Power Xpert® Gateway Series 2000 Card
User's Guide
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.

Requesting a Declaration of Conformity

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

- Harmonized Standard: EIEC 61010-1:2001-02

The EC Declaration of Conformity is available upon request for products with a CE mark. For copies of the EC Declaration of Conformity, contact:

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Chapter 1  Introduction

Eaton’s Power Xpert® Gateway (PXGX) Series 2000 Card provides Web-enabled, real-time monitoring of Powerware® uninterruptible power systems (UPSs) through standard Web pages, Power Xpert software, or third-party software. An integral part of the Eaton Power Xpert Architecture, which provides end-to-end PowerChain Management™ solutions, the PXGX Series 2000 Card provides a central point to connect UPSs to the Ethernet network.

Network managers can view critical downstream device information, such as status, power, energy, and power quality data with an easy-to-use interface.

In addition, the PXGX Series 2000 Card has the following features:

- Web-enabled UPSs – data can be viewed from any location with a Web browser
- Real-time power monitoring – network managers can view critical device data and make informed decisions
- Simple Network Management Protocol (SNMP) support – easily integrate and manage your UPS with third party network management software
- Power quality data using Modbus® Transmission Control Protocol (TCP) – this open communication protocol allows for communication to standard building management systems
- Easy installation – the PXGX Series 2000 Card can be installed while the UPS is online, maintaining the highest system availability
- Field upgradeable – use the Web interface to easily upgrade the card's firmware in the field
Eaton Power Xpert Architecture

Eaton Power Xpert Architecture provides the framework to unify the entire power system. It connects power systems with communication and management systems to provide a holistic approach to the entire power system. This strategic system-level focus is integral to PowerChain Management solutions. It provides increased reliability, cost efficiencies, enhanced safety and risk mitigation, and allows for the more effective use of capital. Eaton Power Xpert Architecture is comprised of both software and hardware components including meters, gateways, time servers, and connectivity devices.
Chapter 2  Getting Started

NOTE  If you have completed all sections in the Power Xpert Gateway Series 2000 Card Quick Start Instructions, proceed to Chapter 3, “Configuring the Card,” on page 21.

This section explains:

- Checklist items needed for installation
- Installing the card
- Connecting the card
- Verifying or assigning the IP address
- Configuring the network settings

Installation Checklist

1. Verify that all of the following items are available:
   - PXGX Series 2000 Card package contents (card, configuration cable, Ethernet cable, and quick start instructions)
   - Phillips® screwdriver
   - Available serial port (RS-232)
   - HyperTerminal® (ships with Microsoft® Windows®) or equivalent terminal emulation application
   - Web browser (Internet Explorer or Mozilla® Firefox® recommended)

2. Provide the local network administrator with the card’s MAC address:
   - MAC Address Port 1  _________________________
   - MAC Address Port 2  _________________________

   The MAC address for Port 1 is located on a label on top of the card. To determine the MAC address of Port 2, increase the Port 1 address by one. For example: 0060261089A8 (Port 1), 0060261089A9 (Port 2).
3. Contact the local network administrator for the following network settings:

- IP Address Port 1 (static address*) ________________
- IP Address Port 2 (static address*) ________________
- Gateway Address _________________________
- Subnet Mask _________________________
- DNS (name server) IP Address** ________________

* The PXGX Series 2000 Card provides two network connections (Port 1 and Port 2), each accessed with separate IP addresses. If you are setting up the PXGX Series 2000 Card in a dynamic host configuration protocol (DHCP) environment (default), the local network administrator must set up the DHCP server to provide a static address each time the card makes a DHCP request. Use Port 2 only if you need a redundant connection using a separate subnet.

** Obtain the Domain Name Server (DNS) IP address if you plan to use host names.

4. If you need e-mail functionality, obtain the SMTP IP address or host name. If using the SMTP host name, verify that you also have the DNS IP address (see Step 3).

- SMTP (mail server) IP Address or Host Name ________________
Installing the Card

The hot-swappable PXGX Series 2000 Card can be installed without turning off the Powerware Series UPS or disconnecting the load.

To install the PXGX Series 2000 Card:

1. Verify that all six DIP switches on the card are in the OFF position (see Figure 1).

![Figure 1. Verify DIP Switches are OFF](image)

2. Remove the X-Slot® cover from the UPS. Retain the screws.

   **NOTE** If there is another card already installed with an attached communication cable, disconnect the cable and then remove the card.

3. If not already done, record the MAC address for Port 1 and Port 2 for future reference (see “Installation Checklist” on page 3).

4. To prevent electrostatic discharge (ESD), place one hand on a metal surface such as the UPS panel.

5. Slide the card into the open slot and secure with the screws removed in Step 2 (see Figure 2 and Figure 3).
GETTING STARTED

6. Connect an active Ethernet cable (supplied) to the Port 1 Ethernet connector on the PXGX Series 2000 Card (see Figure 3).

If you are connecting a second network connection (separate subnet), connect an active Ethernet cable (not supplied) to the Port 2 Ethernet connector on the PXGX Series 2000 Card.

7. If you know the card’s IP address, continue to “Network Configuration” on page 18; otherwise, continue to the following section, “Connecting the Card.”
Connecting the Card

To connect the card to the computer and start the configuration:

1. Plug the RJ-45 end of the supplied configuration cable into the configuration port on the card labeled “10101” (see Figure 4).

   **NOTE** Verify that you have used the port labeled “10101.” The other ports on the card do not work for configuration.

2. Plug the other end of the serial cable into the serial COM port on the computer.

3. Open your terminal emulation program (such as HyperTerminal).
4. Select the serial connection (such as COM1). See Figure 5.

![Figure 5. Select Serial Connection](image)

5. Set the serial line to 9600 baud, No parity, 8 data bits, 1 stop bit, and no flow control (see Figure 6).

![Figure 6. Configure Port Settings](image)
6. Verify that the UPS is turned on.

7. After a few seconds, press **Enter**. The Network Settings menu appears in approximately one minute (see Figure 7).

```
----------------------------------
----------- Network Settings -------
1. Ethernet Port 1 Settings
2. Ethernet Port 2 Settings
3. DNS Server (Primary) : [None]
4. DNS Server (Secondary) : [None]
5. Reset to Factory Defaults and Exit
0. Exit
Select an option ==> 1
```

**Figure 7. Network Settings Menu**

If the menu does not appear, press **Enter** again. If it still does not appear, check the following conditions:

- Verify the serial line is set to 9600 baud, No parity, 8 data bits, 1 stop bit, and no flow control.

- If the serial line settings are correct, check the cabling to verify all connections are secure.

- Verify that your terminal program is on the correct communication port for the serial connection.

- Verify that the card has power (one or more LEDs on the card are illuminated). The UPS should be on.

8. Continue to the following section, “IP Address Assignments.”
IP Address Assignments

Many IT managers prefer the convenience of DHCP for managing the IP addresses of networked devices. With DHCP, IT managers can easily reassign IP addresses as the network structure changes. In some cases, DHCP may not be available, or fixed IP addresses may be preferred for the PXGX Series 2000 Card (for example, if some other networked device needs to reach the card at a fixed address).

To verify the IP addresses assigned through DHCP, continue to “Verifying IP Addresses (DHCP enabled).” To manually enter fixed IP addresses for the card's network connection, continue to “Assigning IP Addresses (DHCP disabled),” on page 13.

NOTE By default, the PXGX Series 2000 Card requests an IP address via DHCP when connected to a network.
Verifying IP Addresses (DHCP Enabled)

To verify the IP address assignments:

1. Type 1 and press Enter on the Network Settings menu (see Figure 7 on page 9) to display the Network Settings: Ethernet Port 1 menu (see Figure 8).

   ![](Network_Settings_Ethernet_Port_1.png)

   **Figure 8. Ethernet Port 1 Menu**

   2. Verify and record the IP address for Port 1* (see “Installation Checklist” on page 3).

   3. Type 0 and press Enter to return to the Network Settings menu.

   4. If you connected Ethernet Port 2 to a separate network, continue to Step 5 to verify the assigned IP address. Otherwise, continue to Step 8.

   5. Type 2 and press Enter on the Network Settings menu to display the Network Settings: Ethernet Port 2 menu.

   6. Verify and record the IP address for Port 2* (see “Installation Checklist” on page 3).

   7. Type 0 and press Enter to return to the Network Settings menu.

   8. Type 0 and press Enter to exit the utility.

* If the IP address field contains [None], press Enter to return to the Network Settings menu and wait 60 seconds. Repeat Steps 1 through 8. If the field remains [None], contact the local network administrator to verify that the DHCP server is responding to requests.
9. Verify network communication by using a Web browser (see Figure 9). Type the IP address of the card and select **Go**.

10. Log in and press **Enter**. The user name and default password is *user* for read-only information and *admin* for configuration (read/write) options.

The PXGX Series 2000 Card Web page displays (see Figure 9).
11. If you logged in as admin, continue to Chapter 3, “Configuring the Card” on page 21 for additional configuration options.

**NOTE** Once you have logged in as admin, it is important to completely exit the browser to set the security level back to the standard read-only level. Click the Logon as User link from the menu bar to force a logoff and re-login as user.

Assigning IP Addresses (DHCP Disabled)

**NOTE** You can also set network settings via the PXGX Series 2000 Card’s Web page Network link (see “Network Configuration” on page 18).

To manually enter fixed IP addresses for the card after you have connected it:

1. Type 1 and press **Enter** on the Network Settings menu (see Figure 10) to display the Network Settings: Ethernet Port 1 menu (see Figure 11).

```
---------------- Network Settings ----------------
1. Ethernet Port 1 Settings
2. Ethernet Port 2 Settings
3. DNS Server (Primary) : [None]
4. DNS Server (Secondary) : [None]
5. Reset to Factory Defaults and Exit
0. Exit
Select an option ==> 1
```

**Figure 10. Network Settings Menu**
--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Enabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option =>

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

--- Network Settings: Ethernet Port 1 ---

1. Dynamic Addressing (DHCP) : Disabled
2. IP Address : [None]
3. Subnet Mask : [None]
4. Default Gateway : [None]
5. Media Type : [Auto-negotiate]

MAC Address : 00:60:26:10:89:A8
Link Status : Enabled

0. Exit to previous menu
Select an option => 1
Enable DHCP? (y/n): n

5. To set the subnet mask, type 3 and press Enter. Type the subnet mask address and press Enter.

6. To set the gateway, type 4 and press Enter. Type the gateway address and press Enter.
7. Type 0 to return to the Network Settings menu (see Figure 13).

![Network Settings Menu]

8. If you connected Ethernet Port 2 to a separate network, continue to Step 9 to assign the IP address for Port 2. Otherwise, continue to Step 11.

