MasterSwitch™ 100V
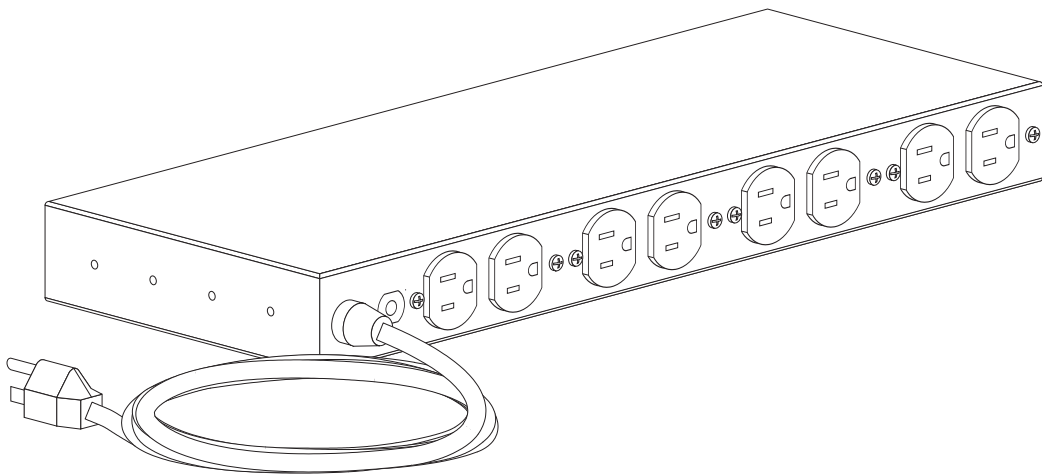
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User
Guide

MasterSwitch – User Guide

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Contents

Chapter 9:
User-Interface
Components   **34**

Index   **35**

About This Guide

This user guide contains information about configuring and using the American Power Conversion (APC) MasterSwitch™, a stand-alone power distribution unit (PDU).

Who Should Read This Guide

This guide is for anyone responsible for using the MasterSwitch to control power.

Associated Documents

This guide explains how to use the MasterSwitch only. Refer to your APC *UPS Owners Manual* for operational information for your specific UPS systems. Refer to the *MasterSwitch Installation Guide* that came with the MasterSwitch for information on how to install the MasterSwitch.

Registering Your Product

Please fill out and return the enclosed warranty card. This card not only provides us with valuable, welcomed feedback on how we can refine our products to better serve your needs, but it also enables us to notify you about important product updates and changes.

Abbreviations

APC refers to American Power Conversion; EEPROM refers to Electrical Erasable Programmable Read Only Memory; IP refers to Internet Protocol; MIB refers to management information base; OID refers to object identification; SNMP refers to simple network management protocol; UPS refers to Uninterruptible Power Supply.

The APC Web Site

For more information on this or any other APC product, visit the APC Web site at http://www.apc.co.jp/. APC is continuously updating the information you obtain from its Web site, including its product documentation.

APC Product Information and Technical Support

Call 0120-80-6090 or 813-5434 2021 to directly access APC's product information database and request to have the latest APC product information faxed directly to you.

If you have any questions concerning the MasterSwitch, or concerning any other APC product, please contact the technical support center nearest you. APC Technical Support is provided at no charge. APC Technical Support teams can be accessed in any of the following ways:

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	Fax:	(33)(1)60 17 80 29
European Tech Support	Phone:	(353)91 702020
	Fax:	(353)91 755275
US and Canada	Phone:	(401)789-5735
	Fax:	(401)789-3180
Austria	Toll Free:	0660 6480
Belgium	Toll Free:	0800 15063
Czech Republic	Toll Free:	0800 102063
Denmark	Toll Free:	800 18 153
Finland	Toll Free:	9800 13 374
France	Toll Free:	0 800 906 483
	Paris:	01 64 62 59 00
Germany	Toll Free:	0130 818907
Holland	Toll Free:	0800 0224655
Hungary	Toll Free:	00800 12221
Ireland	Toll Free:	1 800 702000 x 2045
Israel	Toll Free:	177 353 2206
Italy	Toll Free:	1678 74731
Luxembourg	Toll Free:	0800 2091
Norway	Toll Free:	800 11 632
Poland	Toll Free:	00800 353 1202
Portugal	Toll Free:	050 553182
Russia	Phone:	+7095 916 7166
South Africa	Toll Free:	0800 994206
Spain	Toll Free:	900 95 35 33
Sweden	Toll Free:	020 795 419
Switzerland	Toll Free:	0800 556 177
Turkey	Toll Free:	0800 35390275
United Kingdom	Toll Free:	0800 132990

Chapter 1:
Introduction

The APC MasterSwitch is a network-manageable power control unit (PCU) that allows you complete, independent control of power to eight relay-controlled outlets. This control is programmable using any of the following strategies:

- **Web-based control**. The MasterSwitch features embedded Web management.

- **Simple network management protocol (**SNMP**) control**. The MasterSwitch comes with its own PowerNet™ and MIB-II compliant MIB (APC MasterSwitch-MIB) to allow a remote network management station to use SNMP to program control of the MasterSwitch and its eight outlets.

- **Console control**. The MasterSwitch has a built-in serial port which allows you to connect a terminal (or terminal emulator) directly to the MasterSwitch to use its internal console program to configure power control.

- **Telnet support.** The MasterSwitch provides a telnet interface that permits remote access to the terminal console program.

> **Note:** **MasterSwitch Web control functions and the MasterSwitch console program are protected by a user name/password pair. The default user name is** apc**, in lower case. The default password is** apc**.**

> **Note:** **This guide focuses on providing information on how to use SNMP, telnet, or a terminal to program the MasterSwitch. Information on how to program the MasterSwitch using its embedded Web management feature is provided by a separate on-line help application that focuses solely on how to use the Web management capabilities.**

Overview

The MasterSwitch is a network manageable power control unit (PCU) that:

- Connects a single 100VAC, 50/60Hz input to eight 100VAC, 50/60Hz outlets. The overall output of these outlets is limited to 15 amps and protected by a resettable 15-amp circuit breaker. The outlets, circuit breaker and inlet connector are all located on the MasterSwitch rear panel.

- Allows programmable control of the MasterSwitch, such as defining a delay between power coming on for the MasterSwitch and master power going to the outlets, or turning on, off or rebooting all outlets at one time.

