CHAPTER 2

Monitoring the System

This chapter explains how to monitor the Cisco ICS 7750. The chapter is organized as follows:

Alarms

This section describes alarms, which indicate problems on the Cisco ICS 7750 or on systems with which it is communicating.

Alarms are associated with the following:

- Events—Physical problems, such as system overheating or loss of power, detected by the SAP card and reported to the ICS System Manager software. Events are associated with the following system components:
  - Chassis/backplane
  - Fans
  - Power supply modules
- Traps—Problems, such as a trunk outage, that are detected by MRP cards and transmitted in the form of a Simple Network Management Protocol (SNMP) message.

Note For more information about SNMP messages, see "SNMP Basics" on page 2-10. To find out how to identify and solve system problems, see Chapter 4, "System Troubleshooting Guidelines," and Appendix A, "Error Message Summary."

Alarm Notification

The system issues notifications of alarms in any of the following ways:

- ICS System Manager is notified of an event and takes the appropriate action; for example, it changes the state of one or more LEDs on the system and generates an error message, which you then see.
- An SNMP agent generates a trap that is collected by ICS ICS System Manager or another SNMP management application, which processes the trap and takes the appropriate action.
- You have an open communications session with the Cisco ICS 7750 and retrieve log messages associated with any alarms.

Alarm Levels

The system has the following two alarm levels:

- Major alarm (amber LED)—Any state that indicates a system malfunction that can immediately result in a service outage or that indicates a system problem that can seriously degrade service. Examples include:
  - System overheating because of high ambient air temperature, an air intake or exhaust blockage, or fan failure
  - A power supply module outage
  - SPE memory parity or disk read/write errors
  - Loss of an Ethernet interface because of an equipment or Ethernet facility failure
  - Loss of signal or errors on a T1 or higher trunk because of a local or remote equipment failure
- Minor alarm (yellow LED)—Any state that indicates a system abnormality that does not seriously degrade service, but that may affect the network or equipment, such as a port that is disabled or otherwise out of service.

Logging

This section provides the following information about logging:

- How to Access Log Messages
- How to Read Log Messages
- How to Change the Log Configuration

How to Access Log Messages

You can access log messages in any of the following ways:

- Handling Log Messages with ICS System Manager
- Saving Log Messages to a Syslog Server

Handling Log Messages with ICS System Manager

ICS System Manager provides several options for handling the log messages directed to it. By default, the system sends log messages to the SPE, where they are stored on disk.

ICS System Manager includes an Event Manager that enables you to view system events (messages) and define policies (a set of rules) that specify how you want the system to respond to a particular type of message. For example, for certain types of log messages, you might want to configure the system to automatically generate an e-mail message or send a page.

For additional information about using ICS System Manager for event handling, refer to the ICS System Manager online help.

Saving Log Messages to a Syslog Server

The system saves syslog messages to an internal buffer. You can configure the system to read messages from the buffer and send them to a specified syslog server.

Note For instructions on how to view and change the log configuration, see "How to Change the Log Configuration" on page 2-7.

How to Read Log Messages

When viewed on a log server, the mandatory portion of a log message begins with a percent sign (`%`) and can contain up to 80 characters. The message fields that precede the percent sign (received and sent dates and times) are optional.

Table 2-1 describes the elements of log messages as displayed in Event Manager.

Table 2-1 Log Message Elements

Element	Example	Format	Description
Received date and time	`1999 Nov 21 11:55:00`	yyyy mmm dd hh:mm:ss	The date and time when the message was received.
Sent date and time	`1999 Nov 21 11:55:00`	yyyy mmm dd hh:mm:ss	The date and time when the message was sent.
FACILITY	`%LPR`	STRING	Two or more uppercase letters that indicate the facility to which the message refers (see Table 2-2).
From	`192.31.7.19`	n.n.n.n	The IP address of the device sending the message.
Message	`System temperature OK`	string	A description of the event.
CISCO FACILITY (optional)	`CDP`	STRING	Two or more uppercase letters that indicate the facility to which the message refers. Facilities include hardware devices, protocols, and system software modules.
CISCO SUBFACILITY (optional)	`CIP`	STRING	Two or more uppercase letters that indicate the subfacility for Channel Interface Processor (CIP) messages. CIP messages have a Cisco subfacility code of `CIP`.
Cisco Severity (optional)	`1`	0–7	A single-digit code from 0 to 7 that indicates the severity of the message (see Table 2-3). The lower the number, the more serious the situation.
CISCO MNEMONIC (optional)	`XMIT_ERR`	STRING	A code that uniquely identifies the message.

