Installation Manual

UPS Network Management Card 3

AP9640, AP9641, AP9643

990-9996N-001

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Schneider Electric

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在 APC 公司的网站上（www.apc.com）有本手册的中文版。

Contents

Important Safety Information

Read the instructions carefully to become familiar with the equipment before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE addresses practices not related to physical injury including certain environmental hazards, potential damage or loss of data.

Safety Information for the Network Management Card 3

The Network Management Card (NMC) contains a removable battery. If this battery is ingested, seek immediate medical attention.

⚠ WARNING
HAZARD OF INTERNAL BURNS •   Do not ingest the battery. •   Keep batteries out of reach of children. **Failure to follow these instructions can result in serious injury or death.**

Note: Secure the NMC to the UPS device's SmartSlot using screws to keep the battery out of reach.

Preliminary Information

Features

The Schneider Electric UPS Network Management Cards (AP9640, AP9641, and AP9643) discussed in this document are Web-based, IPv6 Ready products. Devices with the NMC installed can be managed using multiple open standards such as:

Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)	Secure SHell (SSH)
Secure Copy (SCP)	Secure Boot with Root of Trust for enhanced security
RADIUS	Extensible Authentication Protocol (EAP) over LAN (EAPoL)
Building Automation and Control Networks Protocol (BACnet)	Simple Network Management Protocol versions 1, 2c and 3
Syslog	Telnet
Modbus	Hypertext Transfer Protocol (HTTP)
File Transfer Protocol (FTP)	

The **AP9640** Network Management Card:

- *Provides UPS control and self-test scheduling features.*

- *Provides data and event logs.*

- *Enables you to set up notifications through event logging, e-mail, Syslog and SNMP traps.*

- *Provides support for PowerChute® Network Shutdown.*

- *Supports using a Dynamic Host Configuration Protocol (DHCP) or BOOTstrap Protocol (BOOTP) server to provide the network (TCP/IP) values of the NMC.*

- *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.*

- *Provides a selection of security protocols for authentication and encryption.*

- *Communicates with EcoStruxure™ IT Data Center Expert or IT Expert.*

- *Supports Modbus TCP/IP.*

The **AP9641** Network Management Card includes all AP9640 Network Management Card features and the following:

- *Provides two USB ports, which support upgrading the UPS firmware from a USB flash drive, and wi-fi support with the optional APC USB Wi-Fi Device (AP9834). For information on how to configure wi-fi, refer to the APC USB*

*Wi-Fi Device Quick Start Guide (*https://www.apc.com/us/en/download/
document/SPD_CCON-NMC3WIFI_EN*).*

- *Supports two universal input/output ports, to which you can connect:*
    - Temperature (AP9335T) or temperature/humidity sensors (AP9335TH)
    - Relay input/output connectors that support two input contacts and one output relay (using the AP9810 Dry Contact I/O Accessory, which is an optional add-on)
- *Supports Modbus RTU 2-wire RS-485 via Universal I/O port 2, in addition to Modbus TCP/IP. For information on how to configure Modbus RTU, refer to the Modbus Documentation Addendum (*https://www.apc.com/us/en/download/document/SPD_LFLG-A2WGT4_EN*).*

The **AP9643** Network Management Card includes all AP9640 Network Management Card features and the following:

- *Provides two USB ports, which support upgrading the UPS firmware from a USB flash drive, and wi-fi support with the optional APC USB Wi-Fi Device (AP9834). For information on how to configure wi-fi, refer to the APC USB Wi-Fi Device Quick Start Guide (*https://www.apc.com/us/en/download/document/SPD_CCON-NMC3WIFI_EN*).*
- *Supports one universal input/output port, to which you can connect:*
    - Temperature (AP9335T) or temperature/humidity sensor (AP9335TH)
    - Relay input/output connector that support two input contacts and one output relay (using the AP9810 Dry Contact I/O Accessory, which is an optional add-on)
- *Supports Modbus RTU via the 4-wire opto-isolated serial RS-485 port, in addition to Modbus TCP/IP. For information on how to configure Modbus RTU, refer to the Modbus Documentation Addendum (*https://www.apc.com/us/en/download/document/SPD_LFLG-A2WGT4_EN*).*

Supported Devices

The Network Management Card 3 is compatible with:

- Smart-UPS® devices with a SmartSlot with the SUM, SURT, SURTA, SURTD, SMT, SMX, and SRT prefixes, and SUA devices manufactured after 2008 *.
- 1-Phase Symmetra UPS devices.
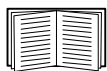
* To view the full list of compatible UPS in which an NMC 3 can be installed, see Knowledge Base article FA237786 on the APC website (www.apc.com/support).

