

- HTTP Server: Shows if management access via HTTP is enabled.
 - HTTP Server Port: Shows the TCP port used by the HTTP interface.
 - Version: Shows the software version number.
 - 802.1X: Shows if IEEE 802.1X access control for wireless clients is enabled.
- AP Wireless Configuration – The AP Wireless Configuration tables display the radio and VAP interface settings listed below. Note that Interface Wireless A refers to the 802.11a radio and Interface Wireless G refers the 802.11b/g radio.
- VAP: Displays the VAP number.
 - Radio Status: Displays if the radio is enabled or disabled for this VAP.
 - SSID: The service set identifier for the VAP interface.
 - Radio Channel: The radio channel through which the access point communicates with wireless clients.
 - Radio Encryption: The key size used for data encryption.
 - Radio Auth. Type: Shows the type of authentication used.
 - Output Antenna: Displays which antenna/e are in use by the VAP.
 - MAC: The physical layer address of the radio interface.

Station Status

The Station Status window shows the wireless clients currently associated with the access point.

Figure 37 Station Status

Station Configuration							
802.11a							
Index	Vlan ID	SSID	Station Address	Authenticated	Associated	Forwarding Allowed	Key Type
802.11g							
Index	Vlan ID	SSID	Station Address	Authenticated	Associated	Forwarding Allowed	Key Type

The Station Configuration page displays basic connection information for all associated stations as described below. Note that this page is automatically refreshed every five seconds.

- Station Address: The MAC address of the wireless client.
- Authenticated: Shows if the station has been authenticated. The two basic methods of authentication supported for 802.11 wireless networks are “open

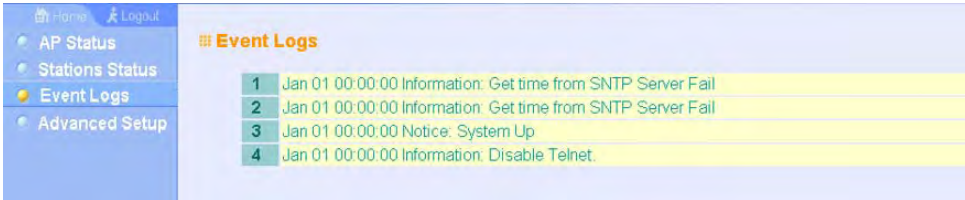
system” and “shared key.” Open-system authentication accepts any client attempting to connect to the access point without verifying its identity. The shared-key approach uses Wired Equivalent Privacy (WEP) to verify client identity by distributing a shared key to stations before attempting authentication.

- Associated: Shows if the station has been successfully associated with the access point. Once authentication is completed, stations can associate with the current access point, or reassociate with a new access point. The association procedure allows the wireless system to track the location of each mobile client, and ensure that frames destined for each client are forwarded to the appropriate access point.
- Forwarding Allowed: Shows if the station has passed 802.1X authentication and is now allowed to forward traffic to the access point.
- Key Type – Displays one of the following:
 - WEP Disabled – The client is not using Wired Equivalent Privacy (WEP) encryption keys.
 - Dynamic – The client is using Wi-Fi Protected Access (802.1X or pre-shared key mode) or using 802.1X authentication with dynamic keying.
 - Static – The client is using static WEP keys for encryption.

Event Logs

The Event Logs window shows the log messages generated by the access point and stored in memory.

Figure 38 Event Logs



The Event Logs table displays the following information:

- Log Time: The time the log message was generated.
- Event Level: The logging level associated with this message. For a description of the various levels, see “logging level” on page 4-46.
- Event Message: The content of the log message.

Error Messages – An example of a logged error message is: “Station Failed to authenticate (unsupported algorithm).”

This message may be caused by any of the following conditions:

- Access point was set to "Open Authentication", but a client sent an authentication request frame with a "Shared key."
- Access point was set to "Shared Key Authentication," but a client sent an authentication frame for "Open System."
- WEP keys do not match: When the access point uses "Shared Key Authentication," but the key used by client and access point are not the same, the frame will be decrypted incorrectly, using the wrong algorithm and sequence number.



COMMAND LINE INTERFACE

USING THE COMMAND LINE INTERFACE

ACCESSING THE CLI

When accessing the management interface for the over a direct connection to the console port, or via a Telnet connection, the access point can be managed by entering command keywords and parameters at the prompt. Using the access point's command-line interface (CLI) is very similar to entering commands on a UNIX system.

CONSOLE CONNECTION

To access the access point through the console port, perform these steps:

1. At the console prompt, enter the user name and password. (The default user name is "admin" and the default password is "password") When the user name is entered, the CLI displays the "Enterprise AP#" prompt.
2. Enter the necessary commands to complete your desired tasks.
3. When finished, exit the session with the "exit" command.

After connecting to the system through the console port, the login screen displays:

```
Username: admin
Password:
Enterprise AP#
```



NOTE: Command examples shown later in this chapter abbreviate the console prompt to "AP" for simplicity.

Telnet Connection

Telnet operates over the IP transport protocol. In this environment, your management station and any network device you want to manage over the network must have a valid IP address. Valid IP addresses consist of four numbers, 0 to 255, separated by periods. Each address consists of a network portion and host portion. For example, if the access point cannot acquire an IP address from a DHCP server, the default IP address used by the access point, 168.254.2.1, consists of a network portion (168.254.2) and a host portion (1).

To access the access point through a Telnet session, you must first set the IP address for the access point, and set the default gateway if you are managing the access point from a different IP subnet. For example:

```
Enterprise AP#configure
Enterprise AP(config)#interface ethernet
Enterprise AP(if-ethernet)#ip address 10.1.0.1 255.255.255.0 10.1.0.254
Enterprise AP(if-ethernet)#
```

If your corporate network is connected to another network outside your office or to the Internet, you need to apply for a registered IP address. However, if you are attached to an isolated network, then you can use any IP address that matches the network segment to which you are attached.

After you configure the access point with an IP address, you can open a Telnet session by performing these steps.

1. From the remote host, enter the Telnet command and the IP address of the device you want to access.
2. At the prompt, enter the user name and system password. The CLI will display the "Enterprise AP#" prompt to show that you are using executive access mode (i.e., Exec).
3. Enter the necessary commands to complete your desired tasks.
4. When finished, exit the session with the "quit" or "exit" command.

After entering the Telnet command, the login screen displays:

```
Username: admin
Password:
Enterprise AP#
```



NOTE: You can open up to four sessions to the device via Telnet.

ENTERING COMMANDS

This section describes how to enter CLI commands.

Keywords and Arguments

A CLI command is a series of keywords and arguments. Keywords identify a command, and arguments specify configuration parameters. For example, in the command “show interfaces ethernet,” **show** and **interfaces** are keywords, and **ethernet** is an argument that specifies the interface type.

You can enter commands as follows:

- To enter a simple command, enter the command keyword.
- To enter commands that require parameters, enter the required parameters after the command keyword. For example, to set a password for the administrator, enter:

```
Enterprise AP(config)#username smith
```

Minimum Abbreviation

The CLI will accept a minimum number of characters that uniquely identify a command. For example, the command “configure” can be entered as **con**. If an entry is ambiguous, the system will prompt for further input.

Command Completion

If you terminate input with a Tab key, the CLI will print the remaining characters of a partial keyword up to the point of ambiguity. In the “configure” example, typing **con** followed by a tab will result in printing the command up to “**configure**.”

Getting Help on Commands

You can display a brief description of the help system by entering the **help** command. You can also display command syntax by following a command with the “?” character to list keywords or parameters.

Showing Commands

If you enter a "?" at the command prompt, the system will display the first level of keywords for the current configuration mode (Exec, Global Configuration, or Interface). You can also display a list of valid keywords for a specific command. For example, the command "**show ?**" displays a list of possible show commands:

```
Enterprise AP#show ?
  APmanagement      Show management AP information.
  authentication     Show Authentication parameters
  bootfile           Show bootfile name
  bridge             Show bridge
  config             System snapshot for tech support
  dhcp-relay         Show DHCP Relay Configuration
  event-log          Show event log on console
  filters            Show filters
  hardware           Show hardware version
  history            Display the session history
  interface          Show interface information
  line              TTY line information
  link-integrity     Show link integrity information
  logging            Show the logging buffers
  radius             Show radius server
  rogue-ap          Show Rogue ap Stations
  snmp              Show snmp configuration
  sntp              Show sntp configuration
  station            Show 802.11 station table
  system            Show system information
  version           Show system version
```

```
Enterprise AP#show
```

The command "**show interface ?**" will display the following information:

```
Enterprise AP#show interface ?
  ethernet  Show Ethernet interface
  wireless  Show wireless interface
  <cr>
```

```
Enterprise AP#show interface
```

Partial Keyword Lookup

If you terminate a partial keyword with a question mark, alternatives that match the initial letters are provided. (Remember not to leave a space between the command and question mark.) For example "**s?**" shows all the keywords starting with "s."

```
Enterprise AP#show s?
snmp      sntp      station  system
Enterprise AP#show s
```

Negating the Effect of Commands

For many configuration commands you can enter the prefix keyword **“no”** to cancel the effect of a command or reset the configuration to the default value. For example, the **logging** command will log system messages to a host server. To disable logging, specify the **no logging** command. This guide describes the negation effect for all applicable commands.

Using Command History

The CLI maintains a history of commands that have been entered. You can scroll back through the history of commands by pressing the up arrow key. Any command displayed in the history list can be executed again, or first modified and then executed.

Using the **show history** command displays a longer list of recently executed commands.

Understanding Command Modes

The command set is divided into Exec and Configuration classes. Exec commands generally display information on system status or clear statistical counters. Configuration commands, on the other hand, modify interface parameters or enable certain functions. These classes are further divided into different modes. Available commands depend on the selected mode. You can always enter a question mark **“?”** at the prompt to display a list of the commands available for the current mode. The command classes and associated modes are displayed in the following table:

Table 7 Command Modes

Class	Mode
Exec	Privileged
Configuration	Global
	Interface-ethernet
	Interface-wireless
	Interface-wireless-vap

Exec Commands

When you open a new console session on an access point, the system enters Exec command mode. Only a limited number of the commands are available in this mode. You can access all other commands only from the configuration mode. To access Exec mode, open a new console session with the user name **“admin.”** The command prompt displays as **“Enterprise AP#”** for Exec mode.

```
Username: admin
Password: [system login password]
Enterprise AP#
```

Configuration Commands

Configuration commands are used to modify access point settings. These commands modify the running configuration and are saved in memory.

The configuration commands are organized into four different modes:

- Global Configuration (GC) - These commands modify the system level configuration, and include commands such as **username** and **password**.
- Interface-Ethernet Configuration (IC-E) - These commands modify the Ethernet port configuration, and include command such as **dns** and **ip**.
- Interface-Wireless Configuration (IC-W) - These commands modify the wireless port configuration of global parameters for the radio, and include commands such as **channel** and **transmit-power**.
- Interface-Wireless Virtual Access Point Configuration (IC-W-VAP) - These commands modify the wireless port configuration for each VAP, and include commands such as **ssid** and **authentication**.

To enter the Global Configuration mode, enter the command **configure** in Exec mode. The system prompt will change to "Enterprise AP(config)#" which gives you access privilege to all Global Configuration commands.

```
Enterprise AP#configure
Enterprise AP(config)#
```

To enter Interface mode, you must enter the "**interface ethernet**," or "**interface wireless a**," or "**interface wireless g**" command while in Global Configuration mode. The system prompt will change to "Enterprise AP(if-ethernet)#," or "Enterprise AP(if-wireless)" indicating that you have access privileges to the associated commands. You can use the **end** command to return to the Exec mode.

```
Enterprise AP(config)#interface ethernet
Enterprise AP(if-ethernet)#
```

Command Line Processing

Commands are not case sensitive. You can abbreviate commands and parameters as long as they contain enough letters to differentiate them from any other currently available commands or parameters. You can use the Tab key to complete partial commands, or enter a partial command followed by the "?" character to display a list of possible matches. You can also use the following editing keystrokes for command-line processing:

Table 8 Keystroke Commands

Keystroke	Function
Ctrl-A	Shifts cursor to start of command line.
Ctrl-B	Shifts cursor to the left one character.
Ctrl-C	Terminates a task and displays the command prompt.
Ctrl-E	Shifts cursor to end of command line.
Ctrl-F	Shifts cursor to the right one character.
Ctrl-K	Deletes from cursor to the end of the command line.
Ctrl-L	Repeats current command line on a new line.
Ctrl-N	Enters the next command line in the history buffer.
Ctrl-P	Shows the last command.
Ctrl-R	Repeats current command line on a new line.
Ctrl-U	Deletes the entire line.
Ctrl-W	Deletes the last word typed.
Esc-B	Moves the cursor backward one word.
Esc-D	Deletes from the cursor to the end of the word.
Esc-F	Moves the cursor forward one word.
Delete key or backspace key	Erases a mistake when entering a command.

COMMAND GROUPS

The system commands can be broken down into the functional groups shown below.

Table 9 Command Groups

Command Group	Description	Page
General	Basic commands for entering configuration mode, restarting the system, or quitting the CLI	5-84
System Management	Controls user name, password, web browser management options, and a variety of other system information	5-89
System Logging	Configures system logging parameters	5-108
System Clock	Configures SNTP and system clock settings	5-113
DHCP Relay	Configures the access point to send DHCP requests from clients to specified servers	5-118
SNMP	Configures community access strings and trap managers	5-120
Flash/File	Manages code image or access point configuration files	5-136
RADIUS	Configures the RADIUS client used with 802.1X authentication	5-140
802.1X Authentication	Configures 802.1X authentication	5-146
MAC Address Authentication	Configures MAC address authentication	5-152
Filtering	Filters communications between wireless clients, controls access to the management interface from wireless clients, and filters traffic using specific Ethernet protocol types	5-155

Command Group	Description	Page
WDS Bridge	Configures WDS forwarding table settings	5-160
Spanning Tree	Configures spanning tree parameters	5-167
Ethernet Interface	Configures connection parameters for the Ethernet interface	5-173
Wireless Interface	Configures radio interface settings	5-179
Wireless Security	Configures radio interface security and encryption settings	5-201
Rogue AP Detection	Configures settings for the detection of rogue access points in the network	5-201
Link Integrity	Configures a link check to a host device on the wired network	5-217
IAPP	Enables roaming between multi-vendor access points	5-220
VLANs	Configures VLAN membership	5-221
WMM	Configures WMM quality of service parameters	5-224

The access mode shown in the following tables is indicated by these abbreviations: **Exec** (Executive Mode), **GC** (Global Configuration), **IC-E** (Interface-Ethernet Configuration), **IC-W** (Interface-Wireless Configuration), and **IC-W-VAP** (Interface-Wireless VAP Configuration).

General Commands

Table 10 General Commands

Command	Function	Mode	Page
configure	Activates global configuration mode	Exec	5-84
end	Returns to previous configuration mode	GC, IC	5-85
exit	Returns to the previous configuration mode, or exits the CLI	any	5-86
ping	Sends ICMP echo request packets to another node on the network	Exec	5-86
reset	Restarts the system	Exec	5-87
show history	Shows the command history buffer	Exec	5-88
show line	Shows the configuration settings for the console port	Exec	5-88

configure

This command activates Global Configuration mode. You must enter this mode to modify most of the settings on the access point. You must also enter Global Configuration mode prior to enabling the context modes for Interface Configuration. See “Using the Command Line Interface” on page 77.

Default Setting

None

Command Mode

Exec

Example

```
Enterprise AP#configure
Enterprise AP(config)#
```

Related Commands

end (5-85)

end

This command returns to the previous configuration mode.

Default Setting

None

Command Mode

Global Configuration, Interface Configuration

Example

This example shows how to return to the Configuration mode from the Interface Configuration mode:

```
Enterprise AP(if-ethernet)#end
Enterprise AP(config)#
```

exit

This command returns to the Exec mode or exits the configuration program.

Default Setting

None

Command Mode

Any

Example

This example shows how to return to the Exec mode from the Interface Configuration mode, and then quit the CLI session:

```
Enterprise AP(if-ethernet)#exit
Enterprise AP#exit
CLI session with the Access Point is now closed
```

Username:

ping

This command sends ICMP echo request packets to another node on the network.

Syntax

ping <host_name | ip_address>

- *host_name* - Alias of the host.
- *ip_address* - IP address of the host.

Default Setting

None

Command Mode

Exec

Command Usage

- Use the ping command to see if another site on the network can be reached.
- The following are some results of the **ping** command:
 - *Normal response* - The normal response occurs in one to ten seconds, depending on network traffic.
 - *Destination does not respond* - If the host does not respond, a "timeout" appears in ten seconds.

- *Destination unreachable* - The gateway for this destination indicates that the destination is unreachable.
- *Network or host unreachable* - The gateway found no corresponding entry in the route table.
- Press <Esc> to stop pinging.

Example

```
Enterprise AP#ping 10.1.0.19
192.254.2.19 is alive
Enterprise AP#
```

reset

This command restarts the system or restores the factory default settings.

Syntax

reset <board | configuration>

- **board** - Reboots the system.
- **configuration** - Resets the configuration settings to the factory defaults, and then reboots the system.

Default Setting

None

Command Mode

Exec

Command Usage

When the system is restarted, it will always run the Power-On Self-Test.

Example

This example shows how to reset the system:

```
Enterprise AP#reset board
Reboot system now? <y/n>: y
```

show history

This command shows the contents of the command history buffer.

Default Setting

None

Command Mode

Exec

Command Usage

- The history buffer size is fixed at 10 commands.
- Use the up or down arrow keys to scroll through the commands in the history buffer.

Example

In this example, the show history command lists the contents of the command history buffer:

```
Enterprise AP#show history
config
exit
show history
Enterprise AP#
```

show line

This command displays the console port's configuration settings.

Command Mode

Exec

Example

The console port settings are fixed at the values shown below.

```
Enterprise AP#show line
Console Line Information
=====
databits   : 8
parity     : none
speed      : 9600
stop bits  : 1
=====
Enterprise AP#
```

System Management Commands

These commands are used to configure the user name, password, system logs, browser management options, clock settings, and a variety of other system information.

Table 11 System Management Commands

Command	Function	Mode	Page
Country Setting			
country	Sets the access point country code	Exec	5--90
Device Designation			
prompt	Customizes the command line prompt	GC	5--91
system name	Specifies the host name for the access point	GC	5-92
snmp-server contact	Sets the system contact string	GC	5-121
snmp-server location	Sets the system location string	GC	5-122
Management Access			
username	Configures the user name for management access	GC	5-92
password	Specifies the password for management access	GC	5-93
ip ssh-server enable	Enables the Secure Shell server	IC-E	5-93
ip ssh-server port	Sets the Secure Shell port	IC-E	5-94
ip telnet-server enable	Enables the Telnet server	IC-E	5-94
APmgmtIP	Specifies an IP address or range of addresses allowed access to the management interface	GC	5-99
APmgmtUI	Enables or disables SNMP, Telnet or web management access	GC	5-100
show APmanagement	Shows the AP management configuration	Exec	5-101
Web Server			
ip http port	Specifies the port to be used by the web browser interface	GC	5-95
ip http server	Allows the access point to be monitored or configured from a browser	GC	5-95
ip https port	Specifies the UDP port number used for a secure HTTP connection to the access point's Web interface	GC	5-96
ip https server	Enables the secure HTTP server on the access point	GC	5-97
web-redirect	Enables web authentication of clients using a public access Internet service	GC	5-98
System Status			
show system	Displays system information	Exec	5-102
show version	Displays version information for the system	Exec	5-103
show config	Displays detailed configuration information for the system	Exec	5-103
show hardware	Displays the access point's hardware version	Exec	5-108

country

This command configures the access point's country code, which identifies the country of operation and sets the authorized radio channels.

Syntax

country <country_code>

country_code - A two character code that identifies the country of operation. See the following table for a full list of codes.

Table 12 Country Codes

Country	Code	Country	Code	Country	Code	Country	Code
Albania	AL	Dominican Republic	DO	Kuwait	KW	Romania	RO
Algeria	DZ	Ecuador	EC	Latvia	LV	Russia	RU
Argentina	AR	Egypt	EG	Lebanon	LB	Saudi Arabia	SA
Armenia	AM	Estonia	EE	Liechtenstein	LI	Singapore	SG
Australia	AU	Finland	FI	Lithuania	LT	Slovak Republic	SK
Austria	AT	France	FR	Macao	MO	Spain	ES
Azerbaijan	AZ	Georgia	GE	Macedonia	MK	Sweden	SE
Bahrain	BH	Germany	DE	Malaysia	MY	Switzerland	CH
Belarus	BY	Greece	GR	Malta	MT	Syria	SY
Belgium	BE	Guatemala	GT	Mexico	MX	Taiwan	TW
		Honduras	HN	Monaco	MC	Thailand	TH
Belize	BZ	Hong Kong	HK	Morocco	MA	Trinidad & Tobago	TT
Bolivia	BO	Hungary	HU	Netherlands	NL	Tunisia	TN
Brazil	BR	Iceland	IS	New Zealand	NZ	Turkey	TR
Brunei Darussalam	BN	India	IN	Norway	NO	Ukraine	UA
Bulgaria	BG	Indonesia	ID	Qatar	QA	United Arab Emirates	AE
Canada	CA	Iran	IR	Oman	OM	United Kingdom	GB
Chile	CL	Ireland	IE	Pakistan	PK	United States	US
China	CN	Israel	IL	Panama	PA	Uruguay	UY
Colombia	CO	Italy	IT	Peru	PE	Uzbekistan	UZ

Country	Code	Country	Code	Country	Code	Country	Code
Costa Rica	CR	Japan	JP	Philippines	PH	Yemen	YE
Croatia	HR	Jordan	JO	Poland	PL	Venezuela	VE
Cyprus	CY	Kazakhstan	KZ	Portugal	PT	Vietnam	VN
Czech Republic	CZ	North Korea	KP	Puerto Rico	PR	Zimbabwe	ZW
Denmark	DK	Korea Republic	KR	Slovenia	SI		
Elsalvador	SV	Luxembourg	LU	South Africa	ZA		

Default Setting

US - for units sold in the United States

99 (no country set) - for units sold in other countries

Command Mode

Exec

Command Usage

- If you purchased an access point outside of the United States, the country code must be set before radio functions are enabled.
- The available Country Code settings can be displayed by using the **country ?** command.

