Network Management Card



User's Guide

Network Management Card



User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix C, "Notices," on page 89.

Second Edition (June 2012)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前,请仔细阅读 Safety Information (安全信息)。

安裝本產品之前,請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat! Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност. Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije. Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled "Statement 1," translations for that caution statement are in the *Safety Information* document under "Statement 1."

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device. Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

To Connect:		To Disconnect:	
1.	Turn everything OFF.	1.	Turn everything OFF.
2.	First, attach all cables to devices.	2.	First, remove power cords from outlet.
З.	Attach signal cables to connectors.	З.	Remove signal cables from connectors.
4.	Attach power cords to outlet.	4.	Remove all cables from devices.
5.	Turn device ON.		

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Chapter 1. Introduction

The IBM[®] Network Management Card works with the IBM UPS Manager software to monitor, manage, and protect uninterruptible power supplies through standard web pages, a Network Time Protocol (NTP) server, and Secure Sockets Layer (SSL) security protocol. The network management card can support up to five connected browsers at one time, or three browsers with the SSL protocol.

You can install the network management card in an IBM uninterruptible power supply (UPS) that has a communication bay, and you can install it while the UPS is online, maintaining the highest system availability. You can configure the network management card by using any of the following methods:

- · Web browser
- Local serial link (network parameters)
- BOOTP/DHCP (network parameters)
- Terminal over network (Telnet), Secure Shell (SSH), or command-line interface (CLI)

If firmware and documentation updates are available, you can download them from the IBM web site. The network management card might have features that are not described in the documentation that comes with the UPS, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the network management card documentation. To check for updates, go to http://www.ibm.com/supportportal/.

Note: Changes are made periodically to the IBM website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

Features

The network management card has the following features:

- · Simultaneous shutdown of protected servers
- Configuration of automatic email messages in response to UPS alarms and to transmit periodic reports
- · Control of UPS on/off switching with a web browser
- Adjustment and control of load segments through the HTML interface, including sequential starting of the installation and optimization of backup time by shutting down non-priority systems
- · Automatic date and time adjustment through an NTP server
- Protection by encrypted password
- Protection by secure SSL connection
- SNMP v1/v3 for supervision Dual Stack IP v4/IP v6
- Log storage in the nonvolatile memory
- Online help (English only)
- Card firmware update through the network
- Fast Ethernet 10/100 MB compatibility with auto-negotiation on the RJ-45 connector
- · Recording of events and measurements in the card log

- Humidity/temperature/dry contact sensor (optional)
- Easy installation (can be installed while the UPS is online, maintaining the highest system availability)
- Compatibility with the Internet Engineering Task Force (IETF) Management Information Base (MIB) and the Power MIB (see "MIB objects" on page 79)
- Available languages:
 - English
 - French
 - Spanish
 - German
 - Simplified Chinese
 - Japanese
 - Russian
 - Korean
 - Traditional Chinese
 - Italian
 - Portuguese

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the IBM *Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- Note: These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- Attention: These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Specifications

The network management card specifications are shown in the following table.

Table 1. Network management card specifications

Specification	Description
Dimensions	132 x 66 x 42 mm (5.2 x 2.6 x 1.6 in.)
Weight	70 g (0.15 lb)
Storage temperature	-10°C to 70°C (14°F to 158°F)
Operating temperature	0°C to 40°C (32°F to 104°F)
Ambient humidity	90% RH max without condensation

Network

The Ethernet connector has fast Ethernet 10/100 Mb compatibility with auto-negotiation. It is compatible with 1 Gb networks in 100 Mb mode.

Table 2. Network management card ports used

Protocol	Port
BOOTP/DHCP	UDP 68, 67
HTML	TCP 80
SSL	TCP 443
IBM UPS Manager shutdown software	TCP 5000 (connected mode)
	UDP 4679, 4680 (broadcast mode)
SMTP	25
NTP	123
SNMP V1 and V3	161
TRAP SNMP	162
Telnet	23
SSH	22

IBM Environmental Monitoring Probe

The IBM Environmental Monitoring Probe (purchased separately) is a connectivity device that enables you to remotely monitor the temperature, humidity, and status of two contact devices through a standard web browser, providing greater power management control and flexible monitoring. The environmental monitoring probe is connected to the network management card.

For more information about the environmental monitoring probe, see Chapter 5, "Connecting and configuring an IBM Environmental Monitoring Probe (optional)," on page 61.

Management Information Base (MIB) compatibility

The network management card is compatible with the following Management Information Bases (MIBs):

- MIB II (RFC 1213)
- Internet Engineering Task Force (IETF) Standard UPS MIB (RFC 1628)
- EATON Powerware MIB (PowerMIB)

For more information about MIBs, see "MIB objects" on page 79.

Chapter 2. Installing and configuring the network management card

This chapter describes how to install the network management card in an uninterruptible power supply (UPS) and how to configure the card to use the web interface.

Installation checklist

Before you install the network management card, make sure that you have the following items:

· Network management card



• Serial communication cable for configuration (comes with the network management card)



- Ethernet cable (purchased separately)
- · Phillips screwdriver (purchased separately)

Handling static-sensitive devices

Attention: Static electricity can damage the UPS and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the UPS for at least 2 seconds. This drains static electricity from the package and from your body.

- Remove the device from its package and install it directly into the UPS without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the UPS cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

LEDs and connectors

The network management card LEDs and connectors are shown in the following illustration.



The Ethernet connector LEDs are described in the following table.

Table 3. Ethernet connector LEDs

LED	Color	Activity	Description
ACT	Green	Off	The network management card is not connected to the network.
		On	The network management card is connected to the network, but there is no activity.
		Flashing	The port is sending and receiving data.
100 M	Amber	Off	The port is operating at 10 Mbps.
		On	The port is operating at 100 Mbps.

The settings/sensor connector LEDs are described in the following table.

Table 4. Settings/sensor connector LEDs

LED	Color	Activity	Description	
UPS data Green Off		Off	The network management card is starting.	
		On	The network management card is communicating with the UPS.	
		Flashing	Communication with the UPS is established (normal operation).	

Table 4. Settings/sensor connector LEDs (continued)

LED	Color	Activity	Description
RS-232	Amber	Off	The Configuration menu is activated.
		On	The Configuration menu is not activated (normal operation).
		Flashing (only if an optional environmental monitoring probe is connected to the network management card)	Communication with the environmental monitoring probe is established (normal operation).

Network management card default parameters

The following table is a summary of the user-configurable settings for the network management card. The default parameters and available choices are listed. For more information, see Chapter 3, "Using the network management card web interface," on page 19.

Table 5. Network management card default parameters

Function	Parameter	Default value	Available choices
Network	IP address	192.168.1.2	Network IP address
	Subnet mask	255.255.0.0	Network IP address
	Gateway address	0.0.0.0	Network IP address
	BOOTP/DHCP	Enabled	Enabled / Disabled
	IPv6 enabled	Disabled	Enabled / Disabled
	IPv6 auto config enabled	Disabled	Enabled / Disabled
	Firmware upload	Enabled	Enabled / Disabled
	SMTP server	smtpserver	49 characters maximum
System	UPS Contact	Computer Room Manager	49 characters maximum
	UPS Location	Computer Room	31 characters maximum
	History log interval (sec.)	60	10 to 99999 sec.
	Environment log interval (sec.)	300	10 to 99999 sec.
	Default Language	English	English / French / Spanish / German / Italian / Chinese Traditional / Chinese Simplified / Japanese / Russian / Korean / Portuguese
	UPS Custom Name	UPS	31 characters maximum
	Log Delimiter	Tab	Comma / Tab
Notified application table		Empty	Not applicable
Access control	User name	USERID	10 characters maximum
	Password	passw0rd	10 characters maximum
	Telnet access enabled	Enabled	Enabled / Disabled
	Telnet security enabled	Disabled	Enabled / Disabled
	Console interface	Menu	Command-line interface / Menu

Table 5. Network management card default parameters (continued)

Function	Parameter	Default value	Available choices
SNMP	Community name read	public	32 characters maximum
	Trap port	162	Not configurable
	SNMP Version	V1&V3	Disabled / V1 / V3 / V1&V3
	Read-Only User	readuser	1 character minimum, 32 characters maximum
	Read-Only Security Level	Authentication	None / Authentication / Authentication&Privacy
	Read-Only Password	readuser	8 characters minimum, 24 characters maximum
	Read-Write User	writeuser	1 character minimum, 32 characters maximum
	Read-Write Security Level	Authentication&Privacy	None / Authentication / Authentication&Privacy
	Read-Write Password	writeuser	8 characters minimum, 24 characters maximum
	Notification Username	notifuser	8 characters minimum, 24 characters maximum
Date and time	Date and time adjustment	Synchronize with an NTP server	Synchronize with an NTP server / Synchronize manually
	NTP server	ntpserver	49 characters maximum
Serial link	Speed	9600 baud	Not configurable
	Data bits	8	Not configurable
	Stop bits	1	Not configurable
	Parity	without	Not configurable
	Flow control	without	Not configurable

Installing the network management card in the UPS

You can install the IBM Network Management Card in an IBM UPS that has a communication bay. You do not have to turn off the UPS or disconnect the load.

To install the network management card, complete the following steps:

1. Record the network management card MAC address for future reference. The MAC address is on the label on the front of the network management card.



2. Remove the two screws from the UPS communication bay cover and remove the cover. For the location of the bay for your model, see the *Installation and Maintenance Guide* that comes with the UPS.

Notes:

- a. The UPS can remain online while you install the network management card.
- b. The orientation of the communication bay on your UPS model might be different from what is shown in the following illustration. You might have to rotate the network management card to install it.



3. Carefully slide the network management card into the bay and align the screw holes on the network management card with the screw holes on the UPS communication bay. Secure the network management card to the UPS with the screws that you removed in step 2 on page 9.



Configuring the network management card

To configure the network management card, complete the following steps:

- 1. Make sure that the UPS is turned on.
- 2. (Optional) For advanced configuration through a web interface and to use the network management card on a network, connect an Ethernet cable (purchased separately) to the Ethernet connector on the network management card and to your network. Wait approximately 2 minutes until the UPS data LED flashes regularly, indicating normal operation. (See "LEDs and connectors" on page 6.)
 - **Note:** You will be able to set the network management card parameters through the settings/sensor connector even if the network management card is not connected to the network.



- 3. Connect the RJ-45 end of the serial communication cable (which comes with the network management card) to the settings/sensor connector on the network management card.
 - **Note:** Make sure there is a physical RS-232 DB-9 port on the computer that you are connecting to the UPS. Do not use RS-232 to USB converter cables.



- 4. Connect the other end of the serial communication cable to the serial (COM) connector on a computer.
- 5. On the computer, start a terminal emulation program, such as HyperTerminal. Select the following settings and click **OK**:
 - Bits per second: 9600
 - Data bits: 8
 - Stop bits: 1
 - Parity: None
 - · Flow control: None
 - · Locally reproduce the characters entered option: Disabled

6. After the initialization process is completed, type USERID (all uppercase) at the prompt. The network management card main menu is displayed.

```
      IBM NETWORK MANAGEMENT CARD :

      1 : Reset

      2 : Network configuration

      3 : Set Login Password to Default

      4 : Return to Default Configuration

      0 : Exit
```

- 7. To configure the network settings, go to one of the following sections:
 - "Configuring the network settings with a DHCPv4 or DHCPv6 server (default)"
 - "Configuring the network settings without a DHCPv4 or DHCPv6 server" on page 14

For more information about the serial communication cable and the serial configuration menus, see "Using the serial configuration menus" on page 16.

Configuring the network settings with a DHCPv4 or DHCPv6 server (default)

If your network is connected to a DHCPv4 or DHCPv6 server, the network management card automatically collects the IP parameters.

Note: If the network management card is not connected to the network, it continuously attempts to make a connection. After the connection is established, the LEDs indicate the status (see "LEDs and connectors" on page 6).

To configure the network settings, complete the following steps:

1. From the main menu, press 2 (Network configuration). The following menu is displayed.

```
      Network settings

      1 : Read Network settings

      2 : Modify Network settings

      3 : Set Ethernet speed

      0 : Exit
```

2. Press 1 (Read Network settings). The network management card displays the following settings that are supplied by the server. Record the IP address.

```
Network configuration :

MAC address : 00:20:85:FD:1C:07

Mode : Static IP

IP address : 166.99.21.94

Subnet mask : 255.255.248.0

Gateway 166.99.17.1

Link Local IPv6 address : FE80::220:85FF:FEFD:4210 /64

Global IPv6 address : 2001:720:410:100A:220:85FF:FEFD:4210 /64

Global IPv6 address : 1789:720:410:100A:220:85FF:FEFD:4210 /64
```

Note: The IPv6 parameters are read-only.

- 3. Press 0 twice to exit.
- 4. Disconnect the serial communication cable from the settings/sensor connector and the computer.

To use the web interface to configure other network management card settings, see Chapter 3, "Using the network management card web interface," on page 19.

Configuring the network settings without a DHCPv4 or DHCPv6 server

If your network is not connected to a DHCPv4 or DHCPv6 server, you must configure the network management card manually. To set the network configuration, complete the following steps:

- 1. From the main menu, press 2 (Network configuration). The following menu is displayed.
 - Note: You cannot configure the IPv6 address through the serial connection. The IPv6 address is provided by the network management card or by the IPv6 DHCP server (if an IPv6 DHCP server is available on the network). To enable the IPv6 feature and configure IPv6 settings, see "Network settings" on page 38.

Network settings
<pre>1 : Read Network settings 2 : Modify Network settings 3 : Set Ethernet speed 0 : Exit</pre>

- 2. Press 2 (Modify Network settings).
- Follow the instructions that are displayed on the screen and enter the static IP parameters. After you are finished entering the parameters, wait until the message Done is displayed, indicating that the IP parameters are saved.



- 4. Press 0 to exit.
- 5. Press 1 to reset the network management card.
- 6. Press 2 to restart the network management card with the new IP parameters.
- 7. Disconnect the serial communication cable from the settings/sensor connector and the computer.

To use the web interface to configure other network management card settings, see Chapter 3, "Using the network management card web interface," on page 19.

Using the serial configuration menus

This section describes the serial communication cable and the serial configuration menus that you can use to configure the network management card.

Serial cable pinout

The following illustration shows the serial communication cable and pinout.



Serial configuration menus

To access the serial configuration menus, complete the following steps. For more detailed information, see Chapter 2, "Installing and configuring the network management card," on page 5.