Related documents

The following documentation is available on the APC website (https://www.apc.com/upsnmc):

- *UPS Network Management Card 3 User Guide*
- *UPS Network Management Card 3 Command Line Interface Guide*
- *UPS Network Management Card 3 Modbus Documentation Addendum (AP9641, AP9643 only)*
- *UPS Network Management Card 3 Modbus Register Maps*
- *UPS Network Management Card 3 BACnet Application Maps*
- *Security Handbook*
- *PowerNet® Management Information Base (MIB) Reference Guide*
- *Declaration of Conformity*

Inventory

The Network Management Card package includes the following items:

- *This Installation Manual*
- *UPS Network Management Card 3*
- *Micro-USB configuration cable (part number 960-0603)*
- *Temperature sensor (AP9335T)—AP9641 and AP9643 Network Management Cards only*
- *Network Management Card quality assurance test slip*
- *Warranty registration form*
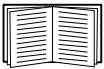
The quality assurance test slip contains the MAC address that you may need when performing the procedures in "UPS User Interface Display" on page 12. You can also find the MAC address on the bottom of your NMC.

Disclaimer

Schneider Electric is not responsible for damage sustained during reshipment of this product.

The Network Management Card 3 (NMC 3) is sensitive to static electricity. When handling the NMC, touch only the end plate while using one or more of these electrostatic-discharge devices (ESDs): wrist straps, heel straps, toe straps, or conductive shoes.
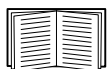
Please recycle

The shipping materials are recyclable. Save them for later use, or dispose of them appropriately.

Management products, including the NMC, contain removable, lithium coin-cell batteries. When discarding these batteries, you must follow local rules for recycling.
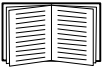
Changing Web UI Language

You can change the language the NMC Web interface is displayed in via the log in screen. See "Changing UI Language" in the *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN) for more information.

Installation in a UPS

How to install the card for different UPS models

To view the full list of compatible UPS in which an NMC can be installed, see Knowledge Base article FA237786 on the APC website (www.apc.com/support).
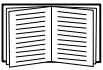
In a Symmetra UPS that uses more than one management product, you *must* install the management products in the correct order for them to operate properly.
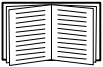
See "How to Install Multiple Management Cards" on page 25.

Step 1: Install the Network Management Card

You do not need to turn off power to install the NMC in a supported Smart-UPS or Symmetra UPS. If you want to turn off your UPS before installing the Network Management Card, see the Knowledge Base article FA156132 on the APC website (www.apc.com/support).

The NMC is sensitive to static electricity. When handling the NMC, touch only the end plate while using one or more of these electrostatic-discharge devices (ESDs): wrist straps, heel straps, toe straps, or conductive shoes.

The Network Management Card (NMC) contains a removable battery. If this battery is ingested, seek immediate medical attention.

WARNING
HAZARD OF INTERNAL BURNS
• Do not ingest the battery. • Keep batteries out of reach of children.
Failure to follow these instructions can result in serious injury or death.

Note: Secure the NMC to the UPS device's SmartSlot using screws to keep the battery out of reach.

For the location of the UPS card slot, see the UPS documentation.

1. Locate the UPS card slot. Remove the slot cover or Network Management Card from the UPS card slot.
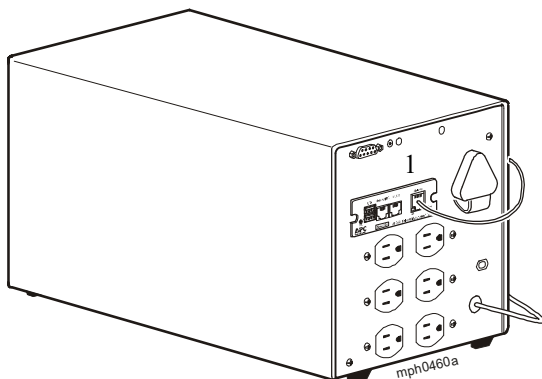
2. Use the same screws that hold the slot cover in place to secure the NMC in the UPS card slot.

3. Connect a network interface cable to the 10/100/1000Base-T network connector 1 on the NMC.

mph0460a

NOTE: This image depicts a Smart-UPS and is used as an example only.

When the network interface cable is connected, the NMC will attempt to obtain an IP address via DHCP. See "TCP/IP Configuration Methods" on page 12.

Step 2: Configure the Network Management Card

See "Quick Configuration" on page 11.

Expansion/Triple Chassis Installation

When to use an Expansion Chassis

Use an Expansion Chassis or a Triple Expansion Chassis if the UPS has no card slot available.

The Single (AP9600) or Triple Expansion Chassis (AP9604) are only compatible with UPS models that have a DB9 serial port. They are compatible with following UPS models only: SURT, SURTA, Symmetra® LX, SU, SUA, and SUM.

When you install the UPS Network Management Card 3 (NMC 3) in the chassis, the NMC communicates with the UPS through the cable connection between the chassis and the UPS.

Step 1: Disconnect the chassis from all power

Make sure that the Expansion Chassis or Triple Expansion Chassis is disconnected from any power source:

1. Disconnect the chassis cable from the UPS.
2. If the chassis uses an AC adapter (AP9505), disconnect that adapter from the chassis.

Step 2: Install the Network Management Card

If the UPS uses multiple management products, you must install them in the correct order for them to operate properly.
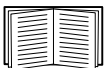
See "How to Install Multiple Management Cards" on page 25.

The UPS Network Management Card (NMC) is sensitive to static electricity. When handling the NMC, touch only the end plate while using one or more of these electrostatic-discharge devices (ESDs): wrist straps, heel straps, toe straps, or conductive shoes.

