# *54/108Mbps Super G Wireless LAN Managed Access Point*

## *WAP-4060PE*

# User's Manual

## Copyright



## Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio technician for help.

## FCC Caution:

To assure continued compliance.(example-use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the Following two conditions: (1) This device may not cause harmful interference, and (2 ) this Device must accept any interference received, including interference that may cause undesired operation.

## Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm(8 inches) during normal operation.

## R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/CE OF THE EUROPEAN PARLIAMENT AND THE COUNCIL OF 9 March 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE)

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8,2000.

## Safety

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacture must therefore be allowed at all times to ensure the safe use of the equipment.

## Revision

User's Manual for PLANET 802.11g Wireless LAN Managed Access Point

Model: WAP-4060PE

Rev: 1.0 (January, 2005)

Part No. EM-WAP4060

# TABLE OF CONTENTS

# Chapter 1
# Introduction

WAP-4060PE is an IEEE 802.11g Wireless Access Point with PoE. Catering to the enterprise demands, WAP-4060PE enhances security and management features, including multiple SSIDs, VLAN support, WPA support, RADIUS MAC authentication, rogue AP detection, and so on. The LAN port of WAP-4060PE is 802.3af compliant. Therefore, it can be installed anywhere without the constraint on power socket. Provided with one reversed-polarity SMA male connector, WAP-4060PE is easy to connect external antenna and booster to extend the wireless distance.

## 1.1 Package Contents

Make sure that you have the following items:

- WAP-4060PE
- Dipole Antenna
- Quick Installation Guide
- User's manual CD-ROM
- Power Adapter

| | |
|---|---|
| ***Note:*** | If any of the above items are missing, contact your supplier as soon as possible. |

## 1.2 System Requirements

Before installation, please check the following requirements with your equipment.

- Pentium Based (And Above) IBM-Compatible PC System
- CD-ROM drive
- Windows 98/ME/2000/XP Operating System with TCP/IP protocol

## 1.3 Features

- Wireless LAN IEEE802.11g and IEEE802.11b compliant
- Support PoE port (IEEE802.3af compliant)
- Support IEEE802.11d standard (Worldwide mode)
- Strong network security with 802.1X authentication, and 64/128-bit WEP encryption
- Supports WPA (Wi-Fi Protected Access) for both 802.1x and WPA-PSK
- One detachable reverse-polarity SMA connectors can connect to external antenna for expanding connection distance
- Super G mode efficiently raises the data transfer rate up to 108Mbps
- Five operation modes selectable: AP / AP Client / Wireless Bridge / Multiple Bridge / Repeater
- Adjustable output power level
- Support Multiple SSIDs, Multiple SSID isolation, 802.1Q VLAN, RADIUS MAC authentication, Rogue AP detection, Access Control

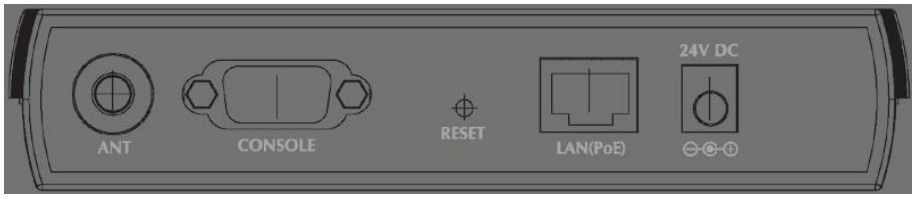
- Provide Windows-base utility, Web, and CLI (Command Line Interface) Configuration
- SNMP support

## 1.4 Physical Details

**Front panel**


| | |
|---|---|
| **STATUS** | **On** - Error condition. |
| | **Off** - Normal operation. |
| | **Blinking** - During start up, and when the Firmware is being upgraded. |
| **POWER** | **On** - Normal operation. |
| | **Off** - No power |
| **LAN** | **On** - The LAN (Ethernet) port is active. |
| | **Off** - No active connection on the LAN (Ethernet) port. |
| | **Flashing** - Data is being transmitted or received via the corresponding LAN (Ethernet) port. |
| **WLAN** | **On** - Idle |
| | **Off** - Error- Wireless connection is not available. |
| | **Flashing** - Data is being transmitted or received via the Wireless access point. Data includes "network traffic" as well as user data. |

**Rear panel**




| | |
|---|---|
| **ANT** | One dipole antenna is supplied. Best results are usually obtained with the antenna in a vertical position. |
| **CONSOLE** | DB9 female RS232 port. |
| **RESET Button** | This button has two (2) functions:<br>• **Reboot**. When pressed and released, the WAP-4060PE will reboot (restart).<br>• **Reset to Factory Defaults**. This button can also be used to clear ALL data and restore ALL settings to the factory default values.<br><br>**To Clear All Data and restore the factory default values:**<br>1. Power Off the WAP-4060PE.<br>2. Hold the Reset Button down while you Power On the device. |

3. Continue holding the Reset Button until the Status (Red) LED blinks TWICE.
4. Release the Reset Button.
   The factory default configuration has now been restored, and the WAP-4060PE is ready for use.

**LAN (PoE)** Use a standard LAN cable (RJ45 connectors) to connect this port to a 10BaseT or 100BaseT hub on your LAN.

**Power port** Connect the supplied power adapter here.

## 1.5 Specification

| | | |
|---|---|---|
| **Standard** | IEEE 802.11b, 802.11g | |
| **Signal Type** | DSSS (Direct Sequence Spread Spectrum) | |
| **Modulation** | OFDM with BPSK, QPSK, 16QAM, 64QAM, DBPSK, DQPSK, CCK | |
| **Port** | 10/100Mbps RJ-45 port * 1, 802.3af compliant | |
| **Antenna Connector** | Reverse SMA male * 1 | |
| **Output Power** | 18dBm | |
| **Sensitivity** | **802.11b** | 11 Mbps (CCK): -85dBm<br>5.5 Mbps (QPSK): - 89dBm<br>1, 2 Mbps (BPSK): - 90dBm<br>(typically @PER < 8% packet size 1024 and @25ºC ± 5ºC) |
| | **802.11g** | 54 Mbps: -72dBm<br>48 Mbps: - 72dBm<br>36 Mbps: -76dBm<br>24 Mbps: -79dBm<br>18 Mbps: -82dBm<br>12 Mbps: -86dBm<br>9 Mbps: -89dBm<br>6 Mbps: -90dBm<br>(typically @PER < 8% packet size 1024 and @25ºC + 5ºC) |
| **Operating Mode** | AP, AP Client, Wireless Bridge, Multiple Bridge, Repeater | |
| **Security** | Open, shared, WPA, and WPA-PSK authentication<br>802.1x support<br>EAP-TLS, EAP-TTLS, PEAP<br>Block inter-wireless station communication<br>Block SSID broadcast | |

| | | |
|---|---|---|
| **Management** | Web based configuration<br>RADIUS Accounting<br>RADIUS-On feature<br>RADIUS Accounting update<br>CLI<br>Message Log<br>Access Control list file support<br>Configuration file Backup/Restore<br>Statistics support<br>Device discovery program<br>Windows Utility | |
| **Data Rate** | Super G mode | Up to 108Mbps |
| | 802.11g | Up to 54Mbps (6/9/12/18/24/36/48/54) |
| | 802.11b | Up to 11Mbps (1/2/5.5/11) |
| **Dimensions (L x W x H)** | 150 x 102 x 30mm | |
| **Weight** | 210g | |
| **Environmental Specification** | Operating temperature: 0 – 40 degree C<br>Storage temperature: -20 – 70 degree C<br>Relative humanity: 0% – 90% (non-condensing) | |
| **Power Requirement** | 24V DC, 0.5A | |
| **Electromagnetic Compatibility** | FCC, CE | |

## 1.6 Wireless Performance

The following information will help you utilizing the wireless performance, and operating coverage of WAP-4060PE.

**1. Site selection**

To avoid interferences, please locate WAP-4060PE and wireless clients away from transformers, microwave ovens, heavy-duty motors, refrigerators, fluorescent lights, and other industrial equipments. Keep the number of walls, or ceilings between AP and clients as few as possible; otherwise the signal strength may be seriously reduced. Place WAP-4060PE in open space or add additional WAP-4060PE as needed to improve the coverage.

**2. Environmental factors**

The wireless network is easily affected by many environmental factors. Every environment is unique with different obstacles, construction materials, weather, etc. It is hard to determine the exact operating range of WAP-4060PE in a specific location without testing.

**3. Antenna adjustment**

The bundled antenna of WAP-4060PE is adjustable. Firstly install the antenna pointing straight up, then smoothly adjust it if the radio signal strength is poor. But the signal reception is definitely weak in some certain areas, such as location right down the antenna.

Moreover, the original antenna of WAP-4060PE can be replaced with other external antennas to extend the coverage. Please check the specification of the antenna you want to use, and make sure it can be used on WAP-4060PE.

**4. WLAN type**

If WAP-4060PE is installed in an 802.11b and 802.11g mixed WLAN, its performance will reduced significantly. Because every 802.11g OFDM packet needs to be preceded by an RTS-CTS or CTS packet exchange that can be recognized by legacy 802.11b devices. This additional overhead lowers the speed. If there are no 802.11b devices connected, or if connections to all 802.11b devices are denied so that WAP-4060PE can operate in 11g-only mode, then its data rate should actually 54Mbps and 108Mbps in Super G mode.

Chapter 2

# Installation

## 2.1 General Installation

Before you proceed with the installation, it is necessary that you have enough information about the WAP-4060PE.

1. **Locate an optimum location for the WAP-4060PE.** The best place for your WAP-4060PE is usually at the center of your wireless network, with line of sight to all of your mobile stations.
2. **Assemble the antenna to WAP-4060PE.** Try to place them to a position that can best cover your wireless network. The antenna's position will enhance the receiving sensitivity.
3. **Connect RJ-45 cable to WAP-4060PE.** Connect this WAP-4060PE to your LAN switch/hub or a single PC.
4. **Plug in power adapter and connect to power source**. After power on, WAP-4060PE will start to operate.

> ***Note:*** ONLY use the power adapter supplied with the WAP-4060PE. Otherwise, the product may be damaged.

## 2.2 Using PoE (Power over Ethernet)

The LAN port of WAP-4060PE supports PoE. Before you proceed with the PoE installation, please make sure the PoE adapter or switch is 802.3af compliant.

1. Do not connect the supplied power adapter to the WAP-4060PE.
2. Connect one end of a standard (category 5) LAN cable to the Ethernet port on the WAP-4060PE.
3. Connect the other end of the LAN cable to the powered Ethernet port on a suitable PoE Adapter or switch. (IEEE 802.3af compliant)
4. Connect the unpowered Ethernet port on the PoE adapter to your Hub or switch.
5. Connect the power supply to the PoE adapter and power up.
6. Check the LEDs on the WAP-4060PE to see it is drawing power via the Ethernet connection.

# Chapter 3
# Access Point Setup

## 3.1 Overview

This chapter describes the setup procedure to make the WAP-4060PE a valid device on your LAN, and to function as an Access Point for your Wireless Stations.

The WAP-4060PE can be configured using either the supplied Windows utility or the Web Browser

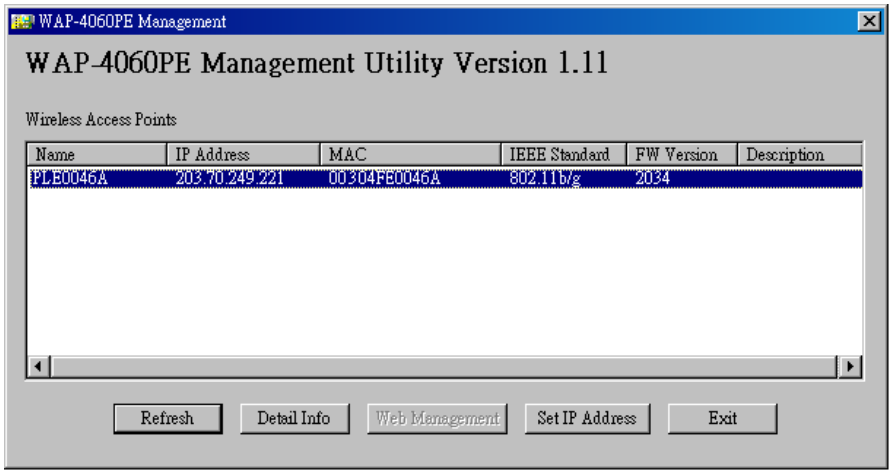
## 3.2 Setup using the Windows Utility

A simple Windows setup utility is supplied on the CD-ROM. This utility can be used to assign a suitable IP address to the WAP-4060PE. Using this utility is recommended, because it can locate the WAP-4060PE even if it has an invalid IP address.

1. Insert the User's Manual and Utility CD into the CD-ROM drive.
2. Once the menu screen appears, click on the "WAP-4060PE Manager" hyperlink for installation. If the menu screen does not appear, you can click the **Start** button and choose **Run**. When the dialog box appears, enter **E:\Utility\setup.exe** (Assume "E" is your CD-ROM drive). Follow the prompts to complete the installation.
3. After the installation completes, you can start this utility from "Start">"Program Files">"Planet">"WAP-4060PE Manager".

### 3.2.1 Main Screen

When the utility is executed, it searches the network for all active WAP-4060PE, and lists them on screen, as shown by the example below.




#### Wireless Access Points

The main panel displays a list of all Wireless Access Points found on the network. For each Access Point, the following data is shown:

| | |
|---|---|
| **Name** | The device name of the WAP-4060PE. |

| | |
|---|---|
| **IP address** | The IP address for the WAP-4060PE. |
| **MAC Address** | The hardware or physical address of the WAP-4060PE. |
| **IEEE Standard** | The wireless standard or standards used by the WAP-4060PE (e.g. 802.11b, 802.11g) |
| **FW Version** | The current Firmware version installed in the WAP-4060PE. |
| **Description** | Any extra information for the WAP-4060PE, entered by the administrator. |

**Note**: If the desired device is not listed, check that the device is installed and powered on, then update the list by clicking the *Refresh* button.

### Buttons

| | |
|---|---|
| **Refresh** | Click this button to update the Wireless Access Point device listing after changing the name or IP Address. |
| **Detail Info** | When clicked, additional information about the selected device will be displayed. |
| **Web Management** | Use this button to connect to the WAP-4060PE's Web-based management interface. |
| **Set IP Address** | Click this button if you want to change the IP Address of the Wireless Access Point. |
| **Exit** | Exit the Management utility program by clicking this button. |

### 3.2.2 Setup Procedure

1. Select the desired Wireless Access Point from the list.
2. Click the Set IP Address button.
3. If prompted, enter the user name and password. The default values are "admin" for the User Name, and "password" for the Password.
4. Ensure the IP address, Network Mask, and Gateway settings are correct for your LAN. Save any changes.
5. The initial IP address setup is now completed. You can click on the "Web Management" button to access the web interface of WAP-4060PE for more configurations.