9. Type 2 and press Enter on the Network Settings menu (see Figure 13) to display the Network Settings: Ethernet Port 2 menu (see Figure 14).

![Ethernet Port 2 Menu]

10. Repeat Steps 2 through 7 to assign the IP address and other options for Port 2.
11. If you will be using host names for controlling access to the card, type 3 and press **Enter** on the Network Settings menu (see Figure 15). Type the primary DNS server IP address and press **Enter**.

Type **4** and press **Enter**. Type the secondary DNS server IP address and press **Enter**.

```
------------------- Network Settings -------------------
1. Ethernet Port 1 Settings
2. Ethernet Port 2 Settings
3. DNS Server (Primary) : 10.222.51.8
4. DNS Server (Secondary) : [None]
5. Reset to Factory Defaults and Exit
6. Save & apply all settings
0. Exit without saving
Select an option ==> 4
```

**Figure 15. DNS Server Settings**

12. Type **6** and press **Enter** to save and apply all settings (see Figure 16).

13. Type **y** and press **Enter** to confirm that you want to save and apply all settings and exit the utility.

```
------------------- Network Settings -------------------
1. Ethernet Port 1 Settings
2. Ethernet Port 2 Settings
3. DNS Server (Primary) : 10.222.51.8
4. DNS Server (Secondary) : 10.222.1.75
5. Reset to Factory Defaults and Exit
6. Save & apply all settings
0. Exit without saving
Select an option ==> 6
Save & apply all settings? (y/n): y
```

**Figure 16. Save and Apply All Settings**

14. Verify network communication by using a Web browser (see Figure 17). Type the IP address of the card and select **Go**.
15. Log in and press **Enter**. The user name and default password is *user* for read-only information and *admin* for configuration (read/write) options.

The PXGX Series 2000 Card Web page displays (see Figure 17).

![Figure 17. PXGX Series 2000 Card Web Page](image)

16. If you logged in as *admin*, continue to Chapter 3, “Configuring the Card” on page 21 for additional configuration options.
NOTE Once you have logged in as admin, it is important to completely exit the browser to set the security level back to the standard read-only level. Click the Logon as User link from the menu bar to force a logoff and re-login as user.

Network Configuration

If you know the card’s IP address, you can configure the network settings from the card’s Web page:

1. Open a Web browser, type the IP address of the card, and select Go.

2. Log in as admin and press Enter. The user name and default password is user for read-only information and admin for configuration (read/write) options.

   The PXGX Series 2000 Card Web page displays (see Figure 18).
3. Select the **Network** link from the menu bar.

   The Network Configuration Settings page appears. The page shows the current network status for each port on the card (green indicates the network is connected; red indicates the network is disconnected).

4. You can enable or disable the DHCP control by activating or deactivating the check box. The default is **DHCP enabled**.
5. If you will be using host names for controlling access to the card, enter the **Domain** and the DNS IP addresses in the **Nameserver** fields.

6. If you will be using Simple Network Management Protocol (SNMP), identify the physical location of the installed UPS/card (sysLocation string) in the **System location** field. This value also displays in the card’s Web page header bar.

Enter the information to identify someone to contact with questions about this device (sysContact string) in the **System contact** field. For example, you can type a person’s name, phone number, department, e-mail address, or physical location.

7. You can also modify the card’s IP address, the subnet mask, and the gateway address for Port 1 and Port 2 (**IP address**, **Netmask**, and **Gateway** fields).

8. To test the card’s network connection, you can ping (request acknowledgement from) a host. Enter an IP address or hostname in the **Ping test** field and then click **Test**.

9. Click **Apply** to save the settings or **Discard** to cancel the changes.

10. Continue to Chapter 3, “Configuring the Card” on page 21 for additional configuration options.

**NOTE** Once you have logged in as admin, it is important to completely exit the browser to set the security level back to the standard read-only level. Click the **Logon as User** link from the menu bar to force a logoff and re-login as user.

---

**Important Security Information**

By default, the PXGX Series 2000 Card is configured to prevent unauthorized SNMP and Modbus TCP access by computers that are not on the Trusted IPs/Hostnames list.

If you are using SNMP or Modbus TCP, see “Changing SNMP Access” on page 29 to add specific IP addresses or host names of trusted computers.
Chapter 3  Configuring the Card

**NOTE** If DHCP is disabled and you will be using host names for servers, such as the mail server, Network Time Protocol (NTP) server, SNMP hosts, Modbus TCP hosts, or trap recipients, enter the IP address of your network DNS Server (see “Network Configuration” on page 18).

**NOTE** You must be logged in as admin to configure the card. Once you have logged in as admin, it is important to completely exit the browser to set the security level back to the standard read-only level.

This section explains:

- Navigating the card’s Web page
- Identifying monitored equipment
- Changing the passwords
- Setting the date and time
- Configuring SNMP options and managing from an SNMP NMS
- Configuring Modbus TCP/IP options
- Configuring HTTP and HTTPS
- Configuring NetWatch
- UPS power management
- Configuring e-mail notification
- Configuring the Powerware Environmental Monitoring Probe (EMP)
- Saving and restoring configuration settings
Navigating the Card's Web Page

Figure 19 shows the different areas and features of the card's Web page.

The header bar at the top of the page displays the gateway time in both UTC (Coordinated Universal Time) and local time. If you enter data for the system location (Network Configuration), the location of the equipment displays.

NOTE: Alarm information displays in red text; alarms are always visible even when menus are collapsed.
If there is an active alarm in the hardware, a flashing alarm icon with an alarm message displays in the header bar. The highest level of an alarm displays as follows:

- Red for critical
- Yellow for caution
- Blue for acknowledged, but not closed (still alarming)

Click the alarm message in the header bar to display the Open Alarms page.

The menu bar to the left of the page contains links to additional pages for status information and configuration options. Menus are expandable and collapsible. Use this menu bar to move through the card’s Web pages.

The main page displays the equipment data. Menus are expandable and collapsible. Alarms display in red text. If an alarm is active, its top menu item also turns red, so that alarms are never hidden even if the menu is collapsed.

You can hover the mouse over items for additional detail or help.

The Web page supports Atom Syndication Format (Atom) for Web feeds. The orange Atom icon is in the bottom right corner of the Web page. Click the Atom Feed icon to subscribe to the Power Xpert Gateway Card’s feed data. Some browsers also display the Atom Feed icon in the toolbar.

The 3rd Party Licensing link at the bottom page directs you to a list of all licenses used with the PXGX Series 2000 Card. Each listing links to the full license text.
Identifying Monitored Equipment

The menu bar lists the monitored equipment (card, UPS, load segments, and optional EMP). Each equipment page displays information related to the equipment. You can modify some fields such as identifying labels.

NOTE The configurable fields may also be available on other pages, such as the System Location field on the Network Configuration page. Changes made to these fields are updated everywhere they appear.

Configurable fields for the card are:

- Display Name
- Location
- Who to Contact

Configurable fields for the UPS are:

- Select a parameter category (you can choose the information you want to display and whether you want items organized by category with headings displayed or all items in alphabetical order)
- Asset Identification Tag
- Display Name
- Attached Devices
- Battery Last Replaced Date
- Date Last Serviced
- Installation Date
- Low Runtime Alarm Setpoint (An alarm is sent indicating the time remaining before the battery shuts down. Increasing the time allows for additional time to shutdown a system before the battery shuts down.)

NOTE See “Automatic Shutdown of UPS-Protected Computers” on page 33 for information on power outage notification and configuring the shutdown process for registered NetWatch clients.
Configurable fields for load segments are:

- Select a parameter category (you can choose the information you want to display and whether you want items organized by category with headings displayed or all items in alphabetical order)
- Display Name

Configurable fields for the EMP are:

- Select a parameter category (you can choose the information you want to display and whether you want items organized by category with headings displayed or all items in alphabetical order)
- Asset Identification Tag
- Display Name
Changing the Passwords

The user name and default password is user for read-only information and admin for configuration (read/write) options. The characters in the password fields appear as asterisks (*).

To change the passwords:

1. From the card’s Web page, click the Access Control link from the menu bar.

   The Access Control Configuration page displays with the password fields.

2. To change the user password, enter the new password twice (replace existing asterisks) in the Password for the user account fields.

   To change the admin password, log in as admin and enter the new password twice (replace existing asterisks) in the Password for the admin account fields.

3. Click Apply and then OK to save the settings. The password updates and displays as a full row of asterisks.

   **NOTE** Once you have logged in as admin, it is important to completely exit the browser to set the security level back to the standard read-only level. Click the Logon as User link from the menu bar to force a logoff and re-login as user.

   **NOTE** After you change the password, you will be prompted to enter the new password the next time you navigate through the card’s Web page.
Setting the Date and Time

**NOTE** All selections are automatically converted to Coordinated Universal Time (UTC).

To set the date and time:

1. From the card’s Web page, click the **Date/Time** link from the menu bar.

   The default is to synchronize the date and time from the PC clock.

2. To synchronize the card with Network Time Protocol servers, select **Synchronize with NTP server(s)** and type the IP addresses or host names. You can synchronize the card with up to three NTP servers.

   The NTP status is indicated in parentheses:
   - **Not running** – Indicates that NTP is not running.
   - **Started, not synchronized** – Indicates that NTP is running, but is not yet synchronized with an NTP server or controlling the local clock.
   - **Synchronizing with NTP server** – Indicates that NTP has synchronized with the local clock, but is not yet synchronized with an NTP server.
   - **Synchronized to XX, NTP stratum YY** – Indicates that the card is synchronized with an NTP server at IP address XX that is operating at NTP Stratum YY.

**NOTE** When using host names, verify that the IP address of your network DNS Server is configured (see “Network Configuration” on page 18).

**NOTE** When NTP status is Synchronized and there is a large discrepancy between the PXGX Series 2000 Card time and the actual time, it may take 5–30 minutes for NTP to reset the card to the proper time.

3. To set the time manually, select **Set date/time manually** and use the pull-down menus to select the local date in **mm/dd/yyyy** format and the local time in **hh/mm/ss** format.

4. To customize how the date appears in the card’s data and event logs, select a **Date format for logs** option (**mm/dd/yyyy**, **dd/mm/yyyy**, **yyyy-mm-dd**, or **dd mm yyyy**). The default is **mm/dd/yyyy**.
5. To select the time zone for the card, specify the **Timezone for Logs, email, and connected device**.

6. To specify how the temperature appears on the Web page, select **Fahrenheit** or **Celsius**.

7. Click **Apply** and then **OK** to save the settings.

8. Refresh the Web page to view the updated formats.

### Configuring SNMP Options

This section describes the following SNMP configuration options:

- Configuring community strings and trap recipients
- Changing SNMP access
- Setting system location and system contact
- Managing from an SNMP NMS

### Community Strings and Trap Recipients

The PXGX Series 2000 Card supports several event-related traps that can be reported to the SNMP network management software. See Chapter 5, “MIB Files,” on page 61 for more information.