Example

```
Enterprise AP#country tw
```

```
Enterprise AP#
```

prompt

This command customizes the CLI prompt. Use the **no** form to restore the default prompt.

Syntax

prompt <string>

no prompt

string - Any alphanumeric string to use for the CLI prompt.
(Maximum length: 32 characters)

Default Setting

Enterprise AP

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#prompt RD2
RD2(config)#
```

system name

This command specifies or modifies the system name for this device. Use the **no** form to restore the default system name.

Syntax

system name <name>

no system name

name - The name of this host.
(Maximum length: 32 characters)

Default Setting

Enterprise AP

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#system name AP
Enterprise AP(config)#
```

username

This command configures the user name for management access.

Syntax

username <name>

name - The name of the user.
(Length: 3-16 characters, case sensitive)

Default Setting

admin

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#username bob
Enterprise AP(config)#
```

password

After initially logging onto the system, you should set the password. Remember to record it in a safe place. Use the **no** form to reset the default password.

Syntax

password <password>
no password

password - Password for management access.
(Length: 3-16 characters, case sensitive)

Default Setting

null

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#password
Enterprise AP(config)#
```

ip ssh-server enable

This command enables the Secure Shell server. Use the **no** form to disable the server.

Syntax

ip ssh-server enable
no ip ssh-server

Default Setting

Disabled

Command Mode

Interface Configuration (Ethernet)

Command Usage

- The access point supports Secure Shell version 2.0 only.
- After boot up, the SSH server needs about two minutes to generate host encryption keys. The SSH server is disabled while the keys are being generated. The **show system** command displays the status of the SSH server.

Example

```
Enterprise AP(if-ethernet)#ip ssh-server enable
Enterprise AP(if-ethernet)#
```

ip ssh-server port

This command sets the Secure Shell server port. Use the **no** form to disable the server.

Syntax

ip ssh-server port <port-number>

- *port-number* - The UDP port used by the SSH server. (Range: 1-65535)

Default Setting

22

Command Mode

Interface Configuration (Ethernet)

Example

```
Enterprise AP(if-ethernet)#ip ssh-server port 1124
Enterprise AP(if-ethernet)#
```

ip telnet-server enable

This command enables the Telnet server. Use the **no** form to disable the server.

Syntax

ip telnet-server enable
no ip telnet-server

Default Setting

Interface enabled

Command Mode

Interface Configuration (Ethernet)

Example

```
Enterprise AP(if-ethernet)#ip telnet-server enable
Enterprise AP(if-ethernet)#
```

ip http port

This command specifies the TCP port number used by the web browser interface. Use the **no** form to use the default port.

Syntax

```
ip http port <port-number>
no ip http port
```

port-number - The TCP port to be used by the browser interface.
(Range: 1024-65535)

Default Setting

80

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#ip http port 769
Enterprise AP(config)#
```

Related Commands

ip http server (5-95)

ip http server

This command allows this device to be monitored or configured from a browser. Use the **no** form to disable this function.

Syntax

```
[no] ip http server
```

Default Setting

Enabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#ip http server
Enterprise AP(config)#
```

Related Commands

`ip http port (5-95)`

ip https port

Use this command to specify the UDP port number used for HTTPS/SSL connection to the access point's Web interface. Use the **no** form to restore the default port.

Syntax

```
ip https port <port_number>
no ip https port
```

port_number – The UDP port used for HTTPS/SSL.
(Range: 80, 1024-65535)

Default Setting

443

Command Mode

Global Configuration

Command Usage

- You cannot configure the HTTP and HTTPS servers to use the same port.
- To avoid using common reserved TCP port numbers below 1024, the configurable range is restricted to 443 and between 1024 and 65535.
- If you change the HTTPS port number, clients attempting to connect to the HTTPS server must specify the port number in the URL, in this format:
https://device:port_number

Example

```
Enterprise AP(config)#ip https port 1234
Enterprise AP(config)#
```

ip https server

Use this command to enable the secure hypertext transfer protocol (HTTPS) over the Secure Socket Layer (SSL), providing secure access (i.e., an encrypted connection) to the access point's Web interface. Use the **no** form to disable this function.

Syntax

[no] ip https server

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

- Both HTTP and HTTPS service can be enabled independently.
- If you enable HTTPS, you must indicate this in the URL:
https://device:port_number]
- When you start HTTPS, the connection is established in this way:
 - The client authenticates the server using the server's digital certificate.
 - The client and server negotiate a set of security protocols to use for the connection.
 - The client and server generate session keys for encrypting and decrypting data.
- The client and server establish a secure encrypted connection.
A padlock icon should appear in the status bar for Internet Explorer 5.x.

Example

```
Enterprise AP(config)#ip https server
Enterprise AP(config)#
```

web-redirect

Use this command to enable web-based authentication of clients. Use the **no** form to disable this function.

Syntax

[no] web-redirect

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

- The web redirect feature is used to support billing for a public access wireless network. After successful association to an access point, a client is “redirected” to an access point login web page as soon as Internet access is attempted. The client is then authenticated by entering a user name and password on the web page. This process allows controlled access for clients without requiring 802.1X or MAC authentication.
- Web redirect requires a RADIUS server on the wired network with configured user names and passwords for authentication. The RADIUS server details must also be configured on the access point. (See “show bootfile” on page 140.)
- Use the **show system** command to display the current web redirect status.

Example

```
Enterprise AP(config)#web-redirect
Enterprise AP(config)#
```

APmgmtIP

This command specifies the client IP addresses that are allowed management access to the access point through various protocols.



NOTE: Secure Web (HTTPS) connections are not affected by the UI Management or IP Management settings.

Syntax

APmgmtIP <**multiple** *IP_address subnet_mask* | **single** *IP_address* | **any**>

- **multiple** - Adds IP addresses within a specifiable range to the SNMP, web and Telnet groups.
- **single** - Adds an IP address to the SNMP, web and Telnet groups.
- **any** - Allows any IP address access through SNMP, web and Telnet groups.
- *IP_address* - Adds IP addresses to the SNMP, web and Telnet groups.
- *subnet_mask* - Specifies a range of IP addresses allowed management access.

Default Setting

All addresses

Command Mode

Global Configuration

Command Usage

- If anyone tries to access a management interface on the access point from an invalid address, the unit will reject the connection, enter an event message in the system log, and send a trap message to the trap manager.
- IP address can be configured for SNMP, web and Telnet access respectively. Each of these groups can include up to five different sets of addresses, either individual addresses or address ranges.
- When entering addresses for the same group (i.e., SNMP, web or Telnet), the access point will not accept overlapping address ranges. When entering addresses for different groups, the access point will accept overlapping address ranges.
- You cannot delete an individual address from a specified range. You must delete the entire range, and reenter the addresses.
- You can delete an address range just by specifying the start address, or by specifying both the start address and end address.

Example

This example restricts management access to the indicated addresses.

```
Enterprise AP(config)#apmgmtip multiple 192.254.1.50 255.255.255.0
Enterprise AP(config)#
```

APmgmtUI

This command enables and disables management access to the access point through SNMP, Telnet and web interfaces.



NOTE: Secure Web (HTTPS) connections are not affected by the UI Management or IP Management settings.

Syntax

APmgmtUI <[SNMP | Telnet | Web] **enable** | **disable**>

- **SNMP** - Specifies SNMP management access.
- **Telnet** - Specifies Telnet management access.
- **Web** - Specifies web based management access.
 - **enable/disable** - Enables or disables the selected management access method.

Default Setting

All enabled

Command Mode

Global Configuration

Example

This example restricts management access to the indicated addresses.

```
Enterprise AP(config)#apmgmtui SNMP enable
Enterprise AP(config)#
```

show apmanagement

This command shows the AP management configuration, including the IP addresses of management stations allowed to access the access point, as well as the interface protocols which are open to management access.

Command Mode

Exec

Example

```
Enterprise AP#show apmanagement
Management AP Information
=====
AP Management IP Mode: Any IP
Telnet UI: Enable
WEB UI   : Enable
SNMP UI  : Enable
=====
Enterprise AP#
```

show system

This command displays basic system configuration settings.

Default Setting

None

Command Mode

Exec

Example

Enterprise AP#show system

System Information

```
=====
Serial Number       : A123456789
System Up time      : 0 days, 4 hours, 33 minutes, 29 seconds
System Name         : Enterprise Wireless AP
System Location     :
System Contact      :
System Country Code : US - UNITED STATES
MAC Address         : 00-30-F1-F0-9A-9C
IP Address          : 192.254.2.1
Subnet Mask         : 255.255.255.0
Default Gateway     : 0.0.0.0
VLAN State          : DISABLED
Management VLAN ID(AP): 1
IAPP State          : ENABLED
DHCP Client         : ENABLED
HTTP Server         : ENABLED
HTTP Server Port    : 80
HTTPS Server        : ENABLED
HTTPS Server Port   : 443
Slot Status         : Dual band(a/g)
Boot Rom Version    : v3.0.3
Software Version    : v4.3.1.9
SSH Server          : ENABLED
SSH Server Port     : 22
Telnet Server       : ENABLED
WEB Redirect        : DISABLED
DHCP Relay          : DISABLED
Proxy ARP           : DISABLED
=====
```

Enterprise AP#

show version

This command displays the software version for the system.

Command Mode

Exec

Example

Enterprise AP#show version

```
Version Information
=====
Version: v4.3.2.2
Date   : Dec 20 2005, 18:38:12
=====
Enterprise AP#
```

show config

This command displays detailed configuration information for the system.

Command Mode

Exec

Example

Enterprise AP#show config

```
Authentication Information
=====
MAC Authentication Server      : DISABLED
MAC Auth Session Timeout Value : 0 min
802.1x supplicant             : DISABLED
802.1x supplicant user        : EMPTY
802.1x supplicant password    : EMPTY
Address Filtering              : ALLOWED

System Default : ALLOW addresses not found in filter table.
Filter Table
-----
No Filter Entries.

Bootfile Information
=====
Bootfile : ec-img.bin
=====
```

Protocol Filter Information

```

=====
Local Bridge      :DISABLED
AP Management     :ENABLED
Ethernet Type Filter :DISABLED

```

Enabled Protocol Filters

```

-----
No protocol filters are enabled
=====

```

Hardware Version Information

```

=====
Hardware version R01A
=====

```

Ethernet Interface Information

```

=====
IP Address       : 192.254.0.151
Subnet Mask      : 255.255.255.0
Default Gateway  : 192.254.0.1
Primary DNS      : 210.200.211.225
Secondary DNS    : 210.200.211.193
Speed-duplex     : 100Base-TX Full Duplex
Admin status     : Up
Operational status : Up
=====

```

Wireless Interface 802.11a Information

```

=====
-----Identification-----
Description      : 802.11a Access Point
SSID            : A 0
Channel         : 0 (AUTO)
Status          : Disable
-----802.11 Parameters-----
Transmit Power   : 100% (5 dBm)
Data Rate        : 54Mbps
Fragmentation Threshold : 2346 bytes
RTS Threshold    : 2347 bytes
Beacon Interval  : 100 TUs
DTIM Interval    : 1 beacon
Maximum Association : 64 stations
Native VLAN ID   : 1

```

```

-----Security-----
Closed System           : DISABLED
Multicast cipher        : WEP
Unicast cipher          : TKIP and AES
WPA clients             : REQUIRED
WPA Key Mgmt Mode       : PRE SHARED KEY
WPA PSK Key Type        : ALPHANUMERIC
Encryption              : DISABLED
Default Transmit Key    : 1
Static Keys :
    Key 1: EMPTY      Key 2: EMPTY      Key 3: EMPTY      Key 4: EMPTY
Key Length :
    Key 1: ZERO       Key 2: ZERO       Key 3: ZERO       Key 4: ZERO
Authentication Type     : OPEN
Rogue AP Detection      : Disabled
Rogue AP Scan Interval  : 720 minutes
Rogue AP Scan Duration  : 350 milliseconds
=====

```

Console Line Information

```

=====
databits   : 8
parity     : none
speed      : 9600
stop bits  : 1
=====

```

Logging Information

```

=====
Syslog State           : Disabled
Logging Console State  : Disabled
Logging Level          : Informational
Logging Facility Type   : 16
Servers
  1: 0.0.0.0           , UDP Port: 514, State: Disabled
  2: 0.0.0.0           , UDP Port: 514, State: Disabled
  3: 0.0.0.0           , UDP Port: 514, State: Disabled
  4: 0.0.0.0           , UDP Port: 514, State: Disabled
=====

```

Radius Server Information

```

=====
IP               : 0.0.0.0
Port             : 1812
Key              : *****
Retransmit       : 3
Timeout          : 5
Radius MAC format : no-delimiter
Radius VLAN format : HEX
=====

```

Radius Secondary Server Information

```
=====
IP                : 0.0.0.0
Port              : 1812
Key               : *****
Retransmit        : 3
Timeout           : 5
Radius MAC format : no-delimiter
Radius VLAN format: HEX
=====
```

SNMP Information

```
=====
Service State      : Disable
Community (ro)     : *****
Community (rw)     : *****
Location           :
Contact            : Contact
```

EngineId :80:00:07:e5:80:00:00:29:f6:00:00:00:0c

EngineBoots:2

Trap Destinations:

```
1:      0.0.0.0, Community: *****, State: Disabled
2:      0.0.0.0, Community: *****, State: Disabled
3:      0.0.0.0, Community: *****, State: Disabled
4:      0.0.0.0, Community: *****, State: Disabled
dot11InterfaceAGFail Enabled      dot11InterfaceBFail Enabled
dot11StationAssociation Enabled    dot11StationAuthentication Enabled
dot11StationReAssociation Enabled  dot11StationRequestFail Enabled
dot1xAuthFail Enabled             dot1xAuthNotInitiated Enabled
dot1xAuthSuccess Enabled          dot1xMacAddrAuthFail Enabled
dot1xMacAddrAuthSuccess Enabled    iappContextDataSent Enabled
iappStationRoamedFrom Enabled      iappStationRoamedTo Enabled
localMacAddrAuthFail Enabled        localMacAddrAuthSuccess Enabled
pppLogonFail Enabled               snmpServerFail Enabled
configFileVersionChanged Enabled    radiusServerChanged Enabled
systemDown Enabled                 systemUp Enabled
=====
```

SNTP Information

```
=====
Service State      : Disabled
SNTP (server 1) IP : 137.92.140.80
SNTP (server 2) IP : 192.43.244.18
Current Time       : 00 : 14, Jan 1st, 1970
Time Zone          : -5 (BOGOTA, EASTERN, INDIANA)
Daylight Saving    : Disabled
=====
```

Station Table Information

```
=====
if-wireless A VAP [0] :
802.11a Channel : Auto
```

No 802.11a Channel Stations.

.
.
.

```
if-wireless G VAP [0] :
802.11g Channel : Auto
```

No 802.11g Channel Stations.

.
.
.

System Information

```
=====
Serial Number      :
System Up time     : 0 days, 0 hours, 16 minutes, 51 seconds
System Name        : Enterprise Wireless AP
System Location    :
System Contact     : Contact
System Country Code : 99 - NO_COUNTRY_SET
MAC Address        : 00-12-CF-05-B7-84
IP Address         : 192.254.0.151
Subnet Mask        : 255.255.255.0
Default Gateway    : 192.254.0.1
VLAN State         : DISABLED
Management VLAN ID(AP): 1
IAPP State         : ENABLED
DHCP Client        : ENABLED
HTTP Server        : ENABLED
HTTP Server Port   : 80
HTTPS Server       : ENABLED
HTTPS Server Port  : 443
Slot Status        : Dual band(a/g)
Boot Rom Version   : v3.0.7
Software Version    : v4.3.2.2
```

```
SSH Server          : ENABLED
SSH Server Port     : 22
Telnet Server       : ENABLED
WEB Redirect        : DISABLED
DHCP Relay          : DISABLED
=====

Version Information
=====
Version: v4.3.2.2
Date   : Dec 20 2005, 18:38:12
=====
Enterprise AP#
```

show hardware

This command displays the hardware version of the system.

Command Mode

Exec

Example

```
Enterprise AP#show hardware

Hardware Version Information
=====
Hardware version R01
=====
Enterprise AP#
```

System Logging Commands

These commands are used to configure system logging on the access point.

Table 13 System Logging Commands

Command	Function	Mode	Page
logging on	Controls logging of error messages	GC	5-109
logging host	Adds a syslog server host IP address that will receive logging messages	GC	5-109
logging console	Initiates logging of error messages to the console	GC	5-110
logging level	Defines the minimum severity level for event logging	GC	5-110
logging facility-type	Sets the facility type for remote logging of syslog messages	GC	5-111
logging clear	Clears all log entries in access point memory	GC	5-112
show logging	Displays the state of logging	Exec	5-112
show event-log	Displays all log entries in access point memory	Exec	5-113

logging on

This command controls logging of error messages; i.e., sending debug or error messages to memory. The **no** form disables the logging process.

Syntax

[no] logging on

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

The logging process controls error messages saved to memory. You can use the **logging level** command to control the type of error messages that are stored in memory.

Example

```
Enterprise AP(config)#logging on
Enterprise AP(config)#
```

logging host

This command specifies syslog servers host that will receive logging messages. Use the **no** form to remove syslog server host.

Syntax

logging host <1 | 2 | 3 | 4> <host_name | host_ip_address> [udp_port]
no logging host <1 | 2 | 3 | 4>

- **1** - First syslog server.
- **2** - Second syslog server.
- **3** - Third syslog server.
- **4** - Fourth syslog server.
- *host_name* - The name of a syslog server. (Range: 1-20 characters)
- *host_ip_address* - The IP address of a syslog server.
- *udp_port* - The UDP port used by the syslog server.

Default Setting

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#logging host 1 10.1.0.3
Enterprise AP(config)#
```

logging console

This command initiates logging of error messages to the console. Use the **no** form to disable logging to the console.

Syntax

[no] logging console

Default Setting

Disabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#logging console
Enterprise AP(config)#
```

logging level

This command sets the minimum severity level for event logging.

Syntax

logging level <Emergency | Alert | Critical | Error | Warning | Notice | Informational | Debug>

Default Setting

Informational

Command Mode

Global Configuration

Command Usage

Messages sent include the selected level down to Emergency level.

Level Argument	Description
Emergency	System unusable
Alert	Immediate action needed
Critical	Critical conditions (e.g., memory allocation, or free memory error - resource exhausted)
Error	Error conditions (e.g., invalid input, default used)
Warning	Warning conditions (e.g., return false, unexpected return)
Notice	Normal but significant condition, such as cold start
Informational	Informational messages only
Debug	Debugging messages

Example

```
Enterprise AP(config)#logging level alert
Enterprise AP(config)#
```

logging facility-type

This command sets the facility type for remote logging of syslog messages.

Syntax

logging facility-type <type>

type - A number that indicates the facility used by the syslog server to dispatch log messages to an appropriate service. (Range: 16-23)

Default Setting

16

Command Mode

Global Configuration

Command Usage

The command specifies the facility type tag sent in syslog messages. (See RFC 3164.) This type has no effect on the kind of messages reported by the access point. However, it may be used by the syslog server to sort messages or to store messages in the corresponding database.

Example

```
Enterprise AP(config)#logging facility 19
Enterprise AP(config)#
```

logging clear

This command clears all log messages stored in the access point's memory.