- Allows independent, programmable control over each of its eight outlets, such as defining when an outlet will provide power after master power is provided, or turning on, off or rebooting each outlet individually without affecting the output from any other outlet.

- Is designed to mount in an APC NetShelter™ and connect to a UPS for its input power.

> **Note:** **The MasterSwitch does not provide power protection. Therefore, APC does not recommend plugging the MasterSwitch directly into any unprotected power source, such as a wall outlet.**

Front Panel

The primary feature of the MasterSwitch is the programmable control of eight power outlets using embedded Web-based control, SNMP control, or the console program via telnet or the onboard serial port. Two connectors provide for the physical link for programming:

- A built-in serial port, which connects a terminal (or terminal emulator) to access the console program.
- A built-in 10Base-T network connector, which connects the MasterSwitch to an Ethernet LAN to allow using the embedded Web control, telnet, or SNMP to configure the MasterSwitch. The MasterSwitch must connect to an Ethernet LAN to use telnet, SNMP or embedded Web control.

As shown in Figure 1, both of these connectors are located on the front panel. Figure 1 also identifies the following:

- Eight receptacle LEDs. When an outlet is on, the corresponding LED is lit.
- Two network status LEDs—**Status** and **Link - TX/RX**. LEDs provide visual indications about the Ethernet LAN connection.
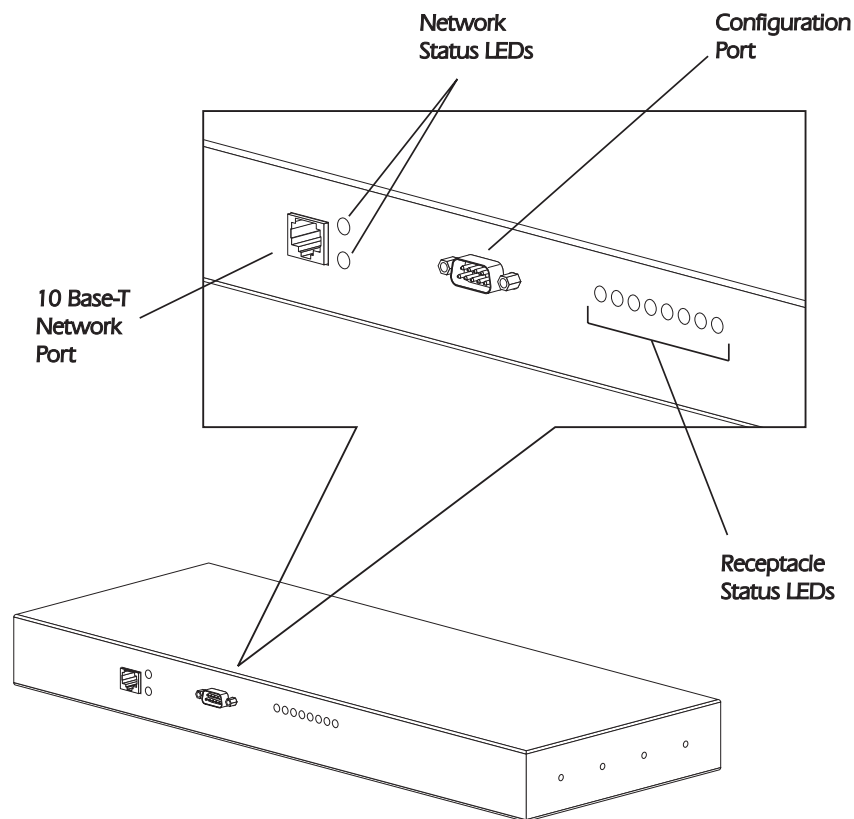- A reset button, which reinitializes the MasterSwitch without affecting its outlet power.

Figure 1: MasterSwitch Front Panel

Chapter 2:
Initial
Setup

The MasterSwitch must have its network settings defined for it to function properly for SNMP, telnet, or embedded Web control of its output power:

- Its IP address

- The IP address of the default gateway

- The subnet mask

- HTTP and telnet port number (for Web-based or telnet control)

How the MasterSwitch initially gets these values depends on whether or not you will be using a BOOTP server:

- The MasterSwitch comes with the Bootstrap Protocol (BOOTP) setting enabled. This allows you to configure a BOOTP server to provide the needed subnet mask and IP values:

  1) Identify the MAC address of the MasterSwitch. This address is provided on a label that is attached to the MasterSwitch side panel.

  2) Refer to your BOOTP server documentation for information on how to use that server to configure the MasterSwitch network values.

- If you will not be using a BOOTP server you must use a terminal to access the MasterSwitch, and use its console program. To access the console program:

  1) Connect one end of the cable that comes with the MasterSwitch to the connector labeled "Serial Port" at the front of the MasterSwitch.

  2) Connect the cable to the serial port of the terminal (or terminal emulator).

  3) Set the terminal serial port for 19200 baud, 8 data bits, no parity, 1 stop bit and press <Enter>.

  4) When the **User Name:** prompt appears, enter the case-sensitive, default user name (**apc**).

  5) When the **Password:** prompt appears, enter the case-sensitive, default password (**apc**).

  6) Once the main configuration menu appears:

     ❑ Use the **Passwords** option under the **MasterSwitch** submenu to change the login password.

Note:	The console, telnet, and Web control share the same password. When you change the password using the console, telnet, or Web control, you change the password for all three control functions.

     ❑ Use the **TCP/IP** option under the **Network** submenu to disable BOOTP and define:

       a) The IP address for the MasterSwitch.

       b) The IP address for the default gateway.

       c) The subnet mask value.

     ❑ Use the **Logout** option to exit the console program, or use any of the other main configuration menu options to further define the MasterSwitch operation before you log out.

Note:	See Chapter 6 for more information on how to use the console program.

Chapter 3:
Logging On

This chapter describes how Web control, console program, and SNMP access is controlled so that only one control option (Web control, console or SNMP) can be used at a time for write activity.

Note: **References throughout this document to the console program apply to telnet sessions and serial communications sessions, which provide identical terminal-style menus.**

Types of Access

The MasterSwitch allows simultaneous read-only access from Web control, console session (via the serial cable or telnet) and SNMP. It does not allow simultaneous write access. You can use Web control, console sessions or SNMP access to configure and control the MasterSwitch, but only one of these can be used to write new configuration and control values at a time.

