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Introduction

Product Description

Features

The following APC Network Management Cards and devices are Web-based products that manage supported devices using multiple, open standards such as Hypertext Transfer Protocol (HTTP), Telnet, Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS), Simple Network Management Protocol (SNMP), File Transfer Protocol (FTP), and Secure CoPy (SCP):

- The AP9617 Network Management Card *EX*:
 - Provides the ability to export a user configuration (.ini) file from a configured card to one or more unconfigured cards without converting the file to a binary file
 - Supports using a Dynamic Host Configuration Protocol (DHCP) or server to provide the Management Card's network (TCP/IP) values
 - Supports using the APC Remote Monitoring Service (RMS)
 - Provides data and event logs
 - Provides UPS shutdown and self-test scheduling features
 - Provides support for the APC PowerChute® Network Shutdown utility
 - Enables you to configure notification through event logging (by the Management Card and Syslog), e-mail, and SNMP traps. You can configure notification for single events or groups of events, based on the severity level or category of events
 - Provides a selection of security protocols for authentication and encryption
- The AP9618 Network Management Card *EM/MDM* includes all AP9617 features and the following:
 - An Integrated Environmental Monitor that has a temperature sensor, input contacts, and an output relay
 - An internal analog modem

- A paging feature that lets you configure any event to generate a page to one or more configured analog or digital pagers when the event occurs. This feature includes call-back capabilities. Optionally, you can convert Network Management Card, UPS, and environmental monitoring event codes to the default Out-of-Band Management Card event codes (supplemented by several additional numeric codes).
- The AP9619 Network Management Card *EM* includes all AP9617 features and has an Integrated Environmental Monitor with a temperature sensor, input contacts, and an output relay.
- In addition to support for the UPS Network Management Cards, the Network Management Card firmware supports the network-enabled model of the APC S Type Power Conditioner with Battery Backup, which provides surge protection, isolated noise filtering, and voltage regulation, in addition to battery backup, for high performance audio-visual (AV), home security, and automation systems.

Upgrade kits available from APC. Use the AP9618U kit to upgrade AP9617 to include the features of AP9618 or to upgrade AP9619 to include the AP9618 analog modem. Use the AP9619U kit to upgrade AP9617 to include the features of AP9619.

For an AP9618 Network Management Card *EM/MDM* or AP9619 Network Management Card *EM* you can also purchase a humidity sensor from APC.

APC devices in which you can install the Management Card. The Management Card can be installed into the following APC devices:

- Any Smart-UPS® or Matrix-UPS® model that has an internal expansion slot, or any Silcon™, AIS 5000, Symmetra®, or Symmetra PX UPS. (The APC S Type Power Conditioner with Battery Backup, S20BLK, has an embedded Management Card.)
- Triple Chassis Protocol Converter (AP9604S), required for a Silcon UPS, which does not have an expansion slot.
- Expansion Chassis (AP9600).
- Triple Expansion Chassis (AP9604).

Initial setup

You must define three TCP/IP settings for the Network Management Card before it can operate on the network:

- IP address of the Management Card
- Subnet mask
- IP address of the default gateway

Do not use the loopback address (127.0.0.1) as the default gateway. Doing so disables the card. You must then log on using a serial connection and reset TCP/IP settings to their defaults.



To configure the TCP/IP settings, see the Network Management Card *Installation and Quick Start Manual*, available on the APC Network Management Card *Utility* CD and in printed form.

For detailed information on how to use a DHCP server to configure the TCP/IP settings at a Management Card, see [TCP/IP and Communication Settings](#).

Network management features

These applications and utilities work with a UPS that connects to the network through a Network Management Card.

- PowerChute® Network Shutdown to provide unattended remote graceful shutdown of computers that are connected to APC UPSs
- APC InfraStruXure™ Manager for enterprise-level power management and management of APC agents, UPSs, information controllers, and environmental monitors
- APC PowerNet® Management Information Base (MIB) with a standard MIB browser to perform SNMP SETs and GETs and to use SNMP traps
- The APC Device IP Configuration Wizard to configure the basic settings of one or more Network Management Cards over the network

- The APC Security Wizard to create components needed for high security for the Network Management Card when you are using Secure Sockets Layer (SSL) and related protocols and encryption routines

Internal Management Features

Overview

Use the Web interface or the control console interface to manage the UPS, an environmental monitor (the Integrated Environmental Monitor at an AP9618 or AP9619 Management Card, an external environmental monitor, or the sensor of and APC S Type Power Conditioner with Battery Backup), and the Management Card itself.



For more information about the internal user interfaces, see [Web Interface](#) and [Control Console](#).

Access priority for logging on

Only one user at a time can log on to the Management Card. The priority for access, beginning with the highest priority, is as follows:

- Local access to the control console from a computer with a direct serial connection to the Management Card.
- Telnet or Secure SHell (SSH) access to the control console from a remote computer.
- Web access, either directly or through the InfraStruXure Manager.



See [SNMP](#) for information about how SNMP access to the Management Card is controlled.

Types of user accounts

The Management Card has three levels of access (Administrator, Device User, and Read-Only User), which are protected by user name and password requirements.

- An Administrator can use all the menus in the Web interface and control console. The default user name and password are both **apc**.
- A Device User can access only the following:
 - In the Web interface, the menus on the **UPS** and **Environment** tabs and the event and data logs, accessible under the **Events** and **Data** headings on the left navigation menu of the **Logs** tab.
 - In the control console, the equivalent features and options.The default user name is **device**, and the default password is **apc**.
- A Read-Only User has the following restricted access:
 - Access through the Web interface only.
 - Access to the same tabs and menus as a Device User, but without the capability to change configurations, control devices, delete data, or use file transfer options. Links to configuration options are visible but disabled, and the event and data logs display no button to clear the log.

The default user name is **readonly**, and the default password is **apc**.



To set **User Name** and **Password** values for the three account types, see [Setting user access \(Administration>Security>Local Users>options\)](#).



Note

You must use the Web interface to configure values for the Read-Only User.

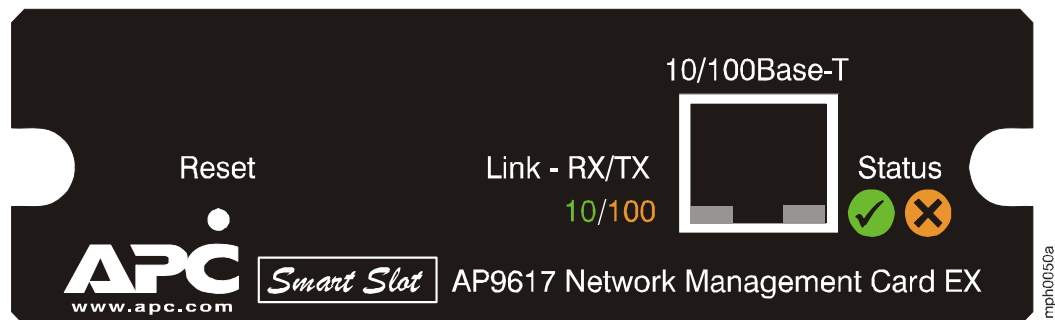
How to Recover from a Lost Password

You can use a local computer, a computer that connects to the Management Card or other device through the serial port, to access the control console.

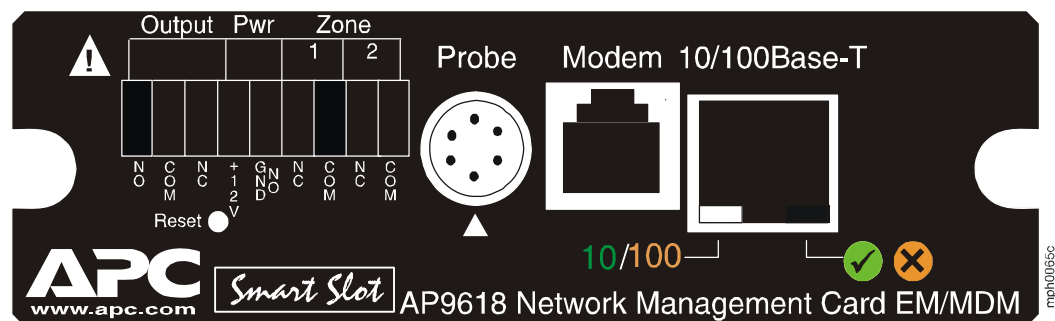
1. At the local computer, select a serial port, and disable any service that uses it.
2. Connect the serial cable from the selected port on the computer to the configuration port at the UPS Network Management Card or at the APC S Type Power Conditioner with Battery Backup:
 - For an APC UPS, use the provided serial cable (APC part number 940-0024) or the longer serial cable that you can order (APC part number 940-1524).
 - For an APC S Type Power Conditioner with Battery Backup, use the provided industry-standard RS-232 serial cable (APC part number 940-1000B.)
3. Run a terminal program (such as HyperTerminal[®]) and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control.
4. Press ENTER, repeatedly if necessary, to display the **User Name** prompt. If you are unable to display the **User Name** prompt, verify the following:
 - The serial port is not in use by another application.
 - The terminal settings are correct as specified in step 3.
 - The correct cable is being used as specified in step 2.
5. Press the **Reset** button. The Status LED will flash alternately orange and green. Press the **Reset** button a second time immediately while the LED is flashing to reset the user name and password to their defaults temporarily.
6. Press ENTER as many times as necessary to redisplay the **User Name** prompt, then use the default, **apc**, for the user name and password. (If you take longer than 30 seconds to log on after the **User Name** prompt is redisplayed, you must repeat step 5 and log on again.)
7. From the **Control Console** menu, select **System**, then **User Manager**.
8. Select **Administrator**, and change the **User Name** and **Password** settings, both of which are now defined as **apc**.
9. Press CTRL+C, log off, reconnect any serial cable you disconnected, and restart any service you disabled.

Front Panels: AP9617, AP9618, and AP9619

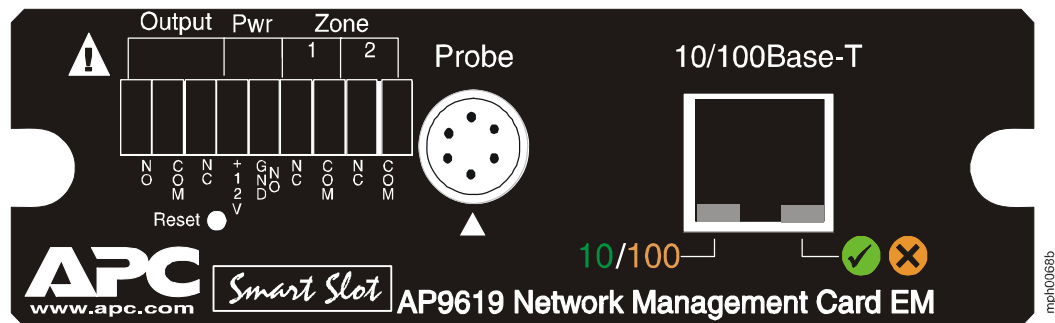
AP9617 includes Status LEDs, a Reset button, and a 10/100Base-T connector.



AP9618 includes the AP9617 features, an analog modem connector, and connections for the sensor (probe), input contacts, and output relay of the Integrated Environmental Monitor.



AP9619 includes AP9617 features and connections for the sensor (probe), input contacts, and output relay of the Integrated Environmental Monitor.

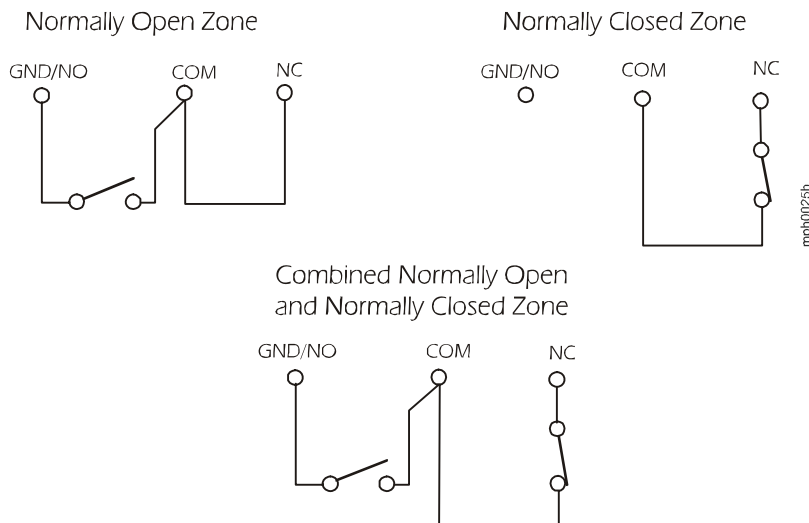


Features

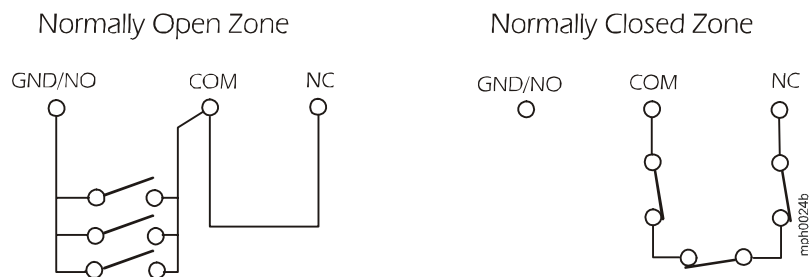
AP9618 or AP9619	Description
9-pin connector ¹	- Output relay (Output): Normally closed (NC), common (COM), and normally open (NO) pins. These pins are used by the Integrated Environmental Monitor to interface to attached alarm systems, annunciators (such as lights, beacons, bells, and buzzers), controllers, HVAC thermostat lines, and similar devices. They are rated for a switching capacity of 1A 30V AC/DC. - Power (Pwr): Normally-open ground (GND NO) and +12VDC pins can provide up to 25mA of power to devices such as smoke and motion sensors. - Input contacts (Zone 1 and 2): Two dry contact inputs. Each zone can be connected to normally open (NO) contacts, normally closed (NC) contacts or a combination (COM) of the two. See Sensor Zone Connections (AP9618 and AP9619 only) for details. Possible applications include magnetic contact switches; tamper switches; and water, pressure, and smoke sensors.
Probe connector ¹	Connects a temperature/humidity sensor (probe) to the Integrated Environmental Monitor.
AP9618 only	Description
Modem connector ²	Connects the internal analog modem to an analog phone line to provide for out-of-band communications.
AP9617, AP9618, AP9619	Description
Reset button	Resets the Management Card while power remains on.
10/100 Base-T connector	Connects the Management Card to the Ethernet network.
Status LEDs	See Status LED .
Link-RX/TX (10/100) LED	See Link-RX/TX (10/100) LED .
- To manage the Integrated Environmental Monitor, see Environmental Monitoring. - To configure this feature for dial-in access to the control console at an AP9618 Network Management Card, see Dial-in access (AP9618 Management Card only).	

Sensor Zone Connections (AP9618 and AP9619 only)

The Network Management Card supports normally open and normally closed loop systems, and allows mixing of normally open and normally closed sensors on any zone. Do not cross-connect the sensors of the Management Card with sensors from any other system.



To use more than one sensor on a zone, connect normally open sensors in parallel and normally closed sensors in series. To avoid receiving alarms on unused zones, install a jumper wire between the COM and NC connectors for each unused zone.



Status LED

This LED indicates the Management Card's status.

Condition	Description
Off	One of the following situations exists: • The Management Card is not receiving input power. • The Management Card is starting up. • The Management Card is not operating properly. It may need to be repaired or replaced. Contact APC Worldwide Customer Support.
Solid Green	The Management Card has valid TCP/IP settings.
Solid Orange	A hardware failure has been detected in the Management Card. Contact APC Worldwide Customer Support .
Flashing Green	The Management Card does not have valid TCP/IP settings. ¹
Flashing Orange	The Management Card is making BOOTP requests. ¹
Alternately flashing Green and Orange	If the LED is alternately flashing slowly, the Management Card is making DHCP² requests.¹ If the LED is alternately flashing rapidly, the Management Card is starting up.
1. If you do not use a BOOTP or DHCP server, see the Network Management Card <i>Installation and Quick Start Manual</i> provided in printed format and on the APC Network Management Card <i>Utility</i> CD in PDF to configure the TCP/IP settings of the Management Card. 2. To use a DHCP server, see TCP/IP and Communication Settings.	

Link-RX/TX (10/100) LED

This LED indicates the network status.

Condition	Description
Off	One or more of the following situations exist: • The Management Card is not receiving input power. • The cable that connects the Management Card to the network is disconnected or defective. • The device that connects the Management Card to the network is turned off or not operating correctly. • The Management Card itself is not operating properly. It may need to be repaired or replaced. Contact APC Worldwide Customer Support.
Solid Green	The Management Card is connected to a network operating at 10 Megabits per second (Mbps).
Solid Orange	The Management Card is connected to a network operating at 100 Megabits per second (Mbps).
Flashing Green	The Management Card is receiving or transmitting data packets at 10 Megabits per second (Mbps).
Flashing Orange	The Management Card is receiving or transmitting data packets at 100 Megabits per second (Mbps).



Note

Using the 5-Port 10Base-T Hub SmartSlot Card eliminates the requirement for a separate hub power supply. However, this card requires that all Network Management Cards connected to it operate at 10 Mbps, not 100 Mbps.

Watchdog Features

Overview

To detect internal problems and recover from unanticipated inputs, the Management Card uses internal, system-wide watchdog mechanisms. When it restarts to recover from an internal problem, a **System: Warmstart** event is recorded in the event log.

Network interface watchdog mechanism

The Management Card implements internal watchdog mechanisms to protect itself from becoming inaccessible over the network. For example, if the Management Card does not receive any network traffic for 9.5 minutes (either direct traffic, such as SNMP, or broadcast traffic, such as an Address Resolution Protocol [ARP] request), it assumes that there is a problem with its network interface and restarts.

Resetting the network timer

To ensure that the Management Card does not restart if the network is quiet for 9.5 minutes, the Management Card attempts to contact the default gateway every 4.5 minutes. If the gateway is present, it responds to the Management Card, and that response restarts the 9.5-minute timer. If your application does not require or have a gateway, specify the IP address of a computer that is running on the network most of the time and is on the same subnet. The network traffic of that computer will restart the 9.5-minute timer frequently enough to prevent the Management Card from restarting.

Control Console

How To Log On

Overview

You can use either a local (serial) connection, or a remote (Telnet or SSH) connection with a computer on the same network (LAN) as the Management Card to access the control console. For an AP9618 Network Management Card, you can also use its internal analog modem to access the control console.



See [Dial-in access \(AP9618 Management Card only\)](#).

Use case-sensitive user name and password entries to log on (by default, **apc** and **apc** for an Administrator, or **device** and **apc** for a Device User). A Read-Only User has no access to the control console.



If you cannot remember your user name or password, see [How to Recover from a Lost Password](#).

Remote access to the control console

You can access the control console through Telnet or Secure SHell (SSH). Telnet is enabled by default. Enabling SSH disables Telnet.

To enable or disable these access methods:

- In the Web interface, on the **Administration** tab, select **Network** on the top menu bar, and then the **access** option under **Console** on the left navigation menu.
- In the control console, use the **Telnet/SSH** option of the **Network** menu.

Telnet for basic access. Telnet provides the basic security of authentication by user name and password, but not the high-security benefits of encryption.