Syntax

logging clear

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#logging clear
Enterprise AP(config)#
```

show logging

This command displays the logging configuration.

Syntax

show logging

Command Mode

Exec

Example

```
Enterprise AP#show logging
Logging Information
=====
Syslog State           : Enabled
Logging Console State  : Enabled
Logging Level          : Alert
Logging Facility Type  : 16
Servers
  1: 192.254.2.19, UDP Port: 514, State: Enabled
  2: 0.0.0.0, UDP Port: 514, State: Disabled
  3: 0.0.0.0, UDP Port: 514, State: Disabled
  4: 0.0.0.0, UDP Port: 514, State: Disabled
=====
Enterprise AP#
```

show event-log

This command displays log messages stored in the access point's memory.

Syntax

show event-log

Command Mode

Exec

Example

```
Enterprise AP#show event-log
Mar 09 11:57:55 Information: 802.11g:11g Radio Interface Enabled
Mar 09 11:57:55 Information: 802.11g:Radio channel updated to 8
Mar 09 11:57:34 Information: 802.11g:11g Radio Interface Enabled
Mar 09 11:57:18 Information: 802.11g:11g Radio Interface Enabled
Mar 09 11:56:35 Information: 802.11a:11a Radio Interface Enabled
Mar 09 11:55:52 Information: SSH task: Set SSH server port to 22
Mar 09 11:55:52 Information: SSH task: Enable SSH server.
Mar 09 11:55:52 Information: Enable Telnet.
Mar 09 11:55:40 Information: 802.11a:11a Radio Interface Disabled
Mar 09 11:55:40 Information: 802.11a:Transmit Power set to QUARTER
Press <n> next. <p> previous. <a> abort. <y> continue to end :
Enterprise AP#configure
Enter configuration commands, one per line. End with CTRL/Z
Enterprise AP(config)#logging clear
```

System Clock Commands

These commands are used to configure SNTP and system clock settings on the access point.

Table 14 System Clock Commands

Command	Function	Mode	Page
sntp-server ip	Specifies one or more time servers	GC	5-114
sntp-server enable	Accepts time from the specified time servers	GC	5-114
sntp-server date-time	Manually sets the system date and time	GC	5-115
sntp-server daylight-saving	Sets the start and end dates for daylight savings time	GC	5-116
sntp-server timezone	Sets the time zone for the access point's internal clock	GC	5-116
show sntp	Shows current SNTP configuration settings	Exec	5-117

sntp-server ip

This command sets the IP address of the servers to which SNTP time requests are issued. Use the this command with no arguments to clear all time servers from the current list.

Syntax

sntp-server ip <1 | 2> <ip>

- **1** - First time server.
- **2** - Second time server.
- *ip* - IP address of an time server (NTP or SNTP).

Default Setting

137.92.140.80

192.43.244.18

Command Mode

Global Configuration

Command Usage

When SNTP client mode is enabled using the **sntp-server enable** command, the **sntp-server ip** command specifies the time servers from which the access point polls for time updates. The access point will poll the time servers in the order specified until a response is received.

Example

```
Enterprise AP(config)#sntp-server ip 10.1.0.19
Enterprise AP#
```

Related Commands

sntp-server enable (5-114)

show sntp (5-117)

sntp-server enable

This command enables SNTP client requests for time synchronization with NTP or SNTP time servers specified by the **sntp-server ip** command. Use the **no** form to disable SNTP client requests.

Syntax

[no] **sntp-server enable**

Default Setting

Enabled

Command Mode

Global Configuration

Command Usage

The time acquired from time servers is used to record accurate dates and times for log events. Without SNTP, the access point only records the time starting from the factory default set at the last bootup (i.e., 00:14:00, January 1, 1970).

Example

```
Enterprise AP(config)#sntp-server enable
Enterprise AP(config)#
```

Related Commands

```
sntp-server ip (5-114)
show sntp (5-117)
```

sntp-server date-time

This command sets the system clock.

Default Setting

00:14:00, January 1, 1970

Command Mode

Global Configuration

Example

This example sets the system clock to 17:37 June 19, 2003.

```
Enterprise AP#sntp-server date-time
Enter Year<1970-2100>: 2003
Enter Month<1-12>: 6
Enter Day<1-31>: 19
Enter Hour<0-23>: 17
Enter Min<0-59>: 37
Enterprise AP#
```

Related Commands

sntp-server enable (5-114)

sntp-server daylight-saving

This command sets the start and end dates for daylight savings time. Use the **no** form to disable daylight savings time.

Syntax

[no] sntp-server daylight-saving

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

The command sets the system clock back one hour during the specified period.

Example

This sets daylight savings time to be used from July 1st to September 1st.

```
Enterprise AP(config)#sntp-server daylight-saving
Enter Daylight saving from which month<1-12>: 6
and which day<1-31>: 1
Enter Daylight saving end to which month<1-12>: 9
and which day<1-31>: 1
Enterprise AP(config)#
```

sntp-server timezone

This command sets the time zone for the access point's internal clock.

Syntax

sntp-server timezone *<hours>*

hours - Number of hours before/after UTC.
(Range: -12 to +12 hours)

Default Setting

-5 (BOGOTA, EASTERN, INDIANA)

Command Mode

Global Configuration

Command Usage

This command sets the local time zone relative to the Coordinated Universal Time (UTC, formerly Greenwich Mean Time or GMT), based on the earth's prime meridian, zero degrees longitude. To display a time corresponding to your local time, you must indicate the number of hours and minutes your time zone is east (before) or west (after) of UTC.

Example

```
Enterprise AP(config)#ntp-server timezone +8
Enterprise AP(config)#
```

show ntp

This command displays the current time and configuration settings for the SNTP client.

Command Mode

Exec

Example

```
Enterprise AP#show ntp
```

```
SNTP Information
=====
Service State      : Enabled
SNTP (server 1) IP : 137.92.140.80
SNTP (server 2) IP : 192.43.244.18
Current Time       : 08 : 04, Jun 20th, 2003
Time Zone          : +8 (TAIPEI, BEIJING)
Daylight Saving    : Enabled, from Jun, 1st to Sep, 1st
=====
```

```
Enterprise AP#
```

DHCP Relay Commands

Dynamic Host Configuration Protocol (DHCP) can dynamically allocate an IP address and other configuration information to network clients that broadcast a request. To receive the broadcast request, the DHCP server would normally have to be on the same subnet as the client. However, when the access point's DHCP relay agent is enabled, received client requests can be forwarded directly by the access point to a known DHCP server on another subnet. Responses from the DHCP server are returned to the access point, which then broadcasts them back to clients.

Table 15 DHCP Relay Commands

Command	Function	Mode	Page
dhcp-relay enable	Enables the DHCP relay agent	GC	5-118
dhcp-relay	Sets the primary and secondary DHCP server address	GC	5-119
show dhcp-relay	Shows current DHCP relay configuration settings	Exec	5-119

dhcp-relay enable

This command enables the access point's DHCP relay agent. Use the **no** form to disable the agent.

Syntax

[no] dhcp-relay enable

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

- For the DHCP relay agent to function, the primary DHCP server must be configured using the **dhcp-relay primary** command. A secondary DHCP server does not need to be configured, but it is recommended.
- If there is no response from the primary DHCP server, and a secondary server has been configured, the agent will then attempt to send DHCP requests to the secondary server.

Example

```
Enterprise AP(config)#dhcp-relay enable
Enterprise AP(config)#
```

dhcp-relay

This command configures the primary and secondary DHCP server addresses.

Syntax

dhcp-relay <**primary** | **secondary**> <*ip_address*>

- **primary** - The primary DHCP server.
- **secondary** - The secondary DHCP server.
- *ip_address* - IP address of the server.

Default Setting

Primary and secondary: 0.0.0.0

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#dhcp-relay primary 192.254.2.10
Enterprise AP(config)#
```

show dhcp-relay

This command displays the current DHCP relay configuration.

Command Mode

Exec

Example

```
Enterprise AP#show dhcp-relay
DHCP Relay           : ENABLED
Primary DHCP Server   : 192.254.2.10
Secondary DHCP Server : 0.0.0.0
Enterprise AP#
```

SNMP Commands

Controls access to this access point from management stations using the Simple Network Management Protocol (SNMP), as well as the hosts that will receive trap messages.

Table 16 SNMP Commands

Command	Function	Mode	Page
snmp-server community	Sets up the community access string to permit access to SNMP commands	GC	5-121
snmp-server contact	Sets the system contact string	GC	5-121
snmp-server location	Sets the system location string	GC	5-122
snmp-server enable server	Enables SNMP service and traps	GC	5-123
snmp-server host	Specifies the recipient of an SNMP notification operation	GC	5-123
snmp-server trap	Enables specific SNMP notifications	GC	5-124
snmp-server engine id	Sets the engine ID for SNMP v3	GC	5-126
snmp-server user	Sets the name of the SNMP v3 user	GC	5-127
snmp-server targets	Configures SNMP v3 notification targets	GC	5-128
snmp-server filter	Configures SNMP v3 notification filters	GC	5-129
snmp-server filter-assignments	Assigns SNMP v3 notification filters to targets	GC	5-130
show snmp groups	Displays the pre-defined SNMP v3 groups	Exec	5-131
show snmp users	Displays SNMP v3 user settings	Exec	5-132
show snmp group-assignments	Displays the assignment of users to SNMP v3 groups	Exec	5-132
show snmp target	Displays the SNMP v3 notification targets	Exec	5-133
show snmp filter	Displays the SNMP v3 notification filters	Exec	5-133
show snmp filter-assignments	Displays the SNMP v3 notification filter assignments	Exec	5-134
show snmp	Displays the status of SNMP communications	Exec	5-135

snmp-server community

This command defines the community access string for the Simple Network Management Protocol. Use the **no** form to remove the specified community string.

Syntax

snmp-server community *string* [**ro** | **rw**]
no snmp-server community *string*

- *string* - Community string that acts like a password and permits access to the SNMP protocol. (Maximum length: 23 characters, case sensitive)
- **ro** - Specifies read-only access. Authorized management stations are only able to retrieve MIB objects.
- **rw** - Specifies read/write access. Authorized management stations are able to both retrieve and modify MIB objects.

Default Setting

- public - Read-only access. Authorized management stations are only able to retrieve MIB objects.
- private - Read/write access. Authorized management stations are able to both retrieve and modify MIB objects.

Command Mode

Global Configuration

Command Usage

If you enter a community string without the **ro** or **rw** option, the default is read only.

Example

```
Enterprise AP(config)#snmp-server community alpha rw
Enterprise AP(config)#
```

snmp-server contact

This command sets the system contact string. Use the **no** form to remove the system contact information.

Syntax

snmp-server contact *string*
no snmp-server contact

string - String that describes the system contact. (Maximum length: 255 characters)

Default Setting

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#snmp-server contact Paul
Enterprise AP(config)#
```

Related Commands

snmp-server location (5-122)

snmp-server location

This command sets the system location string. Use the **no** form to remove the location string.

Syntax

snmp-server location <text>

no snmp-server location

text - String that describes the system location.
(Maximum length: 255 characters)

Default Setting

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#snmp-server location WC-19
Enterprise AP(config)#
```

Related Commands

snmp-server contact (5-121)

snmp-server enable server

This command enables SNMP management access and also enables this device to send SNMP traps (i.e., notifications). Use the **no** form to disable SNMP service and trap messages.

Syntax

snmp-server enable server
no snmp-server enable server

Default Setting

Enabled

Command Mode

Global Configuration

Command Usage

- This command enables both authentication failure notifications and link-up-down notifications.
- The **snmp-server host** command specifies the host device that will receive SNMP notifications.

Example

```
Enterprise AP(config)#snmp-server enable server
Enterprise AP(config)#
```

Related Commands

snmp-server host (5-123)

snmp-server host

This command specifies the recipient of an SNMP notification. Use the **no** form to remove the specified host.

Syntax

snmp-server host <1 | 2 | 3 | 4> <host_ip_address | host_name>
 <community-string>

no snmp-server host

- **1** - First SNMP host.
- **2** - Second SNMP host.
- **3** - Third SNMP host.
- **4** - Fourth SNMP host.
- *host_ip_address* - IP of the host (the targeted recipient).

- *host_name* - Name of the host. (Range: 1-63 characters)
- *community-string* - Password-like community string sent with the notification operation. Although you can set this string using the **snmp-server host** command by itself, we recommend that you define this string using the **snmp-server community** command prior to using the **snmp-server host** command. (Maximum length: 23 characters)

Default Setting

Host Address: None
Community String: public

Command Mode

Global Configuration

Command Usage

The **snmp-server host** command is used in conjunction with the **snmp-server enable server** command to enable SNMP notifications.

Example

```
Enterprise AP(config)#snmp-server host 1 10.1.19.23 batman
Enterprise AP(config)#
```

Related Commands

snmp-server enable server (5-123)

snmp-server trap

This command enables the access point to send specific SNMP traps (i.e., notifications). Use the **no** form to disable specific trap messages.

Syntax

```
snmp-server trap <trap>
no snmp-server trap <trap>
```

- *trap* - One of the following SNMP trap messages:
 - **dot11InterfaceAFail** - The 802.11a or 802.11g interface has failed.
 - **dot11Interface BGFail** - The 802.11b/g interface has failed.
 - **dot11StationAssociation** - A client station has successfully associated with the access point.
 - **dot11StationAuthentication** - A client station has been successfully authenticated.
 - **dot11StationReAssociation** - A client station has successfully re-associated with the access point.

- **dot11StationRequestFail** - A client station has failed association, re-association, or authentication.
- **dot1xAuthFail** - A 802.1X client station has failed RADIUS authentication.
- **dot1xAuthNotInitiated** - A client station did not initiate 802.1X authentication.
- **dot1xAuthSuccess** - A 802.1X client station has been successfully authenticated by the RADIUS server.
- **dot1xMacAddrAuthFail** - A client station has failed MAC address authentication with the RADIUS server.
- **dot1xMacAddrAuthSuccess** - A client station has successfully authenticated its MAC address with the RADIUS server.
- **iappContextDataSent** - A client station's Context Data has been sent to another access point with which the station has associated.
- **iappStationRoamedFrom** - A client station has roamed from another access point (identified by its IP address).
- **iappStationRoamedTo** - A client station has roamed to another access point (identified by its IP address).
- **localMacAddrAuthFail** - A client station has failed authentication with the local MAC address database on the access point.
- **localMacAddrAuthSuccess** - A client station has successfully authenticated its MAC address with the local database on the access point.
- **pppLogonFail** - The access point has failed to log onto the PPPoE server using the configured user name and password.
- **sntpServerFail** - The access point has failed to set the time from the configured SNTP server.
- **sysConfigFileVersionChanged** - The access point's configuration file has been changed.
- **sysRadiusServerChanged** - The access point has changed from the primary RADIUS server to the secondary, or from the secondary to the primary.
- **sysSystemDown** - The access point is about to shutdown and reboot.
- **sysSystemUp** - The access point is up and running.

Default Setting

All traps enabled

Command Mode

Global Configuration

Command Usage

This command is used in conjunction with the **snmp-server host** and **snmp-server enable server** commands to enable SNMP notifications.

Example

```
Enterprise AP(config)#no snmp-server trap dot11StationAssociation
Enterprise AP(config)#
```

snmp-server engine-id

This command is used for SNMP v3. It is used to uniquely identify the access point among all access points in the network. Use the **no** form to delete the engine ID.

Syntax

```
snmp-server engine-id <engine-id>
no snmp-server engine-id
```

engine-id - Enter engine-id in hexadecimal (5-32 characters).

Default Setting

Enabled

Command Mode

Global Configuration

Command Usage

- This command is used in conjunction with the **snmp-server user** command.
- Entering this command invalidates all engine IDs that have been previously configured.
- If the engineID is deleted or changed, all SNMP users will be cleared. You will need to reconfigure all existing users

Example

```
Enterprise AP(config)#snmp-server engine-id 1a:2b:3c:4d:00:ff
Enterprise AP(config)#
```

snmp-server user

This command configures the SNMP v3 users that are allowed to manage the access point. Use the **no** form to delete an SNMP v3 user.

Syntax

snmp-server user <user-name>

user-name - A user-defined string for the SNMP user. (32 characters maximum)

Default Setting

None

Command Mode

Global Configuration

Command Usage

- Up to 10 SNMPv3 users can be configured on the access point.
- The SNMP engine ID is used to compute the authentication/privacy digests from the pass phrase. You should therefore configure the engine ID with the **snmp-server engine-id** command before using this configuration command.
- The access point enables SNMP v3 users to be assigned to three pre-defined groups. Other groups cannot be defined. The available groups are:
 - RO - A read-only group using no authentication and no data encryption. Users in this group use no security, either authentication or encryption, in SNMP messages they send to the agent. This is the same as SNMP v1 or SNMP v2c.
 - RWAuth - A read/write group using authentication, but no data encryption. Users in this group send SNMP messages that use an MD5 key/password for authentication, but not a DES key/password for encryption.
 - RWPriv - A read/write group using authentication and data encryption. Users in this group send SNMP messages that use an MD5 key/password for authentication and a DES key/password for encryption. Both the MD5 and DES key/passwords must be defined.
- The command prompts for the following information to configure an SNMP v3 user:
 - *user-name* - A user-defined string for the SNMP user. (32 characters maximum)

- *group-name* - The name of the SNMP group to which the user is assigned (32 characters maximum). There are three pre-defined groups: RO, RWAuth, or RWPriv.
- *auth-proto* - The authentication type used for user authentication: md5 or none.
- *auth-passphrase* - The user password required when authentication is used (8 – 32 characters).
- *priv-proto* - The encryption type used for SNMP data encryption: des or none.
- *priv-passphrase* - The user password required when data encryption is used (8 – 32 characters).
- Users must be assigned to groups that have the same security levels. If a user who has “AuthPriv” security (uses authentication and encryption) is assigned to a read-only (RO) group, the user will not be able to access the database. An AuthPriv user must be assigned to the RWPriv group with the AuthPriv security level.
- To configure a user for the RWAuth group, you must include the *auth-proto* and *auth-passphrase* keywords.
- To configure a user for the RWPriv group, you must include the *auth-proto*, *auth-passphrase*, *priv-proto*, and *priv-passphrase* keywords.

Example

```
Enterprise AP(config)#snmp-server user
User Name<1-32> :chris
Group Name<1-32> :RWPriv
Authtype(md5,<cr>none):md5
Passphrase<8-32>:a good secret
Privacy(des,<cr>none) :des
Passphrase<8-32>:a very good secret
Enterprise AP(config)#
```

snmp-server targets

This command configures SNMP v3 notification targets. Use the **no** form to delete an SNMP v3 target.

Syntax

```
snmp-server targets <target-id> <ip-addr> <sec-name>
[version {3}] [udp-port {port-number}] [notification-type
{TRAP}]
no snmp-server targets <target-id>
```

- *target-id* - A user-defined name that identifies a receiver of SNMP notifications. (Maximum length: 32 characters)

- *ip-addr* - Specifies the IP address of the management station to receive notifications.
- *sec-name* - The defined SNMP v3 user name that is to receive notifications.
- **version** - The SNMP version of notifications. Currently only version **3** is supported in this command.
- **udp-port** - The UDP port that is used on the receiving management station for notifications.
- **notification-type** - The type of notification that is sent. Currently only **TRAP** is supported.

Default Setting

None

Command Mode

Global Configuration

Command Usage

- The access point supports up to 10 SNMP v3 target IDs.
- The SNMP v3 user name that is specified in the target must first be configured using the **snmp-server user** command.

Example

```
Enterprise AP(config)#snmp-server targets mytraps 192.254.2.33 chris
Enterprise AP(config)#
```

snmp-server filter

This command configures SNMP v3 notification filters. Use the **no** form to delete an SNMP v3 filter or remove a subtree from a filter.

Syntax

snmp-server filter <filter-id> <include | exclude> <subtree>
[mask {mask}]

no snmp-server filter <filter-id> [subtree]

- *filter-id* - A user-defined name that identifies an SNMP v3 notification filter. (Maximum length: 32 characters)
- **include** - Defines a filter type that includes objects in the MIB subtree.
- **exclude** - Defines a filter type that excludes objects in the MIB subtree.
- *subtree* - The part of the MIB subtree that is to be filtered.
- *mask* - An optional hexadecimal value bit mask to define objects in the MIB subtree.

Default Setting

None

Command Mode

Global Configuration

Command Usage

- The access point allows up to 10 notification filters to be created. Each filter can be defined by up to 20 MIB subtree ID entries.
- Use the command more than once with the same filter ID to build a filter that includes or excludes multiple MIB objects. Note that the filter entries are applied in the sequence that they are defined.
- The MIB subtree must be defined in the form ".1.3.6.1" and always start with a ".".
- The mask is a hexadecimal value with each bit masking the corresponding ID in the MIB subtree. A "1" in the mask indicates an exact match and a "0" indicates a "wild card." For example, a mask value of 0xFFBF provides a bit mask "1111 1111 1011 1111." If applied to the subtree 1.3.6.1.2.1.2.2.1.1.23, the zero corresponds to the 10th subtree ID. When there are more subtree IDs than bits in the mask, the mask is padded with ones.

Example

```
Enterprise AP(config)#snmp-server filter trapfilter include .1
Enterprise AP(config)#snmp-server filter trapfilter exclude
.1.3.6.1.2.1.2.2.1.1.23
```

snmp-server filter-assignments

This command assigns SNMP v3 notification filters to targets. Use the **no** form to remove an SNMP v3 filter assignment.