Facilities

Table 2-2 describes the facility types supported by log messages.

Table 2-2 Log Facility Type Keywords

Keyword	Description
auth	Authorization system
cron	Cron facility
daemon	System daemon
kern	Kernel
local0-7	Reserved for user-defined messages (eight types, from local0 through local7, are available)
lpr	Line printer system
mail	Mail system
news	USENET news
syslog	System log
uucp	UNIX-to-UNIX copy system

Severity Levels

Table 2-3 describes log message severity levels.

Table 2-3 Log Message Severity Level Keywords

Keyword	Level	Description	Syslog Definition
emergency	0	System unusable	LOG_EMERG
alert	1	Immediate action required	LOG_ALERT
critical	2	Critical condition	LOG_CRIT
error	3	Error condition	LOG_ERR
warning	4	Warning condition	LOG_WARNING

Table 2-3 Log Message Severity Level Keywords (continued)

Keyword	Level	Description	Syslog Definition
notification	5	Normal but significant condition	LOG_NOTICE
informational	6	Information—no action required	LOG_INFO
debugging	7	Debugging message	LOG_DEBUG

Note Not all messages indicate problems. Some messages are informational. Others may help diagnose problems with communications lines, internal hardware, or system software. To find out how to use system messages to identify and solve problems, see Chapter 4, "System Troubleshooting Guidelines," and Appendix A, "Error Message Summary."

How to Change the Log Configuration

The system sends log messages to ICS System Manager by default. You can redirect these messages to other destinations such as buffers and UNIX hosts running a syslog server.

This section provides the following information about log configurations:

- Default Log Configuration
- Configuring the Syslog Daemon on UNIX Syslog Servers
- Changing Syslog Server Logging

Default Log Configuration

System IOS components (ASI cards, MRP cards, and the SSP card) ship with the default logging configuration shown in Table 2-4.

Table 2-4 Default Logging Configuration

Configuration Parameters	Default Setting
System message logging to the console	Disabled
System message logging to Telnet sessions	Disabled
Log server	Disabled
Syslog server IP address	None configured
Server facility	LOCAL7
Server severity	Warnings (4)
Logging buffer size	500
Logging history size	1
Timestamp option	Disabled

Tip To view the state of syslog error and event logging, including host addresses and whether console logging is enabled, enter the IOS **show logging** command.

Configuring the Syslog Daemon on UNIX Syslog Servers

Before you can send log messages to a UNIX syslog server, you must configure the syslog daemon on the UNIX server. To configure the syslog daemon, log in as root and include a line such as the following in the file syslog.conf:

```
facility.level /syslog path/myfile.log
```

where

- *facility* is the log facility keyword (see Table 2-2)
- *level* is the severity level (see Table 2-3)

- *syslog path* is the path to syslog.conf
- *myfile.log* is the name of your log file

The syslog daemon (syslogd) sends messages at the level specified in syslog.conf, provided that the file exists, and provided that syslogd has permission to write to it.

Changing Syslog Server Logging

To change syslog server logging behavior, use the global configuration commands shown in Table 2-5.

Table 2-5 Syslog Server Logging Behavior Commands

Task	Command
Configure an IOS device to log messages to a syslog server, where *host* is the name or IP address of the target syslog server.	**logging** *host*
Remove a host from the list of syslog servers.	**no logging** *host*
Configure an IOS device to limit the log messages it sends to the syslog server(s) based on the severity level, where *level* is one of the log message severity keywords listed in Table 2-3.	**logging trap** *level*
Disable logging to the syslog server(s).	**no logging trap**

Note For more information about IOS commands related to logging, refer to the *Configuration Fundamentals Command Reference* publication.