## 3.3 Setup using a Web Browser

**Your Browser must support JavaScript**. The configuration program has been tested on the following browsers:

- Netscape V4.08 or later
- Internet Explorer V4 or later

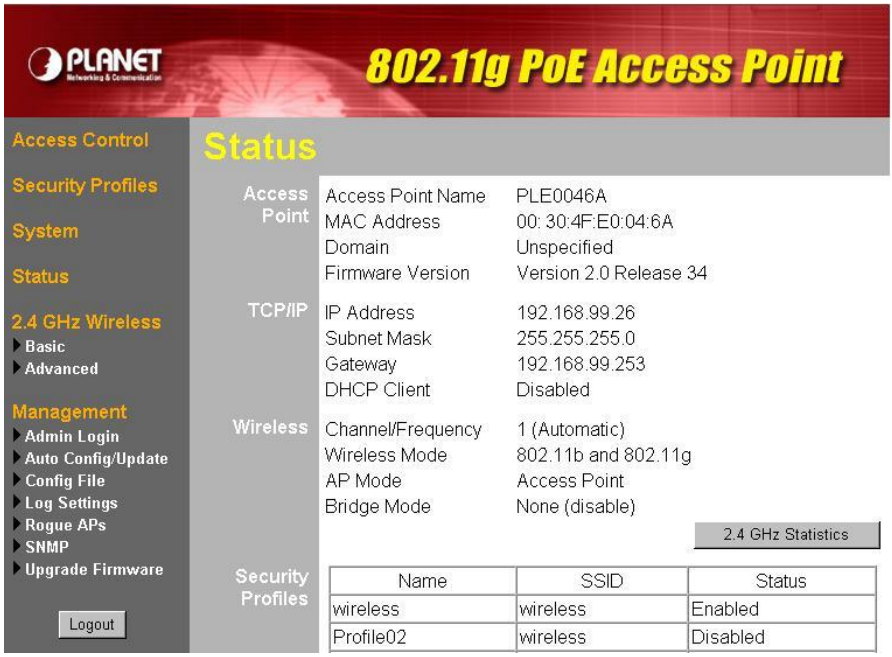
### 3.3.1 Setup Procedure

Before proceeding, please install the WAP-4060PE in your LAN, as described previously.

1. Use a PC which is already connected to your LAN, and start the Web browser.
2. In the *Address* box, enter the IP address of the WAP-4060PE you want to cobnfigure.
3. You should then see a login prompt, which will ask for a *User Name* and *Password*. Enter **admin** for the *User Name*, and **password** for the *Password*.

These are the default values. The password can and should be changed. Always enter the current user name and password, as set on the *Admin Login* screen.

4. You will then see the *Status* screen, which displays the current settings and status. No data input is possible on this screen.




5. From the menu, check the following screens, and configure as necessary for your environment. Details of these screens and settings are described in the following subsections of this chapter.

- **Access Control** - MAC level access control.
- **Security Profiles** - Wireless security.
- **System** - Identification, location, and Network settings
- **Wireless** - Basic & Advanced

6. You may also need to set the admin password and administration connection options. These are on the *Admin Login* screen accessed from the **Management** menu. See Chapter 6 for details of the screens and features available on the **Management** menu.

7. Use the **Apply/Restart** button on the menu to apply your changes and restart the Wireless Access Point.

**If you can't connect:**

It is likely that your PC's IP address is incompatible with the WAP-4060PE's IP address. This can happen if your LAN does not have a DHCP Server. The default IP address of the Wireless Access Point is 192.168.0.228, with a Network Mask of 255.255.255.0.

If your PC's IP address is not compatible with this, you must change your PC's IP address to an unused value in the range 192.168.0.1 ~ 192.168.0.254, with a Network Mask of 255.255.255.0.

## 3.4 Access Control

This feature allows you to block certain access from unknown or distrusted wireless stations.

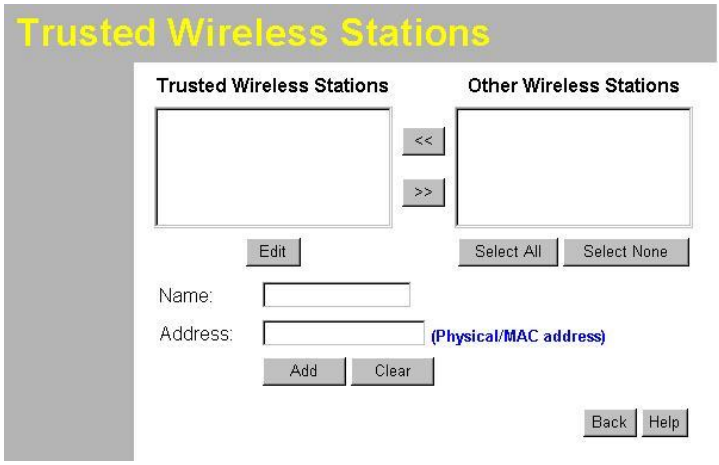
Click *Access Control* on the menu to view a screen like the following.


**Data - Access Control Screen**

| | |
|---|---|
| **Enable** | Use this checkbox to Enable or Disable this feature as desired.<br>**Warning:** Ensure your own PC is in the "Trusted Wireless Stations" list before enabling this feature. |
| **Trusted Stations** | This table lists any Wireless Stations you have designated as "Trusted". If you have not added any stations, this table will be empty. For each Wireless station, the following data is displayed:<br>• MAC Address - the MAC or physical address of each Wireless station.<br>• Connected - this indicates whether or not the Wireless station is currently associates with this Access Point. |
| **Buttons** | |
| **Modify List** | To change the list of Trusted Stations (Add, Edit, or Delete a Wireless Station or Stations), click this button. You will then see the *Trusted Wireless Stations* screen, described below. |
| **Read from File** | To upload a list of Trusted Stations from a file on your PC, click this button. |
| **Write to File** | To download the current list of Trusted Stations from the WAP-4060PE to a file on your PC, click this button. |

### 3.4.1 Trusted Wireless Stations

To change the list of trusted wireless stations, use the *Modify List* button on the *Access Control* screen. You will see a screen like the sample below.




## Data - Trusted Wireless Stations

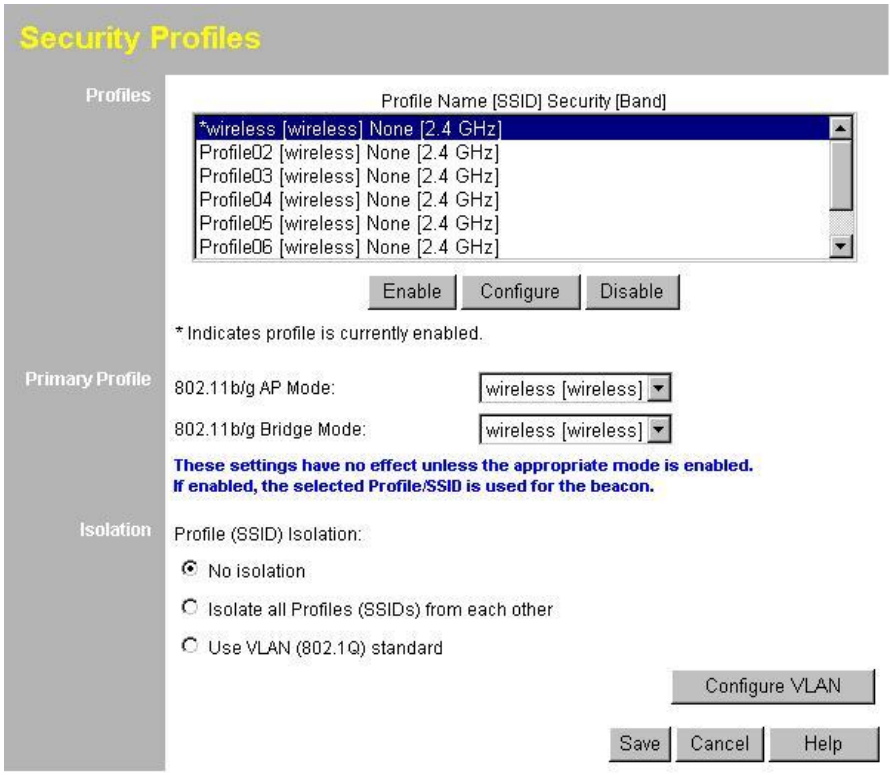
| | |
|---|---|
| **Trusted Wireless Stations** | Here lists ass Wireless Stations which you have designated as “Trusted”. |
| **Other Wireless Stations** | Here lists all Wireless Stations detected by the WAP-4060PE, which you have not designated as "Trusted". |
| **Name** | The name assigned to the Trusted Wireless Station. Use this when adding or editing a Trusted Station. |
| **Address** | The MAC (physical) address of the Trusted Wireless Station. Use this when adding or editing a Trusted Station. |
| **Buttons** | |
| **<<** | Add a Trusted Wireless Station (move from the "Other Stations" list).<br>• Select an entry (or entries) in the "Other Stations" list, and click the " << " button.<br>• Enter the Address (MAC or physical address) of the wireless station, and click the "Add " button. |
| **>>** | Delete a Trusted Wireless Station from the list (move to the "Other Stations" list).<br>• Select an entry (or entries) in the "Trusted Stations" list.<br>• Click the " >> " button. |
| **Select All** | Select all of the Stations listed in the "Other Stations" list. |
| **Select None** | De-select any Stations currently selected in the "Other Stations" list. |
| **Edit** | To change an existing entry in the "Trusted Stations" list, select it and click this button.<br>1. Select the Station in the "Trusted Station" list.<br>2. Click the "Edit" button. The address will be copied to the "Address" field, and the "Add" button will change to "Update".<br>3. Edit the address (MAC or physical address) as required.<br>4. Click "Update" to save your changes. |

| | |
|---|---|
| **Add** | To add a Trusted Station which is not in the "Other Wireless Stations" list, enter the required data and click this button. |
| **Clear** | Clear the *Name* and *Address* fields. |

## 3.5 Security Profiles

Security Profiles contain the SSID and all the security settings of this WAP-4060PE.

- Up to eight (8) Security Profiles can be defined.
- Up to four (4) Security Profiles can be enabled at one time, allowing up to 4 different SSIDs to be used simultaneously.




## Data - Security Profiles Screen

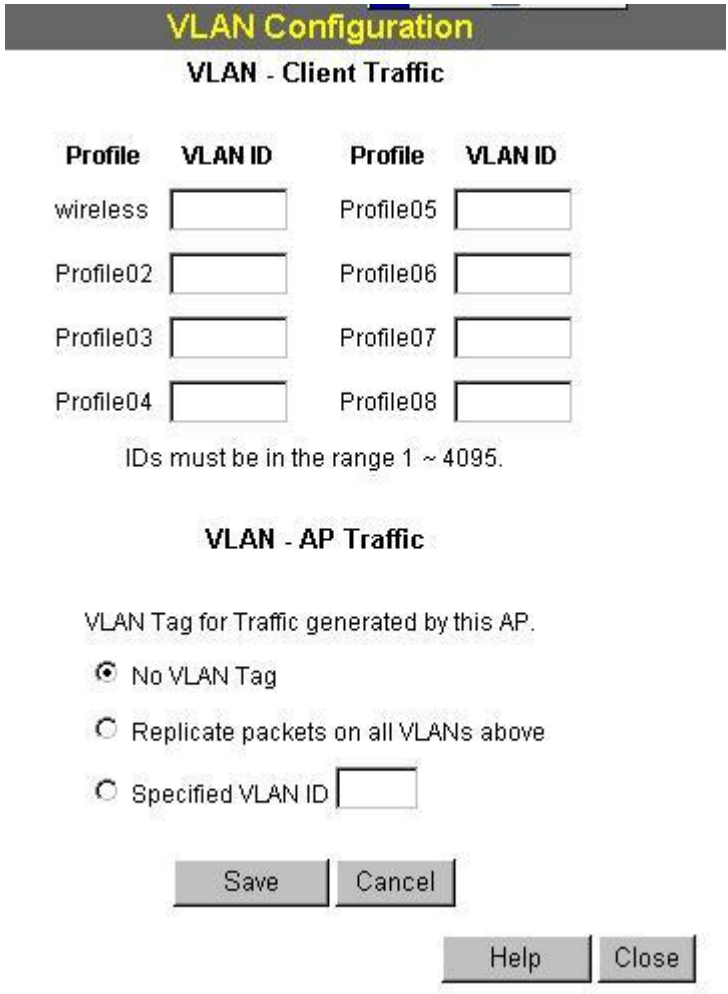
| | |
|---|---|
| **Profile** | |
| **Profile List** | All available profiles are listed. For each profile, the following data is displayed:<br>• * (star sign)<br>If displayed before the name of the profile, this indicates the profile is currently enabled. If not displayed, the profile is currently disabled.<br>• Profile Name<br>The current profile name is displayed.<br>• [SSID]<br>The current SSID associated with this profile.<br>• Security System<br>The current security system (e.g. WPA-PSK) is displayed.<br>• [Frequency Band]<br>The Wireless Band (2.4 GHz) for this profile is displayed. |
| **Buttons** | • **Enable** - enable the selected profile.<br>• **Configure** - change the settings for the selected profile.<br>• **Disable** - disable the selected profile. |
| **Primary Profile** | |
| **802.11b/g AP Mode** | Select the primary profile for 802.11b and 802.11g AP mode. Only enabled profiles are listed. The SSID associated with this profile will be broadcast if the "Broadcast SSID" setting on the **Basic** screen is enabled. |

| | |
|---|---|
| **802.11b/g Bridge Mode** | Select the primary profile for 802.11b and 802.11g Bridge Mode. This setting determines the SSID and security settings used for the Bridge connection to the remote AP. |
| **Isolation** | |
| **None** | If this option is selected, wireless clients using different profiles (different SSIDs) are not isolated, so they will be able to communicate with each other. |
| **Isolate all** | If this option is selected, wireless clients using different profiles (different SSIDs) are isolated from each other, so they will NOT be able to communicate. They will still be able to communicate with other clients using the same profile, unless the "Wireless Separation" setting on the "Advanced" screen has been enabled. |
| **Use VLAN** | This option is only useful if the hubs/switches on your LAN support the VLAN (802.1Q) standard.<br>When VLAN is used, you must select the desired VLAN for each security profile when configuring the profile. (If VLAN is not selected, the VLAN setting for each profile is ignored.)<br>Click the *Configure VLAN* button to configure the IDs used by each VLAN. See below for further details. |

### 3.5.1 VLAN Configuration Screen

This screen is accessed via the *Configure VLAN* button on the *Security Profiles* screen.

- The settings on this screen will be ignored unless the *Use VLAN* option on the *Security Profiles* screen is selected.
- If using the VLAN option, these setting determine which VLAN traffic is assigned to.




**Data - VLAN Configuation Screen**

| | |
|---|---|
| **VLAN – Client Traffic** | |
| **Profile** | Each profile is listed, whether currently enabled or not. You can assign traffic from each profile (SSID) to a different VLAN if desired. To assign multiple profiles to the same VLAN, just enter the same VLAN ID for each profile. |
| **VLAN ID** | Enter the desired VLAN ID, as used on your network. IDs must be in the range 1 ~ 4095. These IDs must match the IDs used by other network devices. |
| **VLAN – AP Traffic** | |
| **No VLAN Tag** | Traffic generated by this AP will not have a VLAN tag (no VLAN ID). |
| **Replicate…** | If selected, each packet generated by this AP will be sent over each active VLAN, as defined in the client VLAN table above. This requires that each packet be replicated (up to 8 times). This has a detrimental effect on performance, so should only be used if necessary. |

| | |
|---|---|
| **Specified VLAN ID** | If selected, you can enter the desired VLAN ID. Normally, this ID should be one of the client VLAN IDs defined above. |

## 3.6 Configure Security Profile

This screen is displayed when you select a Profile on the Security Profiles screen, and click the *Configure* button.