Syntax

```
snmp-server filter-assignments <target-id> <filter-id>
no snmp-server filter-assignments <target-id>
```

- *target-id* - A user-defined name that identifies a receiver of SNMP notifications. (Maximum length: 32 characters)
- *filter-id* - A user-defined name that identifies an SNMP v3 notification filter. (Maximum length: 32 characters)

Default Setting

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#snmp-server filter-assignments mytraps trapfilter
Enterprise AP(config)#exit
Enterprise AP#show snmp target
```

```
Host ID      : mytraps
User         : chris
IP Address   : 192.254.2.33
UDP Port     : 162
=====
```

```
Enterprise AP#show snmp filter-assignments
```

```
HostID  FilterID
```

```
mytraps trapfilter
```

```
Enterprise AP(config)#
```

show snmp groups

This command displays the SNMP v3 pre-defined groups.

Syntax

show snmp groups

Command Mode

Exec

Example

```
Enterprise AP#show snmp groups
```

```
GroupName      :RO
SecurityModel   :USM
SecurityLevel   :NoAuthNoPriv
```

```
GroupName      :RWAAuth
SecurityModel   :USM
SecurityLevel   :AuthNoPriv
```

```
GroupName      :RWPriv
SecurityModel   :USM
SecurityLevel   :AuthPriv
Enterprise AP#
```

show snmp users

This command displays the SNMP v3 users and settings.

Syntax

```
show snmp users
```

Command Mode

```
Exec
```

Example

```
Enterprise AP#show snmp users
```

```
=====
UserName      :chris
GroupName     :RWPriv
AuthType      :MD5
  Passphrase:*****
PrivType      :DES
  Passphrase:*****
=====
Enterprise AP#
```

show snmp group-assignments

This command displays the SNMP v3 user group assignments.

Syntax

```
show snmp group-assignments
```

Command Mode

```
Exec
```

Example

```
Enterprise AP#show snmp group-assignments
```

```
GroupName      :RwPriv  
UserName       :chris  
Enterprise AP#
```

```
Enterprise AP#
```

show snmp target

This command displays the SNMP v3 notification target settings.

Syntax

show snmp target

Command Mode

Exec

Example

```
Enterprise AP#show snmp target
```

```
Host ID        : mytraps  
User           : chris  
IP Address     : 192.254.2.33  
UDP Port       : 162  
=====
```

```
Enterprise AP#
```

show snmp filter

This command displays the SNMP v3 notification filter settings.

Syntax

show snmp filter [*filter-id*]

- *filter-id* - A user-defined name that identifies an SNMP v3 notification filter. (Maximum length: 32 characters)

Command Mode

Exec

Example

```

Enterprise AP#show snmp filter
Filter: trapfilter
      Type: include
      Subtree: iso.3.6.1.2.1.2.2.1

      Type: exclude
      Subtree: iso.3.6.1.2.1.2.2.1.1.23
=====
Enterprise AP#

```

show snmp filter-assignments

This command displays the SNMP v3 notification filter assignments.

Syntax

show snmp filter-assignments

Command Mode

Exec

Example

```

Enterprise AP#show snmp filter-assignments

                                HostID  FilterID
                                -----
                                mytraps  trapfilter

Enterprise AP#

```

show snmp

This command displays the SNMP configuration settings.

Command Mode

Exec

Example

Enterprise AP#show snmp

SNMP Information

=====

```
Service State           : Enable
Community (ro)          : *****
Community (rw)          : *****
Location                 : WC-19
Contact                  : Paul
```

EngineId :80:00:07:e5:80:00:00:2e:62:00:00:00:18

EngineBoots:1

Trap Destinations:

```
1:      192.254.2.9, Community: *****, State: Enabled
2:      0.0.0.0, Community: *****, State: Disabled
3:      0.0.0.0, Community: *****, State: Disabled
4:      0.0.0.0, Community: *****, State: Disabled
```

```
dot11InterfaceAGFail Enabled      dot11InterfaceBFail Enabled
dot11StationAssociation Enabled dot11StationAuthentication
Enabled
dot11StationReAssociation Enabled  dot11StationRequestFail
Enabled
dot1xAuthFail Enabled      dot1xAuthNotInitiated Enabled
dot1xAuthSuccess Enabled   dot1xMacAddrAuthFail Enabled
dot1xMacAddrAuthSuccess Enabled iappContextDataSent
Enabled
iappStationRoamedFrom Enabled   iappStationRoamedTo
Enabled
localMacAddrAuthFail Enabled   localMacAddrAuthSuccess Enabled
pppLogonFail Enabled          snmpServerFail Enabled
configFileVersionChanged Enabled radiusServerChanged
Enabled
systemDown Enabled            systemUp Enabled
```

=====

Enterprise AP#

Flash/File Commands

These commands are used to manage the system code or configuration files.

Table 17 Flash/File Commands

Command	Function	Mode	Page
bootfile	Specifies the file or image used to start up the system	GC	5-136
copy	Copies a code image or configuration between flash memory and a FTP/TFTP server	Exec	5-137
delete	Deletes a file or code image	Exec	5-138
dir	Displays a list of files in flash memory	Exec	5-139
show bootfile	Displays the name of the current operation code file that booted the system	Exec	5-140

bootfile

This command specifies the image used to start up the system.

Syntax

bootfile *<filename>*
filename - Name of the image file.

Default Setting

None

Command Mode

Exec

Command Usage

- The file name should not contain slashes (\ or /), the leading letter of the file name should not be a period (.), and the maximum length for file names is 32 characters. (Valid characters: A-Z, a-z, 0-9, ".", "-", "_")
- If the file contains an error, it cannot be set as the default file.

Example

```
Enterprise AP#bootfile -img.bin
Enterprise AP#
```

copy

This command copies a boot file, code image, or configuration file between the access point's flash memory and a FTP/TFTP server. When you save the configuration settings to a file on a FTP/TFTP server, that file can later be downloaded to the access point to restore system operation. The success of the file transfer depends on the accessibility of the FTP/TFTP server and the quality of the network connection.

Syntax

```
copy <ftp | tftp> file  
copy config <ftp | tftp>
```

- **ftp** - Keyword that allows you to copy to/from an FTP server.
- **tftp** - Keyword that allows you to copy to/from a TFTP server.
- **file** - Keyword that allows you to copy to/from a flash memory file.
- **config** - Keyword that allows you to upload the configuration file from flash memory.

Default Setting

None

Command Mode

Exec

Command Usage

- The system prompts for data required to complete the copy command.
- Only a configuration file can be uploaded to an FTP/TFTP server, but every type of file can be downloaded to the access point.
- The destination file name should not contain slashes (\ or /), the leading letter of the file name should not be a period (.), and the maximum length for file names on the FTP/TFTP server is 255 characters or 32 characters for files on the access point. (Valid characters: A-Z, a-z, 0-9, ".", "-", "_")
- Due to the size limit of the flash memory, the access point supports only two operation code files.
- The system configuration file must be named "syscfg" in all copy commands.

Example

The following example shows how to upload the configuration settings to a file on the TFTP server:

```
Enterprise AP#copy config tftp
TFTP Source file name:syscfg
TFTP Server IP:192.254.2.19
Enterprise AP#
```

The following example shows how to download a configuration file:

```
Enterprise AP#copy tftp file
1. Application image
2. Config file
3. Boot block image
Select the type of download<1,2,3>: [1]:2
TFTP Source file name:syscfg
TFTP Server IP:192.254.2.19
Enterprise AP#
```

delete

This command deletes a file or image.

Syntax

delete <filename>

filename - Name of the configuration file or image name.

Default Setting

None

Command Mode

Exec



NOTE: Beware of deleting application images from flash memory. At least one application image is required in order to boot the access point. If there are multiple image files in flash memory, and the one used to boot the access point is deleted, be sure you first use the **bootfile** command to update the application image file booted at startup before you reboot the access point.

Example

This example shows how to delete the test.cfg configuration file from flash memory.

```
Enterprise AP#delete test.cfg
Are you sure you wish to delete this file? <y/n>:
Enterprise AP#
```

Related Commands

- bootfile (5-136)
- dir (5-139)

dir

This command displays a list of files in flash memory.

Command Mode

Exec

Command Usage

File information is shown below:

Column Heading	Description
File Name	The name of the file.
Type	(2) Operation Code and (5) Configuration file
File Size	The length of the file in bytes.

Example

The following example shows how to display all file information:

```
Enterprise AP#dir
File Name          Type      File Size
-----
dflt-img.bin       2         1044140
syscfg             5          16860
syscfg_bak         5          16860
zz-img.bin         2         1044140

      1048576 byte(s) available

Enterprise AP#
```

show bootfile

This command displays the name of the current operation code file that booted the system.

Syntax

show snmp filter-assignments

Command Mode

Exec

Example

```
Enterprise AP#show bootfile

Bootfile Information
=====
Bootfile : ec-img.bin
=====
Enterprise AP#
```

RADIUS Client

Remote Authentication Dial-in User Service (RADIUS) is a logon authentication protocol that uses software running on a central server to control access for RADIUS-aware devices to the network. An authentication server contains a database of credentials, such as users names and passwords, for each wireless client that requires access to the access point.

Table 18 RADIUS Client

Command	Function	Mode	Page
radius-server address	Specifies the RADIUS server	GC	5-141
radius-server port	Sets the RADIUS server network port	GC	5-141
radius-server key	Sets the RADIUS encryption key	GC	5-142
radius-server retransmit	Sets the number of retries	GC	5-142
radius-server timeout	Sets the interval between sending authentication requests	GC	5-143
radius-server port-accounting	Sets the RADIUS Accounting server network port	GC	5-143
radius-server timeout-interim	Sets the interval between transmitting accounting updates to the RADIUS server	GC	5-144
radius-server radius-mac-format	Sets the format for specifying MAC addresses on the RADIUS server	GC	5-144

Command	Function	Mode	Page
radius-server vlan-format	Sets the format for specifying VLAN IDs on the RADIUS server	GC	5-145
show radius	Shows the current RADIUS settings	Exec	5-145

radius-server address

This command specifies the primary and secondary RADIUS servers.

Syntax

radius-server [secondary] address <host_ip_address | host_name>

- **secondary** - Secondary server.
- *host_ip_address* - IP address of server.
- *host_name* - Host name of server. (Range: 1-20 characters)

Default Setting

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server address 192.254.2.25
Enterprise AP(config)#
```

radius-server port

This command sets the RADIUS server network port.

Syntax

radius-server [secondary] port <port_number>

- **secondary** - Secondary server.
- *port_number* - RADIUS server UDP port used for authentication messages. (Range: 1024-65535)

Default Setting

1812

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server port 181
Enterprise AP(config)#
```

radius-server key

This command sets the RADIUS encryption key.

Syntax

radius-server [**secondary**] **key** <*key_string*>

- **secondary** - Secondary server.
- *key_string* - Encryption key used to authenticate logon access for client. Do not use blank spaces in the string. (Maximum length: 20 characters)

Default Setting

DEFAULT

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server key green
Enterprise AP(config)#
```

radius-server retransmit

This command sets the number of retries.

Syntax

radius-server [**secondary**] **retransmit** *number_of_retries*

- **secondary** - Secondary server.
- *number_of_retries* - Number of times the access point will try to authenticate logon access via the RADIUS server. (Range: 1 - 30)

Default Setting

3

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server retransmit 5
Enterprise AP(config)#
```

radius-server timeout

This command sets the interval between transmitting authentication requests to the RADIUS server.

Syntax

radius-server [**secondary**] **timeout** *number_of_seconds*

- **secondary** - Secondary server.
- *number_of_seconds* - Number of seconds the access point waits for a reply before resending a request. (Range: 1-60)

Default Setting

5

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server timeout 10
Enterprise AP(config)#
```

radius-server port-accounting

This command sets the RADIUS Accounting server network port.

Syntax

radius-server [**secondary**] **port-accounting** *<port_number>*

- **secondary** - Secondary server. If **secondary** is not specified, then the access point assumes you are configuring the primary RADIUS server.
- *port_number* - RADIUS Accounting server UDP port used for accounting messages.
(Range: 0 or 1024-65535)

Default Setting

0 (disabled)

Command Mode

Global Configuration

Command Usage

- When the RADIUS Accounting server UDP port is specified, a RADIUS accounting session is automatically started for each user that is successfully authenticated to the access point.

Example

```
Enterprise AP(config)#radius-server port-accounting 1813
Enterprise AP(config)#
```

radius-server timeout-interim

This command sets the interval between transmitting accounting updates to the RADIUS server.

Syntax

radius-server [**secondary**] **timeout-interim** <*number_of_seconds*>

- **secondary** - Secondary server.
- *number_of_seconds* - Number of seconds the access point waits between transmitting accounting updates. (Range: 60-86400)

Default Setting

3600

Command Mode

Global Configuration

Command Usage

- The access point sends periodic accounting updates after every interim period until the user logs off and a "stop" message is sent.

Example

```
Enterprise AP(config)#radius-server timeout-interim 500
Enterprise AP(config)#
```

radius-server radius-mac-format

This command sets the format for specifying MAC addresses on the RADIUS server.

Syntax

radius-server radius-mac-format <**multi-colon** | **multi-dash** | **no-delimiter** | **single-dash**>

- **multi-colon** - Enter MAC addresses in the form xx:xx:xx:xx:xx:xx.
- **multi-dash** - Enter MAC addresses in the form xx-xx-xx-xx-xx-xx.
- **no-delimiter** - Enter MAC addresses in the form xxxxxxxxxxxx.
- **single-dash** - Enter MAC addresses in the form xxxxxx-xxxxxx.

Default Setting

No delimiter

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server radius-mac-format multi-dash
Enterprise AP(config)#
```

radius-server vlan-format

This command sets the format for specifying VLAN IDs on the RADIUS server.

Syntax

radius-server vlan-format <hex | ascii>

- **hex** - Enter VLAN IDs as a hexadecimal number.
- **ascii** - Enter VLAN IDs as an ASCII string.

Default Setting

Hex

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#radius-server vlan-format ascii
Enterprise AP(config)#
```

show radius

This command displays the current settings for the RADIUS server.

Default Setting

None

Command Mode

Exec

Example

```
Enterprise AP#show radius

Radius Server Information
=====
IP                : 0.0.0.0
Port              : 1812
Key               : *****
Retransmit        : 3
Timeout           : 5
Radius MAC format : no-delimiter
Radius VLAN format : HEX
=====

Radius Secondary Server Information
=====
IP                : 0.0.0.0
Port              : 1812
Key               : *****
Retransmit        : 3
Timeout           : 5
Radius MAC format : no-delimiter
Radius VLAN format : HEX
=====
Enterprise AP#
```

802.1X Authentication

The access point supports IEEE 802.1X access control for wireless clients. This control feature prevents unauthorized access to the network by requiring an 802.1X client application to submit user credentials for authentication. Client authentication is then verified by a RADIUS server using EAP (Extensible Authentication Protocol) before the access point grants client access to the network. The 802.1X EAP packets are also used to pass dynamic unicast session keys and static broadcast keys to wireless clients.

Table 19 802.1X Authentication

Command	Function	Mode	Page
802.1x	Configures 802.1X as disabled, supported, or required	IC-W-VAP	5-147
802.1x broadcast-key-refresh-rate	Sets the interval at which the primary broadcast keys are refreshed for stations using 802.1X dynamic keying	IC-W-VAP	5-148
802.1x session-key-refresh-rate	Sets the interval at which unicast session keys are refreshed for associated stations using dynamic keying	IC-W-VAP	5-149
802.1x session-timeout	Sets the timeout after which a connected client must be re-authenticated	IC-W-VAP	5-149

Command	Function	Mode	Page
802.1x-suplicant enable	Enables the access point to operate as a 802.1X supplicant	GC	5-150
802.1x-suplicant user	Sets the supplicant user name and password for the access point	GC	5-150
show authentication	Shows all 802.1X authentication settings, as well as the address filter table	Exec	5-150

802.1x

This command configures 802.1X as optionally supported or as required for wireless clients. Use the **no** form to disable 802.1X support.

Syntax

802.1x <supported | required>
no 802.1x

- **supported** - Authenticates clients that initiate the 802.1X authentication process. Uses standard 802.11 authentication for all others.
- **required** - Requires 802.1X authentication for all clients.

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

- When 802.1X is disabled, the access point does not support 802.1X authentication for any station. After successful 802.11 association, each client is allowed to access the network.
- When 802.1X is supported, the access point supports 802.1X authentication only for clients initiating the 802.1X authentication process (i.e., the access point does NOT initiate 802.1X authentication). For stations initiating 802.1X, only those stations successfully authenticated are allowed to access the network. For those stations not initiating 802.1X, access to the network is allowed after successful 802.11 association.

- When 802.1X is required, the access point enforces 802.1X authentication for all 802.11 associated stations. If 802.1X authentication is not initiated by the station, the access point will initiate authentication. Only those stations successfully authenticated with 802.1X are allowed to access the network.
- 802.1X does not apply to the 10/100Base-TX port.

Example

```
Enterprise AP(config)#802.1x supported
Enterprise AP(config)#
```

802.1x broadcast-key-refresh-rate

This command sets the interval at which the broadcast keys are refreshed for stations using 802.1X dynamic keying.

Syntax

802.1x broadcast-key-refresh-rate <rate>

rate - The interval at which the access point rotates broadcast keys.
(Range: 0 - 1440 minutes)

Default Setting

0 (Disabled)

Command Mode

Global Configuration

Command Usage

- The access point uses Enterprise APOL (Extensible Authentication Protocol Over LANs) packets to pass dynamic unicast session and broadcast keys to wireless clients. The **802.1x broadcast-key-refresh-rate** command specifies the interval after which the broadcast keys are changed. The **802.1x session-key-refresh-rate** command specifies the interval after which unicast session keys are changed.
- Dynamic broadcast key rotation allows the access point to generate a random group key and periodically update all key-management capable wireless clients.

Example

```
Enterprise AP(config)#802.1x broadcast-key-refresh-rate 5
Enterprise AP(config)#
```

802.1x session-key-refresh-rate

This command sets the interval at which unicast session keys are refreshed for associated stations using dynamic keying.

Syntax

802.1x session-key-refresh-rate <rate>

rate - The interval at which the access point refreshes a session key.
(Range: 0 - 1440 minutes)

Default Setting

0 (Disabled)

Command Mode

Global Configuration

Command Usage

Session keys are unique to each client, and are used to authenticate a client connection, and correlate traffic passing between a specific client and the access point.

Example

```
Enterprise AP(config)#802.1x session-key-refresh-rate 5
Enterprise AP(config)#
```

802.1x session-timeout

This command sets the time period after which a connected client must be re-authenticated. Use the **no** form to disable 802.1X re-authentication.

Syntax

802.1x session-timeout <seconds>

no 802.1x session-timeout

seconds - The number of seconds. (Range: 0-65535)

Default

0 (Disabled)

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#802.1x session-timeout 300
Enterprise AP(config)#
```

802.1x-suppliant enable

This command enables the access point to operate as an 802.1X supplicant for authentication. Use the **no** form to disable 802.1X authentication of the access point.

Syntax

```
802.1x-suppliant enable
no 802.1x-suppliant
```

Default

Disabled

Command Mode

Global Configuration

Command Usage

A user name and password must be configured first before the 802.1X supplicant feature can be enabled.

Example

```
Enterprise AP(config)#802.1x-suppliant enable
Enterprise AP(config)#
```

802.1x-suppliant user

This command sets the user name and password used for authentication of the access point when operating as a 802.1X supplicant. Use the **no** form to clear the supplicant user name and password.

Syntax

```
802.1x-suppliant user <username> <password>
no 802.1x-suppliant user
```

- *username* - The access point name used for authentication to the network. (Range: 1-32 alphanumeric characters)
- *password* - The MD5 password used for access point authentication. (Range: 1-32 alphanumeric characters)

Default

None

Command Mode

Global Configuration

Command Usage

The access point currently only supports EAP-MD5 CHAP for 802.1X supplicant authentication.

Example

```
Enterprise AP(config)#802.1x-supplicant user AP8760 dot1xpass
Enterprise AP(config)#
```

show authentication

This command shows all 802.1X authentication settings, as well as the address filter table.

Command Mode

Exec

Example

```
Enterprise AP#show authentication
```

```
Authentication Information
=====
MAC Authentication Server      : DISABLED
MAC Auth Session Timeout Value : 0 min
802.1x supplicant             : DISABLED
802.1x supplicant user        : EMPTY
802.1x supplicant password    : EMPTY
Address Filtering              : ALLOWED

System Default : ALLOW addresses not found in filter table.
Filter Table

MAC Address      Status
-----
00-70-50-cc-99-1a  DENIED
00-70-50-cc-99-1b  ALLOWED
=====
Enterprise AP(config)#
```

MAC Address Authentication

Use these commands to define MAC authentication on the access point. For local MAC authentication, first define the default filtering policy using the address filter default command. Then enter the MAC addresses to be filtered, indicating if they are allowed or denied. For RADIUS MAC authentication, the MAC addresses and filtering policy must be configured on the RADIUS server.

Table 20 MAC Address Authentication

Command	Function	Mode	Page
address filter default	Sets filtering to allow or deny listed addresses	GC	5-152
address filter entry	Enters a MAC address in the filter table	GC	5-153
address filter delete	Removes a MAC address from the filter table	GC	5-154
mac- authentication server	Sets address filtering to be performed with local or remote options	GC	5-154
mac- authentication session-timeout	Sets the interval at which associated clients will be re-authenticated with the RADIUS server authentication database	GC	5-155
show authentication	Shows all 802.1X authentication settings, as well as the address filter table	Exec	5-150

address filter default

This command sets filtering to allow or deny listed MAC addresses.

Syntax

address filter default <allowed | denied>

- **allowed** - Only MAC addresses entered as “denied” in the address filtering table are denied.
- **denied** - Only MAC addresses entered as “allowed” in the address filtering table are allowed.

Default

allowed

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#address filter default denied
Enterprise AP(config)#
```

Related Commands

address filter entry (5-153)
802.1x-supPLICant user (5-150)

address filter entry

This command enters a MAC address in the filter table.

Syntax

address filter entry <mac-address> <allowed | denied>

- *mac-address* - Physical address of client. (Enter six pairs of hexadecimal digits separated by hyphens; e.g., 00-90-D1-12-AB-89.)
- **allowed** - Entry is allowed access.
- **denied** - Entry is denied access.

Default

None

Command Mode

Global Configuration

Command Mode

- The access point supports up to 1024 MAC addresses.
- An entry in the address table may be allowed or denied access depending on the global setting configured for the **address entry default** command.

Example

```
Enterprise AP(config)#address filter entry 00-70-50-cc-99-1a allowed
Enterprise AP(config)#
```

Related Commands

address filter default (5-152)
802.1x-supPLICant user (5-150)

address filter delete

This command deletes a MAC address from the filter table.