To use Telnet to access the control console:

1. From a computer on the same network as the Management Card, at a command prompt, type **telnet** and the System IP address for the Management Card (for example, **telnet 139.225.6.133**, when the Management Card uses the default Telnet port of 23), and press ENTER.

If the Management Card uses a non-default port number (from 5000 to 32768), you must include a colon or a space, depending on your Telnet client, between the IP address (or DNS name) and the port number.

2. Enter the user name and password (by default, **apc** and **apc** for an Administrator, or **device** and **apc** for a Device User).

SSH for high-security access. If you use the high security of SSL for the Web interface, use Secure SHell (SSH) for access to the control console. SSH encrypts user names, passwords and transmitted data. The interface, user accounts, and user access rights are the same whether you access the control console through SSH or Telnet, but to use SSH, you must first configure SSH and have an SSH client program installed on your computer.

Local access to the control console

For local access, use a computer that connects to the Management Card or other device through the serial port, to access the control console:

1. Select a serial port at the computer and disable any service that uses the port.
2. Connect the serial cable from the selected port on the computer to the configuration port at the UPS Network Management Card or Expansion Chassis or at the APC S Type Power Conditioner with Battery Backup:
 - For an APC UPS, use the serial cable, APC part number 940-0024 or 940-1524.
 - For an APC S Type Power Conditioner with Battery Backup, use the provided industry-standard RS-232 serial cable, APC part number 940-1000B.
3. Run a terminal program (e.g., HyperTerminal), and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control.
4. Press ENTER, and at the prompts, enter your user name and password.

Dial-in access (AP9618 Management Card only)

When you have access to the control console locally or remotely, use this option of the **System** menu to configure dial-in access to the control console using the Management Card's internal analog modem.

Setting	Definition
Console Dial-In	Enables (by default) or disables dial-in access to the control console through the analog modem.
Initialization	The initialization string used to ensure proper operation of the modem and consistent communication between the modem and the Management Card. This string is sent to the internal modem every time the Management Card restarts, or when a setting is changed and accepted.
Country Code	Identifies the country in which the modem is used to match the modem's operation to that country's telephone-system standards.
Terminal Interface	Enables you to send commands directly to the modem and view the modem's response, using a serial, terminal-interface session at a baud rate of 38400. When you use CTRL+A to end the session, the modem is reset to use the Initialization setting.
Dialback	With dial-back enabled, when the user whose telephone number is configured as Dialback String dials in remotely, the Management Card terminates the call immediately and calls that user's modem back. • Dial-back ensures that a dial-in control console session can occur only from the phone number configured as Dialback String. • The cost of the control console session is charged to your company or agency at its telephone calling rate and not to the user who dialed in remotely.
Dialback String	The modem phone number to call back when Dialback is enabled. Include any modem commands needed for tasks such as timing, waiting for a dial tone, or accessing an external telephone line. The default is the sample dial string 9,5551234.

Main Screen

Sample main screen

Following is an example of the screen displayed when you log on to the control console at an AP9618 or AP9619 Management Card that has the output relay of the Integrated Environmental Monitor enabled. The **Relay OK** entry in the environmental status line indicates that the output relay is enabled and that no alarm condition exists.

```
American Power Conversion          Network Management Card AOS  vx.x.x
(c)Copyright 2005 All Rights Reserved Smart-UPS & Matrix-UPS APP  vx.x.x
-----
Name       : Test Lab                      Date : 11/30/2006
Contact    : Don Adams                     Time : 5:58:30
Location   : Building 3                    User  : Administrator
Up Time    : 0 Days, 21 Hours, 21 Minutes  Stat  : P+ N+ A+

Thresholds OK, Contact Alarms OK, Relays OK
Model Name named Tester 8 : On Line

----- Control Console -----

1- Device Manager
2- Network
3- System
4- Logout
<ESC>- Main Menu, <ENTER>- Refresh, <CTRL-L>- Event Log

>
```

Information and status fields

Main screen information fields.

- Two fields identify the APC operating system (AOS) and application (APP) firmware versions. The application firmware name identifies the type of UPS that connects to the network through this Management Card. In the preceding example, the Management Card uses the application firmware for a UPS in the Smart-UPS/Matrix-UPS family.

Network Management Card AOS	vx.x.x
Smart UPS & Matrix UPS APP	vx.x.x

- Three fields identify the system name, contact person, and location of the UPS. (In the control console, use the **System** menu to set these values.)

Name	: Test Lab
Contact	: Don Adams
Location	: Building 3

- The **Up Time** field reports how long the Management Card has been running since it was last turned on or reset.

Up Time	: 0 Days 21 Hours 21 Minutes
---------	------------------------------

- Two fields report when you logged in, by date and time.

Date	: 11/30/2006
Time	: 5:58:30

- The **User** field reports whether you logged in through the **Administrator** or **Device User** account. (The **Read Only User** account cannot access the Control Console.)

User	: Administrator
------	-----------------

Main screen status fields.

- The **Stat** field reports the Management Card status.

Stat : P+ N+ A+

P+	The APC operating system (AOS) is functioning properly.
N+	The network is functioning properly.
N?	A BOOTP request cycle is in progress.
N-	The Management Card failed to connect to the network.
N!	Another device is using the Management Card's IP address.
A+	The application is functioning properly.
A-	The application has a bad checksum.
A?	The application is initializing.
A!	The application is not compatible with the AOS.



Note

If **P+** is not displayed, contact APC support staff. See [APC Worldwide Customer Support](#).

- The field that identifies the UPS model and name also reports the operating status of the UPS.

Model Name named Tester 8 : On Line

- The environmental field reports the status of the sensors (**Thresholds**) and contacts (**Contact Alarms**) at any environmental monitor, including the output relay (**Relay**) of the Integrated Environmental Monitor at an AP9618 or AP9619 Management Card.

Thresholds Ok, Contact Alarms Ok, Relay OK



For more information about the status of the sensor, contact, and output relay, see [Environmental Monitoring](#).

Control Console Menus

Overview

The control console provides options to monitor and configure a Management Card, its UPS, and other supported devices. If a device is not present, the control console displays no options for that device. For example:

- The control console at a Management Card that connects only with an environmental monitor does not provide UPS options.
- The control console of an AP9617 Network Management Card does not provide options for an Integrated Environmental Monitor.

How to use control console menus

The menus in the control console list options by number and name. To use an option, type the option's number, press ENTER, and follow any on-screen instructions. If you use an option that changes a setting or value, select **Accept Changes** to save your change before you exit the menu.

While using a menu, you can also do the following:

- Type ? and press ENTER for menu option descriptions if help exists for the menu.
- Press ENTER to refresh the menu
- Press ESC to go back to the menu from which you accessed the current menu
- Press CTRL+C to return to the main (**Control Console**) menu
- Press CTRL+D to toggle between the UPS and **Environment** menus
- Press CTRL+L to access the event log

Control console structure

For menus not specific to UPSs but shared among APC network-enabled devices, names and locations of options differ from those of the Web interface. The menu structure in the control console is retained from earlier firmware versions for compatibility with scripts and programs that rely on that structure.

Main menu

Use the main **Control Console** menu to access the control console's management features:

- 1- Device Manager
- 2- Network
- 3- System
- 4- Logout



Note

When you log on as Device Manager (equivalent to Device User in the Web interface), you can access only the **Device Manager** menus and the **Logout** menu.

Device Manager menu

Use the options of the **Device Manager** menu to select the device to manage:

- 1- *UPS Model Name* for a UPS, or S20 AV UPS for an S Type Power Conditioner
- 2- Environment

The UPS option, named with the model name, enables an administrator or device user to issue UPS control commands, perform diagnostic tests, configure Management Card and UPS parameters, display detailed UPS status, and view information about the UPS. A read-only user cannot change settings or parameter values.

The **Environment** option is displayed if an environmental monitor is present:

- For an AP9618 or AP9619 Network Management Card, this option enables an administrator or device user to configure the Integrated Environmental Monitor and any connected external environmental monitor.
- For an APC S Type Power Conditioner with Battery Backup, this option enables an administrator or device user to configure the device's sensor:

Network menu

To perform these tasks, use the options of the **Network** menu:

- Configure the TCP/IP settings of the Management Card or, if the Management Card obtains its TCP/IP settings from a server, configure the settings for the type of server (DHCP or BOOTP).

- Use the Ping utility.
- Define settings that affect FTP, Telnet, the Web interface and SSL, SNMP, e-mail, DNS, Syslog, and WAP (Wireless Application Protocol).
- Configure paging parameters for analog or Telocator Alphanumeric Protocol (TAP) paging.

System menu

To perform these tasks, use the options of the **System** menu:

- Control **Administrator** and **Device Manager** access. (You can control **Read Only User** access by using the Web interface only.)
- Define the **Name**, **Contact**, and **Location** values for the system.
- Set the date and time used by the Management Card.
- Through the **Tools** option:
 - Restart the Management Card interface.
 - Reset parameters to their default values.
 - Delete SSH host keys and SSL certificates.
 - Upload an initialization file (.ini file) that has been downloaded from another Management Card. The current Management Card then uses the values in that .ini file to configure its own settings.
- Configure modem parameters, including dial-in access to the control console at an AP9618 Network Management Card using that Management Card's internal analog modem.
- Access system information about the Management Card.

Web Interface

Introduction

Overview

The Web interface provides options to manage a Management Card, its UPS, and other supported devices. If a device is not present, the interface displays no options for that device. For example:

- The Web interface at a Management Card that connects only with an environmental monitor does not provide UPS options.
- The Web interface of an AP9617 Network Management Card does not provide options for an Integrated Environmental Monitor.



See [Web \(Administration>Network>Web>options\)](#) for information on how to select, enable, and disable the protocols that control access to the Web interface and to define the Web-server ports for the protocols.

Supported Web browsers

You can use Microsoft® Internet Explorer (IE) 5.5 and higher (on Windows operating systems only), Firefox, version 1.x, by Mozilla Corporation (on all operating systems), or Netscape® 7.x and higher (on all operating systems) to access the Management Card through its Web interface. Other commonly available browsers may work but have not been fully tested by APC.

The Management Card cannot work with a proxy server. Therefore, before you can use a Web browser to access its Web interface, you must do one of the following:

- Configure the Web browser to disable the use of a proxy server for the Management Card.
- Configure the proxy server so that it does not proxy the specific IP address of the Management Card.

How to Log On

Overview

You can use a Management Card's DNS name or System IP address for the URL address of the Web interface. Use your case-sensitive user name and password to log on. The default user name differs by account type:

- **apc** for an Administrator
- **device** for a Device User
- **readonly** for a Read-Only User

The default password is **apc** for all three account types.



If you are using HTTPS (SSL/TSL) as your access protocol, your login credentials are compared with information in a server certificate. If the certificate was created with the APC Security Wizard, and an IP address was specified as the common name in the certificate, you must use an IP address to log on to the Management Card. If a DNS name was specified as the common name on the certificate, you must use a DNS name to log on.



For information about the Web page displayed when you log on, see [Home Page](#).

URL address formats

Type the Management Card's DNS name or IP address in the Web browser's URL address field and press ENTER. When you specify a non-default Web server port in Internet Explorer, you must include **http://** or **https://** in the URL.

Common browser error messages at log-on.

Cause of the Error	Browser	Error Message
Someone else is logged on.	Internet Explorer, Netscape, Firefox	"You are not authorized to view this page" or "Someone is currently logged in..."
Web access is disabled, or the URL was not correct	Netscape	"The connection was refused...."
	Internet Explorer	"This page cannot be displayed."
	Firefox	"Unable to connect."

URL format examples.

- For a DNS name of Web1:
 - **http://Web1** if HTTP is your access mode
 - **https://Web1** if HTTPS (HTTP with SSL) is your access mode
- For a System IP address of 139.225.6.133 and the default Web server port (80):
 - **http://139.225.6.133** if HTTP is your access mode
 - **https://139.225.6.133** if HTTPS (HTTP with SSL) is your access mode
- For a System IP address of 139.225.6.133 and a non-default Web server port (5000):
 - **http://139.225.6.133:5000** if HTTP is your access mode
 - **https://139.225.6.133:5000** if HTTPS (HTTP with SSL) is your access mode.

Home Page

Overview

On the **Home** page of the interface, displayed when you log on, you can view active alarm conditions and the most recent events recorded in the event log.

Quick status icons

Below the model name of the UPS, one or more icons and accompanying text indicate the current operating status of the UPS:

	Critical: A critical alarm exists, which requires immediate action.
	Warning: An alarm condition requires attention and could jeopardize your data or equipment if its cause is not addressed.
	Online: No alarms are present, and the UPS and Management Card are operating normally.

At the upper right corner of every page, the Web interface displays the same icons currently displayed on the **Home** page to report UPS Status:

- The **Online** icon if no alarms exist.
- One or both of the other icons (**Critical** and **Warning**) if any alarms exist, and after each icon, the number of active alarms of that severity.

To return to the **Home** page to view its summary of UPS status, including the active alarms, click a quick status icon on any page of the interface.

Recent Device Events

On the Home page, **Recent Device Events** displays, in reverse chronological order, the events that occurred most recently and the dates and times they occurred. Click **More Events** to view the entire event log.

How to Use the Tabs, Menus, and Links

Tabs

In addition to the tab for the **Home** page, the following tabs are displayed. Click a tab to display a set of menu options:

- **UPS:** Display UPS status, issue UPS control commands, configure UPS parameters, run diagnostic tests, configure and schedule shutdowns, and view information about the UPS and its Management Card.
- **Environment:** View the status of environmental monitoring devices associated with an AP9618 or AP9619 Management Card (the Integrated Environmental Monitor or any APC environmental monitoring device attached externally) or the status of the sensor of an APC S Type Power Conditioner with Battery Backup. View active environmental alarms and recent environmental events. Configure thresholds and other parameters related to environmental monitoring.



Note

For a UPS, the **Environment** tab is displayed only when an integrated or external environmental monitoring device is present.

For an APC S Type Power Conditioner with Battery Backup, the **Environment** tab is displayed to monitor the device's sensor.

- **Logs:** View and configure event and data logs.
- **Administration:** Configure security, network connection, notification, and general settings.

Menus

Left navigation menu. Each tab (except the tab for the home page) has a left navigation menu, consisting of headings and options:

- If a heading has indented option names below it, the heading itself is not a navigational link. Click an option to display or configure parameters.
- If a heading has no indented option names, the heading itself is the navigational link. Click the heading to display or configure parameters.

Top menu bar. The **Administration** tab has a selection of menu options on the top menu bar. Select one of the menu options to display its left navigation menu.

Quick Links

At the lower left on each page of the interface, there are three configurable links. By default, the links access the URLs for these Web pages:

- **Link 1:** The home page of the APC Web site
- **Link 2:** Demonstrations of APC Web-enabled products.
- **Link 3:** Information on APC Remote Monitoring Services.



To reconfigure the links, see [Configuring Links \(Administration>General>Quick Links\)](#)

Monitor and Configure the UPS

Overview Page

The **Overview** page is displayed when by default when you click the **UPS** tab or when you click **Overview** on the left navigation menu of that tab.

Operating state

Below the UPS model name and configured UPS name, icons and accompanying text indicate the operating state of the UPS:

Operating State	Icons	Description
Online		No alarms present.
In an alarm state (Accompanying text names the alarm condition and gives a brief description of the alarm.)		An alarm condition with the severity Warning exists. A warning alarm indicates a problem that could become serious if not addressed.
		An alarm condition with the severity Critical exists. A critical alarm requires immediate attention to avoid data loss or equipment damage.

Quick Status

The following information is displayed.

- In graphs:
 - **Load in Watts:** A graph showing the load of the attached equipment as a percentage of available Watts.
 - **Battery Capacity:** A graph showing the percentage of the total UPS battery capacity available to support attached equipment.

- In a list:
 - **Input Voltage:** The AC voltage (VAC) being received by the UPS or for 3-phase UPSs by each phase of the UPS.
 - **Output Voltage:** The AC voltage (VAC) the UPS, or each phase of a 3-phase UPS, is providing to its load.
 - **Runtime Remaining:** How long the UPS can use battery power to support its attached equipment.
 - **Last Battery Transfer:** The cause of the last switch to battery operation.

Recent UPS Events

The most recent UPS events that occurred are listed in reverse chronological order. To view the entire event log, click **More Events**.

Status Option

To display detailed UPS status, click **Status** on the left navigation menu of the **UPS** tab.

Status displayed for every UPS model

Item	Description
Last Battery Transfer	The cause of the last switch to battery operation.
Internal Temperature	The temperature inside the UPS.
Runtime Remaining	How long the UPS can use battery power to support its attached equipment.

Model-specific status displayed



To view detailed information about status items specific to the UPS model associated with the Management Card, see the online help.

The types of model-specific information displayed include the following (some of which are reported by phase for 3-phase UPS models):

- **Voltage, Current, and Frequency information**, such as input and output voltage, input and output current, input frequency, input voltage in bypass mode, and minimum and maximum input voltage during the last minute.
- **UPS Load information**, such as the load placed on the UPS in kVA or as a percentage of available kVA, Watts, or VAC.
- **Fault Tolerance information**, such as redundant power available.
- **Battery Information**, such as available battery capacity, percentage of full battery capacity, battery output current, rated voltage capacity of batteries, amp-hour rating of battery cabinets, number of batteries installed, and number of faulty batteries.
- **Status of internal and external components**, such as intelligence and power modules, circuit breaker box, external switch gear, and transformer.

Control Options

For UPS control actions, click **Control** on the left navigation menu of the **UPS** tab.

- To initiate a control action for the UPS of the initiating Management Card only, select **No** for **Apply to Sync Group?**
- To initiate a control action for all members of the Synchronized Control Group to which this Management Card belongs (if the option is allowed for Synchronized Control Groups), select **Yes** for **Apply to Sync Group?**



Note

The option to apply an action to a Synchronized Control Group is displayed only if the UPS supports Synchronized Control Groups and if its Management Card is an active (enabled) group member.

Synchronized Control Group guidelines

The following guidelines apply to Synchronized Control Groups:

- All UPSs in a Synchronized Control Group must be the same model.
- Synchronized Control Groups are supported for any Smart-UPS or Symmetra UPS with a card slot that accepts a Network Management Card.
- In a Synchronized Control Group of Symmetra 3-phase UPSs, the shutdown mode (set at the UPS) must be either **Normal** or **Secure** for each UPS.



To configure a Management Card to be a member of a Synchronized Control Group, see [The Sync Control Option](#).

The synchronization process

If you apply an action to a Synchronization Control Group, enabled members of the group behave as follows:

- Each UPS receives the command regardless of output status (e.g, low battery).
- The action uses the delay periods (such as **Shutdown Delay**, **Sleep Time**, and **Return Delay**) configured for the initiating UPS.
- When the action begins, a UPS that is unable to participate retains its present output status while the other UPSs perform the action. If a UPS is already in an output state that the action requires (e.g., a UPS is already off when the **Reboot UPS** action starts), that UPS logs an event, but performs the rest of the action, if any.
- All participating UPSs synchronize their performance of the action (within a one-second time period under ideal conditions for Smart-UPS, but sometimes longer, especially for Symmetra UPSs).

- In reboot and sleep actions:
 - Immediately before the initiating UPS begins waiting the time specified as **Return Delay**, by default it waits up to 120 seconds (its configurable **Power Synchronized Delay**) for any UPS that does not have input power to regain that power. Any UPS that fails to regain input power during that delay does not participate in the synchronized restart, but waits until its own input power returns before restarting.
 - The LEDs on the front of the UPS do not sequence their lights as they do for a normal (not synchronized) reboot or sleep action.
- UPS status and events are reported in the same way for synchronized actions as for actions on individual UPSs.

