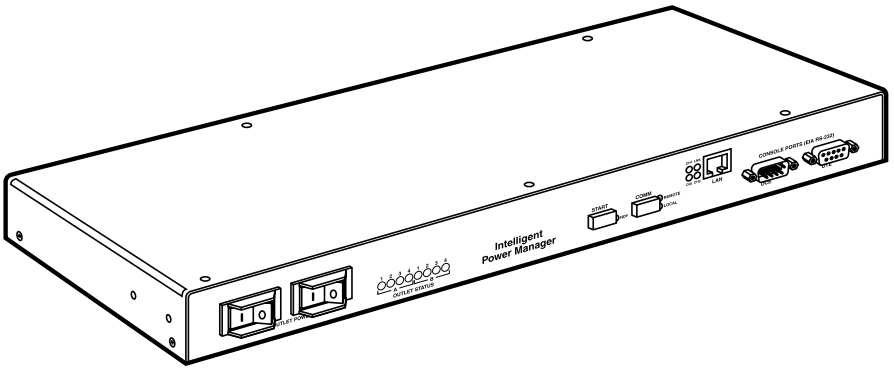
BLACK BOX®
NETWORK SERVICES

MARCH 2005
PS540A
PS545A

Intelligent Power Manager



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

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Contents

Contents (continued)

Chapter **Page**

Chapter **Page**

1. Specifications

Clamp Voltage: 184 volts

Transient Protection: None

User Controls: PS540A: (1) Single breaker on/off switch, (1) Start pushbutton, (1) Comm switch;
PS545A: (1) Dual breaker on/off switch, (1) Start pushbutton, (1) Comm switch

Connectors: PS540A: Front panel: Web/Telnet™: (1) RJ-45;
RS-232C: (1) DB9 for PDA,(1) DB9 for computer;
Rear panel: Quick disconnect: (2) 8-pin connectors;
RS-485: (1) RJ-11;
Power Output: (8) NEMA 5-15R outlet connectors;
Power Input: (1) 120-VAC input IEC connector;
Voltage, current, or temperature: (1) Phoenix terminal block header;
PS545A: Front panel: Web/Telnet: (1) RJ-45;
RS-232C: (1) DB9 for PDA,(1) DB9 for computer;
Rear panel: Quick disconnect: (2) 8-pin connectors;
RS-485: (1) RJ-11;
Power Output: (8) NEMA 5-15R outlet connectors ([4] for each input);
Power Input: (2) 120-VAC input IEC connectors;
Voltage, current, or temperature: (1) Phoenix terminal block header

Indicators: Ready, Remote, Local

Operating Temperature Tolerance: 32 to 113°F (0 to 45°C)

Humidity: Up to 95%, noncondensing

Altitude: Up to 10,000 ft. (3048 m)

Power: PS540A: Input: 95–137 VAC, 47–63 Hz;
Output: 15 amps maximum load current of all receptacles combined;
PS545A: Input: 95–137 VAC, 47–63 Hz;
Output: 30 amps (15 amps per breaker) maximum load current of all receptacles combined

Size: 1.75"H (1U) x 17.25"W x 8.25"D (4.4 x 43.8 x 21 cm)

Weight: 8 lb. (3.6 kg)

2. Overview

NOTE

In this manual and in the software screens, the Intelligent Power Manager is sometimes called the Power Distribution Unit (PDU).

2.1 Introduction

The Intelligent Power Manager is a multifunctional AC power distribution unit that controls up to eight AC loads and monitors vital parameters. Since it powers on the connected equipment sequentially, it protects your equipment from damage caused by excess power voltages generated when powering on several loads at the same time.

Two models are available: one with a single input and eight outputs (PS540A) and one with two independent inputs with four outputs for each input (PS545A). Each input has a circuit breaker to protect the power manager and its associated loads. A programmable software current limit is also available for added protection. The communication and control circuitry is protected by internal fuses. The unit can still communicate when the circuit breaker is in the tripped position.

The power manager monitors line voltage and total load current as well as line frequency. Operate and control the power manager either manually using controls on the front panel or by a remote computing device such as a laptop computer, desktop computer, or palm pilot.

2.2 Components

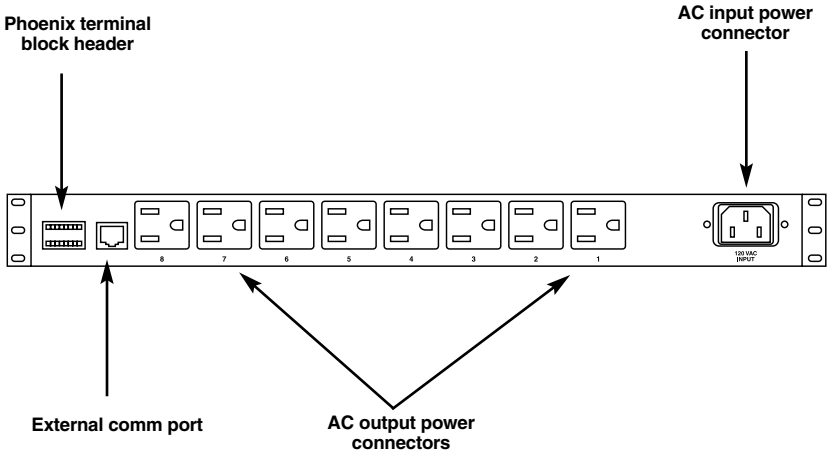

Figure 2-1. The Intelligent Power Manager's rear panel.

Table 2-1. Rear-panel components' functions.

Component	Function
Auxiliary AC input power connector	Available on the PS545A only—connects to a redundant power supply (not shown in Figure 2-1).
External comm port	Connects to a PC or terminal for remote management.
AC output power connectors	Connect to your equipment's output power connectors.
AC input power connector	Connects to the equipment's input power.
Phoenix terminal block header	Controlls voltage, current, or temperature.

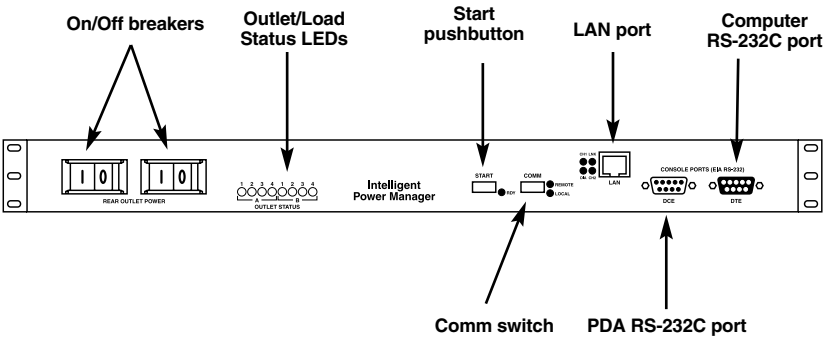

Figure 2-2. The Intelligent Power Manager's front panel.

Table 2-2. Front-panel components' functions.

Component	Function
On/Off Breakers	Powers off the remote power manager if an overvoltage occurs.
Outlet/Load Status LEDs	Lights when a load is detected on an outlet.
Start pushbutton	Press this button to start powering on the load.
Comm switch	Used for remote management.
LAN port	Connects to a LAN.
PDA RS-232C port	Connects to the PDA's serial port.
Computer RS-232C port	Connects to the computer's serial port.

2.3 Typical Application

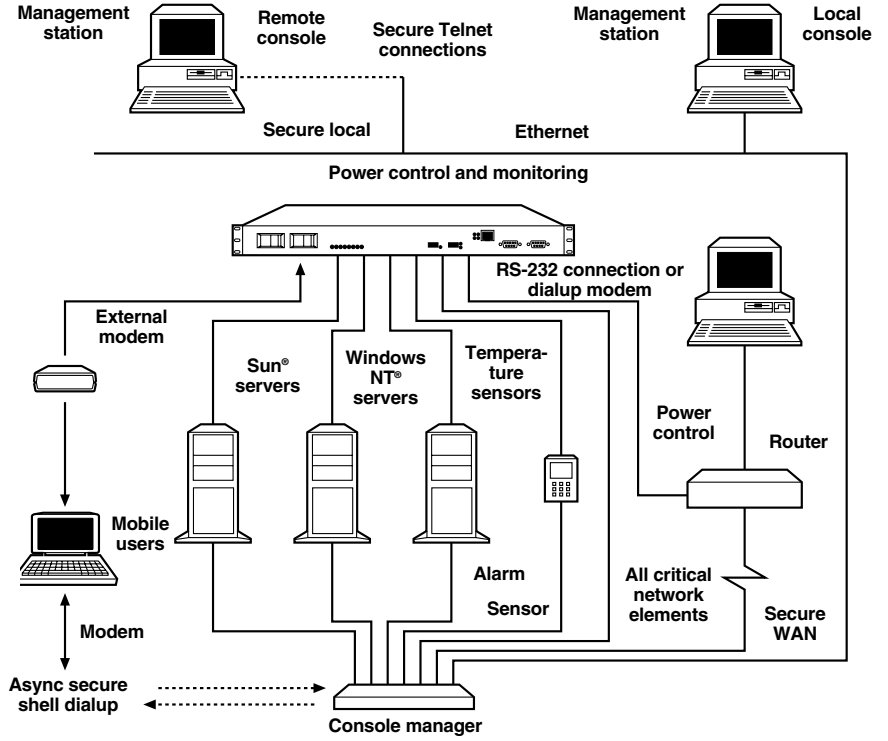

Figure 2-3. Control powered devices connected to an Intelligent Power Manager remotely from a local terminal.

2.4 What's Included

Your package should include the following items. If anything is missing or damaged, please contact Black Box at 724-746-5500.

- (1) Intelligent Power Manager
- (1) CD-ROM containing software
- (2) AC power cords
- This user's manual

3. Installation

3.1 Operating Environment

Keep the following guidelines in mind when installing the Intelligent Power Manager.

1. Place the Intelligent Power Manager in a dry area on a bench, desktop, or shelf.

2. Rackmount the power manager in an equipment rack using mounting brackets. The power manager may be flush with the front of the rack or center mounted.

3. Install the power manager in an environment that does not exceed the maximum temperature tolerance (see **Chapter 1**).

4. Allow ample airflow around the power manager for safe operation.

5. When mounting the power manager in a rack, make sure there is not uneven mechanical loading.

6. Do not overload the circuits; this may affect overcurrent protection and supply wiring.

7. Maintain reliable earth ground. Pay particular attention to supply connections other than direct connections to the branch circuit. Consult the local electrical code for additional information.

3.2 Electrical Connections

- Make sure the power switch is in the Off position.

- Connect a 3-conductor AC line cord to the AC input power connector on the rear panel. The cord must be rated equivalent to or greater than the Intelligent Power Manager's input current rating. The power source must also be rated appropriately and have a ground.

- Connect the power manager to AC outputs. Continuous current draw for all connected devices must not exceed the current rating per output group.

3.3 Communication Connection

- For LAN communications, plug the LAN cable into the RJ-45 connector on the front panel. When connecting to a 10BASE-T Ethernet LAN hub or router, use a straight-through cable. Use a crossover cable if connecting the power manager directly to a PC LAN port.
- For an RS-232 or laptop computer, use a straight-through serial cable to the power manager's front-panel RS-232 (DB9 female) connector. Palm PDAs connect directly to the front-panel DB9 male connector. A null modem is not required.
- Use the rear-panel RJ-11 connector to attach to an RS-485/RS-422 interface.

CAUTION

Do not connect the the RJ-11 connector to a telephone network.

Do not connect any cable to the rear RJ-11 connector unless the connector's internal configuration is known. The power manager or connected computing device may be damaged.

3.4 Auxiliary Input and Output Connections

- Temperature probe input, isolated inputs, and programmable isolated relay outputs connect to the back-panel Phoenix terminal block header. A pluggable mating connector with screw clamp type connectors is included.
- See the commands for direct relay control AFFCA and AFFCB (**Section 4.2**) for information on setting up the programmable relays.
- See commands AFFW1 and AFFW2 (**Section 4.2.17**) for using the input signals. These signals are generated when two points on the auxiliary connector are connected or disconnected from signal ground.

4. Operation

4.1 Overview

FF is the Intelligent Power Manager's default address setting. All basic commands begin with AFF. If you change the power manager's address to another hex number, the command structure will also change. Use the command set described in this chapter to change control and configuration settings.

NOTE

You can only configure the LAN module through the LAN connection. Please see Chapter 5 for LAN module configuration.

The basic commands are valid only when the Intelligent Power Manager is in the remote mode and the attached devices are communicating using RS-232, RS-422/485, or Telnet. If you use an external software program to issue commands, choose a delay of 10 milliseconds between characters and 40 milliseconds between commands being sent. If you type the hex commands, no delays are necessary.

4.2 Hex Commands

The following commands are based on factory-default settings. The "A" at the beginning of the command is an arbitrary letter chosen to indicate the beginning of a command to the Intelligent Power Manager.