Web control and terminal console sessions have protected access using a shared user name/ password pair (the default password is `apc`, all lower case). SNMP access simply requires that the NMS be defined as having SNMP access, and that the NMS uses the proper community name for the defined type of SNMP access.

Login Control

Terminal console and telnet sessions have the highest access priority. If someone has logged on to the MasterSwitch using either of these interfaces, Web control access is disabled, and SNMP access is limited to reads (**GETs**) only.

The embedded Web control has the second highest access priority. If someone has logged on to the MasterSwitch using the embedded Web control, then SNMP access is limited to reads (**GETs**) only. However, if someone logs on to the MasterSwitch using the terminal console or telnet while someone is logged on to the Web control, the Web control user is automatically logged off.

SNMP write (**SETs**) access to the MasterSwitch can only occur when no one is logged on to the MasterSwitch using either Web control or the terminal console.

Note: SNMP **access is controlled by MasterSwitch-**MIB **OIDs that define what** NMSs **can access the MasterSwitch, the access they have (read/write or just read) and what community name must be used for that access.**

Chapter 4:
Configuring the
MasterSwitch

This chapter describes how to use SNMP, embedded Web control or the console program to configure the MasterSwitch and its eight, individually-manageable power outlets.

Note: Most configuration functions can be performed using Web, SNMP or console control. However, some functions are unique to a given control method(s). The descriptions in this chapter identify which methods you can use (Web, SNMP or console control) for each described configuration function.

Functions

The MasterSwitch allows you to use SNMP, embedded Web or the terminal console program to configure operational parameters or other values important to using the MasterSwitch:

- ■ You can use Web, SNMP or console configuration commands to:
  - ❑ Define a master power on delay value that affects all outlets equally.
  - ❑ Define a reboot duration value that affects all outlets equally.
  - ❑ Define a MasterSwitch device name.
  - ❑ Define outlet device names.
  - ❑ Define individual outlet power on values.
  - ❑ Define SNMP access control for up to four network management stations (NMSs).
  - ❑ Define up to four SNMP trap receivers.

    Note: See Chapter 7: Using SNMP **for more information on** SNMP **access control and trap receivers.**

  - ❑ Reinitialize the MasterSwitch without affecting its outlet power.

- ■ You can use embedded Web control, or the console program (but *not* SNMP), to enable or disable BOOTP, or to define the MasterSwitch IP address, the default gateway IP address or the subnet mask network configuration values needed by the MasterSwitch to communicate over the network.

  Note: The console has an option (HTTP Net Config) **in the** Network **submenu that enables or disables the use of Web control to change the network configuration values. See Chapter 2 for information on how to use the console program to define the needed network values; See the help application provided with the embedded Web control for information on how to use the Web control feature.**

- ■ You can use embedded Web control, only, to define URL link values for the MasterSwitch.

Master Power On Delay

You can use Web, SNMP or console configuration commands to define how long a delay, if any, will occur between power being applied to the MasterSwitch and master power being provided to the MasterSwitch outlets. This allows you to sequence the master power when you want to make sure some other device has enough time to power-up before any of the MasterSwitch load devices begin to power-up. For example:

- The MasterSwitch provides power to various servers and workstations.

- These MasterSwitch load devices connect to the network through hub components that get their power from the same UPS as the MasterSwitch, but not from the MasterSwitch, itself.

- By delaying the MasterSwitch master power, you can ensure that the hub components are up and running on the network before the components that connect to the MasterSwitch. The allowable delay values are:

  ❐ Never apply power automatically (requires using a control command to turn on power)
  ❐ Apply power immediately (no delay)
  ❐ Apply power in 15 seconds
  ❐ Apply power in 30 seconds
  ❐ Apply power in 45 seconds
  ❐ Apply power in 60 seconds (1 minute)
  ❐ Apply power in 120 seconds (2 minutes)
  ❐ Apply power in 300 seconds (5 minutes)

Outlet Power On Delay

You can use Web, SNMP or console configuration commands to define how long a delay, if any, will occur between the MasterSwitch supplying master power to an outlet (as defined by the Master Power On Delay described above) and that outlet supplying power to the connected device. This allows you to sequence the power from each outlet when you want to make sure the devices connected to the MasterSwitch power up in a specific order. For example:

- The MasterSwitch provides power to various servers and workstations.

- These MasterSwitch load devices include a printer, a print server and several workstations that use the server and printer.

- By delaying the power output of each outlet, you can ensure that the server and printer are both up and running before the workstations that will use them. The allowable delay values are:

  ❐ Never power on automatically (requires using a control command to turn on the outlet's power)
  ❐ Power on immediately with master (no delay)
  ❐ Power on 15 seconds after master
  ❐ Power on 30 seconds after master
  ❐ Power on 45 seconds after master
  ❐ Power on 60 seconds (1 minute) after master
  ❐ Power on 120 seconds (2 minutes) after master
  ❐ Power on 300 seconds (5 minutes) after master

Reboot Duration

You can use Web, SNMP or console configuration commands to define how long a delay will occur between the power being turned off at the start of a reboot and the power being turned back on to complete the reboot. This delay, which applies to the reboot activity at all outlets, allows you to ensure that the MasterSwitch is configured for a delay that meets the need of any device that is connected to any of the MasterSwitch outlets.

The allowable reboot on/off delay values are:

- ❏ Wait 5 seconds between off/on
- ❏ Wait 10 seconds between off/on
- ❏ Wait 15 seconds between off/on
- ❏ Wait 20 seconds between off/on
- ❏ Wait 30 seconds between off/on
- ❏ Wait 45 seconds between off/on
- ❏ Wait 60 seconds (1 minute) between off/on

MasterSwitch Device Name

You can use Web, SNMP or console configuration commands to define a name for the MasterSwitch, as a whole. This name can be up to 20 characters in length.

Outlet Device Name

You can use Web, SNMP or console configuration commands to define a name for each of eight MasterSwitch outlets. These names can each be up to 20 characters in length.

URL Links

You can use the embedded Web control, only, to define URL links:

For example:

- ■ You can define links to other world wide Web pages.
- ■ You can define the Device URL: value in each of the Web control's Outlet Configuration pages to connect you to the worldwide Web home page for the manufacturer of the device that connects to a specific outlet whenever you click on the link symbol for that outlet's device.

