Error Log. You can configure the parameters in this section only through the initialization file. You cannot view the Error Log through the PowerChute *plus* user interface, but only directly through the UNIX terminal window.

```
[ErrorLogging]
```

```
ErrorLogEnabled=Yes
```
Allowed values are `Yes` or `No`.
`No` disables error logging.

```
ErrorLogName=e:\pwrchute\powrchute.err
```
The drive, path and file name for the error log file.

```
ErrorLogMaxSize=50000
```
Maximum size in bytes for the error log file.

[EventText]

This section of the **.ini** file contains the event text for each FlexEvent. PowerChute *plus* uses the event text to log the event in the Event Log file and display it in the **Last Two Events** window on the Main Screen.

The first digit of the six-digit code at the beginning of each line indicates the severity of the event. The first four digits are the event's ID Code, and the last two digits identify different event texts for different circumstances that generate the event. See **Severity Codes in Appendix A, FlexEvents Reference** for more information on severity.

For example, 3100 identifies the event **Ambient Temp Out Of Range**. This event has two event texts, one used when temperature is below the low threshold and the other used when temperature is above the upper temperature thresholds. The first event text is identified by 01 and the second by 02 after the ID Code.

See your PowerChute *plus* initialization file for a complete list of event texts. A partial list is shown here.

Note:
Words enclosed by number signs (#) are variables. See **Variables in [EventText] and [PopupText]**.

```
[EventText]
100000=*** PowerChute plus Version version number Started ***
100100=*** PowerChute plus Stopped ***
.
.
.
200000=UPS on battery
200001=UPS on battery: High input line voltage #MAX_VOLTAGE# V
.
.
.
300000=Unable to communicate with UPS
300100=UPS output overload
```

See **How to Notify Users** and **How to Notify Administrators in Chapter 5** for alternative ways to change the text logged.

For information on substituting event text in Spanish, French, German, or Italian, see **Appendix C, How to Select a Language for Event Text**.

[PopupText]

This section of the **.ini** file contains the default notification message text that PowerChute *plus* uses in notifying administrators and users when one of nine FlexEvents listed below occurs. In the event log, PowerChute *plus* logs the text from the **[EventText]** section, not from this [Popup] section. This popup text is for notification messages only.

Notification messages are broadcast messages to terminal windows.

Note:
*Words enclosed in number signs (#) are variables. See **Variables in [EventText] and [PopupText]**.*

```
[PopupText]
1003=Normal utility power at #HOSTNAME# has been restored.
1006=Shutdown of #HOSTNAME# has been cancelled.
1007=UPS batteries at #HOSTNAME# are no longer discharged.
1016=Shutdown process started.
2000=#HOSTNAME# is running on battery power.
2001=#HOSTNAME# has been shutdown.
2003=Low battery power at #HOSTNAME#.
3000=#HOSTNAME# has lost communications with the UPS.
3003=UPS batteries at #HOSTNAME# are discharged.
```

See **How to Notify Users** and **How to Notify Administrators in Chapter 5** for alternative ways to change the text displayed.

For information on substituting notification message text in Spanish, French, German, or Italian, see **Appendix C, How to Select a Language for Event Text**.

[Shutdown]

By adding this section to the **.ini** file, you can use the the LowBatteryShutdownType parameter to enable faster shutdowns on some UNIX systems.

```
[Shutdown]
```

LowBatteryShutdownType= Normal	Allowed values for the parameter are Quick or Normal (the default).
	A value of Quick enables faster shutdown for UNIX systems that are using any smart-signalling UPS model. When the value is set to Quick, a UNIX system performs safe but minimal shutdown procedures in the event of a low battery. On some UNIX systems, however, the shutdown may not be noticeably faster than with the Normal setting.

[UPS]

This section of the **.ini** file contains the UpsPollInterval parameter, which controls how frequently PowerChute *plus* retrieves data values from the UPS.

```
[UPS]
```

UpsPollInterval=4	The time interval (in seconds) between PowerChute *plus* queries to the UPS for information.
	The default and lowest allowed value is 4 seconds. Increase this value if you are using UPS Accessory devices, and if PowerChute *plus* is unable to establish communication with the UPS.