SNMP Basics

The Simple Network Management Protocol (SNMP) facilitates the exchange of management information among network devices. SNMP is part of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite. SNMP enables you to manage network performance, find and solve network problems, and plan for network growth.

SNMP Components

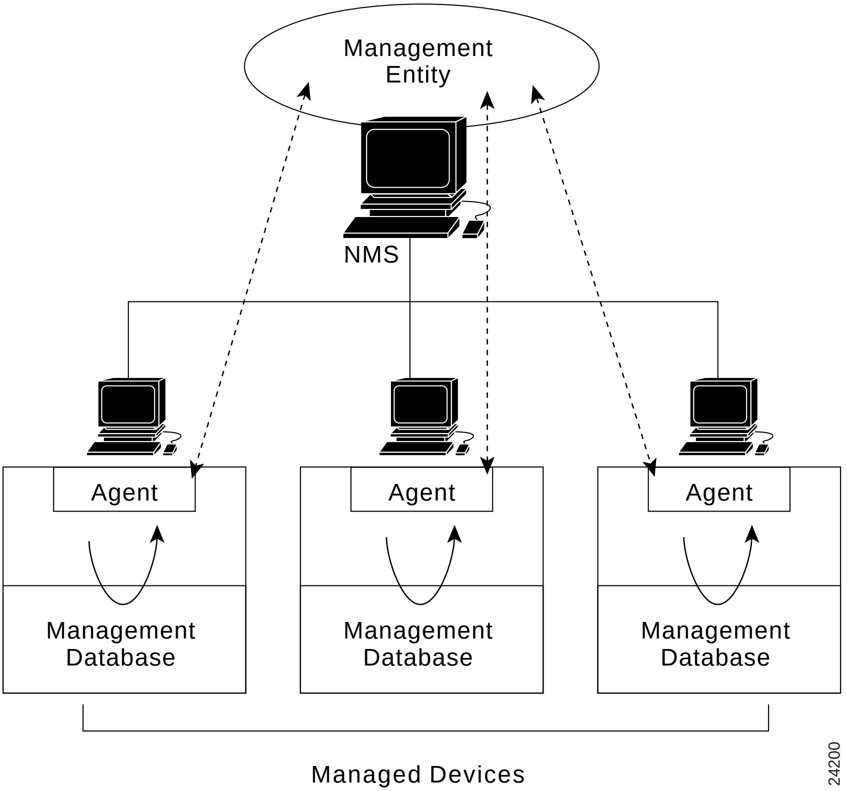
An SNMP-managed network consists of three key components: managed devices, agents, and network management systems (NMSs).

- A managed device is a network node that contains an SNMP agent and resides on a managed network. Managed devices collect and store management information and make it available using SNMP. The Cisco ICS 7750 includes the following managed devices:
  - System processing engine (SPE) cards
  - Analog station interface (ASI) cards
  - Multiservice route processor (MRP) cards
  - System switch processor (SSP) card
  - Catalyst 3524-PWR XL switches
- An agent is network-management software that resides on a managed device. An agent has local knowledge of management information and translates it into a form compatible with SNMP. The agent on the Cisco ICS 7750 is located on the SPE running System Manager.

- An SNMP management application, together with the computer it runs on, is called a *network management system* (NMS). An NMS executes applications that monitor and control managed devices. NMSs provide the bulk of the processing and memory resources required for network management. The Cisco ICS 7750 is compatible with the following NMSs:
  - ICS System Manager
  - CiscoWorks2000
  - HP OpenView

Figure 2-1 shows the relationships between the managed devices and agents, and the NMS.

Figure 2-1 Major Components of SNMP-Managed Networks



The following system components, though not SNMP-managed devices, receive SNMP support through ICS System Manager:

- System alarm processor (SAP) card
- Power supply modules
- Fans
- Chassis

SNMP Management Information Base

A Management Information Base (MIB) is a collection of information that is organized hierarchically. MIBs are accessed using a network management protocol such as SNMP. They comprise managed objects, which are identified by object identifiers.

A managed object (sometimes called a *MIB object or* an *object*) is one of any number of specific characteristics of a managed device. Managed objects comprise one or more object instances, which are essentially variables.