> **Note:** **The embedded Web control feature comes with on-line help. See that on-line help for information on how to use the MasterSwitch embedded Web control.**

Chapter 5: Controlling the MasterSwitch

This chapter describes how you can use Web, SNMP or console commands (telnet or serial sessions) to control output power from the MasterSwitch, as a unit, or from each outlet, individually.

Overview

Using configuration options (Chapter 4) you can control power output from the MasterSwitch by defining such values as when master power is supplied to the outlets, and then sequence the power output from each outlet. The MasterSwitch control options allow you to further control the power output, as follows:

- You can use a master power control to turn all outlets on, turn all outlets off or reboot all outlets.
- You can use outlet controls to turn on, off or reboot an individual outlet.

Master Power Control

You can use Web, SNMP or console commands to control master power to the MasterSwitch outlets:

- You can turn all outlets off immediately.
- You can turn all outlets on immediately.
- You can turn all outlets on in sequence (as defined by an outlet's <u>power on delay</u> value).
- You can reboot all outlets immediately.
- You can reboot all outlets in sequence (as defined by an outlet's <u>power on delay</u> value).

Outlet Power Control

You can use Web, SNMP or console commands to control the power output from each MasterSwitch outlet:

- You can turn an outlet off.
- You can turn an outlet on.
- You can reboot the equipment (turn power off and then back on), with the duration of the reboot cycle defined by the reboot duration value you configured for the MasterSwitch outlets.

Chapter 6: Using the Console Program

This chapter describes how to use the console program to configure and control output power from the MasterSwitch as a unit, or from each outlet individually. The console program is accessed via the serial port or via telnet.

Functions

The console program allows you to perform all MasterSwitch configuration and control functions except definition of URL links for the MasterSwitch and its outlets. You can use the console program to define and control the following values needed for MasterSwitch operation:

■ Define the initial network configuration values needed by the MasterSwitch .

Note: **When a BOOTP server (Chapter 2) is not being used, the console program must be used via the serial port to initially define these values. Once these values are defined and BOOTP is disabled, you can use the console program (including telnet sessions) or the embedded web control to modify the values.**

■ Define NMSs that can use SNMP to access the MasterSwitch , the kind of access they will have, and community names they must use for that access.

■ Define NMSs that can receive SNMP traps.

■ Control master power by turning on, turning off or rebooting all MasterSwitch outlets.

■ Define a master power on delay time value for providing master power to the outlets.

■ Define an outlet power on value for each outlet so that you can control the sequence of power on to the MasterSwitch outlets.

■ Turn off, on or reboot any outlet, individually.

■ Define a name for the MasterSwitch .

■ Define a device name for each outlet.

■ Define the amount of time (reboot duration) that power remains off during reboot cycles.

Additionally, the console program allows you:

■ View factory preset information (serial number, model number, etc.).

■ Use *ping* to test network communication.

■ Set the serial port baud rate.

■ Change the password used to log into the console program and web control.

■ Cancel outstanding commands, reinitialize the MasterSwitch (without affecting its outlet power), reset EEPROM values to their default settings.

Accessing the Console Program

There are two methods of accessing the console program: via the serial port or via telnet.

Via the Serial Port

1) Connect one end of the cable that came with the MasterSwitch to the connector labeled "Serial Port" at the front of the MasterSwitch .

2) Connect the remaining end of the cable to the serial port of the terminal (or terminal emulator).

3) Set the terminal serial port for 19200 baud and press <Enter>.

Via telnet

1) Type `telnet` *<ip>* (where *<ip>* is the ip address of the MasterSwitch to which you wish to connect. **Using telnet requires that the ip address of the MasterSwitch be previously set** (using *bootp* or the console program via the serial port).

When the *User Name:* prompt appears, enter the default, case-sensitive user-name (**apc**) and press <Enter>. At the *Password:* prompt, enter the default password (**apc**) and press <Enter>.

The Main Menu

When the correct username/password, the main configuration menu shown in Figure 2 appears:

```
American Power Conversion              Ethernet MasterSwitch v1.1.0
www.apcc.com                           (c) Copyright 1998 All Rights Reserved
--------------------------------------------------------------------------------
Name      : MasterSwitch #2            Contact   : Joe User
Location  : Engineering Lab

MasterSwitch Up Time : 0 Days 1 Hours 22 Minutes 43 Seconds


-----Current MasterSwitch Status --------------------------------------------
Device 1:OFF        Device 2:ON        Device 3:ON        Device 4:ON
Device 5:ON         Device 6:ON        Device 7:ON        Device 8:ON

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

    1- Outlet Manager
    2- Network
    3- MasterSwitch
    4- Logout

    ?- Help
<ENTER> Redisplay Menu
  <ESC> Refresh Main Menu
```

Figure 2: Main Menu

From the main menu, the user may view overall status of the MasterSwitch and access the various submenu "trees" available. The **Outlet Manager** submenu tree provides configuration and control of outlets. The **Network** submenu tree allows configuration and viewing of the various network operation parameters such as *ip address* and other data. The **MasterSwitch** submenu tree is for general configuration of passwords, baud-rate and other setup information.

To navigate through the menu structure of MasterSwitch and make desired changes, simply type the number corresponding to the selection desired at the **>** prompt and press <Enter>.

Note: To log off MasterSwitch, select option 4 from the Main menu. No other console sessions are permitted until the user has logged out or the user is automatically logged out by MasterSwitch.

Outlet Submenu

From the **Outlets Manager** submenu, a snapshot view of outlet descriptions and status is available:

```
--- Outlet Manager -------------------------

    1- Outlet 1 : Novell Server
    2- Outlet 2 : Device 2
    3- Outlet 3 : Device 3
    4- Outlet 4 : Device 4
    5- Outlet 5 : Device 5
    6- Outlet 6 : Device 6
    7- Outlet 7 : Device 7
    8- Outlet 8 : Monitor
    9- Master   : PDU

<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 3: Outlet Manager Submenu

To change an outlet settings or turn an outlet on or off, type the number corresponding to the desired outlet and press <Enter>. The following submenu appears:

```
---- Outlet 1 : Device 1 ----------------------

    1- Control of Outlet 1
    2- Configuration of Outlet 1

    ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 4: Outlet Submenu

To turn an outlet on or off or to schedule a reboot, select option 1:

```
---- Control of Outlet 1 ------------------------------------------

     Outlet   Device Name        Auto Power On      Reboot Duration
     ------------------------------------------------------------------
     1:ON     Device 1           With Master        Same as Master
     2:ON     Device 2           With Master        Same as Master
     3:ON     Device 3           With Master        Same as Master
     4:ON     Device 4           With Master        Same as Master
     5:ON     Device 5           With Master        Same as Master
     6:ON     Device 6           With Master        Same as Master
     7:ON     Device 7           With Master        Same as Master
     8:ON     Device 8           With Master        Same as Master
     Master   PDU                Immediate          5 Seconds

   1- Turn Outlet On
   2- Turn Outlet Off
   3- Reboot Outlet

   ?- Help
```

Figure 5: Outlet Control Submenu

Type the number corresponding to the desired operation and press <Enter>.