### 3.6.1 Profile Data

Enter the desired settings for each of the following:

| | |
|---|---|
| **Profile Name** | Enter a suitable name for this profile. |
| **SSID** | Enter the desired SSID. Each profile must have an unique SSID. |
| **Wireless Band** | Displays the wireless band for this profile. |

### 3.6.2 Security Settings

Select the desired option, and then enter the settings for the selected method.

The available options are:

- **None** - No security is used. Anyone using the correct SSID can connect to your network.
- **WEP** - The 802.11b standard. Data is encrypted before transmission, but the encryption system is not very strong.
- **WPA-PSK** - Like WEP, data is encrypted before transmission. WPA is more secure than WEP, and should be used if possible. The PSK (Pre-shared Key) must be entered on each Wireless station. The 256Bit encryption key is derived from the PSK, and changes periodically.
- **WPA-802.1x** - This version of WPA requires a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using the WPA standard.

If this option is selected:

- This WAP-4060PE must have a "client login" on the Radius Server.
- Each user must have a "user login" on the Radius Server.
- Each user's wireless client must support 802.1x and provide the login data when required.
- All data transmission is encrypted using the WPA standard. Keys are automatically generated, so no key input is required.

- **802.1x** - This uses the 802.1x standard for client authentication, and WEP for data encryption. If possible, you should use WPA-802.1x instead, because WPA encryption is much stronger than WEP encryption.

  If this option is selected:

  - This WAP-4060PE must have a "client login" on the Radius Server.
  - Each user must have a "user login" on the Radius Server.
  - Each user's wireless client must support 802.1x and provide the login data when required.
  - All data transmission is encrypted using the WEP standard. You only have to select the WEP key size; the WEP key is automatically generated.

## 3.6.3 Security Settings - None


No security is used. Anyone using the correct SSID can connect to your network.

The only settings available from this screen are **Radius MAC Authentication** and **UAM** (Universal Access Method).

## 3.6.4 Radius MAC Authentication

Radius MAC Authentication provides for MAC address checking which is centralized on your Radius server. If you don't have a Radius Server, you cannot use this feature.

### Using MAC authentication

5. Ensure the WAP-4060PE can login to your Radius Server.
   - Add a RADIUS client on the RADIUS server, using the IP address or name of the WAP-4060PE, and the same shared key as pre-configured.
   - Ensure the WAP-4060PE has the correct address, port number, and shared key for login to your Radius Server. These parameters are entered either on

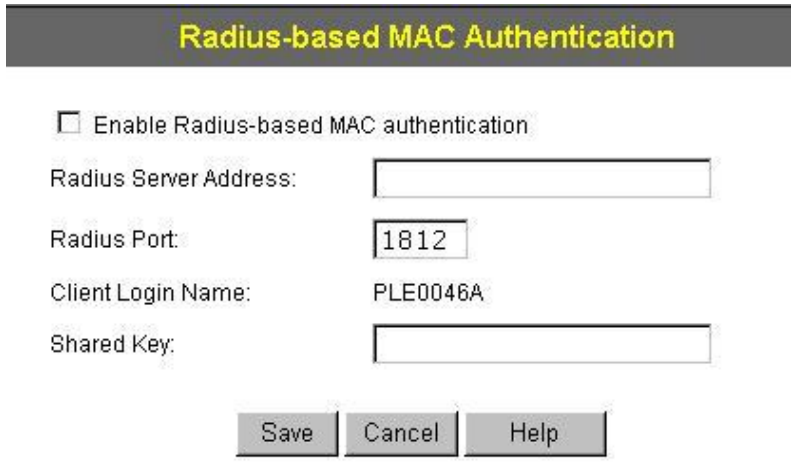
the Security page, or the Radius-based MAC authentication sub-screen, depending on the security method used.

- On the WAP-4060PE, enable the Radius-based MAC authentication feature on the screen below.

6. Add Users on the Radius server as required. The username must be the MAC address of the Wireless client you wish to allow, and the password must be blank.
7. When clients try to associate with the WAP-4060PE, their MAC address is passed to the Radius Server for authentication.
   - If successful, “xx:xx:xx:xx:xx:xx MAC authentication” is entered in the log, and client station status would show as “authenticated” on the station list table;
   - If not successful, “xx:xx:xx:xx:xx:xx MAC authentication failed” is entered in the log, and station status is shown as “authenticating” on the station list table.

### Radius-based MAC authentication Screen

This screen will look different depending on the current security setting. If you have already provided the address of your Radius server, you won't be prompted for it again. Otherwise, you must enter the details of your Radius Server on this screen.




### Data - Radius-based MAC Authentication Screen

| | |
|---|---|
| **Enable ...** | Enable this if you want to use Radius-based MAC authentication. |
| **Radius Server Address** | If this field is visible, enter the name or IP address of the Radius Server on your network. |
| **Radius Port** | If this field is visible, enter the port number used for connections to the Radius Server. |
| **Client Login Name** | If this field is visible, it displays the name used for the Client Login on the Radius Server. This Login name must be created on the Radius Server. |
| **Shared Key** | If this field is visible, it is used for the Client Login on the Radius Server. Enter the key value to match the value on the Radius Server. |
| **WEP Key** | If this field is visible, it is for the WEP key used to encrypt data transmissions to the Radius Server. Enter the desired key value in HEX, and ensure the Radius Server has the same value. |

| | |
|---|---|
| **WEP Key Index** | If this field is visible, select the desired key index. Any value can be used, provided it matches the value on the Radius Server. |

## 3.6.5 UAM

UAM (Universal Access Method) is intended for use in Internet cafes, Hot Spots, and other sites where the WAP-4060PE is used to provide Internet Access.

If enabled, then HTTP (TCP, port 80) connections are checked. (UAM only works on HTTP connections; all other traffic is ignored.) If the user has not been authenticated, Internet access is blocked, and the user is re-directed to another web page. Typically, this web page is on your Web server, and explains how to pay for and obtain Internet access.

To use UAM, you need a Radius Server for Authentication. The "Radius Server Setup" must be completed before you can use UAM. The required setup depends on whether you are using “Internal” or “External” authentication.

- **Internal authentication** uses the web page built in the WAP-4060PE.
- **External authentication** uses a web page on your Web server. Generally, you should use External authentication, as this allows you to provide relevant and helpful information to users.

### UAM authentication - Internal

1. Ensure the WAP-4060PE can login to your Radius Server.
   - Add a RADIUS client on RADIUS server, using the IP address or name of the WAP-4060PE, and the same shared key as pre-configured.
   - Ensure the WAP-4060PE has the correct address, port number, and shared key for login to your Radius Server. These parameters are entered either on the Security page, or the UAM sub-screen, depending on the security method used.
2. Add users on your RADIUS server as required, and allow access by these users.
3. Client PCs must have the correct Wireless settings in order to associate with the WAP-4060PE.
4. When an associated client tries to use HTTP (TCP, port 80) connections, they will be re-directed to a user login page.
5. The client (user) must then enter the user name and password, as defined on the Radius Server. (You must provide some system to let users know the correct name and password to use.)
6. If the user name and password is correct, Internet access is allowed. Otherwise, the user remains on the login page.
   - Clients which pass the authentication are listed as “xx:xx:xx:xx:xx:xx WEB authentication” in the log table, and station status would show as “Authenticated” on the station list table.
   - If a client fails authentication, “xx:xx:xx:xx:xx:xx WEB authentication failed” shown in the log, and station status is shown as “Authenticating” on the station list table.

### UAM authentication - External

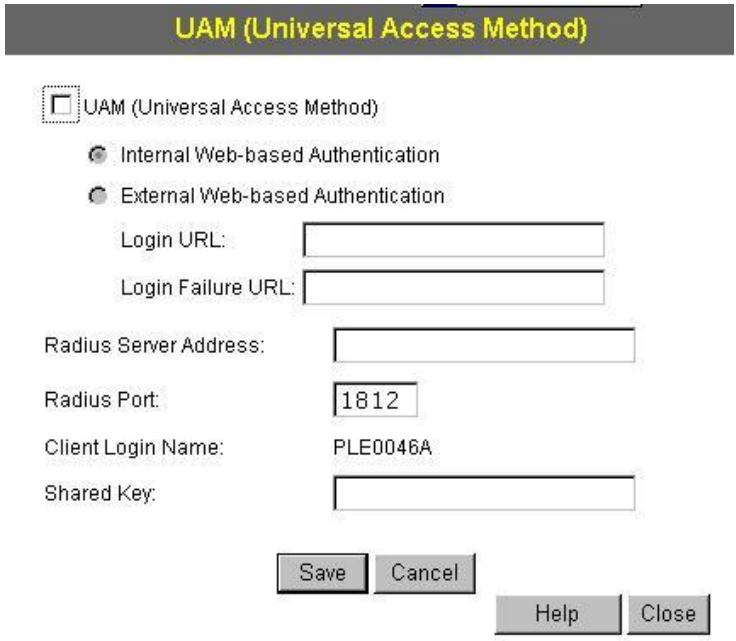
1. Ensure the WAP-4060PE can login to your Radius Server.
   - Add a RADIUS client on RADIUS server, using the IP address or name of the WAP-4060PE, and the same shared key as pre-configured.

- Ensure the WAP-4060PE has the correct address, port number, and shared key for login to your Radius Server. These parameters are entered either on the Security page, or the UAM sub-screen, depending on the security method used.

2. On your Web Server, create a suitable welcome page. The welcome page must have a link or button to allow the user to input their user name and password on the uamlogon.htm page on the WAP-4060PE.
3. On the WAP-4060PE's UAM screen, select External Web-based Authentication, and enter the URL for the welcome page on your Web server.
4. Add users on your RADIUS server as required, and allow access by these users.
5. Client PCs must have the correct Wireless settings in order to associate with the WAP-4060PE.
6. When an associated client tries to use HTTP (TCP, port 80) connections, they will be re-directed to the welcome page on your Web Server.
7. The client (user) must then enter the user name and password, as defined on the Radius Server. (You must provide some system to let users know the correct name and password to use.)
8. If the user name and password is correct, Internet access is allowed. Otherwise, the user remains on the login page.
    - Clients which pass the authentication are listed as "xx:xx:xx:xx:xx:xx WEB authentication" in the log table, and station status would show as "Authenticated" on the station list table.
    - If a client fails authentication, "xx:xx:xx:xx:xx:xx WEB authentication failed" is shown in the log, and station status is shown as "Authenticating" on the station list table.

### UAM Screen

The UAM screen will look different depending on the current security setting. If you have already provided the address of your Radius server, you won't be prompted for it again.

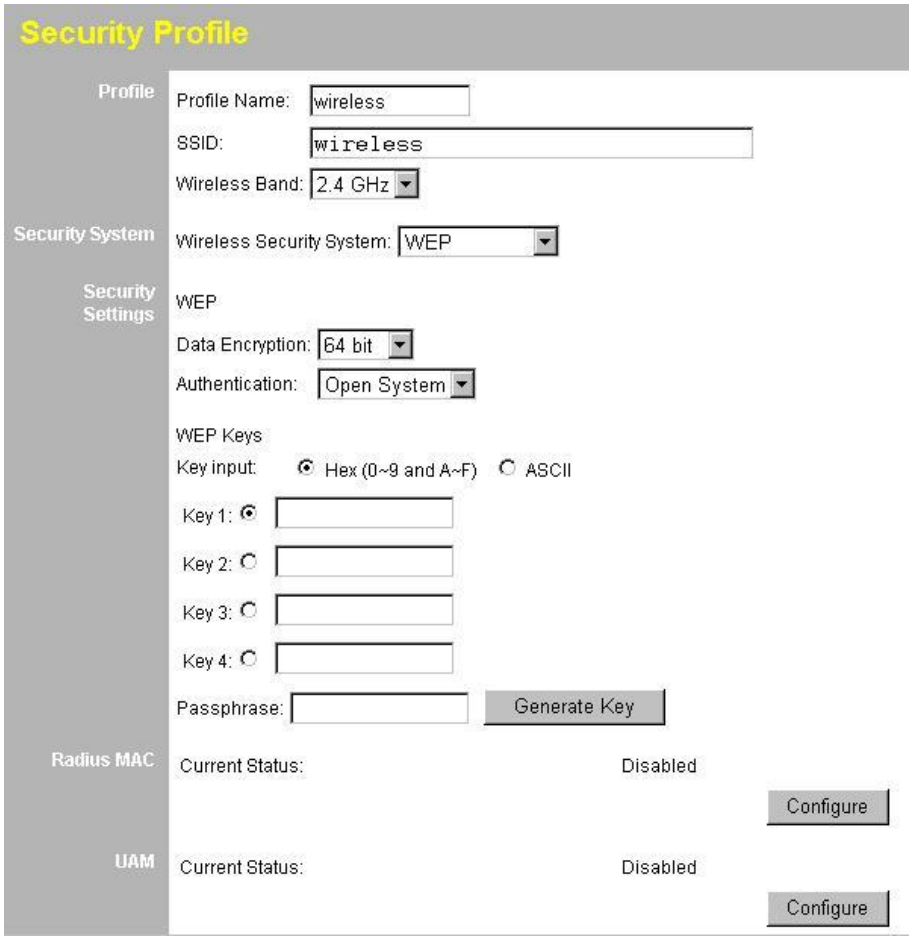



### Data - UAM Screen

| | |
|---|---|
| **Enable** | Enable this if you want to use this feature. See the section above for details of using UAM. |
| **Internal Web-based Authentication** | If selected, then when a user first tries to access the Internet, they will be blocked, and re-directed to the built-in login page. The logon data is then sent to the Radius Server for authentication. |
| **External Web-based Authentication** | If selected, then when a user first tries to access the Internet, they will be blocked, and re-directed to the URL below. This needs to be on your own local Web Server. The page must also link back to the built-in login page on this device to complete the login procedure. |
| **Login URL** | Enter the URL of the page on your local Web Server. When users attempt to access the Internet, they will see this page, but are not logged in. |
| **Login Failure URL** | Enter the URL of the page on your local Web Server you wish users to see if their login fails. (This may be the same URL as the Login URL). |

## 3.6.6 Security Settings - WEP

This is the 802.11b standard. Data is encrypted before transmission, but the encryption system is not very strong.