The "A" or "B" at the end of the command represents each input for the 2 x 4 model. (The inputs are also called Channel A and Channel B.) For example, AFFVA asks the power manager for the voltage on input A and AFFVB asks the power manager for the voltage on input B. For the 1 x 8 unit, there's only one input. For the single-input model (PS540A), commands A and B are still valid, but they both point to the same input voltage, current, etc.

Type a carriage return after typing in a command.

Command	Explanation	Response
AFFB	Returns the current baud rate setting.	UFFB1
AFFB0	Set the baud rate to 4800 bps.	UFFB0
AFFB1	Set the baud rate to 9600 bps.	UFFB1
AFFB2	Set the baud rate to 19,200 bps.	UFFB2
AFFB3	Set the baud rate to 38,400 bps.	UFFB3

NOTE

If a LAN module is present, do not change the baud rate. Use the LAN module configuration menu on Telnet port 9999, menu choice 1 (Channel 1 configuration).

When the power manager is powered on, all external contact relays (bottom row, pins 6, 7, 8) are on.

Command	Explanation	Response
AFFCA	Returns the external contact's configuration setting.	UFFCA FF
AFFCA FF	Sets the external contacts to monitor an undervoltage condition on Channel A (see the AFFUA command in **Section 4.2.14** for setpoint details).	UFFCA FF
AFFCA DD	Sets external contacts to monitor an overcurrent condition on Channel A (see the AFFLA command in **Section 4.2.5** for setpoint details).	UFFCA DD
AFFCA CC	Sets the external contacts to monitor an overtemperature condition (see the AFFK command in **Section 4.2.6** for setpoint details).	UFFCA CC
AFFCA 00	Sets the external contacts to the Off position.	UFFCA 00
AFFCA 01	Sets the external contacts (top row, pins 1, 2, 3) to the On position. When the power manager is powered on, the external contact relays are on.	UFFCA 01
AFFCB	Returns the external contact configuration setting.	UFFCB FF
AFFCB FF	Sets the external contacts to monitor an undervoltage condition on Channel A (see the AFFUB command in **Section 4.2.14** for setpoint details).	UFFCB FF

Command	Explanation	Response
AFFCB DD	Sets the external contacts to monitor an overcurrent condition on Channel A (see the AFFLB command in **Section 4.2.5** for setpoint details).	UFFCB DD
AFFCB 01	Sets the external contacts to the On position.	UFFCB 01

4.2.1 Sequence Delay

Command	Explanation	Response
AFFD	Returns the current time delay between each outlet powering on or off in tenths of seconds.	UFFD010
AFFD050	Changes the time delay to 5 seconds between each outlet turning on or off. Valid settings are from 001 to 300.	UFFD050

4.2.2 Turn Off All Outlets

Command	Explanation	Response
AFFE	Turns all the outputs off at the same time.	UFFE

4.2.3 Line Frequency

Command	Explanation	Response
AFFFA	Returns the line frequency for Channel A.	UFFFA060.0 HZ
AFFFB	Returns the line frequency for Channel B.	UFFFB060.0 HZ

4.2.4 Total Load Current

Command	Explanation	Response
AFFIA	Returns the total load current for Channel A.	UFFIA12.13 Amps
AFFIB	Returns the total load current for Channel B.	UFFIB10.11 Amps

4.2.5 Power On Current Limit

Command	Explanation	Response
AFFLA	Returns the power on current limit setting for Channel A. Once the load current equals or exceeds this value, the remaining outlets will not be energized. The valid range is 2.0 to 25.5 amps (14 to FF hex).	UFFLA 96
AFFLA 66	Changes the power on the current limit setting for Channel A to 12 amps. This value is scaled by 10.0 and then converted to a hex number. For example, 12.0 amps desired trip x 10.0 = 120, then converted to a hex number = 78.	UFFLA 78
AFFLB	Returns the power on the current limit setting for Channel B. Once the load current equals or exceeds this value, the remaining outlets will not be energized. The valid range is 2.0 to 25.5 amps (10 to FF hex).	UFFLB 96

Command	Explanation	Response
AFFLB 32	Changes the power on current limit setting for Channel B to 5.0 amps. This value is scaled by 10.0 and then converted to a hex number. For example, 5.0 amps desired trip x 10.0 = 50, is then converted to a hex number =32.	UFFLA 32
	If the current limit is exceeded during sequencing, the power manager will respond with `IOVER` and the outlet numbers that were not turned on. (This displays on the connected serial terminal's screen.)	IOVER8

4.2.6 Remote Temperature Settings

Command	Explanation	Response
AFFK	Returns the current overtemperature setting.	UFFK FF
AFFK 37	Changes the value of the overtemperature setpoint to 37 hex. 37 = 55 degrees C. The valid range is from 00 to FF hex. (FF = off/sensor not connected.)	UFFK 37

4.2.7 Master/Slave Configuration

Command	Explanation	Response
AFFM	Returns the master/slave setting.	UFFM0
AFFM0	Changes the master/slave setting to a standalone unit.	UFFM0

Command	Explanation	Response
AFFM1	Changes the master/slave setting to a master.	UFFM1
AFFM2	Changes the master/slave setting to a slave.	UFFM2

4.2.8 Address

Command	Explanation	Response
AFFN	Returns the power manager's current address.	UFFNFF
AFFNAA	Changes the power manager's address to AA. The valid range is from 00 to FF hex.	UFFNAA

4.2.9 Turn On Outlets

Command	Explanation	Response
AFFP	Sequences outlets 1 through 8 on in the order of the programmed startup sequence.	UFFP
AFFPA	Sequences outlets 1 through 4 on in the order of the programmed startup sequence.	UFFPA
AFFPB	Sequences outlets 5 through 8 on in the order of the programmed startup sequence.	UFFPB

4.2.10 Sequence Off Outlets

Command	Explanation	Response
AFFQ	Sequences the outlets off in the reverse order of the startup sequence.	UFFQ
AFFQA	Sequences outlets 1 through 4 off in the reverse order of the startup sequence.	UFFQA
AFFQB	Sequences outlets 5 through 8 off in the reverse order of the startup sequence.	UFFQB

4.2.11 Direct Outlet Access

Command	Explanation	Response
AFFr01	Returns outlet #1's status.	UFFr01
AFFr01 0	Turns outlet #1 off.	UFFr01 0
AFFr01 1	Turns outlet #1 on.	UFFr01 1
AFFr02	Returns outlet #2's status.	UFFr02 1
AFFr02 0	Turns outlet #2 off.	UFFr02 0
AFFr02 1	Turns outlet #2 on.	UFFr02 1
AFFr03	Returns outlet #3's status.	UFFr03 1
AFFr03 0	Turns outlet #3 off.	UFFr03 0
AFFr03 1	Turns outlet #3 on.	UFFr03 1
AFFr04	Returns outlet #4's status.	UFFr04 1

Command	Explanation	Response
AFFr04 0	Turns outlet #4 off.	UFFr04 0
AFFr04 1	Turns outlet #4 on.	UFFr04 1
AFFr05	Returns outlet #5's status.	UFFr05 1
AFFr05 0	Turns outlet #5 off.	UFFr05 0
AFFr05 1	Turns outlet #5 on.	UFFr05 1
AFFr06	Returns outlet #6's status.	UFFr06 1
AFFr06 0	Turns outlet #6 off.	UFFr06 0
AFFr06 1	Turns outlet #6 on.	UFFr06 1
AFFr07	Returns outlet #7's status.	UFFr07 1
AFFr07 0	Turns outlet #7 off.	UFFr07 0
AFFr07 1	Turns outlet #7 on.	UFFr07 1
AFFr08	Returns outlet #8's status.	UFFr08 1
AFFr08 0	Turns outlet #8 off.	UFFr08 0
AFFr08 1	Turns outlet #8 on.	UFFr08 1

4.2.12 Outlet Status

Command	Explanation	Response
AFFS	Returns the unit's status. The status is displayed in hex format. The fifth digit represents outlets 8 through 5 MSB to LSB, and the sixth digit represents outlets 4 through 1 MSB to LSB. If the outlet is on, the bit representing that outlet is turned on (0 = no, 1 = yes). The seventh digit represents remote (R) or local (L) mode.	UFFSFFR
AFFS00	Turns all relays off simultaneously. The last two digits of the command are in hex format and will control all 8 relays. This command controls multiple relays at the same time. Use any two-digit hex number combination between 00 and FF.	UFFS00R

4.2.13 Temperature Measurement

Command	Explanation	Response
AFFT01	Returns the value of the first outlet to power on.	UFFT01
AFFT02	Returns the value of the second outlet to power on.	UFFT02
AFFT03	Returns the value of the third outlet to power on.	UFFT03
AFFT04	Returns the value of the fourth outlet to power on.	UFFT04

Command	Explanation	Response
AFFT05	Returns the value of the fifth outlet to power on.	UFFT05
AFFT06	Returns the value of the sixth outlet to power on.	UFFT06
AFFT07	Returns the value of the seventh outlet to power on.	UFFT07
AFFT08	Returns the value of the eighth outlet to power on.	UFFT08
AFFT01 08	Sets outlet #8 to turn on first in the programmed sequence.	UFFT01 08
AFFT02 07	Sets outlet #7 to turn on second in the programmed sequence.	UFFT02 07
AFFT03 06	Sets outlet #6 to turn on third in the programmed sequence.	UFFT03 06
AFFT04 05	Sets outlet #5 to turn on fourth in the programmed sequence.	UFFT04 05
AFFT05 04	Sets outlet #4 to turn on fifth in the programmed sequence.	UFFT05 04
AFFT06 03	Sets outlet #3 to turn on sixth in the programmed sequence.	UFFT06 03
AFFT07 02	Sets outlet #2 to turn on seventh in the programmed sequence.	UFFT07 02
AFFT08 01	Sets outlet #1 to turn on eighth in the programmed sequence.	UFFT08 01

4.2.14 Undervoltage Setpoints

Command	Explanation	Response
AFFUA	Returns the current value of the "A" channel undervoltage dropout setpoint in hex format (5A = 90 VAC).	UFFUA 5A
AFFUA D2	Changes the value of the "A" channel undervoltage dropout setpoint to D2 hex (D2 = 210 VAC). The valid range is from 00 to FF hex.	UFFUA D2
AFFUB	Returns the current value of the "B" channel undervoltage dropout setpoint in hex format (5A = 90 VAC).	UFFUB 5A
AFFUB D2	Changes the value of the "B" channel undervoltage dropout setpoint to D2 hex (D2 = 210 VAC). The valid range is from 00 to FF hex.	UFFUB D2

4.2.15 Software Version

Command	Explanation	Response
AFFv	Returns the microprocessor software version.	UFFvSSJR 1X8 v3.4

4.2.16 Line Voltage Measurement

Command	Explanation	Response
AFFVA	Returns the input voltage level for Channel A.	UFFVA123.5 Volts
AFFVB	Returns the input voltage level for Channel B.	UFFVB118.5 Volts

4.2.17 Remote Message/Word Function

Command	Explanation	Response
AFFW1	Returns the #1 remote message's value (FF not active, 00 active).	UFFW1 FF
AFFW1 00	Activates the #1 remote message function.	UFFW1 00
N/A	Indicates a remote message.	UFFW1 01
AFFW2	Returns the #2 remote message's value (FF not active, 00 active).	UFFW2 FF
AFFW2 00	Activates the #2 remote message function.	UFFW2 00
N/A	Indicates a remote message.	UFFW2 01

4.2.18 Restore Factory Defaults

Command	Explanation	Response
AFFZ	Changes all settings back to the factory-default settings.	UFFZ

NOTES

1. **All messages are prefixed with *Axx*, where "*A*" is an ASCII upper-case character (hex code = 41). "*xx*" is a two-character hex code address in the range 00 to FF representing an ASCII code address range from 0 to 128. Hex address 00 is the general broadcast address to all devices.**

2. **All commands and responses end with an ASCII carriage-return character (hex code = 0D).**

3. **To abort a command before sending a carriage return, type a Cancel (hex = 18), or Escape (hex = 1B) character. The power manager will discard any previous characters and immediately look for a valid address header.**

4. **Intelligent Power Managers that receive messages with a correct address, but fail to recognize the specific command parameters or have illegal command parameters, will return a response with the command that was entered followed by a "?".**

5. **The power manager will respond to a broadcast command with address "00" only if you press the Start button while the power manager is in the remote operation mode.**

5. Configuration

The Intelligent Power Manager utility provides a graphical user interface to operate and control several units.

5.1 System Requirements

- 32-bit Windows® operating systems, including Windows 95, Windows 98 and later or Windows NT 4.0 with service pack 3, Windows 2000 and later
- Internet Explorer 4.0 or later
- Video resolution of 800 x 600 in high color mode
- 64 MB of RAM
- One open COM port for RS-232 communication
- Windows mouse or compatible pointing device

5.2 Program Setup

The installation program will install the program and create system shortcuts in the system Start menu.