- 1. Connect the RJ-45 end of the serial communication cable (which comes with the network management card) to the settings/sensor connector on the network management card.
- 2. Connect the other end of the serial communication cable to the serial (COM) connector on a computer.
- 3. Start a terminal emulation program, such as HyperTerminal. Select the following settings and click **OK**:
 - Bits per second: 9600
 - Data bits: 8
 - Stop bits: 1
 - Parity: None
 - · Flow control: None
 - · Locally reproduce the characters entered option: Disabled

 Make sure that the UPS is turned on. After the initialization process is completed, type USERID at the prompt. The network management card main menu is displayed.

```
      IBM NETWORK MANAGEMENT CARD :

      1 : Reset

      2 : Network configuration

      3 : Set Login Password to Default

      4 : Return to Default Configuration

      0 : Exit
```

1 : Reset

Two options are available for resetting the network management card:

- Hardware Reset: Select this option to reset the hardware. This is equivalent to
 restarting the electrical power supply.
- · Restart application: Select this option to restart only the application.

```
Reset

1 : Hardware Reset

2 : Restart application

0 : Exit
```

2 : Network configuration

Select this option to display additional options for network settings.

```
Network settings

1 : Read Network settings

2 : Modify Network settings

3 : Set Ethernet speed

0 : Exit
```

Three options are available for the network settings:

 Read Network settings: Select this option to view the IPv4 or IPv6 network settings.

```
Network configuration :

MAC address : 00:20:85:FD:1C:07

Mode : Static IP

IP address : 166.99.18.129

Subnet mask : 255.255.248.0

Gateway : 166.99.17.1

Link Local IPv6 address : FE80::220:85FF:FEFD:4210 /64

Global IPv6 address : 2001:720:410:100A:220:85FF:FEFD:4210 /64

Global IPv6 address : 1789:720:410:100A:220:85FF:FEFD:4210 /64
```

- **Modify Network settings:** Select this option to modify existing network parameters. Restart the network management card to activate the new parameters. In DHCP mode, the network management card can receive the following parameters according to the DHCP server settings:
 - IP address
 - Subnet mask
 - Gateway address
 - **Note:** You cannot configure the IPv6 address through the serial connection. The IPv6 address is provided by the network management card or by the IPv6 router (if an IPv6 router is available on the network). To enable the IPv6 feature and configure IPv6 settings, see "Network settings" on page 38.

```
For each of the following questions, you can press <Return> to select the
value shown in braces, or you can enter a new value.
Should this target obtain IP settings from the network?[N]
Static IP address [166.99.18.129]?
Subnet Mask IP address [255.255.248.0]?
Gateway address IP address [166.99.17.1]?
Wait during your new configuration is saved ...
Reset the card to take into account the new configuration.
```

• Set Ethernet speed: Select this option to change the network speed. Restart the network management card to activate the new parameters.

```
Set the Ethernet speed : [1 : Automatic, 2 : 10 MBit]
1
New Ethernet speed : Automatic
Wait during the new setting is saved ...
Reset the card to take into account the new configuration.
```

3 : Set Login Password to Default

Select this option to return the password to the default (passw0rd). Wait until the confirmation message is displayed.

Login Password has successfully been set

After the confirmation message is displayed, you can access the network management card by using the web interface with the default password, but you must restart the network management card to save the new password.

4 : Return to Default Configuration

Select this option to restore the parameters to the default configuration (see "Network management card default parameters" on page 7). Wait until the confirmation message is displayed. Restart the card to save the default parameters.

Configuration has been set to default one. You must Reset the card.

Chapter 3. Using the network management card web interface

This chapter describes how to use the network management card web interface.

Note: Before you can access the network management card and use the web interface, the Ethernet cable must be connected (see step 2 on page 11).

Starting the web interface

To start the web interface, complete the following steps:

- 1. Open a web browser from a computer and enter the IP address of the network management card in the address field.
- 2. In the "Connect to" window, in the **User name** field, type USERID (all uppercase). In the **Password** field, type passw0rd (all lowercase with a zero, not O).

Connect to 10	.222.45.33 🛛 🖓 🔀
7	
Network Manage	ment Card :
Password:	E USERID M
	Remember my password
	OK Cancel

Both the user name and password fields accept up to 10 characters. After 5 minutes have elapsed, or if the browser is closed and reopened, you must reenter the user name and password. An error in either field results in rejection of the requested action (such as save, page access, or card restart). After three unsuccessful login attempts, you must restart the browser. Both the user name and password fields are encrypted with an MD5 type algorithm, ensuring total security. See "3 : Set Login Password to Default" on page 18 to reset the password.

 Click OK. The uninterruptible power supply (UPS) Properties page, which is the home page, is displayed. The UPS Properties page features are described in "UPS properties" on page 20.

Online help

Online contextual help in English is available through the **Help** link in the top-right corner of each page. The navigation menu of the online help is identical to that of the network management card web pages. The Help page always opens in a new window.

Optimizing the performance of your web browser

To view status changes on the UPS in real time, configure the web browser so that it automatically refreshes all the objects on the current page.

To optimize the web browser performance if you are using Internet Explorer, complete the following steps:

- 1. Click Tools > Internet Options > General > Temporary Internet files > Settings.
- 2. Select Every visit to the page.
- 3. Click **OK** to close the Settings window, and then click **OK** again to close the Internet Options window.

UPS properties

Essential information about the UPS status is available on the UPS Properties page (see the following illustration), which refreshes automatically every 10 seconds.

IBM.	 Ne	etwork Management Card
	UPS Properties	0
UPS Properties UPS Control Weekly Schedule Shutdown Parameters	IBM 2200VA1920W R HV UP5 LI R 2200 Computer Room	
Logs and Hotification		
Measurements Event Log	UPS_Status UPS_Alarm	About your UPS
System Log	Power source :	AC Power
Email Notification	Output load level :	0%
Settings Network	Output :	Master: On Group1: On Group2: On
Notified Applications	Battery	
Access Control	Battery load level :	100 % Charging
SNMP Time	Remaining backup time :	6 h 25 mn 48 s
Firmware Upload	Battery status :	ок
	Latupidra : 2010 0414 05:06:54	

The UPS Properties page shows an image and generic name of the UPS. You can customize the UPS name, and replace the default location **Computer Room** to name the location of your system (see "System settings" on page 41). An animated diagram is displayed for online uninterruptible power supplies that shows an overview of the current UPS operating mode.

UPS measurements detail

Place the cursor over an element in the diagram to display the UPS measurement detail (see the following illustration). These measurements are available for Normal mode, Battery mode, and Bypass mode. The available measurements depend on the UPS model.



UPS status icons

The UPS status icons are shown in the following table.

Table 6. UPS status icons

lcon	Description
Ø	Normal operation.
	Alarm present. This icon links directly to the alarm page.
8	Loss of communication with the UPS.

Operating mode diagrams

The operating mode diagrams provide a global overview of the UPS current operating mode. The diagrams are available for all online uninterruptible power supplies. The operating mode diagrams are shown in the following table.

Table 7. Operating mode diagrams



Table 7. Operating mode diagrams (continued)

Operating mode	Diagram
UPS without automatic bypass	

Note: If communication with the UPS is not available, all the elements of the diagram are gray.

The elements of the operating mode diagrams are shown in the following tables.

Table 8. AC normal input

Icon	Color	Description
	Green	In tolerance
	Gray	Out of tolerance

Table 9. AC normal flow

Icon	Color	Description
	Yellow	AC to dc converter powered by ac normal
	Gray	AC to dc converter not powered by ac normal

Table 10. AC to dc converter

Icon	Color	Description
~	Green	Powered
~/=	Gray	Not powered
~=	Red	Internal failure

Table 11. Battery

lcon	Color	Description
	Green	Remaining capacity > 50%
	Orange	Remaining capacity < 50%
	Red	Battery to be checked (battery test result) Low battery when UPS is on battery

Table 12. Battery output flow

lcon	Color	Description
_	Yellow	DC to ac converter powered by battery
	Gray	DC to ac converter not powered by battery

Table 13. DC to ac converter input flow

Icon	Color	Description
	Yellow	Energy flow present
—	Gray	No energy flow

Table 14. DC to ac converter

Icon	Color	Description
	Green	Powered
=/~	Gray	Not powered
- ~	Red	Internal failure

Table 15. DC to ac converter output

lcon	Color	Description
	Yellow	Energy flow present
	Gray	No energy flow

Table 16. AC bypass input

Icon	Color	Description
	Green	In tolerance
	Red	Out of tolerance

Table 17. AC automatic bypass flow

Icon	Color	Description
	Yellow	Energy flow present
—	Gray	No energy flow

Table 18. AC automatic bypass status

lcon	Color	Description
	Green	Powered
-0*	Gray	Not powered
-0*	Red	Internal failure

Table 19. AC manual bypass flow

Icon	Color	Description
	Yellow	Energy flow present
	Gray	No energy flow

Table 20. AC manual bypass status

Icon	Color	Description
e	Green / gray	Open
e	Red / yellow	Closed

Table 21. AC output flow

Icon	Color	Description
-	Yellow	Energy flow present
—	Gray	No energy flow

Table 22. AC output

Icon	Color	Description
	Green	Load protected
	Red	Load not protected

UPS Properties tabs

Select one of the three tabs to view specific information about the UPS. The tabs are under the operating mode diagram on the UPS Properties page. The following table is a summary of the information that is provided in each view, and the following sections describe each view.

Table 23. UPS properties tabs

Tab	Description
UPS Status	(Default view) Provides essential information about the power status of the UPS
UPS Alarm	Displays a list of current alarms
About your UPS	Provides information about the model and firmware version of the UPS and the network management card

UPS Status

The UPS Status view displays the following basic information about power and output:

- **Power source:** Indicates whether the power comes from the utility power or from the UPS battery
- Output load level: Indicates the power percentage that is used at the UPS output
- Output: Indicates whether the UPS outputs are protected
 - Master (UPS): Indicates whether the UPS main output is protected
 - Group1 and Group2: Indicates whether the controlled load segments (if available) are powered (see the following table)

Table 24. UPS output status

Element	Description
@	Receptacle powered
(green)	
(Receptacle not powered or not protected
(red)	

- **Battery charge level:** Remaining battery charge (in percent). The battery modes are as follows:
 - **Fault:** The battery is faulty.
 - No battery: No battery is found.
 - Charging: The utility power is present, and the battery charge is in progress.
 - **Discharging:** The UPS is operating from the battery.
 - Floating: The battery is at the optimal charge level.
 - **Resting:** The battery is not charging.
 - **Note:** The battery has reached the end of the floating mode time period and has stopped charging to extend the life of the battery. The battery slowly discharges until the minimum charge level is reached. When the minimum charge level is reached, the battery returns to Charging mode.
 - Charger disabled: The battery charger is off.
- **Remaining backup time:** An estimate of the maximum backup time that remains for the battery before the UPS shuts down.
- **Battery status:** The result of the last automatic battery test that was run by the UPS. The possible values are as follows:
 - OK: The test was completed correctly.
 - NOK: The battery must be checked.
 - Deactivated: The automatic battery test is not validated on the UPS.

UPS Alarm

Click **UPS Alarm** on the UPS Properties page to display the list of current alarms. Table 25 on page 27 lists the alarm severity levels. For the managed UPS and system alarms, see Table 39 on page 75 and Table 41 on page 78.
	and from the	M.			
C Pagerino 17 Corte III anto Schwidzi anto Pagerino		enderen Stil ongester Frank			
nga matakan man mananan milan		This	William Horgestra		
ctireLoo		diaro Titar	Alara Description	Levely .	
	16	2010/02/04 17:30 20	Terret ACHOR		
		The manual of Section	UPS on hoters		
nam an Rectange Annu Sen Connel Se					

The alarm severity levels are shown in the following table.

Table 25. Alarm severity levels

Icon	Severity level
	Critical
Red	
À	Warning
Yellow	
8	Unknown
Gray	

About your UPS

Click **About your UPS** to view the information about the UPS and the network management card.

IBM.		Networl	k Management Card	
	UPS Properties			0
UPS Properties UPS control Weekly Schedule Shutdown Paremeters	IEM 2200VA/1920W Rack H Computer Room	v ups		
Logs and Hotification				
Measurements	IIPS Status	UPS Alarm	About your HPS	
Event Log System Log	UPO Name		inter join of a	4
Email Notification	UPS Nome :	IBM 2200VA/1920/V Rack HV UPS		
	UPS Part Number :	53952KX		
111 Settinge	UPS Serial Number :	00-000000-00000-000-0000-000		
Network	UPS Technical Level :	unknown		
System Notified Applications	System Technical Level / Firmware Revision :	00.01.0008		
Access Control	VA Rating	2200		
SNMP Time	Network Management Card			
Firmware Upload	Card Firmware revision :	00.01.0005		
	Card Commercial Reference :	103006826		
	Card Technical Level :	09		
	Card Revision :	GA		
	Card Serial Number :	BJ3K11003		
	Card Ethernet Mac Address :	00:20:85:FD:42:10		
	Card Ethernet Speed :	100 MBit		

UPS control

Note: The UPS configuration might prevent the shutdown and restart commands from running correctly. For more information, see the *Installation and Maintenance Guide* that comes with the UPS.

Click UPS	Control from	the menu	to display	the UPS	Control page	e.
-----------	--------------	----------	------------	---------	--------------	----

IEM.			Network	k Management (Card					
	UPS Control									0
III UPS	IBM 2200VA/19	20W R HV UPS	LI R 2200							Computer Room
UPS Properties UPS Control	Output	Status	Control			Off Delay	Т	oggle Duration		On Delay
Weekly Schedule Shitriovan Parameters	Master	🐨 On	None		0	sec	0	sec	0	sec
	Group1	🐨 On	None		0	sec	0	sec	0	sec
Logs and liotification	Group2	🐨 On	None		0	sec	0	sec	0	sec
Measurements Event Log System Log Email Notification			Execute		Save					
Settings Network System Notified Applications Access Control SM# Time Firmware Laload Firmware Laload										
Environment Status Settings Log										

Use the UPS Control page to enable triggering of startup and shutdown sequences for the UPS main output and load segments (by default, named **Master**, **Group1**, and **Group2**).

The status of each output is indicated by an Off icon (red) or an On icon (green).

The shutdown sequences allow time for the registered servers to shut down without losing data (see "Shutdown parameters" on page 31).

The main output has priority over the load segments. Shutdown of the main output causes the load segments to shut down. Load segments can be started only if the master output is on.

In the Control column, select one of the following commands for each output, and click **Execute** to initiate the selected commands:

Safe power down

Immediately start a sequence to turn off output power. The supplied systems are shut down, and the output power is turned off.