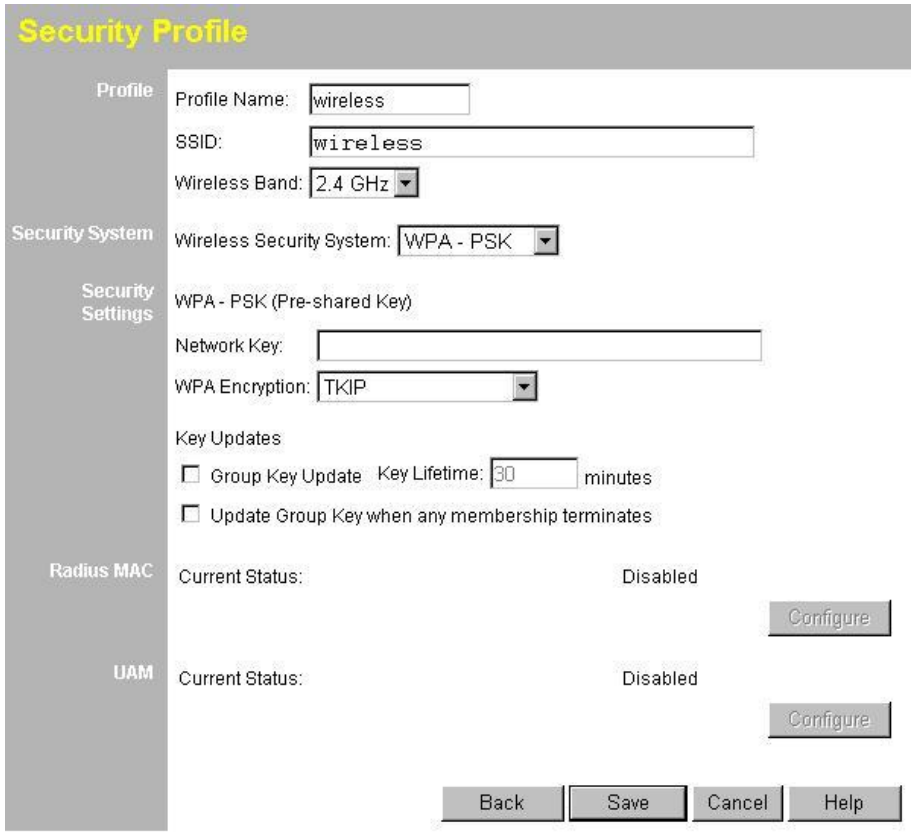

## Data - WEP Screen

| WEP | |
|---|---|
| **Data Encryption** | Select the desired option, and ensure your Wireless stations have the identical setting:<br>• **64 Bit Encryption** - Keys are 10 Hex (5 ASCII) characters.<br>• **128 Bit Encryption** - Keys are 26 Hex (13 ASCII) characters.<br>• **152 Bit Encryption** - Keys are 32 Hex (16 ASCII) characters. |
| **Authentication** | Normally, you can leave this at “Automatic”, so that Wireless Stations can use either method ("Open System" or "Shared Key".).<br>If you wish to use a particular method, select the appropriate value - "Open System" or "Shared Key". All Wireless stations must then be set to use the same method. |
| **Key Input** | Select "Hex" or "ASCII" depending on your input method. (All keys are converted to Hex, ASCII input is only for convenience.) |
| **Key Value** | Enter the key values you want to use. The default key, selected by the radio button, is required. The other keys are optional. Other stations must have matching key values. |

| | |
|---|---|
| **Passphrase** | Use this to generate a key or keys, instead of entering them directly. Enter a word or group of printable characters in the Passphrase box and click the "Generate Key" button to automatically configure the WEP Key(s). |
| **Radius MAC Authentication** | The current status is displayed.<br>Click the "Configure" button to configure this feature if required. |
| **UAM** | The current status is displayed.<br>Click the "Configure" button to configure this feature if required. |

## 3.6.7 Security Settings - WPA-PSK

Like WEP, data is encrypted before transmission. WPA is more secure than WEP, and should be used if possible. The PSK (Pre-shared Key) must be entered on each Wireless station. The 256Bit encryption key is derived from the PSK, and changes frequently.




### Data - WPA-PSK Screen

| **WPA-PSK** | |
|---|---|
| **Network Key** | Enter the key value. Data is encrypted using a 256Bit key derived from this key. Other Wireless Stations must use the same key. |
| **WPA Encryption** | Select the desired option. Other Wireless Stations must use the same method. |

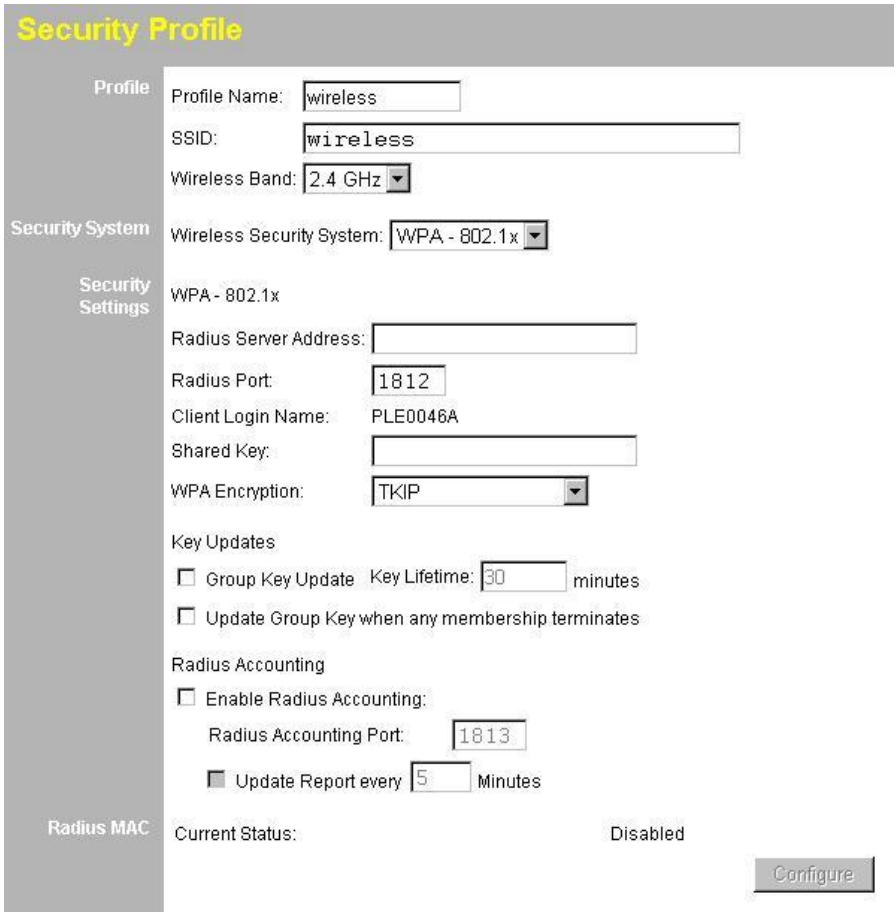
| | |
|---|---|
| | • **TKIP** - Unicast (point-to-point) transmissions are encrypted using TKIP, and multicast (broadcast) transmissions are not encrypted.<br>• **TKIP + 64 bit WEP** - Unicast (point-to-point) transmissions are encrypted using TKIP, and multicast (broadcast) transmissions are encrypted using 64 bit WEP.<br>• **TKIP + 128 bit WEP** - Unicast (point-to-point) transmissions are encrypted using TKIP, and multicast (broadcast) transmissions are encrypted using 128 bit WEP.<br>• **AES - CCMP** - CCMP is the most common sub-type of AES (Advanced Encryption System). Most systems will simply say "AES". If selected, both Unicast (point-to-point) and multicast (broadcast) transmissions are encrypted using AES.<br>• **AES – CCMP + TKIP** - If selected, Unicast (point-to-point) uses AES-CCMP and multicast (broadcast) transmissions are encrypted using TKIP. |
| **Group Key Update** | This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly. |
| **Key Lifetime** | This field determines how often the Group key is dynamically updated. Enter the desired value. |
| **Update Group key when any membership terminates** | If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the WAP-4060PE. |
| **Radius MAC Authentication** | The current status is displayed. This will always be "Disabled", because Radius MAC Authentication is not available with WPA-PSK. |
| **UAM** | The current status is displayed. This will always be "Disabled", because UAM is not available with WPA-PSK. The *Configure* button for this feature will also be disabled. |

### 3.6.8 Security Settings - WPA-802.1x

This version of WPA requires a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using the WPA standard.

If this option is selected:

- This WAP-4060PE must have a "client login" on the Radius Server.
- Each user must have a "user login" on the Radius Server. Normally, a Certificate is used to authenticate each user.
- Each user's wireless client must support 802.1x.
- All data transmission is encrypted using the WPA standard. Keys are automatically generated, so no key input is required.




## Data - WPA-802.1x Screen

| WPA-802.1x | |
|---|---|
| **Radius Server Address** | Enter the name or IP address of the Radius Server on your network. |
| **Radius Port** | Enter the port number used for connections to the Radius Server. |
| **Client Login Name** | This read-only field displays the current login name, which is the same as the name of the WAP-4060PE. The Radius Server must be configured to accept this login. |
| **Shared Key** | This is used for the *Client Login* on the Radius Server. Enter the key value to match the Radius Server. |

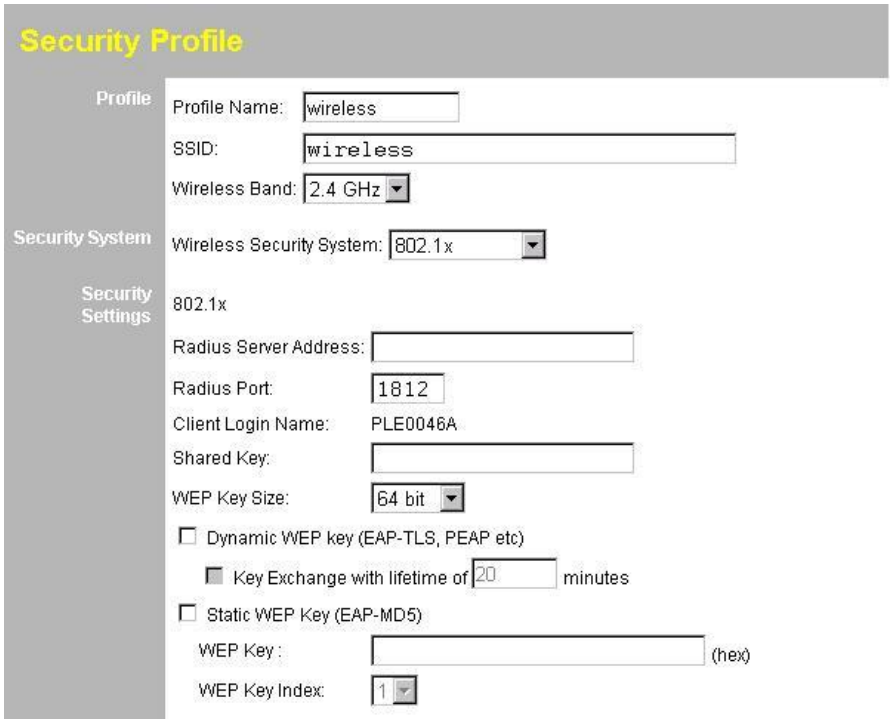
| | |
|---|---|
| **WPA Encryption** | Select the desired option. Other Wireless Stations must use the same method.<br>• **TKIP** - Unicast (point-to-point) transmissions are encrypted using TKIP, and multicast (broadcast) transmissions are not encrypted.<br>• **TKIP + 64 bit WEP** - Unicast (point-to-point) transmissions are encrypted using TKIP, and multicast (broadcast) transmissions are encrypted using 64 bit WEP.<br>• **TKIP + 128 bit WEP** - Unicast (point-to-point) transmissions are encrypted using TKIP, and multicast (broadcast) transmissions are encrypted using 128 bit WEP.<br>• **AES - CCMP** - CCMP is the most common sub-type of AES (Advanced Encryption System). Most systems will simply say "AES". If selected, both Unicast (point-to-point) and multicast (broadcast) transmissions are encrypted using AES.<br>• **AES - TKIP** - If selected, Unicast (point-to-point) uses AES-CCMP and multicast (broadcast) transmissions are encrypted using TKIP. |
| **Group Key Update** | This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly. |
| **Key Lifetime** | This field determines how often the Group key is dynamically updated. Enter the desired value. |
| **Update Group key when any membership terminates** | If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the WAP-4060PE. |
| **Radius Accounting** | Enable this if you want this WAP-4060PE to send accounting data to the Radius Server.<br>If enabled, the port used by your Radius Server must be entered in the “Radius Accounting Port" field. |
| **Update Report every ...** | If Radius accounting is enabled, you can enable this and enter the desired update interval. This WAP-4060PE will then send updates according to the specified time period. |
| **Radius MAC Authentication** | The current status is displayed. This will always be "Disabled", because Radius MAC Authentication is not available with WPA-802.1x. The *Configure* button for this feature will also be disabled. |
| **UAM** | The current status is displayed. This will always be "Disabled", because UAM is not available with WPA-802.1x. The *Configure* button for this feature will also be disabled. |

## 3.6.9 Security Settings - 802.1x

This uses the 802.1x standard for client authentication, and WEP for data encryption. If possible, you should use WPA-802.1x instead, because WPA encryption is much stronger than WEP encryption.

If this option is selected:

- This WAP-4060PE must have a "client login" on the Radius Server.
- Each user must have a "user login" on the Radius Server. Normally, a Certificate is used to authenticate each user.
- Each wireless client must support 802.1x.
- All data transmission is encrypted using the WEP standard. You only have to select the WEP key size; the WEP key is automatically generated.



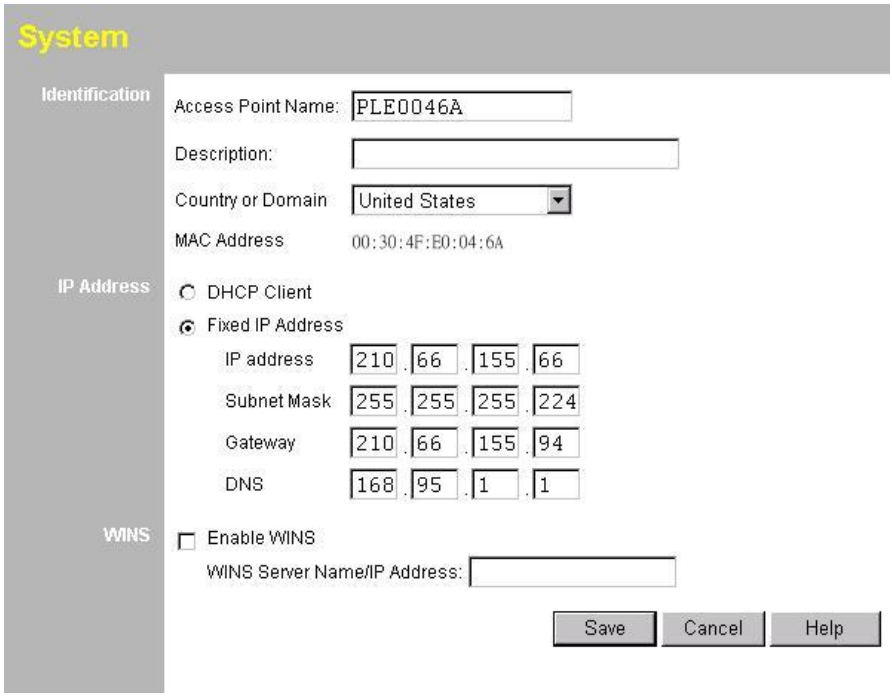

### Data - 802.1x Screen

| 802.1x | |
|---|---|
| **Radius Server Address** | Enter the name or IP address of the Radius Server on your network. |
| **Radius Port** | Enter the port number used for connections to the Radius Server. |
| **Client Login Name** | This read-only field displays the current login name, which is the same as the name of the WAP-4060PE. The Radius Server must be configured to accept this login. |
| **Shared Key** | This is used for the *Client Login* on the Radius Server. Enter the key value to match the Radius Server. |

| | |
|---|---|
| **WEP Key Size** | Select the desired option:<br>• **64 Bit** - Keys are 10 Hex (5 ASCII) characters.<br>• **128 Bit** - Keys are 26 Hex (13 ASCII) characters.<br>• **152 Bit** - Keys are 32 Hex (16 ASCII) characters. |
| **Dynamic WEP Key** | Click this if you want the WEP keys to be automatically generated.<br>• The key exchange will be negotiated. The most widely supported protocol is EAP-TLS.<br>• The following Key Exchange setting determines how often the keys are changed.<br>• Both Dynamic and Static keys can be used simultaneously, allowing clients using either method to use the WAP-4060PE. |
| **Key Exchange** | This setting if only available if using Dynamic WEP Keys. If you want the Dynamic WEP keys to be updated regularly, enable this and enter the desired **lifetime** (in minutes). |
| **Static WEP Key (EAP-MD5)** | Enable this if some wireless clients use a fixed (static) WEP key, using EAP-MD5.<br>**Note:** both Dynamic and Static keys can be used simultaneously, allowing clients using either method to use the WAP-4060PE. |
| **WEP Key** | Enter the WEP key according to the **WEP Key Size** setting above. Wireless stations must use the same key. |
| **WEP Key Index** | Select the desired index value. Wireless stations must use the same key index. |
| **Radius Accounting** | Enable this if you want this WAP-4060PE to send accounting data to the Radius Server.<br>If enabled, the port used by your Radius Server must be entered in the **Radius Accounting Port** field. |
| **Update Report every ...** | If Radius accounting is enabled, you can enable this and enter the desired update interval. This WAP-4060PE will then send updates according to the specified time period. |
| **Radius MAC Authentication** | The current status is displayed.<br>Click the *Configure* button to configure this feature if required. |
| **UAM** | The current status is displayed.<br>Click the *Configure* button to configure this feature if required. |

## 3.7 System Screen

Click System on the menu to view a screen like the following.




