



CONNECTUPS™ SNMP MODULE

User's Guide

M and MX Models

www.powerware.com

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Units that are labeled with a CE mark comply with the following harmonic standards and EU directives:

- Harmonic Standards: EN 50091-1-1 and EN 50091-2
- EU Directives: 73/23/EEC, Council Directive on equipment designed for use within certain voltage limits
93/68/EEC, Amending Directive 73/23/EEC
89/336/EEC, Council Directive relating to electromagnetic compatibility
92/31/EEC, Amending Directive 89/336/EEC relating to EMC

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Class A EMC Statements

FCC Part 15

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

ICES-003

This Class A Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

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

EN50091-2

Some configurations are classified under EN50091-2 as "Class-A UPS for Unrestricted Sales Distribution." For these configurations, the following applies:

WARNING This is a Class A-UPS Product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

Class B EMC Statements

FCC Part 15

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

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

ICES-003

This Class B Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

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



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CHAPTER 1

GETTING STARTED

This book describes how to install and use the Powerware® ConnectUPS™ SNMP Module. Each procedure is outlined in a series of steps. These procedures are written primarily for network supervisors who are responsible for installing and configuring the ConnectUPS SNMP Module.

You should also be familiar with PC hardware and software and have a basic understanding of your network. The network should be set up and operating properly.

If you encounter problems while installing or configuring the module, call the **Help Desk** for assistance at one of the telephone numbers on page 45.

Using This Manual

This manual uses these type conventions:

- *Italic type* represents variable information that you must replace with an actual value, or a directory or file name.
- **Screen type** represents information that appears on your screen.
- **Bold type** represents a command or option that you type or enter at a prompt.

Icon	Description
	Calls attention to information that is specific to SNMP operation.
	Information notes call attention to important features or instructions.
[Keys]	Brackets are used when referring to a specific key such as [Return] or [Esc].

Networking Terminology

A **Network** is a collection of workstations (for example, IBM-compatible personal computers) and other equipment (such as printers), connected for the purpose of exchanging information. Networks vary in size; some are within a single room, others span continents.

Ethernet is a type of local area network, referring to the technology used to pass information around the network.

10BaseT is the name given to the Ethernet protocol that runs over **Unshielded Twisted-Pair (UTP)** cable. The ConnectUPS SNMP Module uses an RJ-45 connector for connecting the network.

Simple Network Management Protocol (SNMP) is a protocol that controls how a management station gains information from a device. SNMP is composed of three areas:

- A set of rules that define how a management station can communicate with a device.
- A **Management Information Base (MIB)** that defines what information can be obtained from the device by the management station. Every SNMP-manageable device has a MIB, which is a list of information about it.
- Unsolicited messages called **Traps**, which work differently from the usual request/reply management communication. You can configure a device so that it generates a trap if a certain condition occurs, for example if the UPS goes on battery. The trap will be sent to the management station to inform it of the occurrence.

Device is a term that is used to refer to a piece of network equipment. Every device has a unique address that is used to identify it on the network.

Internet Protocol (IP) is a data communication protocol used to connect computers and data equipment into computer networks. It is used on a large international network called the Internet, which is composed of universities, government facilities, research institutions, and private companies.



CHAPTER 2

INTRODUCTION

In today's business environment, with computer networks becoming larger and more complex, a constant power supply is vital to the operation of your organization. Your computer system relies on the battery backup of an uninterruptible power supply (UPS) to prevent loss of data when the main power source fails.

If your UPS is supporting a workstation or other peripheral equipment that cannot be interrupted by a network management system, the ConnectUPS SNMP Module is your network solution.

The ConnectUPS SNMP Module provides network power management through UPS monitoring and control. The module is shipped with default settings that you can change to meet the needs of your organization.

The ConnectUPS SNMP Module

The ConnectUPS SNMP Module is available in two models: the ConnectUPS-M for UPSs with an option slot and the ConnectUPS-MX for X-Slot™ UPSs. Both models can connect to a twisted-pair Ethernet (10baseT) network using an RJ-45 connector.

The Modem Configuration option allows you to be notified when a problem occurs or to monitor the UPS from an unattended computer using UPSdial software.

The ConnectUPS SNMP Module is compatible with OnliNet® Power Management Software, providing remote communication between the software and a UPS over an Ethernet network.

SNMP The module also contains a full SNMP agent that implements the proprietary PowerMIB and the Internet standard (RFC-1628) UPS MIB, as well as relevant portions of MIB II.

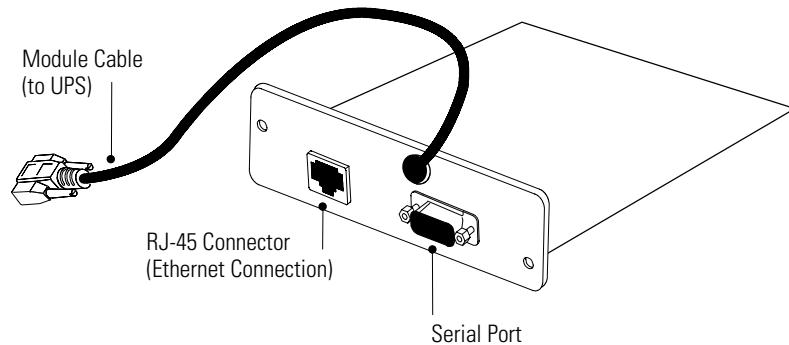


Figure 1. The ConnectUPS-M Module

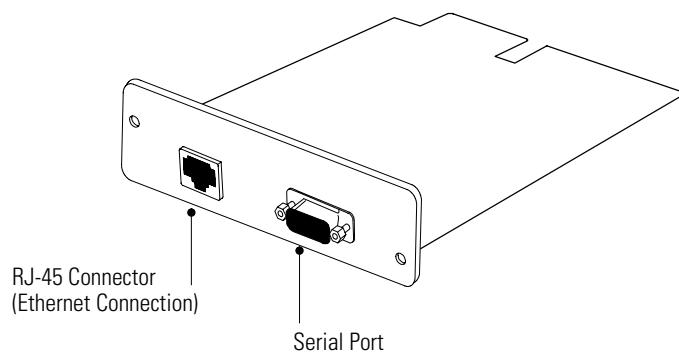


Figure 2. The ConnectUPS-MX Module



CHAPTER 3

INSTALLATION

You can install the ConnectUPS-M Module in a UPS designed for an option slot, such as the Powerware 5119 or the Powerware 5140, and the ConnectUPS-MX Module in a UPS designed for an X-Slot, such as the Powerware 9125.

Before installing the ConnectUPS SNMP Module, you will need the following:

- The UPS should be installed and operating in Normal mode (see the UPS User's Guide for installation instructions).
- Twisted-pair cable for an Ethernet network (optional).
- Modem cable for use with the Modem feature (optional).
- Write down the hardware address from the bottom of the module for future reference.

The hardware address (in hexadecimal notation) is in this format: 002085 *Xnnnnn*. The first part of the hardware address (002085) is fixed. The second part (*Xnnnnn*) is the serial number of the module.

Installing the ConnectUPS-M Module

To install the ConnectUPS-M Module, perform the following steps:



NOTE Be sure to perform the instructions in the following sequence to avoid short-circuiting the module.

1. Remove the option slot cover on the UPS rear panel. Retain the screws (see Figure 3).

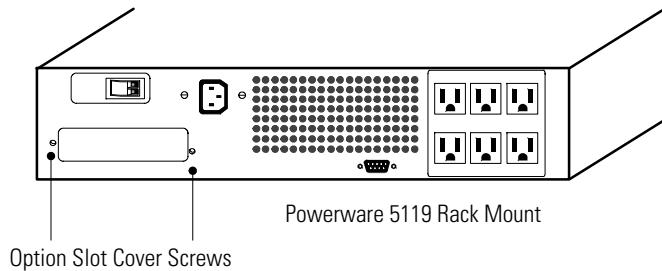


Figure 3. Removing the Option Slot Cover

2. To prevent electrostatic discharge (ESD), place one hand on a metal surface such as the UPS rear panel.
Slide the ConnectUPS-M Module into the open slot and secure with the screws removed in Step 1 (see Figure 4).

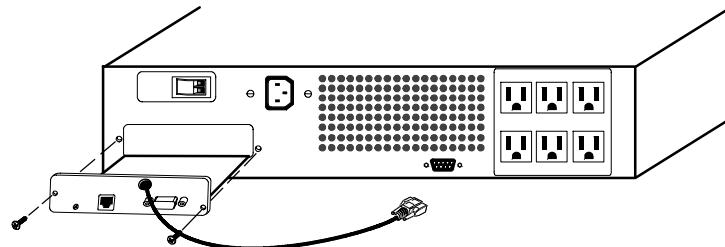


Figure 4. Installing the ConnectUPS-M Module

3. Connect the module cable to the UPS communication port (see Figure 4).
Tighten the screws on the cable connectors to ensure a good connection.

Installing the ConnectUPS-MX Module

To install the ConnectUPS-MX Module, perform the following steps:

1. Remove the X-Slot cover (or existing X-Slot module) on the UPS rear panel. Retain the screws (see Figure 5).



NOTE UPSs with a single X-Slot may have another X-Slot module already installed (such as the Powerware 9125 UPS). If there is a communication cable attached to this module, disconnect the cable and then remove the X-Slot module.

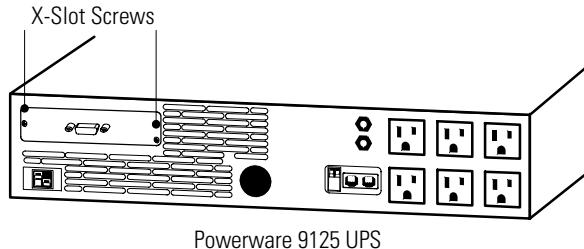


Figure 5. Removing the X-Slot Cover or X-Slot Module

2. To prevent electrostatic discharge (ESD), place one hand on a metal surface such as the UPS rear panel. Align the ConnectUPS-MX Module with the slot guides and slide the module into the slot until it is firmly seated (see Figure 6).

3. Secure the module with the screws removed in Step 1.

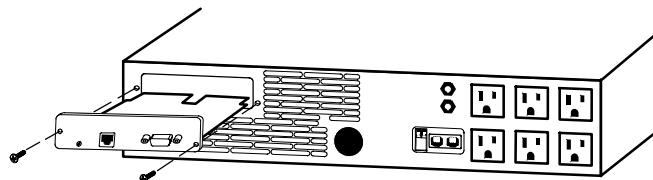


Figure 6. Installing the ConnectUPS-MX Module

Configuration

You must configure the ConnectUPS SNMP Module before you can use it. There are two ways to configure the module:

- locally
- remotely using the bootstrap protocol (BOOTP)

Configuring the Module Locally

The module has a configuration program that you can access by connecting the module to a terminal or a computer with a terminal emulation program.

If you choose to configure your module locally, see Chapter 4, “Local Configuration” on page 9.

Configuring the Module Remotely

You can configure the module using the bootstrap protocol (BOOTP) and the sample configuration file included in the module package. This method is useful if you have access to a BOOTP server.



NOTE Remote (BOOTP) configuration is recommended only for installations that need to configure many ConnectUPS SNMP Modules from a central location.

If you choose to configure your module remotely, see Chapter 5, “Remote Configuration” on page 27.



CHAPTER 4

LOCAL CONFIGURATION

Use the following procedure to use the module's configuration program.

Before You Start

You should contact your network administrator for the following module values: IP address, Netmask (subnet mask), and Default Gateway. Write these values down for future reference.

To use the configuration screens for the module, you need:

- The serial configuration cable included in the module package.
- A terminal with a serial communication port, or a PC with a terminal emulation program such as HyperTerminal®.