Actions (for a single UPS and Synchronized Control Groups)

Use the actions described in the following table for individual UPSs and for Synchronized Control Groups, within these guidelines:

- All actions except **Put UPS in Bypass** and **Take UPS Off Bypass** are supported:
 - For Synchronized Control Groups of Symmetra UPS or Smart-UPS models
 - For all individual APC UPSs except Silcon UPS and AIS 5000 UPS models



To control a Silcon UPS or an AIS 5000 UPS, see [Control options for Silcon UPS and AIS 5000 UPS](#).

- **Put UPS in Bypass** and **Take UPS Off Bypass** are supported:
 - Only for individual UPSs, not for Synchronized Control Groups
 - Only for Matrix-UPS, Symmetra UPS, and some Smart-UPS models



For more information about the delays and settings in the following table, see [Configuration Options](#) and [The Sync Control Option](#). To apply **Test UPS Alarm** to a Synchronized Control Group, see [Diagnostics](#).



Note

When you select **Yes** for **Signal PowerChute Server Shutdown** in the Web interface, initiating a **Turn UPS Off**, **Reboot UPS**, or **Put UPS To Sleep** action is equivalent to selecting **Turn UPS Off Gracefully**, **Reboot UPS Gracefully**, or **Put UPS To Sleep Gracefully** in the control console

Action	Definition
Turn UPS On	Turns on power at the UPS. • For a UPS model with outlet groups, this action then turns on the outlet groups according to the value for Power On Delay for each group. See The settings option (including automatic load-shedding). • For a Synchronized Control Group, after a delay of a few seconds, the action turns on all enabled group members that have input power.
Turn UPS Off	Turns off the output power of the UPS and (for a UPS model with outlet groups) of all its outlet groups immediately, without a shutdown delay. The UPS and all its outlet groups remain off until you turn on its power again. For a Synchronized Control Group, this action turns off power at all enabled members of the group. No Shutdown Delay value is used. The UPSs turn off after a few seconds and remain off until you turn on their power. See The shutdown option. NOTE: For a synchronized turn-off action that uses the value of the Shutdown Delay of the initiating UPS, use SNMP. For the upsAdvControlUpsOff OID, set the value turnUpsSyncGroupOffAfterDelay (5).
Turn UPS Off Gracefully (control console)	Turns off outlet power of the UPS and (for a UPS model with outlet groups) all its outlet groups after the Maximum Required Delay and the configured Shutdown Delay. See The PowerChute Option. For a Synchronized Control Group, the action uses the delays of the initiating UPS.

Action	Definition
Reboot UPS	Restarts the attached equipment by doing the following: • Turns off power at the UPS after Shutdown Delay. • Turns on power at the UPS after the UPS battery capacity returns to at least the percentage configured for Minimum Battery Capacity or can support the load for the time configured for Return Runtime Duration. (The parameter differs by UPS model.) The UPS then waits the time specified as Return Delay. See The shutdown option. • For a UPS with outlet groups, Power On Delay occurs after the UPS turns on and before an outlet group turns on. On the UPS tab, you configure Power On Delay for each outlet group by using the settings option under Outlet Groups. See The settings option (including automatic load-shedding). For a Synchronized Control Group action: 1. This option turns off power at the UPSs that are enabled group members after waiting the time configured as Shutdown Delay for the initiating UPSs. See The shutdown option. 2. The initiating UPS waits up to the number of seconds specified as Power Synchronized Delay to allow time for group members to regain input power. If all group members already regained input power, this delay is omitted. If all group members regain input power during the delay, the rest of the delay is cancelled. To configure Power Synchronized Delay, see Configure a Synchronized Control Group member. 3. Return Delay starts when the initiating UPS is at its configured Minimum Battery Capacity (or Return Runtime Duration). See The shutdown option. Minimum Battery Capacity (or Return Runtime Duration) of the initiating UPS is also required of group members. But you can reduce a group member's requirement by configuring that member's Minimum Battery Capacity Offset (or Return Runtime Duration Offset), e.g, if the initiator's Minimum Battery Capacity is 50%, and a member's Minimum Battery Capacity Offset is 5%, that member needs battery capacity of 45% to reboot. See Configure a Synchronized Control Group member.
Reboot UPS Gracefully (control console)	• This action is similar to Reboot UPS, but with an additional delay before the shutdown. Attached equipment shuts down only after the UPS (or the initiating UPS for a Synchronized Control Group action) waits the Maximum Required Delay, which is calculated as described in PowerChute Network Shutdown parameters. • For a UPS with outlet groups, Power On Delay occurs after the UPS turns on and before an outlet group turns on. On the UPS tab, you configure Power On Delay for each outlet group through the settings option under Outlet Groups. See The settings option (including automatic load-shedding).

Action	Definition
Put UPS To Sleep	Puts the UPS into sleep mode by turning off its output power for a defined period of time: • The UPS turns off output power after waiting the time configured as Shutdown Delay. See The shutdown option. • When input power returns, the UPS turns on output power after two configured periods of time: Sleep Time and Return Delay. See The shutdown option. • For a synchronized control group action, the Management Card of the initiating UPS waits up to the number of seconds configured as Power Synchronized Delay for enabled group members to regain input power before it starts the Return Delay. If all group members already regained input power, the Power Synchronized Delay is omitted. If all group members regain input power during the delay, the rest of the delay is cancelled. See Configure a Synchronized Control Group member.
Put UPS To Sleep Gracefully (control console)	Puts the UPS into sleep mode (turns off power for a defined period of time): • The UPS turns off output power after waiting the Maximum Required Delay to allow time for PowerChute Network Shutdown to shut down its server safely, and its Shutdown Delay. See Maximum Required Delay and The shutdown option. • When input power returns, the UPS turns on output power after two configured periods of time: its Sleep Time and Return Delay. See The shutdown option. • For a synchronized control group action, the Management Card of the UPS initiating the action waits up to the number of seconds configured as its Power Synchronized Delay for enabled group members to regain input power before it starts the Return Delay. If all group members have already regained input power, the Power Synchronized Delay is omitted. If all group members regain input power during the delay, the remainder of the delay is cancelled. See Configure a Synchronized Control Group member.
Put UPS In Bypass and Take UPS Off Bypass	Controls the use of bypass mode, which allows maintenance to be performed at a Matrix-UPS, a Symmetra UPS, and some Smart-UPS models without turning off power at the UPS.

Control options for Silcon UPS and AIS 5000 UPS

By default, no control options are available for Silcon UPS or AIS 5000 UPS. To use control options for a Silcon UPS or AIS 5000 UPS, you must enable the **Accept Remote Turn Off Commands** option, available in the control console's **UPS Control** menu only when you use a local, serial connection to access the control console.



To use a serial connection, see [Local access to the control console](#).

When **Accept Remote Turn Off Commands** is enabled:

- Two control options, **Turn UPS Off** and **Turn UPS Off Gracefully**, become available for a Silcon UPS or an AIS 5000 UPS.
- **Disable Remote Turn Off Commands**, on the **Control** menu of the Web interface and control console, allows you to disable using the Management Card to turn off the Silcon UPS or AIS 5000 UPS.

Configuration Options

The power option

This option is available for all UPS models except Silcon UPS or AIS 5000 UPS.



The available settings differ based on the UPS model. For detailed information about fields and values available through the **power** option and specific to your UPS model, see the online help.

The types of model-specific items you can configure include the following:

- **Voltage** settings that determine the voltage at which the UPS begins to use automatic voltage regulation or switches to battery operation and that determine how sensitive the UPS is to voltage variation
- **Bypass** settings define conditions under which the UPS can switch to bypass mode
- **Alarm thresholds** based on available runtime and redundant power and on UPS Load

The shutdown option



Note

A Silcon UPS or an AIS 5000 UPS uses only the **Low-Battery Duration**, **Maximum Shutdown Time**, and **Shutdown Delay** settings.

Setting	Definition
Low-Battery Duration	How long the UPS can run on battery power after a low-battery condition occurs. NOTE: This setting also defines the time available for PowerChute to shut down servers safely in response to the Control option Signal PowerChute Server Shutdown .
Maximum Required Delay	Reports the delay defined by the Maximum Required Delay setting, accessible through the PowerChute option on the left navigation menu. NOTE: For information about PowerChute features, including how Maximum Shutdown Time is determined, see The PowerChute Option .
Shutdown Delay	How long the UPS waits before it shuts down in response to a turn-off command.
Basic Signaling Shutdown	When enabled, provides safe system shutdown and notification, but without the advanced features available with advanced signaling. Enable basic-signaling shutdown if your computer is connected to the UPS by a basic-signaling cable, and the type of UPS either does not support advanced signaling or is configured to communicate in basic signaling.
Basic Low Battery Duration	Available for only some UPS models. Defines the amount of available battery runtime at which the UPS sends the signal for a low-battery shutdown if basic-signaling shutdown is enabled.
Sleep Time	Defines how long the UPS sleeps (keeps its output power turned off) when you use the Control option Put UPS To Sleep .

Setting	Definition
Return Runtime Duration	Most APC UPSs support one of the following to ensure that the UPS perform a graceful shutdown if input power fails soon after restarting. (The UPS must also wait the time defined as Return Delay before it turns on.) Return Runtime Duration: How long the UPS must be able to support the load by battery power in order for the UPS to end its sleep time (or turn back on when rebooted) and resume providing output power Minimum Battery Capacity: The minimum battery capacity, as a percentage of full capacity, required in order for the UPS to end its sleep time (or turn back on when rebooted) and resume providing output power.
Minimum Battery Capacity	
Return Delay	Defines how long the UPS waits before it turns on after a shutdown that was caused by a power failure or after a scheduled shutdown. NOTE: The UPS must also have the capacity specified by the Minimum Battery Capacity setting or the available runtime specified as Return Runtime Duration before it can turn on.

The general option

Settings vary by UPS model. Each UPS model supports only some of the following:

Setting	Definition
UPS Name	A name to identify the UPS. <i>Maximum length:</i> 8 characters.
UPS Position	The physical orientation of the UPS, rack or tower.
Audible Alarm	Enable or disable the audible alarm of the UPS, and, for some UPS models, define the condition that will cause the alarm to sound.
Last Battery Replacement	The month and year of the most recent battery replacement.
Number of Batteries, or External Batteries	The number of batteries, excluding built-in batteries, that the UPS has. For some models, a value of 16 or above increments in quantities of 16 but can then be adjusted to the value you want.
External Battery Cabinet	The battery cabinet Amp-Hour rating of an external battery source.

The reset UPS defaults option

Mark this check-box to reset all UPS configuration settings to their default values, except **UPS Name** and **Output Voltage**. The time required to reset configuration settings may be a minute or more.

The parallel units option (Smart-UPS VT, Silcon, and AIS 5000 UPSs)

Field or Setting	Description
Parallel Unit Configuration	Lists all parallel units (UPSs of the same type that share a load, continuing to provide power to the load if a parallel unit fails). The UPS to which you are logged on is first on the list.
Add Unit	Use this button to add a unit (up to a maximum of nine) or to change the name of a configured unit. Specify a name for the unit (up to 8 characters) and specify its IP address.

The self-test schedule option

Use this option to define when the UPS will initiate a self-test (never, at start-up and then weekly, at startup and every two weeks, or at start-up only). This option is not available for Silcon and AIS 5000 UPSs.

Diagnostics

You can run these diagnostic tests for any APC UPS except a Silcon or AIS 5000 UPS:

Field	Description
Self-test	The result (passed, failed, or unavailable) and date of the last UPS self-test
Calibration	The result of the last runtime calibration. A calibration recalculates remaining runtime and requires the following: • Because a calibration temporarily depletes the UPS batteries, you can perform a calibration only if battery capacity is at 100%. • For some UPSs, the load must be at least 7% for a calibration to be performed.

Field	Description
Initiate	Select a diagnostic procedure to perform immediately: a test of the UPS audible alarm, a UPS self-test, or a run-time calibration. When you test the alarm of a member of a Synchronized Control Group: • In the Web interface, this option tests the alarms of all enabled members of the group. • In the control console, you can choose to test only the initiating UPS or all members of the group. • In SNMP, you can set the OID upsAdvControlFlashAndBeep to flashAndBeep (2) to test the alarm of an individual UPS or to flashAndBeepSyncGroup (3) to test the alarms of all enabled group members.

Outlet Groups (Smart-UPS XLM)

The UPS provides AC output to three groups of AC outlets. By controlling each outlet group remotely, you can start or stop devices sequentially and restart locked devices.

How outlet groups turn on and off depends on how they are configured and how you turn the UPS on or off:

- Until you configure the actions described in [The control option](#) and their related delays described in [The settings option \(including automatic load-shedding\)](#), when you turn on the UPS output, any outlet group that is off turns on by default and applies power to all devices attached to the outlets in that group.
- After you configure the actions and delays:
 - The actions and delays control how outlet groups turn on and off when you turn the UPS on or off from the user interface of the Network Management Card.
 - When you turn on the UPS from its front panel, each group turns on after the number of seconds configured for **Power On Delay**.
 - When you turn off a UPS with outlet groups at its front panel, all outlets turn off immediately.

The control option

While the output of the UPS is on, select the **UPS** tab and then the **control** option under **Outlet Groups** to turn on, turn off, or restart any outlet group. This option lists by name and state (on or off) each outlet group that is configured through the **settings** option.

You can select any of the following actions (or no action) for the group.

- When the state of the outlet group is **off**:
 - **Immediate On**: Turn on the group immediately.
 - **Delayed On**: Turn on the group after the number of seconds configured as **Power On Delay**.
- When the state of the outlet group is **on**:
 - **Immediate Off**: Turn off the group immediately
 - **Delayed Off**: Turn off the group after the number of seconds configured as **Power Off Delay**.
 - **Reboot**: Turn off the group immediately, then turn it on after the number of seconds configured as **Reboot Duration** and **Power On Delay**
 - **Delayed Reboot**: Turn the outlet group off after the number of seconds configured as **Power Off Delay**, then turn it on after the number of seconds configured as **Reboot Duration** and **Power On Delay**.

After you select an action, click **Next>>** to view a detailed description of the action, including the duration of any delays. Then click **Apply** to confirm the action.

The settings option (including automatic load-shedding)

Click the name of an outlet group to view or configure its settings:

Setting or Field	Description
Name	A name for the outlet group (up to 20 characters) displayed with the outlet group number wherever the interface displays that outlet group number.
State	Displays the state of the outlet group (on or off).
Power On Delay	When this outlet group is off, it waits this delay (up to 600 seconds) before turning on when Delayed On , Reboot , or Delayed Reboot is selected as the action. To override Power On Delay , mark the Never check-box. Only the action Immediate On will turn outlets on when Never is marked.
Power Off Delay	When this outlet group is on, it waits this delay (up to 600 seconds) before turning off when Delayed Off , Reboot , or Delayed Reboot is selected as the action. (During a delayed reboot, the outlet group then waits the number of seconds configured as Reboot Duration and Power On Delay before it turns on.)
Reboot Duration	When this outlet group is on: • If Reboot is selected as the action, the outlet group turns off immediately and then waits this delay (up to 600 seconds) before turning on • If Delayed Reboot is selected as the action, the outlet group waits these three delays: Power Off Delay before turning off, and Reboot Duration followed by Power on Delay before turning on.
Load Shedding	Use these settings to provide automatic, sequenced, load-shedding when a problem occurs with input voltage or battery capacity and to provide automatic sequenced start-up of outlet groups when the problem is resolved. Settings to turn this outlet group off: • When a power failure is longer than the number of seconds you specify. • When input power fails and the UPS battery capacity drops below the percentage you specify. • When the output drawn from the UPS exceeds the percentage of UPS output overload you specify. Settings to turn this outlet group on: • When the outlet group has waited the number of seconds you specify. • When the battery recharges to the percentage of full capacity you specify.

Outlet group events and traps

A change in the state of an outlet group generates the event **UPS: Outlet Group turned on** with a severity of Informational, or **UPS: Outlet Group turned off** with a severity of Warning. The event messages are “UPS: Outlet Group *group_number*, *group_name*, *action* due to *reason*” and “UPS: Outlet Group *group_number*, *group_name*, *action* due to *reason*”. For example:

```
UPS: Outlet Group 1, Web Server, turned on due to user control.
UPS: Outlet Group 3, Printer, turned off due to line fail.
```

By default, the event generates an event log entry, e-mail, and a Syslog message.

If you configure trap receivers for the events, trap 298 is generated when an outlet group turns on, and trap 299 is generated when an outlet group turns off. The event message is the trap argument. The default severity level is the same as for the event.

The Scheduling Option (for Shutdowns)



Note

The **Scheduling** option is not supported for a Silcon UPS or AIS 5000 UPS.

Select the type of shutdown to schedule, **One-time Shutdown**, **Daily Shutdown**, or **Weekly Shutdown** (at 1, 2, 4, or 8 week intervals), and then use these options:

- **Name**: Define a name for the shutdown.
- **Shutdown daily at**, **Shutdown**, or **Shutdown on**: Define when the shutdown will begin, and for a weekly shutdown, the number of weeks between shutdowns.
- **Turn back on**: Define whether the UPS will turn on at a specific day and time, **Never** (the UPS must be turned on manually), or **Immediately** (the UPS will turn on after waiting six minutes and the time specified as **Return Delay**).
- **Signal PowerChute® Server Shutdown**: Select whether to notify the clients listed as **PowerChute Network Shutdown clients** to initiate graceful shutdown.

Schedule a synchronized shutdown. All scheduled shutdowns will be synchronized when the UPS whose Management Card initiates the shutdown is a member of a Synchronized Control Group and its status as a group member is enabled. Always schedule all shutdowns through the same member of the group. For a scheduled synchronized UPS shutdown to occur, a network connection to each UPS in the group must exist at the time at which the action is scheduled to occur.



Do not schedule shutdowns through more than one group member. Such scheduling may cause unpredictable results.

Edit, Enable, Disable, or Delete a Scheduled Shutdown. To access and edit the parameters of a scheduled shutdown, disable it temporarily, or delete it permanently, click the shutdown name in the list of shutdowns, and follow the on-screen instructions.

The Sync Control Option

Guidelines for Synchronized Control Groups

Before you configure this UPS as a Synchronized Control Group member, review these guidelines:

- All UPSs in a Synchronized Control Group must be the same model.
- Synchronized Control Groups are supported for any Smart-UPS or Symmetra UPS with a card slot that accepts a Network Management Card.
- In a Synchronized Control Group of Symmetra 3-phase UPSs, the shutdown mode setting configured at the UPS must be the same (either **Normal** or **Secure**) for all group members.
- When its membership in a Synchronized Control Group is enabled, the Management Card blocks UPS communications from a connected APC management device on the serial communications port. However, the Management Card still allows access to the control console on the serial communications port.

Display status of a Synchronized Control Group member

The following information is displayed about the Synchronized Control Group membership of this group member when its group membership is enabled.