The Network Management Card (NMC) contains a removable battery. If this battery is ingested, seek immediate medical attention.

⚠ WARNING

HAZARD OF INTERNAL BURNS

• Do not ingest the battery.
• Keep batteries out of reach of children.

Failure to follow these instructions can result in serious injury or death.

Note: Secure the NMC to the UPS device's SmartSlot using screws to keep the battery out of reach.

If a cable is connected to the serial port at the UPS or chassis, stop the APC service that uses that serial connection, and disconnect the cable.

1. If you are installing a chassis, connect the chassis to the UPS serial port.

2. Use the same screws that hold the expansion slot cover in place to secure the NMC in the chassis slot.
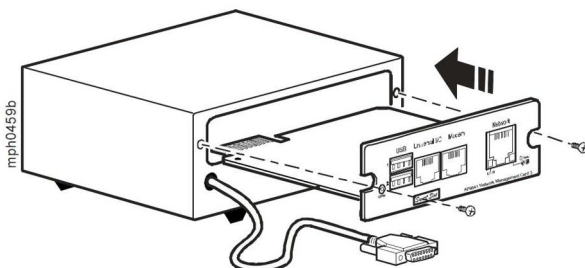
3. Connect a network interface cable to the 10/100/1000Base-T network connector on the front panel of the NMC.

4. If you are using the AC Adapter (AP9505), connect the adapter to the chassis. Then connect the adapter to an independent AC input so that the NMC can continue to operate if the UPS is turned off or not operating.

5. If you disconnected a cable in step 1, reconnect that cable to the serial port at the chassis, and restart the associated APC service.

6. See "Quick Configuration" on page 11.

Quick Configuration

Overview

Disregard the procedures described in this chapter if you have EcoStruxure IT Data Center Expert as part of your system. See the documentation for your EcoStruxure device for more information.

This chapter details how to configure the Network Management Card's (NMC) TCP/IP settings and configure its network protocols.

Configure TCP/IP Settings

You must configure the following TCP/IP settings before the NMC can operate on a network:

- IP address of the NMC
- Subnet mask
- Default gateway

If your network has a DHCP server, which most networks do, this is the easiest way to start configuring your NMC.Starting with DHCP has 2 advantages:

1. The user-friendly Web UI allows you to configure settings and enable protocols.
2. DHCP will correctly set the subnet mask and default gateway. Misconfiguration of these settings can be difficult to diagnose.

If a default gateway is unavailable, use the IP address of a computer that is located on the same subnet as the NMC and that is usually running. The NMC uses the default gateway to test the network when traffic is very light.

Do not use the loopback address (127.0.0.1) as the default gateway address for the NMC. It disables the card and requires you to reset TCP/IP settings to their defaults using a local serial login.

See "Watchdog Features" in the NMC *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN) for more information about the watchdog role of the default gateway.

TCP/IP Configuration Methods

When you first connect the Ethernet cable, the Link-RX/TX LED ( ) will illuminate either green or yellow. Network activity will cause the LED to flicker.

The Status LED ( ) will alternate between green and orange until the NMC has acquired an IP address via DHCP, and it will then stay solid green.

If the Status LED is solid green after 1-2 minutes, your network has a DHCP server, and the NMC has received an IP address from the DHCP server. You can retrieve the NMC's acquired IP address using the below methods:

- "Retrieve IP Address via UPS User Interface Display" on page 12
- "Retrieve IP Address via Local Command Line Interface" on page 13
- "Device IP Configuration Wizard" on page 14

If the Status LED is still alternating between green and amber after ~3 minutes, your network does not have a DHCP server or the NMC was not able to contact the server. You can configure the TCP/IP network settings using the below method:

- "Configure IP Address via UPS User Interface Display" on page 15
- "Configure IP Address via Local Command Line Interface" on page 17

When you know the NMC's IP address and have access to the NMC, you can re-configure the IP address using the below methods:

- "DHCP and BOOTP Configuration" on page 18
- ".INI File Utility" on page 20
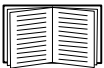
Retrieve IP Address via UPS User Interface Display

Displaying the NMC IP address through the UPS user interface display is not available for all UPS models.

Not all networks provide DHCP services, but most do.

For networks that provide DHCP services, Smart-UPS devices with the SMT/SMX/SRT prefix and many 3-Phase UPS devices, the NMC IP address can be viewed from the UPS user interface display. For UPS devices with a user interface display:

1. Press **Enter (↵)** on the front panel.

2. Navigate down to **Configuration**, and press **Enter**.

3. Navigate down to **Menu Type**. If this is set to "Standard", change it to "Advanced" and press **Enter**.

4. Navigate up to **NMC IP Address** and press **Enter**.

5. Navigate down to **IP Address**. Note the NMC's IP address and pres **ESC** repeatedly to exit.

See "How to Access a Configured Network Management Card" on page 21 to finish the configuration.

Retrieve IP Address via Local Command Line Interface

Use a computer that connects to the Network Management Card through the USB virtual serial port too access the local command line interface. For a Mac device, use Terminal. For a Windows PC:

1. In Windows Search, type "Device Manager", or open it from the Control Panel. Open "Ports (COM & LPT)".

2. Connect the provided micro-USB cable (part number 960-0603) from the console port on the NMC to a USB port on the computer.