The serial line should be set to 9600 baud, No parity, 8 bits, and 1 stop bit. The configuration program always runs at these settings.

Connecting the ConnectUPS SNMP Module

To connect the module to the terminal and start the configuration program:

1. Install the module as described in “Installation” on page 5. The UPS must be powered on.
2. Plug the male end of the serial cable into the serial port on the ConnectUPS SNMP Module.
3. Plug the female end of the serial cable into the serial port on your computer or terminal.
4. Press [Enter]. The Main Configuration screen appears (see Figure 7 on page 12).

If the Main Configuration screen does not appear, press [Enter] again.

If you still do not see the Main Configuration screen, check the following conditions:

- The communication settings of the terminal should be 9600 baud, No parity, 8 bits, and 1 stop bit.
- If the serial configuration is correct, check the cabling to be sure all connections are secure.
- Verify that your terminal program is on the correct communication port for the serial connection.
- Verify that the module power cable is connected to the UPS.
- Verify that the UPS has input power and is turned on.
- If the module was previously configured with an active modem, continue to the following section, “Exiting ASCII Computer Mode.”

Exiting ASCII Computer Mode

When the ConnectUPS SNMP Module has been configured to communicate with a modem, the module automatically enters ASCII computer mode (ACM). To view the Main Configuration screen, exit ACM by performing the following steps.

The following commands are case-sensitive and do not appear on the screen when typed:

1. Type EXITACM. A question mark (?) appears.
2. Type the ConnectUPS SNMP Module authorized password (see page 14). Press [Enter].
3. A percent sign (%) appears. Press [Enter].

The Main Configuration screen appears.

For remote configuration, you can dial into the ConnectUPS SNMP Module with a terminal emulator, such as HyperTerminal. Use the same baud rate as previously used for the modem.



NOTE Remote access is only available if the ConnectUPS command security level is configured for LV 1 - standard (see page 15).

Using the Configuration Screens

Each model of the ConnectUPS SNMP Module has its own configuration screen. When you start the configuration program, the Main Configuration screen for your module appears (see Figure 7).

The Main Configuration screen displays the current configuration settings for your ConnectUPS SNMP Module. A list of command (CMD) options is available in the left column of the screen. Type CF and press [Enter] to redisplay the Main Configuration screen or to return to this screen from any subscreen.

When you press [Enter] after a command, the module saves the new value; however, the module does not implement the change until you use the SA command to reboot the module. You can reboot from any screen. Use the following sequence for configuring the module and connecting to the network:

1. Configure the parameters on the Main Configuration screen. See “Changing the Configuration Fields” on page 12.
2. Optional: Use the HS command to access the Host Table Setup screen if you want to configure hosts to receive traps or modify the host table. Type CF and press [Enter] to return to the Main Configuration screen when complete. See “Host Table Setup Screen” on page 17.
3. Use the MS command to access the Modem Configuration screen for configuring or activating the module to communicate with a modem. When complete, use the PS command to enter the phone number parameters for modem configuration.

Type CF and press [Enter] to return to the Main Configuration screen when complete. See “Modem Configuration Screen” on page 19 and “Phone Number Screen” on page 22.

4. Optional: Connect the module to the network (see page 26).
5. Exit the configuration program (see page 26).

```
Powerware ConnectUPS-M Version 3.50 (8-16-99)
CMD ----- Basic Setup -----
IP IP address: . . . . . **Not Defined** MAC Address: 002085010006
NM Netmask: . . . . . **Not Defined**
----- Network Setup -----
GW Gateway: . . . . . **Not Defined**
BR BOOTP retries: . . . . . . . 30
PW Authorized Password: . . . MustB6
LV Command Security Level . . Stnd
----- UPS Setup -----
Comm Settings: . . . . . 19200/N/8/1
ID UPS Unit ID: . .
----- SNMP Setup -----
CG Get Community name: public
CS Set Community name: private
CT Trap Community name: public
SN sysName: No sysName given
SC sysContact: No sysContact given
SL sysLocation: No sysLocation given
AD AttcDevices: No upsIdentAttachedDevices given
%
UPS Model: No UPS found/UPS comm lost
Permanent Hosts Configured: 0
Help: To change a parameter, type
      the CMD and the new value
Examples: IP 128.1.2.3
          SC "Help Desk x101"
For more help, enter the CMD alone
HS to show Host Table Setup
SA to Save Configuration and Restart
CF to Redisplay this Screen
MS to show Modem Configuration Screen
```

Figure 7. Main Configuration Screen

Changing the Configuration Fields

To change the value of a setup option, enter the two letter command followed by a space and the new value. For example, to change the IP address, type: IP *a.b.c.d*, where *a*, *b*, *c*, and *d* are numbers between 0 and 255.



NOTE The new values do not appear until you press [Enter] on a blank command line to redisplay the screen.

If you enter a command without a new value, the existing value for that option appears. If you enter an invalid value, the screen displays a range of valid values.

You can refresh the Main Configuration screen to show your changes by typing CF and pressing [Enter]. The configuration settings you can change are described in the following sections. Press [Enter] after each command to save the new setting and return to the configuration screen.

 If you are using SNMP protocol, you should configure all of the setup options on the configuration screen.

IP address (IP)

Type IP followed by a space and the Internet protocol assigned to this module to change the IP address.

Use the format $a.b.c.d$, where a , b , c , and d are numbers between 0 and 255. If you type a number that is not in this range, an error message appears. If you do not know the IP address to use, contact your network administrator. The module does not operate properly on a network with a default setting of 0.0.0.0.

Netmask (NM)

Type NM followed by a space and the Netmask address to change the Netmask address.

Use the format $a.b.c.d$, where a , b , c , and d are numbers between 0 and 255. If you type a number that is not in this range, an error message appears. If the local network is partitioned into subnets, be sure to set this value to show that (for example, 255.255.0.0).

If you do not know the Netmask value to use, contact your network administrator.

Gateway (GW)

To change the default gateway, type GW followed by a space and the default gateway. The default gateway is the default destination for all packets not addressed to the local network segment. This value must be set if you have routers in the network. If you do not know the default gateway, contact your network administrator.

Use the format $a.b.c.d$, where a , b , c , and d are numbers between 0 and 255. If you type a number that is not in this range, an error message appears. Type GW 0.0.0.0 if there is not a primary gateway.

BOOTP retries (BR)

Type BR followed by a space and the number of times the module should request BOOTP configuration. You can specify any positive number up to 255 (the default is 30). If you set this field to 0, no BOOTP requests are made. To have the module request BOOTP configuration repeatedly until it receives a successful configuration, specify -1 in this field. Retries are sent at approximately two-minute intervals.



NOTE Be sure to set this field to 0 if the network does not have BOOTP. If you specify any other value, you have to wait while the module powers on and receives a successful BOOTP configuration (or completes the specified number of requests).

Authorized Password (PW)

A password is required for all UPS control commands from OnliNet, including operations where the UPS shuts off. If a command is issued and it does not include the password you specify here, the module does not carry out the command.

To create a six-character password, type PW followed by a space and a password. The password is case-sensitive. You can type any character, but the first character cannot be a space. The default password is MustB6.



NOTE The password function cannot be disabled.

Command Security Level (LV)

To change the command security level, type LV followed by a space and the corresponding level number. This command determines who receives data or sends commands.

There are three possible entries:

- 1 - The standard level allows anyone with the correct community name (for SNMP) to receive data or send commands. The standard level is the default. This is the only level that times out permanent entries in the ARP cache.
- 2 - The high-sets level restricts sets and commands to those hosts that appear in the host table; any SNMP manager with the correct get community name may request data.
- 3 - The high level is the most secure. Only those hosts who appear in the host table and use the correct community name can receive data or send commands.

UPS Unit ID (ID)

To change the UPS Unit ID field, type ID followed by a space and the “name of the UPS unit” that you are currently configuring. You must use quotes to enclose the UPS unit name. You can enter up to 16 characters to identify the UPS unit. This information may be represented as the serial number on some UPS units.

Get Community name (CG)

To change the community name, type CG followed by a space and the community name. This command changes the community name that the SNMP manager can use when performing a get operation, but not set operations.

Type up to 16 alphanumeric characters to specify the get community name. This field is case-sensitive and cannot contain blanks.



NOTE The get community name should be different than the set community name to avoid conflicts with set operations.

Set Community name (CS)

Type CS followed by a space and the community name to change the community name the SNMP manager uses when performing set or get operations.

Type up to 16 alphanumeric characters to specify the set community name. This field is case-sensitive and cannot contain blanks.

Trap Community name (CT)

Type CT followed by a space and the community name to change the community name that is sent along with the traps to your network manager.

Type up to 16 alphanumeric characters to specify the trap community name. This field is case-sensitive and cannot contain blanks.

sysName (SN)

To change the System Name field, type SN followed by a space and the “*system name*.” You must use quotes to enclose the system name. Type the system name assigned by your system administrator (up to 63 alphanumeric characters).

The name you enter is used by network operators, and is not used for network addressing. (If you do not specify a system name here, you can do so using your SNMP management application.)

sysContact (SC)

Type SC followed by a space and the “*system contact name*” to change this field. You must use quotes to enclose the system contact name.

Type up to 63 alphanumeric characters to identify someone to contact with questions about this device. For example, you can type a person’s name, phone number, department, or physical location. (If you do not specify a system contact here, you can do so using your SNMP management application.)

sysLocation (SL)

Type SL followed by a space and the “*system location name*” to change this field. You must use quotes to enclose the system location.

Type up to 63 alphanumeric characters to identify the location of the installed module.

Attached Devices (AD)

To list the protected equipment currently connected to the UPS, type AD followed by a space and the “*device name*.” You must use quotes to enclose the attached devices.

Type up to 63 characters (for device names) to identify devices such as hubs, routers, and modems that are connected to the module.

Host Table Setup Screen

The Host Table Setup screen allows you to add hosts permanently to the ConnectUPS SNMP Module’s Host Table. The host table automatically adds hosts as nonpermanent entries when host communication is established with the module. This command is useful if you want to receive traps.

To access this screen from the Main Configuration screen, type HS and press [Enter]. The Host Table Setup screen appears (see Figure 8).

```
-----
Host      IP      Trap
Num      Address      Level Type
1
2
3
4
5
6
7
8
CMD: HIn (DEn) PIn   TLn   TTn   (n=Host Num 1-8; eg "TL2 1")

Trap Levels: 0=None, 1=Critical, 2=Major, 3=All levels of traps sent
Trap Types: 1=Stnd MIB, 2=PowerMIB, 3=Stnd + msgs, 4=PowerMIB + msgs
HIn adds a Permanent Host IP,          DEn removes a host entry
PIn to "ping" host n (test connection),  SA to Save and Restart
CF to show Configuration Information,   HS to Redisplay this Screen
% ms
-----
```

Figure 8. Host Table Setup Screen

The Host Table Setup screen displays the host access list and the current setting for each host. The host number (Host Num) appears in the left column of the screen.

To change a value of a host field, type the two-letter command for a specific host number. For example, to change the IP address, type: **HIn *a.b.c.d***, where *n* equals the host number and *a*, *b*, *c*, and *d* are numbers between 0 and 255. Press [Enter] after each command to save the new setting and return to the host access list.

The following settings can be changed in the Host Table Setup screen. When complete, type **CF** and press [Enter] to return to the Main Configuration screen.

IP Address (HI)

Type **HI** and the host number followed by a space and the Internet protocol address of the host.

Use the format *a.b.c.d*, where *a*, *b*, *c*, and *d* are numbers between 0 and 255. If you type a number that is not in this range, an error message appears.

Delete Entry (DE)

To remove a configured host, you can change its IP address to a new value, if one exists. Otherwise, use the Delete Entry command. To delete the entry, type **DE** and the host number and press [Enter]. Only eight hosts can be stored in the permanent memory.