Status item	Description
IP Address	The IP address of the Network Management Card of this group member (UPS).
Input Status	The state of the group member's input power: good (acceptable) or bad (not acceptable).
Output Status	The status of the group member's output power: On or Off

Configure a Synchronized Control Group member

Parameter	Description
Group Membership	Determines whether this Synchronized Control Group member is an active member of its group. If you disable group membership, this UPS functions as if it were not a member of any Synchronized Control Group. When you enable or disable Group Membership, the change causes the management interface to reboot the next time you log out. The change takes effect at that time.
Control Group Number	The unique identifier of the Synchronized Control Group of which this Management Card's UPS is a member. This value must be a number from 1 through 65534. A UPS can be a member of only one Synchronized Control Group. All members of a Synchronized Control Group must have the same Control Group Number and Multicast IP Address.
Multicast IP Address	The IP address used to communicate among members of a Synchronized Control Group. The allowed range is 224.0.0.3 to 224.0.0.254. All members must have the same control group number and multicast IP address.
Power Synchronized Delay	The maximum time (120 seconds by default) that the initiating UPS waits, if necessary, for other group members to regain input power when the initiating UPS is ready to turn on. When this delay expires, the initiating UPS waits to recharge its battery to the runtime specified as Return Runtime Duration or the battery capacity specified as Minimum Battery Capacity , if necessary, then waits the time specified as Return Delay , and then turns on.

Parameter	Description
Minimum Battery Capacity Offset or Return Runtime Duration Offset	A UPS supports only one of these parameters, depending on UPS model. You can configure this value differently for each member of the Synchronized Control Group through each member's management interface. Minimum Battery Capacity Offset: A percentage of battery capacity that will be subtracted from Minimum Battery Capacity of the UPS that initiates a synchronized action to determine the battery capacity required for this group member to turn on during synchronized actions. Return Runtime Duration Offset: A number of seconds that will be subtracted from Return Runtime Duration of the UPS that initiates a synchronized action to determine the available runtime required for this group member to turn on during synchronized actions.
Authentication Phrase	The case-sensitive phrase (15 to 32 ASCII characters) used to authenticate members of a synchronized control group. All members of a synchronized control group must have the same authentication phrase. The default is APC SCG auth phrase .
Encryption Phrase	The encryption key for the protocol that ensures secure communication among members of a synchronized control group. All members of a synchronized control group must have the same encryption phrase. The default is APC SCG crypt phrase .
Synchronized Control Port	The network port that synchronized control groups use to communicate. Use any non-standard port from 5000 to 32768.

The PowerChute Option

This option enables you to use the APC PowerChute Network Shutdown utility to shut down a maximum of 50 servers on the network that use a client version of the utility.



See these HTML files and flowcharts on the Management Card *utility* CD:

- *PowerChute Network Shutdown Installation Guide* in the \pcns folder
- *PowerChute Network Shutdown Release Notes* in the \pcns folder
- *PCNS Shutdown Behavior.pdf*, *PCNS Low-Battery Shutdown Behavior.pdf*, and *PCNS Maximum Shutdown Time Negotiation.pdf* in the \trouble folder

PowerChute Network Shutdown clients

Click **Add Client** for a field in which to enter the IP address of a new PowerChute Network Shutdown client. To delete a client, click the IP address of that client in the list, and then click **Delete Client**.

The list can contain the IP addresses of up to 50 clients.



Note

When you install a PowerChute Network Shutdown client on your network, it is added to the list automatically, and when you uninstall a PowerChute Network Shutdown client, it is removed from the list automatically.

PowerChute Network Shutdown parameters

Parameter	Description
Maximum Required Delay	Displays the delay required to ensure that each PowerChute client has enough time to shut down safely when the UPS or the PowerChute client initiates a graceful shutdown. When Force Negotiation is selected, PowerChute polls each server listed as a PowerChute Network Shutdown client for information on the time it needs for a graceful shutdown. PowerChute recalculates this delay whenever the management interface of the UPS turns on or is reset. Maximum Required Delay is the longest shutdown delay needed by any server on the list, plus two additional minutes to allow for unforeseen circumstances. The negotiation can take up to 10 minutes. If you do not select Force Negotiation, two minutes is used by default as the shutdown delay for all clients.
On-Battery Shutdown Behavior	After the PowerChute Network Shutdown clients shut down their computer systems, this parameter determines whether the UPS turns on automatically or must be turned on manually when input power is restored.
Authentication Phrase	The case-sensitive phrase of 15 to 32 ASCII characters to be used during MD5 authentication for PowerChute communication. Default settings are admin user phrase for Administrator, device user phrase for Device User, and readonly user phrase for Read-Only User.

The About Option

This option provides the following information about the UPS and the firmware of its Network Management Card:

- **Model:** The model name of the UPS.
- **Position:** The physical orientation of the UPS, **rack** or **tower** (only for rack- or tower-mounted UPSs).
- **Serial Number:** The unique identification number of the UPS, also provided on the outside of the UPS.
- **Firmware Revision** The revision numbers of the firmware modules currently installed on the UPS
- **Manufacture Date:** The date on which the manufacturing of this UPS was completed.

Environmental Monitoring

Overview Page

Environmental monitoring by internal and external devices

The **Overview** page, displayed when you select the **Environment** tab, lists the status of environmental monitoring components and devices associated with the Network Management Card of the UPS.

- For an AP9617 Management Card, status of an Environmental Monitoring Card in an expansion chassis or in another card slot (of a UPS with multiple card slots).
- For an AP9618 Management Card, status of the sensors, input contacts, and output relay of the Integrated Environmental Monitor.
- For an AP9619 Management Card, status of the components of the Integrated Environmental Monitor and, if an external environmental monitoring device is connected, status of the components of that device.
- For an APC S Type Power Conditioner with Battery Backup, the status of its sensor.

Heading	Displayed Information
Temperature and Humidity	Lists all sensors and, for each sensor, the alarm status, temperature currently recorded, and humidity (if supported) currently recorded. For detailed status or to reconfigure a sensor's parameters, click the sensor's name.
Input Contacts	Lists each enabled input contact and its alarm status and current state (open or closed). For detailed status of an enabled input contact or to reconfigure that contact's parameters, click the name of the contact. NOTE: To view or configure the parameters of a disabled contact, or to enable it, you must access the interface page for that contact through Input Contacts on the left navigation menu
Output Relay	Lists the alarm status and the current state (open or closed) of the output relay of the integrated Environmental Monitor. For detailed status of that output relay or to reconfigure its parameters, click its name.

Environmental events

Recent Environmental Events lists, in reverse chronological order, the most recent environmental events. To view the entire event log click **More Events** at the lower right

Temperature and Humidity Option

Brief status

Click **Temp and Humidity** on the left navigation menu of the **Environment** tab to display the name, alarm status, temperature, and humidity (if supported) for each sensor.

Detailed status and configuration

Click the name of a sensor for detailed alarm status or to configure its values:

Identification and alarm status.

Parameter	Description
Name	A name for this sensor. <i>Maximum: 20 characters.</i>
Location	This physical location of the sensor. <i>Maximum: 20 characters.</i>
Alarm Status	One of the following is displayed: • Normal if this sensor is not reporting an alarm condition. • If this contact is in an alarm state, the text of the alarm, indicating which threshold is violated, and the severity of the alarm, indicated by color (red for critical, orange for warning).
Thresholds	See the next two sections for descriptions of the configurable thresholds and Hysteresis values.

Thresholds. For each sensor, you set the same types of thresholds for temperature and (if supported) humidity measured at the sensor.

Threshold	Description
Maximum	If the threshold for maximum temperature or for maximum humidity for the sensor is exceeded, an alarm occurs.
High	If the threshold for high temperature or for high humidity for the sensor is exceeded, an alarm occurs.
Low	If the temperature or humidity drops below its low threshold for the sensor, an alarm occurs.
Minimum	If the temperature or humidity drops below its minimum threshold for the sensor, an alarm occurs.

Hysteresis. This value specifies how far past a threshold the temperature or humidity must return to clear a threshold violation.

- For Maximum and High threshold violations, the clearing point is the threshold minus the hysteresis.
- For Minimum and Low threshold violations, the clearing point is the threshold plus the hysteresis.

Increase the value for Temperature Hysteresis or Humidity Hysteresis to avoid multiple alarms if temperature or humidity that has caused a violation then wavers slightly up and down. If the hysteresis value is too low, such wavering can cause and clear a threshold violation repeatedly.

Example of falling but wavering temperature: The minimum temperature threshold is 33°F, and the temperature hysteresis is 3°F. The temperature drops below 33°F, violating the threshold. It then wavers up to 34°F and then down to 31°F repeatedly, but no clearing event and no new violation occur. For the existing violation to clear, the temperature would have to rise above 36°F (3°F past the threshold).

Example of rising but wavering humidity: The maximum humidity threshold is 85%, and the humidity hysteresis is 10%. The humidity rises above 85%, violating the threshold. It then wavers down to 80% and up to 90% repeatedly, but no clearing event and no new violation occur. For the existing violation to clear, the humidity would have to drop below 75% (10% past the threshold).

Input Contacts Option

Brief status

Click **Input Contacts** on the left navigation menu of the **Environment** tab to display the name, alarm status, and state (open or closed) of each input contact.

Detailed status and configuration

Click the name of an input contact for detailed status or to configure its values:

Parameter	Description
Input Contact	Enable or disable this input contact. When disabled, the contact generates no alarm even when it is in the abnormal position
Name	A name for this input contact. <i>Maximum:</i> 20 characters.
Location	The location of this input contact. <i>Maximum:</i> 20 characters.
Alarm Status	Normal if this input contact is not reporting an alarm, or the severity of the alarm, if this input contact is reporting an alarm
State	The current state of this input contact: Closed or Open .
Normal State	The normal (non-alarm) state of this input contact: Closed or Open .
Severity	The severity of the alarm that the abnormal state of this input contact generates: Warning or Critical .

Output Relay Option

Click **Output Relay** on the left navigation menu of the **Environment** tab to display the status of the output relay and configure its values.

Parameter	Description
Name	A name for this output relay. <i>Maximum</i> : 20 characters.
Location	The location of this output relay. <i>Maximum</i> : 20 characters.
Alarm Status	Normal if this output relay is not reporting an alarm, or the severity of the alarm if this output relay is reporting an alarm.
State	The current state of this output relay: Closed or Open .
Normal State	The normal (non-alarm) state of this output relay: Closed or Open .
Control	To change the current state of this output relay, check-mark the setting.
Map Output to	Select one or more options. For each option, the number of alarms selected from the number available is in brackets. Click an option name to view available alarms or to change the selection. When a selected alarm occurs, the output relay changes to its alarm state.
Delay	The number of seconds a selected alarm condition must exist before the output relay is activated. Use this setting to avoid activating an alarm for brief transient conditions. NOTE: Even if additional mapped alarms occur after the delay begins, the delay does not restart but continues until the output relay is activated.
Hold	The minimum number of seconds the output relay remains activated after the alarm occurs. Even if the activating alarm condition is corrected, the output relay remains activated until this time period expires.

About

Click **About** on the left navigation menu of the **Environment** tab to display what environmental monitors are in use with this UPS and their firmware versions

Administration: Security

Local Users

Setting user access (Administration>Security>Local Users>options)

You set the case-sensitive user name and password for each account type in the same manner. Maximum length is 10 characters for a user name and 32 characters for a password. Blank passwords (passwords with no characters) are not allowed.



For information on the permissions granted to each account type (Administrator, Device User, and Read-Only User), see [Types of user accounts](#).

Account Type	Default User Name	Default Password	Permitted Access
Administrator	apc	apc	Web Interface and Control Console
Device User	device	apc	
Read-Only User	readonly	apc	Web Interface only

Remote Users

Authentication (Administration>Security>Remote Users>Authentication Method)

Use this option to select how to administer remote access to the Management Card.



For information about local authentication (not using the centralized authentication of a RADIUS server), see the *Security Handbook*, available on the *Utility* CD and on the APC Web site at www.apc.com.

APC supports the authentication and authorization functions of RADIUS (Remote Authentication Dial-In User Service).

- When a user accesses the Network Management Card or other network-enabled device that has RADIUS enabled, an authentication request is sent to the RADIUS server to determine the user's permission level.
- RADIUS user names used with the Network Management Card are limited to 32 characters.

Select one of the following:

- **Local Authentication Only:** RADIUS is disabled. Local authentication is enabled.
- **RADIUS, then Local Authentication:** RADIUS and local authentication are enabled. Authentication is requested from the RADIUS server first. If RADIUS authentication fails, local authentication is used.
- **RADIUS Only:** RADIUS is enabled. Local authentication is disabled.



If **RADIUS Only** is selected, and the RADIUS server is unavailable, improperly identified, or improperly configured, you must use a serial connection to the control console and change the **Access** setting to **Local Authentication Only** or **RADIUS, then Local Authentication** to regain access.

RADIUS (Administration>Security>Remote Users>RADIUS)

Use this option to do the following:

- List the RADIUS servers (a maximum of two) available to the Network Management Card and the time-out period for each.
- Click **Add Server**, and configure the parameters for authentication by a new RADIUS server:
- Click a listed RADIUS server to display and modify its parameters.

RADIUS Setting	Definition
RADIUS Server	The server name or IP address of the RADIUS server. NOTE: RADIUS servers use port 1812 by default to authenticate users. To use a different port, add a colon followed by the new port number to the end of the RADIUS server name or IP address.
Secret	The shared secret between the RADIUS server and the Management Card.
Timeout	The time in seconds that the Management Card waits for a response from the RADIUS server.
Test Settings	Enter the Administrator user name and password to test the RADIUS server path that you have configured.
Skip Test and Apply	Do not test the RADIUS server path.
Switch Server Priority	Change which RADIUS server will authenticate users if two configured servers are listed and RADIUS, then Local Authentication or RADIUS Only is the enabled authentication method.

Configuring the RADIUS Server

Summary of the configuration procedure

You must configure your RADIUS server to work with the Management Card.



For examples of the RADIUS users file with Vendor Specific Attributes (VSAs) and an example of an entry in the dictionary file on the RADIUS server, see the *APC Security Handbook*.

1. Add the IP address of the Management Card to the RADIUS server client list (file).
2. Users must be configured with Service-Type attributes unless Vendor Specific Attributes (VSAs) are defined. If no Service-Type attributes are configured, users will have read-only access (on the Web interface only).



See your RADIUS server documentation for information about the RADIUS users file, and see the *APC Security Handbook* for an example.

3. Vendor Specific Attributes (VSAs) can be used instead of the Service-Type attributes provided by the RADIUS server. VSAs requires a dictionary entry and a RADIUS users file. In the dictionary file, define the names for the ATTRIBUTE and VALUE keywords, but not for the numeric values. If you change numeric values, RADIUS authentication and authorization will fail. VSAs take precedence over standard RADIUS attributes.

Configuring a RADIUS server on UNIX[®] with shadow passwords

If UNIX shadow password files are used (/etc/passwd) with the RADIUS dictionary files, the following two methods can be used to authenticate users:

- If all UNIX users have administrative privileges, add the following to the RADIUS “user” file. To allow only Device Users, change the APC-Service-Type to **Device**.

```

DEFAULT          Auth-Type = System
                   APC-Service-Type = Admin

```

- Add user names and attributes to the RADIUS “user” file, and verify password against /etc/passwd. The following example is for users **bconners** and **thawk**:

```

bconners         Auth-Type = System
                   APC-Service-Type = Admin

thawk            Auth-Type = System
                   APC-Service-Type = Device

```

Supported RADIUS servers

APC supports FreeRADIUS, Microsoft Windows 2000 Server, and Microsoft Windows 2000 RADIUS Server. Other commonly available RADIUS applications may work but have not been fully tested by APC.

Inactivity Timeout (Administration>Security>Auto Log Off)

Use this option to configure the time (3 minutes by default) that the system waits before logging off an inactive user. If you change this value, you must log off for the change to take effect.



Note

This timer continues to run if a user closes the browser window without first logging off by clicking **Log Off** at the upper right. Because that user is still considered to be logged on, no user of that account type can log on until the time specified as **Minutes of Inactivity** expires. For example, with the default value for **Minutes of Inactivity**, if a Device User closes the browser window without logging off, no Device User can log on for 3 minutes.

Administration: Network Features

TCP/IP and Communication Settings

TCP/IP settings (Administration>Network>TCP/IP)

The **TCP/IP** option on the side menu bar, selected by default when you choose **Network** on the top menu bar, displays the current IP address, subnet mask, default gateway, and MAC address of the Network Management Card.

On the same page, **TCP/IP Configuration** provides the following options for how the TCP/IP settings will be configured when the Network Management Card turns on, resets, or restarts: **Manual**, **BOOTP**, **DHCP**, and **DHCP & BOOTP**.



For information on DHCP and DHCP options, see **RFC2131** and **RFC2132**.

Setting	Description
Manual	The IP address, subnet mask, and default gateway must be configured manually. Click Next>> , and enter the new values.
BOOTP	A BOOTP server provides the TCP/IP settings. At 32-second intervals, the Management Card requests network assignment from any BOOTP server: • If it receives a valid response, it starts the network services. • If it finds a BOOTP server, but a request to that server fails or times out, the Management Card stops requesting network settings until it is restarted. • By default, If previously configured network settings exist, and it receives no valid response to five requests (the original and four retries), it uses the previously configured settings so that it remains accessible. Click Next>> to access the BOOTP Configuration page to change the number of retries or the action to take if all retries fail ¹: • Maximum retries: Enter the number of retries that will occur when no valid response is received, or zero (0) for an unlimited number of retries. • If retries fail: Select Use prior settings (the default) or Stop BOOTP request.
DHCP	At 32-second intervals, the Management Card requests network assignment from any DHCP server: By default, the number of retries is unlimited. • If it receives a valid response, by default it requires the APC cookie from the DHCP server in order to accept the lease and start the network services. • If it finds a DHCP server, but the request to that server fails or times out, it stops requesting network settings until it is restarted. To change these values, click Next>> for the DHCP Configuration page¹: • Require vendor specific cookie to accept DHCP Address: Disable or enable the requirement that the DHCP server provide the APC cookie. • Maximum retries: Enter the number of retries that will occur when no valid response is received, or zero (0) for an unlimited number of retries.
1. The default values for these three settings on the configuration pages generally do not need to be changed: • Vendor Class: APC • Client ID: The MAC address of the Network Management Card, which uniquely identifies it on the local area network (LAN) • User Class: The name of the application firmware module	

Setting	Description
DHCP & BOOTP	The default setting. The Network Management Card tries to obtain its TCP/IP settings from a BOOTP server first, and then, if it cannot discover a BOOTP server, from a DHCP server. If it obtains its TCP/IP settings from either server, it switches this setting to BOOTP or DHCP, depending on the type of server that supplied the TCP/IP settings to the Network Management Card. Click Next>> to configure the same settings that are on the BOOTP Configuration and DHCP Configuration pages¹ and to specify that the DHCP and BOOTP setting be retained after either type of server provides the TCP/IP values.
1. The default values for these three settings on the configuration pages generally do not need to be changed: • Vendor Class: APC • Client ID: The MAC address of the Network Management Card, which uniquely identifies it on the local area network (LAN) • User Class: The name of the application firmware module	

DHCP response options

Each valid DHCP response contains options that provide the TCP/IP settings that the Management Card needs to operate on a network, and other information that affects the Management Card's operation.

Vendor Specific Information (option 43). The Management Card uses this option in a DHCP response to determine whether the DHCP response is valid. This option contains up to two APC-specific options in a TAG/LEN/DATA format: the APC Cookie and the Boot Mode Transition.