Using SNMP with MIB Variables

System MIB variables are accessible through SNMP as follows:

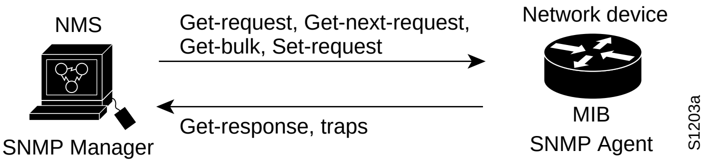
- Accessing a MIB variable—This function is initiated by the SNMP agent in response to a request from the NMS. The agent retrieves the value of the requested MIB variable and responds to the NMS with that value.
- Setting a MIB variable—This function is also initiated by the SNMP agent in response to a message from the NMS. The SNMP agent changes the value of the MIB variable to the value requested by the NMS.

Instead of defining a large set of commands, SNMP places all operations in a *get-request*, *get-next-request*, and *set-request* format. For example, an SNMP manager can get a value from an SNMP agent or store a value in that SNMP agent.

On the Cisco ICS 7750, the ICS System Manager software (the NMS) typically sends SNMP requests to a single IP address to access the SNMP MIBs of any system component. The SNMP agent can then respond to MIB-related queries being sent by the NMS. Similarly, if CiscoWorks2000 is the NMS, it uses the MIB variables to set device variables and poll devices on the network. You can then display the data that CiscoWorks2000 collects as a graph and analyze it to enhance network performance, to monitor traffic loads, or to troubleshoot problems. (See "Monitoring with CiscoWorks2000" on page 2-17.)

As Figure 2-2 shows, the SNMP agent gathers data from the MIB, which is the repository for information about device parameters and network data. The agent can send traps (see "Understanding Traps" on page 2-14) to the manager.

Figure 2-2 SNMP Network



The SNMP manager uses information in the MIB to perform the operations described in Table 2-6.

Table 2-6 SNMP Manager Operations

Operation	Description
get-request	Retrieves a value from a specific variable.
get-next-request	Retrieves a value from a variable within a table.
get-response	The reply to a get-request, get-next-request, and set-request sent by an NMS.
get-bulk	(SNMP version 2 only.) Retrieve large blocks of data, such as multiple rows in a table, which would otherwise require the transmission of many small blocks of data.
set-request	Stores a value in a specific variable.
trap	An unsolicited message sent by an SNMP manager indicating that some event has occurred.

Supported MIBs

The Cisco ICS 7750 supports the following MIBs:

- CISCO-C2900-MIB—Supports the SSP card.
- CISCO-CCM-MIB—Enables the system to get provisioning and statistical information about Cisco CallManager, devices associated with Cisco CallManager (such as Cisco IP phones and gateways), and the Cisco CallManager configuration.
- CISCO-CDP-MIB—Enables Cisco CallManager to advertise itself to other Cisco devices on the network, allowing discovery of other Cisco CallManager installations on the network.
- CISCO-ICSUDSU-MIB—Supports integrated CSU/DSU interfaces in the MRP.
- CISCO-VOICE-IF-MIB—Supports ISDN and analog interfaces in the MRP.
- CISCO-ENTITY-FRU-CONTROL-MIB—Supports field replaceable units (FRUs), such as cards, power supply modules, and the fan tray.
- ENTITY-MIB—Supports the chassis.
- MIB II (RFC1213)—Represents Ethernet and other types of addresses.
- DS1 MIB (RFC1406)—Represents DS1 interfaces in the MRP.

Understanding Traps

An agent can send traps to the manager that identify important system events. The following are examples of conditions where an agent might send an SNMP trap message to an NMS specified as a trap receiver:

- An interface or card starts or stops running.
- Spanning-tree topology changes are made.
- Authentication failures occur.

When an agent detects an alarm condition, it reacts by logging information about the time, type, and severity of the condition and generates a trap—or notification message—that is sent to certain IP addresses.