Safe power down & reboot

Immediately start a sequence to turn off and then restore output power. The supplied systems are shut down, and the output power is turned off. Then, the restart sequence is initiated at the end of the time delay that you specified in the Toggle Duration parameter. The output status is updated.

Immediate On

Immediately start a sequence to turn on output power and start the supplied systems.

Delayed, safe power down

After the number of seconds that you specified in the Off Delay parameter, start a sequence to turn off output power. The supplied systems are shut down during the shutdown sequence, and the output power is turned off.

Delayed, safe power down & reboot

After the number of seconds that you specified in the Off Delay parameter, start a sequence to turn off and then restore output power. The supplied systems are shut down, and the output power is turned off. Then, the restart sequence is initiated at the end of the time delay that you specified in the Toggle Duration parameter. The output status is updated.

Delayed On

After the number of seconds that you specified in the On Delay parameter, start a sequence to turn on output power and start the supplied systems.

In the Off Delay column, specify the value that is used by the **Delayed**, **safe power down** and **Delayed**, **safe power down & reboot** commands to allow time for the registered servers to shut down without losing data (see "Shutdown parameters" on page 31).

In the Toggle Duration column, specify the value that is used by the **Safe power** down & reboot and **Delayed**, safe power down and reboot commands.

In the On Delay column, specify the value that is used by the **Delayed On** command.

Click **Save** to save the Off Delay, Toggle Duration, and On Delay parameters.

Note: For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

UPS weekly schedule programming

Note: The UPS configuration might prevent the shutdown and restart commands from running correctly. For more information, see the *Installation and Maintenance Guide* that comes with the UPS.

Click **Weekly Schedule** from the menu to set up the timing of specific weekly actions.

TEM.		Network Management Card	
	Weekly Schedule		0
UPS Properties	IBM 2200VA/1920W R HV UPS LI R 2200		Computer Room
UPS Control	Day	Shutoff Time	Restart Time
Shutdown Parameters	Sunday	- M	- M
	Monday	• 💌	· 💌
Logs and Hotification	Tuesday	- 💌	· •
Measurements	Wednesday	• M	· 💌
Event Log	Thursday	· M	· •
Ernail Notification	Friday	· 💌	· 💌
	Saturday	• M	· •
Settings Network System Notified Applications Access Control State Time Finitware Lpload		Save	

You can use the weekly schedule to optimize power consumption or program a restart of the protected equipment at a set time.

In a shutdown sequence, the IBM UPS Manager software is notified to make sure that each device is shut down correctly before the UPS output is turned off. You can program up to seven UPS shutdown sequences in one week, with a minimum shutdown delay of 30 minutes.

The on/off sequences are valid only if the network management card time is set correctly.

Note: For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

Shutdown parameters

Click **Shutdown Parameters** from the menu to view and configure UPS parameters for operating in battery mode and restoring power.

TEM.		Network Mana	igement Card	
	Shutdown Parameters			0
UPS Properties	IBM 2200VA/1920W Rack HV	UPS		Computer Room
Weekly Schedule	Output	On battery	System Shutdown	Restart
Shutdown Parameters	Master	Shutdown If Remaining the under: 180 sec If Capacity under: 20 % seter: 30 min	Shutdown duration : 120 sec	If Capacity 0 %
Frent Log System Log Email Notification	Group1	Switch Off after: 21474835 sec if Capacity under: 0 %	Shutdown duration : 120 sec	Switch On after: 0 sec
Settings	Group2	Switch Off after: 21474836 sec if Capacity under: 0 %	Shulldown duration : 120 sec	Switch On after: 1 sec
Notified Applications Access Control SNAP Time Firmware Upload	Save modified settings :	C Show advanced parameters	Save	

Click **Show advanced parameters** to display additional parameters for adjusting specific thresholds related to the percentage of remaining battery charge level.

You can customize the name of the main output and load segments in the Output column (the maximum is 20 characters).

Priority is given to the main output; therefore, the network management card cannot supply power to the load segments when the main output power is off.

Note: For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

UPS shutdown

Note: The first criterion encountered triggers the shutdown sequence. For more information, see Chapter 6, "Shutdown criteria and sequence," on page 69.

To program the criteria for starting the shutdown sequence, set the following parameters in the first row of the table on the Shutdown Parameters page:

- Shutdown if Remaining time under: The minimum remaining backup time, in seconds, that triggers a shutdown sequence. Valid values are 0 to 99999. The default is 180.
- **Shutdown if Capacity under:** The minimum remaining battery capacity level (in percent) that triggers a shutdown sequence. The value cannot be less than 30%. If the value is set below 30%, it is automatically changed to 30%. The value cannot be less than the value that is configured in the UPS itself.

- **Shutdown after:** The operating time, in minutes, that users have after a switch to backup before starting the shutdown sequence. Valid values are 0 to 99999. There is no default value.
- **Shutdown duration:** The time (in seconds) that is required for a complete shutdown of the systems when a switch to backup time is long enough to trigger a shutdown sequence. It is calculated automatically at the maximum of Shutdown duration of subscribed clients, but it can be modified with the Advanced parameters. The default is 120.

Load segments shutdown

Note: Some uninterruptible power supplies do not support the load segments control feature.

To manage receptacle load shedding in the event of electric power failure, set the following parameters in the load segment rows on the Shutdown Parameters page:

- Switch Off after: The amount of time (in seconds) during which the load segment is supplied from the moment of utility power failure. Valid values are 0 to 99999. The default is 65535. This value includes the load segment shutdown duration.
- Switch Off if Capacity under: The minimum remaining battery capacity level (in percent) that triggers a load segment shutdown sequence. The default is 0.
- **Shutdown duration:** The time (in seconds) that is required for a complete shutdown of the systems that are supplied by the load segment when a load segment shutdown sequence starts.
- Switch On after: The period between the main output startup and the startup of the relevant programmable load segment; therefore, load segment startup can be delayed in relation to the main output. Valid values are 0 to 99999. The default for Load segment 1 is 0 and the default for Load segment 2 is 1. Some uninterruptible power supplies do not support this parameter.
- **Note:** For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

Measurements

Click Measurements from the menu to view the measurements for the UPS.

IBM. easurements IBM 2200VA/1920W R HV UPS LI R 220 outer Ro UPS Propertie UPS Control Clear Log Save Log leekly Schedule Time Voltage Frequency Power(kVA) Load level(%) Capacity(%) Remaining time(mn) Voltage Frequency 2010/04/14 04:02:14 49.9 232 0.0 Logs and Hotificatio 2010/04/14 04:03:13 233 50.0 233 50.0 0.0 0 100 385 2010/04/14 04:04:13 233 50.0 233 50.0 0.0 0 100 385 2010/04/14 04:05:14 233 50.0 233 50.0 0.0 0 100 385 2010/04/14 04:06:14 2010/04/14 04:07:14 50.0 233 50.0 0.0 100 385 233 0 2010/04/14 2010/04/14 04:09:14 233 50.0 233 50.0 0.0 0 100 385 2010/04/14 04:10:14 234 50.0 234 50.0 0.0 0 100 385 2010/04/14 04:11:14 234 50.0 234 50.0 0.0 0 100 385 2010/04/14 04:12:13 50.0 2010/04/14 04:13:13 234 50.0 0.0 234 0 100 385 2010/04/14 04:14:13 50.0 0.0 2010/04/14 04:15:14 234 50.0 234 50.0 0.0 0 100 385 2010/04/14 2010/04/14 04:17:14 234 50.0 233 50.0 0.0 0 100 385 2010/04/14 04:18:14 2010/04/14 04:19:14 234 50.0 234 50.0 0.0 0 100 385 2010/04/14 04:20:14 234 50.0 234 50.0 0.0 100 2010/04/14 04:21:13 233 49.9 233 49.9 0.0 0 100 385 2010/04/14 2010/04/14 50.0 0.0 04:23:13 233 50.0 233 0 100 385 2010/04/14 04:24:13 233 50.0 234 50.0 0.0 0 100 385 2010/04/14 04:25:14 233 50.0 233 50.0 0.0 0 100 385

Note: The following illustration shows the measurements for a single-phase UPS.

The following measurements are saved and time stamped:

- AC Normal
 - Voltage: The utility voltage that supplies the UPS
 - Frequency: The utility frequency that supplies the UPS
- AC Output
 - Voltage: The UPS output voltage
 - Frequency: The UPS output frequency
 - Power (kVA): The UPS output power
 - Load level (%): The percentage of the load at the UPS output
- Battery
 - **Capacity (%):** The available charge in the battery (in percent)
 - **Remaining time (mn):** An estimate of the remaining backup time (in minutes)

The save frequency of these values (60 seconds by default) is defined on the System page (see "System settings" on page 41). Approximately 435 time stamps can be stored on the network management card. When this threshold is reached, the oldest time stamp is deleted when a new one occurs.

Click **Save Log** to open or save all saved values in comma separated values (CSV) format (compatible with Microsoft Excel type spreadsheets).

Click **Clear Log** to delete all records. Enter your user name and password to validate this action.

Event log

IBM.		Network	Management Card	
	 Event Log			0
III UPS	IBM 2200VA/1920W R HV UPS LI R 220	90		Computer Room
UPS Properties		Savelop	Clear Log	
UPS Control Weekly Schedule				
Shutdown Parameters	Date	Time	Event Description	
iii Logo and Notification				
Measurements				
Event Log				
System Log				
Email Notification				
10 Martin				
Settings				
Network				
System Notified Applications				
Access Control				
SNMP				
Firmware Upload				

Click Event Log from the menu to view logged events.

The network management card can save up to 435 events. When this threshold is reached, the oldest event is deleted when a new one occurs.

Click Save Log to save values in comma separated values (CSV) format.

Click **Clear Log** to delete all records. Enter your user name and password to validate this action.

For a list of managed alarms, see Table 39 on page 75 and Table 41 on page 78.

System log

Click **System Log** from the menu to view system events.

IBM.		Network	Management Card	
	System Log			0
UPS	IBM 2200VA/1920W R HV UPS LI R 2200			Computer Room
UPS Properties UPS Control Weekly Schedule		Save Log	Clear Log	
Shutdown Parameters	Date	Time	Event Description	
	2010/04/13	17:20:54	Carte reprogrammée	
Logs and liotification	2010/04/13	17:24:25	Network Management Card startup	
Event Log System Log Email Notification				
Network System Notified Applications Access Control Staff Time Firmware Upload				

The network management card can save up to 435 events. When this threshold is reached, the oldest event is deleted when a new one occurs.

Click Save Log to save values in comma separated values (CSV) format.

Click **Clear Log** to delete all records. Enter your user name and password to validate this action.

For a list of managed alarms, see Table 39 on page 75 and Table 41 on page 78.

Notification

The email notification and email message settings are described in this section.

Email notification

The network management card can redirect UPS alarms to an email server to distribute information to the applicable recipients. The format of these email messages is compatible with mobile telephone transfer systems that use the short message service (SMS) standard for text messaging.

Click **Email Notification** from the menu to configure email recipients.

IBM	0			Network Management (Card	
		Email Notification				0
UPS UPS Properties		IBM 2200VA/1920W Rack	HV UPS			Computer Room
UPS Control Weekly Schedule		recipient1@domain.com	Recipient list		Notified events for the selected Recipien	ıt
Shutdown Paramete		recipient2@domain.com recipient3@domain.com recipient4@domain.com	<u>v</u> r	Save	Battery operation UPS on battery	
iii Loge and Hotifics	tion	Recipient :	recipient1@domain.com		UPS Off sequence in progress	✓
Measurements			Disabled 💌		UPS alarms	
Event Log		Attached	— ••		UPS overload	
System Log		files :	Event Log		UPS fault	V
Email Notification			System Log		Characteristic Surgers	Calibration
		Periodic	Every 0 day(s) at:	00:00 💌	SHOWING EVENS	Serberaut
Settings		report :	day of next report:	. 💌		
Network			Text			
System Notified Applications						
Access Control				Email Message Settings		
SNMP				Configure SMTP Server on		
Time Firmware Ubload				Network Settings		
T Inter a Copicada						

On the Email Notification page, you can configure up to four recipients in the Recipient list to receive email messages that are initiated by the network management card. Each recipient receives an email message according to specific trigger events, which you can select from the right side of the page. The network management card log also indicates email transmission errors.

Set the following parameters for each recipient:

- Recipient: Specify the email address of the person or department that is to receive the email. The limit is 99 characters. The default is recipientn@domain.com.
- Attached files: Select the files (Measurements, Event Log, and System Log) that you want to be attached to the email message. Data is sent in CSV format.
- **Periodic report:** In addition to the email messages that are sent when events occur, you can schedule periodic email messages with the logs attached to be sent to the recipient at specified intervals. To configure periodic email messages, specify the day and time of the first transmission and the frequency of subsequent transmissions. After the first transmission, the day and time of the next transmission is displayed.
- Email Message Settings: Click this link to display the Email Message Settings page (see "Email message settings" on page 37).
- **Network Settings:** Click this link to display the Network Settings page (see "Network settings" on page 38).
- **Test:** Use this to send an email message to the recipient immediately. Use this method to check email transmission, particularly to check access to the SMTP server that is configured on the Network Settings page (see "Network settings" on page 38). A transmission report is added to the system log. The event label in the subject and text of the message is replaced with a test label. If you make any modifications to the page, you must save them before you use the Test function.
- Save: Save your settings.

The right side of the page shows the events that can require notification. By default, only main events, such as battery operation and a few of the UPS alarms, are

accessible. If you click **Show/Hide Events**, all the events are displayed or hidden. By default, only two events are selected for notification: **UPS Off sequence in progress** and **UPS alarms**. You can click other events to select them, and you restore the default selections by clicking **Set Default**.

Note: For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

Email message settings

Use the Email Message Settings page to customize the content of email messages that are initiated by the network management card (see "Email notification" on page 35).