- **APC Cookie. Tag 1, Len 4, Data "1APC"**

Option 43 communicates to the Management Card that a DHCP server is configured to service APC devices. By default, this DHCP response option must contain the APC cookie for the Management Card to accept the lease.



To disable the requirement of an APC cookie, see **DHCP**.

Following, in hexadecimal format, is an example of a Vendor Specific Information option that contains the APC cookie:

Option 43 = 0x01 0x04 0x31 0x41 0x50 0x43

- **Boot Mode Transition. Tag 2, Len 1, Data 1/2**

This option 43 setting enables or disables **Remain in DHCP & BOOTP mode after accepting TCP/IP settings**, which, by default, is disabled.

- A data value of 1 enables **Remain in DHCP & BOOTP mode after accepting TCP/IP settings**. Whenever the Management Card reboots, it will request its network assignment first from a BOOTP server, and then, if necessary, from a DHCP server.
- A data value of 2 disables the option **Remain in DHCP & BOOTP mode after accepting TCP/IP settings** option. The **TCP/IP Configuration** setting option switches to **DHCP** when the Management Card accepts the DHCP response. Whenever the Management Card reboots, it will request its network assignment from a DHCP server only.

Following, in hexadecimal format, is an example of a Vendor Specific Information option that contains the APC cookie and the **disable** setting for **Boot Mode Transition**:

Option 43 = 0x01 0x04 0x31 0x41 0x50 0x43 0x02 0x01 0x01

TCP/IP options. The Management Card uses the following options within a valid DHCP response to define its TCP/IP settings. All of these options except the first are described in **RFC2132**.

- **IP Address** (from the **yiaddr** field of the DHCP response, described in **RFC2131**): The IP address that the DHCP server is leasing to the Management Card.
- **Subnet Mask** (option 1): The Subnet Mask value that the Management Card needs to operate on the network.
- **Router**, i.e., Default Gateway (option 3): The default gateway address that the Management Card needs to operate on the network.
- **IP Address Lease Time** (option 51): The time duration for the lease of the IP Address to the Management Card.

- **Renewal Time, T1** (option 58): The time that the Management Card must wait after an IP address lease is assigned before it can request a renewal of that lease.
- **Rebinding Time, T2** (option 59): The time that the Management Card must wait after an IP address lease is assigned before it can seek to rebind that lease.

Other options. The Management Card also uses these options within a valid DHCP response. All of these options except the last are described in **RFC2132**.

- **Network Time Protocol Servers** (option 42): Up to two NTP servers (primary and secondary) that the Management Card can use.
- **Time Offset** (option 2): The offset of the Management Card's subnet, in seconds, from Coordinated Universal Time (UTC).
- **Domain Name Server** (option 6): Up to two Domain Name System (DNS) servers (primary and secondary) that the Management Card can use.
- **Host Name** (option 12): The host name that the Management Card will use (32-character maximum length).
- **Domain Name** (option 15): The domain name that the Management Card will use (64-character maximum length).
- **Boot File Name** (from the **file** field of the DHCP response, described in **RFC2131**): The fully qualified directory-path to a user configuration file (.ini file) to download. The **siaddr** field of the DHCP response specifies the IP address of the server from which the Management Card will download the .ini file. After the download, the Management Card uses the .ini file as a boot file to reconfigure its settings.

Port Speed (Administration>Network>Port Speed)

The **Port Speed** setting defines the communication speed of the TCP/IP port.

- For **Auto-negotiation** (the default), Ethernet devices negotiate to transmit at the highest possible speed, but if the supported speeds of two devices are unmatched, the slower speed is used.
- Alternatively, you can choose 10 Mbps or 100 Mbps, each with the option of half-duplex (communication in only one direction at a time) or full-duplex (communication in both directions on the same channel simultaneously).

DNS (Administration>Network>DNS>options)

Use the options under **DNS** on the left navigation menu to configure and test the Domain Name System (DNS):

- Select **servers** to specify the IP addresses of the primary and optional secondary DNS server. For the Management Card to send e-mail, at least the IP address of the primary DNS server must be defined.
 - The Network Management Card waits up to 15 seconds for a response from the primary DNS server or the secondary DNS server (if a secondary DNS server is specified). If the Management Card does not receive a response within that time, e-mail cannot be sent. Therefore, use DNS servers on the same segment as the Management Card or on a nearby segment (but not across a wide-area network [WAN]).
 - After you define the IP addresses of the DNS servers, verify that DNS is working correctly by entering the DNS name of a computer on your network to look up the IP address for that computer.
- Select **naming** to define the host name and domain name of the Management Card:
 - **Host Name**: After you configure a host name here and a domain name in the **Domain Name** field, users can enter a host name in any field in the Management Card interface (except e-mail addresses) that accepts a domain name.
 - **Domain Name**: You need to configure the domain name here only. In all other fields in the Network Management Card interface (except e-mail addresses) that accept domain names, the Network Management Card adds this domain name when only a host name is entered.
 - To override all instances of the expansion of a specified host name by the addition of the domain name, set the domain name field to its default, `somedomain.com`, or to `0.0.0.0`.
 - To override the expansion of a specific host name entry (or example, when defining a trap receiver) include a trailing period. The Management Card recognizes a host name with a trailing period (such as *mySnmpServer.*) as if it were a fully qualified domain name and does not append the domain name.

- Select **test** to send a DNS query that tests the setup of your DNS servers:
 - As **Query Type**, select the method to use for the DNS query:
 - **by Host**: the URL name of the server
 - **by FQDN**: the fully qualified domain name
 - **by IP**: the IP address of the server
 - **by MX**: the Mail Exchange used by the server
 - As **Query Question**, identify the value to be used for the selected query type:

Query Type Selected	Query Question to Use
by Host	The URL
by FQDN	The fully qualified domain name, <i>my_server.my_domain.</i>
by IP	The IP address
by MX	The Mail Exchange address

- View the result of the test DNS request in the **Last Query Response** field.

Web (Administration>Network>Web>options)

Option	Description
access	To activate changes to any of these selections, log off from the Management Card: • Disable: Disables access to the Web interface. (You must use the control console to re-enable access. Select Network and Web/SSL/TLS. Then for HTTP, select Access and Enabled. For HTTPS access, also select Web/SSL and Enabled.) • Enable HTTP (the default): Enables Hypertext Transfer Protocol (HTTP), which provides Web access by user name and password, but does not encrypt user names, passwords, and data during transmission. • Enable HTTPS: Enables Hypertext Transfer Protocol (HTTPS) over Secure Sockets Layer (SSL). SSL encrypts user names, passwords, and data during transmission, and authenticates the Management Card by digital certificate. When HTTPS is enabled, your browser displays a small lock icon. See “Creating and Installing Digital Certificates” in the <i>Security Handbook</i> on the APC Network Management Card <i>Utility</i> CD to choose among the several methods for using digital certificates. HTTP Port: The TCP/IP port (80 by default) used to communicate by HTTP with the Management Card. HTTPS Port: The TCP/IP port (443 by default) used to communicate by HTTPS with the Management Card. For either of these ports, you can change the port setting to any unused port from 5000 to 32768 for additional security. Users must then use a colon (:) in the address field of the browser to specify the port number. For example, for a port number of 5000 and an IP address of 152.214.12.114: http://152.214.12.114:5000 https://152.214.12.114:5000
ssl cipher suites	Enable or disable any of the SSL encryption ciphers and hash algorithms: • DES: A block cipher that provides authentication by Secure Hash Algorithm. • RC4_MD5 (enabled by default): A stream cipher that provides authentication by MD5 hash algorithm. • RC4_SHA (enabled by default): A stream cipher that provides authentication by Secure Hash Algorithm. • 3DES: A block cipher that provides authentication by Secure Hash Algorithm.

Option	Description
ssl certificate	Add, replace, or remove a security certificate. Status: • Not installed: A certificate is not installed, or was installed by FTP or SCP to an incorrect location. Using Add or Replace Certificate File installs the certificate to the correct location, /sec on the Network Management Card. • Generating: The Network Management Card is generating a certificate because no valid certificate was found. • Loading: A certificate is being activated on the Management Card. • Valid certificate: A valid certificate was installed or was generated by the Management Card. Click on this link to view the certificate's contents. If you install an invalid certificate, or if no certificate is loaded when you enable SSL, the Management Card generates a default certificate, a process which delays access to the interface for up to five minutes. You can use the default certificate for basic encryption-based security, but a security alert message displays whenever you log on. Add or Replace Certificate File: Enter or browse to the certificate file created with the Security Wizard. See "Creating and Installing Digital Certificates" in the <i>Security Handbook</i> on the APC Network Management Card <i>Utility</i> CD to choose a method for using digital certificates created by the Security Wizard or generated by the Management Card. Remove: Delete the current certificate.

Console (Administration>Network>Console>*options*)

Option	Description
access	Choose one of the following for access by Telnet or Secure SHell (SSH): • Disable: Disables all access to the control console. • Enable Telnet (the default): Telnet transmits user names, passwords, and data without encryption. • Enable SSH v1 and v2: Do not enable both versions 1 and 2 of SSH unless you require both. They use extensive processing power.) • Enable SSH v1 only: SSH version 1 encrypts user names, passwords, and data for transmission. There is little or no delay as you log on. • Enable SSH v2 only: SSH version 2 transmits user names, passwords, and data in encrypted form with more protection than version 1 from attempts to intercept, forge, or alter data during transmission. There is a noticeable delay as you log on. Configure the ports to be used by these protocols: • Telnet Port: The Telnet port used to communicate with the Management Card (23 by default). You can change the port setting to any unused port from 5000 to 32768 for additional security. Users must then use a colon (:) or a space, as required by your Telnet client program, to specify the non-default port. For example, for port 5000 and an IP address of 152.214.12.114, your Telnet client requires one of the these commands: <pre>telnet 152.214.12.114:5000 telnet 152.214.12.114 5000</pre> • SSH Port: The SSH port used to communicate with the Management Card (22 by default). You can change the port setting to any unused port from 5000 to 32768 for additional security. See the documentation for your SSH client for the command line format required to specify a non-default port.
ssh encryption	Enable or disable encryption algorithms (block ciphers) compatible with SSH version 1 or version 2 clients: If your SSH v1 client cannot use Blowfish, you must also enable DES. Your SSH v2 client selects the enabled algorithm that provides the highest security. If the client cannot use the default algorithms (3DES or Blowfish), enable an AES algorithm that it can use (AES 128 or AES 256)

Option	Description
ssh host key	Status indicates the status of the host key (private key): • SSH Disabled: No host key in use: When disabled, SSH cannot use a host key. • Generating: The Management Card is creating a host key because no valid host key was found. • Loading: A host key is being activated on the Management Card. • Valid: One of the following valid host keys is in the /sec directory (the required location on the Network Management Card): • A 1024-bit host key created by the APC Security Wizard • A 768-bit RSA host key generated by the Network Management Card Add or Replace: Browse to and upload a host key file created by the Security Wizard: If you use FTP or Secure CoPy (SCP) instead to transfer the host key file, you must specify the /sec directory as the target location in the command. To use the APC Security Wizard, see the <i>Security Handbook</i> on the APC Network Management Card <i>Utility</i> CD. NOTE: To reduce the time required to enable SSH, create and upload a host key in advance. If you enable SSH with no host key loaded, the Management Card takes up to 5 minutes to create a host key, and the SSH server is not accessible during that time. Remove: Remove the current host key.



To use SSH, you must have an SSH client installed. Most Linux and other UNIX[®] platforms include an SSH client, but Microsoft Windows operating systems do not. Clients are available from various vendors.

SNMP

SNMPv1 (Administration>Network>SNMPv1>options)

All user names, passwords, and community names for SNMP are transferred over the network as plain text. If your network requires the high security of encryption, disable SNMP access or set the access for each community to Read. (A community with Read access can receive status information and use SNMP traps.)

When using InfraStruXure Manager to manage a UPS on the public network of an InfraStruXure system, you must have SNMP enabled in the Network Management Card interface. Read access will allow InfraStruXure Manager to receive traps from a Network Management Card, but Write access is required while you use the interface of the Management Card to set InfraStruXure Manager as a trap receiver.



For detailed information on enhancing and managing the security of your system, see the *Security Handbook*, available on the APC Network Management Card *Utility* CD or from the APC Web site, www.apc.com.

Option	Description
access	Enable SNMPv1 Access: Enables SNMP version 1 as a method of communication with this device.
access control	You can configure up to four access control entries to specify which NMSs have access to this device. The opening page for access control, by default, assigns one entry to each of the four available SNMPv1 communities, but you can edit these settings to apply more than one entry to any community to grant access by several specific IP addresses, host names, or IP address masks. To edit the access control settings for a community, click its community name. • If you leave the default access control entry unchanged for a community, that community has access to this device from any location on the network. • If you configure multiple access control entries for one community name, the limit of four entries requires that one or more of the other communities must have no access control entry. If no access control entry is listed for a community, that community has no access to this device. Community Name: The name that a Network Management System (NMS) must use to access the community. The maximum length is 15 ASCII characters, and the default community names for the four communities are public, private, public2, and private2. NMS IP/Host Name: The IP address, IP address mask, or host name that controls access by NMSs. A host name or a specific IP address (such as 149.225.12.1) allows access only by the NMS at that location. IP addresses that contain 255 restrict access as follows: • 149.225.12.255: Access only by an NMS on the 149.225.12 segment. • 149.225.255.255: Access only by an NMS on the 149.225 segment. • 149.255.255.255: Access only by an NMS on the 149 segment. • 0.0.0.0 (the default setting) which can also be expressed as 255.255.255.255: Access by any NMS on any segment. Access Type: The actions an NMS can perform through the community. • Read: GETS only, at any time • Write: GETS at any time, and SETS when no user is logged onto the Web interface or Control Console. • Write+: GETS and SETS at any time. • Disabled: No GETS or SETS at any time.

SNMPv3 (Administration>Network>SNMPv3>options)

For SNMP GETs, SETs, and trap receivers, SNMPv3 uses a system of user profiles to identify users. An SNMPv3 user must have a user profile assigned in the MIB software program to perform GETs and SETs, browse the MIB, and receive traps.



Note

To use SNMPv3, you must have a MIB program that supports SNMPv3.

The Network Management Card supports only MD5 authentication and DES encryption.

Option	Description
access	SNMPv3 Access: Enables SNMPv3 as a method of communication with this device.
user profiles	By default, lists the settings of four user profiles, configured with the user names apc snmp profile1 through apc snmp profile4, and no authentication and no privacy (no encryption). To edit the following settings for a user profile, click a user name in the list. User Name: The identifier of the user profile. SNMP version 3 maps GETs, SETs, and traps to a user profile by matching the user name of the profile to the user name in the data packet being transmitted. A user name can have up to 32 ASCII characters. Authentication Passphrase: A phrase of 15 to 32 ASCII characters (apc auth passphrase, by default) that verifies that the NMS communicating with this device through SNMPv3 is the NMS it claims to be, that the message has not been changed during transmission, and that the message was communicated in a timely manner, indicating that it was not delayed and that it was not copied and sent again later at an inappropriate time. Privacy Passphrase: A phrase of 15 to 32 ASCII characters (apc crypt passphrase, by default) that ensures the privacy of the data (by means of encryption) that an NMS is sending to this device or receiving from this device through SNMPv3. Authentication Protocol: The APC implementation of SNMPv3 supports MD5 authentication. Authentication will not occur unless MD5 is selected as the authentication protocol. Privacy Protocol: The APC implementation of SNMPv3 supports DES as the protocol for encrypting and decrypting data. Privacy of transmitted data requires that DES is selected as the privacy protocol.. Note: You cannot select the privacy protocol if no authentication protocol is selected.

Option	Description
access control	You can configure up to four access control entries to specify which NMSs have access to this device. The opening page for access control, by default, assigns one entry to each of the four user profiles, but you can edit these settings to apply more than one entry to any user profile to grant access by several specific IP addresses, host names, or IP address masks. • If you leave the default access control entry unchanged for a user profile, all NMSs that use that profile have access to this device. • If you configure multiple access entries for one user profile, the limit of four entries requires that one or more of the other user profiles must have no access control entry. If no access control entry is listed for a user profile, no NMS that uses that profile has any access to this device. To edit the access control settings for a user profile, click its user name. Access: Mark the Enable checkbox to activate the access control specified by the parameters in this access control entry. User Name: Select from the drop-down list the user profile to which this access control entry will apply. The choices available are the four user names that you configure through the user profiles option on the left navigation menu. NMS IP/Host Name: The IP address, IP address mask, or host name that controls access by the NMS. A host name or a specific IP address (such as 149.225.12.1) allows access only by the NMS at that location. An IP address mask that contain 255 restricts access as follows: • 149.225.12.255: Access only by an NMS on the 149.225.12 segment. • 149.225.255.255: Access only by an NMS on the 149.225 segment. • 149.255.255.255: Access only by an NMS on the 149 segment. • 0.0.0.0 (the default setting) which can also be expressed as 255.255.255.255: Access by any NMS on any segment.

FTP Server (Administration>Network>FTP Server)

The **FTP server** settings enable (by default) or disable access to the FTP server and specify the TCP/IP port (21 by default) that the FTP server uses to communicate with the Management Card. The FTP server uses both the specified port and the port one number lower than the specified port.

You can change the **Port** setting to the number of any unused port from 5001 to 32768 for added security. Users must then use a colon (:) to specify the non-default port number. For example, for port 5001 and IP address 152.214.12.114, the command would be **ftp 152.214.12.114:5001**.



FTP transfers files without encryption. For higher security, disable the FTP server, and transfer files with Secure CoPy (SCP). Selecting and configuring Secure SHell (SSH) enables SCP automatically.

At any time that you want a UPS to be accessible for management by InfraStruXure Manager, FTP Server must be enabled in the Management Card interface of that UPS.



For detailed information on enhancing and managing the security of your system, see the *Security Handbook*, available on the APC Network Management Card *Utility* CD or from the APC Web site.

WAP (for Smart-UPS models only)

Use this option to enable (the default) or disable the *Wireless Application Protocol* (WAP). WAP is a standard for providing cellular phones, pagers, and other handheld devices with secure access to e-mail and text-based Web pages. WAP runs on all major wireless networks and is device-independent, so that it can be used with many phones and handheld devices.

Administration: Notification and Logging

Event Actions (Administration>Notification>Event Actions>options)

Types of notification

You can configure event actions to occur in response to an event or group of events. These actions notify users of the event in any of several ways:

- Active, automatic notification. The specified users or monitoring devices are contacted directly.
 - E-mail notification
 - SNMP traps
 - Syslog notification
 - Paging
- Indirect notification in the event log. If no direct notification is configured, users must check the log to determine which events have occurred.



For another method of indirect notification, see [SNMP](#). SNMP enables an NMS to perform informational queries. For SNMPv1, configuring the most restrictive SNMP access type, READ, enables informational queries without the risk of allowing remote configuration changes.

You can also log system performance data to use for device monitoring. See [Data log \(Logs>Data>options\)](#) for information on how to configure and use this data logging option.

Configuring event actions

Notification Parameters. For events that have an associated clearing event, you can also set the following parameters as you configure events individually or by group, as described in the next two sections. To access the parameters, click the receiver or recipient name.

Parameter	Description
Delay x time before sending	If the event persists for the specified time, notification is sent. If the condition clears before the time expires, no notification is sent.
Repeat at an interval of x time	The notification is sent at the specified interval (e.g., every 2 minutes).
Up to x times	During an active event, the notification repeats for this number of times.
Until condition clears	The notification is sent repeatedly until the condition clears or is resolved.