To remove the program, follow the instructions from your particular operating system. These directions normally point you to the Control Panel Add/Remove Programs wizard.

NOTE

Some installations might require a reboot in order to update runtime files or controls before final installation.

To install the program, load the CD into the computer that will control the Intelligent Power Manager using a serial interface. Launch the program by double-clicking on the **SETUP.EXE** icon. The window shown in Figure 5-1 will appear.

NOTE

In the screens that appear during program setup and use, the Intelligent Power Manager is called PDU (Power Distribution Unit).

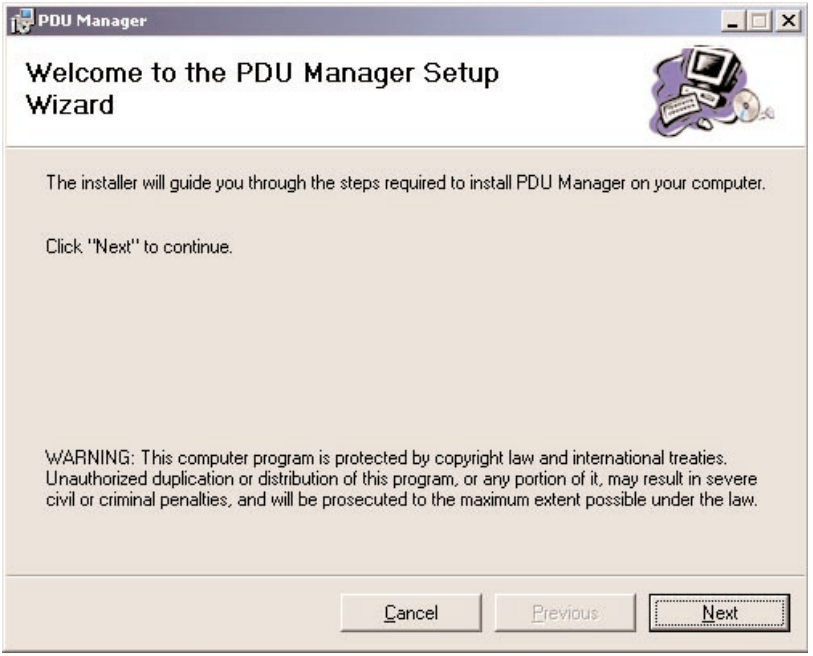

Figure 5-1. Control software setup screen.

Click on **Next** to install the software. The program will then display a window where you can select the destination directory on the computer where the software will be installed. See Figure 5-2. Or, click on **Cancel** to stop the installation or **Previous** to go back to the previous screen.

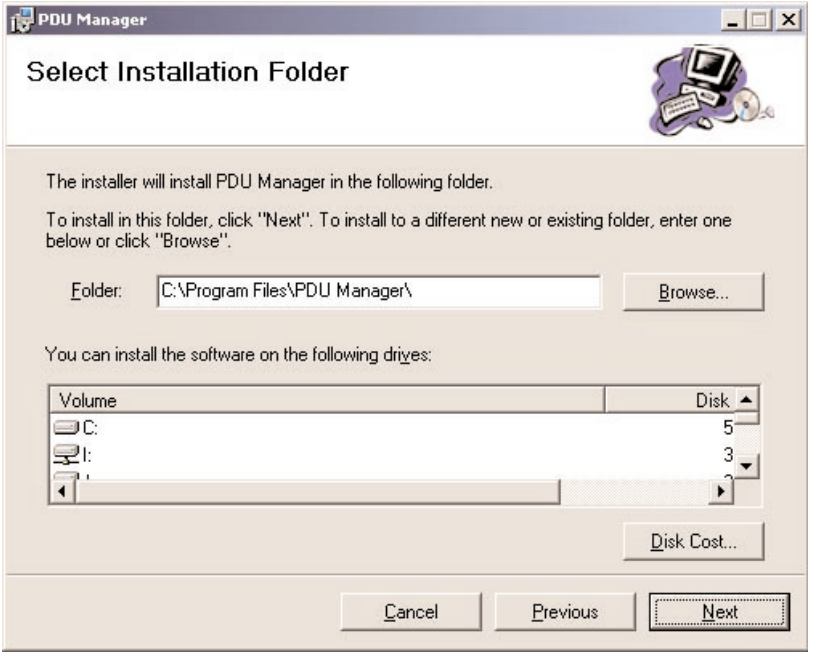

Figure 5-2. Select Installation Folder screen.

Using the **Browse** button to select a folder from the drop-down menu, choose the folder where the software will be installed. Then click on the **Next** button. The software will self install in the desired location. The installation progress will be displayed in the form of several progress bars. Once completed, the window shown in Figure 5-3 will appear. Or, click on **Cancel** to stop the installation or **Previous** to go back to the previous screen. To show the amount of disk space that's available, click on the **Disk Cost** button.

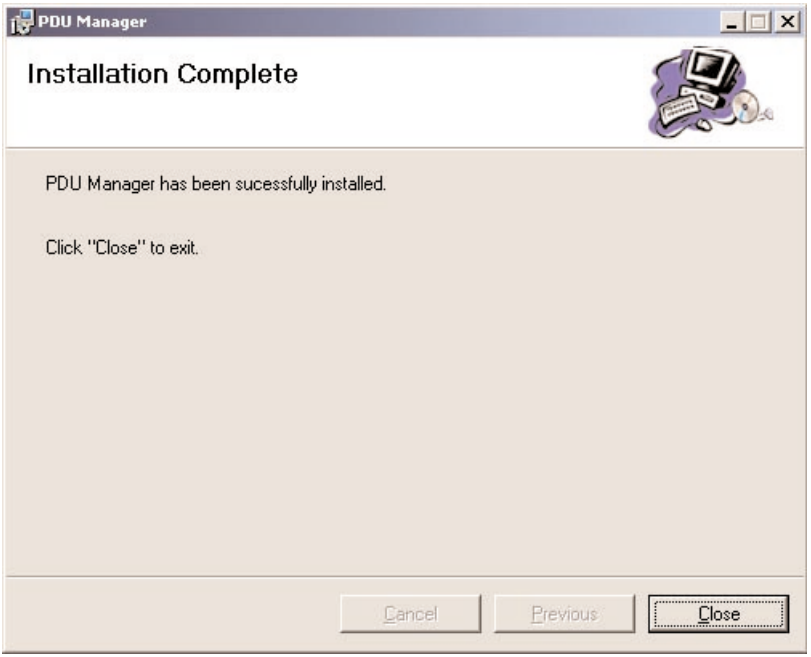

Figure 5-3. Software installed successfully.

Once installed, click on the **Close** button to close the window. An icon is now on your desktop. Click on the icon to launch the control program. Or, click on **Cancel** to stop the installation or **Previous** to go back to the previous screen.

5.3 Window Layout

The management software consists of a main status window and three icons at the top of the screen (see Figure 5-4). From left to right, these icons are PDU Communications, Disconnect from PDU, and Process Window Manager. To get to this window, click on the icon to launch the control program that's described in **Section 5.2**. The icons allow you to connect to an Intelligent Power Manager, disconnect from a power manager, and open sub-windows associated with a given power manager for additional control and monitoring.

Start by clicking on the **PDU Communications** icon (the leftmost icon) in the upper left corner of this screen.

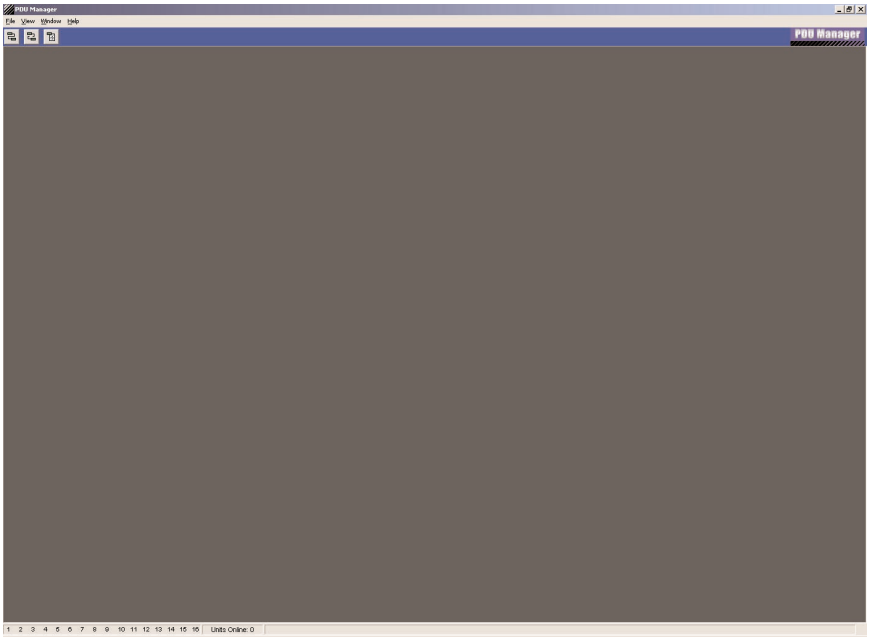

Figure 5-4. Connect to an Intelligent Power Manager.

5.4 Communication and Display Setup

The window shown in Figure 5-5 allows you to configure the software so it can communicate with the power manager. This screen appears when you click on the PDU Communications icon in Figure 5-4. Information that you enter in this screen will be associated with the power manager when additional control and monitoring screens are displayed.

Before you connect the software to the power manager, from the drop-down menus in Figure 5-5:

- Select the RS-232 COM port to use (1–16).
- Select the PC COM port baud rate (4800, 9600, 19,200, 38,400).
- Select the Intelligent Power Manager address in hexadecimal (00–FF).
- Select the temperature control button.

- Click on the Intelligent Power Manager model type (1 x 8, 2 x 4).

Once you choose the proper configuration, click on the **Connect to PDU** button in the lower left-hand corner of the window.

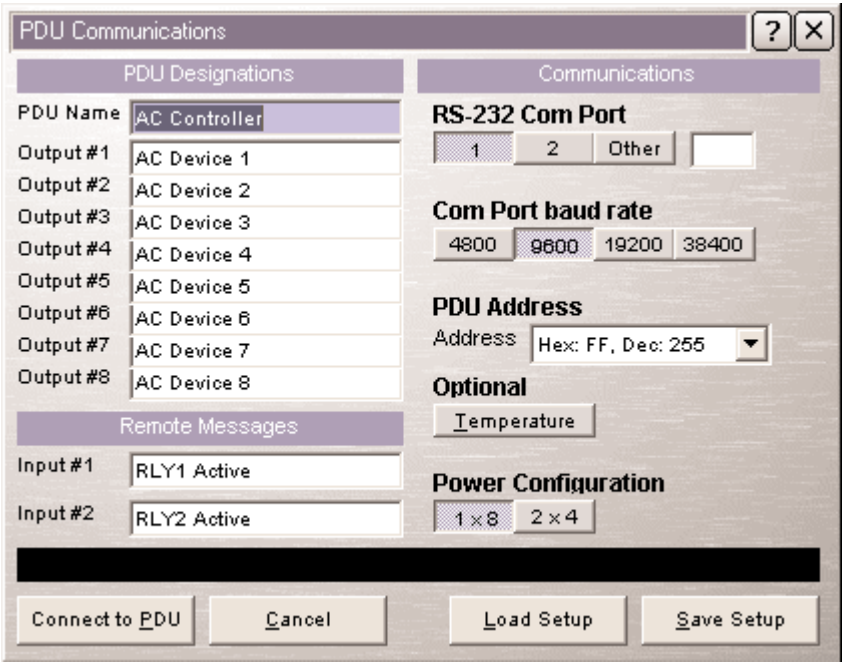

Figure 5-5. Configure communication settings.

Click on **Cancel** to stop the selection, **Load Setup** to load settings that were already defined and saved for a specific Intelligent Power Manager in a previous RS-232 session, or **Save Setup** to save the settings.

When the Intelligent Power Manager is located, the status line will say `PDU FOUND`. The power manager's monitoring variables will be transferred to the PC for display. Once the variables are loaded, the power manager will be visible on the Global PDU Status window.

If the software will not connect, verify that you're using the correct cables and have selected the correct baud rates. Or, call Tech Support at 724-746-5500.

5.5 Process Window Manager

The Process Window Manager allows you to open sub-windows for any given Intelligent Power Manager. To get to this screen, click on the Process Window Manager icon (the rightmost icon) in the top left of the main window (Figure 5-4). Figure 5-6 appears.