Ping (PI)

The Ping option verifies the host's physical address. If you are connected to the network, you can use the Ping function to verify a host's address. Type **PI** and the host number and press [Enter] to send the command.

If the ping is successful, the module responds with the following message: **received 5/5 packets (0% loss) from xx.xx.xx.xx.**

If the ping is unsuccessful, the module displays an error message: **received 0/5 packets (100% loss) from xx.xx.xx.xx.**

Any number greater than 0/5 is not an error.

SNMP Trap Level (TL)

To set the trap level, type **TL** and the host number followed by a space and the trap level. The possible values for the trap level are:

- **0** (None), hosts do not receive any traps
- **1** (Critical), hosts receive only severe traps
- **2** (Major), hosts receive severe and serious traps
- **3** (All), to receive all traps

The default setting for this field is **0** (None).

SNMP Trap Type (TT)

To set the trap type, type **TT** and the host number followed by a space and the trap type. The ConnectUPS SNMP Module provides four possible trap types:

- **1** (Stnd MIB), hosts receive Standard UPS MIB-defined traps
- **2** (PowerMIB), hosts receive PowerMIB-defined traps
- **3** (Stnd+msgs), hosts receive Standard UPS MIB traps plus additional information
- **4** (PowerMIB+msgs), hosts receive PowerMIB traps plus additional messages

The default setting for the ConnectUPS SNMP Module is **1** (Stnd MIB), but trap type **2** (PowerMIB) is recommended since these traps are broken out by alarm type.

Modem Configuration Screen

The Modem Configuration screen allows you to configure and activate the module to communicate with a modem. This feature is helpful if you want to be notified when a problem occurs or to monitor the UPS status from an unattended computer using UPSdial.

To access this screen from the Main Configuration screen, type **MS** and press [Enter]. The Modem Configuration screen appears (see Figure 9).

```
-----  

CMD ----- Modem Configuration -----  

MT Modem Type (1-7) . . . . .**Not Defined** -->Modem Type List:  

MA Modem Active (Y/N) . . . . . No 1 = US Robotics  

NR Number Rings (0-15) . . . . . 3 2 = Hayes/Generic  

BD Baud rate (1200-9600) . . . . 9600 3 = Motorola  

MI Custom Modem Init . . . . . AT 4 = MultiTech  

----- Dialing Parameters ----- 5 = Boca  

PT Phone Type (Pulse/Tone) . . . Tone 6 = Practical Peripherals  

CA Enable Cancel Alarm (Y/N) . . . No 7 = GVC  

CI Call Interval (0-255 min) . . . 0 (eg, "MT 2" selects Hayes Modem Type)  

SU Status Interval (0-1524 min) . . 0  

SA to Save Configuration and Restart PS to show Phone numbers Screen  

CF to show Main Configuration Screen For help, enter just CMD (eg, "BD")  

Each Command is 2 letters + Host Number n (n=1-8) [+ New Value]  

(Example: "H1 128.1.2.3" sets this IP address for host #1)  

%
```

Figure 9. Modem Configuration Screen

The following commands can be used to configure the module for specific modem parameters. Press [Enter] after each command to save the new setting and return to the modem screen. After completing the modem settings, type PS and press [Enter] to configure the Phone Numbers screen.

Modem Type (MT)

Type MT followed by a space and the selection number for the specific modem type (1-7). For example, MT 3 selects a Motorola modem type. The ConnectUPS SNMP Module supports US Robotics, Hayes/Generic, Motorola, MultiTech, Boca, Practical Peripherals, and GVC. The default is Hayes. Enter 0 to indicate that no modem is selected; this automatically changes the Modem Active field to inactive (N).

Modem Active (MA)

To activate the modem feature, type MA followed by a space and Y (for Yes). To deactivate the modem feature, type MA N (for No). The default is inactive.

Number of Rings (NR)

Type NR followed by a space and the number of times the modem should ring before answering an outside call. You can specify between 0 and 15 rings. For network security, you can set this value to zero and the modem will never answer a call. The default value is 3 rings.

Baud Rate (BD)

Type BD followed by a space and the baud rate (1200, 2400, 4800, or 9600). The default is 9600 baud.

Custom Modem Initialization (MI)

To customize the modem initialization string, type MI “*string*.” The modem string must be enclosed in quotes. The custom string overrides the default (AT&F) and initializes the modem whenever the ConnectUPS SNMP Module is powered on or reset. For example, MI “ATL2” turns up the modem speaker volume.

Phone Type (PT)

Type PT followed by a space and P for a pulse-dial phone or T for a touch-tone phone. The default is tone.

Cancel Alarm (CA)

The Cancel Alarm feature allows you to call the modem to stop the repeated pages determined by the Call Interval. To enable the Cancel Alarm feature, type CA Y.

If configured with Y, when the modem receives the incoming call, the module stops redialing the pager even if the alarm is still active. If a new alarm occurs, the module restarts the paging process.

Type CA N to disable this feature. When set to N, the module does not allow alarms to be canceled, even if the modem answers your call.



NOTE If the Number of Rings is set to 0, the Cancel Alarm feature is ignored because the modem does not answer any incoming calls (see “Number of Rings” above).

Call Interval (CI)

Type **CI** *n*, where *n* equals the number of minutes the module should wait before paging you again for the same alarm condition (0 to 255 minutes). For example, if you enter **CI 5**, the module notifies you every 5 minutes while the alarm is active. The default is 0 (you only receive the first page for an active alarm).

Status Interval (SU)

The Status Interval is used for dialing computers only (see “Service” on page 24). The **SU** command configures the module to send status information to a computer with UPSdial within a specified time period. The value (0 to 1524) is in minutes and automatically rounds up to the multiple of 6. For example, **SU 11** sends a status report to the computer every 66 minutes; **SU 5** equals 30 minutes. The default is 0, which disables the Status Interval.

Phone Number Screen

The Phone Number screen allows you to enter the phone number(s) that the modem should dial. The phone numbers can be to a pager or a computer with monitoring software, such as UPSdial.

To access this screen from the Modem Configuration screen, type **PS** and press [Enter]. The Phone Number screen appears (see Figure 10).

```
----- Phone Numbers, Options, and IDs -----
CMD ____ID Fields_____
PD      0065542 . . . Pager Display value (Numeric Page)
PP      ,@ . . . Pager Dialing Pause (@ wait or ,,, pauses)
AP      . . . AlphaPagerID (one or two PINs)
      ____Phone Number____ Service Alert Net-Warn_ (Loss of Network)
PH1  No phone number . . . . .
PH2  No phone number . . . . .
PH3  No phone number . . . . .
PH4  No phone number . . . . .
PH5  No phone number . . . . .
PH6  No phone number . . . . .

Service values: 1=Computer, 2=Standard (Digital) Pager, 3=Alphanumeric Pager
Alert values: 1=Critical, 2=Major, 3=Minor, 4=Informational (All levels)
SA to Save Configuration and Restart MS to show Modem Configuration Screen
CF to show Main Configuration Screen For help, enter just CMD (eg, "BD")
%
```

Figure 10. Phone Number Screen

The following commands can be used to configure specific dialing parameters. Press [Enter] after each command to save the new setting and return to the Phone Number screen. After completing the phone number settings, type CF and press [Enter] to return to the Main Configuration screen.

Pager Display (PD)

To set the message that appears on the pager, type PD “xxxxxx,” where x equals the numeric message. The message must be enclosed in quotes and usually identifies the ID of the UPS or module. Valid characters are 0 through 9 with a maximum length of 8 digits.

Pager Pause (PP)

To adjust the time delay before the modem transmits the numeric message (alarm or status), type PP “*pause symbols*.” The pause symbols must be enclosed in quotes. A comma (,) represents a two-second delay and the @ symbol signals the modem to wait for silence. For example: type PP “,,,” for the modem to wait six seconds before sending the alarm or status. The default is “,@” for a two-second delay and silence.

Alphanumeric Pager ID (AP)

An alphanumeric pager can have one or two different pagers at the same phone number. Type AP “*pager ID or PIN*” to identify the pager. The ID or PIN must be enclosed in quotes. Valid characters are 0 through 9 with a maximum length of 16 digits. If more than one ID is used, include both IDs (or PINs) in the same command separated by a space. For example: type AP “5551212” for one ID, or type AP “5551212 5551234” for two IDs.

Phone Numbers (PH)

Use the PH command to enter the phone number(s) that the modem should dial. You can enter up to six different phone numbers. The numbers are dialed in sequential order.

Type PH*n* “xxxxxx,” where *n* equals the order sequence for the phone number (1–6) and *x* equals characters for the phone number. The phone number must be enclosed in quotes. You can type up to 15 characters including dialing commands, such as a comma (,) for pause and W for wait.

To delete a phone number from the list, enter a 0 for the phone number. For example, enter PH1 0 to remove the first phone number entry.

Service (SV)

The SV command is required and identifies the type of service the phone number dials. Type SV*n* followed by a space and the selection number for the service type, where *n* equals the phone number entry (1–6). The service types are:

- 1 for computer - If you specify computer, it is recommended that computer numbers are dialed last. When the modem connects to the computer, the module communicates with the monitoring software until the software ends the call.
- 2 for standard digital pager
- 3 for alphanumeric pager - only one entry in the phone list can be alphanumeric

For example, SV3 2 defines a standard digital pager for the third phone number.

Alert (AL)

Use the AL command to specify whether or not you want to be notified when the module receives alarms. Type **ALn** followed by a space and the selection number for the trap level, where *n* equals the phone number entry (1–6). The trap levels are:

- **0** (None), pagers/computers are not notified of any alarms
- **1** (Critical), to be notified of only severe alarms
- **2** (Major), to be notified of both severe and serious alarms
- **3** (Minor), to be notified of minor, serious, and severe alarms
- **4** (All), to be notified of all alarms, including informational alarms and when alarms clear

When the module receives an alarm with the specified trap level, the modem dials all phone numbers with the corresponding trap level. For example, **AL1 3** notifies the first phone number whenever there is a minor, serious, or severe alarm. The default is **0** (None).

Loss of Network (NW)

Use the NW command to be notified when there is a loss of communication with the network. If the module loses communication with the network, the module signals the modem to dial all phone numbers configured with the network warning.

Type **NWn** followed by a space and Y (for Yes) or N (for No), where *n* equals the phone number entry (1–6). For example, **NW2 Y** configures the second phone number to be notified of a network communication loss. The default is **N** (No).

Connecting to the Network

Connecting the module to an Ethernet network is optional. If you plan to install the module on a network, perform the connections before exiting the configuration.

To connect the ConnectUPS to a twisted-pair Ethernet network:

1. Plug a twisted-pair cable into the RJ-45 connector on the module.
2. Plug the other end into an appropriate port on your twisted-pair hub.

Exiting the Configuration Program

To activate the new configuration:

1. Type SA and press [Enter]. This command restarts the module with the new configuration changes. If the UPS is correctly configured, the Main Configuration screen automatically reports the correct UPS model.
2. The module is now configured. Disconnect the ConnectUPS SNMP Module from your terminal.
3. If you are using a modem, connect the modem cable to the ConnectUPS SNMP Module's female serial port (where the terminal cable was connected).



NOTE The modem cable is not supplied (see page 68).

4. See page 41 for details on installing the MIB.



CHAPTER 5

REMOTE CONFIGURATION

The bootstrap protocol (BOOTP) is a service that allows a network device to learn its IP address and configuration information through the network.

To use the BOOTP service, you must have a properly configured BOOTP server on your network. You must load the module configuration file (BOOTP/xups) onto the BOOTP server, modify and rename it for your configuration, and configure your BOOTP server to recognize the module.



NOTE Remote (BOOTP) configuration is recommended only for installations that need to configure many ConnectUPS SNMP Modules from a central location.