Configuring by event. To define event actions for an individual event:

1. Select the **Administration** tab, **Notification** on the top menu bar, and **by event** under **Event Actions** on the left navigation menu.
2. In the list of events, review the marked columns to see whether the action you want is already configured. (By default, logging is configured for all events.)
3. To view or change the current configuration, such as recipients to be notified by e-mail or paging, or Network Management Systems (NMSs) to be notified by SNMP traps, click on the event name.



Note

If no Syslog server is configured, items related to Syslog configuration are not displayed.



When viewing details of an event's configuration, you can change the configuration, enable or disable event logging or Syslog, or disable notification for specific e-mail recipients, trap receivers, or paging recipients, but you cannot add or remove recipients or receivers. To add or remove recipients or receivers, see the following:

- [Identifying Syslog Servers \(Logs>Syslog>servers\)](#)
- [E-mail recipients \(Administration>Notification>E-mail>recipients\)](#)
- [Paging \(Administration>Notification>paging>options\)](#)
- [Trap Receivers \(Administration>Notification>SNMP Traps>trap receivers\)](#)

Configuring by group. To configure a group of events simultaneously:

1. Select the **Administration** tab, **Notification** on the top menu bar, and **by group** under **Event Actions** on the left navigation menu.
2. Choose how to group events for configuration:
 - Choose **Grouped by severity**, and then select all events of one or more severity levels. You cannot change the severity of an event.
 - Choose **Grouped by category**, and then select all events in one or more pre-defined categories.
3. Click **Next>>** to move from page to page to do the following:
 - a. Select event actions for the group of events.
 - To choose any action except **Logging** (the default), you must first have at least one relevant recipient or receiver configured.
 - If you choose **Logging** and have configured a Syslog server, select **Event Log** or **Syslog** (or both) on the next page.
 - b. Select whether to leave the newly configured event action enabled for this group of events or to disable the action.

Active, Automatic, Direct Notification

E-mail notification

Overview of setup. Use the Simple Mail Transfer Protocol (SMTP) to send e-mail to up to four recipients when an event occurs.

To use the e-mail feature, you must define the following settings:

- The IP addresses of the primary and, optionally, the secondary Domain Name System (DNS) servers



See [DNS \(Administration>Network>DNS>options\)](#).

- The IP address or DNS name for **SMTP Server** and **From Address**



See [SMTP \(Administration>Notification>E-mail>server\)](#).

- The e-mail addresses for a maximum of four recipients



See [E-mail recipients \(Administration>Notification>E-mail>recipients\)](#).



Note

You can use the **To Address** setting of the **recipients** option to send e-mail to a text-based pager.

SMTP (Administration>Notification>E-mail>server).

Setting	Description
Local SMTP Server	The IP address or DNS name of the local SMTP server. NOTE: This definition is required only when SMTP Server is set to Local. See E-mail recipients (Administration>Notification>E-mail>recipients).
From Address	The contents of the From field in e-mail messages sent by the Management Card: • in the format <i>user@ [IP_address]</i> (if an IP address is specified as Local SMTP Server) • In the format <i>user@domain</i> (if DNS is configured and the DNS name is specified as Local SMTP Server) in the e-mail messages. NOTE: The local SMTP server may require that you use a valid user account on the server for this setting. See the server's documentation.

E-mail recipients (Administration>Notification>E-mail>recipients). Identify up to four e-mail recipients.

Setting	Description
To Address	The user and domain names of the recipient. To use e-mail for paging, use the e-mail address for the recipient's pager gateway account (for example, myacct100@skytel.com). The pager gateway will generate the page. To bypass the DNS lookup of the mail server's IP address, use the IP address in brackets instead of the e-mail domain name, e.g., use jsmith@[xxx.xxx.x.xxx] instead of jsmith@company.com. This is useful when DNS lookups are not working correctly. NOTE: The recipient's pager must be able to use text-based messaging.
SMTP Server	Select one of the following methods for routing e-mail: • Local: Through the Management Card's SMTP server. This setting (recommended) ensures that the e-mail is sent before the Management Card's 20-second time-out, and, if necessary, is retried several times. Also do one of the following: • Enable forwarding at the Management Card's SMTP server so that it can route e-mail to external SMTP servers. Typically, SMTP servers are not configured to forward e-mail. Check with the administrator of your SMTP server before changing its configuration to allow forwarding. • Set up a special e-mail account for the Management Card to forward e-mail to an external mail account. • Recipient: Directly to the recipient's SMTP server. With this setting, the Management Card tries to send the e-mail only once. On a busy remote SMTP server, the time-out may prevent some e-mail from being sent. When the recipient uses the Management Card's SMTP server, this setting has no effect.
E-mail Generation	Enables (by default) or disables sending e-mail to the recipient.

E-mail test (Administration>Notification>E-mail>test). Send a test message to a configured recipient.

SNMP traps

Trap Receivers (Administration>Notification>SNMP Traps>trap receivers). View trap receivers by NMS IP/Host Name. You can configure up to six trap receivers.

- To open the page for configuring a new trap receiver, click **Add Trap Receiver**.
- To modify or delete a trap receiver, first click its IP address or host name to access its settings. (If you delete a trap receiver, all notification settings configured under Event Actions for the deleted trap receiver are set to their default values.)
- To specify the trap type for a trap receiver, select either the SNMPv1 or SNMPv3 radio button. For an NMS to receive both types of traps, you must configure two trap receivers for that NMS, one for each trap type.

Item	Definition
Trap Generation	Enable (the default) or disable trap generation for this trap receiver.
NMS IP/Host Name	The IP address or host name of this trap receiver. The default, 0.0.0.0, leaves the trap receiver undefined.

SNMPv1 option.

Community Name	The name (public by default) used as an identifier when SNMPv1 traps are sent to this trap receiver.
Authenticate Traps	When this option is enabled (the default), the NMS identified by the NMS IP/Host Name setting will receive authentication traps (traps generated by invalid attempts to log on to this device). To disable that ability, unmark the checkbox.

SNMPv3 option. Select the identifier of the user profile for this trap receiver. (To view the settings of the user profiles identified by the user names selectable here, choose **Network** on the top menu bar and **user profiles** under **SNMPv3** on the left navigation menu.)



See [SNMPv3 \(Administration>Network>SNMPv3>options\)](#) for information on creating user profiles and selecting authentication and encryption methods.

SNMP Trap Test (Administration>Notification>SNMP Traps>test)

Last Test Result. The result of the most recent SNMP trap test. A successful SNMP trap test verifies only that a trap was sent; it does not verify that the trap was received by the selected trap receiver. A trap test succeeds if all of the following are true:

- The SNMP version (SNMPv1 or SNMPv3) configured for the selected trap receiver is enabled on this device.
- The trap receiver is enabled.
- If a host name is selected for the **To** address, that host name can be mapped to a valid IP address.

To. Select the IP address or host name to which a test SNMP trap will be sent. If no trap receiver was ever configured, a link to the **Trap Receiver** configuration page is displayed.

Syslog (Logs>Syslog>options)

The Management Card can send messages to up to four Syslog servers when an event occurs. The Syslog servers record events that occur at network devices in a log that provides a centralized record of events.



This user's guide does not describe Syslog or its configuration values in detail. See **RFC3164** for more information about Syslog.

Identifying Syslog Servers (Logs>Syslog>servers).

Setting	Definition
Syslog Server	Uses IP addresses or host names to identify from one to four servers to receive Syslog messages sent by the Management Card.
Port	The user datagram protocol (UDP) port that the Management Card will use to send Syslog messages. The default is 514 , the UDP port assigned to Syslog.

Syslog Settings (Logs>Syslog>settings).

Setting	Definition
Message Generation	Enables (by default) or disables the Syslog feature.
Facility Code	Selects the facility code assigned to the Management Card's Syslog messages (User, by default). NOTE: User best defines the Syslog messages sent by the Management Card. Do not change this selection unless advised to do so by the Syslog network or system administrator.
Severity Mapping	Maps each severity level of Management Card or Environment events to available Syslog priorities. You should not need to change the mappings. The following definitions are from RFC3164: • Emergency: The system is unusable • Alert: Action must be taken immediately • Critical: Critical conditions • Error: Error conditions • Warning: Warning conditions • Notice: Normal but significant conditions • Informational: Informational messages • Debug: Debug-level messages Following are the default settings for the four Local Priority settings: • Severe is mapped to Critical • Warning is mapped to Warning • Informational is mapped to Info NOTE: To disable Syslog messages, see Configuring event actions.

Syslog Test and Format Example (Logs>Syslog>test). Send a test message to the Syslog servers configured through the **servers** option.

1. Select a severity to assign to the test message.
2. Define the test message, according to the required message fields
 - The priority (PRI): the Syslog priority assigned to the message's event, and the facility code of messages sent by the Management Card.

- The Header: a time stamp and the IP address of the Management Card.
- The message (MSG) part:
 - The TAG field, followed by a colon and space, identifies the event type.
 - The CONTENT field is the event text, followed (optionally) by a space and the event code.

For example, **APC: Test Syslog** is valid.

Paging (Administration>Notification>paging>options)

On the **Administration** tab, choose **Notification** on the top menu bar, and use the options under **Paging** on the left navigation menu to display and configure paging recipients and *Telocator Alphanumeric Protocol (TAP)* carriers, and to set up and test paging. TAP is the most common digital paging protocol.



Note

Paging requires an AP9618 Network Management Card *EM/MDM*. An AP9618U kit is available from APC to upgrade an AP9617 Network Management Card *EX* or an AP9619 Network Management Card *EM* to include AP9618 features.

The general setup option. Configure these settings first (before recipients).

Setting	Description
Numeric Site ID	An 8-digit unique identification number for the UPS connected to this Network Management Card. • The number is part of each paging message from the Management Card to a numeric (non-TAP) pager. • The number is part of each paging message from the Management Card to a TAP pager, if Numeric Site ID is selected as Site ID Mode.
Site ID Name (TAP only)	An alphanumeric character string that identifies the UPS connected to this Network Management Card. This string is part of each paging message from the Management Card to a TAP pager, if Site Name is selected as Site ID Mode. <i>Maximum: 30 characters</i>

Setting	Description
Site ID Mode (TAP only)	Select the type of identifier to be used in TAP paging messages: • IP Address • Host Name: the name of the host computer • System Name: See Identification (Administration>General>Identification) • Numeric Site ID. • Site Name: The value configured as Site ID Name. <i>Default: IP Address</i>

The recipients option. Configure parameters for up to four paging recipients.

Setting	Description
Name	Uniquely identifies this paging recipient. <i>Maximum</i> : 20 characters
Access	Enables or disables paging to this recipient. <i>Default</i> : Disabled
Analog Mode or TAP Mode	Select the type of paging service this pager uses, Analog Mode (the default) for a numeric-only pager or TAP Mode for a pager that can receive text messages and uses the TAP protocol.

Configure settings for the mode you selected (**Analog Mode** or **TAP Mode**).

Analog Mode	
Setting	Description
Dial String	A character string that the modem of the Management Card uses to contact this recipient. The string must include the following: • The phone number of the pager • Any modem commands needed for tasks such as timing, waiting for a dial tone, accessing an external telephone line, and providing the pager Personal Identification Number (PIN). Example: 9,15555551234@ NOTE: The modem supports only tone dialing, not pulse dialing.
Space Character	The character (*, @, #, or None) that this pager requires to display a space between the site ID and event code in the numeric message. <i>Default:</i> *
End String	One to ten characters appended to the dial string to ensure that the modem hangs up after it pages the recipient. You need an end string only if the paging service has a menu for reviewing and leaving messages.
Send Out-of-Band Management Event Codes	Mark this box to enable automatic conversion of Network Management Card event codes to default Out-of-Band Management Card event codes if your network has both types of cards, and you want paging notifications to use the same event codes regardless of which card reports the event. <i>Default:</i> Disabled NOTE: By default, Out-of-Band Management Cards enable paging for some events for which Network Management Cards do not. (By default, Network Management Cards enable paging for severe events only.) To ensure that paging is enabled for the same events throughout your system, enable or disable paging for individual events through the user interface of either card.

TAP mode	
Setting	Description
TAP Carrier	Select the service provider that this pager uses from the TAP service providers configured through the carrier option.
Pager Number	The numeric identifier of this pager, i.e., its TAP ID, usually the pager's phone number. Some TAP IDs also include the area code. Check with the TAP carrier.



See these related topics:

- **Configuring event actions** to enable or disable paging for an event, set the time to wait before a page is sent, and set the interval for repeating a page.
- **Conversion of event codes** for conversion of Network Management Card event codes to default Out-of-Band Management Card event codes.
- **Paging message formats** for the format of messages displayed on each type of supported pager.

The carriers option. Configure TAP carriers.

Setting	Description
Name	The name of a TAP service provider. You can configure up to four.
Dial String	The dial string (Example: 9,15556789000). Include the following, in order: • Any numerals (e.g., 9) required to access an external telephone line. A comma to cause the modem to pause to wait for a dial tone. • The telephone number of the TAP carrier gateway, provided by the carrier.
Parity	The parity required for a connection by modem to a TAP paging terminal of this TAP carrier, as provided by the carrier: Even (the default), Odd , or None .
Data Bits	The number of data bits required for a connection by modem to a TAP paging terminal of this TAP carrier, provided by the carrier: 7 (the default) or 8 .

Conversion of event codes. If **Send Out-of-Band Management Event Codes** is enabled for a paging recipient, any Network Management Card event code is converted automatically to a default Out-of-Band Management Card event code in paging notifications to that recipient.



Note

Because an Out-of-Band Management Card does not have event codes for the Integrated Environmental Monitor (IEM) of an AP9618 or AP9619 Network Management Card, codes 16 through 19 in the last of the following tables have been created to enable the conversion of Network Management Card event codes from the IEM to codes compatible with numeric pagers.

One of the following event codes is sent when the UPS starts up, shuts down, switches to battery operation, or has a battery-related problem.

Out-of-Band Management Card		Network Management Card	
Code	Event	Code	Event
0	UPS ON-BATTERY	0x0109	UPS: On battery power in response to an input power problem.
1	AC FAIL/LOW BATTERY	0x010F	UPS: The battery power is too low to continue to support the load; the UPS will shut down if input power does not return to normal soon.
2	UPS SHUT DOWN	0x0114	UPS: The output power is turned off.
3	UPS ON-LINE	0x010A	UPS: No longer on battery power.
		0x0113	UPS: The output power is now turned on.
4	REPLACE BATTERY	0x0119	UPS: At least one faulty battery exists.

One of the following codes is sent when the UPS has a fault condition. Many conditions apply only to specific UPS models or product lines.

Out-of-Band Management Card		Network Management Card	
Code	Event	Event Code	Events
5	UPS FAULT	0x011B, 0x0120, 0x011F, 0x012F, 0x0126, 0x0128, 0x012A	UPS events generated by faults of Smart-UPS or Matrix-UPS models.
		0x0201, 0x0203, 0x0205, 0x0207, 0x0209, 0x020B, 0x020D, 0x020F, 0x0211, 0x0213, 0x0215, 0x0217, 0x0219, 0x021B, 0x021D, 0x021F, 0x0221, 0x0223, 0x0225, 0x0227, 0x0229, 0x022B, 0x022D, 0x022F, 0x0231, 0x0233, 0x0235, 0x0237, 0x0239, 0x023B, 0x023D, 0x023F, 0x0242, 0x0244, 0x0246, 0x0248	UPS events generated by faults of Symmetra UPS models (single-phase only).
		0x0A01, 0x0A03, 0x0A05, 0x0A07, 0x0A09, 0x0A0B, 0x0A0D, 0x0A0F, 0x0A11, 0x0A13, 0x0A15, 0x0A17, 0x0A19, 0x0A1B, 0x0A1D, 0x0A1F, 0x0A21, 0x0A23, 0x0A25, 0x0A27, 0x0A29, 0x0A2B, 0x0A2D, 0x0A2F, 0x0A31, 0x0A33, 0x0A35, 0x0A37, 0x0A39, 0x0A3B, 0x0A3D, 0x0A3F, 0x0A41, 0x0A43, 0x0A45, 0x0A47, 0x0A49, 0x0A4B, 0x0A4D, 0x0A4F, 0x0A51, 0x0A53, 0x0A55, 0x0A57, 0x0A59, 0x0A5B, 0x0A5D, 0x0A5F, 0x0A61, 0x0A63, 0x0A65, 0x0A67, 0x0A69, 0x0A6B, 0x0A6D, 0x0A6F, 0x0A71, 0x0A73, 0x0A75, 0x0A77, 0x0A79, 0x0A7B, 0x0A7D, 0x0A7F	UPS events generated by faults of Symmetra, Symmetra 3-phase, Silcon UPS, and AIS 5000 models.



For a list of supported events for a currently connected UPS model, retrieve the config.ini file of the Management Card of that UPS, and see the list under **[EventActionCode]**. The event codes listed there use an initial E instead of the 0x used in the event codes listed here, but otherwise they are the same. To retrieve the file, see [Retrieving](#) in [Retrieving and Exporting the .ini File](#).

One of the following event codes is sent when communication with the UPS is lost, when the UPS switches to bypass mode, or when the UPS is overloaded.

Out-of-Band Management Card		Network Management Card	
Code	Event	Code	Event
6	LOST COM W/UPS	0x0102	UPS: Lost the local network management interface-to-UPS communication.
7	BYPASS/OVERLOAD	0x0103	UPS: The load exceeds 100% of rated capacity.
		0x011C	UPS: In bypass in response to the UPS front-panel or a user-initiated software command, typically for maintenance.
		0x011D	UPS: In bypass in response to the bypass switch at the UPS, typically for maintenance.

One of the following event codes is sent when an external APC environmental monitoring device or the Integrated Environmental Monitor of a Network Management Card detects a problem or reports that a problem is resolved.

Out-of-Band Management Card		Network Management Card	
Code	Event	Codes	Events for an Environmental Monitoring Card
8	ZONE 1	0x0301	Environment: A critical fault exists for external Environmental Monitor input contact 1 ({name} at {location}).
9	ZONE 2	0x0303	Environment: A critical fault exists for external Environmental Monitor input contact 2 ({name} at {location}).
10	ZONE 3	0x0305	Environment: A critical fault exists for external Environmental Monitor input contact 3 ({name} at {location}).
11	ZONE 4	0x0307	Environment: A critical fault exists for external Environmental Monitor input contact 4 ({name} at {location}).

Out-of-Band Management Card		Network Management Card	
Code	Event	Codes	Events for an Environmental Monitoring Card
12	ZONES CLEARED	0x0302	Environment: A fault no longer exists for external Environmental Monitor input contact 1 ({name} at {location}).
		0x0304	Environment: A fault no longer exists for external Environmental Monitor input contact 2 ({name} at {location}).
		0x0306	Environment: A fault no longer exists for external Environmental Monitor input contact 3 ({name} at {location}).
		0x0308	Environment: A fault no longer exists for external Environmental Monitor input contact 4 ({name} at {location}).
13	PROBE 1	0x0309	Environment: A low temperature threshold violation exists for external Environmental Monitor sensor 1 ({name} at {location}) reporting under {threshold}.
		0x030B	Environment: A high temperature threshold violation exists for external Environmental Monitor sensor 1 ({name} at {location}) reporting over {threshold}.
		0x030D	Environment: A low humidity threshold violation exists for external Environmental Monitor sensor 1 ({name} at {location}) reporting under {threshold}.
		0x030F	Environment: A high humidity threshold violation exists for external Environmental Monitor sensor 1 ({name} at {location}) reporting over {threshold}.