Cisco ICS 7750 Traps

Cisco ICS 7750 ASI cards, MRP cards, and the SSP card can generate traps such as the following:

- coldStart—Indicates power-up reset of a card.
- warmStart—Indicates that software running on a card has been upgraded or that the card has been reset.
- linkDown—Indicates that a port changed to a suspended or disabled state due to a secure address violation (mismatch or duplication), network connection error (such as a loss of Link Beat or a jabber error), or an explicit management disable action.
- linkUp—Indicates that a port has changed from a suspended or disabled state to the enabled state.
- authenticationFailure—Indicates that an SNMP message has been received that is not properly authenticated; that is, the message is not accompanied by a valid community string.
- addressViolation—Indicates that an address violation has been detected on a secured port.
- broadcastStorm—Indicates that the number of broadcast packets received in a second from a port is higher than the broadcast threshold.

Understanding Community Strings

SNMP *community strings* authenticate access to MIB objects and function as embedded passwords.

The Cisco ICS 7750 uses a base community string, to which the string @SLOT*number* can be appended to form a *composite community string*:

```
base community string@SLOTnumber
```

where

- *Base community string* represents the get or set community string. For get (read-only) requests, the community string, or password, has a default ASCII value of *public*. For set (read-write) requests, the community string has a default value of *changeme*.

- *Number* represents the target physical slot number (slots 1 through 8) of the SNMP request.

Note All SNMP requests with a composite community string of @SLOT9 or higher are directed to the SSP, which determines the proper SNMP message destination.

For example, assuming that a particular SNMP request needs to reach an MRP card in slot 3, the following composite community string could be used:

```
ICS7750@SLOT3
```

where *ICS7750* represents the standard system get or set community string.

Modifying the Base Community String

You can modify the default read-only and read-write community strings with ICS System Manager. (Refer to the ICS System Manager online help.)

Monitoring with ICS System Manager

ICS System Manager monitors the Cisco ICS 7750 as follows:

- ASIs and MRPs—ICS System Manager provides information about trunk errors, interface errors, memory usage, buffer failures, buffer creation, and ASI and MRP usage.
- SSP—ICS System Manager provides information about SNMP, IP, Internet Control Message Protocol (ICMP), TCP errors, UDP errors, as well as information about SSP usage.

Note For information about monitoring individual Cisco IP Phones or the lines connecting those devices to the Cisco ICS 7750, refer to the “Admin Serviceability Tool” chapter in the *Cisco CallManager Serviceability Administration Guide*. For additional information on monitoring the system with ICS System Manager, refer to the ICS System Manager online help.

Monitoring with CiscoWorks2000

CiscoWorks2000 uses SNMP to monitor and control system devices. You can integrate CiscoWorks2000 applications with other NMSs, such as HP OpenView.

CiscoWorks2000 Applications

CiscoWorks2000 applications extend industry-standard network management systems to facilitate checking the status of Cisco devices, maintaining device configurations and inventories, and troubleshooting device problems. CiscoWorks2000 applications for monitoring the SNMP devices on your network include:

- Path Tool—Graphically displays a route of a path from a source device to a destination device.
- Real-Time Graphs—Monitors the behavior of device interfaces or other network elements that might be operating in a degraded mode and displays them in a graph.
- Show Commands—Displays data similar to output from IOS **show** commands.
- Health Monitor—Provides device status and access to several CiscoWorks2000 applications in one window (including Show Commands and Real-Time Graphs) to monitor SNMP device activity.
- Contacts—Provides quick access to the emergency contact person for a particular device.
- Log Manager—Enables you to store, query, and delete messages gathered from CiscoWorks2000 applications and Cisco devices on the network.

Using CiscoWorks2000 for Network Management

CiscoWorks2000 runs an AutoDiscovery mechanism to discover the entire network, of which Cisco CallManager may be one component. Since Cisco CallManager supports Cisco Discovery Protocol (CDP), CiscoWorks2000 can also identify the SPE on which Cisco CallManager is running as a Cisco CallManager device.

SNMP and the CiscoWorks2000 Interface

Using SNMP, CiscoWorks2000 retrieves CDP information by polling Cisco CallManager. After the discovery process is completed, a topology map reveals all the Cisco CallManager installations in the network.