If you want to configure your module through the network and do not have BOOTP, contact your system administrator for information about obtaining BOOTP.

BOOTP is available for several different operating systems. Each operating system displays the information in a slightly different format, but the information should be the same or very similar.

Connecting to the Network

To connect the ConnectUPS to a twisted-pair Ethernet network:

1. Plug a twisted-pair cable into the RJ-45 connector on the module.
2. Plug the other end into an appropriate port on your twisted-pair hub.

Configuring the BOOTP File

Perform the following steps to load the module configuration file (BOOTP/xups) onto the BOOTP server and modify the file for configuration. You should know the hardware address of your module. Write this number down for future reference.

The hardware address can be found on the bottom of the module. The hardware address (in hexadecimal notation) is in this format: 002085 Xnnnnn.

The first part of the hardware address (002085) is fixed. The second part (Xnnnnn) is the serial number of the module.



NOTE You must have root access to the BOOTP server to perform some of these steps; contact your network administrator for assistance.

1. Designate a home directory to hold the boot files. The home directory in the example on page 29 is */tftpboot*.
Your server may already have a subdirectory named */tftpboot*.
2. Copy the *unix_mib.tar* file from the PowerMIB CD to the home directory on your BOOTP server.
3. To untar the file, type the following command and press [Return].

```
tar xvf unix_mib.tar ./bootp/xups
```
4. Make a copy of the *xups* file and rename the file to *xups.hostname*, where *hostname* is the (domain) name of your module.
For example, the domain name shown on page 29 is *adap1.your.com*. The new file name would be *xups.adap1.your.com*.
5. Edit the *xups.hostname* file to set up the module's configuration for BOOTP retries, community names, permanent hosts and privileges, and security levels. See “Changing the Configuration Fields” on page 31 for information on modifying the settings in the *xups* file.
6. Verify that Public Read Access is enabled on the *xups* file so that the module can access the file for the TFTP process. For UNIX® systems, use the change mode command to enable read access for other users: `chmod o,+r filename`.

7. Edit the *bootptab* file on your system to define the module's hardware address and to specify *xups* as the boot file for the module. You must also edit the *xups* file to configure the module for your computer system. Both the *bootptab* file and the *xups* file can be edited using any text editor, such as vi.

When you open *bootptab*, you may see license or copyright information at the top. As you scroll down, you may see a legend defining the abbreviations used in the configuration information. These abbreviations vary depending on the type of operating system you have. The following sample legend is for the AIX® operating system:

ht - Hardware type (Ethernet)
ha - Hardware address of the device
ip - Internet protocol (IP) address
sm - Subnet mask (verify with your network administrator)
gw - Gateway (the IP address of the default gateway)
hn - Host name (may be left blank)
tc - Template host (defines this entry as similar)
hd - Home directory (the location of the boot file)
bf - Boot file (the name of the boot and/or configuration file for the device)

The *bootptab* file usually lists global default configuration settings first. Below the global settings, you can add configuration settings specific to the module. This is an example *bootptab* file for IBM AIX:

```
global.default:\
ht=ethernet:\
ha=002085532750:\# just any address
ip=128.1.1.2:\# just any IP
sm=255.255.0.0:\#
gw=128.1.1.1

adap1.your.com:\# hostname of the module
ha=002085040001:\#
ip=128.1.2.3:\#
hd=/tftpboot:
#bf=xups:--may work better if you don't include "bf="
```



NOTE Verify that your BOOTP server uses the “vendor magic cookie value” of 99.130.83.99, as per RFC-951.

8. Check your BOOTP server description to see that the proper file name responds to the module’s BOOTP request.

The module sets the boot file field to *xups* as a generic boot file name in its BOOTP request. The combination of this *xups* name request and the **hd** and **bf** entries in *bootptab* determines the boot file name to be sent in the BOOTP response from your server. Consult your server documentation for more information.

For example, the sample AIX bootserver (shown on page 29) would return a boot file name of either */tftpboot/xups.adap1* or a file name of */tftpboot/xups* if that file did not exist or if the public read access was disabled.



NOTE If you have a router between the BOOTP server and your module, verify that it is configured to forward BOOTP broadcasts from your module.

9. After you edit *xups* to configure the module for your system, save the file and exit from the text editor. Make a backup copy of the new configuration file before powering on the module.
10. Start or restart your BOOTP server so that it reads the updated *bootptab* file. Some BOOTP servers time out if no requests are received within a certain period of time.

The module begins normal operation when it receives a correct BOOTP response (if BOOTP retries = any value other than 0) or when it completes the number of requests equal to the number of BOOTP retries.

If the module does not begin normal operation, you can view error messages on a terminal connected to the ConnectUPS SNMP Module or on the debug screen of your BOOTP server.

11. Continue to “Installing the MIB” on page 41.

Changing the Configuration Fields

The following file is a sample *xups* file. The PowerMIB CD contains a copy of this file.

```

# File XUPS -- Version 2.02 for Powerware Ethernet, Network,
#                                and ConnectUPS SNMP Modules (c)
# Copyright 1993-98, Powerware Corporation
# Last revised: mm/dd/yy by Your Name

# Configuration file for Powerware Network Adapters
# received via TFTP after BOOTP response gives fully qualified file name
# Not all of the configuration items apply to each type of adapter;
# consult your manual; extra items will be ignored by the adapter.

### note -- any characters following a '#' character are comments

# The adapter's IP, Netmask, and default Gateway are set via the
# BOOTP header, and generally not in this file (unless you need to
# change your current IP address to a new one via BOOTP)
# Put a '#' before the gateway statement if you have no gateway.
#my addr      128.1.2.3 # my IP address
#my netmask   255.255.0.0 # network portion of my IP address
#my gateway   128.1.1.1 # IP address of our gateway to other systems

### The number of times to try BOOTP configuration before
### using standard (or default) configuration.
bootp retries 30

### Setup strings for SNMP
### The SYS group values define the SNMP MIB II
### 'sys' group fields.
sys Name      "my.domain.name"
sys Contact   "Who to call, and their extension/pager number"
sys Location  "Where this adapter can be found"

### Community name used for all traps
### The trap community field defines the community name with
### which trap messages will be sent.
trap community all "public"

### This item is the severity level of errors needed to cause a
### warning beep on the speaker. A 0 means beeps are disabled,
### a 1 means only severe errors will beep the speaker, 2 means
### severe and serious errors will beep, and 3 means all errors beep.
### This only applies to the Powerware Network Adapter
audible traplevel 3

### Command Security Level determines who can get data and send commands
### Level 1=Stnd: Anyone with password/comm name can get or send;
### 2= High Set: Must be Perm host to send commands; anyone can get data
### 3= High: Must be Perm host to get data or send commands
cmdSecure level 1

### This item is the number of UPS serial ports
### installed on this adapter.
#comport all 2      # For Powerware Network Adapter
#comport all 1      # For ConnectUPS, Powerware Ethernet Adapter

```

```

#####.....Serial Port Information.....
#####  Unit ID message is 16 characters maximum,
#####  getname and setname are the SNMP community name required for
#####  doing SETS or GETS of MIB data for that port.
#####  Set and get names must be unique, and different for each serial port
#####  The "id____" values define the UPS MIB 'upsIdent' group fields
comport baud 1 19200      # port baud rate
comport id 1 "NetUPS" # ID field is 16 characters
comport getname 1 "public1"      # Community name for "gets"
comport setname 1 "private1"      # Community name for "sets"
#comport passwd 1 "Secret"      # Not secure to set it via TFTP !
comport idName 1 "Put text for upsIdentName here"
comport idAtDev 1 "upsIdentAttachedDevices: File Server, Monitor, CD-ROM"

##### .....Network Host Table Information .....
#####  The 'Num' item is a number used to reference this host later when
#####  specifying the authorizations for the hosts; the 'Name' item is a
#####  text name to identify the host, but is not used for addressing.
#####          Num   IP Address/Value      Name
Host addr      1      128.0.0.1      Network.manager
Host permanent 1      Y
Host traptype  1      3      # Recommend 3 or 4 for PW Network Adapter

##### .....Host Authorization by Port Number Information .....
#####  The desired traplevel to be received from each port is given.
#####          Num   Port1  Port2 (etc)
Host traplevel 1      3      # 3

##### .....Modem Configuration Information.....
#####  If you purchased an adapter with the modem option, you can configure and
#####  activate the adapter to communicate with a modem. This feature is helpful
#####  if you want to be notified when a problem occurs or monitor the UPS status
#####  from an unattended computer using UPSdial.
#####  note: remove modem configuration parameters if the modem feature is not
#####  used by preceding the following entries with the "#" symbol.

##### This command activates (Y) or deactivates (N) the modem feature.
modem enable N

##### Select the specific modem type: 1-US Robotics, 2-Hayes, 3-Motorola,
##### 4-MultiTech, 5-Boca, 6-Practical Peripherals, or 7-GVC.
modem type 2

##### Select the modem connection baud rate (1200, 2400, 4800, or 9600).
modem baud 9600

##### Enter the number of times the modem should ring before answering an
#####  outside call (0 to 15 rings). Use 0 for network security so that the
#####  modem never answers an incoming call.
modem rings 3

##### This command allows you to call in and halt the repeated transmission of
#####  pages for an active alarm.
modem cancel y      # n the call is not answered and the page repeats.

##### Set the number of minutes (0-255) for the adapter to redial the page for
#####  the same alarm condition.
modem redial 5      # redials every 5 minutes

```

```

### If the modem dials a computer and sends status information (via UPSdial),
### use this command to specify the time interval (0 to 1524 minutes). The
### adapter automatically rounds up the numeric interval in increments of
### 6 minutes. For example, modem status 11 automatically sends status
### information every 66 minutes.
modem status 0      # 0 disables

### This command specifies a custom string to configure the modem and
### overrides the default initialization string (AT&F).
modem init "ATL3"  # sets the volume to high

### .....Phone Number Configuration Information.....
### The following commands are used for configuring specific dialing
### parameters. Up to 6 phone numbers can be configured.
### note: remove phone configuration parameters if the modem feature is not
### used by preceding the following entries with the "#" symbol.

### Use this command to set the message that appears on the pager's LCD. The
### message usually identifies the ID of the UPS or adapter. Valid characters
### are 0 to 9 with a maximum of 8 characters.
modem idName "1234911"

### This command adjusts the time delay before the modem transmits
### the numeric message (alarm or status). Use "," for a 1-second delay; use
### "@" to wait for silence.
modem pause ",@"      #waits for 1 second and then for silence

### This command identifies the alphanumeric pager. Valid characters are
### 0 to 9, maximum length of 16 digits. If more than one ID is used, include
### both IDs (or PINs) in the same command separated by a space (for example,
### modem id "5551212" for one ID, or modem id "5551212 5551234" for two IDs).
modem id "pager ID or PIN"

### Enter the phone numbers that the modem should dial (up to 6 numbers);
### dialed in sequential order. After each command, type N V where N is the
### order sequence for the phone number and V is the value for each parameter.
# Phone numbers can have 15 valid characters including dialing commands
# (ie., W for wait or , for pause).
# Modem service is required and identifies the type of service the modem dials:
# 1-computer, 2-digital pager, or 3-alphanumeric pager. Put computer numbers
# last in sequential order; only one alphanumeric pager allowed.
# Modem level is for sending alerts when the adapter receives a specified
# trap level (modem dials all numbers with the corresponding trap level).
# Trap levels: 0-none, 1-critical (only severe), 2-major
# (only severe and serious), 3-minor (severe, serious, and minor), or 4-all.
# Modem warn dials all specified phone numbers when there is a loss of network.
# Type Y for yes or N for no.

# command N V
modem phone 1 "9,5551234"
modem service 1 2
modem level 1 1
modem warn 1 y

#modem phone 2 "9,5556789"
#modem service 2 2
#modem level 2 0
#modem warn 2 n

```

```
#modem phone 3 "9,5554321"
#modem service 3 1
#modem level 3 4
#modem warn 3 y
```

Not all of the settings in the *xups* configuration file apply to the ConnectUPS SNMP Module. The following sections describe the fields you can edit in the *xups* file to configure the module for your system.