To configure the SNMP options:

1. From the card's Web page, click the **SNMP** link from the menu bar.

2. SNMPv1 and SNMPv3 are supported and the default is “enabled” for both versions. To modify, clear the check box for the version to be disabled. The fields associated with the disabled version become unavailable (dimmed).

3. For SNMPv1 configuration, type a new community string in the appropriate field to change the community strings.

   The default community strings are “public” for read-only, “private” for read-write.

4. For SNMPv3 configuration, enter a new read-only username and password and read-write username and password in the appropriate fields. Passwords for SNMPv3 must be at least 8 characters in length.
5. To modify the Trap recipient community string field, type a new name. The default is “public”.

6. Click Add to add a new trap recipient entry to the list.

7. Enter the IP address or host name for the trap recipient in the IP/hostname field.

**NOTE** The IP/hostname field does not display until you select Add for the first time.

**NOTE** When using host names, verify that the IP address of your network DNS Server is configured (see “Network Configuration” on page 18).

8. Click Apply and then OK to save the settings.

9. Repeat Steps 6 through 8 for each additional trap recipient.

   To remove a trap recipient, click Delete Last. Click OK when prompted to remove the settings for the trap recipient entered last.

### Changing SNMP Access

The default is to limit access to the card to trusted SNMP NMS hosts only.

To allow access that is unrestricted by hostname (though still qualified by community names or SNMPv3 passwords):

1. From the card’s Web page, click the Access Control link from the menu bar.

2. Clear the check box for SNMP access restricted by IP/hostname.

3. Click Apply and then OK to save the settings.
To add a host to the Trusted Host List for restricted access:

1. From the card's Web page, click the Access Control link from the menu bar.

2. Verify that the check box for SNMP access restricted by IP/hostname is selected.

3. Type the trusted NMS host's IP addresses or host names, separated by a semicolon, in the Trusted IPs/hostnames field.

   **NOTE** When using host names, verify that the IP address of your network DNS Server is configured (see “Network Configuration” on page 18).

4. Click Apply and then OK to save the settings.

**System Location and System Contact**

To set the system location and system contact:

1. From the card’s Web page, click the Network link from the menu bar.

2. Enter the physical location of the installed UPS/card (sysLocation string) in the System location field. This value also displays in the card’s Web page header bar.

3. Enter the information to identify someone to contact with questions about this device (sysContact string) in the System contact field. For example, you can type a person’s name, phone number, department, e-mail address, physical location, or combination of these items, such as “John Smith x123”.

4. Click Apply and then OK to save the settings.
Management from an SNMP NMS

To access the PXGX Series 2000 Card using SNMP:

1. Verify that the NMS is configured for the correct community strings or SNMPv3 user names and passwords, as shown on the SNMP Web page. See “Community Strings and Trap Recipients” on page 28.

2. Verify that the NMS is a Trusted Host or that your PXGX Series 2000 Card is configured for unrestricted SNMP access on the Access Control Configuration Web page. See “Changing SNMP Access” on page 29.

3. From the card's Web page, click the Documentation link from the menu bar (or visit www.eaton.com/powerxpert) for the following MIB files for the PXGX Series 2000 Card:

<table>
<thead>
<tr>
<th>MIB Name</th>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powerware UPS MIB</td>
<td>XUPS-MIB.txt</td>
<td>Meters and traps for Powerware UPSs</td>
</tr>
<tr>
<td>RFC 1628 UPS MIB</td>
<td>UPS-MIB.txt</td>
<td>Meters and traps for vendor-independent UPSs</td>
</tr>
<tr>
<td>Eaton EMP MIB</td>
<td>EATON-EMP-MIB.txt</td>
<td>Meters and settings for the EMP</td>
</tr>
<tr>
<td>Eaton Alarms+Traps MIB</td>
<td>EATON-PXG-MIB.txt</td>
<td>Alarms and notifications (traps)</td>
</tr>
<tr>
<td>Eaton Object Identifier (OID) assignments</td>
<td>EATON-OIDS.txt</td>
<td>Base document for all OID assignments for Eatons MIBs</td>
</tr>
<tr>
<td>RFC 4133 Entity MIB</td>
<td>ENTITY-MIB.txt</td>
<td>Identification and description of each device attached to the card</td>
</tr>
<tr>
<td>RFC 4268 Entity State MIB</td>
<td>ENTITY-STATE-MIB.txt</td>
<td>Five availability status meters for each device attached to the card</td>
</tr>
<tr>
<td>RFC 4268 Entity State MIB Part 2</td>
<td>ENTITY-STATE-TC-MIB.txt</td>
<td>Possible state values for the Entity State MIB</td>
</tr>
</tbody>
</table>

Add these files to the MIB database of your SNMP management software (such as HP OpenView™, IBM® Director, and Sun NetManager).

4. Use the facilities provided by the SNMP management software to access the individual MIB objects. See Chapter 5, “MIB Files,” on page 61 for more information.
Configuring Modbus TCP/IP Options

To limit access to the card from trusted Modbus Transmission Control Protocol/Internet Protocol (TCP/IP) addresses only:

1. From the card’s Web page, click the **Access Control** link from the menu bar.

2. Select the check box for **Modbus TCP access restricted by IP/hostname**.

3. Type the trusted host’s IP addresses or host names, separated by a semicolon, in the **Trusted IPs/hostnames** field.

   **NOTE** When using host names, verify that the IP address of your network DNS Server is configured (see “Network Configuration” on page 18).

   **NOTE** If the SMTP server does not use Port 25, append the port to the IP address (for example, mysmtpserver:33).

4. Click **Apply** and then **OK** to save the settings.

   For information on Modbus registers, see Chapter 6, “Modbus Registers,” on page 67. See “Returning Error Codes” on page 68 to change how error codes are returned.

Configuring HTTP and HTTPS

To configure the ports for Hypertext Transfer Protocol (HTTP) and HTTP over Secure Socket Layer (HTTPS):

1. From the card’s Web page, click the **Access Control** link from the menu bar.

2. Type the TCP port number for HTTP in the **HTTP port** field.

3. Type the TCP port number for HTTPS in the **HTTPS port** field (the default is 443).

4. To require a secure connection to the card, select the **Require HTTPS** check box.

5. Click **Apply** and then **OK** to save the settings.
Automatic Shutdown of UPS-Protected Computers

NetWatch client software supports remote UPS monitoring and automatic shutdown of UPS-protected computer systems and is available from www.powerware.com under Software Downloads.

Clients are available for many operating systems, including:

- Microsoft Windows
- Novell NetWare
- Linux®
- UNIX
- Mac OS X

Check www.powerware.com for a complete listing of supported operating systems.

Each NetWatch client uses its IP address to register with a specified PXGX Series 2000 Card through the network. Once a client has registered, any change in UPS status is communicated to NetWatch. Depending on the operating system, NetWatch typically alerts the user(s) whenever the UPS begins supplying AC power from its batteries (for example, the AC line fails). Then, if AC line power does not return and the remaining battery time is low, NetWatch takes over and completes an operating system shutdown prior to the UPS running out of battery power.

Settings found in the NetWatch Configuration page are related to the automatic shutdown of the UPS-protected computer system using NetWatch.
Configuring NetWatch

To configure NetWatch client shutdowns, perform the following steps for each load segment you want to modify:

1. From the card’s Web page, click the NetWatch link from the menu bar.

   The NetWatch Configuration page displays. The UPS load segments are shown with configuration options for each segment.

2. The card notifies NetWatch clients when there is a power outage. To modify how long the card waits before sending the message, enter a value between 10 and 600 seconds (10 seconds to 10 minutes) in the **Delay before first AC fail warning message** field. The default is 10 seconds.

3. To modify how often the card repeats the power outage notification, enter a value between 30 and 600 seconds (30 seconds to 10 minutes) in the **Warning interval** field, or enter 0 to receive only the initial message. The default is 60 seconds.

   **NOTE** You can change the name in the **Load segment name** field. Changes to this field update throughout the PXGX Series 2000 Card Web pages when the settings are saved.

4. To enable NetWatch to shut down clients during a power outage, select **Notify client OS to shutdown on an AC failure**.

5. Set the appropriate **Number of seconds the AC failure must last before client is notified to start OS shutdown** to ensure that the NetWatch clients shut down only when there is an extended power outage. To modify, enter a value between 1 and 21600 seconds (1 second to 6 hours). The default is 600 seconds (10 minutes).
6. To turn off power to the UPS output receptacles following the client shutdown:

- Select **Load segment to turn off following OS Shutdown**.

  If **Load segment to turn off following OS Shutdown** is not selected, the power will remain available to the UPS output receptacles until the UPS battery power is exhausted.

- Set the appropriate number of seconds for the **Delay before segment turns off** to ensure that any NetWatch clients and their respective operating systems have enough time to complete their shutdown. The default is 180 seconds (2 minutes), but you may want to increase or decrease this value as appropriate for your system and available battery runtime. To modify, enter a value between 30 and 3600 seconds (30 seconds to 1 hour).

7. To reboot the UPS and the associated load:

- Select **Load segment to restart following the return of AC line**.

  If **Load segment to restart following the return of AC line** is not selected, the UPS will stay off (requiring local interaction to turn it back on) when utility power returns.

- Set the time for **Delay Before Segment Restart** to a valid delay value to allow the UPS enough time to restart after the specified delay. To modify, enter a value between 10 and 3600 seconds (10 seconds to 1 hour). The default is 30 seconds.

  To stagger the load segment restarts (for sequencing, or to avoid a power surge), enter a different delay time for each load segment.

8. Click **Apply** and then **OK** to save the settings.

### Shutdown Clients

The Shutdown Clients area displays the IP addresses of the clients that have registered for the shutdown service. Eaton recommends that each client test the shutdown feature by clicking **Shutdown Test**.

**NOTE** Clicking **Shutdown Test** shuts down the client operating system.
UPS Power Management

The Power Xpert Gateway (PXGX) Series 2000 Card supports the ability to remotely turn off the UPS and its supported load. You can also reboot the UPS (cycling output power off and then back on) and schedule shutdowns and startups on a predetermined basis.

In addition, you may initiate a battery or system test.

**NOTE** Buttons on the UPS Test and Control page are not available (dimmed) if the UPS does not support that function.

Testing the UPS Battery

To test the battery:

1. From the card’s Web page, click the Test and Control link from the menu bar. The UPS Test and Control page displays.

2. Select Start battery test.

   Results display to the right of the button. A failed response indicates that the battery should be replaced. Contact your service representative to order new batteries.