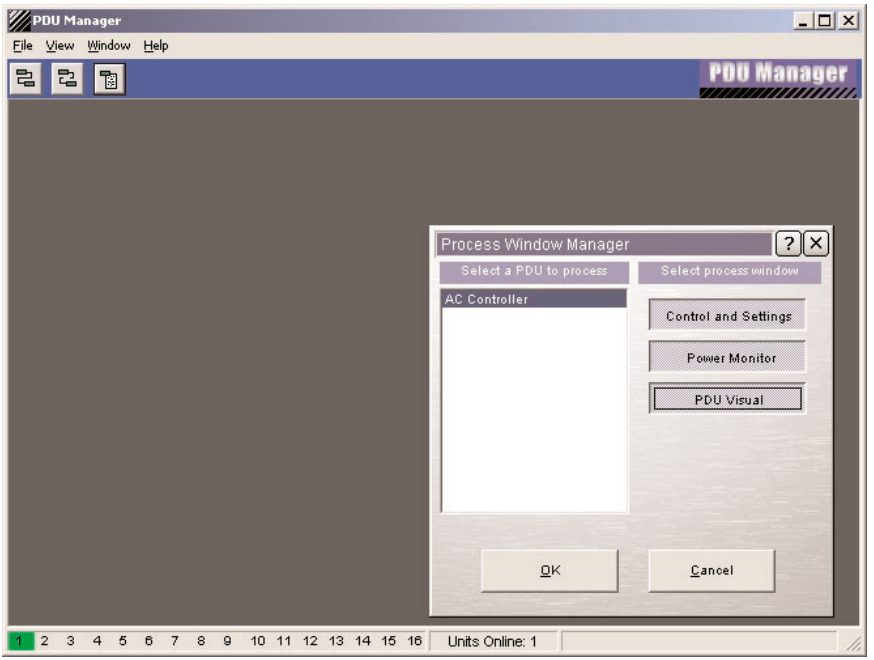

Figure 5-6. Control and monitoring windows.

Select the desired Intelligent Power Manager and then select any or all of the process windows for the Intelligent Power Manager. Once the selection is made, click on **OK** to display the windows. The windows will be placed on the main screen. They can be positioned to suit your needs. Or, click on **Cancel** to stop the selection.

If you pressed **OK** in Figure 5-6, Figure 5-7 appears. It shows all windows.

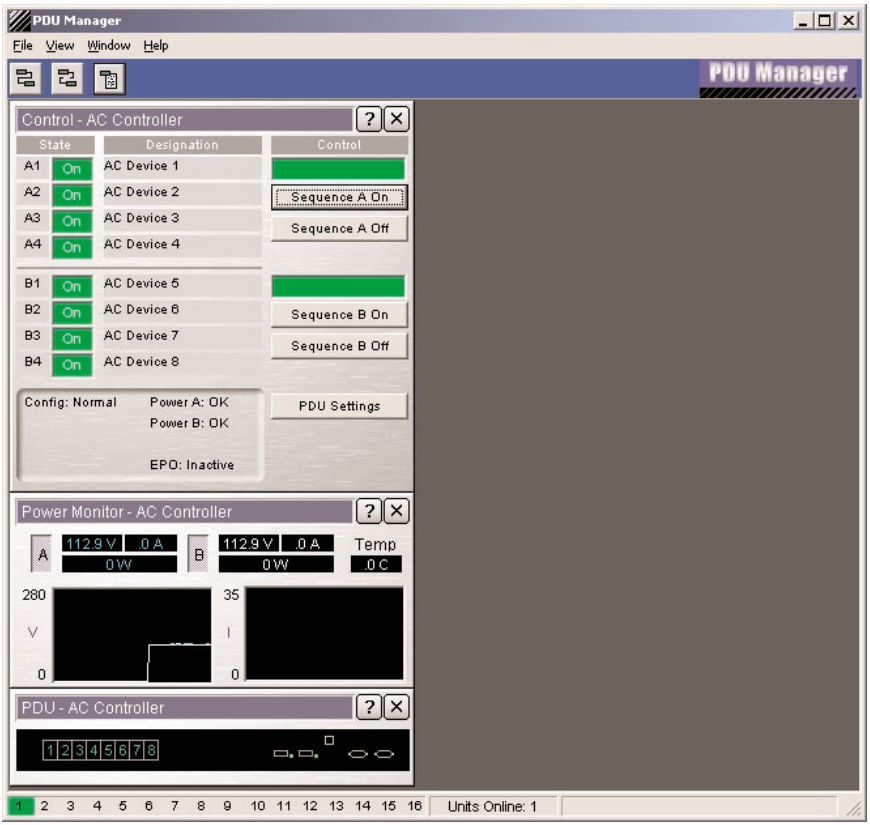

Figure 5-7. Example of all windows.

Power monitor and PDU windows remotely monitor the Intelligent Power Manager. They display the power manager's graphical representation and the parameters that are being measured.

5.6 Control Window

The Control window (shown in the top menu of Figure 5-7) allows you to turn individual outlets off or on, sequence the outlets off or on, and change the Intelligent Power Manager control settings. This window appears when you click on **OK** in Figure 5-6. When using the outlet buttons to control the outputs, the Intelligent Power Manager will remember the state of the outlets when power is removed and then reapplied. Those outlets that were turned off will remain off. If you use the Sequence Off button (on the right side of Figure 5-7), all outlets that were in the On state before sequencing off will sequence back on by selecting the

Sequence On button (also on the right side of Figure 5-7) or by removing and re-applying AC input power.

When you click on the **PDU Settings** button in Figure 5-7, Figure 5-8 appears. This figure contains a vertical menu on its left side. Options available in this menu include Sequencing, Communication, Alarm Settings, Auxiliary I/O, and Exit. These options are described in **Sections 5.6.1** through **5.6.5**.

5.6.1 Sequencing Properties

The sequencing window (Figure 5-8) allows you to change the order that the outputs will sequence on and the time delay between each output turning on. The reverse order and same time delay is used during a down sequence.

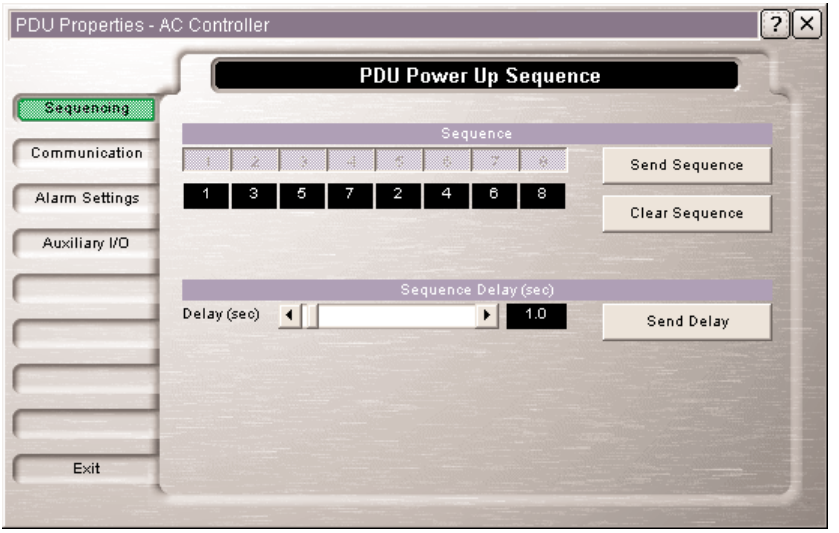

Figure 5-8. Sequencing and delay settings.

5.6.2 Communication Settings

The communication window (Figure 5-9) allows you to change the baud rate, Intelligent Power Manager address, and master/slave configuration settings. To get to this window, click on **Communication** in Figure 5-8. These settings are changed in the microprocessor only. For units that contain a LAN Module, any communication changes should be made from the LAN Module configuration software screens.

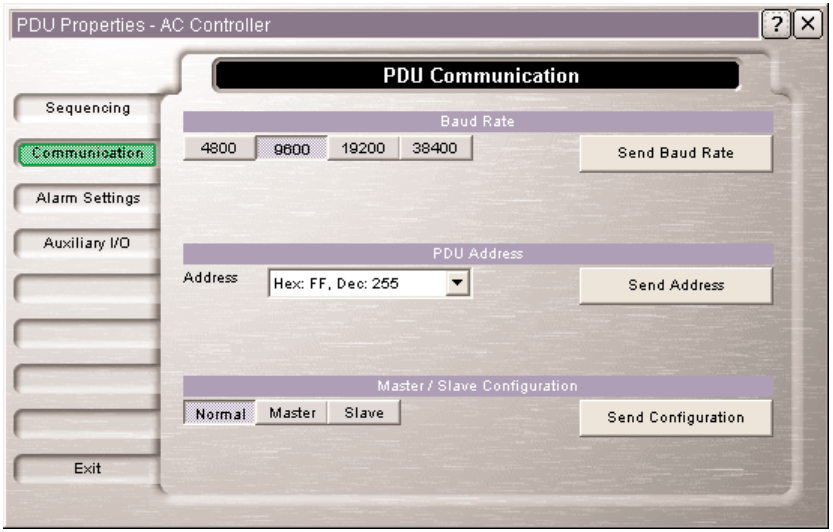

Figure 5-9. Communication settings.

5.6.3 Alarm Settings

The alarm settings window (Figure 5-10) allows you to change the software undervoltage, power on current limit, and temperature limit settings. To get to this window, click on **Alarm Settings** in Figure 5-8. The undervoltage and current limit screens are shown for a single-input unit. On dual-input units there are undervoltage and power on current limits for each input. Each input can have a unique setting.

After the value is chosen, you must send the setting to the Intelligent Power Manager before exiting the screen by pressing the appropriate **Send** button.

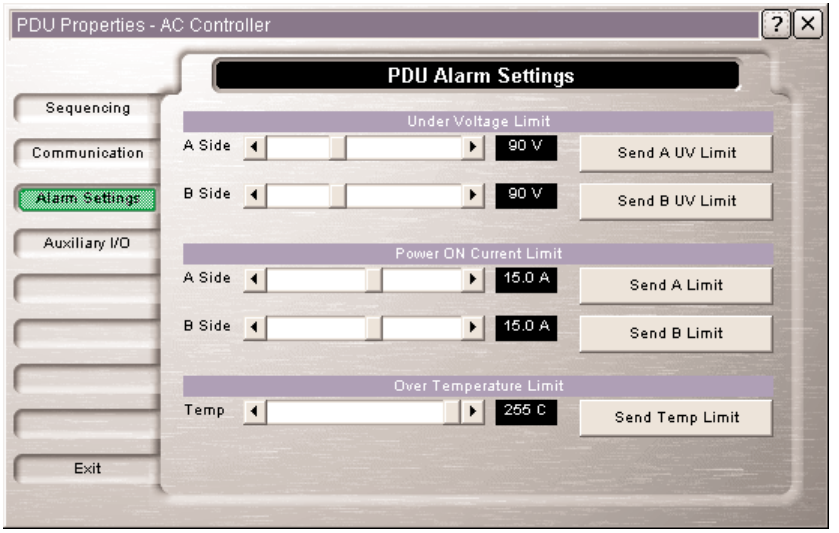

Figure 5-10. Alarm settings for single- or dual-input units.

5.6.4 AUXILIARY SETTINGS

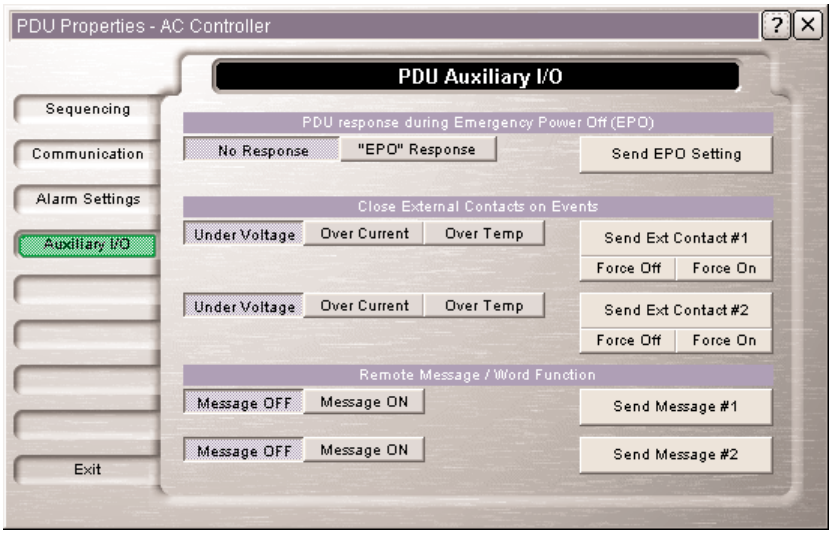

Figure 5-11. Auxiliary settings.

There is a green Phoenix terminal block header connector on the back panel of the Intelligent Power Manager (see Figure 2-1). The external contacts can be forced on or off by selecting the correct button, or they can be controlled by voltage, current, or temperature. The actuation level of the parameter is set by the values programmed in **Section 5.6.3**.