Syntax

address filter delete <mac-address>

mac-address - Physical address of client. (Enter six pairs of hexadecimal digits separated by hyphens.)

Default

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#address filter delete 00-70-50-cc-99-1b
Enterprise AP(config)#
```

Related Commands

802.1x-suppliant user (5-150)

mac-authentication server

This command sets address filtering to be performed with local or remote options. Use the **no** form to disable MAC address authentication.

Syntax

mac-authentication server [local | remote]

- **local** - Authenticate the MAC address of wireless clients with the local authentication database during 802.11 association.
- **remote** - Authenticate the MAC address of wireless clients with the RADIUS server during 802.1X authentication.

Default

Disabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#mac-authentication server remote
Enterprise AP(config)#
```

Related Commands

- address filter entry (5-153)
- radius-server address (5-141)
- 802.1x-suppliant user (5-150)

mac-authentication session-timeout

This command sets the interval at which associated clients will be re-authenticated with the RADIUS server authentication database. Use the **no** form to disable reauthentication.

Syntax

mac-authentication session-timeout <minutes>
minutes - Re-authentication interval. (Range: 0-1440)

Default

0 (disabled)

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#mac-authentication session-timeout 1
Enterprise AP(config)#
```

Filtering Commands

The commands described in this section are used to filter communications between wireless clients, control access to the management interface from wireless clients, and filter traffic using specific Ethernet protocol types.

Table 21 Filtering Commands

Command	Function	Mode	Page
filter local-bridge	Disables communication between wireless clients	GC	5-156
filter ap-manage	Prevents wireless clients from accessing the management interface	GC	5-157
filter uplink enable	Ethernet port MAC address filtering	GC	5-157
filter uplink	Adds or deletes a MAC address from the filtering table	GC	5-157
filter ethernet-type enable	Checks the Ethernet type for all incoming and outgoing Ethernet packets against the protocol filtering table	GC	5-158

Command	Function	Mode	Page
filter ethernet-type protocol	Sets a filter for a specific Ethernet type	GC	5-159
show filters	Shows the filter configuration	Exec	5-159

filter local-bridge

This command disables communication between wireless clients. Use the **no** form to disable this filtering.

Syntax

```
filter local-bridge <all-VAP | intra-VAP>
no filter local-bridge
```

all-VAP - When enabled, clients cannot establish wireless communications with any other client, either those associated to the same VAP interface or any other VAP interface.

intra-VAP - When enabled, clients associated with a specific VAP interface cannot establish wireless communications with each other. Clients can communicate with clients associated to other VAP interfaces.

Default

Disabled

Command Mode

Global Configuration

Command Usage

This command can disable wireless-to-wireless communications between clients via the access point. However, it does not affect communications between wireless clients and the wired network.

Example

```
Enterprise AP(config)#filter local-bridge
Enterprise AP(config)#
```

filter ap-manage

This command prevents wireless clients from accessing the management interface on the access point. Use the **no** form to disable this filtering.

Syntax

[no] filter ap-manage

Default

Enabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#filter ap-manage
Enterprise AP(config)#
```

filter uplink enable

This command enables filtering of MAC addresses from the Ethernet port.

Syntax

[no] filter uplink enable

Default

Disabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#filter uplink enable
Enterprise AP(config)#
```

filter uplink

This command adds or deletes MAC addresses from the uplink filtering table.

Syntax

filter uplink <add | delete> MAC address

MAC address - Specifies a MAC address in the form xx-xx-xx-xx-xx-xx.
A maximum of eight addresses can be added to the filtering table.

Default

Disabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#filter uplink add 00-12-34-56-78-9a
Enterprise AP(config)#
```

filter ethernet-type enable

This command checks the Ethernet type on all incoming and outgoing Ethernet packets against the protocol filtering table. Use the **no** form to disable this feature.

Syntax

[no] **filter ethernet-type enable**

Default

Disabled

Command Mode

Global Configuration

Command Usage

This command is used in conjunction with the **filter ethernet-type protocol** command to determine which Ethernet protocol types are to be filtered.

Example

```
Enterprise AP(config)#filter ethernet-type enable
Enterprise AP(config)#
```

Related Commands

filter ethernet-type protocol (5-159)

filter ethernet-type protocol

This command sets a filter for a specific Ethernet type. Use the **no** form to disable filtering for a specific Ethernet type.

Syntax

filter ethernet-type protocol <protocol>
no filter ethernet-type protocol <protocol>

protocol - An Ethernet protocol type. (Options: ARP, RARP, Berkeley-Trailer-Negotiation, LAN-Test, X25-Level-3, Banyan, CDP, DEC XNS, DEC-MOP-Dump-Load, DEC-MOP, DEC-LAT, Ethertalk, Appletalk-ARP, Novell-IPX(old), Novell-IPX(new), EAPOL, Telxon-TXP, Aironet-DDP, Enet-Config-Test, IP, IPv6, NetBEUI, PPPoE_Discovery, PPPoE_PPP_Session)

Default

None

Command Mode

Global Configuration

Command Usage

Use the **filter ethernet-type enable** command to enable filtering for Ethernet types specified in the filtering table, or the **no filter ethernet-type enable** command to disable all filtering based on the filtering table.

Example

```
Enterprise AP(config)#filter ethernet-type protocol ARP
Enterprise AP(config)#
```

Related Commands

filter ethernet-type enable (5-158)

show filters

This command shows the filter options and protocol entries in the filter table.

Command Mode

Exec

Example

```
Enterprise AP#show filters

Protocol Filter Information
=====
Local Bridge           :Traffic among all client STAs blocked
AP Management          :ENABLED
Ethernet Type Filter   :DISABLED

UPLink Access Table
-----
UPLink access control:Enabled
UPLink MAC access control list      :
00-12-34-56-78-9a
-----
Enabled Protocol Filters
-----
No protocol filters are enabled
=====
Enterprise AP#
```

WDS Bridge Commands

The commands described in this section are used to set the operation mode for each access point interface and configure Wireless Distribution System (WDS) forwarding table settings.

Table 22 WDS Bridge Commands

Command	Function	Mode	Page
bridge role	Selects the bridge operation mode for a radio interface	IC-W	5-161
bridge-link parent	Configures the MAC addresses of the parent bridge node	IC-W	5-162
bridge-link child	Configures MAC addresses of connected child bridge nodes	IC-W	5-162
bridge dynamic-entry age-time	Sets the aging time for dynamic entries in the WDS forwarding table	GC	5-163
show bridge aging-time	Displays the current WDS forwarding table aging time	Exec	5-164
show bridge filter-entry	Displays current entries in the bridge MAC address table	Exec	5-165
show bridge link	Displays current bridge settings for specified interfaces	Exec	5-166

bridge role (WDS)

This command selects the bridge operation mode for the radio interface.

Syntax

bridge role <ap | repeater | bridge | root-bridge >

- **ap** - Operates only as an access point for wireless clients.
- **repeater** - Operates as a wireless repeater, extending the range for remote wireless clients and connecting them to the root bridge. The "Parent" link to the root bridge must be configured. In this mode, traffic is not forwarded to the Ethernet port from the radio interface.
- **bridge** - Operates as a bridge to other access points also in bridge mode.
- **root-bridge** - Operates as the root bridge in the wireless bridge network.

Default Setting

AP

Command Mode

Interface Configuration (Wireless)

Command Usage

- When the bridge role is set to "repeater," the "Parent" link to the root bridge must be configured (see "bridge-link parent" on page 162). When the access point is operating in this mode, traffic is not forwarded to the Ethernet port from the radio interface.
- Up to four WDS bridge links (MAC addresses) per radio interface can be specified for each unit in the wireless bridge network. One unit only must be configured as the "root bridge" in the wireless network. The root bridge is the unit connected to the main core of the wired LAN. Other bridges need to specify one "Parent" link to the root bridge or to a bridge connected to the root bridge. The other seven WDS links are available as "Child" links to other bridges.
- The bridge link on the radio interface always uses the default VAP interface. In any bridge mode, VAP interfaces 1 to 7 are not available for use.

Example

```
Enterprise AP(if-wireless a)#bridge role root-bridge
Enterprise AP(if-wireless a)#
```

bridge-link parent

This command configures the MAC address of the parent bridge node.

Syntax

bridge-link parent <mac-address>

mac-address - The wireless MAC address of the parent bridge unit.
(12 hexadecimal digits in the form "xx-xx-xx-xx-xx-xx").

Default Setting

None

Command Mode

Interface Configuration (Wireless)

Command Usage

Every bridge (except the root bridge) in the wireless bridge network must specify the MAC address of the parent bridge that is linked to the root bridge, or the root bridge itself.

Example

```
Enterprise AP(if-wireless a)#bridge-link parent 00-08-2d-69-3a-51
Enterprise AP(if-wireless a)#
```

bridge-link child

This command configures the MAC addresses of child bridge nodes.

Syntax

bridge-link child <index> <mac-address>

- *index* - The link index number of the child node. (Range: 1 - 6)
- *mac-address* - The wireless MAC address of a child bridge unit.
(12 hexadecimal digits in the form "xx-xx-xx-xx-xx-xx").

Default Setting

None

Command Mode

Interface Configuration (Wireless)

Command Usage

- In root bridge mode, up to six child bridge links can be specified using link index numbers 1 to 6.

- In bridge mode, up to five child links can be specified using link index numbers 2 to 6. Index number 1 is reserved for the parent link, which must be set using the **bridge parent** command.

Example

```
Enterprise AP(if-wireless a)#bridge-link child 2 00-08-3e-84-bc-6d
Enterprise AP(if-wireless a)#bridge-link child 3 00-08-3e-85-13-f2
Enterprise AP(if-wireless a)#bridge-link child 4 00-08-3e-84-79-31
Enterprise AP(if-wireless a)#
```

bridge dynamic-entry age-time

This command sets the time for aging out dynamic entries in the WDS forwarding table.

Syntax

bridge dynamic-entry age-time <seconds>

seconds - The time to age out an address entry. (Range: 10-10000 seconds).

Default Setting

300 seconds

Command Mode

Global Configuration

Command Usage

If the MAC address of an entry in the address table is not seen on the associated interface for longer than the aging time, the entry is discarded.

Example

```
Enterprise AP(config)#bridge dynamic-entry age-time 100
Enterprise AP(config)#
```

show bridge aging-time

This command displays the current WDS forwarding table aging time setting.

Command Mode

Exec

Example

```
Enterprise AP#show bridge aging-time
Aging time: 300
Enterprise AP#
```

show bridge filter-entry

This command displays current entries in the WDS forwarding table.

Command Mode

Exec

Example

```
Enterprise AP#show bridge filter-entry
max entry numbers =512
current entry nums =13
*****
***** Bridge MAC Addr Table *****
*****
|      MAC      | Port |Fwd_type| VlanID|origin life|remain Life| Type
|
01 80 c2 00 00 00      0      5    4095      300      300
Static
01 80 c2 00 00 03      0      5    4095      300      300
Static
00 30 f1 f0 9b 20      1      0      1      300      300
Static
00 30 f1 f0 9b 21      1      0      1      300      300
Static
00 30 f1 f0 9b 22      1      0      1      300      300
Static
00 30 f1 f0 9b 23      1      0      1      300      300
Static
00 30 f1 f0 9b 24      1      0      1      300      300
Static
00 30 f1 f0 9b 25      1      0      1      300      300
Static
00 30 f1 f0 9b 26      1      0      1      300      300
Static
00 30 f1 f0 9b 27      1      0      1      300      300
Static
00 30 f1 2f be 30      1      3      0      300      175
Dynamic
00 30 f1 f0 9a 9c      1      0      1      300      300
Static
ff ff ff ff ff ff      0      4    4095      300      300
Static
Enterprise AP#
```

show bridge link

This command displays WDS bridge link and spanning tree settings for specified interfaces.

Syntax

show bridge link <ethernet | wireless <a | g> [*index*]>

- **ethernet** - Specifies the Ethernet interface.
- **wireless** - Specifies a wireless interface.
 - **a** - The 802.11a radio interface.
 - **g** - The 802.11g radio interface.
 - *index* - The index number of a bridge link. (Range: 1 - 6)

Command Mode

Exec

Example

Enterprise AP#show bridge link wireless a

Interface Wireless A WDS Information

=====

AP Role: Bridge

Parent: 00-12-34-56-78-9a

Child:

Child 2: 00-08-12-34-56-de

Child 3: 00-00-00-00-00-00

Child 4: 00-00-00-00-00-00

Child 5: 00-00-00-00-00-00

Child 6: 00-00-00-00-00-00

STAs:

No WDS Stations.

Enterprise AP#

Enterprise AP#show bridge link wireless a 2

```
Port-No          : 11
status           : Enabled
state            : Disabled
priority         : 0
path cost        : 19
message age Timer : Inactive
message age      : 4469
designated-root   : priority = 32768, MAC = 00:30:F1:F0:9A:9C
designated-cost   : 0
designated-bridge : priority = 32768, MAC = 00:30:F1:F0:9A:9C
designated-port   : priority = 0, port No = 11
forward-transitions : 0
Enterprise AP#
```

Enterprise AP#show bridge link ethernet

```
status           : Enabled
state            : Forwarding
priority         : 0
path cost        : 19
message age Timer : Inactive
message age      : 4346
designated-root   : priority = 32768, MAC = 00:30:F1:F0:9A:9C
designated-cost   : 0
designated-bridge : priority = 32768, MAC = 00:30:F1:F0:9A:9C
designated-port   : priority = 0, port No = 1
forward-transitions : 1
Enterprise AP#
```

Spanning Tree Commands

The commands described in this section are used to set the MAC address table aging time and spanning tree parameters for both the Ethernet and wireless interfaces.

Table 23 Bridge Commands

Command	Function	Mode	Page
bridge stp enable	Enables the Spanning Tree feature	GC	5-168
bridge stp forwarding-delay	Configures the spanning tree bridge forward time	GC	5-168
bridge stp hello-time	Configures the spanning tree bridge hello time	GC	5-169
bridge stp max-age	Configures the spanning tree bridge maximum age	GC	5-170
bridge stp priority	Configures the spanning tree bridge priority	GC	5-170
bridge-link path-cost	Configures the spanning tree path cost of a port	IC	5-171
bridge-link port-priority	Configures the spanning tree priority of a port	IC	5-172

Command	Function	Mode	Page
show bridge stp	Displays the global spanning tree settings	Exec	5-172
show bridge link	Displays current bridge settings for specified interfaces	Exec	5-166

bridge stp enable

This command enables the Spanning Tree Protocol. Use the **no** form to disable the Spanning Tree Protocol.

Syntax

[no] **bridge stp enable**

Default Setting

Enabled

Command Mode

Global Configuration

Example

This example globally enables the Spanning Tree Protocol.

```
Enterprise AP(config)#bridge stp enable
Enterprise AP(config)
```

bridge stp forwarding-delay

Use this command to configure the spanning tree bridge forward time globally for the wireless bridge. Use the **no** form to restore the default.

Syntax

bridge stp forwarding-delay <seconds>

no bridge stp forwarding-delay

seconds - Time in seconds. (Range: 4 - 30 seconds)

The minimum value is the higher of 4 or [(max-age / 2) + 1].

Default Setting

15 seconds

Command Mode

Global Configuration

Command Usage

This command sets the maximum time (in seconds) the root device will wait before changing states (i.e., discarding to learning to forwarding). This delay is required because every device must receive information about topology changes before it starts to forward frames. In addition, each port needs time to listen for conflicting information that would make it return to the discarding state; otherwise, temporary data loops might result.

Example

```
Enterprise AP(config)#bridge stp forwarding-delay 20
Enterprise AP(config)#
```

bridge stp hello-time

Use this command to configure the spanning tree bridge hello time globally for the wireless bridge. Use the **no** form to restore the default.

Syntax

bridge stp hello-time <time>

no bridge stp hello-time

time - Time in seconds. (Range: 1-10 seconds).

The maximum value is the lower of 10 or [(max-age / 2) -1].

Default Setting

2 seconds

Command Mode

Global Configuration

Command Usage

This command sets the time interval (in seconds) at which the root device transmits a configuration message.

Example

```
Enterprise AP(config)#bridge stp hello-time 5
Enterprise AP(config)#
```

bridge stp max-age

Use this command to configure the spanning tree bridge maximum age globally for the wireless bridge. Use the **no** form to restore the default.

Syntax

bridge stp max-age <seconds>

no bridge stp max-age

seconds - Time in seconds. (Range: 6-40 seconds)

The minimum value is the higher of 6 or $[2 \times (\text{hello-time} + 1)]$.

The maximum value is the lower of 40 or $[2 \times (\text{forward-time} - 1)]$.

Default Setting

20 seconds

Command Mode

Global Configuration

Command Usage

This command sets the maximum time (in seconds) a device can wait without receiving a configuration message before attempting to reconfigure. All device ports (except for designated ports) should receive configuration messages at regular intervals. Any port that ages out STP information (provided in the last configuration message) becomes the designated port for the attached LAN. If it is a root port, a new root port is selected from among the device ports attached to the network.

Example

```
Enterprise AP(config)#bridge stp max-age 40
Enterprise AP(config)#
```

bridge stp priority

Use this command to configure the spanning tree priority globally for the wireless bridge. Use the **no** form to restore the default.

Syntax

bridge stp priority<priority>

no bridge stp priority

priority - Priority of the bridge. (Range: 0 - 65535)

Default Setting

32768

Command Mode

Global Configuration

Command Usage

Bridge priority is used in selecting the root device, root port, and designated port. The device with the highest priority becomes the STP root device. However, if all devices have the same priority, the device with the lowest MAC address will then become the root device.

Example

```
Enterprise AP(config)#bridge stp-bridge priority 40000
Enterprise AP(config)#
```

bridge-link path-cost

Use this command to configure the spanning tree path cost for the specified port.

Syntax

bridge-link path-cost <index> <cost>

- *index* - Specifies the bridge link number on the wireless bridge. (Range: 1-6 required on wireless interface only)
- *cost* - The path cost for the port. (Range: 1-65535)

Default Setting

19

Command Mode

Interface Configuration

Command Usage

- This command is used by the Spanning Tree Protocol to determine the best path between devices. Therefore, lower values should be assigned to ports attached to faster media, and higher values assigned to ports with slower media.
- Path cost takes precedence over port priority.

Example

```
Enterprise AP(if-wireless a)#bridge-link path-cost 1 50
Enterprise AP(if-wireless a)#
```

bridge-link port-priority

Use this command to configure the priority for the specified port.

Syntax

bridge-link port-priority *<index>* *<priority>*

- *index* - Specifies the bridge link number on the wireless bridge. (Range: 1-6 required on wireless interface only)
- *priority* - The priority for a port. (Range: 1-255)

Default Setting

128

Command Mode

Interface Configuration

Command Usage

- This command defines the priority for the use of a port in the Spanning Tree Protocol. If the path cost for all ports on a wireless bridge are the same, the port with the highest priority (that is, lowest value) will be configured as an active link in the spanning tree.
- Where more than one port is assigned the highest priority, the port with lowest numeric identifier will be enabled.

Example

```
Enterprise AP(if-wireless a)#bridge-link port-priority 1 64
Enterprise AP(if-wireless a)#
```

Related Commands

bridge-link path-cost (5-171)

show bridge stp

This command displays aging time and spanning tree settings for the Ethernet and wireless interfaces.

Syntax

show bridge stp

Command Mode

Exec

Example

```
Enterprise AP#show bridge stp

Bridge MAC          : 00:12:CF:05:B7:84
Status              : Disabled
priority            : 0
designated-root      : priority = 0, MAC = 00:00:00:00:00:00
root-path-cost      : 0
root-Port-no        : 0
Hold Time           :      1 Seconds
Hello Time          :      2 Seconds
Maximum Age         :     20 Seconds
Forward Delay       :     15 Seconds
bridge Hello Time   :      2 Seconds
bridge Maximum Age  :     20 Seconds
bridge Forward Delay :    15 Seconds
time-since-top-change: 89185 Seconds
topology-change-count: 0
Enterprise AP#
```

Ethernet Interface Commands

The commands described in this section configure connection parameters for the Ethernet port and wireless interface.

Table 24 Ethernet Interface Commands

Command	Function	Mode	Page
interface ethernet	Enters Ethernet interface configuration mode	GC	5-174
dns primary- server	Specifies the primary name server	IC-E	5-174
dns secondary- server	Specifies the secondary name server	IC-E	5-174
ip address	Sets the IP address for the Ethernet interface	IC-E	5-175
ip dhcp	Submits a DHCP request for an IP address	IC-E	5-176
speed-duplex	Configures speed and duplex operation on the Ethernet interface	IC-E	5-177
shutdown	Disables the Ethernet interface	IC-E	5-177
show interface ethernet	Shows the status for the Ethernet interface	Exec	5-178

interface ethernet

This command enters Ethernet interface configuration mode.

Default Setting

None

Command Mode

Global Configuration

Example

To specify the 10/100Base-TX network interface, enter the following command:

```
Enterprise AP(config)#interface ethernet
Enterprise AP(if-ethernet)#
```

dns server

This command specifies the address for the primary or secondary domain name server to be used for name-to-address resolution.

Syntax

```
dns primary-server <server-address>
dns secondary-server <server-address>
```

- **primary-server** - Primary server used for name resolution.
- **secondary-server** - Secondary server used for name resolution.
- *server-address* - IP address of domain-name server.