Variables in [EventText] and [PopupText]

Some event texts and popup texts use one or more variables, which PowerChute *plus* replaces with values when it logs or displays the text. They appear in the **.ini** file as #*variable_name*#.

The following table specifies the variables PowerChute *plus* uses in event or popup texts. For examples of their usage, see the **[EventText]** and **[PopupText]** sections of the **.ini** file.

Variable	Description
#BATTERY_CAPACITY#	The battery capacity remaining
#CONTACT_NUMBER#	The Measure-UPS contact number
#CONTACT_POSITION#	The position of a Measure-UPS contact: Open or Closed
#HIGH_THRESHOLD#	The value of the high threshold for ambient temperature or humidity
#HOSTNAME#	The name of the server or host computer
#LOW_THRESHOLD#	The value of the low threshold for ambient temperature or humidity
#MAX_VOLTAGE#	The maximum reported voltage
#MIN_VOLTAGE#	The minimum reported voltage
#NORMAL_POSITION#	The normal operating position for the Measure-UPS contact
#USER_COMMENT#	The user-defined description for the Measure-UPS contact

Appendix C: How to Select a Language for Event Text

You can customize PowerChute *plus* so that event text and popup text (workstation notification messages) are displayed in one of four languages other than the default, English.

PowerChute *plus* logs event text in the Event Log file and displays in the **Last Two Events** window of the Main Screen when an event occurs.

PowerChute *plus* uses popup text in notification messages in response to events for which either the **Notify Administrators** or **Notify Users** action is configured. To configure these actions, see **How to Configure FlexEvents in Chapter 5**.

To replace the default English messages with messages in the language of your choice, perform the following steps.

1. In your PowerChute *plus* installation directory, make a backup copy of the PowerChute *plus* initialization file, **powerchute.ini**. Name the backup copy as **powerchute.old**.

2. Use an ASCII text editor to replace the [EventText] and [PopupText] sections of the initialization file with the language file of your choice:

    a. In the initialization file, delete the entire [EventText] and [PopupText] sections, beginning with the section heading [EventText] and ending with the final line in the [PopupText] section, which reads as follows:

        3003=UPS batteries at #HOSTNAME# are discharged

       Do not delete the section heading [FlexEventNames] or any of the lines following it. The [FlexEventNames] section immediately follows the [PopupText] section.

    b. In place of the sections you just deleted, insert the entire contents of one of the following files from the **languages** subdirectory on your installation CD-ROM or from the APC's Worldwide Web site, **http://www.apcc.com**.

        • **french.txt**
        • **german.txt**
        • **italian.txt**
        • **spanish.txt**

    c. Save the edited file as **powrchute.ini**, and exit from the text editor.

3. If PowerChute *plus* is running, stop and restart it.

If PowerChute *plus* does not restart correctly or does not function properly, you may have made an editing error that damaged the **powerchute.ini** file. Use the file **powerchute.old** that you created in **Step 1** to recreate a correct **powerchute.ini** file, and perform the procedure in this section again.

Appendix D: Apache Shutdown Utility

An Apache Web server — a server running Apache HTTP Server software — manages web sites by storing web pages which are then sent out in response to HTTP requests from remote browsers. Apache Web servers often work in conjunction with e-commerce packages and database software to manage large volumes of customer transactions.

The APC PowerChute Shutdown Utility for Apache Web Server configures the automatic shut-down of Apache HTTP Server software running on certain UNIX operating systems. Shutdown is invoked by PowerChute *plus* when it detects a given condition in the attached APC UPS.

The utility supports Apache HTTP Server releases 1.2.x and 1.3.x running on any of the following:

- Linux
- Sun Solaris SPARCStations
- IBM AIX systems

Apache Web Servers and Power Failure

In the event of a sudden loss of power, an Apache Web server without UPS protection does not complete the steps it would normally take in order to close all open Web transactions and shut down: log files may be incomplete, incorrect, or corrupted. Thus administrators can lose critical transaction data (data upload or download transactions, etc.).

A protected Apache Web server that lacks automatic shutdown capability requires the presence of the Web administrator. In the event of a power failure, the administrator must quickly send a complex "kill" command to the server in order to shut down the software before the UPS stops supplying power.