The unit has the capability of displaying a message based on an input on the auxiliary connector located on the rear. If there is a change in state on either of the inputs, a message of "UFFW1" or "UFFW2" appears if the message function is enabled. When used with the LAN Module, an actual text message can be displayed or e-mailed.

5.6.5 EXIT

Click on this button to exit the Control window.

6. LAN Module and Communications

6.1 LAN Module Interface

The LAN Module provides an interface between a computer network and the Intelligent Power Manager using the front RJ-45 connector (described in Figure 6-1 and Table 6-1). Communications between the Intelligent Power Manager and a computer can take place via a Telnet session or Web browser. The module operates at 10-/100-Mbps via an Ethernet connection for both configurations.

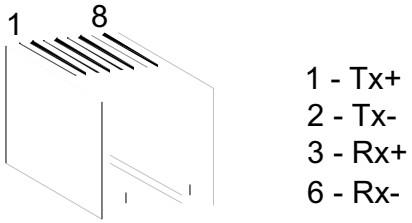

Figure 6-1. LAN connector (RJ-45).

Table 6-1. LAN connector pinout.

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
4	None
5	None
6	Rx-
7	None
8	None

The LAN module consists of integrated hardware and a network agent software program. These components provide the ability to configure, control, and monitor multiple power managers using a standard Web browser. The network interface can operate using Telnet, SNMP, and SMTP protocols.

The LAN Module is configured at the factory with an IP address of 192.168.1.10 and a netmask of 255.255.255.0. The module gets an IP address via DHCP or AutoIP.

6.2 LAN Module IP Address and DHCP

The module gets an IP address via DHCP, if a DHCP server exists on the network and the IP address is set to 0.0.0.0. Upon power on, if the IP address is set to 0.0.0.0, a DHCP server on the network will supply the LAN Module with an IP address, gateway address, and subnet mask. If no DHCP server exists, the LAN Module's red diagnostic LED will blink continuously and the screen status LED will blink five times. Call Tech Support if IP configuration is needed when using DHCP. Record the module's IP address.

6.3 LAN Module IP Address and AutoIP

To enable AutoIP, the IP address must be set to 0.0.0.0. AutoIP allows the module to obtain an address in a network that does not have a DHCP server. AutoIP assigns a random valid address to the LAN Module in the range of 169.254.*x*.1 to 169.254.*x*.1 where *x* is a number between 0 and 255. Don't use this range of IP addresses over the Internet. If a LAN Module has not been configured manually and cannot find a DHCP server, it automatically chooses an address from the reserved range. The LAN Module then uses the Address Resolution Protocol (ARP) to send out a request asking if any node uses that same address or not. If another node using the same address is found, the LAN Module will assign another IP address, reboot, and repeat the sequence.

The purpose of AutoIP is to allow a small network of AutoIP-enabled devices to be set up without any need for a DHCP server. Setting the IP address to 0.0.1.0 can disable AutoIP.

6.4 LAN Module IP Address and ARP

If a link can be established on a network but you cannot ping the module's IP address, you might need to reconfigure the IP address using the MAC address. The MAC address is a unique serial number given to every device that could be connected to a LAN. The MAC address is on a label on the module's rear panel. If the label has been removed, contact your IT department for additional help in identifying the MAC address or IP addresses trying to connect to the network. There are software packages that can scan a network for all devices connected, then the power manager can be connected and the software will show the newly connected device's attributes. From this information you will be able redefine the

power manager's IP address and netmask to the necessary settings for the application.

The ARP method is available under Windows based systems. The LAN Module will set its address from the first directed TCP/IP packet it receives. You'll need the MAC address for the LAN Module that is being changed.

In order for the ARP command to work on Windows, the ARP table on the PC must have at least one IP address defined other than its own. If the ARP table is empty, the command will return an error message. Type `ARP -A` at the DOS prompt to verify that there is at least one entry in the ARP table.

If the local computer is the only entry, ping another IP address on the network to build a new entry in the ARP table. The IP address that you ping must be a device other than the machine on which you are issuing the ARP command. Once there is at least one additional entry in the ARP table, use the following command to ARP an IP address to the LAN Module.

```
arp -s 192.168.1.10 00-20-4A-xx-xx-xx
```

The last string of characters is the MAC address for the power manager that you are trying to send the new IP address.

The next step is to open a Telnet session on port 1. The connection will quickly fail, but the LAN Module will temporarily change its IP address to the one designated in the ARP command.

The final step is to open a Telnet session on port 9999 to permanently save the IP address. Using the ARP command only temporarily changes the IP address. If you reset or power off the LAN Module, it will revert back to the previous setting.

6.5 Telnet Communications

Telnet is supported on port 3001 and provides a command line interface. Issue any power manager commands as described in **Chapter 5**.

To configure the LAN Module over the network, establish a Telnet connection to port 9999. From the Windows Start menu, click on **Run** and type the following command (shown on the next page), where *x.x.x.x* is the IP address and *9999* is the LAN Module's fixed network configuration port number.

NOTE

Be sure to include a space between the IP address and 9999.

The default IP address is 192.168.1.10, so the command will be:

```
telnet 192.168.1.10 9999
```

This command will launch the Configuration menu. After the first sentence appears, press **Enter** to go into the setup mode. The menu shown in Figure 6-2 will appear. **Sections 6.5.1** through **6.5.12** describe the Configuration menu options.

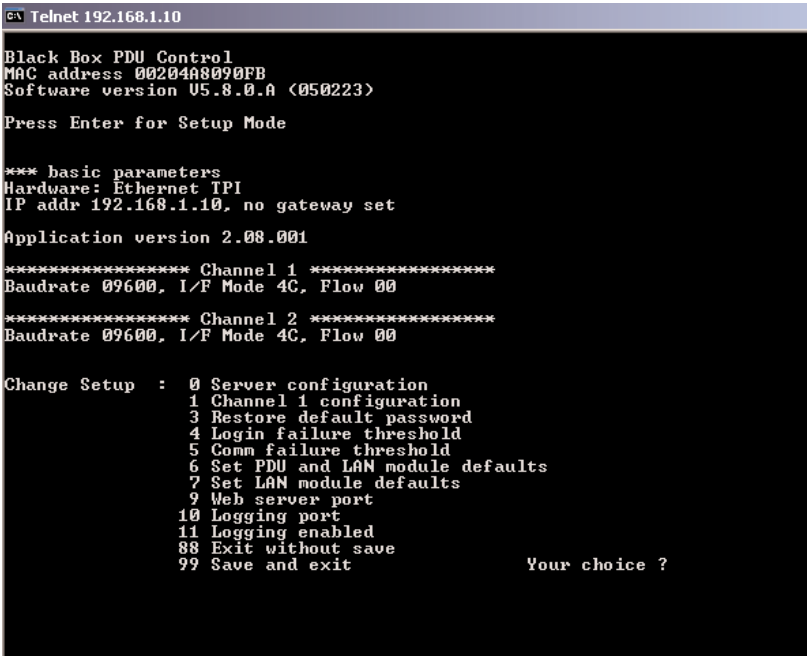

Figure 6-2. Configuration menu using Telnet.

IP Address

The IP address must be set to a unique value in your network. Type in the new IP address at the prompt. You may type a "." between the number groups or press **Enter**. See your LAN administrator for more information about IP addressing and network configuration.

NOTE

The LAN Module cannot connect to the network if the assigned IP address is already in use by another device.

Gateway Address

The gateway address (or router) allows communication to other LAN segments. The gateway address should be the IP address of the router that's connected to the same LAN segment as the LAN Module. If a router is not present in the network or if a crossover cable is being used, then we recommend that you program the IP address for the computer that will be controlling the power manager in the gateway address.

NOTE

The gateway address must be within the local network.

Subnet Mask

A netmask defines the number of bits taken from the IP address that are assigned for the host section. Choose 24, 16, or 8 bits for Class A, B, or C.

The LAN Module prompts you to enter the number of host bits, then calculates the netmask, which is displayed in standard decimal-dot notation when the saved parameters are displayed (for example, 255.255.255.0).

Telnet Configuration Password

Setting the Telnet configuration password prevents unauthorized access of the setup menu via a Telnet connection to port 9999. The password is limited to 4 characters. Option 0 allows you to change the IP address, enter the gateway IP address, configure the netmask, and change the Telnet configuration password.

You can configure the parameters by typing in one of the numbers on the Change Setup menu, or you can confirm default values by pressing **Enter**. Then type in `99` to save the new configurations and exit the program.

6.5.1 Server Configuration

Select **0** to configure the LAN Module's basic parameters.

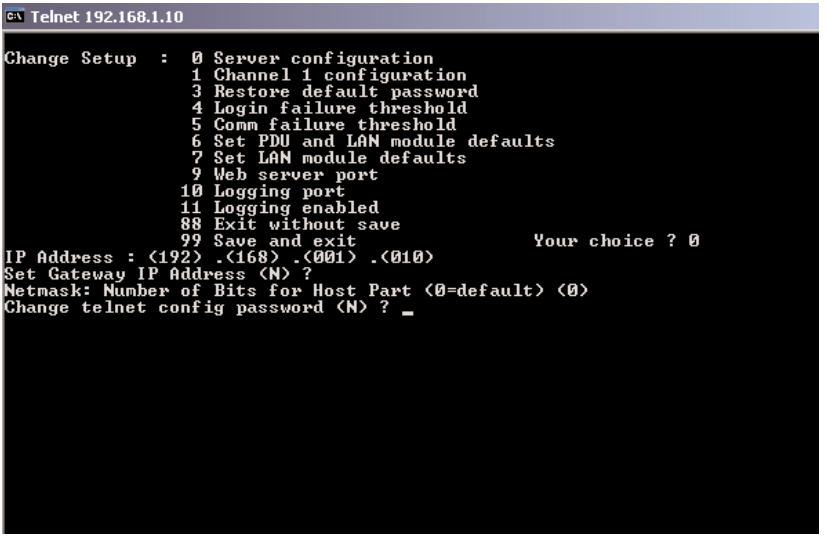

Figure 6-3. Server configuration.

6.5.2 Channel 1 Configuration

Channel 1 configuration reconfigures the RS-232 serial communications. (See Figure 6-4.) The factory defaults of 9600 baud rate, I/F mode 4C, and Flow 00 represent the scheme used on the serial channel between the LAN Module and the internal microprocessor. These same settings apply to the front RS-232 DB9 connectors. If a new baud rate is needed for RS-232 communications, make the change using this menu. Do not make changes using the low-level baud rate command in **Section 5.6.2** if a LAN Module is present.

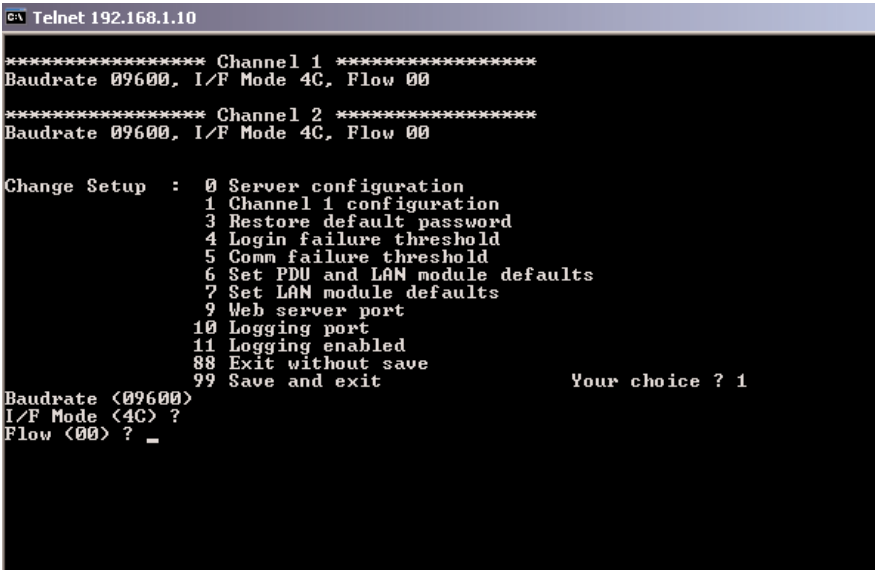

Figure 6-4. Serial channel 1 configuration.

6.5.3 Channel 2 Configuration

Menu option 2 is not used on the power manager. Changing parameters in this menu option has no effect on the power manager.

6.5.4 Restore Default Password

Menu option 3 automatically restores the default factory user "ssjr" and password "ssjr." Please note that the default user and password are all in lower case.

6.5.5 Login Failure Threshold

Menu option 4 sets the threshold for the number of unsuccessful logins before the ability to login is disabled. Each time that you attempt to log into the power manager, an entry is made in a software table. If you have a set number of consecutive unsuccessful logins, the ability to login will be disabled. The only ways to reset the login counter is to power off the power manager or increase the login failure threshold above the current number of login failures. Valid settings are from 2 to 16959.