Default Setting

None

Command Mode

Global Configuration

Command Usage

The primary and secondary name servers are queried in sequence.

Example

This example specifies two domain-name servers.

```
Enterprise AP(if-ethernet)#dns primary-server 192.254.2.55
Enterprise AP(if-ethernet)#dns secondary-server 10.1.0.55
Enterprise AP(if-ethernet)#
```

Related Commands

show interface ethernet (5-178)

ip address

This command sets the IP address for the access point. Use the **no** form to restore the default IP address.

Syntax

ip address <ip-address> <netmask> <gateway>
no ip address

- *ip-address* - IP address
- *netmask* - Network mask for the associated IP subnet. This mask identifies the host address bits used for routing to specific subnets.
- *gateway* - IP address of the default gateway

Default Setting

IP address: 192.254.2.1
Netmask: 255.255.255.0

Command Mode

Interface Configuration (Ethernet)

Command Usage

- DHCP is enabled by default. To manually configure a new IP address, you must first disable the DHCP client with the **no ip dhcp** command.
- You must assign an IP address to this device to gain management access over the network or to connect the access point to existing IP subnets. You can manually configure a specific IP address using this command, or direct the device to obtain an address from a DHCP server using the **ip dhcp** command. Valid IP addresses consist of four numbers, 0 to 255, separated by periods. Anything outside this format will not be accepted by the configuration program.

Example

```
Enterprise AP(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
Enterprise AP(if-ethernet)#ip address 192.254.2.1 255.255.255.0
192.254.2.253
Enterprise AP(if-ethernet)#
```

Related Commands

ip dhcp (5-176)

ip dhcp

This command enables the access point to obtain an IP address from a DHCP server. Use the **no** form to restore the default IP address.

Syntax

[no] ip dhcp

Default Setting

Enabled

Command Mode

Interface Configuration (Ethernet)

Command Usage

- You must assign an IP address to this device to gain management access over the network or to connect the access point to existing IP subnets. You can manually configure a specific IP address using the **ip address** command, or direct the device to obtain an address from a DHCP server using this command.
- When you use this command, the access point will begin broadcasting DHCP client requests. The current IP address (i.e., default or manually configured address) will continue to be effective until a DHCP reply is received. Requests will be broadcast periodically by this device in an effort to learn its IP address. (DHCP values can include the IP address, subnet mask, and default gateway.)

Example

```
Enterprise AP(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
Enterprise AP(if-ethernet)#ip dhcp
Enterprise AP(if-ethernet)#
```

Related Commands

ip address (5-175)

speed-duplex

This command configures the speed and duplex mode of a given interface when autonegotiation is disabled. Use the **no** form to restore the default.

Syntax

speed-duplex <auto | 10MH | 10MF | 100MF | 100MH>

- **auto** - autonegotiate speed and duplex mode
- **10MH** - Forces 10 Mbps, half-duplex operation
- **10MF** - Forces 10 Mbps, full-duplex operation
- **100MH** - Forces 100 Mbps, half-duplex operation
- **100MF** - Forces 100 Mbps, full-duplex operation

Default Setting

Auto-negotiation is enabled by default.

Command Mode

Interface Configuration (Ethernet)

Command Usage

If autonegotiation is disabled, the speed and duplex mode must be configured to match the setting of the attached device.

Example

The following example configures the Ethernet port to 100 Mbps, full-duplex operation.

```
Enterprise AP(if-ethernet)#speed-duplex 100mf
Enterprise AP(if-ethernet)#
```

shutdown

This command disables the Ethernet interface. To restart a disabled interface, use the **no** form.

Syntax

[no] shutdown

Default Setting

Interface enabled

Command Mode

Interface Configuration (Ethernet)

Command Usage

This command allows you to disable the Ethernet port due to abnormal behavior (e.g., excessive collisions), and reenables it after the problem has been resolved. You may also want to disable the Ethernet port for security reasons.

Example

The following example disables the Ethernet port.

```
Enterprise AP(if-ethernet)#shutdown
Enterprise AP(if-ethernet)#
```

show interface ethernet

This command displays the status for the Ethernet interface.

Syntax

show interface [ethernet]

Default Setting

Ethernet interface

Command Mode

Exec

Example

```
Enterprise AP#show interface ethernet
Ethernet Interface Information
=====
IP Address       : 192.254.2.1
Subnet Mask      : 255.255.255.0
Default Gateway  : 192.254.2.253
Primary DNS      : 192.254.2.55
Secondary DNS    : 10.1.0.55
Speed-duplex     : 100Base-TX Half Duplex
Admin status     : Up
Operational status : Up
=====
Enterprise AP#
```

Wireless Interface Commands

The commands described in this section configure connection parameters for the wireless interfaces.

Table 25 Wireless Interface Commands

Command	Function	Mode	Page
interface wireless	Enters wireless interface configuration mode	GC	5-180
vap	Provides access to the VAP interface configuration mode	IC-W	5-181
speed	Configures the maximum data rate at which the access point transmits unicast packets	IC-W	5-181
turbo	Configures turbo mode to use a faster data rate	IC-W (a)	5-182
multicast-data-rate	Configures the maximum rate for transmitting multicast packets on the wireless interface	IC-W	5-183
channel	Configures the radio channel	IC-W	5-184
transmit-power	Adjusts the power of the radio signals transmitted from the access point	IC-W	5-185
radio-mode	Forces the operating mode of the 802.11g radio	IC-W (b/g)	5-185
preamble	Sets the length of the 802.11g signal preamble	IC-W (b/g)	5-186
antenna control	Selects the antenna control method to use for the radio	IC-W	5-187
antenna id	Selects the antenna ID to use for the radio	IC-W	5-188
antenna location	Selects the location of the antenna	IC-W	5-188
beacon-interval	Configures the rate at which beacon signals are transmitted from the access point	IC-W	5-189
dtim-period	Configures the rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions	IC-W	5-190
fragmentation-length	Configures the minimum packet size that can be fragmented	IC-W	5-191
rts-threshold	Sets the packet size threshold at which an RTS must be sent to the receiving station prior to the sending station starting communications	IC-W	5-191
super-a	Enables Atheros proprietary Super A performance enhancements	IC-W (a)	5-192
super-g	Enables Atheros proprietary Super G performance enhancements	IC-W (b/g)	5-193
description	Adds a description to the wireless interface	IC-W-VAP	5-193

Command	Function	Mode	Page
ssid	Configures the service set identifier	IC-W-VAP	5-194
closed system	Opens access to clients without a pre-configured SSID	IC-W-VAP	5-194
max-association	Configures the maximum number of clients that can be associated with the access point at the same time	IC-W-VAP	5-195
assoc- timeout-interval	Configures the idle time interval (when no frames are sent) after which a client is disassociated from the VAP interface	IC-W-VAP	5-195
auth- timeout-value	Configures the time interval after which clients must be re-authenticated	IC-W-VAP	5-196
shutdown	Disables the wireless interface	IC-W-VAP	5-196
show interface wireless	Shows the status for the wireless interface	Exec	5-197
show station	Shows the wireless clients associated with the access point	Exec	5-201

interface wireless

This command enters wireless interface configuration mode.

Syntax

interface wireless <a | g>

- **a** - 802.11a radio interface.
- **g** - 802.11g radio interface.

Default Setting

None

Command Mode

Global Configuration

Example

To specify the 802.11a interface, enter the following command:

```
Enterprise AP(config)#interface wireless a
Enterprise AP(if-wireless a)#
```

vap

This command provides access to the VAP (Virtual Access Point) interface configuration mode.

Syntax

vap <vap-id>

vap-id - The number that identifies the VAP interface. (Options: 0-3)

Default Setting

None

Command Mode

Interface Configuration (Wireless)

Example

```
Enterprise AP(if-wireless g)#vap 0
Enterprise AP(if-wireless g: VAP[0])#
```

speed

This command configures the maximum data rate at which the access point transmits unicast packets.

Syntax

speed <speed>

speed - Maximum access speed allowed for wireless clients.

(Options for 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps)

(Options for 802.11b/g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps)

Default Setting

54 Mbps

Command Mode

Interface Configuration (Wireless)

Command Usage

- The maximum transmission distance is affected by the data rate. The lower the data rate, the longer the transmission distance. Please refer to the table for maximum distances on page C-6.
- When turbo mode is enabled (page 194) for 802.11a, the effective maximum speed specified by this command is double the entered value

(e.g., setting the speed to 54 Mbps limits the effective maximum speed to 108 Mbps).

Example

```
Enterprise AP(if-wireless g)#speed 6
Enterprise AP(if-wireless g)#
```

turbo

This command sets the access point to an enhanced proprietary modulation mode (not regulated in IEEE 802.11a) that provides a higher data rate of up to 108 Mbps.

Syntax

turbo <static | dynamic>
no turbo

static - Always uses turbo mode.

dynamic - Will use turbo mode when no other nearby access points are detected or active.

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless - 802.11a)

Command Usage

- The normal 802.11a wireless operation mode provides connections up to 54 Mbps. Turbo Mode is an enhanced mode (not regulated in IEEE 802.11a) that provides a higher data rate of up to 108 Mbps. Enabling Turbo Mode allows the access point to provide connections up to 108 Mbps.
- In normal mode, the access point provides a channel bandwidth of 20 MHz, and supports the maximum number of channels permitted by local regulations (e.g., 11 channels for the United States). In Turbo Mode, the channel bandwidth is increased to 40 MHz to support the increased data rate. However, this reduces the number of channels supported (e.g., 5 channels for the United States).

Example

```
Enterprise AP(if-wireless a)#turbo
Enterprise AP(if-wireless a)#
```

multicast-data-rate

This command configures the maximum data rate at which the access point transmits multicast and management packets (excluding beacon packets) on the wireless interface.

Syntax

multicast-data-rate <*speed*>

speed - Maximum transmit speed allowed for multicast data.

(Options for 802.11a: 6, 12, 24 Mbps)

(Options for 802.11b/g: 1, 2, 5.5, 11 Mbps)

Default Setting

1 Mbps for 802.11b/g

6 Mbps for 802.11a

Command Mode

Interface Configuration (Wireless)

Example

```
Enterprise AP(if-wireless g)#multicast-data-rate 5.5
```

```
Enterprise AP(if-wireless g)#
```

channel

This command configures the radio channel through which the access point communicates with wireless clients.

Syntax

channel <*channel* | **auto**>

- *channel* - Manually sets the radio channel used for communications with wireless clients. (Range for 802.11a: 36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161, 165 for normal mode, and 42, 50, 58, 152, 160 for turbo mode; Range for 802.11b/g: 1 to 14)
- **auto** - Automatically selects an unoccupied channel (if available). Otherwise, the lowest channel is selected.

Default Setting

Automatic channel selection

Command Mode

Interface Configuration (Wireless)

Command Usage

- The available channel settings are limited by local regulations, which determine the number of channels that are available.
- When multiple access points are deployed in the same area, be sure to choose a channel separated by at least two channels for 802.11a to avoid having the channels interfere with each other, and at least five channels for 802.11b/g. You can deploy up to four access points in the same area for 802.11a (e.g., channels 36, 56, 149, 165) and three access points for 802.11b/g (e.g., channels 1, 6, 11).
- For most wireless adapters, the channel for wireless clients is automatically set to the same as that used by the access point to which it is linked.

Example

```
Enterprise AP(if-wireless g)#channel 1
Enterprise AP(if-wireless g)#
```

transmit-power

This command adjusts the power of the radio signals transmitted from the access point.

Syntax

transmit-power <*signal-strength*>

signal-strength - Signal strength transmitted from the access point.
(Options: full, half, quarter, eighth, min)

Default Setting

full

Command Mode

Interface Configuration (Wireless)

Command Usage

- The “min” keyword indicates minimum power.
- The longer the transmission distance, the higher the transmission power required. But to support the maximum number of users in an area, you must keep the power as low as possible. Power selection is not just a trade off between coverage area and maximum supported clients. You also have to ensure that high strength signals do not interfere with the operation of other radio devices in your area.

Example

```
Enterprise AP(if-wireless g)#transmit-power half
Enterprise AP(if-wireless g)#
```

radio-mode

This command forces the operating mode for the 802.11g wireless interface.

Syntax

radio-mode <**b** | **g** | **b+g**>

- **b** - b-only mode: Both 802.11b and 802.11g clients can communicate with the access point, but 802.11g clients can only transfer data at 802.11b standard rates (up to 11 Mbps).
- **g** - g-only mode: Only 802.11g clients can communicate with the access point (up to 54 Mbps).
- **b+g** - b & g mixed mode: Both 802.11b and 802.11g clients can communicate with the access point (up to 54 Mbps).

Default Setting

b+g mode

Command Mode

Interface Configuration (Wireless - 802.11g)

Command Usage

- For Japan, only 13 channels are available when set to **g** or **b+g** modes. When set to **b** mode, 14 channels are available.
- Both the 802.11g and 802.11b standards operate within the 2.4 GHz band. If you are operating in **g** mode, any 802.11b devices in the service area will contribute to the radio frequency noise and affect network performance.

Example

```
Enterprise AP(if-wireless g)#radio-mode g
Enterprise AP(if-wireless g)#
```

preamble

This command sets the length of the signal preamble that is used at the start of a 802.11b/g data transmission.

Syntax

preamble [long | short-or-long]

- **long** - Sets the preamble to long (192 microseconds).
- **short-or-long** - Sets the preamble to short if no 802.11b clients are detected (96 microseconds).

Default Setting

Short-or-Long

Command Mode

Interface Configuration (Wireless - 802.11b/g)

Command Usage

- Using a short preamble instead of a long preamble can increase data throughput on the access point, but requires that all clients can support a short preamble.
- Set the preamble to long to ensure the access point can support all 802.11b and 802.11g clients.

Example

```
Enterprise AP(if-wireless g)#preamble short
Enterprise AP(if-wireless g)#
```

antenna control

This command selects the use of two diversity antennas or a single antenna for the radio interface.

Syntax

antenna control <diversity | left | right>

- **diversity** - The radio uses both antennas in a diversity system. Select this method when the Antenna ID is set to "Default Antenna" to use the access point's integrated antennas. The access point does not support external diversity antennas.
- **left** - The radio only uses the antenna on the left side (the side farthest from the access point LEDs). The access point does not support an external antenna connection on its left antenna. Therefore, this method is not valid for the access point.
- **right** - The radio only uses the antenna on the right side (the side closest to the access point LEDs). Select this method when using an optional external antenna that is connected to the right antenna connector.

Default Setting

Diversity

Command Mode

Interface Configuration (Wireless)

Command Usage

The antenna ID must be selected in conjunction with the antenna control method to configure proper use of any of the antenna options.

Example

```
Enterprise AP(if-wireless g)#antenna control right
Enterprise AP(if-wireless g)#
```

antenna id

This command specifies the antenna type connected to the access point represented by a four-digit hexadecimal ID number, either the integrated diversity antennas (the "Default Antenna") or an optional external antenna.

Syntax

antenna id <*antenna-id*>

- *antenna-id* - Specifies the ID number of an approved antenna that is connected to the access point (Range: 0x0000 - 0xFFFF)

Default Setting

0x0000 (built-in antennas)

Command Mode

Interface Configuration (Wireless)

Command Usage

- The optional external antennas (if any) that are certified for use with the access point are listed by typing **antenna control id ?**. Selecting the correct antenna ID ensures that the access point's radio transmissions are within regulatory power limits for the country of operation.
- The antenna ID must be selected in conjunction with the antenna control method to configure proper use of any of the antenna options.

Example

```
Enterprise AP(if-wireless g)#antenna id 0000
Enterprise AP(if-wireless g)#
```

antenna location

This command selects the antenna mounting location for the radio interface.

Syntax

antenna location <**indoor** | **outdoor**>

- **indoor** - The antenna is mounted indoors.
- **outdoor** - The antenna is mounted outdoors.

Default Setting

Indoor

Command Mode

Interface Configuration (Wireless)

Command Usage

- When an external antenna is selected, the antenna control must be set to "right."
- Selecting the correct location ensures that the access point only uses radio channels that are permitted in the country of operation.

Example

```
Enterprise AP(if-wireless g)#antenna location indoor
Enterprise AP(if-wireless g)#
```

beacon-interval

This command configures the rate at which beacon signals are transmitted from the access point.

Syntax

beacon-interval <*interval*>

interval - The rate for transmitting beacon signals.
(Range: 20-1000 milliseconds)

Default Setting

100

Command Mode

Interface Configuration (Wireless)

Command Usage

The beacon signals allow wireless clients to maintain contact with the access point. They may also carry power-management information.

Example

```
Enterprise AP(if-wireless g)#beacon-interval 150
Enterprise AP(if-wireless g)#
```

dtim-period

This command configures the rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions.

Syntax

dtim-period *<interval>*

interval - Interval between the beacon frames that transmit broadcast or multicast traffic. (Range: 1-255 beacon frames)

Default Setting

1

Command Mode

Interface Configuration (Wireless)

Command Usage

- The Delivery Traffic Indication Map (DTIM) packet interval value indicates how often the MAC layer forwards broadcast/multicast traffic. This parameter is necessary to wake up stations that are using Power Save mode.
- The DTIM is the interval between two synchronous frames with broadcast/multicast information. The default value of 2 indicates that the access point will save all broadcast/multicast frames for the Basic Service Set (BSS) and forward them after every second beacon.
- Using smaller DTIM intervals delivers broadcast/multicast frames in a more timely manner, causing stations in Power Save mode to wake up more often and drain power faster. Using higher DTIM values reduces the power used by stations in Power Save mode, but delays the transmission of broadcast/multicast frames.

Example

```
Enterprise AP(if-wireless g)#dtim-period 100
Enterprise AP(if-wireless g)#
```

fragmentation-length

This command configures the minimum packet size that can be fragmented when passing through the access point.

Syntax

fragmentation-length <length>

length - Minimum packet size for which fragmentation is allowed.
(Range: 256-2346 bytes)

Default Setting

2346

Command Mode

Interface Configuration (Wireless)

Command Usage

- If the packet size is smaller than the preset Fragment size, the packet will not be segmented.
- Fragmentation of the PDUs (Package Data Unit) can increase the reliability of transmissions because it increases the probability of a successful transmission due to smaller frame size. If there is significant interference present, or collisions due to high network utilization, try setting the fragment size to send smaller fragments. This will speed up the retransmission of smaller frames. However, it is more efficient to set the fragment size larger if very little or no interference is present because it requires overhead to send multiple frames.

Example

```
Enterprise AP(if-wireless g)#fragmentation-length 512
Enterprise AP(if-wireless g)#
```

rts-threshold

This command sets the packet size threshold at which a Request to Send (RTS) signal must be sent to the receiving station prior to the sending station starting communications.

Syntax

rts-threshold <threshold>

threshold - Threshold packet size for which to send an RTS.
(Range: 0-2347 bytes)

Default Setting

2347

Command Mode

Interface Configuration (Wireless)

Command Usage

- If the threshold is set to 0, the access point always sends RTS signals. If set to 2347, the access point never sends RTS signals. If set to any other value, and the packet size equals or exceeds the RTS threshold, the RTS/CTS (Request to Send / Clear to Send) mechanism will be enabled.
- The access point sends RTS frames to a receiving station to negotiate the sending of a data frame. After receiving an RTS frame, the station sends a CTS frame to notify the sending station that it can start sending data.
- Access points contending for the wireless medium may not be aware of each other. The RTS/CTS mechanism can solve this “Hidden Node” problem.

Example

```
Enterprise AP(if-wireless g)#rts-threshold 256
Enterprise AP(if-wireless g)#
```

super-a

This command enables Atheros proprietary Super A performance enhancements. Use the **no** form to disable this function.

Syntax

[no] **super-a**

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless - 802.11a)

Command Usage

Super A enhancements include bursting, compression, and fast frames. Maximum throughput ranges between 40 to 60 Mbps for connections to Atheros-compatible clients.

Example

```
Enterprise AP(if-wireless a)#super a
Enterprise AP(if-wireless a)#
```

super-g

This command enables Atheros proprietary Super G performance enhancements. Use the **no** form to disable this function.

Syntax

[no] **super-g**

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless - 802.11g)

Command Usage

These enhancements include bursting, compression, fast frames and dynamic turbo. Maximum throughput ranges between 40 to 60 Mbps for connections to Atheros-compatible clients.

Example

```
Enterprise AP(if-wireless a)#super g
Enterprise AP(if-wireless a)#
```

description

This command adds a description to a the wireless interface. Use the **no** form to remove the description.

Syntax

description <string>
no description

string - Comment or a description for this interface.
(Range: 1-80 characters)

Default Setting

None

Command Mode

Interface Configuration (Wireless-VAP)

Example

```
Enterprise AP(if-wireless g: VAP[0])#description RD-AP#3
Enterprise AP(if-wireless g: VAP[0])#
```

ssid

This command configures the service set identifier (SSID).

Syntax

ssid <*string*>

string - The name of a basic service set supported by the access point.
(Range: 1 - 32 characters)

Default Setting

802.11a Radio: VAP_TEST_11A (0 to 3)

802.11g Radio: VAP_TEST_11G (0 to 3)

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

Clients that want to connect to the wireless network via an access point must set their SSIDs to the same as that of the access point.

Example

```
Enterprise AP(if-wireless g: VAP[0])#ssid RD-AP#3
Enterprise AP(if-wireless g)#
```

closed-system

This command prohibits access to clients without a pre-configured SSID. Use the **no** form to disable this feature.