### Data - System Screen

| | |
|---|---|
| **Identification** | |
| **Access Point Name** | Enter a suitable name for this WAP-4060PE. |
| **Description** | If desired, you can enter a description for the WAP-4060PE. |
| **Country Domain** | Select the country or domain matching your current location. |
| **IP Address** | |
| **DHCP Client** | Select this option if you have a DHCP Server on your LAN, and you want the WAP-4060PE to obtain an IP address automatically. |
| **Fixed** | If selected, the following data must be entered.<br>• **IP Address** - The IP Address of this device. Enter an unused IP address from the address range on your LAN.<br>• **Subnet Mask** - The Network Mask associated with the IP Address above. Enter the value used by other devices on your LAN.<br>• **Gateway** - The IP Address of your Gateway or Router. Enter the value used by other devices on your LAN.<br>• **DNS** - Enter the DNS (Domain Name Server) used by PCs on your LAN. |

| WINS | |
|---|---|
| **Enable WINS** | If your LAN has a WINS server, you can enable this to have this AP register with the WINS server. |
| **WINS Server Name/IP Address** | Enter the name or IP address of your WINS server. |

# 3.8 2.4GHz Wireless

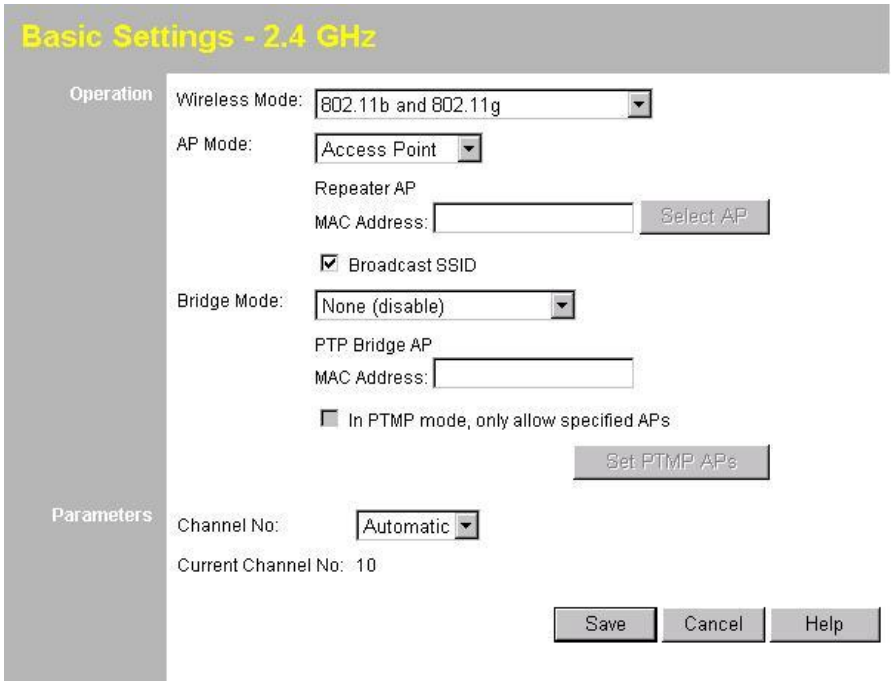
There are two configuration screens available:

- Basic Settings
- Advanced

## 3.8.1 Basic Settings Screen

The settings on this screen must match the settings used by Wireless Stations.

Click ***Basic*** on the menu to view a screen like the following.




## Data - Basic Settings Screen

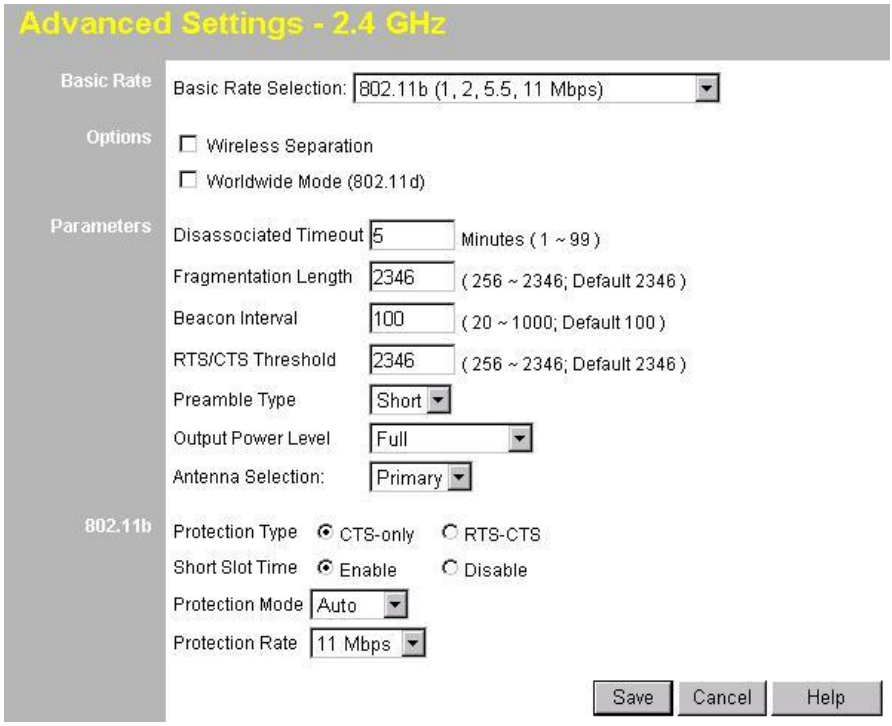
| Operation | |
|---|---|
| **Wireless Mode** | Select the desired option:<br>• **Disable** - select this if for some reason you do not want this AP to transmit or receive at all.<br>• **802.11b and 802.11g** - this is the default setting, and will allow connections by both 802.11b and 802.1g wireless stations.<br>• **802.11b** - if selected, only 802.11b clients are allowed. 802.11g wireless stations will only be able to connect if they are fully backward compatible with the 802.11b standard.<br>• **802.11g** - only 802.11g clients are allowed. If you only have 802.11g, selecting this option may provide a performance improvement over using the default setting.<br>• **Dynamic Super 802.11g (108Mbps)** - This uses *Packet Bursting*, *FastFrame*, *Compression*, and *Channel Bonding* (using 2 channels) to increase throughput. Only clients supporting the "Atheros Super G" mode can connect at 108Mbps, and they will only use this speed when necessary. However, this option is backward compatible with 802.11b and (standard) 802.11g.<br>• **Static Super 802.11g (108Mbps)** - This uses *Packet Bursting*, *FastFrame*, *Compression*, and *Channel Bonding* (using 2 channels) to increase throughput.<br>Because "Channel Bonding" is always used, this method is NOT compatible with 802.11b and (standard) 802.11g. Only clients supporting the "Atheros Super G" mode can connect at 108Mbps; they will always connect at this speed. Select this option only if all wireless stations support this "Atheros Super G" mode. |

| | |
|---|---|
| **AP Mode** | Both Bridge mode and AP mode can be used simultaneously, unless AP mode is "Client/Repeater". Select the desired AP mode:<br>• **None (disable)** - Disable AP mode. Use this if you want this WAP-4060PE to act as Bridge only.<br>• **Access Point** - operate as a normal Access Point<br>• **Client/Repeate**r - act as a client or repeater for another Access Point. If selected, you must provide the address (MAC address) of the other AP in the **Repeater AP MAC Address** field. In this mode, all traffic is sent to the specified AP.<br>**Note**: If using Client/Repeater mode, you cannot use Bridge Mode. |
| **Repeater AP MAC Address** | This is not required unless the AP Mode is "Client/Repeater". In this mode, you must provide the MAC address of the other AP in this field. You can either enter the MAC address directly, or, if the other AP is on-line and broadcasting its SSID, you can click the "Select AP" button and select from a list of available APs. |
| **Broadcast SSID** | If Disabled, no SSID is broadcast.<br>If enabled, you must select the security profile whose SSID is to be broadcast. This can be done in the "Security Profiles" screen. The SSID will then be broadcast to all Wireless Stations. Stations which have no SSID (or a "null" value) can then adopt the correct SSID for connections to this Access Point. |
| **Bridge Mode** | Both Bridge mode and AP mode can be used simultaneously, unless AP mode is "Client/Repeater". Select the desired Bridge mode:<br>• **None (disable)** - Disable Bridge mode. Use this if you want this WAP-4060PE to act as an AP only.<br>• **Point-to-Point Bridge (PTP)** - Bridge to a single AP. You must provide the MAC address of the other AP in the **PTP Bridge AP MAC Address field**.<br>• **Point-to-Multi-Point Bridge (PTMP)** - Select this only if this AP is the "Master" for a group of Bridge-mode APs. The other Bridge-mode APs must be set to Point-to-Point Bridge mode, using this AP's MAC address. They then send all traffic to this "Master".<br>If required, you can specify the MAC addresses of the APs which are allowed to connect to this AP in PTMP mode. To specify the allowed APs:<br>1. Enable the checkbox "In PTMP mode, only allow specified APs".<br>2. Click the button "Set PTMP APs".<br>3. On the resulting sub-screen, enter the MAC addresses of the allowed APs. |
| **PTP Bridge AP MAC Address** | This is not required unless the Bridge Mode is "Point-to-Point Bridge (PTP)". In this case, you must enter the MAC address of the other AP in this field. |

| | |
|---|---|
| **In PTMP mode, only allow specified APs** | This is only functional if using Point-to-Multi-Point Bridge (PTMP) mode. If enabled, you can specify the MAC addresses of the APs which are allowed to connect to this AP. To specify the allowed APs:<br>1. Enable this checkbox<br>2. Click the button "Set PTMP APs".<br>3. On the resulting sub-screen, enter the MAC addresses of the allowed APs. |
| **Set PTMP APs** | Use this to open a sub-window where you can specify the MAC addresses of the APs which are allowed to connect to this AP. This is only functional if using Point-to-Multi-Point Bridge (PTMP) mode and you has enabled the checkbox "In PTMP mode, only allow specified APs". |
| **Parameters** | |
| **Channel No** | • If "Automatic" is selected, the WAP-4060PE will select the best available Channel.<br>• If you experience interference (shown by lost connections and/or slow data transfers) you may need to experiment with manually setting different channels to see which is the best. |
| **Current Channel No.** | This displays the current channel used by the WAP-4060PE. |

### 3.8.2 Advanced Settings

Clicking the *Advanced* link on the menu will result in a screen like the following.




## Data - Advanced Settings Screen

| | |
|---|---|
| **Basic Rate** | |
| **Basic Rate** | The Basic Rate is used for broadcasting. It does not determine the data transmission rate, which is determined by the "Mode" setting on the Basic screen.<br>Select the desired option.<br>Do NOT select the "802.11g" or "ODFM" options unless ALL of your wireless clients support this. 802.11b clients will not be able to connect to the WAP-4060PE if either of these modes is selected. |
| **Options** | |
| **Wireless Separation** | If enabled, each Wireless station using the WAP-4060PE is invisible to other Wireless stations. In most business situations, this setting should be Disabled. |
| **Worldwide Mode (802.11d)** | Enable this setting if you want to use this mode, and your Wireless stations also support this mode. |
| **Parameters** | |
| **Disassociated Time-out** | This determines how quickly a Wireless Station will be considered "Disassociated" with this AP, when no traffic is received. Enter the desired time period. |
| **Fragmentation** | Enter the preferred setting between 256 and 2346. Normally, this can be left at the default value. |
| **Beacon Interval** | Enter the preferred setting between 20 and 1000. Normally, this can be left at the default value. |

| | |
|---|---|
| **RTS/CTS Threshold** | Enter the preferred setting between 256 and 2346. Normally, this can be left at the default value. |
| **Preamble Type** | Select the desired option. The default is "Long". The "Short" setting takes less time when used in a good environment. |
| **Output Power Level** | Select the desired power output. Higher levels will give a greater range, but are also more likely to cause interference with other devices. |
| **Antenna Selection** | WAP-4060PE has only 1 antenna, there is only 1 option available. |
| **802.11b** | |
| **Protection Type** | Select the desired option. The default is CTS-only. |
| **Short Slot Time** | Enable or disable this setting as required. |
| **Protection Mode** | The Protection system is intended to prevent older 802.11b devices from interfering with 802.11g transmissions. (Older 802.11b devices may not be able to detect that an 802.11g transmission is in progress.) Normally, this should be left at "Auto". |
| **Protection Rate** | Select the desired option. The default is 11 Mbps. |

Chapter 4

# PC and Server Configuration

## 4.1 Overview

All Wireless Stations need to have settings which match the Wireless Access Point. These settings depend on the mode in which the WAP-4060PE is being used.

- If using WEP or WPA-PSK, it is only necessary to ensure that each Wireless station's settings match those of the WAP-4060PE, as described below.
- For WPA-802.1x and 802.1x modes, configuration is much more complex. The Radius Server must be configured correctly, and setup of each Wireless station is also more complex.

## 4.2 Using WEP

For each of the following items, each Wireless Station must have the same settings as the WAP-4060PE.

| | |
|---|---|
| **Mode** | On each PC, the mode must be set to ***Infrastructure***. |
| **SSID (ESSID)** | This must match the value used on the WAP-4060PE.<br>The default value is **wireless**<br>**Note: The SSID is case sensitive.** |
| **Wireless Security** | • Each Wireless station must be set to use WEP data encryption.<br>• The Key size (64 bit, 128 bit, 152 bit) must be set to match the WAP-4060PE.<br>• The keys values on the PC must match the key values on the WAP-4060PE.<br>**Note**:<br>On some systems, the key sizes may be shown as 40bit, 104bit, and 128bit instead of 64 bit, 128 bit and 152bit. This difference arises because the key input by the user is 24 bits less than the key size used for encryption. |

## 4.3 Using WPA-PSK

For each of the following items, each Wireless Station must have the same settings as the WAP-4060PE.

| | |
|---|---|
| **Mode** | On each PC, the mode must be set to ***Infrastructure***. |
| **SSID (ESSID)** | This must match the value used on the WAP-4060PE.<br>The default value is **wireless**<br>**Note: The SSID is case sensitive.** |
| **Wireless** | On each client, Wireless security must be set to WPA-PSK. |

| | |
|---|---|
| **Security** | • The **Pre-shared Key** entered on the WAP-4060PE must also be entered on each Wireless client.<br>• The **Encryption** method (e.g. TKIP, AES) must be set to match the WAP-4060PE. |

## 4.4 Using WPA-802.1x

This is the most secure and most complex system.