IBM.	Network Management Card	
	Email Message Settings	0
III UPS	IBM 2200VA/1920W R HV UPS LI R 2200	Computer Room
UPS Properties UPS Control	These settings are common for all the recipients, which can be notified by E-mail.	
Weekly Schedule	Sender :	
Shutdown Parameters	Les@domain.com	
Logs and Notification	Subject:	
Measurements	Network Management Card - «Event message»	
Event Log	Network Management Card	
System Log	UPS Name	
Entail Nourication	LPS Location	
	I Event message	
Settings		
Network	Message text :	
System	Type here your own text	
Access Control		
SNMP		
Time		
Firmware Upload	Save	

All email message recipients have the following common settings:

- Sender: The source of the message. This field allows free text. However, depending on the SMTP server configuration, the server might verify that the domain name in the sender address exists and that the user in the sender address belongs to that domain. The limit is 59 characters. The default is ups@domain.com.
- **Subject:** The subject of the email message. Enter text and select from the following optional check boxes to build the message subject:
 - UPS Name is the name of the UPS.
 - UPS Location is the geographic location of the UPS (see "System Settings" on page 52).
 - **Event message** is the event that generated the email message.
- **Message text:** Type your message in this field. The limit is 255 characters. As shown in the following figure, the body of the email message contains the following items:
 - Message text
 - The date and time of the event, as saved in the log

- The URL of the network management card, enabling a direct link with the network management card to be established
- Attachments, as configured for the email recipients
- The subject text

From:	ups@domain.com	Sent Wed 4/22/2009 3:41 PM
fα		
De:		
Bubject	Network Management Card - Test Me	ssage
	anter 10 PANO 1002 Local antibations	monu (4 K P)
	The second s	
Netwo	k Management Card - Test message	
	009/04/03	
Date: 2		
URL: 1	ttp://166.99.224.102	
URL: 1 Type y	nto://166.99.224.102 our own text here.	
Date: 2 URL: 1 Type y	ttp://166.99.224.102 our own text here.	
Date: 2 URL: 1 Type y	ng://966.99.224.102. our own text here.	

Sending text messages

The network management card can redirect UPS alarms to an email server. The format of these email messages is compatible with mobile telephone email/SMS transfer systems that are used by Internet service providers (ISPs). The format that is to be used depends on the service provider.

Network settings

Click **Network** from the menu to configure the network parameters of the network management card and authorize the remote upgrade of the embedded system.

IBM.		Network Management Card
	Network Settings	0
UPS UPS Properties	IBM 2200VA/1920W R HV UPS LI R 2200	Computer Room
UPS Control Weekly Schenkile	BootP/DHCP :	Enskled V
Shutdown Parameters	IP address :	166.99.224.162
	Subnet Mask :	255 255 255 0
Logs and Hotification	Gateway Address :	166.99.224.1
Measurements Event Lon	Hostname :	ups16
System Log	Domain Name :	ups domain.com
Email Notification	✓ IPv6 Enabled	
	✓ IPv6 Auto Config Enabled	
Settings	IPv6 Address 1 :	Waiting Router Advertisement
Network System	Prefix length :	0
Notified Applications	IPv6 Gateway :	
SNMP	IPv6 Local Address :	FE80::220.85FF:FEFD:4210
Time	IPv6 Address 2 :	Waiting Router Advertisement
Firmware Upload	Firmware Upload :	Enabled V
	Primary DNS Server (IPv4 or IPv6) :	151.110.239.25
Environment	Secondary DNS Server :	151.110.239.27
Settings	SMTP Server (for Email Notification) :	smtpserver
Log	SMTP server authentication	
	Login :	smtplogin
	Password:	
	Save modified settings :	Save

Note: If you are not already logged on, you are prompted to enter your user name and password before you access the Network Settings page.

You can configure the following network management card network settings:

 BootP/DHCP: Select Enabled to authorize configuration of network parameters with the BOOTP/DHCP server when the network management card is started. Mode of card operation with server: After each startup, the network management card makes five attempts to recover the network parameters. If it receives no response from the server, the card starts with the last saved parameters from the most recent start. These parameters are shown on the page. The default value for this parameter is **Enabled**.

Notes:

- 1. If the host name is not used, the IP address that is supplied by the DHCP server must be assigned through Static DHCP Assignment to maintain the connection with the clients on the stations that are to be protected.
- 2. During the first connection, if the DHCP query is not successful, the network management card starts with the following IP configuration:

IP address: 192.168.1.2 Subnet mask: 255.255.255.0 Gateway address: 0.0.0.0

- **IP address:** The IP address of the network management card (for example, 166.99.224.70).
- **Subnet Mask:** The mask of the subnetwork of the network (for example, 255.255.255.0).
- **Gateway Address:** The IP address of the gateway to access the stations that are outside the network management card subnet (for example, 166.99.224.1).
- **Hostname:** The host name of the network management card. This is the first part of the fully qualified domain name that is used by the Domain Name System (DNS). Because the network management card does not support the NetBIOS protocol, the host name is sent to the DNS only if the DHCP server sends the host name with the new IP address. This mechanism is described in the update of the DNS protocol RFC 2136.
- **Domain Name:** The domain to which the network management card belongs. The domain name is the part of the fully qualified domain name that follows the host name and is used by the DNS. The default fully qualified domain name is ups.domain.com.
- **IPv6 Enabled:** Select this check box to enable Internet Protocol version 6 (IPv6) features.

Note: IPv6 is described in the Internet standard RFC 2460.

- IPv6 Auto Config Enabled: Select this check box to have the network management card or the IPv6 router (if an IPv6 router is available on the network) automatically generate the following IPv6 parameters:
 - Local IPv6 address
 - Prefix length
 - The IPv6 Gateway field becomes unavailable and remains blank.
- IPv6 Address 1: If IPv6 Auto Config Enabled is selected, the first IPv6 address is displayed.

If **IPv6 Auto Config Enabled** is not selected, the IPv6 address of the network management card is entered in one of the following formats:

- [::1:0:0; 1FFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF] for a range of prefixes [4-128]
- [2000:: ; FEFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF] for a prefix of 64
- **Prefix length:** The addressing prefix that is used to route external traffic for a network.

If IPv6 Auto Config Enabled is selected, the IPv6 network prefix is displayed.

If **IPv6 Auto Config Enabled** is not selected, you can enter the IPv6 network prefix in the following format:

- [4-128] for an IP address 1:
 - [::1:0:0; 1FFF:FFFF:FFFF:FFFF:FFFF:FFFF]
- IPv6 Gateway: If IPv6 Auto Config Enabled is selected, the IPv6 Gateway field is not available.

If **IPv6 Auto Config Enabled** is not selected, you can enter the name of the IPv6 gateway.

- IPv6 Local Address: The IPv6 local address is generated from the network management card MAC address and is displayed in this field.
- IPv6 Address 2: If IPv6 Auto Config Enabled is selected, the second IPv6 address is provided by the DHCP server (for example, 1876:720:410:100A:1111:2222:33:4444) and cannot be changed.

If **IPv6 Auto Config Enabled** is not selected, the **IPv6 Address 2** field is not available.

- Firmware Upload: Select Enabled to authorize remote updating of the network management card embedded software. The default is Enabled.
- **Primary DNS Server (IPv4 or IPv6):** The IP address of the main DNS server that ensures conversion of the domain name to an IP address.
- Secondary DNS Server: The IP address of the secondary DNS server that ensures conversion of the domain name to an IP address if the primary DNS server is not available.
- SMTP Server (for Email Notification): The name or IP address of the local server to which the network management card connects to send email messages. You can enter a host + domain name (DNS resolution) or an IP address.

The default is **smtpserver**. The network management card uses the standard port (25) for sending email messages.

- SMTP server authentication: If you select this check box, enter the SMTP server user name and password.
- **Note:** For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

Restart the network management card after any changes to these parameters (see "System settings" on page 41).

System settings

Click **System** from the menu to customize the information that is displayed on the UPS Properties page (see "UPS properties" on page 20).

IBM.	Network Management Card		
	System Settings		0
UPS Properties	IBM 2200VA/1920W R HV UPS LI R 2200		Computer Room
UPS Control Weekly Schedule	UPS Contact :	Computer Room Manager	
Shutdown Parameters	UPS Location :	Computer Room	
	UPS Custom Name :	UPS	
Logs and Hotification	Default Language :	English	
Measurements Event Lon	History log interval (sec):	60	
System Log	Environment log interval (sec):	300	
Email Notification	Log Delimiter :	Tab 🗸	
Settings Network	Save modified settings :	Save	
System Notified Applications Access Control SNMP Time Firmware Upload	♥ Keep TCP#P parameters	Reset Communication Factory Reset	

You can configure the following network management card system settings:

- **UPS Contact:** Enter the name of the person who is responsible for UPS administration at the IT network level or the person who is responsible for electrical maintenance. This field is not displayed on any other web page. The limit is 49 characters. The default is **Computer Room Manager**.
- **UPS Location:** Enter a description of the physical location of the UPS in your installation (for example, Computer Room E1-C066). This text is displayed on the home page. The limit is 31 characters. The default is **Computer Room**.
- UPS Custom Name: An alias personalization of the UPS name. The limit is 31 characters. The default is UPS.
- **Default Language:** Select one of the available languages (English, French, Spanish, German, Simplified Chinese, Japanese, Russian, Korean, or Traditional Chinese) to enable initialization of the browser language at the network management card connection. To change the language of the web interface pages, restart your browser after you change this setting.
- **History log interval (sec):** Enter the length of time (in seconds) that the measurement history log is saved. Valid values are 5 to 99999. The default is **60**.
- Environment log interval (sec): Enter the length of time (in seconds) that the temperature and humidity measurement log is saved. Valid values are 60 to 99999. The default is **300**.

Note: The Environment log interval parameter is displayed only if an optional environmental monitoring probe is installed.

- Log Delimiter: Select the delimiter that is used in the log saved file. The default is Tab.
- Save: Save any changes that you have made on the System Settings page.

- **Reset Communication:** Perform a remote restart of the network management card without modifying the configuration. This action is required for any changes that you have made on the Network Settings page.
- Factory Reset: Restore all the network management card parameters to their default settings.
- Keep TCP/IP parameters: Select this check box to maintain the IP address, subnet mask, gateway, and BOOTP/DHCP value.
 - **Note:** For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

Notified applications

Use the Notified Applications page to modify a network management system (NMS) that is set to receive notifications from the network management card or to add up to three NMSs to the notified applications.

To modify or add a new NMS, complete the following steps:

1. Select **Notified Applications** from the menu. The Notified Applications page is displayed.

	IEM.				Ne	twork N	lanagement Card				
		Notified	Applic	ations		_			_	_	0
	UPS	IBM 2200VA:1920W R HV UPS LI R 2200 Computer Room									
	UPS Properties UPS Control	Al	Hr	Hostname or IP Address	Application Name	Output	Shutdown duration(sec)	_	-	Shutdown after(min)	Connected
	Shutdown Parameters		1	166.99.224.100	Notif1						Yes
			2	166.99.224.101	Notif2						Yes
- 888	Logs and Notification Measurements Event Log	Select the	e applic	cations to be removed.				Remove			
	System Log Email Notification	Select the	e applic	cations to be tested.				Utility failure Test	Shutdow	n Test	
		Select the	e Netw	ork-Management-System to b	e modified.			Modify NMS	Add NMS		
	Settings Network System Natified Applications Access Control Shife Time Farmware Upload										

 Click Modify NMS or Add NMS to open a new window in which you can modify or enter SNMP trap receiver information (application name, host name or IP address, protocol, trap community, and MIB filter).



Access control

Click **Access Control** from the menu to configure the different parameters to allow secure access to the card.

Notes:

- 1. If you are not already logged on, you are prompted to enter your user name and password before you access the Access Control page.
- 2. Restart the network management card to activate any configuration changes. For more information, see "System settings" on page 41.

IBM.		Network Management Card
UPS	(). unknown	
UPS Properties UPS Control	Enter New Manager Login :	USERID
Weekly Schedule	Enter New Password :	
Shatown Parameters	Confirm New Password :	
Logs and Notification	Security mode :	• Authentication for configuration
Measurements		O Full authentication
Event Log		O SSL and full authentication
Email Notification	Telnet Access Enabled	
	Telnet Security Enabled	
Settings	Console Interface :	Cu v
Network System Notified Applications Access Control SNMP Time Firmware Upload	Save modified settings :	Save

On the Access Control page, you can configure the following access control settings:

- Enter New Manager Login: This text field (limited to 10 characters) enables secure access and modification of pages. The default is USERID (all uppercase).
- Enter New Password: This text field (limited to 10 characters) enables secure access to Configuration menu pages. The default is passw0rd (all lowercase with a zero, not the letter O).
- · Confirm New Password: Reenter the new password.
- **Security mode:** Select the authentication method for page access. The following security modes are available:
 - Authentication for configuration: Only the configuration pages are protected by a user name and password.
 - Full authentication: All pages are protected by a user name and password.
 - SSL and full authentication: All pages are protected by a user name and password and are accessible only in SSL.

When **SSL and full authentication** is selected, access to the web interface is made in secure mode (https). Connections with network shutdown modules stay in standard mode (secure TCP).

SSL security implementation:

- SSL version 3.0
- TLS version 1.0
- Method: TLS_RSA_WITH_512_MD5
- Auth: RSA
- Key exchange: RSA
- Encryption: RCA_512
- Digest: MD5
- Save: Save your settings.
- **Telnet Access Enabled:** Select this field to allow access to the configuration parameters through a Telnet, SSH, or command-line interface connection.
- **Telnet Security Enabled:** Select this field to set SSH security (secure access). Deselect this field to allow unsecure access.
- **Console Interface:** Select the interface that you want to use to view the configuration parameters during a Telnet, SSH, or command-line interface connection. The following console interfaces are available:
 - Menu: The parameters are grouped into predefined menus.
 - CLI: The parameters are accessible independently of each other using the command-line interface.

The interface setting applies to the TCP/IP connection and the Telnet and SSH protocols.

SNMP setting

Click **SNMP** from the menu to enable configuration of the SNMP security parameters.

Note: If you are not already logged on, you are prompted to enter your user name and password before you access the SNMP Settings page.

III.		Network Management Card	
	SNMP Settings		0
UPS UPS Properties	IBM 2200VA/1920W R HV UPS LI R 2200		Computer Room
UPS Control Meetly Schedule	SNMP Version :	V18V3 V	
Shutdown Parameters			
	SIMP V1 Setting		
Logs and Hotification	Community Read-Only :	public	
Measurements	SNMP Write :	Enabled 💌	
Event Log	Community Write :	private	
Email Notification			
	SIMP V3 Setting		
Settings	Read-Only User :	readuser	
Network	Read-Only Security Level :	Auth No Priv 💌	
System	Read-Only Password :		
Notified Applications Access Control	Read-Write User :	writeuser	
SNMP	Read-Write Security Level :	Auth Priv V	
Firmware Upload	Read-Write Password :		
	Notification Username :	notifuser	
	Save modified settings : :	Swe	

You can configure the following information:

- **SNMP Version:** Select the SNMP protocol version (Disabled, V1, or V3) that is supported by the network management card.
- **Community Read-Only:** The SNMPv1 read community name that identifies a subgroup that is attached to a network manager or a logical entity. The network management card and the clients must share the same community name to communicate.
- SNMP Write: Select Enabled to enable the SNMP write function.
- **Community Write:** This field is available only if the SNMP write function is enabled. This is the SNMPv1 write community name that identifies a subgroup that is attached to a network manager or a logical entity. The network management card and the clients must share the same community name to communicate.
- **Read-Only User:** The user name of the user in the SNMPv3 version who is authorized only to read SNMP variables.
- Read-Only Security Level: Select one of the following security levels:
 - No Auth No Priv: The user must not use authentication and privacy to access SNMP variables.
 - Auth No Priv: The user must use authentication and *not* privacy to access SNMP variables.
 - Auth Priv: The user must use authentication and privacy to access SNMP variables.
- **Read Only Password:** Enter a new password for the Read-Only User. The password must be between 8 and 24 characters and use only letters, numbers, and <>&@#%_=:;,./?l\$*() symbols.
- **Read-Write User:** The user name of the user in the SNMPv3 version who is authorized to read and write SNMP variables.
- Read-Write Security Level: Select one of the following security levels:
 - No Auth No Priv: The user must not use authentication and privacy to access SNMP variables.