Syntax

[no] closed-system

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

When closed system is enabled, the access point will not include its SSID in beacon messages. Nor will it respond to probe requests from clients that do not include a fixed SSID.

Example

```
Enterprise AP(if-wireless g: VAP[0])#closed-system
Enterprise AP(if-wireless g)#
```

max-association

This command configures the maximum number of clients that can be associated with the access point at the same time.

Syntax

max-association *<count>*

count - Maximum number of associated stations. (Range: 0-64)

Default Setting

64

Command Mode

Interface Configuration (Wireless-VAP)

Example

```
Enterprise AP(if-wireless g: VAP[0])#max-association 32
Enterprise AP(if-wireless g)#
```

assoc-timeout-interval

This command configures the idle time interval (when no frames are sent) after which the client is disassociated from the VAP interface.

Syntax

assoc-timeout-interval *<minutes>*

minutes - The number of minutes of inactivity before disassociation.
(Range: 5-60)

Default Setting

30

Command Mode

Interface Configuration (Wireless-VAP)

Example

```
Enterprise AP(if-wireless g: VAP[0])#association-timeout-interval 20
Enterprise AP(if-wireless g: VAP[0])#
```

auth-timeout-value

This command configures the time interval within which clients must complete authentication to the VAP interface.

Syntax

auth-timeout-value *<minutes>*

minutes - The number of minutes before re-authentication.
(Range: 5-60)

Default Setting

60

Command Mode

Interface Configuration (Wireless-VAP)

Example

```
Enterprise AP(if-wireless g: VAP[0])#auth-timeout-value 40
Enterprise AP(if-wireless g: VAP[0])#
```

shutdown

This command disables the wireless interface. Use the **no** form to restart the interface.

Syntax

[no] shutdown

Default Setting

Interface enabled

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

You must first enable VAP interface 0 before you can enable VAP interfaces 1, 2, 3, 4, 5, 6, or 7.

Example

```
Enterprise AP(if-wireless g: VAP[0])#shutdown
Enterprise AP(if-wireless g)#
```

show interface wireless

This command displays the status for the wireless interface.

Syntax

show interface wireless <a | g> *vap-id*

- **a** - 802.11a radio interface.
- **g** - 802.11g radio interface.
- *vap-id* - The number that identifies the VAP interface. (Options: 0~3)

Command Mode

Exec

Example

Enterprise AP#show interface wireless g 0

Wireless Interface Information

```

=====
-----Identification-----
Description                : Enterprise 802.11g Access Point
SSID                      : VAP_G 0
Channel                   : 1 (AUTO)
Status                    : ENABLED
MAC Address                : 00:03:7f:fe:03:02
-----802.11 Parameters-----
Radio Mode                 : b & g mixed mode
Protection Method          : CTS only
Transmit Power             : FULL (16 dBm)
Max Station Data Rate      : 54Mbps
Multicast Data Rate        : 5.5Mbps
Fragmentation Threshold    : 2346 bytes
RTS Threshold              : 2347 bytes
Beacon Interval            : 100 TUs
Authentication Timeout Interval : 60 Mins
Association Timeout Interval : 30 Mins
DTIM Interval              : 1 beacon
Preamble Length            : LONG
Maximum Association        : 64 stations
MIC Mode                   : Software
Super G                    : Disabled
VLAN ID                    : 1
.
.

```

```

-----Security-----
Closed System                : Disabled
Multicast cipher             : WEP
Unicast cipher               : TKIP and AES
WPA clients                  : DISABLED
WPA Key Mgmt Mode            : PRE SHARED KEY
WPA PSK Key Type             : PASSPHRASE
WPA PSK Key                  : EMPTY
PMKSA Lifetime               : 720 minutes
Encryption                   : ENABLED
Default Transmit Key         : 1
Common Static Keys           : Key 1: EMPTY      Key 2: EMPTY
                             : Key 3: EMPTY      Key 4: EMPTY
Pre-Authentication           : DISABLED
Authentication Type          : SHARED
-----802.1x-----
802.1x                       : DISABLED
Broadcast Key Refresh Rate   : 30 min
Session Key Refresh Rate     : 30 min
802.1x Session Timeout Value : 0 min
-----Antenna-----
Antenna Control method       : Diversity
Antenna ID                   : 0x0000(Default Antenna)
Antenna Location              : Indoor
-----Quality of Service-----
WMM Mode                     : SUPPORTED
WMM Acknowledge Policy
AC0(Best Effort)              : Acknowledge
AC1(Background)               : Acknowledge
AC2(Video)                    : Acknowledge
AC3(Voice)                    : Acknowledge
WMM BSS Parameters
AC0(Best Effort)              : logCwMin: 4  logCwMax: 10  AIFSN: 3
                             : Admission Control: No
                             : TXOP Limit: 0.000 ms
AC1(Background)               : logCwMin: 4  logCwMax: 10  AIFSN: 7
                             : Admission Control: No
                             : TXOP Limit: 0.000 ms
AC2(Video)                    : logCwMin: 3  logCwMax: 4   AIFSN: 2
.
.
Admission Control: No
                             : TXOP Limit: 3.008 ms
AC3(Voice)                    : logCwMin: 2  logCwMax: 3   AIFSN: 2
                             : Admission Control: No
                             : TXOP Limit: 1.504 ms

```

WMM AP Parameters

```
AC0(Best Effort)      : logCwMin:  4  logCwMax:  6  AIFSN:  3
                        Admission Control: No
                        TXOP Limit: 0.000 ms
AC1(Background)      : logCwMin:  4  logCwMax: 10  AIFSN:  7
                        Admission Control: No
                        TXOP Limit: 0.000 ms
AC2(Video)           : logCwMin:  3  logCwMax:  4  AIFSN:  1
                        Admission Control: No
                        TXOP Limit: 3.008 ms
AC3(Voice)           : logCwMin:  2  logCwMax:  3  AIFSN:  1
                        Admission Control: No
                        TXOP Limit: 1.504 ms
=====
Enterprise AP#
```

show station

This command shows the wireless clients associated with the access point.

Command Mode

Exec

Example

```
Enterprise AP#show station

Station Table Information
=====
if-wireless A VAP [0]   :
802.11a Channel : 60

No 802.11a Channel Stations.
.
.
.
if-wireless G VAP [0]   :
802.11g Channel : 1
802.11g Channel Station Table

Station Address   : 00-04-23-94-9A-9C VLAN ID: 0
Authenticated Associated Forwarding KeyType
TRUE             FALSE    FALSE    NONE
Counters:pkts   Tx  /  Rx   bytes   Tx  /  Rx
                20/      0    721/      0
Time:Associated LastAssoc LastDisAssoc LastAuth
              0         0         0         0

if-wireless G VAP [1]   :
802.11g Channel : 1

No 802.11g Channel Stations.
.
.
.
Enterprise AP#
```

Rogue AP Detection Commands

A “rogue AP” is either an access point that is not authorized to participate in the wireless network, or an access point that does not have the correct security configuration. Rogue APs can potentially allow unauthorized users access to the network. Alternatively, client stations may mistakenly associate to a rogue AP and be prevented from accessing network resources. Rogue APs may also cause radio interference and degrade the wireless LAN performance.

The access point can be configured to periodically scan all radio channels and find other access points within range. A database of nearby access points is maintained where any rogue APs can be identified.

Table 26 Rogue AP Commands

Command	Function	Mode	Page
rogue-ap enable	Enables the periodic detection of other nearby access points	GC	5-202
rogue-ap authenticate	Enables identification of all access points	GC	5-203
rogue-ap duration	Sets the duration that all channels are scanned	GC	5-204
rogue-ap interval	Sets the time between each scan	GC	5-204
rogue-ap scan	Forces an immediate scan of all radio channels	GC	5-205
show rogue-ap	Shows the current database of detected access points	Exec	5-206

rogue-ap enable

This command enables the periodic detection of nearby access points. Use the **no** form to disable periodic detection.

Syntax

[no] rogue-ap enable

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless)

Command Usage

- While the access point scans a channel for rogue APs, wireless clients will not be able to connect to the access point. Therefore, avoid frequent scanning or scans of a long duration unless there is a reason to believe that more intensive scanning is required to find a rogue AP.
- A “rogue AP” is either an access point that is not authorized to participate in the wireless network, or an access point that does not have the correct security configuration. Rogue access points can be identified by unknown BSSID (MAC address) or SSID configuration. A database of nearby access points should therefore be maintained on a RADIUS server, allowing any rogue APs to be identified (see “rogue-ap authenticate” on page 203).

The rogue AP database can be viewed using the **show rogue-ap** command.

- The access point sends Syslog messages for each detected access point during a rogue AP scan.

Example

```
Enterprise AP(if-wireless g)#rogue-ap enable
configure either syslog or trap or both to receive the rogue APs detected.
Enterprise AP(if-wireless g)#
```

rogue-ap authenticate

This command forces the unit to authenticate all access points on the network. Use the **no** form to disable this function.

Syntax

[no] rogue-ap authenticate

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless)

Command Usage

Enabling authentication in conjunction with a database of approved access points stored on a RADIUS server allows the access point to discover rogue APs. With authentication enabled and a configured RADIUS server, the access point checks the MAC address/Basic Service Set Identifier (BSSID) of each access point that it finds against a RADIUS server to determine whether the access point is allowed. With authentication disabled, the access point can identify its neighboring access points only; it cannot identify whether the access points are allowed or are rogues. If you enable authentication, you should also configure a RADIUS server for this access point (see "RADIUS" on page 20).

Example

```
Enterprise AP(if-wireless g)#rogue-ap authenticate
Enterprise AP(if-wireless g)#
```

rogue-ap duration

This command sets the scan duration for detecting access points.

Syntax

rogue-ap duration <*milliseconds*>

milliseconds - The duration of the scan. (Range: 100-1000 milliseconds)

Default Setting

350 milliseconds

Command Mode

Interface Configuration (Wireless)

Command Usage

- During a scan, client access may be disrupted and new clients may not be able to associate to the access point. If clients experience severe disruption, reduce the scan duration time.
- A long scan duration time will detect more access points in the area, but causes more disruption to client access.

Example

```
Enterprise AP(if-wireless g)#rogue-ap duration 200
Enterprise AP(if-wireless g)#
```

Related Commands

rogue-ap interval (5-204)

rogue-ap interval

This command sets the interval at which to scan for access points.

Syntax

rogue-ap interval <*minutes*>

minutes - The interval between consecutive scans. (Range: 30-10080 minutes)

Default Setting

720 minutes

Command Mode

Interface Configuration (Wireless)

Command Usage

This command sets the interval at which scans occur. Frequent scanning will more readily detect other access points, but will cause more disruption to client access.

Example

```
Enterprise AP(if-wireless g)#rogue-ap interval 120
Enterprise AP(if-wireless g)#
```

Related Commands

rogue-ap duration (5-204)

rogue-ap scan

This command starts an immediate scan for access points on the radio interface.

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless)

Command Usage

While the access point scans a channel for rogue APs, wireless clients will not be able to connect to the access point. Therefore, avoid frequent scanning or scans of a long duration unless there is a reason to believe that more intensive scanning is required to find a rogue AP.

Example

```
Enterprise AP(if-wireless g)#rogue-ap scan
Enterprise AP(if-wireless g)#rogueApDetect Completed (Radio G) : 9 APs
detected
rogueAPDetect (Radio G): refreshing ap database now
Enterprise AP(if-wireless g)#
```

show rogue-ap

This command displays the current rogue AP database.

Command Mode

Exec

Example

```
Enterprise AP#show rogue-ap

802.11a Channel : Rogue AP Status
AP Address(BSSID)      SSID    Channel(MHz) RSSI Type Privacy RSN
=====
802.11g Channel : Rogue AP Status
AP Address(BSSID)      SSID    Channel(MHz) RSSI Type Privacy RSN
=====
00-04-e2-2a-37-23      WLAN1AP 11(2462 MHz)  17  ESS      0   0
00-04-e2-2a-37-3d      ANY     7(2442 MHz)  42  ESS      0   0
00-04-e2-2a-37-49      WLAN1AP 9(2452 MHz)  42  ESS      0   0
00-90-d1-08-9d-a7      WLAN1AP 1(2412 MHz)  12  ESS      0   0
00-30-f1-fb-31-f4      WLAN    6(2437 MHz)  16  ESS      0   0
Enterprise AP#
```

Wireless Security Commands

The commands described in this section configure parameters for wireless security on the 802.11a and 802.11g interfaces.

Table 27 Wireless Security Commands

Command	Function	Mode	Page
auth	Defines the 802.11 authentication type allowed by the access point	IC-W-VAP	5-210
encryption	Defines whether or not WEP encryption is used to provide privacy for wireless communications	IC-W-VAP	5-209
key	Sets the keys used for WEP encryption	IC-W	5-210
transmit-key	Sets the index of the key to be used for encrypting data frames sent between the access point and wireless clients	IC-W-VAP	5-211
cipher-suite	Selects an encryption method for the global key used for multicast and broadcast traffic	IC-W-VAP	5-212
mic_mode	Specifies how to calculate the Message Integrity Check (MIC)	IC-W	5-213
wpa-pre-shared- key	Defines a WPA preshared-key value	IC-W-VAP	5-214

Command	Function	Mode	Page
pmksa-lifetime	Sets the lifetime PMK security associations	IC-W-VAP	5-215
pre-authentication	Enables WPA2 pre-authentication for fast roaming	IC-W-VAP	5-215

auth

This command configures authentication for the VAP interface.

Syntax

auth <**open-system** | **shared-key** | **wpa** | **wpa-psk** | **wpa2** | **wpa2-psk** | **wpa-wpa2-mixed** | **wpa-wpa2-psk-mixed** | > <required | supported>

- **open-system** - Accepts the client without verifying its identity using a shared key. "Open" authentication means either there is no encryption (if encryption is disabled) or WEP-only encryption is used (if encryption is enabled).
- **shared-key** - Authentication is based on a shared key that has been distributed to all stations.
- **wpa** - Clients using WPA are accepted for authentication.
- **wpa-psk** - Clients using WPA with a Pre-shared Key are accepted for authentication.
- **wpa2** - Clients using WPA2 are accepted for authentication.
- **wpa2-psk** - Clients using WPA2 with a Pre-shared Key are accepted for authentication.
- **wpa-wpa2-mixed** - Clients using WPA or WPA2 are accepted for authentication.
- **wpa-wpa2-psk-mixed** - Clients using WPA or WPA2 with a Pre-shared Key are accepted for authentication
- **required** - Clients are required to use WPA or WPA2.
- **supported** - Clients may use WPA or WPA2, if supported.

Default Setting

open-system

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- The **auth** command automatically configures settings for each authentication type, including encryption, 802.1X, and cipher suite. The command **auth open-system** disables encryption and 802.1X.

- To use WEP shared-key authentication, set the authentication type to “shared-key” and define at least one static WEP key with the **key** command. Encryption is automatically enabled by the command.
- To use WEP encryption only (no authentication), set the authentication type to “open-system.” Then enable WEP with the **encryption** command, and define at least one static WEP key with the **key** command.
- When any WPA or WPA2 option is selected, clients are authenticated using 802.1X via a RADIUS server. Each client must be WPA-enabled or support 802.1X client software. The 802.1X settings (see “802.1X Authentication” on page 146) and RADIUS server details (see “RADIUS Client” on page 140) must be configured on the access point. A RADIUS server must also be configured and be available in the wired network.
- If a WPA/WPA2 mode that operates over 802.1X is selected (WPA, WPA2, WPA-WPA2-mixed, or WPA-WPA2-PSK-mixed), the 802.1X settings (see “802.1X Authentication” on page 146) and RADIUS server details (see “RADIUS Client” on page 140) must be configured. Be sure you have also configured a RADIUS server on the network before enabling authentication. Also, note that each client has to be WPA-enabled or support 802.1X client software. A RADIUS server must also be configured and be available in the wired network.
- If a WPA/WPA2 Pre-shared Key mode is selected (WPA-PSK, WPA2-PSK or WPA-WPA2-PSK-mixed), the key must first be generated and distributed to all wireless clients before they can successfully associate with the access point. Use the wpa-preshared-key command to configure the key (see “key” on page 210 and “transmit-key” on page 211).
- WPA2 defines a transitional mode of operation for networks moving from WPA security to WPA2. WPA2 Mixed Mode allows both WPA and WPA2 clients to associate to a common VAP interface. When the encryption cipher suite is set to TKIP, the unicast encryption cipher (TKIP or AES-CCMP) is negotiated for each client. The access point advertises its supported encryption ciphers in beacon frames and probe responses. WPA and WPA2 clients select the cipher they support and return the choice in the association request to the access point. For mixed-mode operation, the cipher used for broadcast frames is always TKIP. WEP encryption is not allowed.
- The “required” option places the VAP into TKIP only mode. The “supported” option places the VAP into TKIP+AES+WEP mode. The “required” mode is used in WPA-only environments.
- The “supported” mode can be used for mixed environments with legacy WPA products, specifically WEP. (For example, WPA+WEP. The WPA2+WEP environment is not available because WPA2 does not support

WEP). To place the VAP into AES only mode, use “required” and then select the “cipher-ccmp” option for the cipher-suite command.

Example

```
Enterprise AP(if-wireless g: VAP[0])#auth shared-key
Enterprise AP(if-wireless g)#
```

Related Commands

encryption (5-209)
key (5-210)

encryption

This command enables data encryption for wireless communications. Use the **no** form to disable data encryption.

Syntax

[no] **encryption**

Default Setting

disabled

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- Wired Equivalent Privacy (WEP) is implemented in this device to prevent unauthorized access to your wireless network. For more secure data transmissions, enable encryption with this command, and set at least one static WEP key with the **key** command.
- The WEP settings must be the same on each client in your wireless network.
- Note that WEP protects data transmitted between wireless nodes, but does not protect any transmissions over your wired network or over the Internet.
- You must enable data encryption in order to enable all types of encryption (WEP, TKIP, and AES-CCMP) in the access point.

Example

```
Enterprise AP(if-wireless g: VAP[0])#encryption
Enterprise AP(if-wireless g)#
```

Related Commands

key (5-210)

key

This command sets the keys used for WEP encryption. Use the **no** form to delete a configured key.

Syntax

key *<index>* *<size>* *<type>* *<value>*

no key *index*

- *index* - Key index. (Range: 1-4)
- *size* - Key size. (Options: 64, 128, or 152 bits)
- *type* - Input format. (Options: ASCII, HEX)
- *value* - The key string.
 - For 64-bit keys, use 5 alphanumeric characters or 10 hexadecimal digits.
 - For 128-bit keys, use 13 alphanumeric characters or 26 hexadecimal digits.
 - For 152-bit keys, use 16 alphanumeric characters or 32 hexadecimal digits.

Default Setting

None

Command Mode

Interface Configuration (Wireless)

Command Usage

- To enable Wired Equivalent Privacy (WEP), use the **auth shared-key** command to select the “shared key” authentication type, use the **key** command to configure at least one key, and use the **transmit-key** command to assign a key to one of the VAP interfaces.
- If WEP option is enabled, all wireless clients must be configured with the same shared keys to communicate with the access point.
- The encryption index, length and type configured in the access point must match those configured in the clients.

Example

```
Enterprise AP(if-wireless g)#key 1 64 hex 1234512345
Enterprise AP(if-wireless g)#key 2 128 ascii asdeipadjsipd
Enterprise AP(if-wireless g)#key 3 64 hex 12345123451234512345123456
Enterprise AP(if-wireless g)#
```

Related Commands

key (5-210)
 encryption (5-209)
 transmit-key (5-211)

transmit-key

This command sets the index of the key to be used for encrypting data frames for broadcast or multicast traffic transmitted from the VAP to wireless clients.

Syntax

transmit-key <*index*>
index - Key index. (Range: 1-4)

Default Setting

1

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- If you use WEP key encryption option, the access point uses the transmit key to encrypt multicast and broadcast data signals that it sends to client devices. Other keys can be used for decryption of data from clients.
- When using IEEE 802.1X, the access point uses a dynamic key to encrypt unicast and broadcast messages to 802.1X-enabled clients. However, because the access point sends the keys during the 802.1X authentication process, these keys do not have to appear in the client's key list.
- In a mixed-mode environment with clients using static and dynamic keys, select transmit key index 2, 3, or 4. The access point uses transmit key index 1 for the generation of dynamic keys.

Example

```
Enterprise AP(if-wireless g: VAP[0])#transmit-key 2
Enterprise AP(if-wireless g)#
```

cipher-suite

This command defines the cipher algorithm used to encrypt the global key for broadcast and multicast traffic when using Wi-Fi Protected Access (WPA) security.

Syntax

cipher-suite <aes-ccmp | tkip | wep>

- **aes-ccmp** - Use AES-CCMP encryption for the unicast and multicast cipher.
- **tkip** - Use TKIP encryption for the multicast cipher. TKIP or AES-CCMP can be used for the unicast cipher depending on the capability of the client.
- **wep** - Use WEP encryption for the multicast cipher. TKIP or AES-CCMP can be used for the unicast cipher depending on the capability of the client.