To change outlet settings (device name or power-on characteristics) select option 2 from the **Outlets** submenu:

```
--- Configuration of Outlet 1 --------------------------------------

     Outlet   Device Name        Auto Power On      Reboot Duration
     ------------------------------------------------------------------
     1:ON     Device 1           With Master        Same as Master
     2:ON     Device 2           With Master        Same as Master
     3:ON     Device 3           With Master        Same as Master
     4:ON     Device 4           With Master        Same as Master
     5:ON     Device 5           With Master        Same as Master
     6:ON     Device 6           With Master        Same as Master
     7:ON     Device 7           With Master        Same as Master
     8:ON     Device 8           With Master        Same as Master
     Master   PDU                Immediate          5 Seconds

   1- Device Name    : Novell Server
   2- Auto Power On  : With Master
   3- Accept Changes :

   ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 6: Outlet Configuration Submenu

Configuration items consist of the name of the device powered by the corresponding outlet and the Auto Power On characteristics of the outlet (see next paragraph).

Auto Power On

The Auto Power On selection allows the user to configure the receptacle to power-up and reboot independently or with the master:

```
--- Auto Power On ----------------------------

    1- With Master
    2- 15 Sec After Master
    3- 30 Sec After Master
    4- 45 Sec After Master
    5- 1 Min After Master
    6- 2 Min After Master
    7- 5 Min After Master
    8- Never

<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 7: Auto Power On Submenu

Select one of the settings. Selecting "With Master" indicates that user-selected settings for the master outlet will also apply to this outlet. For more discussion of the master outlet, see below.

Master Outlet Configuration and Control

From the **Outlets Manager** submenu (see Figure 3), Option 9 allows the user to configure/control master settings to apply to all outlets whose Auto Power On settings are set to "With Master." To perform an action on all outlets assigned to the master outlet, select Option 1 from the **Outlets Manager** submenu shown in Figure 3. The following submenu appears:

```
---- Control of Master Outlet ------------------------------------------------
      Outlet  Device Name          Auto Power On        Reboot Duration
      ------------------------------------------------------------------
      1:ON    Device 1             With Master          Same as Master
      2:ON    Device 2             With Master          Same as Master
      3:ON    Device 3             With Master          Same as Master
      4:ON    Device 4             With Master          Same as Master
      5:ON    Device 5             With Master          Same as Master
      6:ON    Device 6             With Master          Same as Master
      7:ON    Device 7             With Master          Same as Master
      8:ON    Device 8             With Master          Same as Master
      Master  PDU                  Immediate            5 Seconds

    1- Immediate All On
    2- Immediate All Off
    3- Sequence All On
    4- Immediate Reboot
    5- Sequenced Reboot

    ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 8: Master Control Menu

For configuration of the master outlet, select option 2 from the **Outlets Manager** submenu. The following submenu appears:

```
------ Configuration of Master Outlet ------------------------------------

       Outlet   Device Name          Auto Power On        Reboot Duration
       ------------------------------------------------------------------
       1:ON     Device 1             With Master          Same as Master
       2:ON     Device 2             With Master          Same as Master
       3:ON     Device 3             With Master          Same as Master
       4:ON     Device 4             With Master          Same as Master
       5:ON     Device 5             With Master          Same as Master
       6:ON     Device 6             With Master          Same as Master
       7:ON     Device 7             With Master          Same as Master
       8:ON     Device 8             With Master          Same as Master
       Master   PDU                  Immediate            5 Seconds

   1- PDU Name       : Main PDU
   2- Auto Power On  : Immediate
   3- Reboot Duration : 5 Seconds
   4- Accept Changes :

   ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 9: Master Configuration Menu

Network Submenu

From the main menu, option 2 activates the **Network** submenu. From this submenu, the user may configure and the various networking parameters used by the MasterSwitch, use the *ping* utility to test network connections, and set access control parameters. Figure 10 shows the Network submenu.

```
--- Network ----------------------------------------------------------------

    1- TCP/IP
    2- Ping Utility
    3- Access Control
    4- HTTP
    5- Telnet
    6- SNMP


<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 10: Network Submenu

TCP/IP Submenu

The TCP/IP submenu allows the user to set network address parameters and enable or disable BOOTP. Note that MAC addresses are not changeable.

Note: **Ensure that any changes made to network settings are correct. Incorrect settings are the most common reason for network communications problems!**

```
----- TCP/IP ----------------------------------------------------------------

        The Network Service has started with the following settings :
        ---------------------------------------------------------------------

        Adapter IP      : 159.215.87.62
        Subnet Mask     : 255.255.255.0
        Default Gateway : 0.0.0.0
        MAC Address     : 00 C0 B7 B2 3A EB

    1- MasterSwitch IP : 159.215.87.62
    2- Subnet Mask     : 255.255.255.0
    3- Default Gateway : 0.0.0.0
    4- BOOTP           : Disabled
    5- Accept Changes  :

    ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 11: TCP/IP Settings

TCP/IP settings are used for SNMP, Web, and telnet access to the MasterSwitch. Incorrect settings will likely result in none of these access methods working.

Note: A Gateway value of 0.0.0.0 indicates that no gateway is used.

Telnet Submenu

To change the port on which the MasterSwitch communicates via telnet sessions, select the **Telnet** submenu from the **Network** submenu:

```
------- Telnet ---------------------------------------------------------------
    1- Telnet Port      : 23
    2- Accept Changes   :

    ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 12: Telnet Configuration Submenu

This is useful if you wish to limit access to telnet sessions by "hiding" telnet at some obscure port number, known only by authorized personnel.

HTTP Submenu

Similarly, to enable or disable configuration of the MasterSwitch via HTTP, or to change the port on which the MasterSwitch communicates HTTP sessions, select the **HTTP** submenu from the **Network** submenu:

```
----- HTTP -------------------------------------------------------------------

    1- HTTP Net Config : Enabled
    2- HTTP Port       : 80
    3- Accept Changes  :

    ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 13: HTTP Configuration Submenu

If HTTP network configuration is disabled, only the console program may be used to configure the MasterSwitch operation.