3. Click OK to close the response dialog box.

Testing the UPS System

To test the UPS system:

1. From the card’s Web page, click the Test and Control link from the menu bar. The UPS Test and Control page displays.

2. Select Start system test.

   Results display to the right of the button. For a failed response, refer to the “Troubleshooting” section of the UPS user's guide or the UPS front panel for more information.

3. Click OK to close the response dialog box.
Turning the UPS Load Segments On and Off

To turn on and off the load segments on the UPS:

1. From the card's Web page, click the Test and Control link from the menu bar. The UPS Test and Control page displays.

2. Select the Enable auto-refresh of UPS state check box if it is not already selected to view changes in the UPS load segment state as they happen.

3. Click Shutdown Now to shut down the selected UPS load segment. Results display to the right of the button.

4. Click OK to close the dialog box. The highlighted text reflects the UPS output state.

   **NOTE** NetWatch clients are also shut down, so the shutdowns may be delayed to accommodate the OS shutdown times specified on the NetWatch Configuration Web page.

5. Click Startup Now to start the selected UPS load segment. Results display to the right of the button.

6. Click OK to close the dialog box. The highlighted text reflects the UPS output state.
Scheduling a UPS Shutdown and Restart

Up to seven UPS shutdown and restart events can be scheduled for any day and time of the week.

**NOTE** Times and dates for scheduled shutdowns and restarts are based on the local time and date configured for the card. The date and time is displayed in the header bar. For more information, see “Setting the Date and Time” on page 27.

**NOTE** NetWatch clients are also shut down, so the shutdowns may be delayed to accommodate the OS shutdown times specified on the NetWatch Configuration Web page.

To configure scheduled UPS shutdowns:

1. From the card’s Web page, click the **Schedule Shutdown** link from the menu bar.

2. Select the day, hour, and minutes for the shutdown and restart.

**NOTE** Do not overlap the scheduled shutdown and restart events.

3. Repeat Step 2 for each event to be scheduled.

4. Click **Apply** and then **OK** to save the settings.

   If any of the scheduled shutdown times are not possible, an error message displays on the right.

5. To disable scheduled events, you can deselect one event or select the check box for **Disable all schedules**. The event fields dim but the values remain for use later.

6. Click **Apply** and then **OK** to save the settings.
Configuring E-mail Notification

The Power Xpert Gateway Card can be configured to send e-mail notification to selected recipients when an event is triggered:

- Configure general e-mail notification to send e-mail messages when any selected event is triggered on the monitored UPS.
- Configure collective e-mail notification to send a single e-mail message instead of one from each affected UPS in the network when input power-related events are triggered.

General E-Mail

You can use the PXGX Series 2000 Card to inform selected e-mail accounts of events and changes in status as they occur in the UPS or to provide a status message at a predetermined time.

To configure e-mail notification:

1. From the card’s Web page, click the General Email link on the menu bar.
2. Enter the IP address or host name of the SMTP Server IP/hostname (mail server) that will be used to send the e-mail messages.
3. If you need to enter a user name and password for the SMTP server, click Advanced SMTP configuration.

If you have made changes to the General Email Configuration page, a confirmation box opens. Click OK to save the settings; otherwise, click Cancel. The Advanced SMTP Configuration Settings page displays.

Enter the user name and password in the SMTP username and SMTP password fields.

Specify a “from” e-mail address in the SMTP “From” Address field (for example, UPS_1@10.222.10.111).

Click Apply to save the settings and return to the General Email Configuration page.
4. Click **Test SMTP server connection** to test the configuration for the SMTP server. The SMTP Test Results window opens. Close the window when you are done viewing.

**NOTE** If the SMTP test is successful, the confirmation displays immediately. A failed test may take a long time. Close the window if you want to terminate the test.

5. Specify events to trigger an e-mail to be sent to all recipients:

   - Click **Configure** to open the Email Event Trigger Configuration page.

   - Select **Select All**, **Select All Unbatched**, **De-select All**, or select specific event check boxes to indicate which events are to be included for e-mail notification.

   - Test the event e-mail function by selecting **Test Event Email**. A sample e-mail is sent for the first trigger event that is selected and saved.

   - Click **Apply** and **OK** to save the settings.

   - Click the **General Email** link from the menu bar to return to the General Email Configuration page.

**NOTE** Input power-related events (batched items) are identified by **(Input Power Bad)** appended to the event name. To avoid receiving duplicate notification, do not select batched items if Collective Email is enabled and one or more gateways are configured with at least one e-mail recipient for Collective E-mails. See “Collective E-mail” on page 42.

6. To create a new recipient:

   - Select a blank number from the **Recipients** list.

   - Enter the recipient’s e-mail address in the **To** field.

   - Click **Apply**. The e-mail address is added to the **Recipients** list.

**NOTE** Up to ten recipients can be configured to receive event e-mail messages.
7. To modify the options for a recipient, select the e-mail address from the **Recipients** list and select options for the recipient. See Table 1 for a description of options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send on event active</td>
<td>Sends an e-mail message when event occurs</td>
</tr>
<tr>
<td>Send on event clear</td>
<td>Sends an e-mail message when event clears</td>
</tr>
<tr>
<td>Attach event log file to event emails</td>
<td>Attaches the event log to the event e-mail message (the log is always attached to status e-mail messages)</td>
</tr>
<tr>
<td>Attach data log file to event emails</td>
<td>Attaches the data log to the event e-mail message (the log is always attached to status e-mail messages)</td>
</tr>
<tr>
<td>Send periodic status emails</td>
<td>Sends periodic status e-mail messages</td>
</tr>
<tr>
<td>Days between periodic status emails</td>
<td>The number of days between the periodic status e-mail messages</td>
</tr>
<tr>
<td>Time of day (gateway time) for periodic status email (HH:MM)</td>
<td>Time of day for periodic status e-mail messages to be send (in 24-hour format, PXGX Series 2000 Card UTC time)</td>
</tr>
</tbody>
</table>

8. Click **Apply** and then **OK** to save the settings.

**NOTE** Apply changes before modifying or creating another e-mail recipient.
Collective E-mail

Use the collective e-mail feature to limit redundant e-mail messages during input power-related events affecting the UPS. When an input power-related event is detected by one or more gateways, event data is shared in real time between gateways and consolidated.

Input power related events are:

- Input AC Over Voltage
- Input Under Or Over Frequency
- Utility Not Present
- Input AC Under Voltage
- UPS On Battery
- Utility Out Of Limits

After a delay of about 30 seconds with no event activity, a single e-mail is sent, detailing the list of input power-related events present and the list of UPSs affected.

Collective e-mail can be configured to send notification from one PXGX Series 2000 Card to some or all recipients, or from several PXGX Series 2000 Cards to a some or all recipients, in any combination. Recipients can be set up into logical groups and e-mail addresses are displayed so duplication can be avoided.

To configure collective e-mail event messages:

1. From the card’s Web page, click the General Email link on the menu bar. The General Email Configuration page displays. Verify that the IP address of the SMTP server has been configured and, if applicable, that SMTP has been configured. See “General E-Mail” on page 39.

2. From the card’s Web page, click the Collective Email link on the menu bar. The Collective Email Configuration page displays.

3. Verify that Participate in collective notification is selected. When this option is selected, your gateway is visible to peer gateways so that redundant e-mail messages can be combined.
4. Enter the e-mail address of one or more recipients in the **Collective email recipients** field. Verify that the recipient is not already listed in the Visible Peers section that displays at the bottom of this page to avoid duplication.

The Visible Peers section lists all gateways in the network that are participating in collective notification (see Table 2 for details).

**NOTE** UPSs must have a PXGX Series 2000 Card to participate in collective notification.

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>IP address of the PXGX Series 2000 Card</td>
</tr>
<tr>
<td>Firmware Version</td>
<td>PXGX Series 2000 Card firmware version</td>
</tr>
<tr>
<td>Email Server</td>
<td>IP address of the SMTP server entered on the General Email Configuration page</td>
</tr>
<tr>
<td>Email Recipients</td>
<td>E-mail address of recipients</td>
</tr>
</tbody>
</table>

5. Click **Apply** and then **OK** to save the settings.

**Configuring EMP Settings**

**NOTE** Verify that the Power Xpert Gateway Card DIP switch #2 is set to the ON position, enabling the card for communication with an EMP.

To configure the EMP settings:

1. From the card’s Web page, click the **Environmental Monitoring Probe** link under the Configuration section of the the menu bar.

2. For Contact #1 and #2, enter the **Contact Description**, such as External Contact #1 and External Contact #2.

3. For Contact #1 and #2, select the **Contact Type** as Normally Open or Normally Closed from the pull-down menu. Disabled is the default.
4. If Contact #1 or Contact #2 alarms remain active for a specified amount of time, you can signal the NetWatch clients to shut down. To specify the amount of time, set the seconds for Contact #1 and #2 in the **OS Shutdown Delay** field. Enter 1 to 600 seconds (1 second to 10 minutes) to enable the shutdown. The default is 0, which means the NetWatch clients will not shut down.

5. To set the temperature limits of the EMP, enter 0 to 70 degrees Celsius for the **Temperature Upper Limit** and the **Temperature Lower Limit**.

6. Use the **Temperature Hysteresis** to control the alarm when the current value is hovering around the limit. When the EMP temperature measure activates the alarm, it can come out of the alarm state only by dropping below the Temperature Hysteresis value. Enter a value between 0 and 10 percent.

7. If the temperature alarm remains active for a specified amount of time, you can signal the NetWatch clients to shut down. To specify the amount of time, set the seconds for the temperature alarm in the **OS Shutdown Delay**. Enter 1 to 600 seconds (1 second to 10 minutes) to enable the shutdown. The default is 0, which means the NetWatch clients will not be shut down.

8. To set the humidity limits of the EMP, enter 0 to 90 percent for the **Humidity Upper Limit** and the **Humidity Lower Limit**.

9. Use the **Humidity Hysteresis** to control the alarm when the current value is hovering around the limit. When the EMP humidity measure activates the alarm, it can come out of the alarm state only by dropping below the Humidity Hysteresis value. Enter a value between 0 and 20 percent.

10. If the humidity alarm remains active for a specified amount of time, you can signal the NetWatch clients to shut down. To specify the amount of time, set the seconds for the humidity alarm in the **OS Shutdown Delay**. Enter 1 to 600 seconds (1 second to 10 minutes) to enable the shutdown. The default is 0, which means the NetWatch clients will not be shut down.

11. Click **Apply** and then **OK** to save the settings.
Saving and Restoring Configuration Settings

You can create a backup of the PXGX Series 2000 Card settings and restore them at a later date.

Creating a Backup

To create a backup:

1. From the card’s Web page, click the Save and Restore link from the menu bar.

2. To save the PXGX Series 2000 Card settings and preferences, click Save gateway configuration.

   The card exports an XML file.