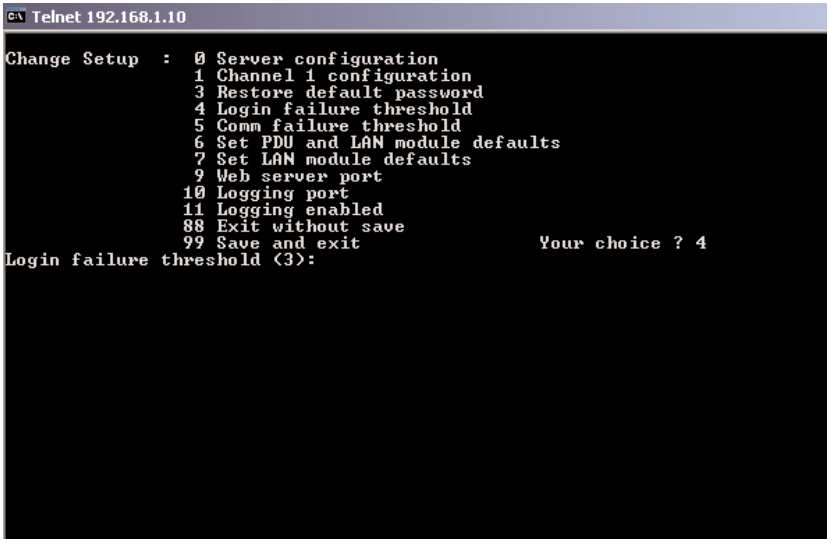

Figure 6-5. Login failure threshold setpoint.

6.5.6 Communication Failure Threshold

Menu option 5 sets the threshold for the number of communication failures within the power manager before an alert is broadcasted. If the LAN Module and internal power manager microprocessor stop communicating or become out of synchronization, an entry is made in a software table. Once the number of communication errors exceeds the set point, an SNMP alert is sent notifying the user or administrator of a communication error, and that power manager will need to be serviced or replaced. The entries in the software table are cumulative as long as the power manager is powered on. Upon power down, the software table is reset. Valid settings are from 2 to 16959.

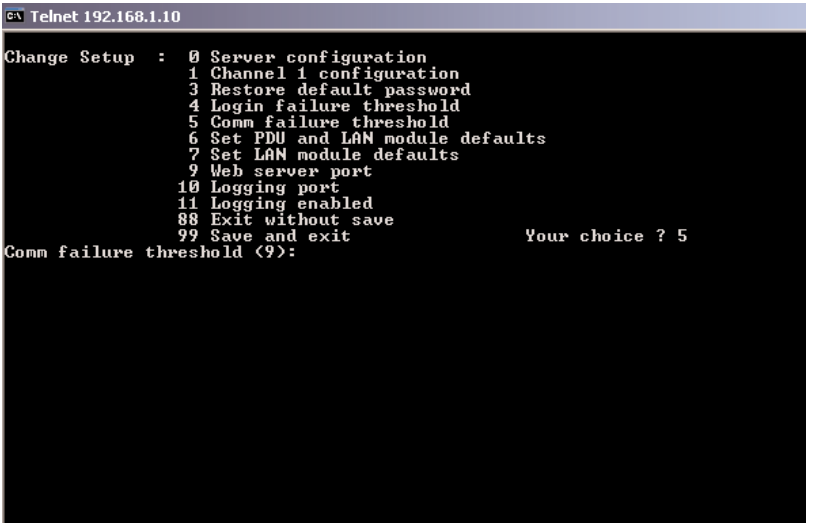

Figure 6-6. Communication failure threshold setpoint.

6.5.7 Set Power Manager and LAN Module to Factory Defaults

Menu option 6 restores all power manager and LAN Module defaults back to the factory settings. This command will ensure that both the LAN Module and internal power manager microprocessor are returned to identical communication settings. If changes are made using the commands in **Chapter 5** and the power manager is no longer communicating, use this menu selection to resort internal communications. Intelligent Power Managers with LAN Modules should have all configuration changes made using the LAN Module Configuration menu selections.

6.5.8 Set LAN Module to Factory Defaults

Select 7 to restore all factory settings in the LAN Module to the factory-default settings. The server configurations remain unchanged.

6.5.9 Set Web Server Port

Select **9** to change the port which will be used for Web information. The factory default is 80.

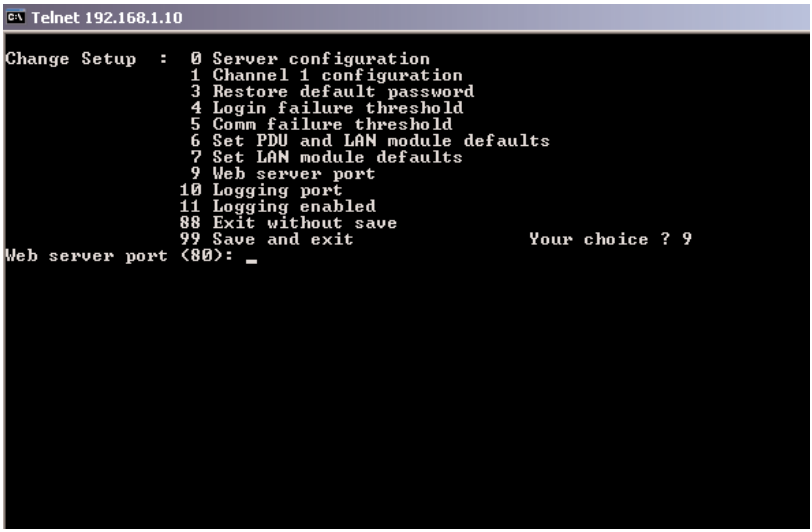

Figure 6-7. Selecting Web server port configuration.

6.5.10 Set LAN Module Logging Port

Select **10** to select the command logging port. When enabled, the command logging feature will log the last commands received and processed by the power manager. The feature is used for security and troubleshooting purposes.

6.5.11 Enable Command Logging

Select **11** to enable logging of commands received and processed by the power manager. The commands will be displayed on the port selected by menu option 10. The feature is used for security and troubleshooting purposes.

6.5.12 Exit Configuration Mode

Select **88** to exit the configuration mode without saving any changes, or select **99** to exit and save all changes. All values are stored in nonvolatile RAM. The LAN Module will automatically reset, but the state of the power manager outputs will not be affected.

6.6 Web Interface

Remote users can monitor and control the power manager with a standard Web browser. When the home page is requested, the browser receives a Web page containing an embedded Java™ applet. The applet establishes a connection with the agent and provides a user interface for monitoring and controlling the power manager. Because of the amount of graphics and LAN connection speeds within a network, the initial page could take several seconds to display.

6.7 Monitor Screen

The device applet initially displays the following screen. This screen is slightly different for 1 x 8 versus 2 x 4 models. The LAN Module software reads its configuration from the power manager's microprocessor and automatically displays the proper format for the application.

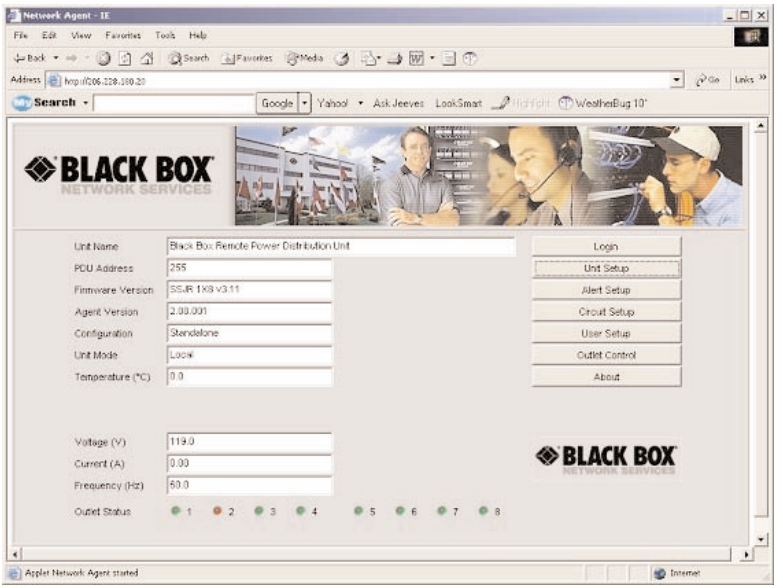

Figure 6-8. Device monitor screen.

The monitor screen contains the following items:

Item	Function
Unit Name	User-defined descriptive name of the unit.
PDU Address	Number between 0 and 255, identifies the PDU.
Firmware Version	Version of the basic firmware running in the PDU.
Agent Version	Version of the agent firmware running the embedded LAN module.
Configuration	Standalone, master, or slave.
Unit Mode	Remote or Local.
Temperature	Displays the Celsius temperature of units equipped with a temperature sensor.
Voltage	Input line voltage (separate channels shown on 2 x 4 units).
Current	Input line current (separate channels shown on 2 x 4 units).
Frequency	Input line frequency (separate channels shown on 2 x 4 units).
Outlet Status Indicators	The On/Off status of each outlet is shown by a green/red indicator, respectively.
Login Button	Allow the user to log into the unit to perform maintenance and control functions. (See **Section 6.7.1**.)
Unit Setup Button	Allows privileged users to set up and maintain basic unit information. (See **Section 6.7.2**.)

Item	Function
Alert Setup Button	Allows privileged users to set up and maintain alerts. (See **Section 6.7.3**.)
Circuit Setup Button	Allows privileged users to set up and maintain auxiliary circuit configuration. (See **Section 6.7.4**.)
User Setup Button	Allows privileged users to set up and maintain additional users. (See **Section 6.7.5**.)
Outlet Control Button	Allows privileged users to directly control outlets. (See **Section 6.7.6**.)
About Button	Displays identifying information about the applet. (See **Section 6.7.7**.)

Sections 6.7.1 through **6.7.7** describe the buttons shown vertically on the right side of the Monitor screen (Figure 6-8).

6.7.1 Login

The Login screen requests a username and password. Each username has an associated set of privileges. Initially a single username and password are defined, "ssjr" and "ssjr," respectively. The username has full privileges to set up, maintain, and control the unit. Additional users can be set up via the Setup screen, described in **Section 6.7.2**.

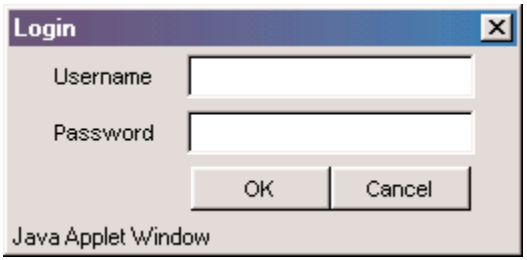

Figure 6-9. Web interface login screen.

When a username and password are entered (these parameters are case-sensitive), the applet changes the Enabled/Disabled status of buttons throughout the applet to reflect the users' privileges.

6.7.2 SETUP

The Setup screen (not shown in this manual) is used to set up and maintain basic operational parameters of the PDU and the network agent.

The Setup screen contains the following items.

Item	Function
Unit Name	User-defined descriptive name of the unit.
PDU Address	Number between 0 and 255, identifies the PDU.
Master/Slave	Configures the unit for standalone, master, or slave operation.
Baud Rate	Baud rate of the serial interface.
Current Limit A	Shown as current limit on 1 x 8 units—indicates the maximum allowable current draw for Channel A, expressed in amps.
Current Limit B	Not shown on 1 x 8 units—indicates the maximum allowable current draw for Channel B, expressed in amps.
Undervoltage Setpoint A	Shown as undervoltage setpoint on 1 x 8 units—indicates the maximum allowable input voltage for Channel A, expressed in volts.
Undervoltage Setpoint B	Not shown on 1 x 8 units—indicates the minimum allowable input voltage for Channel B, expressed in volts.

Item	Function
Sequence Delay	The delay between outlets when turning on or off sequentially, expressed in seconds.
Sequence	The sequence in which outlets are turned on or off automatically. If an outlet number is not entered in the sequence, the outlet will remain at its current state (On or Off) until power is removed from the unit.
Outlet Names	Identifying names for each outlet. These names are displayed in the Outlet Control dialog window.
Group Names	Identifying names for outlet groupings. These names are displayed in the Outlet Control dialog window.
Group Outlets	Specify the outlet number associated with the given outlet grouping. Up to four outlets can be turned on or off simultaneously.

6.7.3 Alert Setup

The Alert Setup screen lets the user set up and maintain conditions that cause alerts, recipients who receive alerts, and other information related to alerts.