NOTE Be careful not to remove the double quotes around variable-length fields (such as community name, system contact, system location, modem init, and modem phone). The quotes are delimiters indicating the beginning and end of a field. Removing them may cause the module to be configured incorrectly.

Number of attempts for BOOTP before using default information

Specify the number of times the module should request BOOTP configuration. You can specify any positive number up to 255 (the default is 30). If you set this field to 0, no BOOTP requests are made. To have the module request BOOTP configuration repeatedly until it receives a successful configuration, specify -1 in this field. Retries are sent at approximately two-minute intervals.



NOTE If you configure the module using the configuration program rather than BOOTP, be sure to set this field to 0. If you specify any other value, you have to wait while the module powers on and receives a successful BOOTP configuration (or completes the specified number of requests).

sys Name

Type the system name assigned by your system administrator (up to 63 alphanumeric characters). The name you type is used by network operators, and is not used for network addressing.

sys Contact

Type up to 63 alphanumeric characters to identify someone to contact with questions about the module or its operation.

sys Location

Type up to 63 alphanumeric characters to identify the location of the installed module.

SNMP trap community all

Type up to 16 alphanumeric characters to specify the community name the SNMP manager uses for sending all traps.

cmdSecure level

Type 1, 2, or 3 to set the command security level. This command determines who receives data or sends commands. There are three possible entries:

- 1 - The standard level allows anyone with the correct OnliNet password or community name (for SNMP) to receive data or send commands. This is the only level that times out permanent entries in the ARP cache. This level also allows remote configuration via modem.
- 2 - The high-sets level restricts sets and commands to those hosts that appear in the host table; any SNMP manager with the correct get community name or any OnliNet Network user may request data.
- 3 - The high level is the most secure. Only those hosts who appear in the host table and use the correct OnliNet password or community name can receive data or send commands.

comport baud

Type the port baud rate. It is recommended to set this value to 19200 baud.

comport id

Type the name of the UPS unit that you are currently configuring. You can enter up to 16 characters to identify the UPS unit. This information may be represented as the serial number on some UPS units.

SNMP comport getname (Community name for "gets")

Type up to 16 alphanumeric characters to specify the get community name.

SNMP comport setname (Community name for "sets")

Type up to 16 alphanumeric characters to specify the set community name.

comport idName

Type a description to identify the UPS. You can type up to 16 alphanumeric characters in this field.

comport idAtDev

To list devices that are currently connected to the module, type the device name. You can type up to 63 characters (for device names) to identify devices such as hubs, routers, and modems that are connected to the module.

Num

This field is used for host commands. You must specify a specific host number with each host command. Type a single digit (1–8) to specify the number of the host.

Host addr (IP address)

Type the Internet protocol address assigned to this module. Use the format *a.b.c.d*, where *a*, *b*, *c*, and *d* are numbers between 0 and 255. If you do not know the IP address, contact your network administrator.

Host permanent

To enter a host into permanent memory type Y (for Yes) or N (for No).

SNMP Host traptype

To set the trap type, type the trap type number. The ConnectUPS SNMP Module provides four possible trap types:

- 1 (Stnd MIB), hosts receive Standard UPS MIB-defined traps
- 2 (PowerMIB), hosts receive PowerMIB-defined traps (recommended)
- 3 (Stnd+msgs), hosts receive Standard UPS MIB traps plus additional information
- 4 (PowerMIB+msgs), hosts receive PowerMIB traps plus additional messages

SNMP ➤ Host traplevel

To set the trap level, type the trap level number. The possible values for the trap level are:

- 0 (None), hosts do not receive any traps
- 1 (Critical), hosts receive only severe traps
- 2 (Major), hosts receive severe and serious traps
- 3 (All), to receive all traps

modem enable

To activate the modem feature, type Y (for Yes). To deactivate the modem feature, type N (for No). The default is inactive.

modem type

Type the selection number for the specific modem type (1–7). For example, **modem type 3** selects a Motorola modem type. The ConnectUPS SNMP Module supports US Robotics, Hayes, Motorola, MultiTech, Boca, Practical Peripherals, and GVC. Enter 0 to indicate that no modem is selected; this automatically changes the modem enable field to inactive (N).

modem baud

To set the baud rate for the modem connection, type the baud rate after this command (1200, 2400, 4800, or 9600).

modem rings

Type the number of times the modem should ring before answering an outside call. You can specify between 0 and 15 rings. For network security, you can set this value to 0 and the modem will never answer a call.

modem cancel

The cancel alarm feature allows you to call the modem to stop the repeated pages determined by the call interval. To enable the cancel alarm feature, type Y. If configured with Y, when the modem receives the incoming call, the module stops redialing the pager even if the alarm is still active. If a new alarm occurs, the module restarts the paging process. Type N to disable this feature. When set to N, the module does not allow alarms to be canceled, even if the modem answers your call.



NOTE If the number of modem rings is set to 0, the cancel alarm feature is ignored because the modem does not answer any incoming calls (see “modem rings” in the previous section).

modem redial

Use the modem redial command to set the number of minutes the module should wait before paging you again for the same alarm condition (0 to 255 minutes). For example, if you enter **modem redial 5**, the module notifies you every 5 minutes while the alarm is active.

modem status

The status interval is used for dialing computers only (see “modem service” on page 39). The **modem status** command configures the module to send status information to a computer with UPSdial within a specified time period. The value (0 to 1524) is in minutes and automatically rounds up to the multiple of 6. For example, **modem status 5** sends a status report to the computer every 30 minutes.

modem init

To customize the modem initialization string, type the “*string*” after the command. The custom string overrides the default (AT&F) and initializes the modem whenever the ConnectUPS SNMP Module is powered on or reset.

modem idName

To set the message that appears on the pager, type “xxxxxx,” where *x* equals the numeric message. The message usually identifies the ID of the UPS or module. Valid characters are 0 through 9 with a maximum length of 8 digits.

modem pause

To adjust the time delay before the modem transmits the numeric message (alarm or status), type “*pause symbols*.” A comma (,) represents a two-second delay and the @ symbol signals the modem to wait for silence. For example: **modem pause “,,”** waits six seconds before sending the alarm or status.

modem id

An alphanumeric pager can have one or two different pagers at the same phone number. Use **modem id “*pager ID or PIN*”** to identify the pager. Valid characters are 0 through 9 with a maximum length of 16 digits. If more than one ID is used, include both IDs (or PINs) in the same command separated by a space. For example: type **modem id “5551212”** for one ID, or **modem id “5551212 5551234”** for two IDs.

modem phone

Use the **modem phone** command to enter the phone number(s) that the modem should dial. You can enter up to six different phone numbers. The numbers are dialed in sequential order.

Type *n* “*xxxxxx*,” where *n* equals the order sequence for the phone number (1–6) and *x* equals characters for the phone number. You can type up to 15 characters including dialing commands, such as a comma (,) for pause and W for wait.

To add phone numbers to the list, enter the command and number on a new line. To remove a phone number from the list, delete the line.

modem service

The **modem service** command is required and identifies the type of service the phone number dials. Type *n x*, where *n* equals the phone number entry (1–6) and *x* equals the selection number for the service type. The service types are:

- 1 for computer - If you specify computer, it is recommended that computer numbers are dialed last. When the modem connects to the computer, the module communicates with the monitoring software until the software ends the call.

- 2 for standard digital pager
- 3 for alphanumeric pager - only one entry in the phone list can be alphanumeric

For example, **modem service 3 2** defines a standard digital pager for the third phone number.

modem level

Type the trap level number to set the module to send alerts. When the module receives an alarm with the specified trap level, the modem dials all phone numbers with the corresponding trap level.

Type **n x** where **n** equals the phone number entry (1–6) and **x** equals the selection number for the trap level. The trap levels are:

- 0 (None), pagers/computers are not notified of any alarms
- 1 (Critical), to be notified of only severe alarms
- 2 (Major), to be notified of both severe and serious alarms
- 3 (Minor), to be notified of minor, serious, and severe alarms
- 4 (All), to be notified of all alarms, including informational alarms and when alarms clear

For example, **modem level 1 3** notifies the first phone number whenever there is a minor, serious, or severe alarm.

modem warn

Use the **modem warn** command to be notified when there is a loss of communication with the network. If the module loses communication with the network, the module signals the modem to dial all phone numbers configured with the network warning.

Type **n** followed by a space and **Y** (for Yes) or **N** (for No), where **n** equals the phone number entry (1–6). For example, **modem warn 2 Y** configures the second phone number to be notified of a network communication loss.

After you edit **xups** to configure the module for your system, save the file and exit from the text editor. Make a backup copy of the new configuration file before powering on the module.



CHAPTER 6

INSTALLING THE MIB

You can install the UPS PowerMIB and the Standard UPS MIB on any general network manager.



NOTE Some network management packages are "element" managers (for example, hubs or routers), and cannot accept new MIBs.

Selecting MIB Files

The PowerMIB CD contains a variety of UPS MIB files. To install the MIB files, decide which files to load based on your preferences and the Network Management Software you are using. Refer to the *read_me.txt* file on the PowerMIB CD for current installation instructions.

You can use the Standard UPS MIB, as described in RFC-1628, or the proprietary PowerMIB. If you have enough disk space on your management station, it is recommended to load both MIBs. The following table lists the advantages of both MIBs.

Standard UPS MIB	PowerMIB
Enhances the Test and Control groups	More trap types and trap descriptions Simpler battery test procedure Includes the MIB for individual receptacle control
Includes some objects not found in PowerMIB: upsIdentName upsIdentAttachedDevices upsBatteryStatus upsSecondsOnBattery upsOutputSource upsConfigInputFreq upsConfigOutputVA upsConfigLowBattTime upsConfigAudibleStatus	Includes some objects not found in Standard MIB: xupsAlarmNumEvents xupsAlarmEventID xupsAlarmEventDateAndTime xupsAlarmEventKind xupsAlarmEventDescr xupsBatteryAbmStatus xupsEnvironmentGroup xupsControlToBypassDelay xupsConfigDateAndTime xupsMaxTrapLevel xupsSendTrapType

To select the appropriate MIB file, locate the operating system you use and load the MIB file that corresponds to the operating system.

Choosing a Standard UPS MIB File

If you are using Novell's® NetWare Management System™ 2.0 on HP OpenView™ for Windows®, you should load the MIB file located in the appropriate subdirectory. The traps in the Novell NMS file are annotated for NMS. You should also copy the `\NVL_NMSUPS_*.PRF` file to include all MIB browsing profiles with Novell NMS.

If you are not using one of these managers, you should load the `STDUPSV1.MIB` file. Only SNMP version 1 is currently supported in this file. The `RFC1628.TXT` file located in the `RFC` subdirectory has the SNMP version 2 format.



NOTE If you are using a UNIX platform, you need the `STDUPSV1.MIB` file from the `unix_mib.tar` file on the PowerMIB CD. This eliminates unwanted carriage return symbols in the MIB file.

Choosing a PowerMIB File

If you are using Novell NMS on HP OpenView for Windows, then you should load the MIB file from the appropriate subdirectory. You should also copy all MIB browsing profiles in the `\NVL_NMS_XUPS*.PRF` file for Novell NMS.

If you are not using one of these managers, you should load the `XUPS.MIB` file.



NOTE If you are using a UNIX platform, you need the `XUPS.MIB` file from the `unix_mib.tar` file on the PowerMIB CD. This eliminates unwanted carriage return symbols in the MIB file.