3. Click Save and enter a file name and location to save the XML file.

Restoring a Backup

**NOTE** Restoring a backup overrides all changes made to the configuration settings since the backup was created.

To restore a backup:

1. From the card’s Web page, click the Save and Restore link from the menu bar.

2. Click Browse to select the file name and then click OK.

3. When prompted, confirm that you want to override the configuration settings with the backup file. Click OK or Cancel.

   After the card completes the backup, reload the Web page until all of the panels display in the device list in the menu bar.
Chapter 4 Root Certificate Authority Installation

Improve the security of your PXGX Series 2000 Card on the Web by installing its root certificate authority (CA) into your browser’s CA cache. A CA is a trusted third party that issues digital certificates for use with encrypted digital transactions. The digital certificate guarantees the identity of the Web site of the company that holds the certificate. In this case, the PXGX Series 2000 Card functions as both the CA and the certificate holder.

You can use the card without installing its root CA (using HTTP), but the transactions will not be as secure as with the root CA (using HTTPS). You can require secure transactions by configuring the card for HTTPS (see “Configuring HTTP and HTTPS Ports” on page 32). The performance of the card is not impacted by using secure transactions.

This section explains root CA installation for:

- Microsoft Internet Explorer 6
- Microsoft Internet Explorer 7
- Mozilla Firefox
Installing Root CA with Microsoft Internet Explorer 6

To install a certificate for the PXGX Series 2000 Card with Microsoft Internet Explorer 6:

1. Open the browser, type the IP address of the card in the address bar, and select Go. For example: https://10.222.51.236/

The Security Alert window opens (see Figure 20).

![Figure 20. Security Alert Window](image-url)
2. Click the **View Certificate** button.

The Certificate window opens (see Figure 21).

![Certificate Window](Image)

**Figure 21. Certificate Window**

**NOTE** The certificate cannot be verified yet because it is issued by a nontrusted CA.
3. Select the **Certification Path** tab.

The root CA is displayed as “Power Xpert Gateway Card” and the issued certificate is shown as the device’s IP address (see Figure 22).

4. Select **Power Xpert Gateway Card**.

![Figure 22. Certification Path Window](image-url)
5. Click **View Certificate**.

A new Certificate window opens for the CA (see Figure 23).

![Certificate Window](image)

**Figure 23. Certification Window for the Power Xpert Gateway Card**
6. Click **Install Certificate**...

The Certificate Import Wizard window opens (see Figure 24).

![Certificate Import Wizard](image)

**Figure 24. Certificate Import Wizard**
7. Click **Next**.

The Certificate Store window opens, prompting you to specify a certificate store (see Figure 25).

![Certificate Store Window](image)

**Figure 25. Certificate Store Window**
8. Verify that the default setting, **Automatically select the certificate store ...**, is selected.

9. Click **Next**.

The certificate wizard displays a final verification (see Figure 26).

![Certificate Import Wizard](image)

**Figure 26. Verifying the Certificate Import Settings**

10. Click **Finish** to complete the wizard.

A message box similar to Figure 27 opens:

![Security Warning](image)

**Figure 27. Security Warning Message**
11. Click **Yes** to install the CA.

   A new dialog box window opens to verify that the import was successful.

12. Close all windows except for the original Security Alert window (see Figure 20 on page 48).

13. Click **View Certificate**.

   An updated Certificate window opens showing a trusted certificate (see Figure 28).

14. Click **OK**.

15. The installation process is complete. You can now access the card using the HTTPS protocol (for example, https://10.222.51.236).
Installing Root CA with Microsoft Internet Explorer 7

To install a certificate for the PXGX Series 2000 Card with Microsoft Internet Explorer 7:

1. Open the browser and type the IP address of the card followed by the path “/ca.html” in the address bar. For example: http://10.222.51.236/ca.html.

The following window displays (see Figure 29):

![Root CA Installation Window](image)

Root CA Installation

To trust SSL certificates by this device, you must add the device as a trusted root CA. Use the link below and follow the instructions in the user manual to install the device’s root CA certificate.

In many browsers (Internet Explorer 7 or above, Mozilla/Firefox, and Opera are known to work) you can simply click the link below to begin installation.

Root CA Certificate

Figure 29. Internet Explorer 7 Window
2. Click **Root CA Certificate**.

A File Download warning window opens (see Figure 30).

![File Download Warning](image)

**Figure 30. File Download Warning**

3. Click **Open**.

The Certificate Window opens (see Figure 21 on page 49).

4. Follow the remaining steps for using Internet Explorer 6 (Step 3 on page 50 through Step 15 on page 55).
Installing Root CA with Mozilla Firefox

To install a certificate for the PXGX Series 2000 Card with Mozilla Firefox:

1. Open the browser and type the IP address of the card followed by the path “/ca.html” in the address bar. For example: http://10.222.51.236/ca.html.

The following window displays (see Figure 31):

![Figure 31. Mozilla Firefox Window](image-url)
2. Click **Root CA Certificate**.

Firefox opens the Downloading Certificate window (see Figure 32).

![Figure 32. Downloading Certificate Window](image)

3. If desired, click **View** to manually examine the contents of the certificate.

4. Click the **Trust this CA to identify web sites** check box option.

5. Click **OK** to complete the installation process.

The installation process is complete. You can now access the card using the HTTPS protocol (for example, `https://10.222.51.236`).
Chapter 5  MIB Files

This chapter describes the Management Information Base (MIB) files available with the card. A MIB is an information repository residing on a device in a communication network. Network management software uses a device’s MIB to manage the device. Every manageable device on a network has a MIB consisting of one or more files that list information about the device.

Use the facilities provided by your Simple Network Management Protocol (SNMP) management software to access the individual MIB objects. The objects define the information available about your UPS.

You can configure a device so that it generates a trap if a certain condition occurs, such as an alarm clearing. The trap is sent to the management station to inform it of the occurrence.

This chapter contains an overview of MIB definitions for each of the MIB files:

- Powerware UPS MIB
- RFC 1628 UPS MIB
- Eaton EMP MIB
- Eaton Alarms+Traps MIB
- Eaton OID Assignments
- RFC 4133 Entity MIB
- RFC 4268 Entity State MIB
- RFC 4268 Entity State MIB Part 2

See the MIB files for detailed information about each MIB object.
Selecting a UPS MIB File

You can use the Standard UPS MIB, as described in RFC-1628, or the proprietary Powerware UPS MIB with the client SNMP management software. It is recommended to load both MIBs. The following table lists the advantages of both MIBs.

<table>
<thead>
<tr>
<th>Standard UPS MIB</th>
<th>Powerware UPS MIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works with UPS SNMP agents from many vendors</td>
<td>Downward compatible with existing ConnectUPS cards or adapters</td>
</tr>
<tr>
<td>Includes some objects not found in Powerware UPS MIB:</td>
<td>Includes some objects not found in Standard UPS MIB:</td>
</tr>
<tr>
<td>upsBatteryStatus</td>
<td>Environment Group (xupsEnvironment)</td>
</tr>
<tr>
<td>upsConfigAudibleStatus</td>
<td>Receptacle Group (xupsRecep)</td>
</tr>
<tr>
<td>upsConfigInputFreq</td>
<td>Topology Group (xupsTopology)</td>
</tr>
<tr>
<td>upsConfigLowBattTime</td>
<td>xupsBatteryAbmStatus</td>
</tr>
<tr>
<td>upsConfigOutputVA</td>
<td>xupsBatteryLastReplacedDate</td>
</tr>
<tr>
<td>upsIdentAttachedDevices</td>
<td>xupsConfigInstallDate</td>
</tr>
<tr>
<td>upsIdentName</td>
<td>xupsControlToBypassDelay</td>
</tr>
<tr>
<td>upsSecondsOnBattery</td>
<td>xupsHeartbeatMinsInterval</td>
</tr>
<tr>
<td></td>
<td>xupsSendTrapType</td>
</tr>
<tr>
<td>Enhances the Test and Control groups</td>
<td>More trap types and trap descriptions</td>
</tr>
<tr>
<td></td>
<td>Simpler battery test procedure</td>
</tr>
</tbody>
</table>

Table 3. UPS MIB Comparison
The Powerware UPS MIB consists of the following groups:

- **Identification** – the xupsIdent status objects provide UPS information, such as the UPS model or UPS firmware version.

- **Battery** – the xupsBattery status objects provide UPS battery information, such as battery time remaining or the percentage of battery charge.

- **Input, Output, and Bypass** – the xupsInput, xupsOutput, and xupsBypass 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.

- **Environment** – the xupsEnvironment objects provide data around the UPS, such as the ambient temperature, and also allow you to set the upper and lower limits for the ambient temperature alarm.

- **Alarms and Traps** – the xupsAlarm and xupsTrapControl objects alert the SNMP management station to the condition of the UPS and of significant conditions, such as Shutdown Imminent.

- **Test** – the xupsTest objects perform a general UPS systems test and UPS battery test.

- **Control** – with the xupsControl objects, a network manager can remotely control the UPS by SNMP set commands, performing such tasks as shutting down or turning on the UPS.

- **Configuration** – the xupsConfig objects allow you to view UPS configuration, such as watts, voltage, or frequency and configure the UPS date and time and installation date.

- **Receptacle** – the xupsRecep objects provide status information about the controllable load groups and control objects for removing and returning power to these load groups.

- **Topology** – the xupsTopology objects describe the machine type and are primarily used for machine-to-machine communication within a power management system.
RFC 1628 UPS MIB

The RFC 1628 standard UPS MIB consists of the following groups:

- **Identification** – the upsIdent status objects provide UPS information, such as the UPS model or UPS firmware version.
- **Battery** – the upsBattery status objects provide UPS battery information, such as battery time remaining or the percentage of battery charge.
- **Input, Output, and Bypass** – the upsInput, upsOutput, and upsBypass 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.
- **Alarms** – the upsAlarm objects alert the SNMP management station to the condition of the UPS and of significant conditions, such as Shutdown Imminent; this group also lists well-known UPS alarm conditions.
- **Test** – the upsTest objects perform UPS diagnostic testing and provide the test results; this group also lists well-known UPS diagnostic tests.
- **Control** – with the upsControl objects, a network manager can remotely control the UPS by SNMP set commands, performing such tasks as shutting down or turning on the UPS.
- **Configuration** – the upsConfig objects allow you to view UPS configuration, such as watts, voltage, or frequency; for UPSs that allow read-write control for objects in this group, you can also remotely configure UPS parameters, such as input voltage or output frequency.

Eaton EMP MIB

Objects in this group are provided by the Powerware Environmental Monitoring Probe (EMP) and include temperature and humidity readings, alarming limits, the two contacts readings, and setup information. The group contains a table of values for environmental contact sensing (normally two digital inputs for monitoring all contacts).