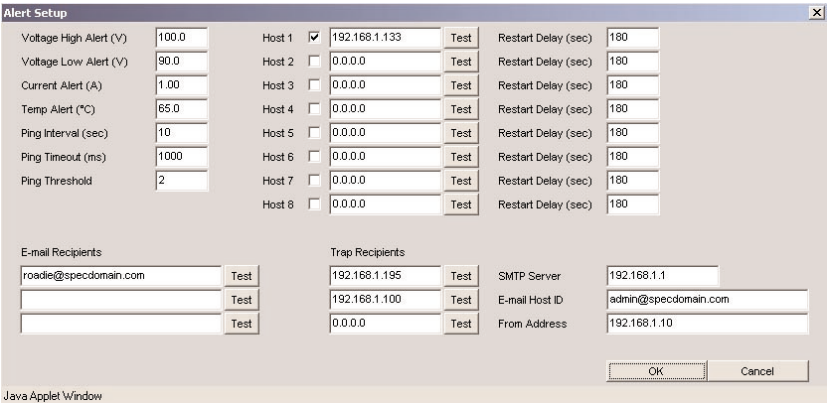

Figure 6-10. Web interface alert setup.

Alerts and actions can be set up for the following events:

- High input voltage
- Low input voltage
- High current draw
- High temperature
- Monitored host not detected

The Alert Setup dialog contains the following items:

Item	Function
Voltage High Alert	Input voltage at which a high-voltage alert is issued.
Voltage Low Alert	Input voltage at which a low-voltage alert is issued.
Current Alert	Current draw at which a high-current alert is issued.
Temp Alert	Temperature at which a high-temperature alert is issued.
Ping Interval	Seconds between attempts to contact a monitored host.
Ping Time-out	Milliseconds to wait for a “ping” response from a monitored host.
Ping Threshold	Number of times a “ping” fails before an alert is issued and the outlet associated with a monitored host that has been turned off due to a “ping” failure.
Restart Delay	Number of seconds to wait before turning on the outlet associated with a monitored host that has been turned off due to a “ping” failure.
Host 1–8	IP addresses of monitored hosts associated with outlets 1–8, respectively.

Item	Function
Host 1–8 check box	Check box to enable Ping feature for host.
Host Test buttons	Pings the associated host and reports the result in a popup dialog box.
E-mail Recipients	E-mail addresses of up to three e-mail alert recipients.
E-mail Test buttons	Sends a test e-mail to the associated e-mail recipient as a test.
Trap Recipients	IP addresses of up to three SNMP trap recipients.
Trap Test buttons	Sends a test trap to the associated SNMP trap recipient as a test.
SMTP Server	IP address of SMTP server used to issue e-mail alerts.
E-mail Host ID	Fully qualified host name to be used in e-mail alerts (can often be ignored or set to “foo”; foo is a term which can mean anything).
From Address	Return address appearing on e-mail alerts.
OK button	Click on this button to save the changes.
Cancel button	Click on this button to cancel the changes.

6.7.4 Circuit Setup

The Circuit Setup screen lets the user set messages for Circuit 1 and 2 or external contacts.

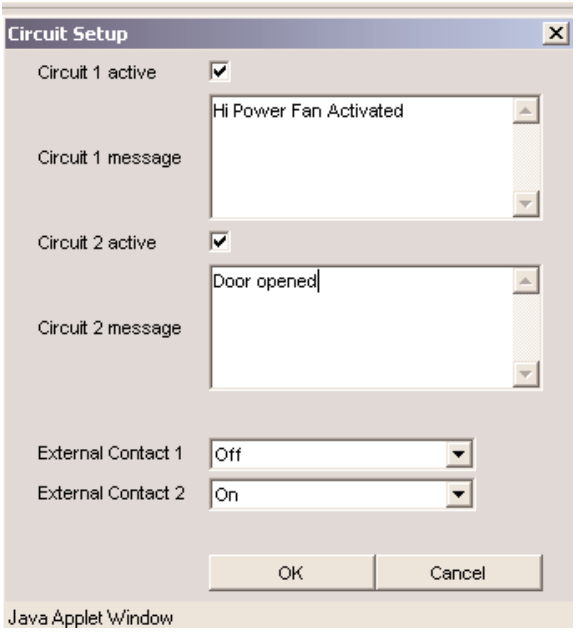

Figure 6-11. Web interface external circuit setup.

Alerts and related actions can be set up for the following events:

- External circuit 1 opened
- External circuit 2 opened
- External contact 1 voltage/current/temperature
- External contact 2 voltage/current/temperature

The Circuit Setup dialog contains the following items.

Item	Function
Circuit 1 Active	Checkbox indicating whether external circuit 1 is being monitored.
Circuit 1 Message	Message sent with alerts when circuit 1 is opened while monitored.
Circuit 2 Active	Checkbox indicating whether external circuit 2 is being monitored.
Circuit 2 Message	Message sent with alerts when circuit 2 is opened while monitored.
External Contact 1	Select variable when external contact change state (Voltage/Current/Temperature or Manual). Values used for trigger points are based on settings in the Alert Setup screen (Figure 6-10). Note when 2 x 4 configuration is used, contact 1 is tied to Channel A. Select On or Off from the drop-down menu.
External Contact 2	Select variable when external contact change state (Voltage/Current/Temperature or Manual). Values used for trigger points are based on settings in the Alert Setup screen (Figure 6-10). Note when 2 x 4 configuration is used, contact 2 is tied for Channel B. Select On or Off from the drop-down menu.
OK button	Click on this button to save the changes.
Cancel button	Click on this button to cancel the changes.

6.7.5 User Setup

The User Setup screen allows usernames, passwords, and privileges to be set up and maintained for up to eight users. When a user logs in, the functions he or she can perform are determined by the privileges established in the User Setup screen. By default (on new units, for example), a single user "ssjr", password "ssjr" is defined with full privileges. Do not use "non-standard" characters when creating usernames and passwords; use numbers and letters only.

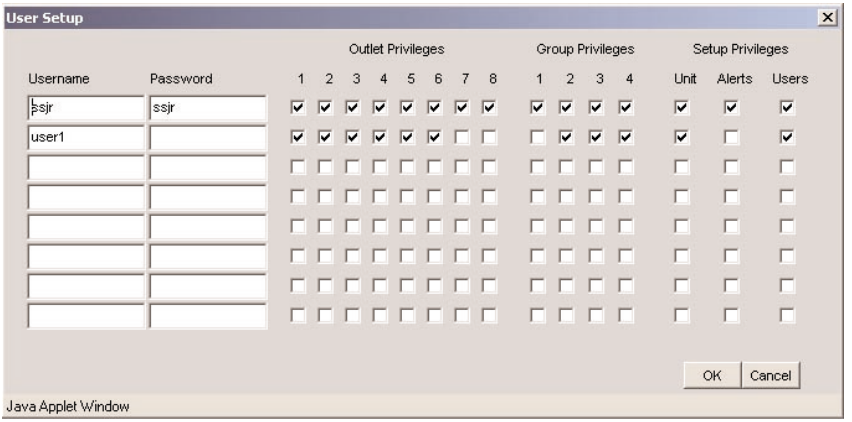

Figure 6-12. Web User Setup screen.

The User Setup screen contains the following items for each defined user.

Item	Function
Username	Case-sensitive user name.
Password	Case-sensitive password.
Outlet Control Privileges 1–8	If checked, the user may turn the specified outlet On or Off, including sequenced operations.
Group Setup Privileges 1–4	If checked, the user may turn the specified group On or Off.
Unit Setup Privilege	If checked, the user may set up and maintain basic unit parameters.

Item	Function
Alert Setup Privilege	If checked, the user may set up and maintain alerts.
Users Setup Privilege	If checked, the user may set up and maintain users.
OK button	Click on this button to save the selections.
Cancel button	Click on this button to cancel the selections.

6.7.6 Outlet Control

The Outlet Control screen allows direct control of the PDU outlets, either individually or in sequenced operations. The exact items displayed and whether they are enabled depends on the type of unit (1 x 8 or 2 x 4) and the privileges of the currently logged-in user. If an outlet is manually turned off, it will not be included in the automatic or power-on sequences.

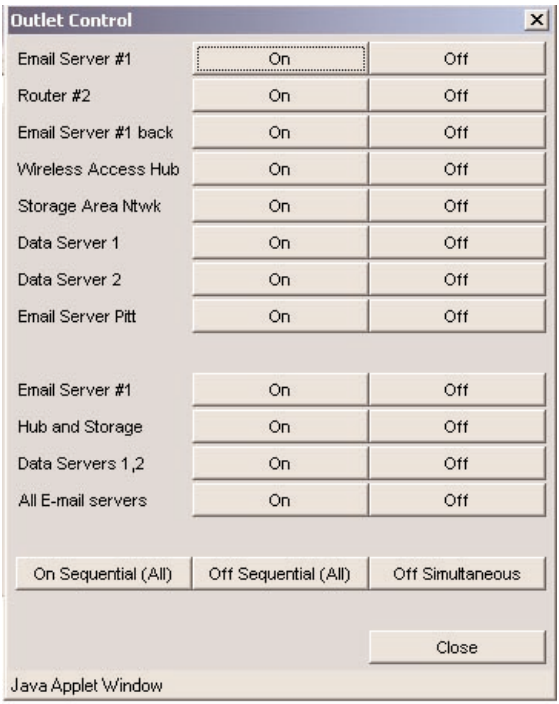

Figure 6-13. Web interface outlet control.

The Outlet Control screen contains the following items.

Item	Function
Outlet names	Names of outlets as defined in the Setup screen.
Outlet On/Off buttons	Turns the associated outlet On or Off.
Outlet Group names	Names of outlet groups as defined in the Setup screen.
Outlet Group On/Off buttons	Turns the associated power outlet group On or Off.
On Sequential buttons	Sequences On outlets (all outlets, Channel A outlets, or Channel B outlets)
Off Sequential buttons	Sequences Off outlets (all outlets, Channel A outlets, or Channel B outlets)
Off Simultaneous buttons	Turns Off all outlets simultaneously.

6.7.7 About

The About screen displays identifying information about the agent software and provides contact information and Web/e-mail links.

6.8 SNMP and SMTP E-Mail Alerts

The Network Agent software includes an SNMP agent, which provides read-only and read-write access to a limited number of variables. These are defined in an SNMP MIB and are shown in **Section 6.8.1**. **Section 6.8.2** lists SNMP Traps, and **Section 6.8.3** describes SMTP (e-mail alerts).

6.8.1 SNMP Variables

The OIDs (Object Identifiers Registry) shown in this table are relative to the enterprise OID 1.3.6.1.4.1.11923.

Variable	Access	OID	Description
devcLineVoltageA	read-only	1.1.1.1.1.1	Line voltage for Channel A, units are volts x 10
devcLineVoltageB	read-only	1.1.1.1.1.2	Line voltage for Channel B, units are volts x 10
devcLoadCurrentA	read-only	1.1.1.1.1.3	Total load current for Channel A, units are amps x 100
devcLoadCurrentB	read-only	1.1.1.1.1.4	Total load current for Channel B, units are amps x 100
devcLineFrequencyA	read-only	1.1.1.1.1.5	Line frequency for Channel A, units are Hz x 10
devcLineFrequencyB	read-only	1.1.1.1.1.6	Line frequency for Channel B, units are Hz x 10
devcTemperature	read-only	1.1.1.1.1.7	Temperature reading from external probe, units are degrees C x 10
devcSequence	read-only	1.1.1.1.1.8	Each character position contains a digit corresponding to an outlet number
devcSequenceDelay	read-only	1.1.1.1.1.9	Time delay between each outlet turning on or off in tenths of a second
devcPDUAddres	read-only	1.1.1.1.1.10	PDU address (0 to 255)
devcMasterSlave	read-only	1.1.1.1.1.11	Master/slave setting: 1 = standalone, 2 = master, 3 = slave
devcSoftwareVersion	read-only	1.1.1.1.2.1	Microprocessor software version

Variable	Access	OID	Description
optdBaudRate	read-only	1.1.1.1.2.2	Baud rate 1 = 4800, 2 = 9600, 3 = 19,200, 4 = 38,400
optdOutletsOff Simultaneous	read-write	1.1.1.1.2.2	Turn off all outlets simultaneously
optdPowerOn CurrentLimitA	read-only	1.1.1.1.2.3	Power-on current limit for Channel A, units are amps x 10
optdPowerOn CurrentLimitB	read-only	1.1.1.1.2.4	Power-on current limit for Channel B, units are amps x 10
optdOutletsOnAll	read-write	1.1.1.1.2.5	Turns on outlets 1–8 in sequence; 1 = execute
optdOutletsOnA	read-write	1.1.1.1.2.6	Turns on outlets 1–4 in sequence, 1 = execute
optdOutletsOnB	read-write	1.1.1.1.2.7	Turns on outlets 5–8 in sequence, 1 = execute
optdOutletsOffAll	read-write	1.1.1.1.2.8	Turns off outlets 1–8 in reverse sequence, 1 = execute
optdOutletsOffA	read-write	1.1.1.1.2.9	Turns on outlets 1–4 in reverse sequence, 1 = execute
optdOutletsOffB	read-write	1.1.1.1.2.10	Turns on outlets 5–8 in reverse sequence, 1 = execute
optdOutletDirect1	read-only	1.1.1.1.2.11	On/off status of outlet 1: 1 = off, 2 = on
optdOutletDirect2	read-only	1.1.1.1.2.12	On/off status of outlet 2: 1 = off, 2 = on
optdOutletDirect3	read-only	1.1.1.1.2.13	On/off status of outlet 3: 1 = off, 2 = on