3. Note the COM port number that was added when you connected the micro-USB cable. For example, "USB Serial Device (COM7)".

4. Run a terminal emulator program (e.g. HyperTerminal, PuTTy, or Tera Term) and connect to the COM port number noted in step 3. It is not necessary to configure the port.

5. Press ENTER, repeatedly if necessary, to display the **User Name** prompt.

6. Use **apc** for the **user name** and **password**.

   NOTE: The user name will be "apc" at first log for the Super User account. You will be prompted to enter a new password after you log in.

NOTE: A driver is required to connect to the NMC console via Windows 7. The driver can be downloaded from the NMC product pages on the APC website (www.apc.com/upsnmc), located in the **Software / Firmware** section. No driver is required for Windows 10.

1. When you connect the NMC via the micro-USB cable, a device called "NMC3-CDC" is discovered in "Other Devices".

2. Right-click on this device and select "Update Driver Software..."

3. Select the "Browse my computer for driver software" option and navigate to the download location of the driver (usb_cdc_ser.inf).

4. Accept the unsigned driver security message.

Windows will now recognize the NMC and assign a COM port to the device.

If the micro-USB cable is left connected to the NMC, the NMC will wait 15 seconds at each boot up to access the Boot Monitor. To avoid this 15 second boot delay, disconnect the micro-USB cable if local access to the CLI is not required.

After you log in to the CLI, you can retrieve the NMC's IP address or manually configure the NMC's network settings. To retrieve the DHCP assigned IP address:

1. Type `tcpip` and press ENTER.
2. The active IP address, subnet mask, and default gateway will be displayed.
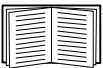
See "How to Access a Configured Network Management Card" on page 17 to finish the configuration.

## Device IP Configuration Wizard

The Device IP Configuration Wizard is useful in one of two situations:

1. **Unconfigured NMCs:** By default, an unconfigured NMC will send DHCP requests. The Device IP Configuration Wizard functions as a constrained DHCP server that only responds to APC/Schneider Electric MAC addresses and it can be used to assign an IP address, subnet mask, and gateway information to an unconfigured NMC.

2. **Configured NMCs with SNMPv1 enabled and configured with the Community Name set to "public":** By entering an IP range to define the search, the Wizard scans the IP addresses in the defined range and discovers and reports NMCs. The Wizard can then list the MAC address, IP address, device description, and firmware version of an NMC and allow the table to be printed.

   The NMC IP address will be displayed with an HTTP prefix. If the NMC is configured to use HTTPS, the prefix must be updated from `http` to `http`**s.** For more information on SNMPv1, see the *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN) .

NOTE: The Device IP Configuration Wizard is not useful for NMCs with an IP address that do not have SNMPv1 enabled and configured.
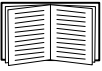
For detailed information on the Wizard, see Knowledge Base article FA156064 on the APC website (www.apc.com/support).

To use the DHCP Option 12, see Knowledge Base article FA156110 on the APC website (www.apc.com/support).

System requirements

The Wizard runs on Microsoft Server® 2012, Windows Server 2016, Windows Server 2019 and on both 32- and 64-bit versions of Windows 8.1 and Windows 10 operating systems.

This Wizard is for IPv4 only.

Installation

To install the Wizard from a downloaded executable file:

1. Go to www.apc.com/tools/download.

2. Filter by **Software / Firmware > Wizards and Configurators**.

3. Select and download the Network Management Device IP Configuration Wizard.

4. Open the folder where you downloaded the Wizard, and run the executable file.

When installed, the Wizard is available through the Windows "Start Menu" option.
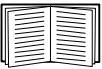
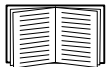See "How to Access a Configured Network Management Card" on page 21 to finish the configuration.

Configure IP Address via UPS User Interface Display

Configuring the NMC IP address through the UPS user interface display is not available for all UPS models.

For Smart-UPS devices with the SMT/SMX/SRT prefix and many 3-Phase UPS devices, the NMC IP address can be configured from the UPS user interface display.

1. If you plan to manually assign the network settings, contact your system administrator to obtain a valid IP address, subnet mask, and default gateway for the NMC.

2. Press **Enter** (↵) on the front panel.

3. Navigate down to **Configuration**, and press **Enter**.

4. Navigate down to **Menu Type**. If this is set to "Standard", change it to "Advanced" and press **Enter**.

5. Navigate up to **NMC IP Address** and press **Enter**.

6. Navigate down to **IP Address**. If the IP address is acceptable, press the down arrow to move to the next step. If the IP address is not acceptable, press **Enter** and change the four octets with the up and down arrows, and press **Enter** for each.

7. Navigate down to **Subnet Mask**. If the subnet mask is acceptable, press the down arrow to move to the next step. If the subnet mask is not acceptable, press **Enter** and change the four octets with the up and down arrows, and press **Enter** for each.

8. Navigate down to **Default Gateway**. If the default gateway is acceptable, press the down arrow to move to the next step. If the default gateway is not acceptable, press **Enter** and change the four octets with the up and down arrows, and press **Enter** for each.