802.1x mode provides greater security and centralized management, but it is more complex to configure.

### Wireless Station Configuration

For each of the following items, each Wireless Station must have the same settings as the WAP-4060PE.

| | |
|---|---|
| **Mode** | On each PC, the mode must be set to ***Infrastructure***. |
| **SSID (ESSID)** | This must match the value used on the WAP-4060PE.<br>The default value is **wireless**<br>**Note: The SSID is case sensitive.** |
| **802.1x Authentication** | Each client must obtain a Certificate which is used for authentication for the Radius Server. |
| **802.1x Encryption** | Typically, EAP-TLS is used. This is a dynamic key system, so keys do NOT have to be entered on each Wireless station.<br>However, you can also use a static WEP key (EAP-MD5); the WAP-4060PE supports both methods simultaneously. |

### Radius Server Configuration

If using **WPA-802.1x** mode, the Radius Server on your network must be configured as follow:

- It must provide and accept **Certificates** for user authentication.
- There must be a **Client Login** for the WAP-4060PE itself.
- The WAP-4060PE will use its Default Name as its Client Login name. (However, your Radius server may ignore this and use the IP address instead.)
- The *Shared Key*, set on the *Security* Screen of the WAP-4060PE, must match the *Shared Secret* value on the Radius Server.
- **Encryption** settings must be correct.

## 4.5 802.1x Server Setup (Windows 2000 Server)

This section describes using *Microsoft Internet Authentication Server* as the Radius Server, since it is the most common Radius Server available that supports the EAP-TLS authentication method.

The following services on the Windows 2000 Domain Controller (PDC) are also required:

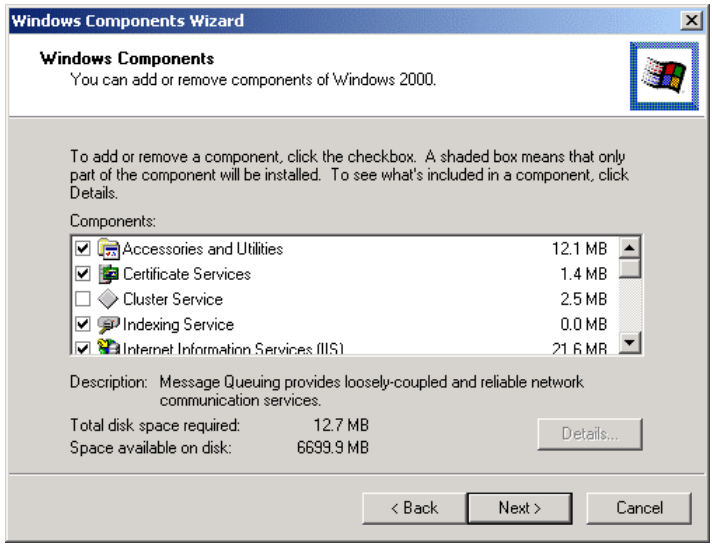
- dhcpd
- dns
- rras
- webserver (IIS)
- Radius Server (Internet Authentication Service)
- Certificate Authority

### 4.5.1 Windows 2000 Domain Controller Setup

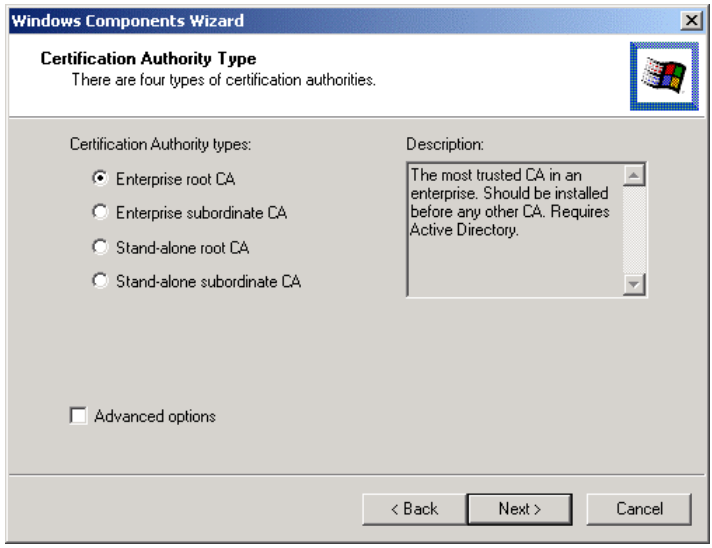
1. Run *dcpromo.exe* from the command prompt.
2. Follow all of the default prompts, ensure that DNS is installed and enabled during installation.

### 4.5.2 Services Installation

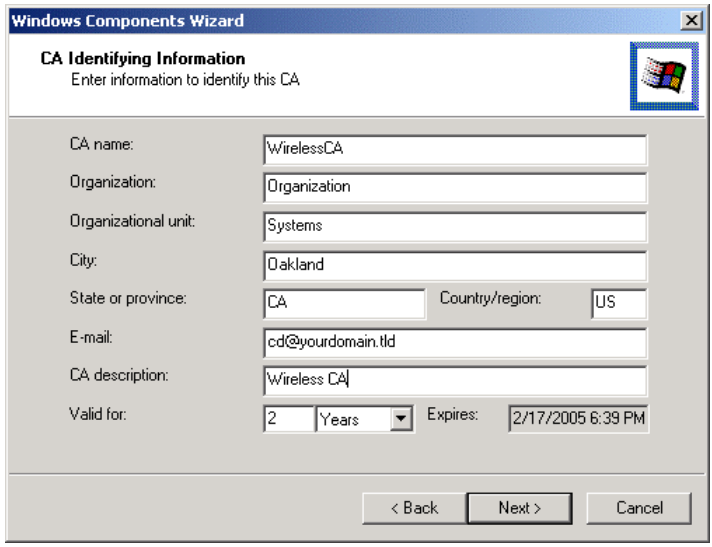
1. Select the *Control Panel - Add/Remove Programs*.
2. Click *Add/Remove Windows Components* from the left side.
3. Ensure that the following components are activated (selected):
   - *Certificate Services*. After enabling this, you will see a warning that the computer cannot be renamed and joined after installing certificate services. Select *Yes* to select certificate services and continue
   - *World Wide Web Server*. Select *World Wide Web Server* on the *Internet Information Services* (IIS) component.
   - From the *Networking Services* category, select *Dynamic Host Configuration Protocol* (DHCP), and *Internet Authentication Service* (DNS should already be selected and installed).




4. Click *Next*.
5. Select the *Enterprise root CA*, and click *Next*.



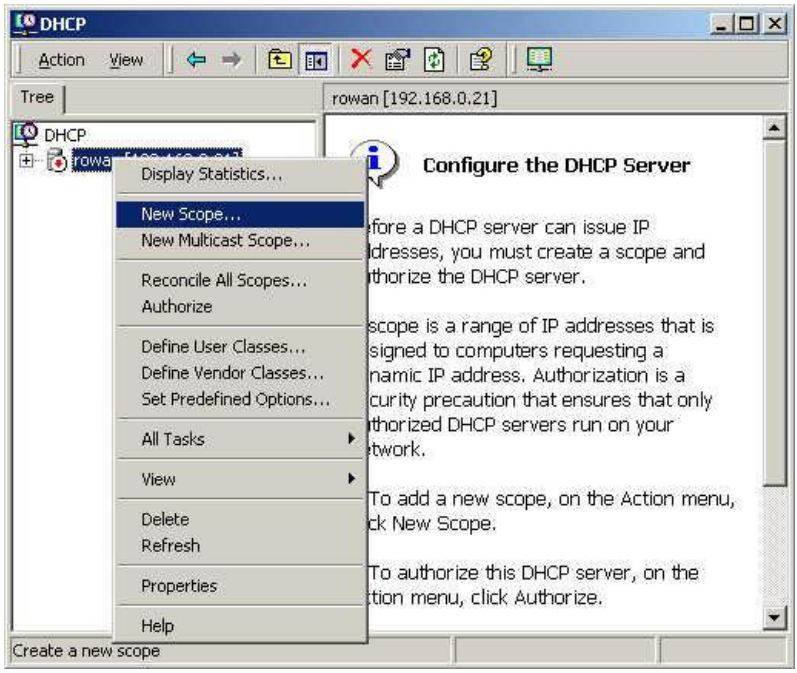

6. Enter the information for the Certificate Authority, and click *Next*.



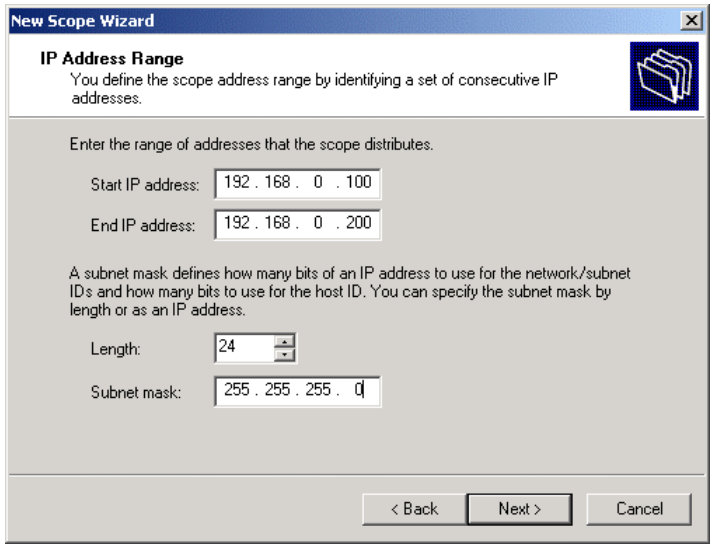

7. Click *Next* if you don't want to change the CA's configuration data.
8. Installation will warn you that Internet Information Services are running, and must be stopped before continuing. Click *Ok*, then *Finish*.

### 4.5.3 DHCP server configuration

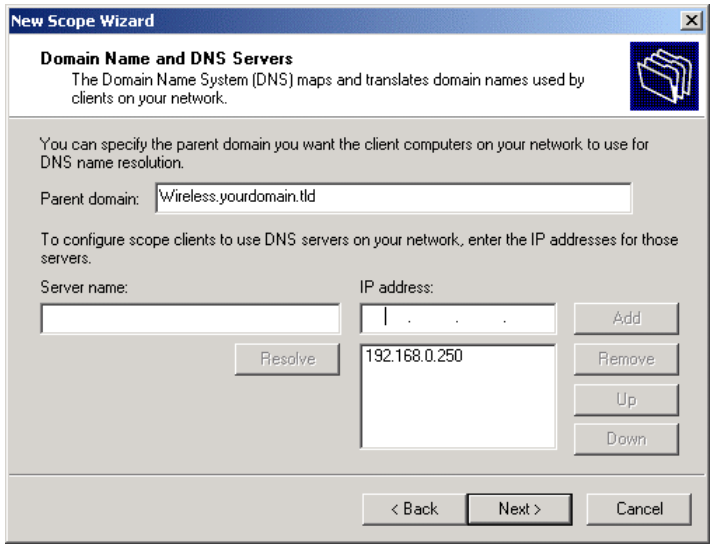
1. Click on the *Start - Programs - Administrative Tools - DHCP*
2. Right-click on the server entry as shown, and select *New Scope*.




3. Click *Next* when the New Scope Wizard Begins.
4. Enter the name and description for the scope, click *Next*.
5. Define the IP address range. Change the subnet mask if necessary. Click *Next*.



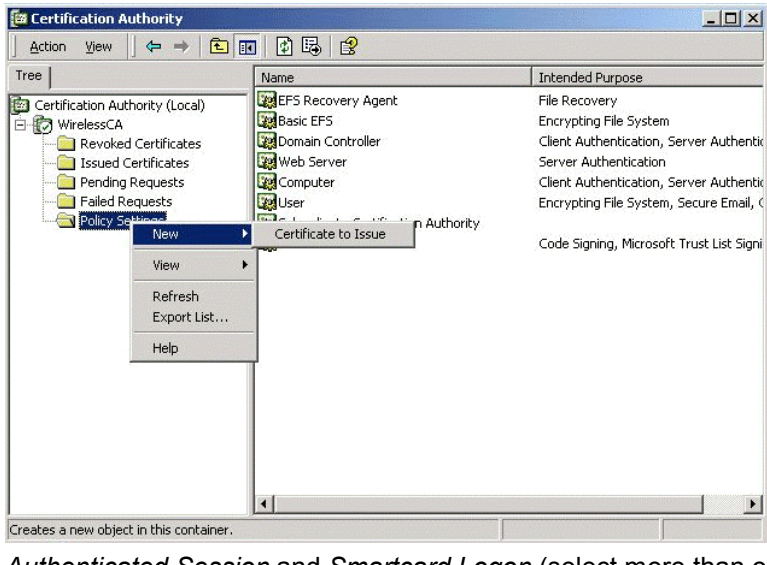

6. Add exclusions in the address fields if required. If no exclusions are required, leave it blank. Click *Next*.
7. Change the *Lease Duration* time if preferred. Click *Next*.
8. Select *Yes, I want to configure these options now*, and click *Next*.
9. Enter the router address for the current subnet. The router address may be left blank if there is no router. Click *Next*.
10. For the Parent domain, enter the domain you specified for the domain controller setup, and enter the server's address for the IP address. Click *Next*.




11. If you don't want a WINS server, just click *Next*.
12. Select *Yes, I want to activate this scope now*. Click *Next*, then *Finish*.
13. Right-click on the server, and select *Authorize*. It may take a few minutes to complete.

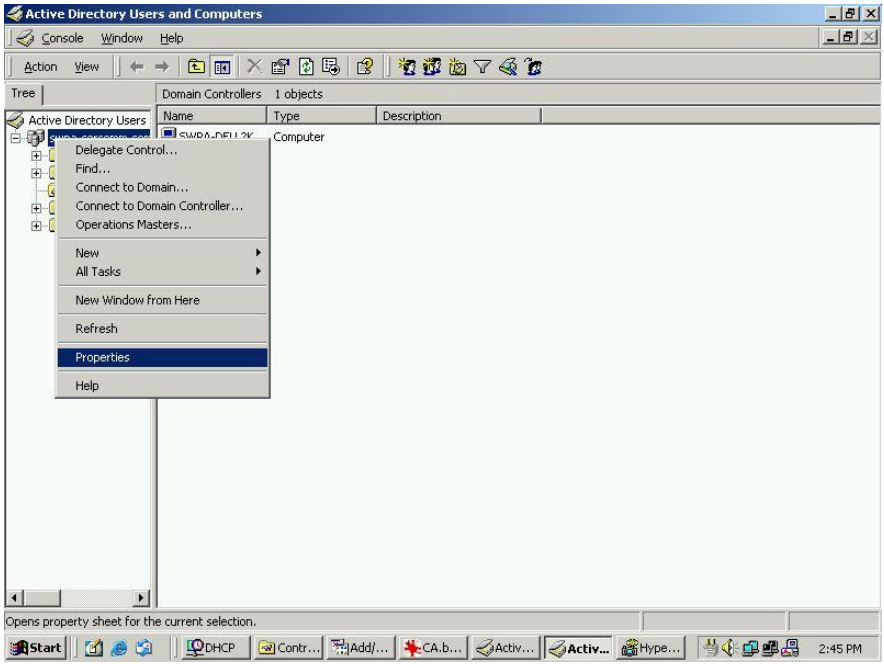
## 4.5.4 Certificate Authority Setup

1. Select *Start - Programs - Administrative Tools - Certification Authority*.
2. Right-click *Policy Settings*, and select *New - Certificate to Issue*.