- Auth No Priv: The user must use authentication and *not* privacy to access SNMP variables.
- Auth Priv: The user must use authentication and privacy to access SNMP variables.
- Read-Write Password: Enter a new password for the Read-Write User. The password must be between 8 and 24 characters and use only letters, numbers, and <>&@#%_=:;,./?l\$*() symbols.
- Notification Username: Enter the username field that is sent in SNMPV3 notifications. This field must be defined in the applications that receive the notifications.
- Save: Save your settings.

Date and time

Click **Time** from the menu to manually set the network management card date and time or to set the date and time to synchronize with the NTP server.

IBM.		Network Management Card	
	Setting time	0	
UPS	IBM 2200VA/1920W Rack HV UPS	Computer	Room
UPS Properties UPS Control	Current date and time		
Weekly Schedule	Date (yyyy/mm/dd):	2010/05/27	
Shutdown Parameters	Time (hhummuss):	14:51:06	
Logs and Hotification	Setting time		
Measurements	 Set manually 		
Event Log System Log	Date (yyyy/mm/dd):	2010/05/27	
Email Notification	Time (hhummiss):	14:51:06	
			_
Settings	O Synchronize with NTP server		
Network	Hostname :	ntpserver	
System Notified Applications	Time-Zone :	(GMT) Casablanca, Greenwich Mean TIME : Dublin, Lisbon, London	
Access Control		European Daylight Savings Time	
SNMP Tine Firmware Uplaad	Save modified settings :	Save	

To set the date and time, complete the following steps:

- 1. Click **Time** from the menu to open the Setting Time page.
- To manually set the date and time, select Set manually, enter the values in the Date and Time fields, and click Save. The maximum drift is ±2 minutes per month.
- To synchronize the time with the Network Time Protocol (NTP) server, select Synchronize with NTP server. Selecting this option enables a connection with a time server, which is available either on the company internal network or on the web. This server communicates the GMT.
 - · Enter the IP address or host name of the time server.
 - · Select the time zone for your geographic area from the list.
 - · Click Save to connect with the server and set the date and time.

The time is updated every 5 hours to prevent any time drift. After two attempts, if the NTP server is not accessible, the network management card changes to manual mode. The network management card uses the NTP (UDP 123 port).

The firewall must be set to transmit queries outside the intranet. No error message is generated if the time server contact fails.

Notes:

- 1. After startup, if the network management card is in manual mode, or if no NTP server was reached, the card initializes at 00:00 01/01/1970.
- 2. If the network management card is installed in an UPS that supports time stamping, the network management card time is automatically synchronized with that of the UPS.

Updating firmware

To update the network management card firmware, complete the following steps.

- **Note:** During the upgrade process, the network management card does not monitor the UPS status.
- 1. Go to http://www.ibm.com/systems/support/ and download the new firmware version to your computer.
- 2. Click Firmware Upload to open the Firmware Upload page.

IDM.	Network Management Card	
	Firmware Upload	0
UPS	IBM 2200VA11920W R HV UPS LI R 2200	Computer Room
UPS Properties	Firmware to Upload :	
Weekly Schedule Shutdown Parameters	Percoari., Uphoed	
	WARNING: This action takes a few minutes.	
Logs and Notification	Don't click on any button or item during this operation.	
Measurements		
Event Log		
System Log Email Natification		
::: Settings		
System		
Notified Applications		
Access Control		
SIMMP Time		
Firmware Upload		
Environment		
Status		
Settings		
Log		

3. Click **Browse** and select the firmware update file.

4. Click Upload.

Note: The upload can take up to 5 minutes. Do not interrupt the operation until the firmware upload is successful and the following screen is displayed.



Chapter 4. Using the Telnet, SSH, and CLI

This chapter describes how to use the Telnet, Secure Shell (SSH), and command-line interface (CLI) to access the IBM Network Management Card.

Note: You cannot configure email recipients through Telnet, SSH, or CLI.

Overview

Telnet is a terminal emulation protocol that you can use to access and configure the parameters for the network management card. Telnet is not a secure protocol, but when it is used with Secure Shell (SSH) the connection is secure.

You can configure the connection to use one of the following interfaces:

- A Menu interface that groups the configuration parameters in pre-defined menus for easy navigation
- A command-line interface (CLI) that enables direct access to the individual configuration parameters

Telnet access to the network management card is enabled by default, with SSH security enabled and the Menu interface selected.

Session constraints

Up to five sessions with the network management card can be open at one time. Each open session must have the same protocol configuration. The available protocol configurations are shown in the following table.

Security	Interface	Comments
Telnet	Menu	
Telnet	CLI	
SSH	Menu	Default setting
SSH	CLI	

Table 26. Available session protocol configurations

Available settings

Most configuration parameters that are available through the web interface are also available through the Telnet, SSH, or command-line interface:

- For a detailed explanation of each parameter, default, and possible values, see Chapter 3, "Using the network management card web interface," on page 19.
- For a quick reference of default parameters, see Table 5 on page 7.

Note: You cannot configure email recipients through Telnet, SSH, or CLI.

Depending on the current configuration of the network management card, some parameters are not available. Table 2 lists the type of each parameter or message coded by color.

Table 27. Color codes

Parameter or message	Color
Read-write or write-only parameter	Light green
Read-only parameter	Yellow
Warning message	Green
Error message	Light red

Starting and ending a session

To start a session, complete the following steps:

- 1. Open a terminal emulator or other session manager such as PuTTY.
- 2. At the prompt, type telnet *IPaddress*, where *IPaddress* is the IP address of the network management card.

If the connection is successful, the server responds with connected to *IPaddress* and a welcome message.

 At the Login and Password prompts, enter your user name and password. If the login is successful, the configured interface displays either Menu (the main menu) or CLI (the #> prompt).

If you want to use the Menu interface, see "Using the Menu interface."

If you want to use the command-line interface, see "Using the command-line interface" on page 52.

To end a session in either the Menu interface or the command-line interface, enter quit at any time.

Using the Menu interface

The Menu interface is available with the Telnet and SSH protocols and is in English only.

Menu structure

The Menu interface groups the configuration parameters into the same menus and submenus that are available through the web interface (for details about the parameters, see "Available settings" on page 49. Table 28 on page 51 shows the parameters arranged in the Menu interface tree.

Using the menus

To use the menus, type the number of the menu item that you want to run and then press Enter. For example, in the following sample menu screen, to access the Trap Receiver 2 parameters you type 2 and press Enter. To return to the previous menu from any screen, type 0 and press Enter.

The following illustration shows a sample menu screen.

NETWORK MANAGEMENT CARD Trap receiver	
1 : Receiver 1 2 : Receiver 2 3 : Receiver 3	
0 : Exit	

To close the session from any menu screen, enter quit.

The following table provides an overview of the menu tree for the Menu interface.

Table 28. Menu interface main menu tree

Main menu item	Submenu	Submenu	Description
Reset			Resets the network management card
Network settings	MAC address, IP address, and other parameters		Configures the network parameters and authorizes remote upgrades.
	SMTP menu	Host name and other parameters	Configures the SMTP server.
	SNMP menu	Version and other parameters	Configures the SNMP versions v1 and v3.
Trap receivers	Receiver 1 Receiver 2 Receiver 3	Host name, protocol, and other parameters for each receiver	Lists the stations receiving traps and configures the traps. Maximum of three.
System settings	Uninterruptible power supply (UPS) contact, UPS location, and other parameters		Customizes information on the UPS Properties pages.
Shutdown settings	Outlet 1 (main or master) Outlet 2 Outlet 3	Name and other parameters for each outlet	Defines the UPS behavior during a shutdown.
Access control	Login, password, and other parameters		Configures secure access to the network management card.
Date and time	Date, hour, and other parameters		Sets the date and time.
Environment	Sensor name, Temperature, Humidity, and Inputs	Thresholds and identifiers	Configures the optional environmental monitoring probe.
Set login password to default			Resets the login and password to the defaults.
Default configuration			Resets all parameters to their defaults and restarts the network management card.

Using the command-line interface

The command-line interface enables direct access to the individual configuration parameters.

Usage guidelines

Type a command at the prompt and press Enter. A recognized command is processed; otherwise a warning message is returned.

Blank characters are not allowed in commands, except inside strings.

Enclose strings in double quotation marks (""). For example, name a server My Server by sending the string "My Server" as part of the command.

General commands

Use the general commands in the following table to open, close, and control sessions.

Table 29. General commands

help or ?	Display help about a specific command.
Syntax	help [command] or [command] ?
Example	#> help getNetwork or #> getNetwork ?
setEcho	Hide, or not, all characters. If hidden, each character entered is replaced by an asterisk (*).
Syntax	setEcho [option]
Options	ON I OFF
Example	#> setEcho ON
quit	Close a current CLI session.
Syntax	quit
Example	#> quit
reset	Reset the software.
Syntax	reset
Example	#> reset
version	Get information about the software version.
Syntax	version
Example	#> version
defaultPass	Return to the default login and password.
Syntax	defaultPass
Example	#> defaultPass

Table 29. General commands (continued)

defaultConf	Return to the default configuration.
Syntax	defaultConf
Example	#> defaultConf

Network commands

Use the network commands in the following table to administer network parameters and authorizations.

Table 30. I	Network	commands
-------------	---------	----------

Read a network setting.		
getNetwork [option1] [option2]		
DHCP IPAddress IPMask IPGateway HostName DomainName IPv6Enable IPv6AutoConf IPv6Address1 PrefixLength IPv6DefaultGateway IPv6LocalAddress IPv6Address2 PrimaryDNS SecondaryDNS FirmwareUpgrade		
#> getNetwork IPAddress		
Modify a network setting.		
setNetwork [option1=xxxx] [option2=yyyy]		
DHCP = 0 1	(0=No, 1=Yes)	
IPAddress = "xxx.xxx.xxx"		(See Note 1)
IPMask = "xxx.xxx.xxx"		(See Note 1)
IPGateway = "xxx.xxx.xxx"		(See Note 1)
HostName = "xxxx"		
DomainName = "xxxx"		
IPv6Enable = 0 1	(0=No, 1=Yes)	
IPv6AutoConf = 0 1	(0=No, 1=Yes)	(See Note 2)
IPv6Address1 = ""		(See Note 3)
PrefixLength = xx		(See Note 3)
IPv6DefaultGateway [=]		(See Note 3)
PrimaryDNS = "xxxx"		
SecondaryDNS = "xxxx"		
FirmwareUpgrade = 0 1	(0=No, 1=Yes)	
#> setNetwork IPAddress="166.99.18.129" IPMask="	"255.255.248.0"	
Note 1: Setting is write-enabled depending on "DHCP" status. Note 2: Setting is write-enabled depending on "IPv6Enable" status. Note 3: Setting is write-enabled depending on "IPv6AutoConf" status.		
Read an SMTP setting.		
aetSMTP [option1] [option2]		
HostName Authentication Login Password		
#> getSMTP HostName		
For Password, each character is replaced with an as	sterisk (*).	
,	· · /	
Modify an SMTP setting.		
setSMTP [option1=xxxx] [option2=yyyy]		
	Read a network setting. getNetwork [option1] [option2] DHCP IPAddress IPMask IPGateway HostNam IPv6Address1 PrefixLength IPv6DefaultGateway secondaryDNS FirmwareUpgrade #> getNetwork IPAddress Modify a network setting. setNetwork [option1=xxxx] [option2=yyyy] DHCP = 0 1 IPAddress = "xxx.xxx.xxx" IPMask = "xxx.xxx.xxx.xx" IPGateway = "xxx.xxx" IPGateway = "xx.xx" DomainName = "xxxx" IPv6Enable = 0 1 IPv6Address1 = "" PrefixLength = xx IPv6DefaultGateway [=] PrimaryDNS = "xxxx" SecondaryDNS = "xxxx" SecondaryDNS = "xxxx" FirmwareUpgrade = 0 1 #> setNetwork IPAddress="166.99.18.129" IPMask=" Note 1: Setting is write-enabled depending on "DHC Note 2: Setting is write-enabled depending on "IPv6 Note 3: Setting is write-enabled depending on "IPv6 Note	Read a network setting. getNetwork [option1] [option2] DHCP IPAddress IPMask IPGateway HostName DomainName IPv6E IPv6Address1 PrefixLength IPv6DefaultGateway IPv6LocalAddress IPv6 IsecondaryDNS FirmwareUpgrade #> getNetwork [option1=xxxx] [option2=yyyy] DHCP = 0 1 (0=No, 1=Yes) IPAddress = "xxx.xxx.xxxx" IPAddress = "xxx.xxx.xxx.xxx" IPGateway = "xxx.xxx.xxx.xxx" IPGateway = "xxx.xxx.xxx" DomainName = "xxxx" DomainName = "xxxx" IPv6Address1 = "" PrefixLength = xx IPv6DefaultGateway [=] PrimaryDNS = "xxxx" SecondaryDNS = "xxxx" SecondaryDNS = "xxxx" FirmwareUpgrade = 0 1 (0=No, 1=Yes) #> setNetwork IPAddress="166.99.18.129" IPMask="255.255.248.0" Note 1: Setting is write-enabled depending on "DHCP" status. Note 2: Setting is write-enabled depending on "IPv6Enable" status. Note 3: Setting is write-enabled depending on "IPv6Enable" status. Note 3: Setting is write-enabled depending on "IPv6Enable" status. Note 3: Setting is write-enabled depending on "IPv6Enable" status. Note 3: Setting is write-enabled depending on "IPv6Enable" status.