9. If you configured any settings, the UPS will display "NMC is rebooting..." followed by "UPS IP address." Navigate down to **NMC IP Address** and review the settings. Press **ESC** to exit to the Status screen.

See "How to Access a Configured Network Management Card" on page 21 to finish the configuration.

Configure IP Address via Local Command Line Interface

Use a computer that connects to the Network Management Card through the USB virtual serial port too access the local command line interface:

1. In Windows Search, type "Device Manager", or open it from the Control Panel. Open "Ports (COM & LPT)".

2. Connect the provided micro-USB cable (part number 960-0603) from the console port on the NMC to a USB port on the computer.

3. Note the COM port number that was added when you connected the micro-USB cable. For example, "USB Serial Device (COM7)".

4. Run a terminal emulator program (e.g. HyperTerminal, PuTTy, or Tera Term) and connect to the COM port number noted in step 3. It is not necessary to configure the port.

5. Press ENTER, repeatedly if necessary, to display the **User Name** prompt.

6. Use **apc** for the **user name** and **password**.

   NOTE: The user name will be "apc" at first log for the Super User account. You will be prompted to enter a new password after you log in.

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2.Right-click on this device and select "Update Driver Software..."

3.Select the "Browse my computer for driver software" option and navigate to the download location of the driver (usb_cdc_ser.inf).

4.Accept the unsigned driver security message.

Windows will now recognize the NMC and assign a COM port to the device.

If the micro-USB cable is left connected to the NMC, the NMC will wait 15 seconds at each boot up to access the Boot Monitor. To avoid this 15 second boot delay, disconnect the micro-USB cable if local access to the CLI is not required.

To set a static IP address:

1. Contact your network administrator to obtain the IP address, subnet mask, and default gateway for the Network Management Card.

2. Use this command to configure network settings. (Text in italics indicates a variable.)

   `tcpip`

   `-i` *yourIPaddress*

   `-s` *yourSubnetMask*

   `-g` *yourDefaultGateway*

   For each variable, type a numeric value that has the format *xxx.xxx.xxx.xxx*.

   The command can be entered on one line. For example, to set a system IP address of 156.205.14.141, a Subnet Mask of 255.255.255.0 and a default gateway of 156.205.14.1, type the following command and press ENTER:
   `tcpip -i 156.205.14.141 -s 255.255.255.0 -g 156.205.14.1`

3. Type `reboot`. The Network Management Card restarts to apply the changes.
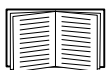
> See "How to Access a Configured Network Management Card" on page 21 to finish the configuration.

DHCP and BOOTP Configuration

The default TCP/IP configuration setting, **DHCP**, assumes that a properly configured DHCP server is available to provide TCP/IP settings to Network Management Cards. You can also configure the setting for BOOTP.
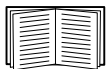
> A user configuration (.ini) file can function as a BOOTP or DHCP boot file. For more information, see the TCP/IP configuration section of the Network Management Card *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN).
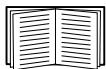
> If neither of these servers is available, see "TCP/IP Configuration Methods" on page 12 to configure the needed TCP/IP settings.

BOOTP

For the Network Management Card to use a BOOTP server to configure its TCP/IP settings, it must find a properly configured RFC951-compliant BOOTP server.

In the BOOTPTAB file of the BOOTP server, enter the Network Management Card's MAC address, IP address, subnet mask, and default gateway, and, optionally, a bootup file name. Look for the MAC address on the bottom of the Network Management Card or on the Quality Assurance slip included in the package.

When the Network Management Card reboots, the BOOTP server provides it with the TCP/IP settings.

- • If you specified a bootup file name, the Network Management Card attempts to transfer that file from the BOOTP server using TFTP or FTP. The Network Management Card assumes all settings specified in the bootup file.

- • If you did not specify a bootup file name, you can configure the other settings of the Network Management Card remotely through its Web interface or command line interface; the **user name** and **password** are both **apc**, by default.

To create a bootup file, see your BOOTP server documentation.

DHCP

You can use an RFC2131/RFC2132-compliant DHCP server to configure the TCP/IP settings for the Network Management Card (NMC).

1. The NMC sends out a DHCP request that uses the following to identify itself:
   - – A Vendor Class Identifier (APC by default)
   - – A Client Identifier (by default, the MAC address of the NMC)
   - – A User Class Identifier (by default, the identification of the application firmware installed on the NMC)

2. A properly configured DHCP server responds with a DHCP offer that includes all the settings that the NMC needs for network communication. The DHCP offer also includes the Vendor Specific Information option (DHCP option 43). The NMC can be configured to ignore DHCP offers that do not encapsulate the APC cookie in DHCP option 43 using the following hexadecimal format. (The card does not require this cookie by default).

```
Option 43 = 01 04 31 41 50 43
```

where

- – the first byte (`01`) is the code
- – the second byte (`04`) is the length
- – the remaining bytes (`31 41 50 43`) are the APC cookie.
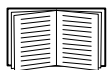
See your DHCP server documentation to add code to the Vendor Specific Information option.

The NMC Web interface has options to utilize vendor-specific data to require the DHCP server to provide an "APC" cookie which will supply information to the NMC. See the *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN) for information.