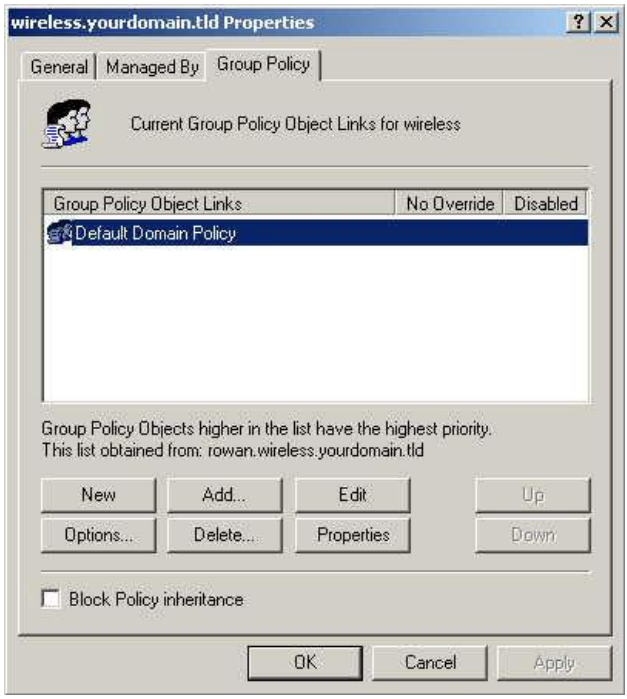



3. Select *Authenticated Session* and *Smartcard Logon* (select more than one by holding down the Ctrl key). Click *OK*.

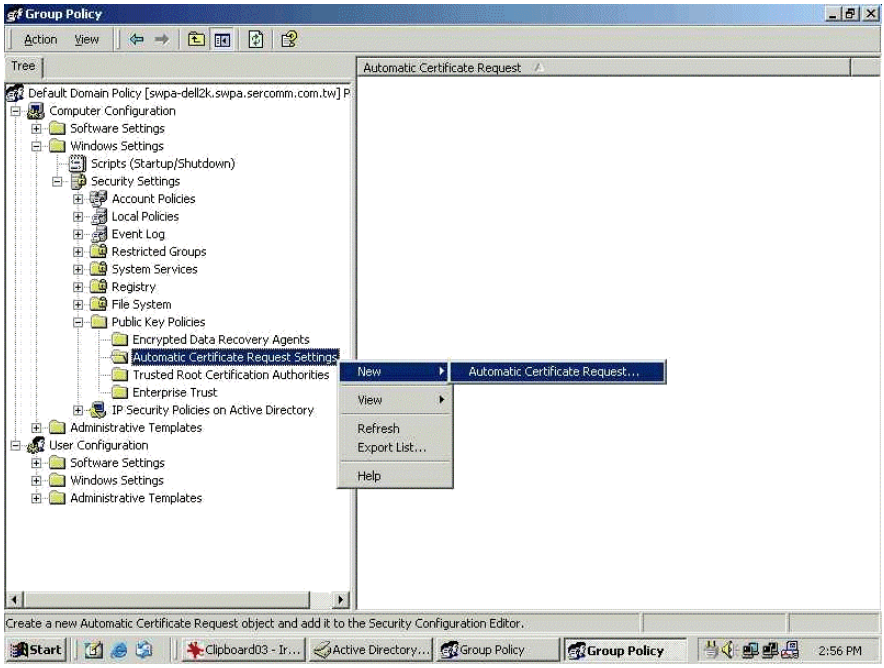

4. Select *Start - Programs - Administrative Tools - Active Directory Users and Computers*.
5. Right-click on your active directory domain, and select *Properties.*




6. Select the *Group Policy* tab, choose *Default Domain Policy* then click *Edit*.




7. Select *Computer Configuration - Windows Settings - Security Settings - Public Key Policies*, right-click *Automatic Certificate Request Settings - New - Automatic Certificate Request*.

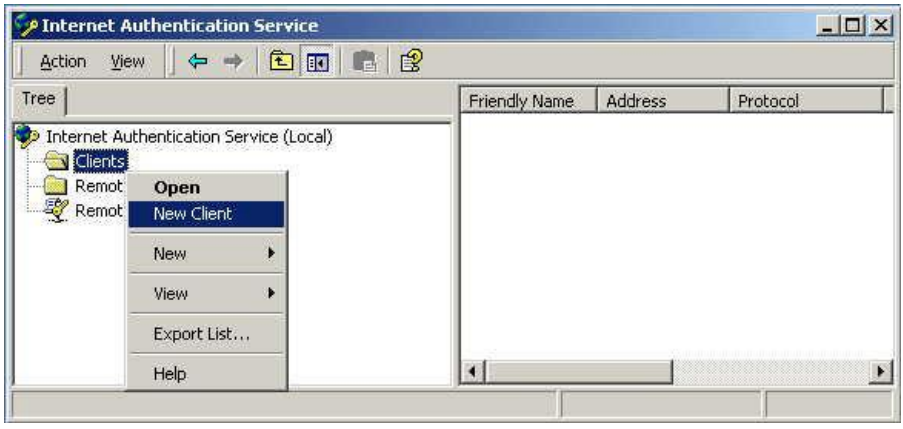



8. When the Certificate Request Wizard appears, click *Next*.
9. Select *Computer*, then click *Next*.

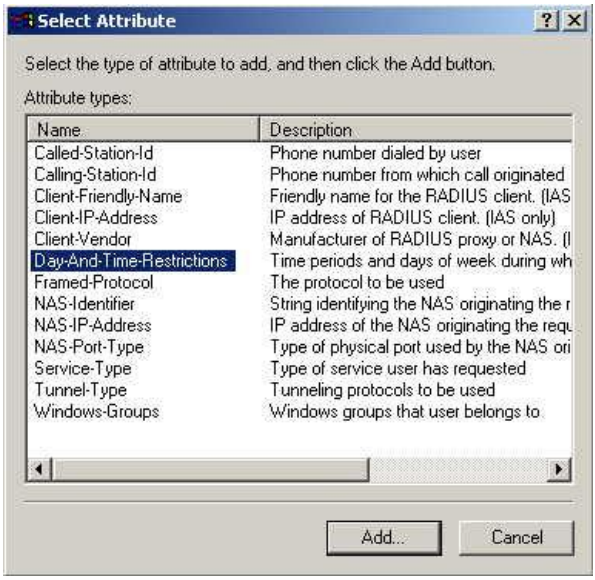

10. Ensure that your certificate authority is checked, then click *Next*.
11. Review the policy change information and click *Finish*.
12. Click *Start* - *Run*, type *cmd* and press enter.
    Enter *secedit /refreshpolicy machine_policy*
    This command may take a few minutes to take effect.

### 4.5.5 Internet Authentication Service (Radius) Setup

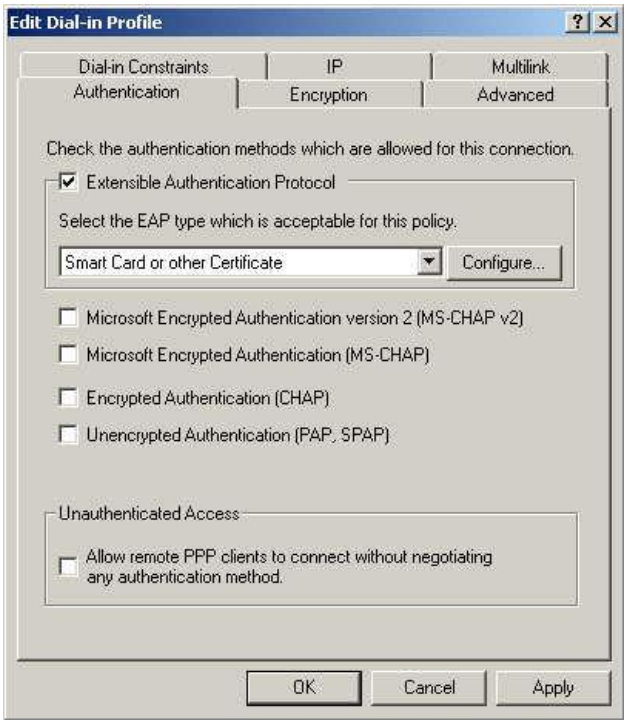
1. Select *Start* - *Programs* - *Administrative Tools* - *Internet Authentication Service*
2. Right-click on *Clients*, and select *New Client*.




3. Enter a name for the access point, click *Next*.
4. Enter the IP address of the WAP-4060PE, and set the shared secret, as entered on the Security Profile screen of the WAP-4060PE.
5. Click *Finish*.
6. Right-click on *Remote Access Policies*, select *New Remote Access Policy*.
7. Assuming you are using EAP-TLS, name the policy eap-tls, and click *Next*.
8. Click *Add...*
   If you don't want to set any restrictions and a condition is required, select *Day-And-Time-Restrictions*, and click *Add...*




9. Click *Permitted*, then *OK*. Select *Next*.
10. Select *Grant remote access permission*. Click *Next*.
11. Click *Edit Profile...* and select the *Authentication* tab. Enable *Extensible Authentication Protocol*, and select *Smart Card or other Certificate*. Deselect other authentication methods listed. Click *OK*.

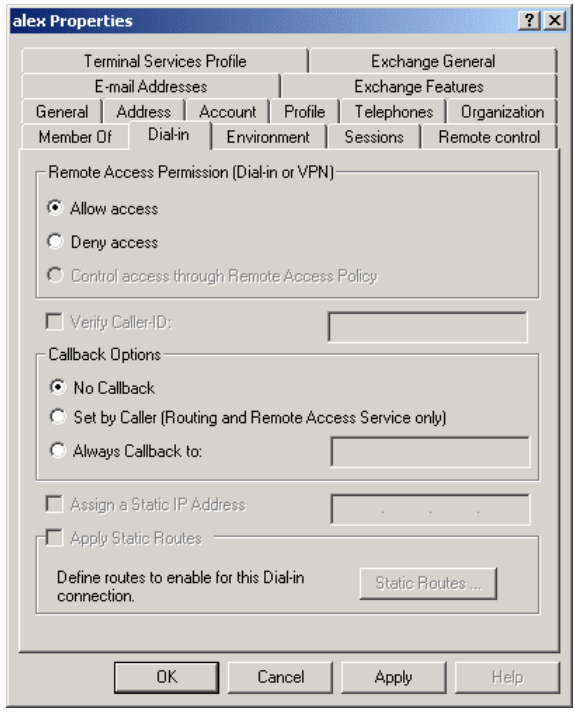



12. Select *No* if you don't want to view the help for EAP. Click *Finish*.

## 4.5.6 Grant Remote Access for Users

1. Select *Start - Programs - Administrative Tools- Active Directory Users and Computers*.
2. Double click on the user who you want to enable.

3. Select the *Dial-in* tab, and enable *Allow access*. Click *OK*.




## 4.6 802.1x Client Setup on Windows XP

Windows XP ships with a complete 802.1x client implementation. If using Windows 2000, you can install SP3 (Service Pack 3) to gain the same functionality.

If you don't have either of these systems, you must use the 802.1x client software provided with your wireless adapter. Refer to the documentation of your wireless adapter for setup instructions.

The following instructions assume that:

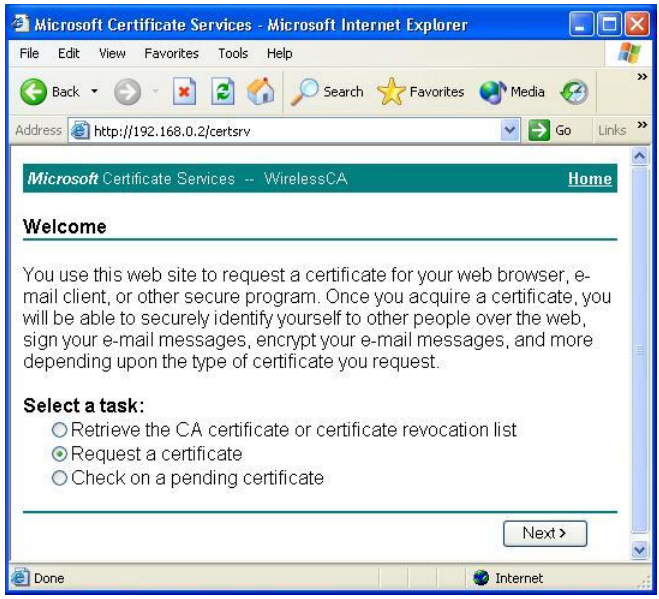
- You are using Windows XP
- You are connecting to a Windows 2000 server for authentication.
- You already have a login (User name and password) on the Windows 2000 server.

### 4.6.1 Client Certificate Setup

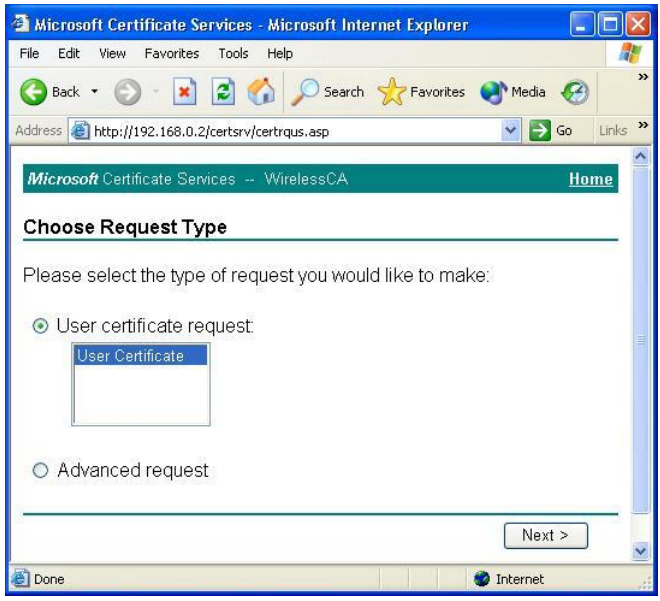
1. Connect to a network which doesn't require port authentication.
2. Start your Web Browser. In the *Address* box, enter the IP address of the Windows 2000 Server, followed by */certsrv*

   For example: http://192.168.0.2/certsrv
3. You will be prompted for a user name and password. Enter the *User name* and *Password* assigned to you by your network administrator, and click *OK*.