Traps are sent in response to Powerware EMP changes to indicate the type of alarm, alarm acknowledgement, and alarm clearing.
Eaton Alarms+Traps MIB

Objects in this group provide a table of active alarms and a count of alarms currently active. The notification traps provided are triggered by the publishing of an alarm or event.

Eaton OID Assignments

These objects document all the object identifier assignments for Eaton products.

Entity MIB Files

The objects in these MIB files provide information standard in the industry:

- The RFC 4133 Entity MIB provides standard objects for identifying and describing devices attached to the card.
- The RFC 4268 Entity State MIB provides availability status measures for each device.
- The RFC 4268 Entity State MIB Part 2 provides possible state values for the Entity State MIB.
Selecting the UPS Trap Type

Use the Powerware UPS MIB xupsSendTrapType object to select the primary type of traps to be sent to the configured trapsinks when UPS alarms occur or clear. There are three types of traps: stnd(1), xups(2), and pxg(5). Table 4 compares the traps.

### Table 4. UPS Trap Type Comparison

<table>
<thead>
<tr>
<th>xupsSendTrapType Options</th>
<th>stnd(1)</th>
<th>xups(2)</th>
<th>pxg(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIB File that Sends Traps</td>
<td>RFC 1628 UPS MIB (UPS-MIB.txt)</td>
<td>Powerware UPS MIB (XUPS-MIB.txt)</td>
<td>Eaton Alarms+Traps MIB (EATON-PXG-MIB.txt)</td>
</tr>
<tr>
<td>Number of Defined Traps for Alarms and Notices</td>
<td>Only three: upsTrapOnBattery, upsTrapAlarmEntryAdded, and upsTrapAlarmEntryRemoved.</td>
<td>Up to 50; each well-known Powerware UPS MIB alarm is mapped to a trap.</td>
<td>Eleven, with one trap sent for each entry in the PXGX Series 2000 Card Active Alarms table. Each trap indicates its severity level.</td>
</tr>
<tr>
<td>Advantages</td>
<td>Simplest set of traps.</td>
<td>• Breaks out the alarms into individual traps, and adds a text message describing the UPS alarm.</td>
<td>• Comparable to other Eaton Power Xpert Gateway products and parallels the BACnet/WS events logged by the Power Xpert software.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Auto-clearing alarm types.</td>
<td>• Fullest text description for each alarm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Includes traps when you acknowledge and close the alarms (see page 82).</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>You have to decode the upsAlarmDescr object ID to determine which alarm has occurred.</td>
<td>None.</td>
<td>• If five UPS alarms occur for an On Battery condition, it will send five traps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Alarm Cleared traps will not be sent until you acknowledge and close each alarm (see page 82).</td>
</tr>
<tr>
<td>Traps that are Sent Regardless of Trap Type Setting</td>
<td>upsTrapTestCompleted</td>
<td>xupstdCommunicationsLost xupstdHeartbeat xupstdCommEstablished</td>
<td>powerChainEvent (for example, StructureChanged events)</td>
</tr>
</tbody>
</table>
Chapter 6  Modbus Registers

This chapter describes the UPS data that is available through the Modbus TCP/IP protocol. The UPS monitors several parameters, such as voltage, current, power, and alarms. The value of each parameter is stored in a corresponding Modbus data register.

The values of the parameters can be read over an Ethernet network by using Modbus TCP/IP building monitoring programs or Modbus TCP/IP analyzer programs.

**NOTE** If your Modbus program requires one-based addressing, add a one to the register addresses listed in Table 7 on page 73. For example, one-based addressing for the vendor name would be 1033 (1032 + 1).

### Obtaining the Modbus Register Map

To view a list of the Modbus registers in your UPS:

1. From the card’s Web page, click the **Modbus TCP Register Maps** link under Documentation on the menu bar.

2. Select the hardware type from the **Select a map to generate** pull-down menu.

3. Click **View Register Map**. A dialog box opens.

4. Click **Open** to view or **Save** to save the file.

**NOTE** The Modbus file is a comma-separated values (*.csv) file that can be opened in Microsoft Excel software. Some computer configurations automatically open the files in the Microsoft Excel software instead of prompting you to save.

5. If you selected **Save**, select a location for the `pxgx-modbus-uid-XXX.csv` file, where XXX is the UnitID of the requested map.

**NOTE** Some browsers leave a blank window open after you save or view the file. Close the window.
Returning Error Codes

By default, the PXGX Series 2000 Card returns a Modbus error code when it receives an incoming register/discrete/coil READ request for an address that is not currently valid. To improve performance in some situations, you can configure the card to disable this error response and instead return zero-filled data in all of the invalid address ranges.

To change how error codes are returned:

1. From the card's Web page, click the Modbus TCP link from the menu bar.

2. Clear the Return error on unsupported read request check box to disable the error code or select the check box to enable the error code.

3. Click Apply and then OK to save the setting.
Modbus Register Addressing

This section describes Modbus function codes, data formats, and data addressing.

Modbus Function Codes

The UPS registers are read using Modbus Function Codes (FC). For most UPS registers, FC 04 is used. For alarms, FC 02 is used. The UPS supports the following hex function codes:

Table 5. Function Codes

<table>
<thead>
<tr>
<th>FC</th>
<th>Hex</th>
<th>Description</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>0x01</td>
<td>Read Coil Status</td>
<td>Supported for compatibility purposes—returns the same data as FC 02</td>
</tr>
<tr>
<td>02</td>
<td>0x02</td>
<td>Read Discrete Inputs</td>
<td>Single input data, such as alarms and discrete contacts</td>
</tr>
<tr>
<td>03</td>
<td>0x03</td>
<td>Read Holding Registers</td>
<td>Supported for compatibility purposes—returns the same data as FC 04</td>
</tr>
<tr>
<td>04</td>
<td>0x04</td>
<td>Read Input Registers</td>
<td>Analog data (most string and numeric data types), such as voltage</td>
</tr>
<tr>
<td>05</td>
<td>0x05</td>
<td>Write Single Coil</td>
<td>For future use</td>
</tr>
<tr>
<td>06</td>
<td>0x06</td>
<td>Write Single Register</td>
<td>For future use</td>
</tr>
<tr>
<td>07</td>
<td>0x0F</td>
<td>Write Multiple Coils</td>
<td>For future use</td>
</tr>
<tr>
<td>08</td>
<td>0x10</td>
<td>Write Multiple Registers</td>
<td>For future use</td>
</tr>
</tbody>
</table>
Data Formats

Modbus programs usually provide an option for viewing various data types. Refer to your Modbus program documentation for detailed information on viewing data options.

A register is 16 bits (two bytes). The UPS supports the following data types:

- **STRING** – A string of ASCII characters (two per register). Consult the Size parameter to find the string’s length for a given entry (it is a multiple of two so that entries are register-aligned).
- **FLOAT** – A 32-bit IEEE754 floating point number. FLOATs are always two registers.
- **UINT** – An unsigned integer. Consult the Size parameter to find the integer’s size for a given entry (it is a multiple of two so that entries are register-aligned).
- **TIME** – The TIME type \((ym \ dh \ ms)\) consists of six bytes specifying the year, month, day, hour, minutes, and seconds. The bytes are stored in hexadecimal format. If your Modbus application displays the individual bytes in a register, view the bytes using the decimal option. Otherwise, the bytes are best viewed by displaying the two-byte register in a binary format and translating each byte to decimal.

For example, if today is May 17, 2008 and the time is 10:45 and 20 seconds, viewing each byte in decimal would yield the following data, which is viewable as the year (08), month (05), day (17), hour (10), minutes (45), and seconds (20):

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>05</td>
<td>17</td>
<td>10</td>
<td>45</td>
</tr>
</tbody>
</table>

See “Time or Date (FC 04)” on page 76 for more information.

- **BOOL** – A binary (Boolean) value of 0 or 1. BOOL is usually assigned to discrete input alarms.

Data Addressing

If a data type spans multiple registers (such as a FLOAT), lower addressed registers map to higher-order parts of the value. Within each register, data is in most significant bit (MSB) first format.
NOTE A Modbus register contains two bytes. Therefore, the number of registers containing the information can be obtained by dividing the bytes by two. For example, the vendor name in Table 7 on page 73 can be obtained by reading 32 Modbus registers starting at register 1032.

NOTE If a register is not supported in a particular device, an exception response is returned.

UPS Unit ID Numbers

The Unit IDs associated with the Modbus registers apply to specific load groups or segments (see Table 6).

The UPS has a Unit ID of 0, 1, or 255, while load groups or segments within the UPS have Unit IDs that range from 2 to 65 (for load groups or segments 1 to 64).

If there is an optional Powerware Environmental Monitoring Probe (EMP) installed, use Unit ID 254 to obtain EMP data. See “EMP (FC 04)” on page 75 for more information.

Table 6. UPS Unit ID Numbers

<table>
<thead>
<tr>
<th>Unit ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1, 255</td>
<td>UPS Summary Data</td>
</tr>
<tr>
<td>2–65</td>
<td>Load Groups or Segments Data</td>
</tr>
<tr>
<td>254</td>
<td>Powerware Environmental Monitoring Probe</td>
</tr>
</tbody>
</table>


**UPS Registers and Alarms**

This section contains information for the UPS Registers (FC 04) and UPS Alarms (FC 02).

**UPS Registers (FC 04)**

Table 7 provides a partial list of data registers that is available from a UPS. Not all registers may be available in your UPS or in selected load groups.

To read the vendor name in the UPS, set the Modbus program to Unit ID 1 and register 1032:

```
IP: <IP address of UPS>
Unit ID: 1
Starting Register: 1032
Number of registers: 32
Function Code: 04
```

The UPS returns 32 registers containing up to 64 characters. There are two ASCII characters per register, so the vendor name could be displayed as **EATON**.