Variable	Access	OID	Description
optdOutletDirect4	read-only	1.1.1.1.2.14	On/off status of outlet 4: 1 = off, 2 = on
optdOutletDirect5	read-only	1.1.1.1.2.15	On/off status of outlet 5: 1 = off, 2 = on
optdOutletDirect6	read-only	1.1.1.1.2.16	On/off status of outlet 6: 1 = off, 2 = on
optdOutletDirect7	read-only	1.1.1.1.2.17	On/off status of outlet 7: 1 = off, 2 = on
optdOutletDirect8	read-only	1.1.1.1.2.18	On/off status of outlet 8: 1 = off, 2 = on
optdUnitMode	read-only	1.1.1.1.2.20	Unit mode is local or remote: 1 = remote, 2 = local
optdUndervoltage SetpointA	read-only	1.1.1.1.2.21	Undervoltage dropout setpoint for Channel A, units are volts
optdUndervoltage SetpointB	read-only	1.1.1.1.2.22	Undervoltage dropout setpoint for Channel B, units are volts
optdSetFactory Defaults	read-only	1.1.1.1.2.23	Changes all settings back to factory: 1 = execute
ThrsVoltageHigh	read-only	1.1.1.1.3.1	Threshold voltage triggering overvoltage trap, units are volts x 10
ThrsVoltageLow	read-only	1.1.1.1.3.2	Threshold voltage triggering undervoltage trap, units are volts x 10

Variable	Access	OID	Description
ThrsCurrentHigh	read-only	1.1.1.1.3.5	Threshold voltage triggering overcurrent trap, units are amps x 100
ThrsTemperatureHigh	read-only	1.1.1.1.3.13	Threshold voltage triggering overtemp trap, units are degrees C x 10
ThrsLoginFail	read-only	1.1.1.1.3.14	Number of login failure triggering error
ThrsCommFail	read-only	1.1.1.1.3.15	Number of comm failures triggering error
circRemoteMessage1	read-only	1.1.1.1.4.1	Remote message 1 text
circRemoteMessage2	read-only	1.1.1.1.4.2	Remote message 2 text
circActive1	read-only	1.1.1.1.4.3	Auxiliary contact circuit 1: 1 = inactive, 2 = active
circActive2	read-only	1.1.1.1.4.4	Auxiliary contact circuit 2: 1 = inactive, 2 = active
circOpenCircuit	read-only	1.1.1.1.4.5	Circuit causing open-circuit trap: 0 = none, 1 = circuit 1, 2 = circuit 2
snmpTrapRecipient1	read-only	1.1.1.1.5.1	IP address of trap recipient 1
snmpTrapRecipient2	read-only	1.1.1.1.5.2	IP address of trap recipient 2
snmpTrapRecipient3	read-only	1.1.1.1.5.3	IP address of trap recipient 3
smtpServerAddress	read-only	1.1.1.1.6.1	IP address of SMTP server
smtpUserName	read-only	1.1.1.1.6.2	User name used by some SMTP servers for authentication

Variable	Access	OID	Description
smtpPassword	read-only	1.1.1.1.6.3	Password used by some SMTP servers for authentication
smtpHostID	read-only	1.1.1.1.6.4	Host domain of e-mail sender
smtpFrom	read-only	1.1.1.1.6.5	E-mail address of the sender
smtpEmailRecipient1	read-only	1.1.1.1.6.6	E-mail address of recipient 1
smtpEmailRecipient2	read-only	1.1.1.1.6.7	E-mail address of recipient 2
smtpEmailRecipient3	read-only	1.1.1.1.6.8	E-mail address of recipient 3
pingHost1	read-only	1.1.1.1.7.1	IP address of host powered by outlet 1
pingHost2	read-only	1.1.1.1.7.2	IP address of host powered by outlet 2
pingHost3	read-only	1.1.1.1.7.3	IP address of host powered by outlet 3
pingHost4	read-only	1.1.1.1.7.4	IP address of host powered by outlet 4
pingHost5	read-only	1.1.1.1.7.5	IP address of host powered by outlet 5
pingHost6	read-only	1.1.1.1.7.6	IP address of host powered by outlet 6
pingHost7	read-only	1.1.1.1.7.7	IP address of host powered by outlet 7
pingHost8	read-only	1.1.1.1.7.8	IP address of host powered by outlet 8

Variable	Access	OID	Description
PingInterval	read-only	1.1.1.1.7.9	Interval between pings in sec. Zero disables the ping feature
pingTimeout	read-only	1.1.1.1.7.10	Timeout in milliseconds before ping attempt fails
pingFailThreshold	read-only	1.1.1.1.7.11	Number of failed pings before device is power-cycled
pingFailedHost	read-only	1.1.1.1.7.13	Most recently failed host
pingHostEnabled1	read-only	1.1.1.1.7.14	Ping host enablement flag 1, 1 = disabled, 2 = enabled
pingHostEnabled2	read-only	1.1.1.1.7.15	Ping host enablement flag 2, 1 = disabled, 2 = enabled
pingHostEnabled3	read-only	1.1.1.1.7.16	Ping host enablement flag 3, 1 = disabled, 2 = enabled
pingHostEnabled4	read-only	1.1.1.1.7.17	Ping host enablement flag 4, 1 = disabled, 2 = enabled
pingHostEnabled5	read-only	1.1.1.1.7.18	Ping host enablement flag 5, 1 = disabled, 2 = enabled
pingHostEnabled6	read-only	1.1.1.1.7.19	Ping host enablement flag 6, 1 = disabled, 2 = enabled
pingHostEnabled7	read-only	1.1.1.1.7.20	Ping host enablement flag 7, 1 = disabled, 2 = enabled
pingHostEnabled8	read-only	1.1.1.1.7.21	Ping host enablement flag 8, 1 = disabled, 2 = enabled
PingRestartDelay1	read-only	1.1.1.1.7.22	Interval to wait before powering-on outlet 1 in seconds

Variable	Access	OID	Description
PingRestartDelay2	read-only	1.1.1.1.7.23	Interval to wait before powering-on outlet 2 in seconds
PingRestartDelay3	read-only	1.1.1.1.7.24	Interval to wait before powering-on outlet 3 in seconds
PingRestartDelay4	read-only	1.1.1.1.7.25	Interval to wait before powering-on outlet 4 in seconds
PingRestartDelay5	read-only	1.1.1.1.7.26	Interval to wait before powering-on outlet 5 in seconds
PingRestartDelay6	read-only	1.1.1.1.7.27	Interval to wait before powering-on outlet 6 in seconds
PingRestartDelay7	read-only	1.1.1.1.7.28	Interval to wait before powering-on outlet 7 in seconds
PingRestartDelay8	read-only	1.1.1.1.7.29	Interval to wait before powering-on outlet 8 in seconds
unitName	read-only	1.1.1.1.8.1	Descriptive name of unit
unitLoginFailCount	read-only	1.1.1.1.8.2	Login failure count
unitCommFailCount	read-only	1.1.1.1.8.3	Communication failure count

6.8.2 SNMP Traps

SNMP traps are issued if trap recipients have been specified and any of the following conditions occur:

- Line voltage A greater than or equal to high threshold.
- Line voltage A less than or equal to low threshold.
- Line voltage B greater than or equal to high threshold.
- Line voltage B less than or equal to low threshold.

- Load current A greater than or equal to high threshold.
- Load current B greater than or equal to high threshold.
- Temperature greater than or equal to high threshold.
- Ping failure threshold exceeded for host.
- Remote circuit opened.
- Login failure, logins disabled.
- Serial communications between the PDU and the LAN Module failed.
- Test only.

6.8.3 SMTP (E-Mail Alerts)

E-mails are issued if e-mail recipients have been specified and any of the following conditions occur:

- Line voltage A greater than or equal to high threshold.
- Line voltage A less than or equal to low threshold.
- Line voltage B greater than or equal to high threshold.
- Line voltage B less than or equal to low threshold.
- Load current A greater than or equal to high threshold.
- Load current B greater than or equal to high threshold.
- Temperature greater than or equal to high threshold.
- Ping failure threshold exceeded for host.
- Remote circuit opened.
- Login failure, logins disabled.
- Serial communications between the PDU and the LAN Module failed.

6.9 Device Organizer

The Device Organizer is installed separately on the user's computer and provides a way to organize and access multiple Intelligent Power Manager network agents.

Sections 6.9.1 through **6.9.3** describe the Main menu, Edit menu, and Device Node screens.

6.9.1 Main Screen

Devices (network-enabled Intelligent Power Managers) are organized in a tree structure on the left side of the main screen (this screen is not shown in this manual). The tree contains groups and devices.

Groups are identified by a handle icon that allows the group to expand or collapse to show or hide the contained items. Groups can contain other groups or devices. Right-clicking an item in the tree or selecting the "Edit" menu item displays the edit menu, shown in **Section 6.9.2**.

6.9.2 Edit Menu

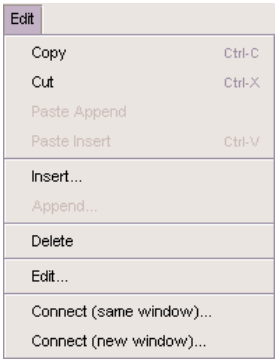

Figure 6-14. Device organizer Edit menu.

The menu contains the following items.

Item	Function
Copy	Copies the item (and any sub-items) to the clipboard.
Cut	Copies the item (and any sub-items) to the clipboard and deletes it from the tree.
Paste Append	Pastes the item on the clipboard at the end of the sublist belonging to the selected item.

Item	Function
Paste Insert	Pastes the item on the clipboard immediately before the selected item and at the same level.
Insert	Displays the Device Node screen (Figure 6-15) and inserts the result before the selected item.
Append	Displays the Device Node screen (Figure 6-15) and appends the result to the sublist belonging to the selected item.
Delete	Remove the selected item and all sub-items.
Edit	Displays the selected item in the Device Node screen (Figure 6-15).
Connect (same window)	Connects to the network agent identified by the selected item and displays the Device Applet in the panel on the right side of the screen.
Connect (new window)	Connects to the network agent identified by the selected item and displays the Device Applet in a new browser window.

6.9.3 Device Node

The Device Node screen allows the user to specify detailed information about groups and devices shown in the tree.

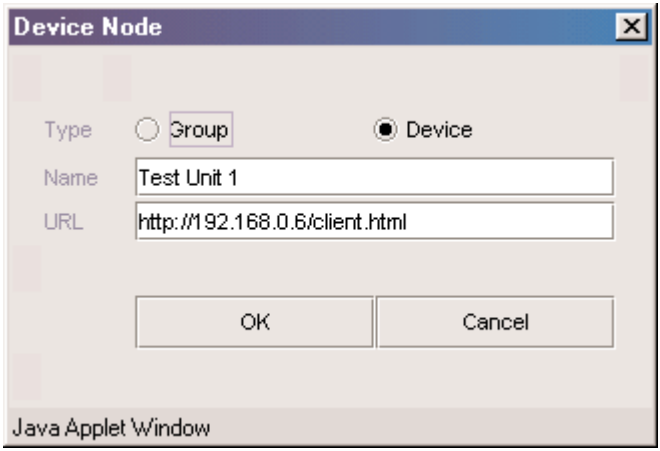

Figure 6-15. Device organizer node screen.

The Device Node screen contains the following items.

Item	Function
Type	Specifies whether the item is a group or a device.
Name	Name to be displayed on the tree.
URL	For devices only, specifies the URL to be displayed when the Connect item is selected in Figure 6-14.
OK button	Click on this button to save the selections.
Cancel button	Click on this button to cancel the selections.

Each Intelligent Power Manager network agent contains a Web page named client.html. It displays the Device Applet without headings. This page should be specified as the URL in the Device Node screen.

Appendix. Troubleshooting

A.1 Troubleshooting Program Setup

A common installation problem exists when the operating system will not allow the install program to update the required system files. This is diagnosed by either an error message or a continuous reboot cycle.

Some causes could be:

- Anti-virus software.
- You do not have computer administrator privileges.
- The operating system is blocking or protecting the system files.

Try these steps:

- Disable any anti-virus software.
- See your network administrator, if applicable.
- Run the setup program after booting the computer in safe mode.

A.2 Calling Black Box

If you determine that your Intelligent Power Manager is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

A.3 Shipping and Packaging

If you need to transport or ship your Intelligent Power Manager:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the Intelligent Power Manager for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.

1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746