See "How to Access a Configured Network Management Card" on page 21 to finish the configuration.

.INI File Utility

You can use the .INI file export utility to export .INI file settings from configured NMCs to one or more unconfigured NMCs. The utility and documentation are available on the APC website, and are also available in Knowledge Base article FA156117 on the APC website (www.apc.com/support).

How to Access a Configured Network Management Card

Overview

After the UPS Network Management Card (NMC) is running on your network, you can use the interfaces summarized here: Web interface, Telnet, SSH, SNMP, FTP, and SCP. The Web interface is recommended for ease of configuration.

For more information about the interfaces, see the *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN).

Web interface

The Network Management Card 3 Web interface is compatible with:

- Windows® operating systems:
    - The latest release of Microsoft® Edge®
- All operating systems:
    - The latest releases of Mozilla® Firefox® or Google® Chrome®

Other commonly available browsers may work but have not been fully tested by APC by Schneider Electric.

You can use either of the following protocols when you use the Web interface:

- By default, only HTTPS is enabled. The HTTPS protocol (enabled by default), which provides extra security through Secure Socket Layer (SSL); encrypts user names, passwords, and data being transmitted; and authenticates Network Management Cards by means of digital certificates.

- The HTTP protocol, which provides authentication by user name and password but no encryption.

    NOTE: HTTP is disabled by default. The first log in to the Web UI must be using the HTTPS protocol.

To access the Web interface and configure the security of your device on the network:

1. Address the Network Management Card by its IP address (or its DNS name, if a DNS name is configured). For example:

   `https://156.205.14.141`

2. Enter the user name and password (**apc**/**apc** by default).

3. If the NMC received an IP address via DHCP and you want to assign a static IP address to the NMC, navigate to **Configuration > Network > TCP/IP > IP v4 Settings**.

4. To enable or disable HTTPS, or enable HTTP, use the NMC Web interface.

See the *Security Handbook* (www.apc.com/us/en/download/document/SPD_CCON-BDYD7K_EN) for more information on selecting and configuring network security.

Command Line Interface access - SSH and Telnet Access

You can access the command line interface through Secure SHell (SSH) or Telnet, depending on which is enabled. To enable these access methods, use the NMC Web interface. By default, only SSH is enabled.

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 command line interface. SSH encrypts user names, passwords, and transmitted data.

The interface, user accounts, and user access rights are the same whether you access the command line interface through SSH or Telnet, but to use SSH, you must first configure SSH and have an SSH client program installed on your computer.
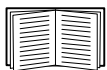
See the *User Guide* (www.apc.com/us/en/download/document/ SPD_CCON-AYCEFJ_EN) for more information on configuring and using SSH.

To access the command line interface using SSH, at a command prompt enter:

```
ssh -c aes256-ctr <username>@<IP address>
```

NOTE: This SSH command is for OpenSSH. The command may differ depending on the SSH tool used.

Telnet for basic access. By default, Telnet is disabled. 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 command line interface of the Network Management Card from any computer on the same subnet:

1. At a command prompt, use the following command line, and press ENTER:

   `telnet` *address*

   As *address*, use the Network Management Card's IP address (or DNS name, if configured).

2. Enter the user name and password.

Simple Network Management Protocol (SNMP)

SNMPv1, SNMPv2c, and SNMPv3 are all disabled by default. You must configure community names in the Web UI before you can enable any version of SNMP.

To enable or disable SNMP access, you must be an Administrator. Use the NMC Web interface or Command Line interface to set it up.

SNMPv1 only. After you add the PowerNet® MIB to a standard SNMP MIB browser, you can use that browser to access the Network Management Card. All user names, passwords, and community names for SNMP are transferred over the network as plain text.

Use of SNMPv2c is supported by the SNMPv1 options.

SNMPv3 only. 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.

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

The Network Management Card supports SHA or MD5 authentication and AES or DES encryption.

SNMPv1 and SNMPv3. To use EcoStruxure IT Data Center Expert or IT Expert to manage the Network Management Card on the public network of an EcoStruxure IT system, you must have SNMPv1 enabled in the unit interface. Read access allows EcoStruxure IT Data Center Expert and IT Expert to receive traps from the Network Management Card. Write access is required while you set EcoStruxure IT Data Center Expert and IT Expert as a trap receiver.

SCP and FTP

You can use SCP or FTP to access a copy of the Network Management Card's event or data logs.

NOTE: By default, only SCP is enabled. You can use SCP once you have used SSH or HTTPS to create a user password.

To use EcoStruxure IT Data Center Expert to manage the UPS, you must have the **FTP Server** option enabled in the Network Management Card interface.

To enable or disable FTP server access, you must be an Administrator. Use the NMC Web interface or Command Line interface to set it up.
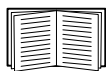
The SCP interface is enabled when SSH is enabled, as they are part of the same protocol suite. See the *User Guide* for more information on configuring and using SSH.

To retrieve a copy of the event or data log, see the *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN).

Manage the security of your system
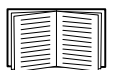
For detailed information on enhancing the security of your system after installation and initial configuration, see the *Security Handbook* (www.apc.com/us/en/download/document/SPD_CCON-BDYD7K_EN).