Default Setting

wep

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- WPA enables the access point to support different unicast encryption keys for each client. However, the global encryption key for multicast and broadcast traffic must be the same for all clients.
- If any clients supported by the access point are not WPA enabled, the cipher-suite algorithm must be set to WEP.
- WEP is the first generation security protocol used to encrypt data crossing the wireless medium using a fairly short key. Communicating devices must use the same WEP key to encrypt and decrypt radio signals. WEP has many security flaws, and is not recommended for transmitting highly sensitive data.
- TKIP provides data encryption enhancements including per-packet key hashing (i.e., changing the encryption key on each packet), a message integrity check, an extended initialization vector with sequencing rules, and a re-keying mechanism. Select TKIP if there are clients in the network that are not WPA2 compliant.
- TKIP defends against attacks on WEP in which the unencrypted initialization vector in encrypted packets is used to calculate the WEP key. TKIP changes the encryption key on each packet, and rotates not just the unicast keys, but the broadcast keys as well. TKIP is a replacement for WEP that removes the predictability that intruders relied on to determine the WEP key.

- AES-CCMP (Advanced Encryption Standard Counter-Mode/CBCMAC Protocol): WPA2 is backward compatible with WPA, including the same 802.1X and PSK modes of operation and support for TKIP encryption. The main enhancement is its use of AES Counter-Mode encryption with Cipher Block Chaining Message Authentication Code (CBC-MAC) for message integrity. The AES Counter-Mode/CBCMAC Protocol (AES-CCMP) provides extremely robust data confidentiality using a 128-bit key. The AES-CCMP encryption cipher is specified as a standard requirement for WPA2. However, the computational intensive operations of AES-CCMP requires hardware support on client devices. Therefore to implement WPA2 in the network, wireless clients must be upgraded to WPA2-compliant hardware.

Example

```
Enterprise AP(if-wireless g: VAP[0])#cipher-suite TKIP
Enterprise AP(if-wireless g)#
```

mic_mode

This command specifies how to calculate the Message Integrity Check (MIC).

Syntax

mic_mode <**hardware** | **software**>

- **hardware** - Uses hardware to calculate the MIC.
- **software** - Uses software to calculate the MIC.

Default Setting

software

Command Mode

Interface Configuration (Wireless)

Command Usage

- The Michael Integrity Check (MIC) is part of the Temporal Key Integrity Protocol (TKIP) encryption used in Wi-Fi Protected Access (WPA) security. The MIC calculation is performed in the access point for each transmitted packet and this can impact throughput and performance. The access point supports a choice of hardware or software for MIC calculation. The performance of the access point can be improved by selecting the best method for the specific deployment.
- Using the “hardware” option provides best performance when the number of supported clients is less than 27.

- Using the “software” option provides the best performance for a large number of clients on one radio interface. Throughput may be reduced when both 802.11a and 802.11g interfaces are supporting a high number of clients simultaneously.

Example

```
Enterprise AP(if-wireless a)#mic_mode hardware
Enterprise AP(if-wireless g)#
```

wpa-pre-shared-key

This command defines a Wi-Fi Protected Access (WPA/WPA2) Pre-shared-key.

Syntax

wpa-pre-shared-key <hex | passphrase-key> <value>

- **hex** - Specifies hexadecimal digits as the key input format.
- **passphrase-key** - Specifies an ASCII pass-phrase string as the key input format.
- *value* - The key string. For ASCII input, specify a string between 8 and 63 characters. For HEX input, specify exactly 64 digits.

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- To support WPA or WPA2 for client authentication, use the **auth** command to specify the authentication type, and use the **wpa-preshared-key** command to specify one static key.
- If WPA or WPA2 is used with pre-shared-key mode, all wireless clients must be configured with the same pre-shared key to communicate with the access point’s VAP interface.

Example

```
Enterprise AP(if-wireless g: VAP[0])#wpa-pre-shared-key ASCII agoodsecret
Enterprise AP(if-wireless g)#
```

Related Commands

auth (5-207)

pmksa-lifetime

This command sets the time for aging out cached WPA2 Pairwise Master Key Security Association (PMKSA) information for fast roaming.

Syntax

pmksa-lifetime *<minutes>*

minutes - The time for aging out PMKSA information.
(Range: 0 - 14400 minutes)

Default Setting

720 minutes

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- WPA2 provides fast roaming for authenticated clients by retaining keys and other security information in a cache, so that if a client roams away from an access point and then returns reauthentication is not required.
- When a WPA2 client is first authenticated, it receives a Pairwise Master Key (PMK) that is used to generate other keys for unicast data encryption. This key and other client information form a Security Association that the access point names and holds in a cache. The lifetime of this security association can be configured with this command. When the lifetime expires, the client security association and keys are deleted from the cache. If the client returns to the access point, it requires full reauthentication.
- The access point can store up to 256 entries in the PMKSA cache.

Example

```
Enterprise AP(if-wireless g: VAP[0])#wpa-pre-shared-key ASCII agoodsecret
Enterprise AP(if-wireless g: VAP[0])#
```

pre-authentication

This command enables WPA2 pre-authentication for fast secure roaming.

Syntax

pre-authentication **<enable | disable>**

- **enable** - Enables pre-authentication for the VAP interface.
- **disable** - Disables pre-authentication for the VAP interface.

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- Each time a client roams to another access point it has to be fully re-authenticated. This authentication process is time consuming and can disrupt applications running over the network. WPA2 includes a mechanism, known as pre-authentication, that allows clients to roam to a new access point and be quickly associated. The first time a client is authenticated to a wireless network it has to be fully authenticated. When the client is about to roam to another access point in the network, the access point sends pre-authentication messages to the new access point that include the client's security association information. Then when the client sends an association request to the new access point the client is known to be already authenticated, so it proceeds directly to key exchange and association.
- To support pre-authentication, both clients and access points in the network must be WPA2 enabled.
- Pre-authentication requires all access points in the network to be on the same IP subnet.

Example

```
Enterprise AP(if-wireless g: VAP[0])#wpa-pre-shared-key ASCII agoodsecret
Enterprise AP(if-wireless g: VAP[0])#
```

Link Integrity Commands

The access point provides a link integrity feature that can be used to ensure that wireless clients are connected to resources on the wired network. The access point does this by periodically sending Ping messages to a host device in the wired Ethernet network. If the access point detects that the connection to the host has failed, it disables the radio interfaces, forcing clients to find and associate with another access point. When the connection to the host is restored, the access point re-enables the radio interfaces.

Table 28 Link Integrity Commands

Command	Function	Mode	Page
link-integrity ping-detect	Enables link integrity detection	GC	5-217
link-integrity ping-host	Specifies the IP address of a host device in the wired network	GC	5-218
link-integrity ping-interval	Specifies the time between each Ping sent to the link host	GC	5-218
link-integrity ping-fail-retry	Specifies the number of consecutive failed Ping counts before the link is determined as lost	GC	5-219
link-integrity ethernet-detect	Enables integrity check for Ethernet link	GC	5-219
show link-integrity	Displays the current link integrity configuration	Exec	5-220

link-integrity ping-detect

This command enables link integrity detection. Use the **no** form to disable link integrity detection.

Syntax

[no] link-integrity ping-detect

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

- When link integrity is enabled, the IP address of a host device in the wired network must be specified.
- The access point periodically sends an ICMP echo request (Ping) packet to the link host IP address. When the number of failed responses (either the

host does not respond or is unreachable) exceeds the limit set by the **link-integrity ping-fail-retry** command, the link is determined as lost.

Example

```
Enterprise AP(config)#link-integrity ping-detect
Enterprise AP(config)#
```

link-integrity ping-host

This command configures the link host name or IP address. Use the **no** form to remove the host setting.

Syntax

link-integrity ping-host *<host_name | ip_address>*
no link-integrity ping-host

- *host_name* - Alias of the host.
- *ip_address* - IP address of the host.

Default Setting

None

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#link-integrity ping-host 192.254.2.10
Enterprise AP(config)#
```

link-integrity ping-interval

This command configures the time between each Ping sent to the link host.

Syntax

link-integrity ping-interval *<interval>*
interval - The time between Pings. (Range: 5 - 60 seconds)

Default Setting

30 seconds

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#link-integrity ping-interval 20
Enterprise AP(config)#
```

link-integrity ping-fail-retry

This command configures the number of consecutive failed Ping counts before the link is determined as lost.

Syntax

link-integrity ping-fail-retry <counts>

counts - The number of failed Ping counts before the link is determined as lost. (Range: 1 - 10)

Default Setting

6

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#link-integrity ping-fail-retry 10
Enterprise AP(config)#
```

link-integrity ethernet-detect

This command enables an integrity check to determine whether or not the access point is connected to the wired Ethernet.

Syntax

[no] link-integrity ethernet-detect

Default Setting

Disabled

Command Mode

Global Configuration

Example

```
Enterprise AP(config)#link-integrity ethernet-detect

Notification : Ethernet Link Detect SUCCESS - RADIO(S) ENABLED

Enterprise AP(config)#
```

show link-integrity

This command displays the current link integrity configuration.

Command Mode

Exec

Example

```
Enterprise AP#show link-integrity
```

```
Link Integrity Information
```

```
=====
Ethernet Detect : Enabled
Ping Detect     : Enabled
Target IP/Name  : 192.254.0.140
Ping Fail Retry : 6
Ping Interval   : 30
=====
```

```
Enterprise AP#
```

IAPP Commands

The command described in this section enables the protocol signaling required to ensure the successful handover of wireless clients roaming between different 802.11f-compliant access points. In other words, the 802.11f protocol can ensure successful roaming between access points in a multi-vendor environment.

iapp

This command enables the protocol signaling required to hand over wireless clients roaming between different 802.11f-compliant access points. Use the **no** form to disable 802.11f signaling.

Syntax

[no] iapp

Default

Enabled

Command Mode

Global Configuration

Command Usage

The current 802.11 standard does not specify the signaling required between access points in order to support clients roaming from one access point to another. In particular, this can create a problem for clients roaming

between access points from different vendors. This command is used to enable or disable 802.11f handover signaling between different access points, especially in a multi-vendor environment.

Example

```
Enterprise AP(config)#iapp
Enterprise AP(config)#
```

VLAN Commands

The access point can enable the support of VLAN-tagged traffic passing between wireless clients and the wired network. Up to 64 VLAN IDs can be mapped to specific wireless clients, allowing users to remain within the same VLAN as they move around a campus site.

When VLAN is enabled on the access point, a VLAN ID (a number between 1 and 4094) can be assigned to each client after successful authentication using IEEE 802.1X and a central RADIUS server. The user VLAN IDs must be configured on the RADIUS server for each user authorized to access the network. If a user does not have a configured VLAN ID, the access point assigns the user to its own configured native VLAN ID.



NOTE: When VLANs are enabled, the access point's Ethernet port drops all received traffic that does not include a VLAN tag. To maintain network connectivity to the access point and wireless clients, be sure that the access point is connected to a device port on a wired network that supports IEEE 802.1Q VLAN tags.

The VLAN commands supported by the access point are listed below.

Table 29 VLAN Commands

Command	Function	Mode	Page
vlan	Enables a single VLAN for all traffic	GC	5-222
management-vlanid	Configures the management VLAN for the access point	GC	5-222
vlan-id	Configures the default VLAN for the VAP interface	IC-W-VAP	5-223

vlan

This command enables VLANs for all traffic. Use the **no** form to disable VLANs.

Syntax

[no] vlan enable

Default

Disabled

Command Mode

Global Configuration

Command Description

- When VLANs are enabled, the access point tags frames received from wireless clients with the VLAN ID configured for each client on the RADIUS server. If the VLAN ID has not been configured for a client on the RADIUS server, then the frames are tagged with the access point's native VLAN ID.
- Traffic entering the Ethernet port must be tagged with a VLAN ID that matches the access point's native VLAN ID, or with a VLAN tag that matches one of the wireless clients currently associated with the access point.

Example

```
Enterprise AP(config)#vlan enable
Reboot system now? <y/n>: y
```

Related Commands

management-vlanid (5-222)

management-vlanid

This command configures the management VLAN ID for the access point.

Syntax

management-vlanid <vlan-id>

vlan-id - Management VLAN ID. (Range: 1-4094)

Default Setting

1

Command Mode

Global Configuration

Command Usage

The management VLAN is for managing the access point. For example, the access point allows traffic that is tagged with the specified VLAN to manage the access point via remote management, SSH, SNMP, Telnet, etc.

Example

```
Enterprise AP(config)#management-vlanid 3
Enterprise AP(config)#
```

Related Commands

vlan (5-222)

vlan-id

This command configures the default VLAN ID for the VAP interface.

Syntax

vlan-id <vlan-id>

vlan-id - Native VLAN ID. (Range: 1-4094)

Default Setting

1

Command Mode

Interface Configuration (Wireless-VAP)

Command Usage

- To implement the default VLAN ID setting for VAP interface, the access point must enable VLAN support using the **vlan** command.
- When VLANs are enabled, the access point tags frames received from wireless clients with the default VLAN ID for the VAP interface. If IEEE 802.1X is being used to authenticate wireless clients, specific VLAN IDs can be configured on the RADIUS server to be assigned to each client. Using IEEE 802.1X and a central RADIUS server, up to 64 VLAN IDs can be mapped to specific wireless clients.

- If the VLAN ID has not been configured for a client on the RADIUS server, then the frames are tagged with the default VLAN ID of the VAP interface.

Example

```
Enterprise AP(if-wireless g: VAP[0])#vlan-id 3
Enterprise AP(if-wireless g: VAP[0])#
```

WMM Commands

The access point implements QoS using the Wi-Fi Multimedia (WMM) standard. Using WMM, the access point is able to prioritize traffic and optimize performance when multiple applications compete for wireless network bandwidth at the same time. WMM employs techniques that are a subset of the developing IEEE 802.11e QoS standard and it enables the access point to inter-operate with both WMM- enabled clients and other devices that may lack any WMM functionality.

The WMM commands supported by the access point are listed below.

Table 30 WMM Commands

Command	Function	Mode	Page
wmm	Sets the WMM operational mode on the access point	IC-W	5-224
wmm-acknowledge-policy	Allows the acknowledgement wait time to be enabled or disabled for each Access Category (AC)	IC-W	5-225
wmmparam	Configures detailed WMM parameters that apply to the access point (AP) or the wireless clients (BSS)	IC-W	5-226

wmm

This command sets the WMM operational mode on the access point. Use the **no** form to disable WMM.

Syntax

```
[no] wmm <supported | required>
```

- **supported** - WMM will be used for any associated device that supports this feature. Devices that do not support this feature may still associate with the access point.
- **required** - WMM must be supported on any device trying to associated with the access point. Devices that do not support this feature will not be allowed to associate with the access point.

Default

supported

Command Mode

Interface Configuration (Wireless)

Example

```
Enterprise AP(if-wireless a)#wmm required
Enterprise AP(if-wireless a)#
```

wmm-acknowledge-policy

This command allows the acknowledgement wait time to be enabled or disabled for each Access Category (AC).

Syntax

wmm-acknowledge-policy <ac_number> <ack | noack>

- **ac_number** - Access categories. (Range: 0-3)
- **ack** - Require the sender to wait for an acknowledgement from the receiver.
- **noack** - Does not require the sender to wait for an acknowledgement from the receiver.

Default

ack

Command Mode

Interface Configuration (Wireless)

Command Usage

- WMM defines four access categories (ACs) – voice, video, best effort, and background. These categories correspond to traffic priority levels and are mapped to IEEE 802.1D priority tags (see Table). The direct mapping of the four ACs to 802.1D priorities is specifically intended to facilitate interpretability with other wired network QoS policies. While the four ACs are specified for specific types of traffic, WMM allows the priority levels to be configured to match any network-wide QoS policy. WMM also specifies a protocol that access points can use to communicate the configured traffic priority levels to QoS-enabled wireless clients.
- Although turning off the requirement for the sender to wait for an acknowledgement can increase data throughput, it can also result in a high number of errors when traffic levels are heavy.

Example

```
Enterprise AP(if-wireless a)#wmm-acknowledge-policy 0 noack
Enterprise AP(if-wireless a)#
```

wmmparam

This command configures detailed WMM parameters that apply to the access point (AP) or the wireless clients (BSS).

Syntax

wmmparam <AP | BSS> <ac_number> <LogCwMin> <LogCwMax>
<AIFS> <TxOpLimit> <admission_control>

- **AP** - Access Point
- **BSS** - Wireless client
- *ac_number* - Access categories (ACs) – voice, video, best effort, and background. These categories correspond to traffic priority levels and are mapped to IEEE 802.1D priority tags as shown in Table . (Range: 0-3)
- *LogCwMin* - Minimum log value of the contention window. This is the initial upper limit of the random backoff wait time before wireless medium access can be attempted. The initial wait time is a random value between zero and the LogCwMin value. Specify the LogCwMin value. Note that the LogCwMin value must be equal or less than the LogCwMax value. (Range: 1-15 microseconds)
- *LogCwMax* - Maximum log value of the contention window. This is the maximum upper limit of the random backoff wait time before wireless medium access can be attempted. The contention window is doubled after each detected collision up to the LogCwMax value. Note that the CwMax value must be greater or equal to the LogCwMin value. (Range: 1-15 microseconds)
- *AIFS* - Arbitrary InterFrame Space specifies the minimum amount of wait time before the next data transmission attempt. (Range: 1-15 microseconds)
- *TXOPLimit* - Transmission Opportunity Limit specifies the maximum time an AC transmit queue has access to the wireless medium. When an AC queue is granted a transmit opportunity, it can transmit data for a time up to the TxOpLimit. This data bursting greatly improves the efficiency for high data-rate traffic. (Range: 0-65535 microseconds)
- *admission_control* - The admission control mode for the access category. When enabled, clients are blocked from using the access category. (Options: 0 to disable, 1 to enable)

Default

AP Parameters				
WMM Parameters	AC0 (Best Effort)	AC1 (Background)	AC2 (Video)	AC3 (Voice)
LogCwMin	4	4	3	2
LogCwMax	10	10	4	3
AIFS	3	7	2	2
TXOP Limit	0	0	94	47
Admission Control	Disabled	Disabled	Disabled	Disabled

BSS Parameters				
WMM Parameters	AC0 (Best Effort)	AC1 (Background)	AC2 (Video)	AC3 (Voice)
LogCwMin	4	4	3	2
LogCwMax	6	10	4	3
AIFS	3	7	1	1
TXOP Limit	0	0	94	47
Admission Control	Disabled	Disabled	Disabled	Disabled

Command Mode

Interface Configuration (Wireless)

Example

```
Enterprise AP(if-wireless a)#wmmparams ap 0 4 6 3 1 1
Enterprise AP(if-wireless a)#
```


6

TROUBLESHOOTING

If you have difficulty with the 3Com Wireless LAN access point, first check the following items in the configuration:

- Radio Settings page: Ensure that the SSID is the same on clients and the access point.
- Security page: Ensure that Encryption is the same on clients and the access point.
- Authentication page: Ensure that the Local MAC Authentication System Default is set to Allow. Ensure that 802.1x Authentication Settings are correct.
- TCP/IP Settings page: If the DHCP Client is set to Disabled, then ensure that the access point IP Address is within the same subnet as the wired LAN.

If necessary, reset the access point to the factory defaults.

Try the solutions in the following table. If you need further assistance, contact 3Com Technical Support through the following Web page:
http://www.3com.com/products/en_US/supportedindex.jsp

Symptom	Solutions
Access point does not power up.	Make sure the Ethernet cable is plugged into the port labeled <i>To Access Point</i> on the power brick. Check for a faulty access point power supply. Check for a failed AC power supply
Access point powers up, but has no connection to the wired network.	Make sure that the Ethernet cable is plugged into the port labeled <i>To Hub/Switch</i> on the power brick. Verify the network wiring and topology for proper configuration. Check that the cables used are the proper type.

Symptom	Solutions
No operation.	Verify the access point configuration. Review access point firmware revisions and update firmware if necessary. Make sure that there are no duplicate IP addresses on the network. Unplug the access point and ping the assigned address to make sure that no other device responds to that address.
Access point powers up, but does not associate with wireless clients.	Confirm that the service area on the access point matches that on the clients. Verify that the clients are operating correctly. Make sure that security settings on the access point match those on the clients. Make sure that the access point antennas are positioned properly. Check the range and move clients closer if necessary.
Mobile users do not have roaming access to the access point.	Make sure that all access points and wireless devices in the ESS in which mobile users can roam are configured to the same WEP setting, SSID, and authentication settings.
Slow or erratic performance.	Try changing the wireless channel on the access point. Check the access point antennas, connectors, and cabling for loose connections. Check the wired network topology and configuration for malfunctions.
Running on a computer connected to the wired LAN, the 3Com Device Manager cannot find an access point.	The 3Com Device Manager cannot discover devices across routers. Make sure that the computer is connected on the same segment as the access point.
After you specify an IP address for an access point, the 3Com Device Manager continues to point to the old IP address when you select the access point in the Wireless Network Tree.	In the 3Com Device Manager window click the <i>Refresh</i> button to refresh the Wireless Network Tree. Then click the access point in the Wireless Network Tree and click <i>Properties</i>. The IP address you specified is now listed. If you want to continue configuring the access point, click <i>Configure</i>.

Symptom	Solutions
While you are configuring the access point, the Configuration Management System stops responding.	To maintain wireless association, the service area and the security settings on the client and the access point must match exactly. Therefore, if you are associated with the access point that you are configuring and you change the access point service area or security, make sure to change the client service area to match. If you change the IP address and save the change, you cannot continue to configure the access point using the old IP address. Therefore, if you want to continue configuring this access point after you save this change, you must do the following: 1 Close your browser. 2 Return to the 3Com Device Manager Wireless Network Tree and click <i>Refresh</i>. 3 Select the access point and click <i>Configure</i> to start a new configuration session.
The access point cannot be configured using the Web browser.	Reset the access point (push the reset button located near the access point LEDs).

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