CiscoWorks2000 also polls other MIB tables in the CISCO-CCM-MIB to gather information required by other components, such as User Tracking (refer to the CiscoWorks2000 Campus Manager online documentation). CiscoWorks2000 periodically polls these agents to get additional updated information.

Note For examples of how to use CiscoWorks2000 to troubleshoot network problems, see Chapter 4, "System Troubleshooting Guidelines."

Monitoring with Cisco IOS Software

This section describes proven strategies to help you monitor your network.

Evaluating System Performance

Collecting, analyzing, and archiving system performance data is important in understanding how well your system is meeting your organization's needs. Important things to monitor are the behavior of network applications and protocols and the response time of individual devices such as MRP cards and Catalyst 3524-PWR XL switches.

Common ways to monitor system performance include the following:

- Evaluating Reachability and Response Times
- Evaluating Traffic Loads

Evaluating Reachability and Response Times

Polling remote parts of the network enables you to test reachability and measure response times. Response-time measurements consist of sending a ping (packet internet groper) packet and measuring the round-trip time (RTT) that it takes to send the packet and receive a response. The ping packet is sent and received as an ICMP echo packet.

Note For information about **ping** command usage, see Chapter 4, "System Troubleshooting Guidelines," and Chapter 7, "Solving Serial Connection Problems."

Caution Polling activity can result in a significant increase in network traffic. Therefore it is important to carefully assess what level of monitoring is appropriate for your organization.

Evaluating Traffic Loads

You can use protocol analyzers or SNMP tools to record traffic loads between important sources and destinations. (See Chapter 4, "System Troubleshooting Guidelines," for additional information about protocol analyzers and other monitoring and troubleshooting tools.) The objective is to document how much data can pass between pairs of autonomous systems, networks, hosts, or applications. Source and destination traffic-load documentation is useful for capacity planning and troubleshooting. Source and destination traffic-load data is also useful if you have a service-level agreement that includes throughput requirements.

In-Band Versus Out-of-Band Monitoring

Another important factor affecting how and when you perform network monitoring is the degree to which monitoring either does or does not consume system bandwidth. Depending on how your network is structured, you can use in-band monitoring, out-of-band monitoring, or a combination of the two.

With in-band monitoring, network management data is sent over the same paths as user traffic. This means that any problems on the network will be more difficult to solve because collecting troubleshooting data will take longer. Using management tools is beneficial even when the internetwork is congested, failing, or under a security attack.

With out-of-band monitoring, network management data travels on different paths than user data. NMSs and agents are linked by circuits that are separate from the internetwork. The circuits can use dial-up, ISDN, or other technologies. The separate circuits can be used all the time or they can be used as backup only when the primary internetwork path is broken.

Using show Commands

You can use IOS **show** commands to perform a variety of tasks:

- Monitor behavior during installation
- Monitor normal network operation
- Isolate problem interfaces, nodes, media, or applications
- Determine when a network is congested
- Determine the status of servers, clients, or other neighbors

Common show Commands

Commands that you are likely to use include the following:

- **show interfaces** displays statistics for network interfaces. (For example, **show interfaces serial** and **show interfaces ethernet**.)
- **show buffers** displays statistics for the buffer pools on the target device.
- **show memory** shows statistics about the device’s memory.
- **show processes** displays information about the active processes on the device.
- **show stacks** displays information about the stack utilization of processes and interrupt routines, as well as the reason for the last system reboot.
- **show version** displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

Searching and Filtering Output of show Commands

In Cisco IOS software Release 12.0(1)T or later, you can search and filter the output for **show** commands. This functionality is useful when you need to sort through large amounts of output, or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** command followed by the "pipe" character (|), one of the keywords **begin**, **include**, or **exclude**, and an expression that you want to search or filter on:

```
command | {begin | include | exclude} regular-expression
```

The following is an example of a **show interface** command that provides information only about lines where the word "protocol" appears:

```
Cisco ICS 7750# show interface | include protocol
FastEthernet0/0 is up, line protocol is up
Serial4/0 is up, line protocol is up
Serial4/1 is up, line protocol is up
Serial4/2 is administratively down, line protocol is down
Serial4/3 is administratively down, line protocol is down
```

For more information on search and filter functionality, refer to the "Basic Command-Line Interface Commands" section in the "Cisco IOS User Interfaces Commands" chapter in the *Cisco IOS Configuration Fundamentals Configuration Guide*.