How to Reset after a Lost Password

NOTE: Resetting your NMC will reset the card to its default configuration.

If you forget your password, you must use the **Reset** button on the NMC to wipe all configuration, including the password. Hold down the **Reset** button for 20-25 seconds, ensuring the Status LED is pulsing green during this time. When the Status LED changes to amber or orange, release the **Reset** button to allow the NMC to complete its reboot process.

After the NMC reboots, you must re-configure your NMC. See "Quick Configuration" on page 11.

It is recommended you export the .ini file after configuring your NMC to prevent loss of data in the event of a lost password. See "Retrieving and Exporting the .ini File" in the NMC *User Guide* (www.apc.com/us/en/download/document/SPD_CCON-AYCEFJ_EN) for more information.

How to Install Multiple Management Cards

Overview

When installing more than one Network Management Card 3, you must install the cards in the order described in this document. This is because they share a serial link with the UPS. Installing the cards in any other order might result in operational failure.

NOTE: This topic only applies to UPS devices on the UPS-Link protocol. See Knowledge Base article FA230533 on the APC website (www.apc.com/support) for a breakdown of devices on the UPS-Link protocol.

Before you start

The following table identifies the priority of the cards you will be installing. Management cards that have more control over the UPS have higher priority.

- Level 6: Exerts total control
- Level 5: Exerts wide, but not total, control
- Level 4: Exerts limited control
- Level 3: Passes commands to the UPS
- Level 2: Exerts no control
- Level 1: Exerts no control and must be installed closest to the UPS

Management Card	Priority
Network Management Card 3 (AP9640, AP9641, AP9643)[1] Network Management Card 2 (AP9630, AP9631, AP9635)[2] Network Management Card 1 (AP9617, AP9618, AP9619)[2]	Level 6
Out of Band Management Card (AP9608)[3]	Level 5
Relay I/O Module (AP9613, AP9610)	Level 4
Interface Expander Card (AP9607[4], AP9624)	Level 3
Building Management Integration Card (AP9622)[5]	Level 2
Environmental Monitoring Card	Level 1

1. Attach no more than two Network Management Cards to a UPS.

2. Network Management Cards AP9617, AP9618, AP9619 are discontinued and replaced by AP9630, AP9631, and AP9635. AP9630, AP9631 and AP9635 are replaced by the next-generation AP9640, AP9641 and AP9643 cards.

3. The AP9608 is discontinued and replaced by AP9635.

4. The AP9607 is discontinued and replaced by AP9624.

5. Attach only one Building Management Integration Card to a UPS.The AP9622 card is discontinued and replaced by AP9635.

Two models of expansion chassis

If you need management card slots in addition to those in your UPS, use one or more expansion chassis available.

| Chassis	Compatible UPS Devices
Expansion Chassis (AP9600), one slot	UPS devices that have a DB9 port and that are not installed in a rack or enclosure.
Triple Expansion Chassis (AP9604BLK), three slots	UPS devices that have a DB9 port.

The Single (AP9600) or Triple Expansion Chassis (AP9604BLK) are only compatible with UPS models that have a DB9 serial port. They are only compatible with following UPS models: SURT, SURTA, Symmetra® Power Array/RM/LX/PX (excluding PX 250/500), SU, SUA, and SUM.

Installing cards in an expansion chassis

Install the lowest-priority cards in any available card slots in the UPS, and then use an expansion chassis for remaining higher-priority cards. In a Triple Expansion Chassis:

- Install each card, starting with the lowest priority (see "Before you start" on page 25) in the lowest-numbered slot.
- If you are installing an NMC, install it in slot 3, even if you are leaving another slot empty.
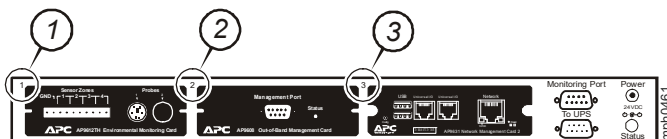
## Installing cards in an expansion chassis set up serially

If you have increased your management card capacity by connecting multiple expansion chassis serially (in a cascading setup), install the NMC in the highest-numbered slot

Warning: Do not attach more than two NMCs or one Building Management Integration Card to a UPS.

If the NMC is pre-installed in the UPS, refer instead to "When an NMC has been pre-installed." on page 28.

Installing cards in a Symmetra UPS
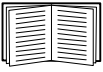
For more information on Symmetra UPS models that are compatible with your NMC, see Knowledge Base article FA237786 on the APC website (www.apc.com/support).

If you are installing an NMC without an attached expansion chassis, install that card in the highest numbered slot, even if you are leaving other slots empty. If you are using an expansion chassis, see "Installing cards in an expansion chassis" on page 26.

For Symmetra models with 4, 3, or 2 slots, install each card, starting with the lowest priority (as listed in the table on page 25) in the lowest numbered slot. Use the following illustrations to determine model-specific slot numbering.

NOTE: The AP9612TH and AP9608 cards shown in the following illustrations are discontinued.