CHAPTER 7

TROUBLESHOOTING

Problem	Possible Cause	Corrective Action
ConnectUPS SNMP Module does not respond to SNMP get requests, but does respond to pings.	<p>The UPS is not connected.</p> <p>Wrong community name being used. The get community name that was set during the module configuration does not match the one being used by your network management system (NMS) for get requests.</p>	<p>Check all connections between the UPS and module and verify the connections are secure.</p> <p>To verify that the community name is mismatched, connect a terminal to the module (see Chapter 4, “Local Configuration” on page 9). If the <code>authentication failed, SNMP source: xx.xx.xx.xx:yy</code> message appears (where <code>xx.xx.xx.xx</code> is the IP address of your NMS) every time your NMS does an SNMP get request, then correct the get community name used by the NMS. Note that community names are case-sensitive, and non-alphanumeric characters (such as spaces) are included in the count. Please refer to your NMS user’s guide for more information on configuring community names.</p>
ConnectUPS SNMP Module does not respond to some UPS object get requests, but responds to others.	<p>The UPS is not communicating with the module.</p> <p>A particular UPS data object is not implemented on this UPS.</p>	<p>Check all connections between the UPS and module and verify the connections are secure. With a Powerware 5119, the Communication indicator should be blinking at an irregular rate.</p> <p>Get <code>upsIdentModel</code> or <code>xupsIdentModel</code> from your NMS. If it responds with the UPS model, then the UPS is communicating properly. No UPS model reports all of the MIB items.</p>
Using the same community name for SNMP gets and sets; gets work, but sets do not.	The same community name is used for both gets and sets.	<p>Confirm the get community name and set community name are different. You can use the set community name for doing both gets and sets.</p> <p>If you want to use just one community name (such as <code>public</code>) for gets and sets, then configure the module’s get community name to some value you are not using (such as <code>unused</code>) and configure its set community name to the desired value (<code>public</code>).</p>

Problem	Possible Cause	Corrective Action
There are UPS alarms, as indicated by a non-zero <code>upsAlarmsPresent</code> , but the NMS shows an empty <code>upsAlarmTable</code> .	Some NMSs, such as Novell's NMS 2.0, cannot get the sparsely populated <code>upsAlarmTable</code> reliably.	Try accessing the PowerMIB's <code>xupsAlarmTable</code> .
BOOTP does not work.	<p>The ConnectUPS SNMP Module's physical address or other configuration item is not correctly entered in the hardware address (ha) field of <code>bootptab</code> file on the BOOTP server.</p>	<p>See also the helpful hints located in the \BOOTP directory on the PowerMIB.</p> <p>Connect a terminal to the module (see Chapter 4, "Local Configuration" on page 9). When the module sends a BOOTP request, the following message appears on the terminal:</p> <pre>bootp: made BOOTP request (num retries = xx).</pre> <p>If any BOOTP response is received, the module prints <code>Got a BOOTP response</code> and then immediately prints the response contents. The response can be checked to see if the correct values were received. A network analysis tool can be used to monitor the sequence and contents of BOOTP requests and responses.</p>
BOOTP server not configured properly.		If no response is received, check the <code>bootptab</code> file on your BOOTP server and verify that the standard "magic cookie value" of 99.130.83.99 is used by your BOOTP server.
BOOTP not received correctly when using the module's IP address.		Configure the module's IP address to 0.0.0.0 (not defined) and save the configuration to reboot the ConnectUPS SNMP Module.
The BOOTP request succeeds, but the follow-on TFTP request for the <code>xups</code> configuration file fails.	TFTP server not running, or the ConnectUPS SNMP Module is not authorized by the server for TFTP.	Use a network analysis tool to determine which part of the TFTP process is not working correctly.
Incorrect configuration file name or path given by BOOTP server.		Connect a terminal to the module and examine the data dump of the BOOTP response, particularly, what appears for the Boot file name.
ConnectUPS SNMP Module configured incorrectly after BOOTP response.		Compare the module configuration screen before and after the BOOTP packet is received. Note any configuration items that have changed; for instance, if the BOOTP packet contains an incorrect netmask, the module sends the TFTP request to the Default Gateway instead of to the BOOTP and TFTP server. Correct errors in the <code>bootptab</code> file.

Service and Support

If you have any questions or problems with the ConnectUPS SNMP Module, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for a ConnectUPS SNMP Module technical representative.

In the United States	1-800-365-4892
In Canada	1-800-461-9166
All other countries	1-919-870-3149

Please have the following information ready when you call the Help Desk:

- Model number
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.



NOTE For critical applications, immediate replacement may be available. Call the **Help Desk** for the dealer or distributor nearest you.

Two-Year Limited Warranty (US and Canada Only)

Powerware Corporation warrants the electronics of the ConnectUPS SNMP Module to be free from defects in material and workmanship for a period of two years from Date of Purchase. If, in Powerware Corporation's opinion, the electronics fails to meet its published specifications due to a defect in material and workmanship covered by this warranty, Powerware Corporation will repair or replace the warranted Unit at no cost to the customer for parts and labor.

Equipment supplied by Powerware Corporation, but not manufactured by Powerware Corporation, is warranted solely by the manufacturer of such equipment. Powerware Corporation does not warrant equipment not manufactured by Powerware Corporation.

This warranty does not apply to any Unit that has been subject to neglect, accident, abuse, misuse, misapplication, incorrect connection or that has been subject to repair or alteration not authorized in writing by Powerware Corporation's personnel. THIS WARRANTY IS THE PURCHASER'S (USER'S) SOLE REMEDY AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTY, AND THERE ARE NO OTHER EXPRESSED OR IMPLIED GUARANTEES OR WARRANTIES (INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE). In no case will Powerware Corporation's liability under this contract exceed the value of the Unit furnished.

In no event shall Powerware Corporation be liable for any indirect, incidental, special or consequential damages. Powerware Corporation shall not be responsible for failure to provide service or parts due to causes beyond Powerware Corporation's reasonable control. THIS LIMITED WARRANTY IS VOID UNLESS USER RETURNS TO POWERWARE CORPORATION THE INCLUDED WARRANTY REGISTRATION CARD WITHIN THIRTY (30) DAYS OF DELIVERY.

Any advice furnished the Purchaser (User) before or after delivery in regard to use or application of Powerware Corporation equipment is furnished without charges and on the basis that it represents Powerware Corporation's best judgement under the circumstances. The use of any such advice by the Purchaser (User) is solely and entirely at his or her own risk.

This limited warranty applies only to equipment installed in the fifty United States of America and Canada. In other countries, consult your local distributor.

Extended Service Coverage

A full complement of warranty extensions and enhancements are available from Powerware Corporation for your UPS. Information pertaining to these services should be available in the shipping container along with this manual. If not, or if you would like more information, call the Powerware Corporation **Help Desk** and ask about warranty services.

International Limited Warranty

Powerware Corporation warrants the electronics modules manufactured by Powerware Corporation ("Unit") and batteries originally packaged in the Unit or in battery packs manufactured by Powerware Corporation against defect in material or workmanship until the earlier of: (1) 18 months from date of shipment or (2) 12 months from date of initial start-up is performed by Powerware Corporation field personnel or field personnel authorized by Powerware Corporation to carry out such service efforts on its behalf and provided that, startup occurs no later than 6 months after shipment. If the unit does not function in accordance with its published specification, the user should give Powerware Corporation prompt notice thereof and if requested by Powerware Corporation, the user shall return the warranted Unit or parts thereof to the plant or service station designated by Powerware Corporation for inspection by Powerware Corporation. Any Unit which may require repair and/or replacement of parts as the result of defects in workmanship or material within the stated warranty period, will be replaced or repaired at Powerware Corporation's option without charge for replacement parts. The cost of shipment, duties or all other expenses associated with shipment of repaired or replaced items is for the account of the user.

Powerware Corporation will not be responsible or liable for work done or expense incurred in connection with repair or replacement except as expressly authorized by Powerware Corporation, Raleigh, NC, USA in writing. If a service engineer is required, labor, at current published rates, and all travel and living expenses are for the account of the user.

Powerware Corporation does not warrant equipment not manufactured by Powerware Corporation including any battery not originally packaged with the Unit or in battery packs manufactured by Powerware Corporation. The manufacturer of all such equipment shall solely warrant that equipment and Powerware Corporation shall have no responsibility or liability thereof.

IT IS AGREED THAT POWERWARE CORPORATION, ITS PARENT COMPANY, OR ANY OF THEIR AFFILIATES, SHALL HAVE NO LIABILITY FOR INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES, AND THAT THERE IS NO WARRANTY, EITHER EXPRESSED OR IMPLIED BY LAW OR THE PARTIES HERETO, OTHER THAN THOSE EXPRESSLY SET FORTH HEREIN. THIS WARRANTY DOES NOT COVER DAMAGE TO THE UNIT CAUSED BY MISUSE, ABUSE, NEGLECT, UNAUTHORIZED MODIFICATIONS, IMPROPER MAINTENANCE, ACCIDENTS OR OTHER ABNORMAL CONDITIONS.

Force Majeure

Powerware Corporation shall not be liable for any delays or defaults hereunder by reason of fire, floods, acts of God, labor troubles, accidents to machinery, delays of carriers or suppliers, inability of suppliers to supply, the impositions of priorities, restrictions or other acts of government, or other causes beyond its reasonable control.

This Warranty shall be governed by the laws of the State of North Carolina, USA in all respects.



CHAPTER 8

APPENDIX

The appendix contains MIB definitions, MIB II interface support, related Internet reference documentation, and ConnectUPS SNMP Module pin assignments.

PowerMIB Definitions

The PowerMIB consists of four main sections:

- UPS Control Objects
- Alarm and Trap Objects
- UPS Status Objects
- UPS Receptacle Control Objects

With the UPS Control Objects, a network manager can remotely control the UPS by SNMP set commands, performing such tasks as shutting down or turning on the UPS.

The Alarm and Trap Objects alert the SNMP management station to the condition of the UPS and of significant conditions, such as Shutdown Imminent.

The UPS Status Objects allow the network manager to check or graph the condition of the UPS and its environment such as monitoring input voltage and output load.

The objects described are for version 2.11 of the PowerMIB; later versions may add objects, which will be described in the PowerMIB itself.

PowerMIB UPS Control Objects

These objects are used to control the UPS and are managed by SNMP set commands. For example, to get the UPS to turn off in 125 seconds, set *xupsControlOutputOffDelay* to 125. When *xupsControlOutputOffDelay* is read back, it indicates the seconds remaining before shutdown.

UPS Control Objects	
<i>xupsControlOutputOffDelay</i>	Turns the UPS off after the specified delay (in seconds).
<i>xupsControlOutputOnDelay</i>	Turns the UPS on after the specified delay (in seconds).
<i>xupsControlOutputOffTrapDelay</i>	Sends an <i>xupsControlOff</i> trap the specified number of seconds before shutdown (UPS Off).
<i>xupsControlToBypassDelay</i>	Puts the UPS on Bypass after the specified delay (in seconds).
<i>xupsTestBattery</i>	Initiates a 30 second battery test.
<i>xupsEnvAmbientLower&UpperLimit</i>	The Lower Limit of the ambient temperature (before <i>xupsAmbientTempBad</i> alarm). The Upper Limit of the ambient temperature (before <i>xupsAmbientTempBad</i> alarm).
<i>xupsTestBatteryStatus</i>	Indicates whether the battery test passed, failed, has not been run, or is not supported in this UPS.
<i>xupsConfigDateAndTime</i>	Sets or reads the date and time in the UPS with an internal clock.