Note: **Shortcut keys are available from anywhere in the console program:**
<CTRL-C> Returns to the main menu
<CTRL-O> Toggles between outlet menus.

SNMP Submenu

From the **Network** submenu, the **SNMP** submenu allows the user to specify up to four access-control groups and trap receivers in addition to specifying other information used by SNMP.

```
---- SNMP --------------------------------------------------------------

     1- Access Control 1
     2- Access Control 2
     3- Access Control 3
     4- Access Control 4
     5- Trap Receiver 1
     6- Trap Receiver 2
     7- Trap Receiver 3
     8- Trap Receiver 4
     9- System
     10- Summary

     ?- Help
 <ENTER> Redisplay Menu
   <ESC> Return To Previous Menu
```

Figure 14: SNMP Submenu

SNMP Summary Page

The summary page displays the overall settings for the SNMP operation of the MasterSwitch.

Note: SNMP options may not be changed from the SNMP Summary Page.

```
     --------------------------------------------------------------------
     SNMP Configuration Summary

     sysName           : Unknown
     sysLocation       : Unknown
     sysContact        : Unknown

     Access Control Summary
     #  Community           Access      NMS IP
     --------------------------------------------------------------------
     1  public              Read        0.0.0.0
     2  public              Read        0.0.0.0
     3  public              Read        0.0.0.0
     4  public              Read        0.0.0.0

     Trap Receiver Summary
     #  Community           Generation  Authentication  Receiver NMS IP
     --------------------------------------------------------------------
     1  public              Disabled    Enabled         0.0.0.0
     2  public              Disabled    Enabled         0.0.0.0
     3  public              Disabled    Enabled         0.0.0.0
     4  public              Disabled    Enabled         0.0.0.0
```

Figure 15: SNMP Summary Page

SNMP Access Control Submenu

```
---- Access Control 1 -------------------------------------------------------

        Access Control Summary
        #  Community           Access        NMS IP
        --------------------------------------------------------------------
        1  public              Read          0.0.0.0
        2  public              Read          0.0.0.0
        3  public              Read          0.0.0.0
        4  public              Read          0.0.0.0

     1- Community       : public
     2- Access Type     : Read
     3- NMS IP Address  : 0.0.0.0
     4- Accept Changes  :

     ?- Help
 <ENTER> Redisplay Menu
   <ESC> Return To Previous Menu
```

Figure 16: Access Control Submenu

From here the SNMP community string, read/write access and NMS *ip* address may be set for a Network Management Station.

Note: **These Access Control settings must be configured correctly before the MasterSwitch will respond to *gets* and *sets* from a NMS. A setting of 0.0.0.0 indicates no NMS assignment.**

MasterSwitch Submenu

From the main menu, select option 3 to enter the **MasterSwitch** submenu. This submenu permits configuration and review of general settings required for operation as the menu indicates:

```
---- MasterSwitch -----------------------------------------------------------

     1- Passwords
     2- Tools
     3- Control Console
     4- About MasterSwitch

     ?- Help
 <ENTER> Redisplay Menu
   <ESC> Return To Previous Menu
```

Figure 17: MasterSwitch Submenu

Password Submenu

The **Password** submenu allows the user to change user name/password pairs and set the automatic logout feature, which automatically logs the user out after the specified number of minutes of inactivity on any session (HTTP, telnet or serial port).

```
---- Passwords ------------------------------------------------------------

     1- Auto Logout       : 3 Minutes
     2- New User Name     : apcuser
     3- New Password      :
     4- Current Password  :
     5- Accept Changes    :

     ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 18: Password Submenu

Tools Submenu

```
---- Tools ----------------------------------------------------------------

     1- Restart The MasterSwitch
     2- Reset MasterSwitch To Defaults

     ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 19: Tools Submenu

As shown in Figure 18, restarting the MasterSwitch processor board (without cycling power to outlets) is available. The user may also reset the factory default configuration from this submenu.

Control Console Submenu

To change the baud rate of the serial port, select option 3 from the MasterSwitch submenu.

Note: **Baud rate changes take effect the next time the user logs into the MasterSwitch.**

```
--- Control Console -------------------------------------------------------

     1- Baud Rate      : 19200
     2- Accept Changes :

     ?- Help
<ENTER> Redisplay Menu
  <ESC> Return To Previous Menu
```

Figure 20: Control Console Submenu

About Submenu

The **About** submenu provides factory information about the MasterSwitch. These fields are not editable.

```
 -----------------------------------------------------------------------------
       About MasterSwitch

       Model Number      : AP9210      Serial Number      : WA9714663445
       Firmware Revision : v1.1.0.a    Hardware Revision : B2
       Manufacture Date  : 04/11/1997  MAC Address        : 00 C0 B7 B2 3A EB
```

Figure 20: About Page

Chapter 7:
Using
SNMP

This chapter briefly describes the APC MasterSwitch-MIB (provided on the diskette that came with the MasterSwitch as PDU.MIB) and how to use that MIB to configure and control output power from the MasterSwitch, as a unit, or from each outlet, individually. This chapter also briefly describes the MasterSwitch-MIB and MIB-II traps the MasterSwitch can send.

Note: **This chapter assumes you are familiar with how to load and compile a MIB at the NMS you will be using for SNMP control, and are proficient at using its SNMP browser. See your NMS documentation for more information on loading, compiling and using a MIB. For more information on the MasterSwitch-MIB, see the descriptions provided in the SNMP browser for each OID, or use a text editor to read a copy of the PDU.MIB.**

Functions

You can use SNMP to:

- Define NMSs that can receive SNMP traps (using **apcmgmt** OIDs).

- Restart the MasterSwitch SNMP agent (using **apcmgmt** OIDs).

- Control master power by turning on, turning off or rebooting all MasterSwitch outlets (using **sPDUMasterControl** OIDs).

- Define a master power on delay time value for providing master power to the outlets (using an **sPDUMasterConfig** OID).