APC Solution to Apache Web Server Shutdown

APC's Shutdown Utility automates the process of creating the proper command script to be invoked by PowerChute *plus* in the event of a power failure. It does this by initiating the command script which prevents new connections, finishes processing current transactions, shuts down the software gracefully, and logs all transactions.

With the Shutdown Utility for Apache Web Server you can:

- Easily configure PowerChute *plus* to shut down your Apache Web server automatically during a power failure
- Keep a log of all unattended shutdowns
- Specify the location of the shutdown script

Downloading the Utility

You can download the utility from the APC web site at **http://www.apcc.com**:

1. Go to the web site and select the link to software downloads.
2. Scroll down to the Shutdown Utility for Apache on Linux and click on the blue text.
3. You can download three files:
   - the actual utility, compressed as a tar file
   - a brief readme on installation of the utility, in simple text format

- a more detailed guide to using the utility in PDF format. (PDF files can be read using the free Adobe utility, Adobe Acrobat Reader, available from the Adobe web site, **http://www.adobe.com**).

We recommend downloading all three files. Right click on each file in turn and save to your local hard disk.

Glossary

3rd-Party Plug-in

An interface or program that integrates APC's software with the software of another manufacturer.

Architecture (Network Architecture)

A communications system design containing interrelated components that can operate together or independently within a network.

AC (Alternating Current)

Electricity which reverses direction at regular intervals. In North America, utility voltage changes direction 60 times per second; in Europe, 50 times per second. See **Frequency**.

Ambient Temperature

The current air temperature registered by the Measure-UPS.

Application

A computer program that performs work for the user and is not part of the operating system.

ASCII (American Standard Code for Information Interchange)

A system of binary codes used to communicate text characters, such as letters and numbers, and control characters, such as tabs and linefeeds.

Back-up

A copy of an original file, disk or program, made to ensure the information will be available if the original becomes unusable.

Battery Capacity

The total power the battery is able to provide to the UPS, which is reported by PowerChute *plus* as a percentage of full capacity.

Battery Volts

The battery voltage, in VDC (Voltage Direct Current), the UPS has available.

Browser

A specialized program that provides access to hypertext data and Web sites.

Cell

The intersection of a column and a row on a spreadsheet or a grid.

Check Box

An on-screen square in which you click to select or deselect an option.

Click

To depress a mouse button.

Client

A personal computer, terminal or workstation which uses the services of a shared-network resource (a server).

COM Port (Communications Port)

A connector on a computer to which you attach a cable to communicate with another machine or device.

Command File

A file used to execute specific commands or functions.

Configuration

The settings which define how a machine or application will perform.

Contacts

Two-position (on or off) switches used by the Measure-UPS to monitor various conditions, including doors or windows being opened or closed, or a fire alarm reacting to a fire.

Cursor

An on-screen symbol indicating the current point of action.

CPIO

Copy in/out: a UNIX utility that copies files in or out of file archives.

Data Log

A file containing power and environmental information generated by an APC smart-signalling UPS, and a Measure-UPS device.

DC (Direct Current)

Electricity that moves through a circuit in one direction only. Batteries use DC.

Default

When an action, command, parameter or setting has more than one selectable value, the default is the value applied when the user has not selected any other allowed values.

Dialog Box

A window that enables a user to change optional values, or otherwise directly affect the operation of a machine or application.

Directory

See **Folder**.

Drop-down List

A list of options or menus (displayed below a selected item) which disappears after a selection is made. See **Popup Menu**.

Equipment Load

Any equipment which connects with the UPS for its power.

Fault

A malfunction which causes a machine or application to fail to perform as designed.

FlexEvent

An event that you can configure to define how PowerChute *plus* responds to a specific situation.

Folder

A list of files and sub-files stored on a machine.

Frequency

Usually expressed as Hertz (Hz), the number of times an alternating current reverses direction in one second. This completes one cycle, which equals one Hertz.

Hardware

The physical components of a system, including the central processing unit (CPU), memory, disks, and cables.

Host

In APC's terminology, the machine which runs the PowerChute *plus* User Interface Module, or PowerNet SNMP Manager application.

HTML (Hypertext Markup Language)

A system of encoding documents for electronic publication on the Web.

Hypertext

A method of electronically linking information for on-screen display.