Options	HostName = "xxxx"		
	Authentication = 0 1	(0=No, 1=Yes)	
	Login = "xxxx"		(See Note 1)
	Password = "**.**"		(See Notes 1, 2)
Example	#> setSMTP HostName = "Smtp Server"		
Comments	Note 1: Setting is write-enabled depending on "Authentication" status. Note 2: Remember to set echo off.		
getSNMP	Read an SNMP setting.		
Svotax	getSNMP [ontion1] [ontion2]		
Options	snmpVersion ReadCommunityName WriteCommunitySecurityLevel WriteCommunityName User UserSecurityLevel UserPassword Admin AdminSecurityLevel AdminPassword NotificationUserName FirmwareUpgrade		
Example	#> getSNMP User		
Comments	For UserPassword and AdminPassword, each character is replaced with an asterisk (*).		
setSNMP	Modify an SNMP setting.		
Syntax	getSNMP [option1] [option2]		
Options	snmpVersion = Disabled V1 V3 V1V3		
	ReadCommunityName = "xxxx"		(See Note 1)
	WriteCommunitySecurityLevel = 0 2	(0=No, 2=Yes)	
	WriteCommunityName = "xxxx"		(See Notes 1, 2)
	User = "xxxx"		(See Note 1)
	UserSecurityLevel = 1 2 3 (1=No Auth, 2=Auth NoPriv, 3=Auth Priv)	1	(See Note 1)
	UserPassword = "xxxx"		(See Notes 1, 3, 5, 6)
	Admin = "xxxx"		(See Note 1)
	AdminSecurityLevel = 1 2 3 (1=No Auth, 2=Auth NoPri 3=Auth Priv)	iv,	(See Note 1)
	AdminPassword = "xxxx"		(See Notes 1, 4, 5, 6)
	NotificationUserName = "xxxx"		
	FirmwareUpgrade = 0 1	(0=No, 1=Yes)	
Example	#> setSNMP User = "readuser"		
Comments	Note 1: Setting is write-enabled depending on "snmpVersion" status. Note 2: Setting is write-enabled depending on "WriteCommunitySecurityLevel" status. Note 3: Setting is write-enabled depending on "UserSecurityLevel" status. Note 4: Setting is write-enabled depending on "AdminSecurityLevel" status. Note 5: Remember to set echo off. Note 6: Minimum length is 8 characters.		

Table 30. Network commands (continued)

Trap receiver commands

Use the trap receiver commands in the following table to configure the stations receiving traps. The maximum number of trap receivers is three.

Table 31. Trap receiver commands

getTrap	Read a trap receiver setting.
Syntax	getTrap N [option1] [option2]
Options for N = 0 1 2	HostName Name TrapCommunity TrapSnmpVersion TrapSelectedMibs
Example	#> getTrap 1 HostName Name
setTrap	Modify a trap receiver setting.
Syntax	setTrap N [option1] [option2]
Options for N = 0 1 2	HostName = "xxxx" Name = "xxxx" TrapCommunity = "xxxx" TrapSnmpVersion = Disabled V1 V3 V1V3 TrapSelectedMibs = 0 1 2 3 4 5 6 7 (See Note 1)
Example	#> setTrap 0 Name="My application"
Comments	Note 1: bit0 = 1: MIB Pulsar enabled bit1 = 1: Power MIB enabled bit2 = 1: MIB IETF enabled

System commands

Use the system commands in the following table to customize the information about the UPS.

getSystem	Read a system setting.
Syntax	getSystem [option1] [option2]
Options	Contact Location upsCustomName Language
Example	#> getSystem Location
setSystem	Modify a system setting.
Syntax	setSystem [option1] [option2]
Options	Contact = "xxxx" Location = "xxxx" upsCustomName = "xxxx" Language = AUTO FRE ENG SPA GER ITA CHI JPN KOR CZI RUS
Example	#> setSystem Location="my office"
getHistSyst	Read a history system setting.
Syntax	getHistSyst [option]
Options	Interval
Example	#> getHistSyst Interval

Table 32. System commands (continued)

setHistSyst	Modify a history system setting.
Syntax	setHistSyst [option]
Options	Interval = xx (10 to 2147483647 in seconds)
Example	#> setHistSyst Interval=12
getEnvSyst	Read an environment system setting.
Syntax	getEnvSyst [option1] [option2]
Options	Interval Delimiter
Example	#> getEnvSyst Delimiter
setEnvSyst	Modify an environment system setting.
Syntax	setEnvSyst [option1] [option2]
Options	Interval = xx (10 to 2147483647 in seconds) Delimiter = Comma Tab
Example	#> setEnvSyst Delimiter=Comma

Shutdown commands

Use the shutdown commands in the following table to define the UPS behavior during a shutdown.

Table 33. Shutdown commands

getShutdown	Read a shutdown setting.	
Syntax	getShutdown N [option1] [option2]	
Options for N = 1 2 3	Options for N=1: iName RunTimeToEmptyLimit RemainingCa ShutdownTimer ShutdownDuration Restart Options for N=2 or 3: iName ShutdownTimer RemainingCapacity	apacityLimit ShutdownTimerSelected Level Limit ShutdownDuration StartupTimer
Example	#> getShutdown 1 ShutdownDuration	
setShutdown	Modify a shutdown setting.	
Syntax	setShutdown N [option1] [option2]	
Options for N = 1 2 3	Options for N=1: iName = "xxxx" RunTimeToEmptyLimit = xx RemainingCapacityLimit = xx ShutdownTimerSelected = 0 1 ShutdownTimer = xx ShutdownDuration = xx RestartLevel = xx Options for N=2 or N=3: iName = "xxxx" ShutdownTimer = xx RemainingCapacityLimit = xx ShutdownDuration = xx ShutdownDuration = xx StartupTimer = xx	 (0 to 99999 in seconds) (0 to100 in seconds) (0=No, 1=Yes) (0 to 5999940/60 in minutes) (120 to 9999 in seconds) (0 to 100%) (99 to 99999 in seconds) (0 to 100 in seconds) (120 to 9999 in seconds) (120 to 9999 in seconds) (0 to 100 in seconds) (0 to 65535 in seconds)

Table 33. Shutdown commands (continued)

Example	#> setShutdown 1 ShutdownDuration=120
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Access control commands

Use the access control commands in the following table to configure secure access to the network management card.

Table 34. Access control commands

getAccess	Read an access control setting.	
Syntax	getAccess [option1] [option2]	
Options	Login Password Security	
Example	#> getAcess Login	
Comments	For Password, each character is replaced with an asterisk (*).	
setAccess	Modify an access control setting.	
Syntax	setAccess [option1] [option2]	
Options	Login = "xxxx" Password = "****" (See Note 1) Security = 1 2 3 (1=configuration pages, 2=full authorization, 3=full authorization and SSL)	
Example	#> setAccess Security=3	
Comments	Note 1: Remember to set echo off.	
getTelnet	Read a Telnet setting.	
Syntax	getTelnet [option1] [option2]	
Options	Access Security Console	
Example	#> getTelnet Security	
setTelnet	Modify a Telnet setting.	
Syntax	setTelnet [option1] [option2]	
Options	Access = 0 1(0=Disabled, 1=Enabled)Security = 0 1(0=No, 1=Yes with SSH)Console = CLI Menu	
Example	#> setTeInet Security=0	

Date and time commands

Use the date and time commands in the following table to set the date and time parameters for the network management card.

Table 35. Date and time commands

getDate	Read a date and time setting.
Syntax	getDate [option1] [option2]
Options	Date Time TimeSync TimeNtp TimeZone TimeDaylight
Example	#> getDate timeSync
setDate	Modify a date and time setting.

Table 35. Date and time commands (continued)

Syntax	setDate [option1] [option2]		
Options	Date = yyyy/mm/dd Time = hh:mm:ss TimeSync = MANUAL AUTO NTP TimeNtp = "xxxx" TimeZone = +/-hh:mm TimeDaylight = 0 1	(See Note 1) (See Note 1) (See Note 2) (0=No, 1=Yes)	
Example	#> getDate timeSync=MANUAL		
Comments	Note 1: Setting is write-enabled depending on "TimeSync" status. Note 2: Setting resolves to the nearest half hour. For example, sending +02:36 results in +02:30, and sending +02:46 results in +03:00.		

Environment commands

Use the environment commands in the following table to configure the optional environmental monitoring probe.

Table 36. Environment commands

getEnv	Read an environment setting.		
Syntax	getEnv [option]		
Options	Name		
Example	#> getEnv Name		
setEnv	Modify an environment setting.		
Syntax	setEnv [option]		
Options	Name = "xxxx"		
Example	#> setEnv Name="sensor"		
getTemp	Read a temperature setting.		
Syntax	getTemp [option1] [option2]		
Options	Unit HighThreshold LowThreshold Hysteresis Offset HighNotify LowNotify HighShutdown LowShutdown		
Example	#> getTemp Unit		
setTemp	Modify a temperature setting.		
Syntax	setTemp [option1] [option2]		
Options	Unit = C KHighThreshold = xxLowThreshold = xxHysteresis = xxOffset = xxHighNotify = 0 1LowNotify = 0 1Uo=No, 1=Yes)HighShutdown = 0 1LowShutdown = 0 1Uo=No, 1=Yes)LowShutdown = 0 1	(See Note 1) (See Note 1)	
Example	#> setTemp Unit=C		
Comments	Note 1: Setting is write-enabled only if the notification is enabled.		

Table 36. I	Environment	commands	(continued)
-------------	-------------	----------	-------------

getHum	Read a humidity setting.	Read a humidity setting.		
Syntax	getHum [option1] [option2]			
Options	HighThreshold LowThreshold Hysteresis Offset HighNotify LowNotify HighShutdown LowShutdown			
Example	#> getHum Offset			
setHum	Modify a humidity setting.			
Syntax	setHum [option1] [option2]			
Options	HighThreshold = xxLowThreshold = xxHysteresis = xx (0 to 5)Offset = xx (-5 to 5)HighNotify = 0 1LowNotify = 0 1 (0=No, 1=Yes)HighShutdown = 0 1LowShutdown = 0 1(0:10)LowShutdown = 0 1	=No, 1=Yes))=No, 1=Yes) =No, 1=Yes)	(See Note 1) (See Note 1)	
Example	#> setHum HighNotify=0			
Comments	Note 1: Setting is write-enabled only if the notification is enabled.			
getInput1 or getInput2	Read an input setting.			
Syntax	getInput1 [option1] [option2]			
Options	iName State[0].Description State[0].Notify State[0].Shutdown State[1].Description State[1].Notify State[1].Shutdown			
Example	#> getInput1 iName			
setInput1 or setInput2	Modify an input setting.			
Syntax	setInput1 [option1] [option2]			
Options	iName = "xxxx" $State[0].Description = "xxxx"$ $State[0].Notify = 0 1$ $State[0].Shutdown = 0 1$ $State[1].Description = "xxxx"$ $State[1].Notify = 0 1$ $State[1].Shutdown = 0 1$	(0=No, 1=Yes) (0=No, 1=Yes) (0=No, 1=Yes) (0=No, 1=Yes)	(See Note 1) (See Note 1)	
Example	#> setInput1 State[0].Description="Door open" State[0].Notify=1			
Comments	Note 1: Setting is write-enabled only if the notification is enabled.			

Chapter 5. Connecting and configuring an IBM Environmental Monitoring Probe (optional)

The IBM Environmental Monitoring Probe (purchased separately) is a connectivity device that you can use to remotely monitor the temperature, humidity, and status of two contact devices through a standard web browser, providing greater power management control and flexible monitoring.

When the environmental monitoring probe is connected to the settings/sensor connector on the network management card, temperature and humidity readings are automatically displayed in the web interface. To access the readings, you must run a web browser and connect to the network management card IP address.



The environmental monitoring probe option comes with the following items:

- · Environmental monitoring probe
- Screws
- Hook-and-loop fasteners
- Tie wrap
- Ethernet cable

You can install the device anywhere on the rack cabinet. To attach the environmental monitoring probe, use the hook-and-loop fasteners or mount the probe on the screw. The environmental monitoring probe has a universal slot on the back that makes it easy to mount on the screw and in any direction.

Environmental monitoring probe features

The environmental monitoring probe has the following features:

- Temperature measurement from 0°C to 70°C with ±1°C accuracy.
- Humidity measurement from 0% to 100% with ±6% accuracy.
- · Minimum/maximum time stamped function for temperature and humidity.
- · Choice of temperature readings in Celsius or Fahrenheit.
- High and low thresholds, hysteresis and offset adjustable through the web interface.
- Possibility of notification of status changes by email, SMS, or SNMP trap. SMS notification requires the use of a vendor-acquired application that converts emails to SMS.
- Position detection of two dry contacts (maximum sensor-to-contact distance is 20 m).

- Name and status of each configurable contact.
- · Recording of events and measurements in the card log.
- Possibility of shutting down the installation if a threshold is exceeded or on the opening or closing of a dry contact.
- Connection to the network management card with straight Category 5 Ethernet cables (maximum sensor-to-card distance is 20 m).

Connecting an environmental monitoring probe to the network management card

To connect the environmental monitoring probe to the network management card, complete the following steps:

1. If applicable, connect external contact inputs to the screw terminals on the environmental monitoring probe.



Note: External contact device 1 is connected between pins 1 and 2. Device 2 is connected between pins 3 and 4 (as labeled to show device 1 and 2). External contact devices can be normally open or normally closed.

Tabla 37	Environmental	monitoring	probe screw	torminal	nin accimment
Table 37.	LINNOINTEINA	monitoring	probe screw	terminar	pin assignment

Pin number	Description	Normally open/normally closed
1	Contact 1 return	Normally closed
2	Contact 1 signal input	Normally open
3	Contact 2 return	Normally closed
4	Contact 2 signal input	Normally open
- 2. Connect the Category 5 Ethernet cable that comes with the environmental monitoring probe to the settings/sensor connector on the network management card and to the RJ-45 connector on the environmental monitoring probe.
 - **Note:** If the cable is not long enough for your configuration, you can use a cable that is 20 m (65.6 ft) or less.



- Make sure that the uninterruptible power supply (UPS) has a network connection, the power cord is connected, and the power to the UPS is turned on. The environmental monitoring probe is automatically recognized by the UPS.
- 4. Start a web browser and connect to the network management card IP address.

After the environmental monitoring probe is connected to the network management card, an **Environment** menu option is available on the main menu. The **Environment** menu has the following elements:

- Status
- Settings
- Log
- **Note:** To switch the settings/sensor connector to the configuration mode, disconnect the cable and reset the network management card.