PowerMIB Alarm and Trap Objects

The Alarm and the Alarm Event History MIB objects are listed in the following table. The Alarm Event History is a log of significant events that is stored by the UPS in nonvolatile memory; not all UPSs implement this log.

Alarm and Trap Objects	
xupsAlarms	The number of active alarms in the alarm table.
xupsAlarmEntry	Each entry consists of <i>xupsAlarmID</i> , <i>xupsAlarmDescr</i> , and <i>xupsAlarmTime</i> .
xupsAlarmID	The alarm number (same as its trap number).
xupsAlarmDescr	The MIB object identifier number for this alarm.
xupsAlarmTime	The <i>sysUpTime</i> when this alarm occurred.
xupsAlarmNumEvents	The number of entries in the alarm event table (up to 200).
xupsAlarmEventEntry	Each entry consists of <i>xupsAlarmEventID</i> , <i>xupsAlarmEventDateAndTime</i> , <i>xupsAlarmEventKind</i> , and <i>xupsAlarmEventDescr</i> .
xupsAlarmEventID	The index number of this entry.
xupsAlarmEventDateAndTime	The date and time when this event occurred.
xupsAlarmEventKind	Indicates whether this event was an alarm occurring or being cleared.
xupsAlarmEventDescr	The MIB object identifier number for this alarm event (there are over 192 distinct events that may be indicated by this value).
xupsMaxTrapLevel	The level of severity of traps that are sent to the requesting host.
xupsSendTrapType	The type of traps that are sent to the requesting host.

The alarms and traps that are defined by the PowerMIB are listed in the following table. The number in parenthesis following the alarm/trap name represents the alarm and trap number. The *xupsControlOff* and *xupsControlOn* names exist only as traps, not alarms.

Alarm and Trap Names	Trap Level
<i>xupsControlOff</i> (1) The UPS output power to turn off in a number of seconds equal to <i>xupsControlOutputOffTrapDelay</i> .	Critical
<i>xupsControlOn</i> (2) The UPS output power turns on in a number of seconds equal to <i>xupsControlOutputOnTrapDelay</i> .	Informational
<i>xupsOnBattery</i> (3) The UPS is operating from battery power.	Major
<i>xupsLowBattery</i> (4) The UPS is operating from battery power, and there are only 2 minutes or less of run time available.	Critical
<i>xupsUtilityPowerRestored</i> (5) Input power has been restored after running on battery.	Informational
<i>xupsReturnFromLowBattery</i> (6) The UPS has recovered from a low battery condition.	Informational
<i>xupsOutputOverload</i> (7) The UPS has sensed that output current exceeds the rated value.	Major
<i>xupsInternalFailure</i> (8) Some component of the UPS (rectifier, inverter, or control panel) has failed.	Major
<i>xupsBatteryDischarged</i> (9) The battery is fully depleted; there is no battery backup protection available in the event of an input power failure.	Critical
<i>xupsInverterFailure</i> (10) The UPS inverter is unavailable due to a failure in its circuitry.	Critical
<i>xupsOnBypass</i> (11) The UPS is operating from bypass power.	Major
<i>xupsBypassNotAvailable</i> (12) The UPS bypass power is not available or out of tolerance.	Minor
<i>xupsOutputOff</i> (13) The UPS output is turned off.	Critical
<i>xupsInputFailure</i> (14) The input power is out of tolerance in voltage, frequency, or phase rotation.	Minor

Alarm and Trap Names	Trap Level
xupsBuildingAlarm (15) One of the defined building alarms has occurred.	Major
xupsShutdownImminent (16) The UPS turns off the output power in less than 5 seconds.	Critical
xupsOnInverter (17) The UPS is supplying output power through its inverter (normal operation).	Informational
xupsBreakerOpen (20) One of the UPS breakers or contactors has been opened.	Critical
xupsAlarmEntryAdded (21) An alarm not defined in the xups Well Known Alarms has been added to the Alarm Table.	Major
xupsAlarmEntryRemoved (22) An alarm not defined in the xups Well Known Alarms has been removed from the Alarm Table.	Informational
xupsAlarmBatteryBad (23) One or more batteries needs replacing.	Major
xupsOutputOffAsRequested (24) The UPS has shutdown as requested (i.e., the output is off).	Informational
xupsDiagnosticTestFailed (25) The result of the last diagnostic test indicates a failure.	Minor
xupsCommunicationsLost (26) A problem has been encountered in the communications between the agent and the UPS.	Major
xupsUpsShutdownPending (27) An xupsControlOutputOffDelay countdown is underway.	Major
xupsAlarmTestInProgress (28) A test is in progress, as initiated and indicated by the Battery Test Group.	Informational
xupsAmbientTempBad (29) The Ambient Temperature is outside of its lower/upper limits.	Major

PowerMIB UPS Status Objects

The MIB objects that supply monitoring and status information about the UPS are detailed below. These objects were chosen to be similar to the industry-standard UPS MIB objects. Some of the groups implement tables of values, where the measured values for each phase constitute one entry in the table.



NOTE Not every UPS model implements all the objects listed below. For example, the Bypass objects are only supported by larger UPSs with a separate bypass feed.

UPS Status Objects

xupsIdentManufacturer

The UPS manufacturer name (for example, Fiskars Power Systems).

xupsIdentModel

The UPS model (for example, Powerware 5119).

xupsIdentSoftwareVersion

The firmware revision level(s) of the UPS microcontrollers.

xupsBatTimeRemaining

Battery run time in seconds before UPS turns off due to low battery.

xupsBatVoltage

Measured battery voltage.

xupsBatCurrent

Measured battery current (discharge is positive).

xupsBatCapacity

Percent of battery charge.

xupsBatteryAbmStatus

Gives the status of the Advanced Battery Management.

xupsInputFrequency

The utility line frequency in tenths of Hz.

xupsInputLineBads

The number of times the input was out of tolerance in voltage or frequency.

xupsInputNumPhases

The number of phases in the input.

xupsInputEntry

Each entry consists of *xupsInputPhase*, *xupsInputVoltage*, *xupsInputCurrent*, and *xupsInputWatts*.

UPS Status Objects	
xupsInputPhase	The number of the phase. Serves as an index for the table.
xupsInputVoltage	The measured input Root Mean Squared (RMS) voltage.
xupsInputCurrent	The measured input current in amps.
xupsInputWatts	The measured input real power in watts.
xupsOutputLoad	The UPS output load in percent of rated capacity.
xupsOutputFrequency	The output frequency in tenths of Hz.
xupsOutputNumPhases	The number of phases in the output.
xupsOutputEntry	Each entry consists of <i>xupsOutputPhase</i> , <i>xupsOutputVoltage</i> , <i>xupsOutputCurrent</i> , and <i>xupsOutputWatts</i> .
xupsOutputPhase	The number of the phase. Serves as an index for the table.
xupsOutputVoltage	The measured output RMS voltage.
xupsOutputCurrent	The measured output current in amps.
xupsOutputWatts	The measured output real power in watts.
xupsBypassFrequency	The bypass frequency in tenths of Hz.
xupsBypassNumPhases	The number of phases in the bypass.
xupsBypassEntry	Each entry consists of <i>xupsBypassPhase</i> and <i>xupsBypassVoltage</i> .
xupsBypassPhase	The number of the phase. Serves as an index for the table.
xupsBypassVoltage	The measured bypass RMS voltage.

UPS Status Objects
xupsConfigOutputVoltage The nominal UPS output voltage per phase.
xupsEnvAmbientTemp The reading of the ambient temperature in the vicinity of the UPS.
xupsConfigInputVoltage The nominal UPS input voltage per phase.
xupsConfigOutputWatts The nominal UPS available real power output in watts.
xupsConfigOutputFreq The nominal output frequency in tenths of Hz.

PowerMIB UPS Receptacle Control Objects

The following table lists the objects for individual receptacle control.

Receptacle Control Objects
xupsNumReceptacles The number of receptacles (outlets) that can be individually controlled on this UPS. Gives the number of entries in the <i>xupsRecepTable</i> .
xupsRecepEntry Each entry consists of <i>xupsRecepIndex</i> , <i>xupsRecepStatus</i> , <i>xupsRecepOffDelaySecs</i> , <i>xupsRecepOnDelaySecs</i> , <i>xupsRecepAutoOffDelay</i> , and <i>xupsRecepAutoOnDelay</i> .
xupsRecepIndex The number of the receptacle. Serves as index for receptacle table.
xupsRecepStatus The receptacle status 1=On/Close, 2=Off/Open, 3=On with Pending Off, 4=Off with Pending On, 5=Unknown.
xupsRecepOffDelaySecs The delay until the receptacle is turned off (in seconds).
xupsRecepOnDelaySecs The delay until the receptacle is turned on (in seconds).
xupsRecepAutoOffDelay The delay after going on battery until the receptacle is automatically turned off (in seconds).
xupsRecepAutoOnDelay The delay added at power-up or after an On command before the receptacle is turned on (in seconds).

Standard UPS MIB

The Standard UPS MIB is compatible with UPS SNMP agents from several vendors and contains some objects not found in the PowerMIB.

UPS Control Objects

The following table lists the UPS Control Objects for the Standard UPS MIB.

UPS Control Objects
<i>upsTestId</i> The test as named by an OBJECT IDENTIFIER which allows a standard mechanism for the initiation of tests.
<i>upsTestSpinLock</i> A spin lock on the test subsystem.
<i>upsTestResultsSummary</i> The results of the current or last UPS diagnostics test performed.
<i>upsTestResultsDetail</i> Additional information about <i>upsTestResultsSummary</i> .
<i>upsTestStartTime</i> The value of <i>sysUpTime</i> at the time the test in progress was initiated; or if no test is in progress, the time the previous test was initiated.
<i>upsTestElapsedTime</i> The amount of time (in TimeTicks) since the test in progress was initiated; or if no test is in progress, the time the previous test took to complete.
<i>upsShutdownType</i> Determines the nature of the action to be taken at the time when the countdown of the <i>upsShutdownAfterDelay</i> and <i>upsRebootWithDuration</i> objects reaches zero.
<i>upsShutdownAfterDelay</i> Shuts down either the UPS output voltage or the UPS system.
<i>upsStartupAfterDelay</i> Starts the output after the indicated number of seconds, including starting the UPS, if necessary.
<i>upsRebootWithDuration</i> Immediately shuts down either the UPS output voltage or the UPS system.
<i>upsAutoRestart</i> Causes the UPS system to restart after a shutdown if the shutdown occurred during a power loss as a result of either a <i>upsShutdownAfterDelay</i> or an internal battery depleted condition.

Alarms and Traps

The Alarm and Trap MIB objects are listed in the following table.

Alarm and Trap Objects
<i>upsAlarmsPresent</i> The present number of active alarm conditions.
<i>upsAlarmId</i> A unique identifier for an alarm condition.
<i>upsAlarmDescr</i> A reference to an alarm description object.
<i>upsAlarmTime</i> The value of <i>sysUpTime</i> when the alarm condition was detected.
<i>upsTrapOnBattery</i> The UPS is operating on battery power.
<i>upsTrapTestCompleted</i> This trap is sent upon completion of a UPS diagnostic test.
<i>upsTrapAlarmEntryAdded</i> This trap is sent each time an alarm is inserted into the alarm table.
<i>upsTrapAlarmEntryRemoved</i> This trap is sent each time an alarm is removed from the alarm table.

Common Alarms for Standard UPS MIB

The following table is a list of the well-known alarms for Standard UPS MIBs.

Well-Known Alarms for Standard UPS MIB
<i>upsAlarmBatteryBad</i> One or more batteries have been determined to require replacement.
<i>upsAlarmOnBattery</i> The UPS is drawing power from the batteries.
<i>upsAlarmLowBattery</i> The remaining battery runtime is less than or equal to <i>upsConfigLowBattTime</i> .
<i>upsAlarmDepletedBattery</i> The UPS is unable to sustain the present load when and if the utility power is lost.
<i>upsAlarmTempBad</i> A temperature is out of tolerance.