Icon

A graphic symbol for a program, file or document.

Initialization File

The file which controls the behavior of PowerChute *plus*. See **Configuration**.

Interface

The part of a machine or application that allows interaction with another machine, application, or user.

IP Address (Internet Protocol Address)

A unique, numerical identification, which identifies each machine connected to a TCP/IP network.

LAN (Local Area Network)

A group of interconnected servers and workstations functioning within a specific, limited area, such as an office, building, or corporation.

Load

The amount of power required by the equipment plugged into the UPS.

Log File

A record of events, actions or data.

Machine

A generic term for a personal computer, workstation, terminal or server.

Menu Bar

A set of menus, each providing a drop-down list of options.

MIB (Management Information Base)

For APC, a set of object identifications (OIDs) that an SNMP browser can use to monitor or control a UPS, Measure-UPS, or MasterSwitch.

Monitor

To track the performance of software, hardware, or changes in environmental conditions.

Mouse

A device used (as an alternative to keystrokes) to move the cursor or to make on-screen selections.

Network

A group of machines connected with each other for communication, or to share resources, such as files or print servers.

Online Documentation

Instructions available for viewing on a machine's screen.

Online Help

Information available for display from within an application to help operators use the application.

Operating System

The control program of your computer or network. It is the first program loaded when you turn on the computer, and it manages the operation of the computer, including tasks, data, peripheral devices, and security.

Overload

An equipment load greater than the amount of voltage the UPS can safely provide.

Parameter

A setting with optional values defining how the machine or application will perform.

Path

The route that must be followed by a program or user to access a specific directory or file on a disk.

Permissions

Authorization to access specific machines, files, or programs in a network.

Poll

To access information from a machine or application at regular, pre-determined intervals.

Popup Menu

A list of choices (displayed in front of the present window) which disappears after the user makes a selection.

Protocol

A set of rules that governs the way data is conveyed through a network.

Radio Buttons

A set of options, usually small circles, that limit a user to one selection at a time by automatically disabling all other options when one is chosen.

Reboot

To restart the computer and operating system.

Reinstall

To repeat the installation process to replace corrupted files or to add a component or feature.

Runtime

How long the UPS can provide power to support the equipment load if the UPS goes on battery.

Scroll

To use a mouse, keyboard arrow keys, or a scroll bar to move through a display to view information which the display cannot show all at once.

Self-Test

A series of functions and operations, performed by a device to verify its own operation.

Server

A machine or application which provides a network with a central source of information, programs, files or services.

Shut Down

To close all applications and turn off the operating system.

SmartBoost

During AC undervoltage conditions, a UPS normally switches to battery power in order to supply the correct voltage to user equipment. With SmartBoost, the UPS can actually correct the incoming voltage and restore it to its correct value without using any battery power. This feature extends battery life.

SmartTrim

This feature automatically cuts voltage supplied to your computer system when it's too high.

SMTP (Simple Mail Transfer Protocol)

The e-mail protocol most commonly used on the Internet.

SNMP (Simple Network Management Protocol)

A network management protocol used on the Internet.

Spike

A sudden, very brief increase in voltage.

Surge

An increase in voltage which lasts longer than a spike.

Threshold

A setting defining the boundary between a normal condition and an abnormal condition.

Uninstall

To remove an application from a machine, usually by using a file or application specifically designed for that purpose.

UPS (Uninterruptible Power Supply)

A device that can use one or more batteries to provide back-up power to its equipment load during power disturbances or interruptions.

UPS Monitoring Module

The PowerChute *plus* component which communicates with the UPS and the PowerChute *plus* User Interface Module, logs data and events, notifies users of impending shutdowns and shuts down the operating system, when required.

User Interface Module

The PowerChute *plus* component which directly interacts with the user.

Utility Line Voltage

The voltage (in VAC) being supplied by power companies.

VAC (Voltage Alternating Current)

Voltage which uses alternating current. See **Utility Line Voltage**.

Voltage

The power used by electrical devices.

Voltage Conditioner

A filter for AC power that provides protection to attached equipment in cases of power surges, but not sags, brownouts, or blackouts.

Window

A display that an application utilizes to provide information to a user.

Workstation

A single-user machine which allows a user to access shared network services or work independently.

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