Monitoring a UPS

This section explains how to monitor an APC Smart-UPS.

Connecting and Powering Up the UPS Components

Complete the following steps to set up the components:

Step 1 Connect the UPS to the SAP card COM1 port or to an Ethernet switch that is connected to the Cisco ICS 7750. Refer to the "SAP Card COM Ports" section in the "Installing the Cisco ICS 7750" chapter of the *Cisco ICS 7750 Hardware Installation Guide*.

Step 2 If any of the following devices are not turned on, power them on as follows:

- UPS—Press the Test button on the UPS front panel.
- Cisco ICS 7750—Press the power supply switches (on the right side of the chassis) to on (|).
- Catalyst switches—Connect one end of the AC power cord to the AC power connector on the switch; then connect the other end of the power cord to an AC power outlet.

Step 3 Complete the procedure that is appropriate for the type of UPS connection that you made in Step 1:

- SAP Card COM1 Port—Go to "Configuring the System to Monitor the UPS Through a Serial Connection" on page 2-22.
- Ethernet switch—Go to "Configuring the System to Monitor a UPS Through an Ethernet Connection" on page 2-23.

Configuring the System to Monitor the UPS Through a Serial Connection

If the UPS serial port is connected to the SAP card COM1 port on the Cisco ICS 7750, complete the following steps to configure the UPS so that the Cisco ICS 7750 can monitor UPS status:

Step 1 On the PC, choose **Start** > **Run**.

Step 2 Open a Telnet session with the SPE running System Manager:

```
telnet IP address 5000
```

Step 3 Log in as an administrator (userID *administrator*), and enter your password (the default is *changeme*).

Step 4 Enter the following command to stop the FMMServer on the SPE:

```
net stop FmmServer
```

Step 5 Change to the FMM directory:

```
cd Program Files\Cisco Systems\ics\FMM
```

Step 6 Install the UPS:

```
installups
```

Step 7 Start FmmServer:

```
net start FmmServer
```

Step 8 Go to "Verifying That the Cisco ICS 7750 Can Communicate with the UPS" on page 2-26.

Configuring the System to Monitor a UPS Through an Ethernet Connection

If the UPS is connected to an Ethernet switch that is connected to the SSP card on the Cisco ICS 7750, complete the following steps to configure the UPS so that the Cisco ICS 7750 can monitor UPS status:

Step 1 Ensure that you have the following information available:

- The IP address that you intend to use for the UPS.
- The IP address of the SPE running System Manager. (If you do not know this IP address, see "Determining the IP Address of an SPE" in Chapter 1, "Operating the System.")
- The subnet mask that you used when you configured the Cisco ICS 7750.

Step 2 Insert the Web/SNMP Management CD-ROM that came with your APC Smart-UPS into your PC CD-ROM drive.

Step 3 Follow the on-screen prompts to install the SNMP/Web Management Utility.

Note If the SNMP/Web Card Management Wizard does not automatically run after the software installation is complete, click **Start > Programs > APC Card Management Wizard**.

While the system is attempting to communicate with the UPS, the first screen of the SNMP/Web Card Management Wizard continues to be displayed (this process might take several minutes). When the system is ready for you to continue with configuring the UPS, the Found An Unconfigured Management Card dialog box displays.

Step 4 Enter the following information in the Found An Unconfigured Management Card dialog box:

- In the System IP Address field, enter the UPS IP address.
- In the Subnet Mask field, enter the Cisco ICS 7750 subnet mask.
- In the Default Gateway field, enter the IP address of the SPE running System Manager.
- Check the **Start a Web browser when finished** check box.

Step 5 Click **Finish**.

A dialog box displays, informing you that your default Web browser will start and that your User Name and password for UPS configuration will be *apc*.

Step 6 Click **OK**.

Step 7 Click **Next**.

Step 8 In the Installation Options dialog box, choose **Express**.

Step 9 Click **Next**.

Step 10 Choose the type of connection (LAN) that you are using to communicate with the UPS.

Step 11 Click **Next**.