To read the UPS output voltage from Phase C to Neutral, set the Modbus program to Unit ID 1 and register 4050:

```
IP: <IP address of UPS>
Unit ID: 1
Starting Register: 4050
Number of Registers: 2
Function Code: 04
```

The UPS returns a floating point value of the output voltage from Phase C to Neutral (such as 120.7 volts) of the UPS at the specified IP address.
### Table 7. UPS Sample Registers (FC 04)

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Display Name</th>
<th>Register</th>
<th>Discrete</th>
<th>Units</th>
<th>Data Type</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VendorName</td>
<td>Vendor Name</td>
<td>1032</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>ModelName</td>
<td>Model Name</td>
<td>1064</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>iDisplayName</td>
<td>Display Name</td>
<td>1096</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>iDeviceType</td>
<td>Device Type</td>
<td>1128</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>iDeviceID</td>
<td>Device ID</td>
<td>1192</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>iDeviceGuid</td>
<td>Device GUID</td>
<td>1256</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>40</td>
</tr>
<tr>
<td>SerialNumber</td>
<td>Serial Number</td>
<td>1276</td>
<td>No</td>
<td>No</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>SoftwareVersion</td>
<td>Software Version</td>
<td>1308</td>
<td>No</td>
<td>No</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mACVoutC</td>
<td>Vcn Output</td>
<td>4050</td>
<td>No</td>
<td>Volts</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mACVbypassA</td>
<td>Van Bypass</td>
<td>4058</td>
<td>No</td>
<td>Volts</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mACVbypassB</td>
<td>Vbn Bypass</td>
<td>4060</td>
<td>No</td>
<td>Volts</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mACVbypassC</td>
<td>Vcn Bypass</td>
<td>4062</td>
<td>No</td>
<td>Volts</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mDCVbatt</td>
<td>DCV Batt</td>
<td>4377</td>
<td>No</td>
<td>Volts</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mAClinA</td>
<td>IinA</td>
<td>5022</td>
<td>No</td>
<td>Amperes</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mAClinB</td>
<td>IinB</td>
<td>5024</td>
<td>No</td>
<td>Amperes</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mAClinC</td>
<td>IinC</td>
<td>5026</td>
<td>No</td>
<td>Amperes</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>mACloutA</td>
<td>IoutA</td>
<td>5028</td>
<td>No</td>
<td>Amperes</td>
<td>FLOAT</td>
<td>4</td>
</tr>
</tbody>
</table>
UPS Alarms (FC 02)

Table 8 provides a partial list of example UPS alarms. Your UPS may have different alarms. UPS alarms are not registers, but are discrete inputs and are read using FC 01 or FC 02.

The UPS monitors the condition of several parameters and can activate an alarm status if a parameter is out of range. For example, if the utility power is too high or too low, the UPS can set the Utility Out of Limits alarm.

To read the Utility Out of Limits alarm, set the Modbus program to Unit ID 1 and discrete address 1057:

```
IP: <IP address of UPS>
Unit ID: 1
Starting Address: 1057
Number of Addresses: 1
Function Code: 02
```

The UPS returns a BOOL value (0 or 1), indicating if the alarm is active or not active. A return value of 0 (false) indicates an inactive alarm (the utility input is within limits). A return value of 1 (true) indicates an active alarm (the utility input is out of limits).

### Table 8. UPS Sample Alarms (FC 02)

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Display Name</th>
<th>Address</th>
<th>Discrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>aUtilityOutOfLimits</td>
<td>Utility Out Of Limits</td>
<td>1057</td>
<td>Yes</td>
</tr>
<tr>
<td>aInternalCommFail</td>
<td>Internal Communication Failure</td>
<td>1062</td>
<td>Yes</td>
</tr>
<tr>
<td>aBattVoltsHigh</td>
<td>Battery Voltage High</td>
<td>1067</td>
<td>Yes</td>
</tr>
<tr>
<td>aCheckPowerSupply</td>
<td>Check Power Supply</td>
<td>1069</td>
<td>Yes</td>
</tr>
<tr>
<td>aCheckLogicSupply</td>
<td>Check Logic Power Supply</td>
<td>1070</td>
<td>Yes</td>
</tr>
<tr>
<td>aHeatsinkOverTemp</td>
<td>Heatsink Over Temperature</td>
<td>1072</td>
<td>Yes</td>
</tr>
<tr>
<td>aCheckHeatsinkSensor</td>
<td>Check Heatsink Temperature Sensor</td>
<td>1073</td>
<td>Yes</td>
</tr>
<tr>
<td>aRectifier125OverI</td>
<td>Rectifier Current Over 125%</td>
<td>1074</td>
<td>Yes</td>
</tr>
<tr>
<td>aInverterOffCommand</td>
<td>Inverter Off Command</td>
<td>1091</td>
<td>Yes</td>
</tr>
</tbody>
</table>
EMP (FC 04)

NOTE See “Configuring EMP Settings” on page 43 for more information.

The optional EMP for the UPS can measure temperature and humidity. Because the device can be located outside the UPS, the reference is to “auxiliary” data. In addition, it contains two connections for monitoring the condition of auxiliary input contacts, such as a door switch. See Table 9 for a list of EMP registers.

An exception code is returned if the EMP is not installed.

To read the temperature at the UPS, set the Modbus program to Unit ID 254 and register address 12028:

```
IP: <IP address of UPS>
Unit ID: 254
Starting Register: 12028
Number of registers: 2
Function Code: 04
```

Table 9. EMP Registers (FC 04)

<table>
<thead>
<tr>
<th>Name</th>
<th>Register</th>
<th>Data Type</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Name</td>
<td>1032</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>Model Name</td>
<td>1064</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>Display Name</td>
<td>1096</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>Serial Number</td>
<td>1276</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>Device ID</td>
<td>1192</td>
<td>STRING</td>
<td>64</td>
</tr>
<tr>
<td>Auxiliary Input 1</td>
<td>10275</td>
<td>UINT</td>
<td>2</td>
</tr>
<tr>
<td>Auxiliary Input 2</td>
<td>10276</td>
<td>UINT</td>
<td>2</td>
</tr>
<tr>
<td>Auxiliary Temperature</td>
<td>12028</td>
<td>FLOAT</td>
<td>4</td>
</tr>
<tr>
<td>Auxiliary Humidity</td>
<td>12030</td>
<td>FLOAT</td>
<td>4</td>
</tr>
</tbody>
</table>
Time or Date (FC 04)

Some UPS models support a time and/or date function. This format has a DATE data type and contains six bytes. Each byte represents the year, month, day, hour, minutes, or seconds (see page 70 for more information).

To read the UPS date and time, set the Modbus program to Unit ID 1 and register 12203:

- **IP:** <IP address of UPS>
- **Unit ID:** 1
- **Starting Register:** 12203
- **Number of registers:** 3
- **Function Code:** 04

The UPS would return three registers containing hexadecimal data in the ym dh ms format (for example, May 17, 2007 at 10:45 and 20 seconds).

```
07 05 11 0A 2D 14
```

Viewing each byte in decimal would yield the following data, which is viewable as the year (07), month (05), day (17), hour (10), minutes (45), and seconds (20):

```
07 05 17 10 45 20
```

Viewing each byte as two-byte unsigned integers would yield the following data:

```
1797 4362 11540
```

Viewing each byte as binary would yield the following data:

```
00000111 00000101 00010001 00001010 00101101 00010100
```

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Display Name</th>
<th>Register</th>
<th>Discrete</th>
<th>Units</th>
<th>Data Type</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>mCurrentTime</td>
<td>Time</td>
<td>12203</td>
<td>No</td>
<td>No</td>
<td>DATE</td>
<td>6</td>
</tr>
</tbody>
</table>
## Chapter 7 Specifications

<table>
<thead>
<tr>
<th>Table 11. Technical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
</tr>
<tr>
<td><strong>Memory</strong></td>
</tr>
<tr>
<td><strong>LAN Controller</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Network Connection</strong></td>
</tr>
<tr>
<td><strong>UPS Protocol</strong></td>
</tr>
<tr>
<td><strong>Network Protocols (not limited to)</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Supported SNMP MIBs</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
</tr>
<tr>
<td><strong>Operating Humidity</strong></td>
</tr>
<tr>
<td><strong>Power Input</strong></td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
</tr>
<tr>
<td><strong>Size (L x W x H)</strong></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
</tr>
<tr>
<td><strong>EMC Statements</strong></td>
</tr>
</tbody>
</table>
Chapter 8  
Operation and Maintenance

This section explains:

- PXGX Series 2000 Card panel details
- Indicator descriptions
- DIP switch settings
- Open alarms
- Generating log files
- Firmware upgrade instructions

PXGX Series 2000 Card Panel Details

![Image of PXGX Series 2000 Card Panel Details]

Figure 33. PXGX Series 2000 Card Panel Details
# Indicator Descriptions

The Ethernet port indicator descriptions for the PXGX Series 2000 Card are listed in Table 12; the stacked indicator descriptions are listed in Table 13.

## Table 12. Ethernet Port Indicators

<table>
<thead>
<tr>
<th>Indicator Label</th>
<th>Illuminated</th>
<th>Not Illuminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet Port 1</td>
<td>Indicates a valid 100 Mb Connection (Link).</td>
<td>Indicates a valid 10 Mb Connection (Link) as long as the corresponding ACT indicator is illuminated.</td>
</tr>
<tr>
<td></td>
<td>Indicates network activity when the indicator is on or blinking.</td>
<td>Indicates no network activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet Port 2</td>
<td>Indicates a valid 100 Mb Connection (Link).</td>
<td>Indicates a valid 10 Mb Connection (Link) as long as the corresponding ACT indicator is illuminated.</td>
</tr>
<tr>
<td></td>
<td>Indicates network activity when the indicator is on or blinking.</td>
<td>Indicates no network activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Table 13. Stacked Indicator Descriptions

<table>
<thead>
<tr>
<th>Label</th>
<th>Color</th>
<th>Illuminated</th>
<th>Not Illuminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td>Green</td>
<td>Communication with the UPS has been established.</td>
<td>Communication with the UPS has not been established. As the card boots, the indicator remains off. However, if it remains off after one minute, there is a communication problem between the card and the UPS.</td>
</tr>
<tr>
<td>DHCP</td>
<td>Amber</td>
<td>At least one port is configured for DHCP and has obtained IP address information.</td>
<td>The use of DHCP has been disabled by the user, or all ports configured for DHCP have failed to obtain IP address information.</td>
</tr>
<tr>
<td>IDENT</td>
<td>Red</td>
<td>A firmware update is in progress. Do not remove the card from the UPS.</td>
<td>A firmware update is not in progress.</td>
</tr>
<tr>
<td>POWER</td>
<td>Green</td>
<td>DC power is available to the card from the UPS.</td>
<td>If all indicators are not illuminated, DC power is not available from the UPS. This may indicate that the UPS is off and unplugged.</td>
</tr>
</tbody>
</table>

**NOTE** During the power-on sequence, all four indicators are illuminated for approximately 20 seconds. Wait at least one minute for the card’s boot process to complete before comparing the indicators to the table above because indicators may turn on and off at different times in the boot process.
DIP Switch Description

DIP switch definitions for the PXGX Series 2000 Card are listed in Table 14.