- When 4 slots are available, arranged in a horizontal row, the lowest-numbered slot is at the right.
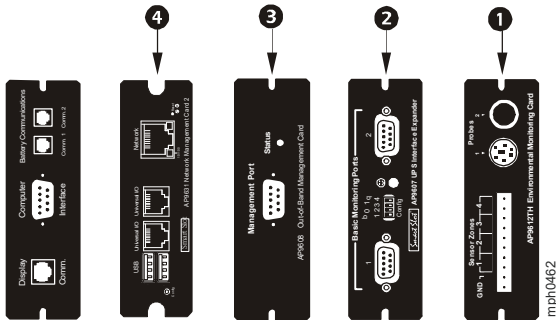
- When slots are arranged in a vertical column:
    - If 3 slots are available, the lowest-numbered slot is at the top (as shown in the following illustration).
    - If 2 slots are available, the lowest-numbered slot is at the bottom (as shown in the following illustration).
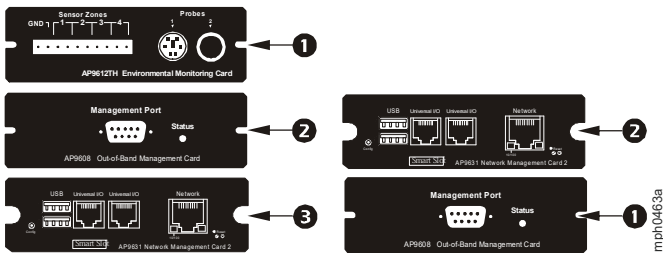
When an NMC has been pre-installed. For Symmetra UPS models that are shipped with a Network Management Card already installed (such as Symmetra LX models), the UPS itself may have only one remaining card slot available. Referring to the table on page 25, install the lowest priority card in the UPS and use one or more expansion chassis for any other cards, as described beginning on page 26.

Specifications AP9640, AP9641

Physical

Size (H x W x D)	38.1 x 120.7 x 108.0 mm (1.50 x 4.75 x 4.25 in)
Weight	0.14 kg (0.30 lb)
Shipping weight	0.91 kg (2.00 lb)

Environmental

Elevation (above MSL) Operating Storage	 0 to 3000 m (0 to 10,000 ft) 0 to 15 000 m (0 to 50,000 ft)
Temperature Operating Storage	 -5 to 45°C (23 to 113°F) -15 to 65°C (5 to 149°F)
Operating humidity	0 to 95%, non-condensing

Regulatory compliance

Emissions	FCC Class A, EN 61000-6-3, BS EN 61000-6-3, ICES-003 Class A, VCCI Class A, AS/NZS, EN 55032 Class A, BS EN 55032 Class A
Immunity	EN 55024, BS EN 55024, EN 61000-4-2, BS EN 61000-4-2, EN 61000-4-3, BS EN 61000-4-3, EN 61000-4-4, BS EN 61000-4-4, EN 61000-4-5, BS EN 61000-4-5, EN 61000-4-6, BS EN 61000-4-6, EN 61000-4-8, BS EN 61000-4-8, EN 61000-4-11, BS EN 61000-4-11, EN 55035, BS EN 55035, EN 62040-2, BS EN 62040-2, EN 61326-2, BS EN 61326-2

Specifications AP9643

Physical

Size (H x W x D)	38.1 x 120.7 x 108.0 mm (1.50 x 4.75 x 4.25 in)
Weight	0.14 kg (0.30 lb)
Shipping weight	0.91 kg (2.00 lb)

Environmental

Elevation (above MSL) Operating Storage	 0 to 3000 m (0 to 10,000 ft) 0 to 15 000 m (0 to 50,000 ft)
Temperature Operating Storage	 -5 to 45°C (23 to 113°F) -15 to 65°C (5 to 149°F)
Operating humidity	0 to 95%, non-condensing

Regulatory compliance

Emissions	FCC Class A, EN 55011+A1, BS EN 55011+A1, ICES-003, Issue 6, Class A, VCCI Class A, AS/NZS, EN 55032 Class A, BS EN 55032 Class A
Immunity	EN 61000-4-2, BS EN 61000-4-2, EN 61000-4-3, BS EN 61000-4-3, EN 61000-4-4, BS EN 61000-4-4, EN 61000-4-5, BS EN 61000-4-5, EN 61000-4-6, BS EN 61000-4-6, EN 61000-4-8, BS EN 61000-4-8, EN 61000-4-11, BS EN 61000-4-11, EN 55024+A1, BS EN 55024, EN 55035, BS EN 55035, EN 62040-2, BS EN 62040-2

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Lua

Countly Web SDK

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jQuery

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Radio Frequency Interference

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

USA—FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this user manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. The user will bear sole responsibility for correcting such interference.

Canada—ICES

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Japan—VCCI

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VCCI-A

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被要求採取某些適當的對策。

Australia and New Zealand

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. APC cannot accept responsibility for any failure to satisfy the protection requirements resulting from an unapproved modification of the product.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide a reasonable protection against interference with licensed communication equipment.

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  - www.apc.com (Corporate Headquarters)
    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - www.apc.com/support/
    Global support searching APC Knowledge Base and using e-support.

- Contact the APC Customer Support Center by telephone or e-mail.

  - Local, country-specific centers: go to www.apc.com/support/contact for contact information.

For information on how to obtain local customer support, contact the representative or other distributors from whom you purchased your product.

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