Environment status

TRM IBM 2200VA/1920W R HV UPS LI R 2200 Computer Ro UPS Propertie: UPS Control 25.3 °C in: 23.9 recorded on 2010/04/06 16:03:36 ax: 25.5 re Logs and llotifi onfigure thresholds Environment Setti Reset Min/Max Calibrate System Log Email Notification 32.2 % 0% 100 % Settings Min: 26.9 % recorded on 2010/04/06 13:45:33 Max: 32.2 % recorded on 2010/04/14 09:50:11 Reset Min/Max Calibrate Time 2010/04/14 09:49:31 input #1 clo Envi Input #2 2010/04/14 09:49:31 Setting Log

Click **Status** to display the Environment Status page.

For both the temperature and humidity measurements, a graduated gauge provides the following functions:

- The cursor indicates the current value.
- Two red zones to the left and right represent the high and low thresholds that you can set on the Environment Settings page.
- You can set an alarm to notify you if the measured value enters one of the red zones (see the Notification parameter on the Environment Settings page).
- Time stamped minimum and maximum temperatures show the extreme values that have been recorded since the last time you clicked **Reset Min/Max**. A thin dotted line shows their positions on the gauge.
- You can force the minimum and maximum values to the current value at any time by clicking Reset Min/Max.
- The environmental monitoring probe is factory-calibrated, but you can apply an offset to adjust the measurement by clicking **Calibrate**.
- **Input #1** and **Input #2** show the positions of the two contacts that are acquired by the environmental monitoring probe. The positions are displayed with the parameters entered on the Environment Settings page.
- The last status change of each contact is time stamped.

The Internet browser updates the Environment Status page every 10 seconds.

Environment settings

Click **Settings** to display the Environment Settings page.

	IIM.	Network Management Card								
—		Environment Settings							•	
	UPS UPS Properties UPS Control	IBM 2200VA/1920W R HV UPS LI R 2200 Computer Room								
		Sensor name:	Environment sensor		_			Notification	System Shutdown	
	Shutdown Parameters	Temperature	High threshold:		40					
		*C 💌	Low threshold:		5					
	Logs and Notification		Hysteresis:		2					
	Measurements	Humidity	High threshold:		90	%				
	System Log		Low threshold		5	%			-	
	Email Notification		Hysteresis:		5	%				
Katata									-	
	Settings	Input #1:	Input #1		closed		when closed			
	Network System Notified Applications Access Control SMMP Time				open		when open			
		Input #2:	Input #2		closed		when closed			
					open		when open		-	
			Show advanced parameters	meters						
	T Interval & Optobol	Save modified settings :						Save		
	Environment									
	Status									
	Settings									
	Log									

The environment sensor measures temperature and humidity and reports the status of the two contacts (which are used for doors, alarms, or a generator unit).

The temperature and humidity thresholds can be adjusted and can trigger notification and correct shutdown of the protected system.

The sensor name is the function name that is assigned to the sensor. Usually it describes the location of the sensor.

To enable a notification to be triggered when a status change occurs, select the applicable check box in the Notification column. The following functions are activated for each selected event:

- · Display in the list of current alarms
- Listing in the UPS log
- SNMP trap generation
- Notification by email (if the environmental monitoring probe notification option is enabled on the Email Notification page)

To enable a system shutdown to be triggered when a notification is triggered, select the applicable check box in the System Shutdown column. A system shutdown cannot be enabled if the corresponding notification is not enabled.

Note: For security, you must click **Save** and enter the administrator login and password to save modifications or run commands. The default login is USERID (all uppercase), and the password is passw0rd (all lowercase with a zero, not the letter O).

Temperature

- Temperature: Select the temperature unit (°C or °F).
- **High threshold:** If this value is exceeded, a notification is sent if the corresponding notification checkbox is selected on the Environment Settings page. The default is 40°C (104°F).
- Low threshold: If this value is exceeded, a notification is sent if the corresponding notification checkbox is selected on the Environment Settings page. The default is 5°C (41°F).
- **Hysteresis:** Specify a value to prevent multiple notifications if the temperature fluctuates around a threshold. The default is 2°C (36°F).

The high alarm is not displayed if the value drops below the high threshold - hysteresis value.

The low alarm is not displayed if the value rises above the low threshold + hysteresis value.

Humidity

- **High threshold:** If this value is exceeded, a notification is sent if the corresponding notification checkbox is selected on the Environment Settings page. The default is 90%.
- Low threshold: If this value is exceeded, a notification is sent if the corresponding notification checkbox is selected on the Environment Settings page. The default is 5%.
- **Hysteresis:** Specify a value to prevent multiple notifications if the humidity fluctuates around a threshold. The default is 5%.

The high alarm is not displayed if the value drops below the high threshold - hysteresis value.

The low alarm is not displayed if the value rises above the low threshold + hysteresis value.

External contacts

- **Input #1** and **Input #2:** Enter an identifier that corresponds to the acquired contact (for example, rack door, air conditioning, or generator unit). The limit is 28 characters.
- when closed and when open: Enter names that are associated with the two contact positions (for example, 0pen and Closed for a door and 0n and 0ff for a generator).

For the list of messages, see Table 39 on page 75.

Event log

	IBM.	Network Management Card			
		Environment Log Data			0
	UPS	IBM 2200VA/1920W R HV UPS LI R 2200			Computer Room
	UPS Properties		Save Log	Clear Log	
	Weekly Schedule				
	Shutdown Parameters	Date	Time	Temperature (°C)	Humidity (%)
		2010/04/14	09:53:44	25	25
- 111	Logs and Notification	2010/04/14	09.58.52	24	25
	Measurements	2010/04/14	10:04:00	24	25
	Event Log	2010/04/14	10.09.09	24	25
	System Log Email Notification				
	Settings				
	System				
	Notified Applications				
	Access Control				
	Time				
	Firmware Upload				
	Environment				
	Status				
	Settings				
	109				

Click Log to display the Environment Data Log page.

The temperature and humidity environment sensor measurements are recorded at an interval that you specify in the **Environment log interval (sec)** field on the System Settings page. The default is 300 seconds.

Each measurement is dated and stored in the log of the network management card. The size of the log files is limited by a time indexing system.

Click **Save Log** to save the log on your computer at any time, in a CSV format file.

Click **Clear Log** to clear the files in the network management card and reset the log.

Chapter 6. Shutdown criteria and sequence

This chapter describes the shutdown criteria that are managed by the network management card, the shutdown sequence, and load segments.

Note: If you are using IBM UPS Manager as the power management software, keep the shutdown criteria in the network management card at the default settings, which enables IBM UPS Manager to program the settings correctly.

Shutdown criteria managed by the network management card

During an extended power failure, three criteria can cause the server shutdown sequence to be initiated. If multiple criteria are selected, the first criterion that is encountered triggers the shutdown sequence.

At the end of the shutdown sequence, when all servers are shut down, the uninterruptible power supply (UPS) itself might shut down to avoid unnecessary discharge of the batteries, depending on the configuration.

The shutdown criteria and sequence are shown in the following illustration and are described in Table 38 on page 70.



Note: See "Shutdown parameters" on page 31 to configure the shutdown parameters.

Table 38. Shutdown criteria

Criterion	Description	
Backup time before shutdown starts (using the Shutdown parameter)	When the UPS switches to battery power, the network management card starts the shutdown timer countdown and starts the system shutdown sequence at the end of the countdown. You must select this value carefully to allow users time to complete their tasks and disconnect, without exceeding battery backup time. Note: The IBM UPS Manager software uses parameters that can interfere with this shutdown configuration. If you use this criterion to initiate a shutdown sequence, an automatic restart when power is restored is not guaranteed. For more information, see the documentation that comes with the IBM UPS Manager software.	
Shutdown when the battery level is low (using the Shutdown If Capacity Under parameter)	When the network management card detects that the remaining backup time percentage is less than the configured level, the shutdown sequence is started. The default is 20%. Note: The UPS has an equivalent parameter. The network management card does not accept values less than what is configured in the UPS. See the UPS documentation.	
Shutdown when backup time is less than specified (using the Shutdown If Remaining Time Under parameter)	When the network management card detects that the percentage of remaining backup time is less than the set value, the shutdown sequence is started.	

Load segments

Some UPS models are equipped with load segments. Load segments are sets of receptacles that can be controlled through the network management card, providing an orderly shutdown and startup of your equipment. Load segments are dependent on the main output of the UPS. Shutdown of the main output causes shutdown of the load segments. For the locations of the load segments, see the *Installation and Maintenance Guide* that comes with the UPS.

Shutdown sequences detail

This section describes the individual shutdown sequences in detail.

Shutdown initiated by the shutdown timer

After a user-defined backup time period (configured on the Shutdown Parameters page), the shutdown of all servers is initiated, followed by the UPS shutdown (depending on its configuration). The UPS restarts when utility power is restored (depending on its configuration).

The network management card tracks the shutdown times required by the configured equipment connected to the UPS. To protect all connected equipment, the network management card uses the maximum required shutdown time for the Shutdown Duration parameter.



Shutdown initiated by low battery

When the Low battery power message is displayed, the UPS is turned off after allowing for the specified shutdown delay.

The Low battery power message is displayed if either of the two following criteria is reached:

- Low battery level
- · Low battery delay



Power restoration before the end of the shutdown duration

If power is restored before the end of the shutdown duration specified by the Shutdown Duration parameter, the UPS is shut off after the shutdown duration for a time equal to the forced reboot delay (10 seconds).



Appendix A. Uninterruptible power supply alarms, events, and MIB objects

This chapter describes the uninterruptible power supply (UPS) alarms, events, and MIB objects.

Table of alarms

The following table lists the time-dated alarms for the UPS.

Table 39. UPS time-dated alarms

Alarm on	Alarm off	
Battery fuse blown	Battery fuse OK	
No battery	Battery present	
Battery temperature fault	Battery temperature OK	
Battery charger fault	Battery charger OK	
Battery fault	Battery OK	
MAX charger voltage fault	Charger voltage OK	
MIN charger voltage fault	Charger voltage OK	
Charger temperature fault	Charger temperature OK	
Rectifier fault	Rectifier OK	
Chopper fault	Chopper OK	
Normal ac frequency out of tolerance	Normal ac frequency OK	
Normal ac fuses blown	Normal ac fuses OK	
Normal ac module fault	Normal ac module OK	
Normal ac voltage out of tolerance	Normal ac voltage OK	
Normal ac NOK	Normal ac OK	
Site wiring fault	Site wiring OK	
Bypass ac frequency out of tolerance	Bypass ac frequency OK	
Bypass ac phase out of tolerance	Bypass ac phase OK	
Bypass ac voltage out of tolerance	Bypass ac voltage OK	
Automatic bypass fault	Automatic bypass OK	
Automatic bypass overload	Automatic bypass load OK	
Automatic bypass overtemperature	Automatic bypass temperature OK	
Automatic bypass thermal overload	Automatic bypass load OK	
Automatic bypass switch (Q4S) open	Automatic bypass switch (Q4S) closed	
Normal ac switch (Q1) open	Normal ac switch (Q1) closed	
Battery switch (QF1) open	Battery switch (QF1) closed	
Manual bypass switch (Q3BP) closed	Manual bypass switch (Q3BP) open	
UPS on manual bypass		
Output switch (Q5N) open	Output switch (Q5N) closed	
Single wave load fault	Load OK	
Negative DC bus too high	Negative DC bus OK	

Table 39. UPS time-dated alarms (continued)

Alarm on	Alarm off
Positive DC bus too high	Positive DC bus OK
Negative DC bus too low	Negative DC bus OK
Positive DC bus too low	Positive DC bus OK
Inverter limitation	Inverter end of limitation
Inverter fuses blown	Input fuses OK
Inverter fault	Inverter OK
Inverter overload	Inverter load OK
Inverter overtemperature	Inverter temperature OK
Inverter short circuit	Inverter OK
Inverter thermal overload	Inverter load OK
Load not protected; on automatic bypass	Load protected; return from bypass
Load short circuit	Load OK
Load not powered	Load powered
Protection lost	Protection OK
Emergency button on	Emergency button off
Fan fault	Fan OK
Redundancy lost	Redundancy OK
Low battery	Battery OK
UPS communication failed	UPS communication restored
UPS data base not available	UPS data base OK
UPS on battery	UPS on normal AC
UPS internal fault	UPS OK
UPS overload	UPS returns to normal load
UPS overtemperature	UPS temperature OK
Imminent UPS shutoff	UPS OK
sensor_name: Temperature is above high threshold xx°C	sensor_name: Temperature is in normal range
sensor_name: Humidity is above high threshold xx%	sensor_name: Humidity is in normal range
sensor_name: Temperature is below low threshold xx°C	sensor_name: Temperature is in normal range
sensor_name: Humidity is below low threshold xx%	sensor_name: Humidity is in normal range

Table of events

The following table lists the UPS events.

Table 40. UPS events

Alarm on	Alarm off	
Battery fuse blown	Battery fuse OK	
Battery temperature fault	Battery temperature OK	
No battery	Battery present	
Battery charger fault	Battery charger OK	
Charger temperature fault	Charger temperature OK	

Table 40. UPS events (continued)

Alarm on	Alarm off
Maximum charger voltage fault	Charger voltage OK
Minimum charger voltage fault	Charger voltage OK
End of warranty	LCM message OK
End of battery life	LCM message OK
End of life of the wearing parts	LCM message OK
Outlet 1 open	Outlet 1 closed
Outlet 2 open	Outlet 2 closed
Chopper fault	Chopper OK
Normal ac switch (Q1) open	Normal ac switch (Q1) closed
Normal ac frequency out of tolerance	Normal ac frequency OK
Normal ac fuses blown	Normal ac fuses OK
Normal ac module fault	Normal ac module OK
Normal ac voltage out of tolerance	Normal ac voltage OK
Site wiring fault	Site wiring OK
Automatic bypass switch (Q4S) open	Automatic bypass switch (Q4S) closed
Bypass ac frequency out of tolerance	Bypass ac frequency OK
Automatic bypass fault	Automatic bypass OK
Automatic bypass overload	Automatic bypass load OK
Automatic bypass overtemperature	Automatic bypass temperature OK
Bypass ac phase out of tolerance	Bypass ac phase OK
Automatic bypass thermal overload	Automatic bypass load OK
Load not protected - on automatic bypass	Load protected - return from bypass
Bypass ac voltage out of tolerance	Bypass ac voltage OK
Battery switch (QF1) open	Battery switch (QF1) closed
Manual bypass switch (Q3BP) closed	Manual bypass switch (Q3BP) open
UPS on manual bypass	
Inverter limitation	Inverter end of limitation
Inverter fuses blown	Input fuses OK
Inverter fault	Inverter OK
Inverter overload	Inverter load OK
Inverter overtemperature	Inverter temperature OK
Inverter short circuit	Inverter OK
Inverter thermal overload	Inverter load OK
Output switch (Q5N) closed	Single wave load fault load OK
Load short circuit	Load OK
Single wave load fault	Load OK
Negative dc bus too high	Negative dc bus OK
Positive dc bus too high	Positive dc bus OK
Rectifier fault	Rectifier OK
Negative dc bus too low	Negative dc bus OK

Table 40. UPS events (continued)

Alarm on	Alarm off	
Positive dc bus too low	Positive dc bus OK	
Protection lost	Protection OK	
Redundancy lost	Redundancy OK	
Normal ac NOK	Normal ac OK	
Low battery	Battery OK	
UPS communication failed	UPS communication restored	
UPS database not available	UPS database OK	
UPS on battery	UPS on normal ac	
Emergency button on	Emergency button off	
Fan fault	Fan OK	
Load not powered	Load powered	
UPS internal fault	UPS OK	
Battery fault	Battery OK	
UPS overload	UPS returns to normal load	
UPS overtemperature	UPS temperature OK Imminent UPS shutoff UPS OK	
Imminent UPS shutoff	UPS OK	
<i>sensor_name</i> : Temperature is above high threshold <i>xx</i> °C	sensor_name: Temperature is in normal range	
sensor_name: Humidity is above high threshold xx%	sensor_name: Humidity is in normal range	
sensor_name: Temperature is below low threshold xx°C	sensor_name: Temperature is in normal range	
sensor_name: Humidity is below low threshold xx%	sensor_name: Humidity is in normal range	

Table of system alarms

The following table lists the system alarms.