Well-Known Alarms for Standard UPS MIB	
<i>upsAlarmInputBad</i>	An input condition is out of tolerance.
<i>upsAlarmOutputBad</i>	An output condition other than <i>OutputOverload</i> is out of tolerance.
<i>upsAlarmOutputOverload</i>	The output load exceeds the UPS output capacity.
<i>upsAlarmOnBypass</i>	The Bypass is presently engaged on the UPS.
<i>upsAlarmBypassBad</i>	The Bypass is out of tolerance.
<i>upsAlarmOutputOffAsRequested</i>	The UPS has shut down as requested.
<i>upsAlarmUpsOffAsRequested</i>	The entire UPS has shut down as commanded.
<i>upsAlarmChargerFailed</i>	An uncorrected problem has been detected within the UPS charger subsystem.
<i>upsAlarmUpsOutputOff</i>	The output of the UPS is in the off state.
<i>upsAlarmUpsSystemOff</i>	The UPS system is in the off state.
<i>upsAlarmFanFailure</i>	The failure of one or more fans in the UPS has been detected.
<i>upsAlarmFuseFailure</i>	The failure of one or more fuses has been detected.
<i>upsAlarmGeneralFault</i>	A general fault in the UPS has been detected.
<i>upsAlarmDiagnosticTestFailed</i>	The result of the last diagnostic test indicates a failure.
<i>upsAlarmCommunicationsLost</i>	A problem has been encountered in the communications between the agent and the UPS.
<i>upsAlarmAwaitingPower</i>	The UPS output is off and the UPS is awaiting the return of input power.
<i>upsAlarmShutdownPending</i>	A <i>upsShutdownAfterDelay</i> countdown is underway.

Well-Known Alarms for Standard UPS MIB

upsAlarmShutdownImminent

The UPS turns off power to the load in less than 5 seconds (this may be either a timed shutdown or a low battery shutdown).

upsAlarmTestInProgress

A test is in progress, as initiated and indicated by the Test Group.

UPS Status Objects

The MIB objects that supply monitoring and status information about the UPS are detailed below. Some of the groups implement tables of values, where the measured values for each phase constitute one entry in the table.

UPS Status Objects

upsIdentManufacturer

The UPS manufacturer name (for example, Fiskars Power Systems).

upsIdentModel

The UPS model (for example, Powerware 5119).

upsIdentUPSSoftwareVersion

The UPS firmware/software versions.

upsIdentAgentSoftwareVersion

The UPS agent software version.

upsIdentName

String identifying the UPS.

upsIdentAttachedDevices

String identifying the devices attached to the output of the UPS.

upsBatteryStatus

The indication of the capacity remaining in the UPS batteries.

upsSecondsOnBattery

Elapsed time since the UPS last switched to battery power, or the time since the network management subsystem was last restarted, whichever is less.

upsEstimatedMinutesRemaining

Estimate of the time to battery charge depletion under present load conditions.

upsEstimatedChargeRemaining

Estimate of the battery charge remaining expressed as a percent of full charge.

UPS Status Objects
<i>upsBatteryVoltage</i> The magnitude of the present battery voltage.
<i>upsBatteryCurrent</i> The present battery current.
<i>upsBatteryTemperature</i> Ambient temperature at or near the UPS battery casing.
<i>upsInputLineBads</i> The number of times the input voltage entered an out-of-tolerance condition as defined by the manufacturer.
<i>upsInputNumLines</i> The number of input lines used in this device.
<i>upsInputLineIndex</i> The input line identifier (for example, phase).
<i>upsInputFrequency</i> The present input frequency.
<i>upsInputVoltage</i> The magnitude of the present input voltage.
<i>upsInputCurrent</i> The magnitude of the present input current.
<i>upsInputTruePower</i> The magnitude of the present input true RMS power.
<i>upsOutputSource</i> The present source of output power.
<i>upsOutputFrequency</i> The present output frequency.
<i>upsOutputNumLines</i> The number of output lines used in this device.
<i>upsOutputLineIndex</i> The output line identifier.
<i>upsOutputVoltage</i> The present output voltage.
<i>upsOutputCurrent</i> The present output current.
<i>upsOutputPower</i> The present output true power.

UPS Status Objects	
<i>upsOutputPercentLoad</i>	Percentage of the UPS power capacity presently used on this output line.
<i>upsBypassFrequency</i>	Present bypass frequency.
<i>upsBypassNumLines</i>	The number of bypass lines used in this device.
<i>upsBypassLineIndex</i>	The bypass line identifier.
<i>upsBypassVoltage</i>	The present bypass voltage.
<i>upsConfigInputVoltage</i>	The magnitude of the nominal input voltage.
<i>upsConfigInputFreq</i>	The nominal input frequency.
<i>upsConfigOutputVoltage</i>	The magnitude of the nominal output voltage.
<i>upsConfigOutputFreq</i>	The nominal output frequency.
<i>upsConfigOutputVA</i>	The magnitude of the nominal volt-amperes rating.
<i>upsConfigOutputPower</i>	The magnitude of the nominal true power rating.
<i>upsConfigLowBattTime</i>	The value of <i>upsEstimatedMinutesRemaining</i> at which a low battery condition is declared.
<i>upsConfigAudibleStatus</i>	The requested state of the audible alarm.

MIB II Interface Group Support

The ConnectUPS SNMP Module can control communications via the MIB II Interface Group using the following interfaces:

- The first interface (*ifIndex* = 1) is the Network Interface.
- The second interface (*ifIndex* = 2) is the Serial Interface connected to the UPS.

Rebooting the ConnectUPS SNMP Module

By setting *ifAdminStatus.1* to *down*, you can reset the ConnectUPS SNMP Module just as though it had a power-on reset. If the ConnectUPS SNMP Module is configured to send traps to your management station, it should receive the *coldStart* trap from the ConnectUPS SNMP Module in 10 to 60 seconds.

Monitoring and Controlling Serial Ports

By setting *ifAdminStatus.2* to *down*, the ConnectUPS SNMP Module is forced to stop communicating on the associated serial port. Resetting the *ifAdminStatus* object to *up* allows the communications to restart.

If the ConnectUPS SNMP Module has not established communication with a UPS on a given serial port, that port's *ifOperStatus* is *down*, and *ifSpeed* identifies the baud rate the ConnectUPS SNMP Module is currently using to attempt the communications.

Other interface objects count events for the serial ports; some of the error counters are:

- ifInUnknownProtocols* - unrecognized commands
- ifInErrors* - bad data received (usually due to noise on the serial line)
- ifInDiscards* - received data that couldn't be processed
- ifOutErrors* - UPS timeouts (times UPS did not respond)
- ifOutDiscards* - had a request that could not be sent to the UPS

Authentication Failure Traps

The authFail traps can be disabled for a management station if that station sets *snmpEnableAuthenTraps* to *disable*. If you would like to learn the source of the authFail traps, look at the string for *xupsTrapMessage*, included in the authFail trap message, which gives the IP address of the source.

Related Internet Documentation

For more information about the Internet suite of protocols, you can consult the Request for Comments (RFC) document series. RFCs are research notes that are available in both printed and electronic form. RFCs are not standardized, but some are updated periodically to reflect new or changing information.

Printed copies of RFCs are available for a fee from the DDN Network Information Center:

Address: **DDN Network Information Center
14200 Park Meadow Drive
Suite 200
Chantilly, VA USA 22021**

Telephone: **1-800-365-3642
1-703-802-4535**

E-mail address: **nic@nic.ddn.mil**

Other sites also maintain copies of RFCs. This list may change, but some of these Internet addresses include:

**ftp://nisc.sri.com
ftp://venera.isi.edu
ftp://wuarchive.wustl.edu
ftp://nis.nsf.net
ftp://nisc.jvnc.net
ftp://src.doc.ic.ac.uk**

The tables on the following pages list the major RFCs you may want to request for reference.

These are key administrative RFCs:

RFC	Name	Status
1009	Gateway Requirements	Required
1122	Host Requirements - Communications	Required
1123	Host Requirements - Applications	Required
1340	Assigned Numbers	Required
1410	IAB Official Protocol Standards	Required

These RFCs pertain to the core of the Internet suite of protocols:

RFC	Name	Status
791	Internet Protocol	Required
792	Internet Control Message Protocol	Required
919	Broadcast Datagrams	Required
922	Broadcast Datagrams with Subnets	Required
950	Subnet Extension	Required
768	User Datagram Protocol	Recommended
1034	Domain Name System Concepts and Facilities	Recommended
1035	Domain Name System Implementation and Specification	Recommended
1350	TFTP Protocol (revision 2)	Elective

These RFCs pertain to transmission of the IP over various media:

RFC	Name	Standard
826	Address Resolution Protocol	Full
894	Ethernet Networks	Full
951	Bootstrap Protocol (BOOTP)	
1497	BOOTP Vendor Information Extensions	
1542	Clarifications and Extensions of the Bootstrap Protocol (BOOTP)	

These RFCs define the original Internet-standard network management framework:

RFC	Name	Status
1155	Structure of Management Information	Recommended
1157	Simple Network Management Protocol	Recommended
1212	Concise MIB Definitions	Recommended
1213	Management Information Base II	Recommended

These RFCs define MIB modules for particular environments:

RFC	Name	Standard
1129	Extensions to the Generic-Interface MIB	Proposed
1239	Reassignment of Experimental MIBs to Standard MIBs	Proposed
1628	UPS MIB	Proposed

These are miscellaneous informational RFCs:

RFC	Name	Status
1215	A Convention for Defining Traps for Use with the SNMP	Informational
1270	SNMP Communication Services	Informational

Pin Assignments

The ConnectUPS SNMP Module cable pins are identified in Figure 11 and the pin functions are described in Table 1.

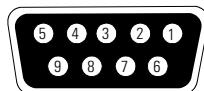


Figure 11. Serial Communication Port

Table 1. Communication Port Pin Assignment

Pin Number	Signal Name	Function	ConnectUPS SNMP Module Direction
1	DCD	DCD input	In
2	RxD	Transmit to external device	Out
3	TxD	Receive from external device	In
4	DTR	PnP (Plug and Play) from external device	In
5	GND	Signal common	—
6	DSR	To external device	Out
7	RTS	PnP from external device	In
8	CTS	Clear to send	Out
9	Power Source	+V (8 to 24 volts DC power)	Out

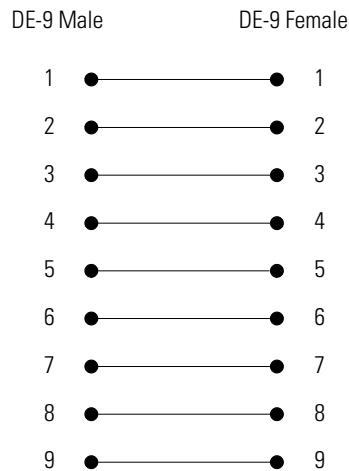


Figure 12. Serial Cable

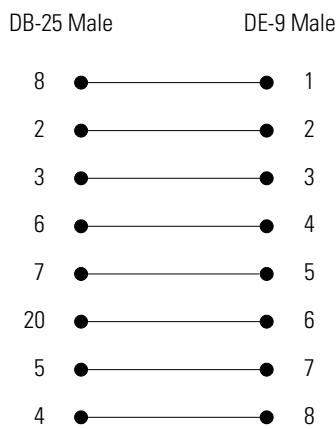


Figure 13. Modem Cable



NOTE The modem cable is not supplied with the ConnectUPS SNMP Module. It can be ordered from Powerware by calling the **Help Desk** at one of the telephone numbers on page 45. The Powerware part number is 124102027-002.