- Define a power on value for each outlet so that you can sequence the power output from the MasterSwitch outlets (using **sPDUOutletConfig** OIDs).

- Turn off, on or reboot any outlet, individually (using **sPDUOutletControl** OIDs).

- Define a name for the MasterSwitch (using an **sPDUMasterConfig** OID).

- Define a device name for each outlet (using **sPDUOutletControl** OIDs).

- Define how long power remains off during reboot cycles (using an **sPDUMasterConfig** OID).

- Access information about factory preset values (using **sPDUIdent** OIDs).

You cannot use SNMP to:

- Define the network configuration values needed by the MasterSwitch.

Note: **When a BOOTP server (Chapter 2) is not being used, the console program must be used to initially define these values. Once these values are defined, and BOOTP is disabled, you can use the console program or the embedded Web control to modify the values.**

■ Define any URL links to be used by the MasterSwitch embedded Web control.

The same diskette that contained the PDF copy of this user's guide (PDUguide.pdf) also contains a copy of APC's MasterSwitch-MIB (as PDU.MIB). This MIB is compatible with APC's PowerNet™ MIB and MIB-II compliant. Once the MasterSwitch-MIB is loaded and compiled at an NMS, you can use the NMS's SNMP browser to configure and control the MasterSwitch:

1) Refer to your NMS documentation to access the MasterSwitch using the NMS SNMP browser.

2) Step down the SNMP browser's MIB tree to select **apc** under the **enterprises** listing, then:

   a) Select the **apcmgmt** listing if you want to define trap receiver information or reinitialize the MasterSwitch without affecting its outlet power.

   b) Select the **products** listing, then the **hardware** listing, followed by the **MasterSwitchV1** listing, if you want to define any other MasterSwitch-MIB value.

apcmgmt OIDs

When you select the **apcmgmt** listing, the SNMP browser will present you with two categories of OIDs: APC management control (**mcontrol**) OIDs and APC management configuration (**mconfig**) OIDs

Management Control (mcontrol) OIDs

The **mcontrol** OIDs allow you to affect the operation of the SNMP agent, as follows:

■ If the MasterSwitch SNMP agent appears to be hung up, you can use **restartCurrentAgent** to restart the MasterSwitch without affecting its outlet power.

■ You can use **continueCurrentAgent** to continue using the current SNMP agent without restarting it.

Note: **New** SNMP **agent code cannot be downloaded to a MasterSwitch. Therefore, the loadAndExecuteNewAgent mcontrol** OID **option is not used.**

Management Configuration (mconfig) OIDs

The **mconfig** OIDs allow you to define up to four NMSs as trap receivers, as follows:

Note: **For information on MasterSwitch traps, see the MasterSwitch-MIB Traps section provided at the end of this chapter.**

■ You can use **mconfigNumTrapReceivers**, a read-only OID, to find out how many managers are currently defined.

■ You can use **mconfigTrapReceiverEntry** OIDs to:
   ❑ Identify which of the four trap receivers is being defined (**trapIndex)**.
   ❑ Define the IP address of the NMS that is being defined as a trap receiver (**receiverAddr**).
   ❑ Define the community name to be used in traps sent to the defined NMS (**communityString**).
   ❑ Define whether or not the defined NMS is to be enabled to receive traps at this time (**acceptThisReceiver**).

MasterSwitchV1 OIDs

When you select the **MasterSwitchV1** listing, the SNMP browser will present you with five categories of OIDs:

- MasterSwitch-MIB identification (**sPDUIdent**) OIDs
- MasterSwitch-MIB master control (**sPDUMasterControl**) OIDs
- MasterSwitch-MIB master configuration (**sPDUMasterConfig**) OIDs
- MasterSwitch-MIB outlet control (**sPDUOutletControl**) OIDs
- MasterSwitch-MIB outlet configuration (**sPDUOutletConfig**) OIDs

Identification (sPDUIdent) OIDs

Five **sPDUIdent** OIDs, all read-only, allow you to access the following self-explanatory information about the MasterSwitch:

- **sPDUHardwareRev**
- **sPDUFirmwareRev**
- **sPDUDateOfManufacture**
- **sPDUIdentModelNumber**
- **sPDUIdentSerialNumber**

Master Control (sPDUMasterControl) OIDs

There are three **sPDUMasterControl** OIDs:

- **sPDUMasterState**, a read-only OID, allows you find out the current status of all eight outlets.
- **sPDUMasterPending**, a read-only OID, allows you to find out if any of the outlets have commands pending.
- **sPDUMasterControlSwitch** allows you to reboot all outlets, turn all outlets on or turn all outlets off by setting one of the following values to this OID:
  - ❑ **turnAllOnNow**
  - ❑ **turnAllOnSequence**
  - ❑ **turnAllOffNow**
  - ❑ **rebootAllNow**
  - ❑ **rebootAllSequence**

Master Configuration (sPDUMasterConfig) OIDs

There are three **sPDUMasterConfig** OIDs:

- **sPDUMasterConfigPowerOn** allows you to define the delay, if any, in seconds, between when power is applied to the MasterSwitch and the application of master power to the eight outlets:

  - ❑ **-1** (for never apply power automatically)
  - ❑ **15** (for 15-second delay)
  - ❑ **30** (for 30-second delay)
  - ❑ **45** (for 45-second delay)
  - ❑ **60** (for 1-minute delay)
  - ❑ **120** (for 2-minute delay)
  - ❑ **300** (for 5-minute delay)

- **sPDUMasterConfigReboot** allows you to define how long power will remain off, in seconds, during a reboot cycle:

  - ❑ **5**
  - ❑ **10**
  - ❑ **15**
  - ❑ **20**
  - ❑ **30**
  - ❑ **45**
  - ❑ **60**

- **sPDUMasterConfigPDUName** allows you to define an up to 20-character long name for the MasterSwitch.

Outlet Control (sPDUOutletControl) OIDs

The **sPDUOutletControl** OIDs consist of an **sPDUOutletControlTableSize** read-only OID that defines the number of outlets (always 8), as well as one set of identical OIDs for each outlet, each set consisting of:

- An **sPDUOutletControlIndex** read-only OID that identifies the outlet.

- An **sPDUOutletPending** read-only OID that identifies if the outlet has a command pending (commandPending) or not (**noCommandPending**).