Table 41. System alarms
Network Management Card startup
Send test mail SUCCESS
Send test mail ERROR
Send mail to recipient ERROR
sensor_name Communication failure
sensor_name Communication restored
Firmware upgraded
Connected NSM list Full, last connection refused
sendTrap()-> Unable to resolve hostname hostname
SNMP Send Trap # num failure to hostname
Time changed by user with yyyy/mm/dd hh:mm:ss
Time synchronized by NSM or EPM with yyyy/mm/dd hh:mm:ss

MIB objects

The following sections describe the Management Information Base (MIB) files that are available with the network management card. A MIB is an information repository on a device in a communication network. Network management software uses the MIB of a device to manage the device. Every manageable device on a network has a MIB that consists of one or more files that list information about the device.

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

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

IETF MIB

The network management card implements the full IETF standard UPS MIB (RFC 1628), including the IETF alarm table. The IETF traps are supported. For a description of the MIB, see http://tools.ietf.org. The UPS MIB access path is 1.3.6.1.2.1.33.

Eaton Powerware MIB

The network management card implements the full Eaton Powerware MIB (PowerMIB), including alarm tables. The Eaton traps are sent. The Eaton Powerware MIB access path is 1.3.6.1.4.1.534. Table 42 is an abbreviated list of objects from the Powerware MIB. For the UPS output/load segment controls objects, the MIB description, and to download the MIB and network management card firmware updates, go to http://www.ibm.com/supportportal/.

MIB object	SNMP format	Add.path	
xupsIdentManufacturer	String	{1.1.0}	
xupsIdentModel	String	{1.2.0}	
xupsIdentSoftwareVersion	String	{1.3.0}	
xupsIdentOemCode	Integer	{1.4.0}	
xupsBatTimeRemaining	Seconds	{2.1.0}	
xupsBatVoltage	Volts dc	{2.2.0}	
xupsBatCurrent	Amps dc	{2.3.0}	
xupsBatCapacity	Percent	{2.4.0}	
xupsBatteryAbmStatus	Integer	{2.5.0}	
xupsBatteryLastReplacedDate	String	{2.6.0}	
xupsInputFrequency	0.1 hertz	{3.1.0}	
xupsInputLineBads	Integer	{3.2.0}	
xupsInputNumPhases	Integer	{3.3.0}	
xupsInputTable		{3.4.0}	
xupsInputPhase	Integer	{3.4.1.1.x}	

Table 42. Eaton Powerware MIB objects

Table 42. Eaton Powerware MIB objects (continued)

MIB object	SNMP format	Add.path
xupsInputVoltage	RMS volts	{3.4.1.2.x}
xupsInputCurrent	RMS amps	{3.4.1.3.x}
xupsInputWatts	Watts	{3.4.1.4.x}
xupsInputSource	Integer	{3.5.0}
xupsOutputLoad	Percent	{4.1.0}
xupsOutputFrequency	0.1 hertz	{4.2.0}
xupsOutputNumPhases	Integer	{4.3.0}
xupsOutputTable		{4.4.0}
xupsOutputPhase	Integer	{4.4.1.1.x}
xupsOutputVoltage	RMS volts	{4.4.1.2.x}
xupsOutputCurrent	RMS amps	{4.4.1.3.x}
xupsOutputWatts	Watts	{4.4.1.4.x}
xupsOutputSource	Integer	{4.5.0}
xupsBypassFrequency	0.1 hertz	{5.1.0}
xupsBypassNumPhases	Integer	{5.2.0}
xupsBypassTable		{5.3.0}
xupsBypassPhase (IBM 6000 VA and 11000 VA UPS models only)	Integer	{5.3.1.1.x}
xupsBypassVoltage (IBM 6000 VA and 11000 VA UPS models only)	RMS volts	{5.3.1.2.x}
xupsEnvAmbientLowerLimit	Degrees C	{6.2.0}
xupsEnvAmbientUpperLimit	Degrees C	{6.3.0}
xupsEnvRemoteTemp1	Degrees C	{6.5.0}
xupsEnvRemoteHumidity1	Percent	{6.6.0}
xupsEnvNumContacts 1	Integer	{6.7.0}
xupsContactSenseTable	Table	{6.8.0}
xupsContactIndex ¹	Integer	{6.8.1.1.1}
xupsContactIndex ¹	Integer	{6.8.1.1.2}
xupsContactType1	Integer	{6.8.1.2.1}
xupsContactType1	Integer	{6.8.1.2.2}
xupsContactState1	Integer	{6.8.1.3.1}
xupsContactState ¹	Integer	{6.8.1.3.2}
xupsContactDescr ¹	String	{6.8.1.4.1}
xupsContactDescr ¹	String	{6.8.1.4.2}
xupsEnvRemoteTempLowerLimit ¹	Degrees C	{6.9.0}
xupsEnvRemoteTempUpperLimit ¹	Degrees C	{6.10.0}
xupsEnvRemoteHumidityLowerLimit ¹	Percent	{6.11.0}

Table 42. Eaton Powerware MIB objects (continued)

MIB object	SNMP format	Add.path
xupsEnvRemoteHumidityUpperLimit ¹	Percent	{6.12.0}
xupsAlarmTable	Table	{7.2.0}
xupsAlarmID		{7.2.1.1.x}
xupsAlarmDescr		{7.2.1.2.x}
xupsAlarmTime		{7.2.1.3.x}
xupsOnBattery		{7.3.0}
xupsLowBattery		{7.4.0}
xupsUtilityPowerRestored		{7.5.0}
xupsReturnFromLowBattery		{7.6.0}
upsOutputOverload		{7.7.0}
xupsInternalFailure		{7.8.0}
xupsBatteryDischarged		{7.9.0}
xupsInverterFailure		{7.10.0}
xupsOnBypass		{7.11.0}
xupsBypassNotAvailable		{7.12.0}
xupsOutputOff		{7.13.0}
xupsInputFailure		{7.14.0}
xupsBuildingAlarm		{7.15.0}
xupsShutdownImminent		{7.16.0}
xupsOnInverter		{7.17.0}
xupsAlarmNum	Events	{7.18.0}
xupsAlarmEventID		{7.19.1.1}
xupsAlarmEventDateAndTime		{7.19.1.2}
xupsAlarmEventKind		{7.19.1.3}
xupsAlarmEventDescr		{7.19.1.4}
xupsAlarmEventMsg		{7.19.1.5}
xupsBreakerOpen		{7.20.0}
xupsAlarmBatteryBad		{7.23.0}
xupsOutputOffAsRequested		{7.24.0}
xupsDiagnosticTestFailed		{7.25.0}
xupsCommunicationsLost		{7.26.0]
xupsUpsShutdownPending		{7.27.0}
xupsAlarmTestInProgress		{7.28.0}
xupsAmbientTempBad		{7.29.0}
xupsLossOfRedundancy		{7.30.0}
xupsAlarmTempBad		{7.31.0}
xupsAlarmChargerFailed		{7.32.0}

Table 42. Eaton Powerware MIB objects (continued)

MIB object	SNMP format	Add.path
xupsAlarmFanFailure		{7.33.0}
xupsAlarmFuseFailure		{7.34.0}
xupsPowerSwitchBad		{7.35.0}
xupsModuleFailure		{7.36.0}
xupsOnAlternatePowerSource		{7.37.0}
xupsAltPowerNotAvailable		{7.38.0}
xupsNoticeCondition		{7.39.0}
xupsRemoteTempBad		{7.40.0}
xupsRemoteHumidityBad		{7.41.0}
xupsAlarmOutputBad		{7.42.0}
xupsAlarmAwaitingPower		{7.43.0}
xupsOnMaintenanceBypass		{7.44.0}
xupsTestBatteryStatus	Integer	{8.2.0}
xupsControlOutputOffDelay	Integer	{9.1.0}
xupsControlOutputOnDelay	Integer	{9.2.0}
xupsControlOutputOffTrapDelay	Integer	{9.3.0}
xupsControlOutputOnTrapDelay	Integer	{9.4.0}
xupsControltoBypassDelay	Integer	{9.5.0}
xupsLoadShedsecondswith Restart	Integer	{9.6.0}
xupsConfigOutputVoltage	RMS volts	{10.1.0}
xupsConfigInputVoltage	RMS volts	{10.2.0}
xupsConfigOutputWatts	Watts	{10.3.0}
xupsConfigOutputFreq	0.1 hertz	{10.4.0}
xupsConfigDateAndTime	String	{10.5.0}
xupsConfigLowOutputVoltageLimit	RMS volts	{10.6.0}
xupsConfigHighOutputVoltageLimit	RMS volts	{10.7.0}
xupsConfigInstallDate	String	{10.8.0}
xupsMaxTrapLevel	Integer	{11.1.0}
xupsTrapType	Integer	{11.2.0}
xupsTrapmessage	String	{11.3.0}
xupsNumberofcontrolledreceptacles	Integer	{12.1.0}
xupsFirstreceptacle	Integer	{12.2.1.1.1}
xupsSecondreceptacle	Integer	{12.2.1.1.2}
xupsFirstreceptaclestatus	Integer	{12.2.1.2.1}
xupsSecondreceptaclestatus	Integer	{12.2.1.2.2}

Table 42. Eaton Powerware MIB objects (continued)

MIB object	SNMP format	Add.path
xupsFirstreceptacleoffdelay	Integer	{12.2.1.3.1}
xupsSecondreceptacleoffdelay	Integer	{12.2.1.3.2}
xupsFirstreceptacleondelay	Integer	{12.2.1.4.1}
xupsSecondreceptacleondelay	Integer	{12.2.1.4.2}
xupsFirstreceptacleAutoOffdelay	Integer	{12.2.1.5.1}
xupsSecondreceptacleAutoOffdelay	Integer	{12.2.1.5.2}
xupsFirstreceptacleAutoondelay	Integer	{12.2.1.6.1}
xupsSecondreceptacleAutoondelay	Integer	{12.2.1.6.2}
xupsFirstreceptacleShedsecswithRestart	Integer	{12.2.1.7.1}
xupsSecondreceptacleShedsecswithRestart	Integer	{12.2.1.7.2}
xupsTopologyType	Integer	{13.1.0}
xupsTopoMachineCode	Integer	{13.2.0}
xupsTopoUnitNumber	Integer	{13.3.0}
¹ This MIB object is available only if the optional	environmental monitoring	probe is installed.

Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- · Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated firmware and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your IBM product.
- Go to http://www.ibm.com/supportportal/ to check for information to help you solve the problem.
- Gather the following information to provide to IBM Support. This data will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
 - Hardware and Software Maintenance agreement contract numbers, if applicable
 - Machine type number (IBM 4-digit machine identifier)
 - Model number
 - Serial number
 - Current system UEFI and firmware levels
 - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request/ to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to IBM Support quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that

contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/supportportal/. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal/. The address for IBM System x[®] information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter[®] information is http://www.ibm.com/systems/ bladecenter/. The address for IBM IntelliStation[®] information is http://www.ibm.com/systems/

How to send Dynamic System Analysis data to IBM

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- Secure upload: http://www.ibm.com/de/support/ecurep/send_http.html#secure
- Secure upload with the system serial number: https://www.ecurep.ibm.com/ app/upload_hw

Creating a personalized support web page

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IBM Taiwan product service



IBM Taiwan product service contact information: IBM Taiwan Corporation 3F, No 7, Song Ren Rd. Taipei, Taiwan Telephone: 0800-016-888

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

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Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the device. IBM may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 43.	Limits	for	particulates	and	gases
			/		•

Contaminant	Limits
Particulate	 The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹. Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. The deliquescent relative humidity of the particulate contamination must be more than 60%². The room must be free of conductive contamination such as zinc whiskers.
Gaseous	 Copper: Class G1 as per ANSI/ISA 71.04-1985³ Silver: Corrosion rate of less than 300 Å in 30 days

¹ ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

² The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

³ ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants.* Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

Information Development IBM Corporation 205/A015 3039 E. Cornwallis Road P.O. Box 12195 Research Triangle Park, North Carolina 27709-2195 U.S.A.

In the request, be sure to include the publication part number and title.

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Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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Responsible manufacturer: International Business Machines Corp. New Orchard Road Armonk, New York 10504 914-499-1900

European Community contact: IBM Deutschland GmbH Technical Regulations, Department M372 IBM-Allee 1, 71139 Ehningen, Germany Telephone: 0049 (0) 7032 15-2941 Email: lugi@de.ibm.com

Germany Class A statement

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Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

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Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller: International Business Machines Corp. New Orchard Road Armonk, New York 10504 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist: IBM Deutschland GmbH Technical Regulations, Abteilung M372 IBM-Allee 1, 71139 Ehningen, Germany Telephone: 0049 (0) 7032 15-2941 Email: lugi@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А. В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

中华人民共和国"A类"警告声明

声 明 此为A级产品,在生语环境中,该产品可能会造成无线电干扰。在这种情况下, 可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者: 這是甲類的資訊產品,在 居住的環境中使用時,可 能會造成射頻干擾,在這 種情況下,使用者會被要 求採取某些適當的對策。

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IBW ®

Part Number: 81Y1034

Printed in USA

(1P) P/N: 81Y1034