Out-of-Band Management Card		Network Management Card	
Code	Event	Codes	Events for an Environmental Monitoring Card
14	PROBE 2	0x0311	Environment: A low temperature threshold violation exists for external Environmental Monitor sensor 2 ({name} at {location}) reporting under {threshold}.
		0x0313	Environment: A high temperature threshold violation exists for external Environmental Monitor sensor 2 ({name} at {location}) reporting over {threshold}.
		0x0315	Environment: A low humidity threshold violation exists for external Environmental Monitor sensor 2 ({name} at {location}) reporting under {threshold}.
		0x0317	Environment: A high humidity threshold violation exists for external Environmental Monitor sensor 2 ({name} at {location}) reporting over {threshold}.

Out-of-Band Management Card		Network Management Card	
Code	Event	Codes	Events for an Environmental Monitoring Card
15	PROBES CLEAR	0x030A	Environment: A low temperature threshold violation no longer exists for external Environmental Monitor sensor 1 ({name} at {location}).
		0x030C	Environment: A high temperature threshold violation no longer exists for external Environmental Monitor sensor 1 ({name} at {location}).
		0x030E	Environment: A low humidity threshold violation no longer exists for external Environmental Monitor sensor 1 ({name} at {location}).
		0x0310	Environment: A high humidity threshold violation no longer exists for external Environmental Monitor sensor 1 ({name} at {location}).
		0x0312	Environment: A low temperature threshold violation no longer exists for external Environmental Monitor sensor 2 ({name} at {location}).
		0x0314	Environment: A high temperature threshold violation no longer exists for external Environmental Monitor sensor 2 ({name} at {location}).
		0x0316	Environment: A low humidity threshold violation no longer exists for external Environmental Monitor sensor 2 ({name} at {location}).
		0x0318	Environment: A high humidity threshold violation no longer exists for external Environmental Monitor sensor 2 ({name} at {location}).

Event Code (Converted to Numeric Format) and Event Name †		Network Management Card	
Code	Event	Codes	Events
16	INTERNAL ZONE	0x031B	Environment: A critical fault exists for integrated Environmental Monitor input contact {number} ({name} at {location}).
17	INTERNAL ZONE CLEAR	0x031C	Environment: A fault no longer exists for integrated Environmental Monitor input contact {number} ({name} at {location}).
18	INTERNAL PROBE	0x031D	Environment: A low temperature threshold violation exists for integrated Environmental Monitor sensor ({name} at {location}) reporting under {threshold}.
		0x031F	Environment: A high temperature threshold violation exists for integrated Environmental Monitor sensor ({name} at {location}) reporting over {threshold}.
		0x0321	Environment: A low humidity threshold violation exists for integrated Environmental Monitor sensor ({name} at {location}) reporting under {threshold}.
		0x0323	Environment: A high humidity threshold violation exists for integrated Environmental Monitor sensor ({name} at {location}) reporting over {threshold}.
19	INTERNAL PROBE CLEAR	0x031E	Environment: A low temperature threshold violation no longer exists for integrated Environmental Monitor sensor ({name} at {location}).
		0x0320	Environment: A high temperature threshold violation no longer exists for integrated Environmental Monitor sensor ({name} at {location}).
		0x0322	Environment: A low humidity threshold violation no longer exists for integrated Environmental Monitor sensor ({name} at {location}).
		0x0324	Environment: A high humidity threshold violation no longer exists for integrated Environmental Monitor sensor ({name} at {location}).
† The Out-of-Band Management Card has no event codes or event names for these events generated by the Integrated Environmental Monitor of an AP9618 or AP9619 Network Management Card.			

Paging message formats

Analog Mode	Format
Network Management Card event code format (for numeric pagers only)	<i>[site_ID][space_character][event_code]</i> • <i>site_ID</i>: A configurable 8-digit number to identify the location of the UPS. See Numeric Site ID. • <i>space_character</i>: The character that the pager requires to display a space. See Space Character. • <i>event_code</i>: A six-digit number, with the decimal form of the Network Management Card event type as the first three digits and the decimal form of the Network Management Card event number as the last three digits. Example: 636792 001007
Out-of-Band Management Card event code format (for numeric pagers only)	<i>[site_ID][space_character][event_code]</i> • <i>site_ID</i>: A configurable 8-digit number to identify the location of the UPS. See Numeric Site ID. • <i>space_character</i>: The character that the pager requires to display a space. See Space Character. • <i>event_code</i>: A one- or two-digit number in the format of an Out-of-Band Management Card event code after conversion from a Network Management Card event code. See Conversion of event codes. Example: 752968 8
TAP Mode	Format
For non-numeric pagers. Maximum message length: 160 characters.	<i>location_ID:severity:event_code:event_text</i> • <i>location_ID</i>: The IP address, host name, device name, numeric site ID, or site name that uniquely identifies the location of the UPS. <i>location_ID</i> must be the type of identifier configured as Site ID Mode. • <i>severity</i>: The severity of the event (severe, warning, or informational). • <i>event_code</i>: The hexadecimal Network Management Card event code. • <i>event_text</i>: The Network Management Card event text. Example: 139.234.6.49:Severe:0x0107:UPS: Batteries Discharged

Indirect Notification through Logs or Queries

Event log (Logs>Events>*options*)

Displaying and using the event log (Logs>Events>log). view or delete the event log. The log displays events recorded since it was last deleted, in reverse chronological order. By default, all events are logged:

- You can view the event log as a page of the Web interface (the default view) or, to see more of the listed events without scrolling, click **Launch Log in New Window** from that page to display a full-screen view of the log.



Note

In your browser's options, JavaScript® must be enabled for you to use the **Launch Log in New Window** button.



You can also use FTP or Secure CoPy (SCP) to view the event log. See [How to use FTP or SCP to retrieve log files](#).

- To delete all events recorded in the log, click **Clear Event Log** on the Web page that displays the log. Deleted events cannot be retrieved.



To disable the logging of events based on their assigned severity level or their event category see [Configuring by group](#).

For lists of all configurable events and their current configuration, select the **Administration** tab, **Notification** on the top menu bar, and **by event** under **Event Actions** on the left navigation menu.



See [Configuring by event](#).

Reverse Lookup (Logs>Events>reverse lookup). Reverse lookup is disabled by default. Enable this feature unless you have no DNS server configured or have poor network performance because of heavy network traffic.

With reverse lookup enabled, when a network-related event occurs, both the IP address and the domain name for the networked device associated with the event are logged in the event log. If no domain name entry exists for the device, only its IP address is logged with the event. Since domain names generally change less frequently than IP addresses, enabling reverse lookup can improve the ability to identify addresses of networked devices that are causing events.

Data log (Logs>Data>options)

Displaying and using the data log (Logs>Data>log). View a log of measurements about the UPS, the power input to the UPS, and the ambient temperature and relative humidity (if an environmental monitor is present). Each entry is listed by the date and time the data was recorded.

- You can view the data log as a page of the Web interface (the default view) or, to see more of the data without scrolling, click **Launch Log in New Window** from that page to display a full-screen view of the log.



Note

In your browser's options, JavaScript® must be enabled for you to use the **Launch Log in New Window** button.



Alternatively, you can use FTP or Secure CoPy (SCP) to view the data log. See [How to use FTP or SCP to retrieve log files](#)

- To delete all data recorded in the log, click **Clear Data Log** on the Web page that displays the log. Deleted data cannot be retrieved.

Setting the data collection interval (Logs>Data>interval). Define, in the **Log Interval** setting, how frequently data is sampled and stored in the data log, and view the calculation of how many days of data the log can store, based on the interval you selected. When the log is full, the older entries are deleted. To avoid automatic deletion of older data, enable and configure data log rotation, described in the next section.

Configuring data log rotation (Logs>Data>rotation). Set up a password-protected data log repository on a specified FTP server. Enabling rotation causes the contents of the data log to be appended to the file you specify by name and location. Updates to this file occur at the upload interval you specify.

Parameter	Description
Data Log Rotation	Enable or disable (the default) data log rotation.
FTP Server Address	The location of the FTP server where the data repository file is stored.
User Name	The user name required to send data to the repository file. This user must also be configured to have read and write access to the data repository file and the directory (folder) in which it is stored.
Password	The password required to send data to the repository file.
File Path	The path to the repository file.
File Name	The name of the repository file (an ASCII text file).
Automatically Upload Every	The number of hours between uploads of data to the file.
Maximum Retries	The maximum number of times the upload will be attempted after initial failure.
Failure Wait Time	How long in minutes before an attempt to upload data times out.

How to use FTP or SCP to retrieve log files

An Administrator or Device User can use FTP or SCP to retrieve a tab-delineated event log file (*event.txt*) or data log file (*data.txt*) and import it into a spreadsheet.

- The file reports all events or data recorded since the log was last deleted or (for the data log) truncated because it reached maximum size.
- The file includes information that the event log or data log does not display.
 - The version of the file format (first field)
 - The date and time the file was retrieved
 - The **Name**, **Contact**, and **Location** values and IP address of the Management Card

- The unique **Event Code** for each recorded event (*event.txt* file only)



Note

The Management Card uses a four-digit year for log entries. You may need to select a four-digit date format in your spreadsheet application to display all four digits.

If you are using the encryption-based security protocols for your system, use Secure CoPy (SCP) to retrieve the log file.

If you are using unencrypted authentication methods for the security of your system, use FTP to retrieve the log file.



See the *Security Handbook*, available on the APC Network Management Card utility CD and on the APC Web site (www.apc.com) for information on available protocols and methods for setting up the type of security you need.

To use SCP to retrieve the files. To use SCP to retrieve the *event.txt* file, use the following command:

```
scp username@hostname_or_ip_address:event.txt ./event.txt
```

To use SCP to retrieve the *data.txt* file, use the following command:

```
scp username@hostname_or_ip_address:data.txt ./data.txt
```

To use FTP to retrieve the files. To use FTP to retrieve the *event.txt* or *data.txt* file:

1. At a command prompt, type **ftp** and the Management Card's IP address, and press ENTER.

If the **Port** setting for the **FTP Server** option (set through the **Network** menu of the **Administration** tab) has been changed from its default (**21**), you must use the non-default value in the FTP command. For Windows FTP clients, use the following command, including spaces. (For some FTP clients, you must use a colon instead of a space between the IP address and the port number.)

```
ftp>open ip_address port_number
```



To set a non-default port value to enhance security for the FTP Server, see **FTP Server (Administration>Network>FTP Server)**. You can specify any port from 5001 to 32768.

2. Use the case-sensitive **User Name** and **Password** for Administrator or Device User to log on. For Administrator, **apc** is the default for **User Name** and **Password**. For the Device User, the defaults are **device** for **User Name** and **apc** for **Password**.
3. Use the **get** command to transmit the text of a log to your local drive.
ftp>get event.txt
or
ftp>get data.txt
4. You can use the **del** command to clear the contents of either log.
ftp>del event.txt
or
ftp>del data.txt
You will not be asked to confirm the deletion.
 - If you clear the data log, the event log records a deleted-log event.
 - If you clear the event log, a new *event.txt* file records the event.
5. Type **quit** at the **ftp>** prompt to exit from FTP.

Queries (SNMP GETs)



See **SNMP** for a description of SNMPv1 and SNMPv3 settings that enable an NMS to perform informational queries. With SNMPv1, which does not encrypt data before transmission, configuring the most restrictive SNMP access type (READ) enables informational queries without allowing remote configuration changes.

Administration: General Options

Identification (Administration>General>Identification)

Define values for **Name** (the device name), **Location** (the physical location), and **Contact** (the person responsible for the device) used by the Management Card's SNMP agent. These settings are the values used for the MIB-II **sysName**, **sysContact**, and **sysLocation** Object Identifiers (OIDs).



For more information about MIB-II OIDs, see the *PowerNet® SNMP Management Information Base (MIB) Reference Guide*, available on the APC Network Management Card *utility* CD and the APC Web site, www.apc.com.

Set the Date and Time

Method (Administration>General>Date & Time>mode)

Set the time and date used by the Management Card. You can change the current settings manually or through a Network Time Protocol (NTP) Server:

- **Manual Mode:** Do one of the following:
 - Enter the date and time for the Management Card.
 - Mark the checkbox **Apply Local Computer Time** to match the date and time settings of the computer you are using.
- **Synchronize with NTP Server:** Have an NTP Server define the date and time for the Management Card.

Setting	Definition
Primary NTP Server	Enter the IP address or domain name of the primary NTP server.
Secondary NTP Server	Enter the IP address or domain name of the secondary NTP server, when a secondary server is available.

Setting	Definition
Time Zone	Select a time zone. The number of hours preceding each time zone in the list is the offset from Coordinated Universal Time (UTC), formerly Greenwich Mean Time).
Update Interval	Define how often, in hours, the Management Card accesses the NTP Server for an update. <i>Minimum: 1; Maximum: 8760 (1 year).</i>
Update Using NTP Now	Initiate an immediate update of date and time by the NTP Server.

Daylight saving (Administration>General>Date & Time>daylight saving)

Enable either traditional United States Daylight Saving Time (DST) or enable and configure a customized daylight saving time to match how Daylight Saving Time is implemented in your local area. DST is disabled by default.

When customizing Daylight Savings Time (DST):

- If the local DST always starts or ends on the fourth occurrence of a specific weekday of a month (e.g, the fourth Sunday), choose **Fourth/Last**. If a fifth Sunday occurs in that month in a subsequent year, the time setting still changes on the fourth Sunday.
- If the local DST always starts or ends on the last occurrence of a specific weekday of a month, whether it is the fourth or the fifth occurrence, choose **Fifth/Last**.

Format (Administration>General>Date & Time>date format)

Select the numerical format in which to display all dates in this user interface. In the selections, each letter m (for month), d (for day), and y (for year) represents one digit. Single-digit days and months are displayed with a leading zero.

Use an .ini File (Administration>General>User Config File)

Use the settings from one Management Card to configure another. Retrieve the config.ini file from the configured Management Card, customize that file (e.g., to change the IP address), and upload the customized file to the new Management Card. The file name can be up to 64 characters, and must have the.ini suffix.

Status	Reports the progress of the upload. The upload succeeds even if the file contains errors, but a system event r reports the errors in the event log.
Upload	Browse to the customized file and upload it so that the current Management Card can use it to set its own configuration.



To retrieve and customize the file of a configured Management Card, see [How to Export Configuration Settings](#).

Instead of uploading the file to one Management Card, you can export the file to multiple Management Cards by using an FTP or SCP script or a batch file and the APC .ini file utility, available from www.apc.com/tools/download.

Temperature Units (Administration>General>Unit Preference)

Select the temperature scale (Fahrenheit or Celsius) in which to display all temperature measurements in this user interface.

Reset the Interface (Administration>General>Reset/Reboot)

Action	Definition
Reboot Management Interface	Restarts the interface of the Management Card.
Reset All ¹	Check-mark Include TCP/IP to reset all configuration values; unmark Include TCP/IP to reset all values except TCP/IP
1. Resetting may take up to a minute. The UPS name and output voltage settings will not be reset.	

Action	Definition
Reset Only ¹	TCP/IP settings: Set TCP/IP Configuration to DHCP & BOOTP , its default setting, requiring that the Management Card receive its TCP/IP settings from a DHCP or BOOTP server. See TCP/IP settings (Administration>Network>TCP/IP) .
	Event configuration: Reset all changes to event configuration, by event and by group, to their default settings.
	UPS to defaults: Reset only UPS settings, not network settings, to their defaults.
	Lost Environmental Communication Alarms: Clears any environmental alarms caused by lost communication with a sensor, e.g., if a sensor is disconnected, this setting returns the alarm status for that sensor to Normal.
1. Resetting may take up to a minute. The UPS name and output voltage settings will not be reset.	

Configuring Links (Administration>General>Quick Links)

Select the **Administration** tab, **General** on the top menu bar, and **Quick Links** on the left navigation menu to view and change the URL links displayed at the bottom left of each page of the interface.

By default, these links access the following Web pages:

- **Link 1:** The home page of the APC Web site.
- **Link 2:** A page where you can use samples of APC Web-enabled products.
- **Link 3:** The home page of the APC Remote Monitoring Service.

To reconfigure any of the following, click the link name in the **Display** column:

- **Display:** The short link name displayed on each interface page
- **Name:** A name that fully identifies the target or purpose of the link
- **Address:** Any URL — for example, the URL of another device or server

About the Management Card (Administration>General>About)

The hardware information is especially useful to APC Customer Support to troubleshoot problems with the Management Card. The serial number and MAC address are also available on the Management Card itself.

Firmware information for the Application Module and APC OS (AOS) indicates the name, the firmware version, and the date and time each firmware module was created. This information is also useful in troubleshooting and enables you to determine if updated firmware is available at the APC Web site.

Management Uptime is the length to time the interface has been running continuously.

APC Device IP Configuration Wizard

Capabilities, Requirements, and Installation

How to use the Wizard to configure TCP/IP settings

The APC Device IP Configuration Wizard configures the IP address, subnet mask, and default gateway of one or more Network Management Cards or APC network-enabled devices (devices containing an embedded Management Card). You can use the Wizard in either of the following ways:

- Remotely over your TCP/IP network to discover and configure unconfigured Management Cards or devices on the same network segment as the computer running the Wizard.
- Through a direct connection from a serial port of your computer to a Management Card or device to configure or reconfigure it.

System requirements

The Wizard runs on Microsoft Windows 2000, Windows 2003, and Windows XP operating systems.

Installation

To install the Wizard from the *utility* CD:

1. If autorun is enabled, the user interface of the CD starts when you insert the CD. Otherwise, open the file **contents.htm** on the CD.
2. Click **Device IP Configuration Wizard** and follow the instructions.

To install the Wizard from a downloaded executable file:

1. Go to **www.apc/tools/download**.
2. Download the Device IP Configuration Wizard.
3. Run the executable file in the folder to which you downloaded it.

Use the Wizard



Note

Most software firewalls must be temporarily disabled for the Wizard to discover unconfigured Network Management Cards.

Launch the Wizard

The installation creates a shortcut link in the **Start** menu to launch the Wizard.

Configure the basic TCP/IP settings remotely

Prepare to configure the settings. Before you run the Wizard:

1. Contact your network administrator to obtain valid TCP/IP settings.
2. If you are configuring multiple unconfigured Management Cards or network-enabled devices, obtain the MAC address of each one to identify it when the Wizard discovers it. (The Wizard displays the MAC address on the screen on which you then enter the TCP/IP settings.)
 - For a Management Card that you install, the MAC address is on a label on the bottom of the card.
 - For a network-enabled device (with an embedded Management Card), the MAC address is on a label on the device.
 - You can also obtain the MAC address from the Quality Assurance slip that came with the Management Card or device.

Run the Wizard to perform the configuration. To discover and configure, unconfigured Management Cards or network-enabled devices over the network:

1. From the **Start** menu, launch the Wizard. The Wizard detects the first Management Card or network-enabled device that is not configured.
2. Select **Remotely (over the network)**, and click **Next >**.
3. Enter the system IP, subnet mask, and default gateway for the Management Card or device identified by the MAC address. Click **Next >**.

On the **Transmit Current Settings Remotely** screen, if you check-mark **Start a Web browser when finished**, the default Web browser connects to the Management Card or device after the Wizard transmits the settings.