- An **sPDUOutletCtl** OID that allows you to use an SNMP **SET** to reboot the outlet (**outletReboot**), turn the outlet on (**outletOn**) or turn the outlet off (**outletOff**), or an SNMP **GET** to determine the outlet's current state.

- An **sPDUOutletCtlName** read-only OID that identifies the outlet's device name (as defined by **sPDUOutletName**, an **sPDUOutletConfig** OID).

Outlet Configuration (sPDUOutletConfig) OIDs

The **sPDUOutletConfig** OIDs consist of an **sPDUOutletConfigTableSize** read-only OID that defines the number of outlets (always 8), as well as one set of identical OIDs for each outlet, each set consisting of:

❑ An **sPDUOutletConfigIndex** read-only OID that identifies the outlet.

❑ An **sPDUOutletPowerOnTime** OID that allows you to define how much time, if any, in seconds, the outlet will delay providing output power when master power is newly applied:

-1 (for never power on automatically)
0 (no delay: power on with master)
15 (for 15-second delay)
30 (for 30-second delay)
45 (for 45-second delay)
60 (for 1-minute delay)
120 (for 2-minute delay)
300 (for 5-minute delay)

❑ An **sPDUOutletName** OID that allows you to define an up to 20-character long device name for the outlet.

Traps

The MasterSwitch can send eight different MasterSwitch-MIB traps and three MIB-II traps.

MasterSwitch-MIB Traps

The following table briefly identifies and describes the eight MasterSwitch-MIB traps.

MasterSwitch-MIB Trap	Index Number - Description
outletOn	41 - The specified outlet has been turned on (if 0, all outlets have been turned on).
outletOff	42 - The specified outlet has been turned off (if 0, all outlets have been turned off).
outletReboot	43 - The specified outlet has been rebooted (if 0, all outlets have been rebooted).
configChangeSNMP	44 - The SNMP configuration has been changed.
configChangeOutlet	45 - The specified outlet has changed configuration (if 0, the master outlet has changed configuration.
accessViolationConsole	46 - Three unsuccessful terminal console logins have occurred.
configViolationHTTP	47 - An unsuccessful HTTP login has occurred.
passwordChange	48 - The password for the MasterSwitch has changed.

MIB-II Traps

The following table briefly identifies and describes the three MIB-II traps.

MIB-II Traps	Index Number - Description
coldStart	0 - The MasterSwitch has been turned on.
warmStart	1 - A MasterSwitch reinitialization has occurred.
snmpAuthenticationFailure	4 - An attempt to use SNMP to access the MasterSwitch, while using an incorrect community name, has occurred.

Chapter 8:
Using Embedded
Web Control

This chapter briefly describes how to access and use the embedded Web control MasterSwitch feature to configure and control power output.

Note: **For more information on the embedded Web control, see the on-line help provided with this MasterSwitch feature.**

Accessing Web Control

Before you can access the embedded Web control, the network values needed by the MasterSwitch must be defined, either by the BOOTP server (when BOOTP is enabled, which is the shipping default), or by the console program (when BOOTP is disabled). When that is done, you can access the embedded Web control from a Web browser by typing in the name of the MasterSwitch (if that name is defined in the DNS server) or the MasterSwitch IP address.

Functions

The embedded Web control consists of a series of interactive pages you can access using a Web browser:

- A **Master Configuration** page allows you control and configure the MasterSwitch, as a unit, to:

    - Define an up to 20-character long name for the MasterSwitch (**PDU Name:** option).
    - Define a master power on delay time value for providing master power to the outlets (**Auto Power On:** option).
    - Control master power by turning on, turning off or rebooting all MasterSwitch outlets, simultaneously (**Master:** option).
    - Define the amount of time that power remains off during reboot cycles (**Reboot Duration:** option).

- Eight **Outlet Configuration** pages allow you to configure and control each MasterSwitch outlet, individually, to:

    - Define a URL link for the outlet (**Device URL:** option).
    - Define an up to 20-character long name for the device that connects to the outlet (**Device Name:** option).
    - Define a power on value for each outlet so that you can sequence the power output from the MasterSwitch outlets (**Auto Power On:** option).
    - Control power output from the outlet by turning power off, turning power on or rebooting the outlet, without affecting any other outlet (**Outlet 1:** through **Outlet 8:** option, depending on the **Outlet Configuration** page).

■ A **Status** page provides:

❑ A graphic display that defines the current status of all outlets.
❑ Graphic links to the eight outlet pages.
❑ Graphic links to the URLs defined for each outlet's device.

> **Note:**   **The URL for an outlet is defined in that outlet's Web control page.**

■ A **System Configuration** page allows you to:

❑ Modify the values needed for MasterSwitch network communication, when BOOTP is disabled:

- The MasterSwitch IP address
- HTTP port number
- Default gateway IP address
- Subnet mask

> **Note:**   **Although you can use the Web control to modify the network values, the initial values can only be supplied by the BOOTP server (when BOOTP is enabled, which is the shipping default setting) or the console program (when BOOTP is disabled). Also, you can only change network configuration values using the Web control when the** HTTP Net Config **option in the terminal console's** Network **submenu is enabled.**

❑ Define/modify the user name/password pair used for access to the Web control pages and the console control program.

> **Note:**   **The console, telnet, and Web control share the same password. When you change the password using the console, telnet, or Web control, you change the password for all three control functions.**

❑ Define/modify SNMP access, SNMP trap receiver and MIB-II OID values.

■ The frame used for the Web control pages allows you to access any other Web control page, APC support information or other links.

Chapter 9:
User-Interface
Components

This chapter describes the three types of MasterSwitch user-interface components:

- The Reset button
- The network LEDs
- The outlet LEDs

Reset Button

Pressing this button reinitializes the MasterSwitch without affecting its outlet power.

Outlet LEDs

The MasterSwitch has eight LEDs located on the left side of the front panel that report whether an outlet is on (the corresponding outlet LED is lit), or off (LED is not lit).

Network LEDs

The MasterSwitch has two status LEDs located directly to the right of the network connector. These LEDs provide visual indications about the network link:

- Status LED:
    - ❑ Solid Green: OK
    - ❑ Blinking Green: Network configuration values have not been fully defined.
    - ❑ Slowly Blinking Red: Processing BOOTP.
    - ❑ Solid Red: Hardware failure

    - Link - TX/RX LED:

    - ❑ Blinking Green: MasterSwitch is connected to a working network.
    - ❑ Off: Network or connection failure.

Index