Step 12 Click **Close**.

Step 13 Click **OK**.

Step 14 If a Web browser (Netscape Communicator or Microsoft Internet Explorer, for example) is not already running, open it. Enter your UPS IP address in the Location or Address field of the browser.

The Username and Password Required dialog box displays.

Step 15 In the User Name and Password fields, enter **apc**.

Step 16 Click **OK**.

The APC Status Summary page appears in your browser.

Step 17 In the left pane of the browser window, choose **Smart-UPS 1400 RM XL** > **PowerChute**.

Step 18 In the Add Client IP Address field, enter the IP address of the SPE running System Manager.

Step 19 Click **Add**.

The IP address that you entered in Step 18 and Step 19 will appear in the Configured Client IP Addresses pane.

Step 20 In the left pane of the browser window, choose **Network** > **SNMP**.

Step 21 In the SNMP table, verify that the Access field is set to **enabled**.

Step 22 Click **Apply**.

Step 23 In the Trap Receiver table, enter the UPS IP address in the Public field.

Step 24 Click **Apply**.

Step 25 In the Access Control table, enter the UPS IP address in the Private and Public fields.

Step 26 Click **Apply**.

Step 27 In the left pane of the browser window, choose **Event Log**.

The UPS reports its status in the Event column. Text similar to the following will be displayed:

```
Management Card: Web User apc logged in from <IP address>
```

Step 28 Unplug the UPS power cord.

The UPS emits an audio tone.

Step 29 Plug the UPS power cord in again.

In the Event column of the Event Log, text similar to the following will be displayed:

```
UPS: Switched to battery backup power, utility power failure.
UPS: Returned from battery backup power, utility power restored.
```

Step 30 Choose **Start** > **Run**.

Step 31 Open a Telnet session with the SPE running System Manager:

```
telnet IP address 5000
```

Step 32 Log in as an administrator (userID *administrator*), and enter your password (the default is *changeme*).

Step 33 Enter the following command to stop the FMMServer on the SPE:

```
net stop FmmServer
```

Step 34 Change to the FMM directory:

```
cd Program Files\Cisco Systems\ics\FMM
```

Step 35 Install the UPS:

```
installups
```

Step 36 Start FmmServer:

```
net start FmmServer
```

Step 37 Set the host name of the UPS, where *Name* is the UPS IP address:

```
SetUPSHostName -HostName Name
```

Step 38 Continue with "Verifying That the Cisco ICS 7750 Can Communicate with the UPS" on page 2-26.

Verifying That the Cisco ICS 7750 Can Communicate with the UPS

Complete the following steps to verify that the Cisco ICS 7750 can communicate with the UPS:

Step 1 On the PC, choose **Start** > **Run**.

Step 2 Open a Telnet session with the SPE running System Manager:

```
telnet IP address 5000
```

Step 3 Log in as an administrator (userID *administrator*), and enter your password (the default is *changeme*).

Step 4 Change to the FMM directory:

```
cd Program Files\Cisco Systems\ics\FMM
```

Step 5 Verify that the Cisco ICS 7750 can communicate with the UPS:

```
fmmcli getchassisinfo | more
```

Information similar to the following will be displayed:

```
UPS status = AC
Battery Level = <non-zero value>
Batt. Span = <non-zero value>
```

Note If `UPS status = UpsNotAvailable` is displayed, verify that your system components are properly connected and powered on. Then try this procedure again.

Step 6 Unplug the UPS power cord.

The UPS emits an audio tone, and the ALARM LED on the SAP turns on (amber).

Step 7 Using the Telnet session that you opened at Step 2, enter the following command to verify that the system has detected the change in power status:

```
fmmcli getchassisinfo | more
```

Information similar to the following will be displayed:

```
UPS status = DC
Battery Level = <non-zero value>
Batt. Span = <non-zero value>
```

Step 8 Open an ICS System Manager session (see "Accessing ICS System Manager" on page 1-9).

Step 9 Click the **Event Manager** tab on the ICS System Manager home page.

Step 10 At the bottom of the Live Viewer page, click **Start Events**.

Information similar to the following will be displayed:

```
AC power is off, using DC
```