4. Click **Finish** to transmit the settings. If the IP address you entered is in use on the network, the Wizard prompts you to enter an IP address that is not in use. Enter a correct IP address, and click **Finish**.
5. If the Wizard finds another unconfigured Network Management Card or device, it displays the screen to enter TCP/IP settings. Repeat this procedure beginning at **step 3**, or to skip the Management Card or device whose MAC address is currently displayed, click **Cancel**.

Configure or reconfigure the TCP/IP settings locally

1. Contact your network administrator to obtain valid TCP/IP settings.
2. Connect the serial configuration cable (which came with the Management Card or device) from an available communications port on your computer to the serial port of the card or device. Make sure no other application is using the computer port.
3. From the **Start** menu, launch the Wizard application.
4. If the Network Management Card or network-enabled device is not configured, wait for the Wizard to detect it. Otherwise, click **Next>**.
5. Select **Locally (through the serial port)**, and click **Next >**.
6. Enter the system IP, subnet mask, and default gateway for the Management Card or device, and click **Next >**.
7. On the **Transmit Current Settings Remotely** screen, if you check-mark **Start a Web browser when finished**, the default Web browser connects to the Management Card or device after the Wizard transmits the settings.
8. Click **Finish** to transmit the TCP/IP settings. If the IP address you entered is in use on the network, the Wizard prompts you to enter an IP address that is not in use. Enter a correct IP address, and click **Finish**.
9. If you selected **Start a Web browser when finished** in step 6, you can now configure other parameters through the Web interface of the card or device.

How to Export Configuration Settings

Retrieving and Exporting the .ini File

Summary of the procedure

An Administrator can retrieve the .ini file of a Network Management Card and export it to another Management Card or to multiple Management Cards.

1. Configure a Management Card to have the settings you want to export.
2. Retrieve the .ini file from that Management Card.
3. Customize the file to change at least the TCP/IP settings.
4. Use a file transfer protocol supported by the Management Card to transfer a copy to one or more other Management Cards. For a transfer to multiple Management Cards, use an FTP or SCP script or the APC .ini file utility.

Each receiving Management Card uses the file to reconfigure its own settings and then deletes it.

Contents of the .ini file

The config.ini file you retrieve from a Management Card contains the following:

- *section headings* and *keywords* (only those supported for the device from which you retrieve the file): Section headings are category names enclosed in brackets ([]). Keywords, under each section heading, are labels describing specific Management Card settings. Each keyword is followed by an equals sign and a value (either the default or a configured value).
- The **Override** keyword: With its default value, this keyword prevents the exporting of one or more keywords and their device-specific values, e.g., in the **[NetworkTCP/IP]** section, the default value for **Override** (the MAC address of the Management Card) blocks the exporting of values for the **SystemIP**, **SubnetMask**, **DefaultGateway**, and **BootMode**.

Detailed procedures

Retrieving. To set up and retrieve an .ini file to export:

1. If possible, use the interface of a Management Card to configure it with the settings to export. Directly editing the .ini file risks introducing errors.
2. To use FTP to retrieve config.ini from the configured Management Card:
 - a. Open a connection to the Management Card, using its IP Address:

```
ftp> open ip_address
```

- b. Log on using the Administrator user name and password.

- c. Retrieve the config.ini file containing the Management Card's settings:

```
ftp> get config.ini
```

The file is written to the folder from which you launched FTP.



To retrieve configuration settings from multiple Management Cards and export them to other Management Cards, see *Release Notes: ini File Utility, version 1.0*, available on the APC Network Management Card *Utility* CD and at www.apc.com.

Customizing. You must customize the file before you export it.

1. Use a text editor to customize the file.
 - Section headings, keywords, and pre-defined values are not case-sensitive, but string values that you define are case-sensitive.
 - Use adjacent quotation marks to indicate no value. For example, **LinkURL1=""** indicates that the URL is intentionally undefined.
 - Enclose in quotation marks any values that contain leading or trailing spaces or are already enclosed in quotation marks.
 - To export scheduled events, configure the values directly in the .ini file.
 - To export a system time with the greatest accuracy, if the receiving Management Cards can access a Network Time Protocol server, configure **enabled** for **NTPEnable**:

```
NTPEnable=enabled
```

Alternatively, reduce transmission time by exporting the **[SystemDate/Time]** section as a separate .ini file.

- To add comments, start each comment line with a semicolon (;).
2. Copy the customized file to another file name in the same folder:
- The file name can have up to 64 characters and must have the .ini suffix.
 - Retain the original customized file for future use. **The file that you retain is the only record of your comments.**

Transferring the file to a single Management Card. To transfer the .ini file to another Network Management Card, do either of the following:

- From the Web interface of the receiving Management Card, select the **Administration** tab, **General** on the top menu bar, and **User Config File** on the left navigation menu. Enter the full path of the file, or use **Browse**.
- Use any file transfer protocol supported by Network Management Cards, i.e., FTP, FTP Client, SCP, or TFTP). The following example uses FTP:
 - a. From the folder containing the copy of the customized .ini file, use FTP to log in to the Management Card to which you are exporting the .ini file:

```
ftp> open ip_address
```

- b. Export the copy of the customized .ini file to the root directory of the receiving Management Card:

```
ftp> put filename.ini
```

Exporting the file to multiple Management Cards. To export the .ini file to multiple Network Management Cards:

- Use FTP or SCP, but write a script that incorporates and repeats the steps used for exporting the file to a single Network Management Card.
- Use a batch processing file and the APC .ini file utility.



To create the batch file and use the utility, see *Release Notes: ini File Utility, version 1.0* on the APC Network Management Card Utility CD.

The Upload Event and Error Messages

The event and its error messages

The following event occurs when the receiving Network Management Card completes using the .ini file to update its settings.

Configuration file upload complete, with *number* valid values

If a keyword, section name, or value is invalid, the upload by the receiving Management Card succeeds, and additional event text states the error.

Event text	Description
Configuration file warning: Invalid keyword on line <i>number</i> . Configuration file warning: Invalid value on line <i>number</i> .	A line with an invalid keyword or value is ignored.
Configuration file warning: Invalid section on line <i>number</i> .	If a section name is invalid, all keyword/value pairs in that section are ignored.
Configuration file warning: Keyword found outside of a section on line <i>number</i> .	A keyword entered at the beginning of the file (i.e., before any section headings) is ignored.
Configuration file warning: Configuration file exceeds maximum size.	If the file is too large, an incomplete upload occurs. Reduce the size of the file, or divide it into two files, and try uploading again.

Messages in config.ini

A device associated with the Management Card from which you download the config.ini file must be discovered successfully in order for its configuration to be included. If the device (such as a UPS or Integrated Environmental Monitor) is not present or, for another reason, is not discovered, the config.ini file contains a message under the appropriate section name, instead of keywords and values. For example:

```
UPS not discovered  
IEM not discovered
```

If you did not intend to export the configuration of the device as part of the .ini file import, ignore these messages.

Errors generated by overridden values

The **Override** keyword and its value will generate error messages in the event log when it blocks the exporting of values.



See [Contents of the .ini file](#) for information about which values are overridden.

Because the overridden values are device-specific and not appropriate to export to other Management Cards, ignore these error messages. To prevent these error message, you can delete the lines that contain the **Override** keyword and the lines that contain the values that they override. Do not delete or change the line containing the section heading.

Related Topics

On Windows operating systems, instead of transferring .ini files, you can use the APC Device IP Configuration Wizard to update the basic TCP/IP settings of Management Cards and configure other settings through their user interface.



See [APC Device IP Configuration Wizard](#).

File Transfers

Upgrading Firmware

Benefits of upgrading firmware

When you upgrade the firmware on the Network Management Card:

- You obtain the latest bug fixes and performance improvements.
- New features become available for immediate use.

Keeping the firmware versions consistent across your network ensures that all Network Management Cards support the same features in the same manner.

Firmware files (Network Management Card)

A firmware version consists of two modules: An APC Operating System (AOS) module and an application module. Each module contains one or more Cyclical Redundancy Checks (CRCs) to protect its data from corruption during transfer.

The APC Operating System (AOS) and application module files used with the Network Management Card share the same basic format:

`apc_hardware-version_type_firmware-version.bin`

- **apc**: Indicates that this is an APC file.
- **hardware-version**: **hw0x** identifies the version of the hardware on which you can use this binary file.
- **type**: Identifies whether the file is for the APC Operating System (AOS) or the application module for the Network Management Card.
- **version**: The version number of the file.
- **bin**: Indicates that this is a binary file.

Obtain the latest firmware version

Automated upgrade tool for Microsoft Windows systems. An upgrade tool automates the transferring of the firmware modules on any supported Windows operating system. Obtain the latest version of the tool at no cost from www.apc.com/tools/download. At this Web page, find the latest firmware release for your APC product (in this case, either the Management Card of your UPS or your APC S Type Power Conditioner with Battery Backup) and download the automated tool, not the individual firmware modules. **Never** use the tool for one APC product to upgrade firmware of another.

Manual upgrades, primarily for Linux systems. If no computer on your network is running a Microsoft Windows operating system, you must upgrade the firmware of your Management Cards by using the separate AOS and application firmware modules.

Obtain the firmware modules from www.apcc.com/tools/download.



Note

The APC S Type Power Conditioner with Battery Backup uses the same application firmware module as Smart-UPS and Matrix-UPS use.

Firmware File Transfer Methods

To upgrade the firmware of a Management Card, use one of these methods:

- From a networked computer running a Microsoft Windows operating system, use the firmware upgrade tool downloaded from the APC Web site.
- From a networked computer on any supported operating system, use FTP or SCP to transfer the individual AOS and application firmware modules.
- For a Network Management Card that is not on your network, use XMODEM through a serial connection to transfer the individual firmware modules from your computer to the Management Card.



Note

When you transfer individual firmware modules, **you must** transfer the APC Operating System (AOS) module to the Management Card before you transfer the application module.

Use FTP or SCP to upgrade one Management Card

FTP. For you to use FTP to upgrade one Management Card over the network:

- The Management Card must be connected to the network, and its system IP, subnet mask, and default gateway must be configured
- The FTP server must be enabled at the Management Card.

To transfer the files:

1. Open a command prompt window of a computer on the network. Go to the directory that contains the firmware files, and list the files:

```
C:\>cd\apc
C:\apc>dir
```

For the listed files, xxx represents the firmware version number:

- **apc_hw03_aos_xxx.bin**
- **apc_hw03_application_xxx.bin**

2. Open an FTP client session:

```
C:\apc>ftp
```

3. Type **open** and the Management Card's IP address, and press ENTER. If the **port** setting for the FTP Server has changed from its default of **21**, you must use the non-default value in the FTP command.

- For Windows FTP clients, separate a non-default port number from the IP address by a space. For example:

```
ftp> open 150.250.6.10 21000
```

- Some FTP clients require a colon instead before the port number.

4. Log on as Administrator; **apc** is the default user name and password.

5. Upgrade the AOS. (In the example, xxx is the firmware version number:

```
ftp> bin
ftp> put apc_hw03_aos_xxx.bin
```

6. When FTP confirms the transfer, type **quit** to close the session.

7. After 20 seconds, repeat **step 2** through **step 5**. In **step 5**, use the application module file name.

SCP. To use Secure CoPy (SCP) to upgrade firmware for a Management Card:

1. Identify and locate the firmware modules described in the preceding instructions for FTP.
2. Use an SCP command line to transfer the AOS firmware module to the Management Card. The following example uses xxx to represent the version number of the AOS module:
`scp apc_hw03_aos_xxx.bin apc@158.205.6.185:apc_hw03_aos_xxx.bin`
3. Use a similar SCP command line, with the name of the application module, to transfer the second firmware module to the Management Card.

How to upgrade multiple Management Cards

Export configuration settings. You can create batch files and use an APC utility to retrieve configuration settings from multiple Management Cards and export them to other Management Cards.



See *Release Notes: ini File Utility, version 1.0*, available on the APC Network Management Card *utility* CD.

Use FTP or SCP to upgrade multiple Management Cards. To upgrade multiple Network Management Cards using an FTP client or using SCP, write a script which automatically performs the procedure.

Use XMODEM to upgrade one Management Card

To upgrade the firmware for a Management Card that is not on the network:

1. Obtain the individual firmware modules (the AOS module and the application module) from www.apc.com/tools/download.
2. Select a serial port at the local computer and disable any service that uses the port.
3. Connect the advanced signaling cable that came with the Management Card to the selected port and to the serial port at the Management Card.
4. Run a terminal program such as HyperTerminal, and configure the selected port for 2400 bps, 8 data bits, no parity, 1 stop bit, and no flow control.

5. Press ENTER to display the **User Name** prompt.
6. Enter the Administrator user name and password (**apc** by default for both).
7. From the **Control Console** menu, select **System**, then **Tools**, then **File Transfer**, then **XMODEM**; and type **Yes** at the prompt to continue.
8. Select a baud rate, change the terminal program's baud rate to match your selection, and press ENTER. A higher baud rate causes faster upgrades.
9. From the terminal program's menu, select the binary AOS file to transfer using XMODEM-CRC. After the XMODEM transfer is complete, set the baud rate to 2400. The Management Card automatically restarts.
10. Repeat [step 4](#) through [step 9](#) to install the application module. In [step 9](#), use the application module file name, not the AOS module file name.



For information about the format used for firmware modules, see [Firmware files \(Network Management Card\)](#).

Verifying Upgrades and Updates

Verify the success or failure of the transfer

To verify whether a firmware upgrade succeeded, use the **Network** menu in the control console and select the **FTP Server** option to view **Last Transfer Result**, or use an SNMP GET to the **mfiletransferStatusLastTransferResult** OID.

Last Transfer Result codes

Code	Description
Successful	The file transfer was successful.
Result not available	There are no recorded file transfers.
Failure unknown	The last file transfer failed for an unknown reason.
Server inaccessible	The TFTP or FTP server could not be found on the network.
Server access denied	The TFTP or FTP server denied access.
File not found	The TFTP or FTP server could not locate the requested file.
File type unknown	The file was downloaded but the contents were not recognized.
File corrupt	The file was downloaded but at least one Cyclical Redundancy Check (CRC) failed.

Verify the version numbers of installed firmware.

Use the Web interface to verify the versions of the upgraded firmware modules by selecting the **Administration** tab, **General** on the top menu bar, and **About** on the left navigation menu, or use an SNMP GET to the MIB II **sysDescr** OID.

Troubleshooting

Management Card Access Problems



For problems that are not described here, see the troubleshooting flowcharts in on the APC Network Management Card *utility* CD. Click the **Troubleshooting** link in the CD interface

If the problem still persists, see [Two-Year Factory Warranty](#).

Problem	Solution
Unable to ping the Management Card	If the Management Card's Status LED is green, try to ping another node on the same network segment as the Management Card. If that fails, it is not a problem with the Management Card. If the Status LED is not green, or if the ping test succeeds, perform the following checks: • Verify that the Management Card is properly seated in the UPS or expansion chassis. • Verify all network connections. • Verify the IP addresses of the Management Card and the NMS. • If the NMS is on a different physical network (or subnetwork) from the Management Card, verify the IP address of the default gateway (or router). • Verify the number of subnet bits for the Management Card's subnet mask.
Cannot allocate the communications port through a terminal program	Before you can use a terminal program to configure the Management Card, you must shut down any application, service, or program using the communications port.
Cannot access the control console through a serial connection	Make sure that you did not change the baud rate. Try 2400, 9600, 19200, or 38400.

Problem	Solution
Cannot access the control console remotely	• Make sure you are using the correct access method, Telnet or Secure SHell (SSH). An Administrator can enable these access methods. By default, Telnet is enabled. Enabling SSH automatically disables Telnet. • For SSH, the Management Card may be creating a host key. The Management Card can take up to 5 minutes to create the host key, and SSH is inaccessible for that time.
Cannot access the Web interface	• Verify that HTTP or HTTPS access is enabled. • Make sure you are specifying the correct URL — one that is consistent with the security system used by the Management Card. SSL requires https, not http, at the beginning of the URL. • Verify that you can ping the Management Card. • Verify that you are using a Web browser supported for the Management Card. See Supported Web browsers. • If the Management Card has just restarted and SSL security is being set up, the Management Card may be generating a server certificate. The Management Card can take up to 5 minutes to create this certificate, and the SSL server is not available during that time.

SNMP Issues

Problem	Solution
Unable to perform a GET	• Verify the read (GET) community name (SNMPv1) or the user profile configuration (SNMPv3). • Use the control console or Web interface to ensure that the NMS has access. See SNMP
Unable to perform a SET	• Verify the read/write (SET) community name(SNMPv1) or the user profile configuration (SNMPv3). • Use the control console or Web interface to ensure that the NMS has write (SET) access (SNMPv1) or is granted access to the target IP address through the access control list (SNMPv3). See SNMP.
Unable to receive traps at the NMS	• Make sure the trap type (SNMPv1 or SNMPv3) is correctly configured for the NMS as a trap receiver. • For SNMP v1, query the mconfigTrapReceiverTable APC MIB OID to verify that the NMS IP address is listed correctly and that the community name defined for the NMS matches the community name in the table. If either is not correct, use SETs to the mconfigTrapReceiverTable OIDs, or use the control console or Web interface to correct the trap receiver definition. • For SNMPv3, check the user profile configuration for the NMS, and run a trap test. See SNMP, Trap Receivers (Administration>Notification>SNMP Traps>trap receivers), and SNMP Trap Test (Administration>Notification>SNMP Traps>test)
Traps received at an NMS are not identified	See your NMS documentation to verify that the traps are properly integrated in the alarm/trap database.

Synchronization Problems

Problem	Solution
A Synchronized Control Group member does not participate in a synchronized action.	Make sure the group member's status is set to Enabled . Also check the group member's battery capacity, if the synchronized action required UPSs to turn on.
An attempt to add a member to a Synchronized Control Group fails.	The values for Multicast IP Address , Synchronized Control Group Number , and firmware version must match those of other members of the group.

Product Information

Two-Year Factory Warranty¹

This warranty applies only to the products you purchase for your use in accordance with this manual.

Terms of warranty

APC warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. APC will repair or replace defective products covered by this warranty. This warranty does not apply to equipment that has been damaged by accident, negligence or misapplication or has been altered or modified in any way. Repair or replacement of a defective product or part thereof does not extend the original warranty period. Any parts furnished under this warranty may be new or factory-remanufactured.

Non-transferable warranty

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Warranty claims

Customers with warranty claims issues may access the APC customer support network through the Support page of the APC Web site, www.apc.com/support. Select your country from the country selection pull-down menu at the top of the Web page. Select the Support tab to obtain contact information for customer support in your region.

¹ To determine which factory warranty applies to the APC product you purchased, consult the factory warranties located on the APC Web site, www.apc.com.

Life-Support Policy

General policy

American Power Conversion (APC) does not recommend the use of any of its products in the following situations:

- In life-support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life-support device or to affect significantly its safety or effectiveness.
- In direct patient care.

APC will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to APC that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) the liability of American Power Conversion is adequately protected under the circumstances.

Examples of life-support devices

The term *life-support device* includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults and infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

Hospital-grade wiring devices and leakage current protection may be ordered as options on many APC UPS systems. APC does not claim that units with these modifications are certified or listed as hospital-grade by APC or any other organization. Therefore these units do not meet the requirements for use in direct patient care.

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