<table>
<thead>
<tr>
<th>S1 Position Number</th>
<th>OFF Position (Default)</th>
<th>ON Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enable previously stored network configuration settings (Normal mode)</td>
<td>Override network settings to assign private IP addresses (Configuration mode); Port 1 is set to 192.168.1.1 and Port 2 is set to 192.168.1.2</td>
</tr>
<tr>
<td>2</td>
<td>Enable the front panel RJ-45 for serial communication</td>
<td>Enable the front panel RJ-45 port for communication with an Environmental Monitoring Probe (EMP) device for immediate or future use</td>
</tr>
<tr>
<td>3</td>
<td>Normal behavior</td>
<td>Reset the HTTP passwords to the defaults on boot (user and admin). After a successful boot, the switch should be turned back off before rebooting the card.</td>
</tr>
<tr>
<td>4</td>
<td>Reserved</td>
<td>Reserved</td>
</tr>
<tr>
<td>5</td>
<td>Reserved</td>
<td>Reserved</td>
</tr>
<tr>
<td>6</td>
<td>Normal behavior</td>
<td>Reset the card to factory defaults on boot (after a successful boot, the switch should be turned back off before rebooting the card)</td>
</tr>
</tbody>
</table>
Open Alarms

Alarm notices can display in three areas of the Web page:

- **Header bar:** If there is an active alarm(s) present on the UPS (Condition Active: true), a flashing alarm icon and an alarm message display in the header bar. Clicking the alarm message displays the Open Alarms page.

- **Default page:** If there is an open alarm(s), the “(Alarms Present)” message displays at the top of the default page and the alarmed data value(s) is highlighted in red text and continues to display in the alarm state until the alarm is closed.

- **Menu bar:** If there is an open alarm(s), “Open Alarms” and the number of active alarms display in red under the Alarms menu. Clicking Open Alarms displays the Open Alarms page.

**NOTE** The alarm notice in the header bar reflects the actual condition of the highest active alarm in the UPS. The UPS considers an alarm no longer active when the condition that triggered the alarm no longer exists (Condition Active: false). Everywhere else that an active alarm displays indicates that the alarm has not been closed.

The Open Alarms page displays a list of the latest alarms (up to 20). Inactive alarms continue to display until they are closed.

To view, acknowledge, or close alarms:

1. From the card’s Web page, click the **Open Alarms** link from the menu bar.

   The Open Alarms page displays with the following information for each alarm:

   - Time and date when the error occurred.
   - The alarm message that appears on the UPS display.
   - The parameter that is in alarm (appears as a link).
   - The alarm level (informational, critical, or major).
   - The condition of the alarm (active is true, inactive is false). The condition of the alarm indicates the actual condition of the UPS.
2. To view the specific alarm parameter data, click the parameter link. The data display page appears and the value in error appears in red text.

**NOTE** In the following steps, you are prompted to enter a note regarding the alarms. This note is optional and is entered into the Event log and appears in the Power Xpert software. If you select Acknowledge All or Close All, you can enter one note regarding all of the alarms.

3. To acknowledge that you are aware of the alarm, click **Acknowledge**. You have the option to add a note when prompted. Click **OK** to submit the acknowledgement.

4. To acknowledge all alarms at one time, click **Acknowledge All** at the top of the page. You have the option to add a note when prompted. Click **OK** to submit the acknowledgement.

5. To close the alarm and remove it from the Open Alarms list, click **Close**. You have the option to add a note when prompted. Click **OK** to submit the closure.

6. To close all alarms at one time, click **Close All** at the top of the page. You have the option to add a note when prompted. Click **OK** to submit the closure.

**NOTE** If a UPS alarm is still active (Condition Active: true) and you close the alarm, a new alarm and event ID is entered into the Open Alarms list.

**NOTE** If a UPS alarm clears automatically, close the alarm to remove it from the Open Alarms list.
Generating Log Files

NOTE  The data log and event log files are comma-separated values (*.csv) files that can be opened in Microsoft Excel software. Some computer configurations will automatically open the files in the Microsoft Excel software instead of prompting you to save.

To generate a data log:

1. From the card’s Web page, click the Data link from the menu bar.
2. Click View the log.
3. Select a name and location for the file (if prompted to save).

To generate an event log:

1. From the card’s Web page, click the Event link from the menu bar.
2. Click View the log.
3. Select a name and location for the file (if prompted to save).

To generate a system log:

1. From the card’s Web page, click the System link from the menu bar.
2. Click View the log.
3. Select a name and location for the file (if prompted to save).

To erase a data, event, or system log:

1. Click Erase the log from the Data Log, Event Log, or System page.
2. Click OK to erase the log; otherwise, click Cancel.
Upgrading the Card’s Firmware

The card’s firmware may be updated by downloading the appropriate file from www.eaton.com/powerxpert. During the upgrade process, the PXGX Series 2000 Card does not monitor the UPS status.

To upgrade the firmware:

1. From the card’s Web page, click the **Firmware** link from the menu bar.

2. Select the **Reboot when complete** check box to automatically reboot after updating the firmware.

   **NOTE** If the **Reboot when complete** check box is not selected, you will be prompted to select **Reboot** when the update is done.

3. Click **Browse**.


   An audible alarm sounds as the card reboots, and the Web page shows the “Gateway rebooting, please wait...” message. The Web page reloads when complete.
Chapter 9  Service and Support

If you have any questions or problems with the PXGX Series 2000 Card, call your Local Distributor or the Help Desk at one of the following telephone numbers and ask for a PXGX Series 2000 Card technical representative.

United States: 1-800-843-9433 or 1-919-870-3028
Canada: 1-800-461-9166 ext 260
All other countries: Call your local service representative

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

- Model number
- Serial number
- Version number (if available)
- 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 warranted 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)

Power Xpert Gateway (PXGX) Series 1000 and Series 2000 Cards

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton Corporation, a Delaware Corporation company (“Company”).

LIMITED WARRANTY: This limited warranty (this “Warranty”) applies only to the original End-User (the “End-User”) of the Power Xpert Gateway (PXGX) Series 1000 or Series 2000 Card (the “Product”) purchased on or after June 1, 2004 and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Company for resale to an End-User.

LIMITED WARRANTY PERIOD: The period covered by this Warranty for the Product installed [and currently located] in the fifty (50) United States, the District of Columbia, and Canada is twenty-four (24) months from the date of purchase.

WHAT THIS LIMITED WARRANTY COVERS: The warrantor warrants that the Product (the “Warranted Item”) is free from defects in material and workmanship. If, in the opinion of Company, a Warranted Item is defective and the defect is within the terms of this Warranty, Company’s sole obligation will be to repair or replace such defective Warranted Item (including by providing service, parts and labor, as applicable), at the option of Company.

PROCEDURES FOR REPAIR OR REPLACEMENT OF WARRANTED ITEMS: The Warranted Item will be repaired or replaced at a Company site or such other location as determined by Company.

If the Warranted Item is to be replaced by Company, and the End-User supplies a credit card number or purchase order for the value of the replacement Product, Company will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Company receives notice of the warranty claim. In such case, the End-User must return (at Company’s expense) the defective Warranted Item to Company in the same packaging as the replacement Warranted Item received by the End-User or as otherwise instructed by Company. If Company does not receive the defective Warranted Item, Company will either charge the End-User’s credit card, or send the End-User an invoice (which the End-User agrees to pay), for the value of the replacement Product.

If the Warranted Item is to be replaced by Company, but the End-User is unwilling or unable to supply a credit card number or purchase order for the value of the replacement Product, Company will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Company receives the defective Product from the End-User.

In any case, Company will provide shipping instructions and will pay its designated carrier for all shipping charges for return of defective equipment and replacement of Warranted Items. Any returned Warranted Item or parts that are replaced may be new or reconditioned. All Warranted Items returned to Company and all parts replaced by Company shall become the property of Company.

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, abuse, misuse, misapplication, or incorrect installation; (d) repair or alteration not authorized in writing by Company personnel or performed by an authorized Company Customer Service Engineer or Agent; (e) improper testing, operation, maintenance, adjustment, or modification of any kind not authorized in writing by Company personnel or performed by an authorized Company Customer Service Engineer or Agent; or (f) use of the Product under other than normal operating conditions or in a manner inconsistent with the Product’s labels or instructions.

This Warranty is not valid if the Product’s serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof.
Company shall not be responsible for any charges for testing, checking, removal or installation of Warranted Items.

COMPANY DOES NOT WARRANT EQUIPMENT NOT MANUFACTURED BY COMPANY. IF PERMITTED BY THE APPLICABLE MANUFACTURER, COMPANY SHALL PASS THROUGH SUCH MANUFACTURER’S WARRANTIES TO END-USER.

COMPANY DOES NOT WARRANT SOFTWARE (IF APPLICABLE TO THE PRODUCT), INCLUDING SOFTWARE EMBEDDED IN PRODUCTS, THAT IS NOT CREATED BY COMPANY. WITHOUT LIMITING THE FOREGOING, COMPANY SPECIFICALLY DOES NOT WARRANT SOFTWARE (SUCH AS LINUX) THAT WAS CREATED USING AN “OPEN SOURCE” MODEL OR IS DISTRIBUTED PURSUANT TO AN OPEN SOURCE LICENSE.

THIS WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OFFERED BY COMPANY WITH RESPECT TO THE PRODUCTS AND SERVICES AND, EXCEPT FOR SUCH FOREGOING WARRANTY COMPANY DISCLAIMS ALL OTHER WARRANTIES INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE COMPANY’S SOLE LIABILITY AND END-USER’S EXCLUSIVE REMEDY FOR FAILURE OF COMPANY TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE END-USER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE.

LIMITATION OF LIABILITY: The remedies of the End-User set forth herein are exclusive and are the sole remedies for any failure of Company to comply with its obligations hereunder. In no event shall Company be liable in contract, in tort (including negligence or strict liability) or otherwise for damage to property or equipment other than the Products, including loss of profits or revenue, loss of use of Products, loss of data, cost of capital, claims of customers of the End-User or any special, indirect, incidental or consequential damages whatsoever. The total cumulative liability of Company hereunder whether the claims are based in contract (including indemnity), in tort (including negligence or strict liability) or otherwise, shall not exceed the price of the Product on which such liability is based.

Company shall not be responsible for failure to provide service or parts due to causes beyond Company’s reasonable control.

END-USER’S OBLIGATIONS: In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way; follow the Product’s user’s guide; and protect against further damage to the Product if there is a covered defect.

OTHER LIMITATIONS: Company’s obligations under this Warranty are expressly conditioned upon receipt by Company of all payments due to it (including interest charges, if any). During such time as Company has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Company shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

COSTS NOT RELATED TO WARRANTY: The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses or labor of Company representatives outside the terms of this Warranty will be borne by the End-User.

OBTAINING WARRANTY SERVICE: In the USA, call the Customer Reliability Center 7x24 at 800-356-5737. Outside of the USA, contact your local Eaton product sales or service representative, or call the Customer Reliability Center in the USA at 919-870-3149. For comments or questions about this Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.