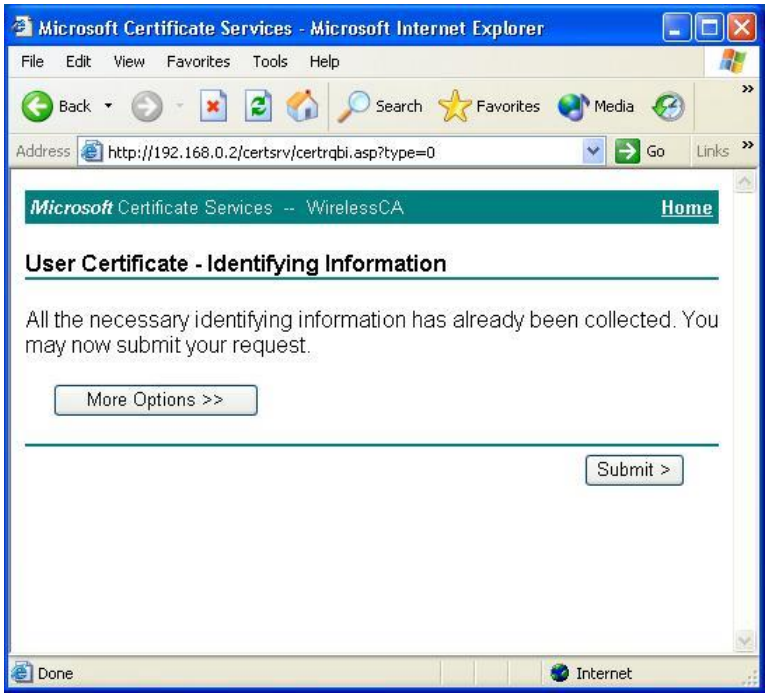

4. On the first screen (below), select *Request a certificate*, click *Next*.



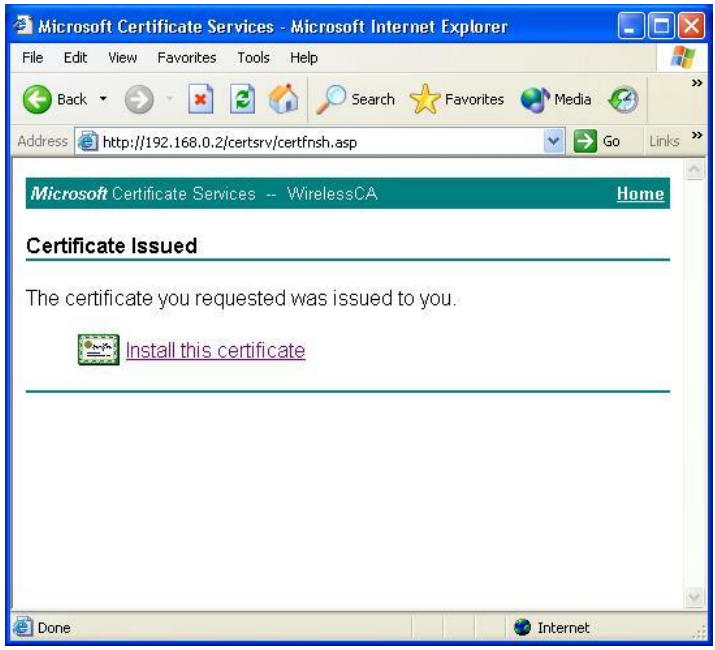

5. Select *User certificate request* and select *User Certificate*, the click *Next*.




6. Click *Submit*.




7. A message will be displayed, then the certificate will be returned to you. Click *Install this certificate*.




8. . You will receive a confirmation message. Click *Yes*.


9. Certificate setup is now complete.

### 4.6.2 802.1x Authentication Setup

1. Open the properties for the wireless connection, by selecting *Start - Control Panel - Network Connections.*
2. Right Click on the *Wireless Network Connection*, and select *Properties*.
3. Select the *Authentication* Tab, and ensure that *Enable network access control using IEEE 802.1X* is selected, and *Smart Card or other Certificate* is selected from the EAP type.


## Encryption Settings

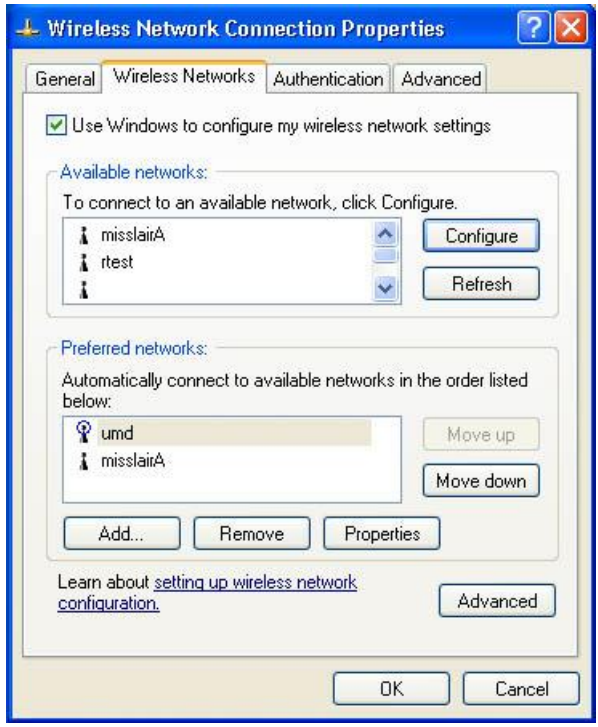
The Encryption settings must match the APs (WAP-4060PE) on the Wireless network you want to join.

- Windows XP will detect any available Wireless networks, and allow you to configure each network independently.
- Your network administrator can advise you of the correct settings for each network. 802.1x networks typically use EAP-TLS. This is a dynamic key system, so there is no need to enter key values.

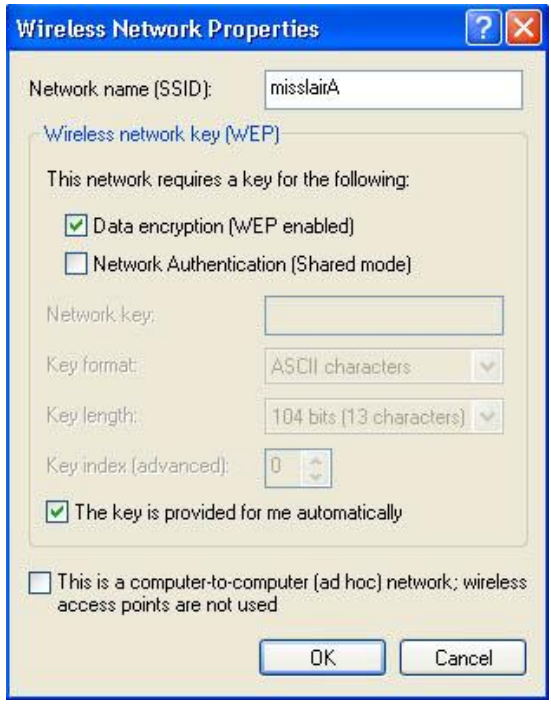
## Enabling Encryption

To enable encryption for a wireless network, follow this procedure:

1. Click on the *Wireless Networks* tab.




2. Select the wireless network from the *Available Networks* list, and click *Configure*.
3. Select and enter the correct values, as advised by your Network Administrator. For example, to use EAP-TLS, you would enable *Data encryption*, and click the checkbox for the setting: *The key is provided for me automatically*, as shown below.



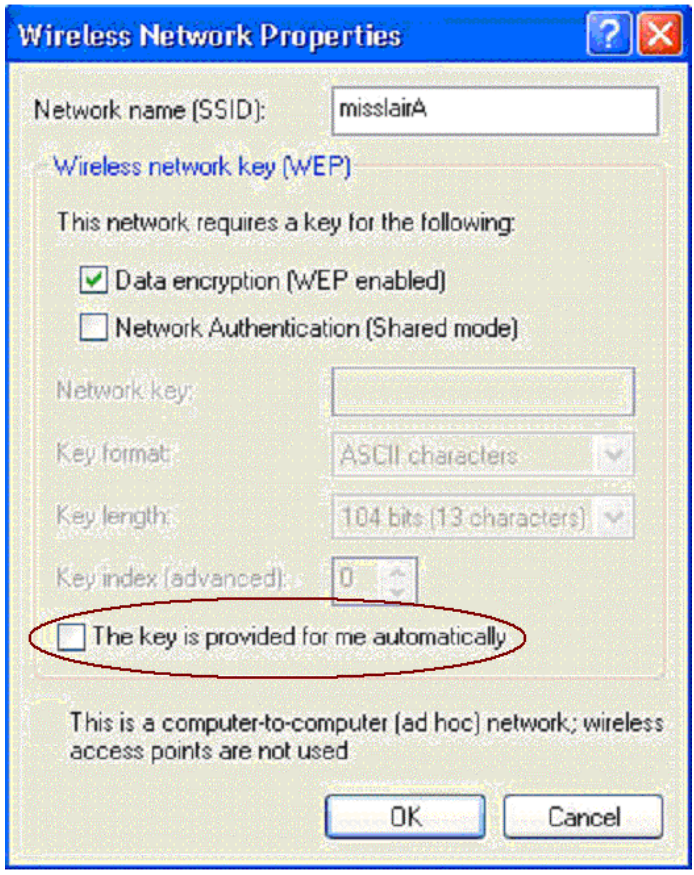

Setup for Windows XP and 802.1x client is now complete.

## 4.7 Using 802.1x Mode (without WPA)

The procedures are similar to using WPA-802.1x.

The only difference is that on your client, you must NOT enable the setting: *The key is provided for me automatically*.

Instead, you must enter the WEP key manually, ensuring it matches the WEP key used on the Access Point.




**Note**:

On some systems, the "64 bit" WEP key is shown as "40 bit" and the "128 bit" WEP key is shown as "104 bit". This difference arises because the key input by the user is 24 bits less than the key size used for encryption.

Chapter 5

# Operation and Status

## 5.1 Operation

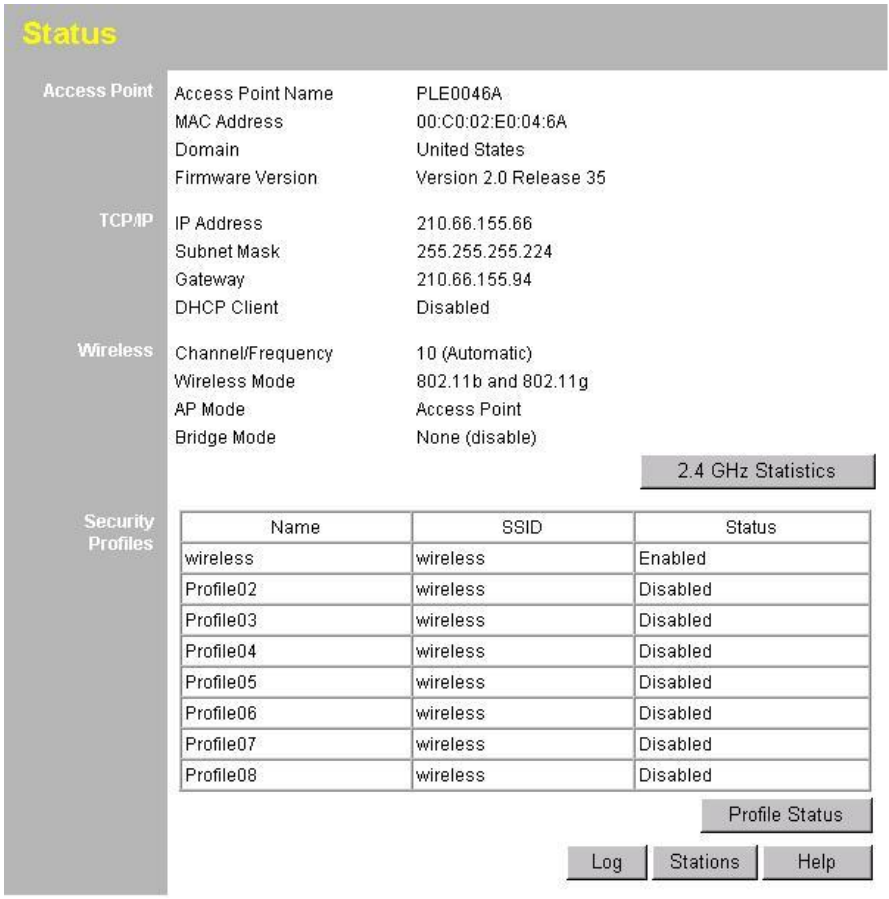
**Once both the WAP-4060PE and the PCs are configured, operation is automatic.**

However, you may need to perform the following operations on a regular basis.

- If using the *Access Control* feature, update the *Trusted PC* database as required. (See *Access Control* in Chapter 3 for details.)
- If using 802.1x mode, update the *User Login* data on the Windows 2000 Server, and configure the client PCs, as required.

## 5.2 Status Screen

Use the ***Status*** link on the main menu to view this screen.

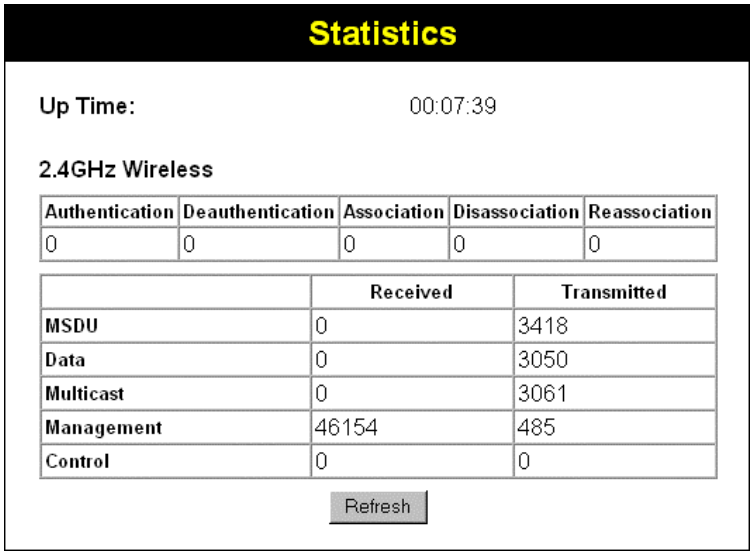


### Data - Status Screen

| | |
|---|---|
| **Access Point** | |
| **Access Point Name** | The current name will be displayed. |
| **MAC Address** | The MAC (physical) address of the WAP-4060PE. |
| **Domain** | The region or domain, as selected on the System screen. |
| **Firmware Version** | The version of the firmware currently installed. |
| **TCP/IP** | |
| **IP Address** | The IP Address of the WAP-4060PE. |
| **Subnet Mask** | The Network Mask (Subnet Mask) for the IP Address above. |
| **Gateway** | Enter the Gateway for the LAN segment to which the WAP-4060PE is attached (the same value as the PCs on that LAN segment). |
| **DHCP Client** | This indicates whether the current IP address was obtained from a DHCP Server on your network.<br>It will display "Enabled" or "Disabled". |
| **Wireless** | |
| **Channel/Frequency** | The Channel currently in use is displayed. |
| **Wireless Mode** | The current mode (e.g. 802.11g) is displayed. |
| **AP Mode** | The current Access Point mode is displayed. |
| **Bridge Mode** | The current Bridge mode is displayed. |
| **Security Profiles** | |
| **Name** | This displays the current name of each security profile. |
| **SSID** | This displays the SSID associated with the profile. |
| **Status** | This indicates whether or not the profile is enabled. |
| **Buttons** | |
| **Statistics** | Click this to open a sub-window where you can view Statistics on data transmitted or received by the WAP-4060PE. |
| **Profile Status** | Click this to open a sub-window which displays further details about each security profile. |
| **Log** | Click this to open a sub-window where you can view the activity log. |
| **Stations** | Click this to open a sub-window where you can view the list of all current Wireless Stations using the WAP-4060PE. |

### 5.3.1 Statistics Screen

This screen is displayed when the *2.4GHz Statistics* button on the *Status* screen is clicked. It shows details of the traffic flowing through the WAP-4060PE.



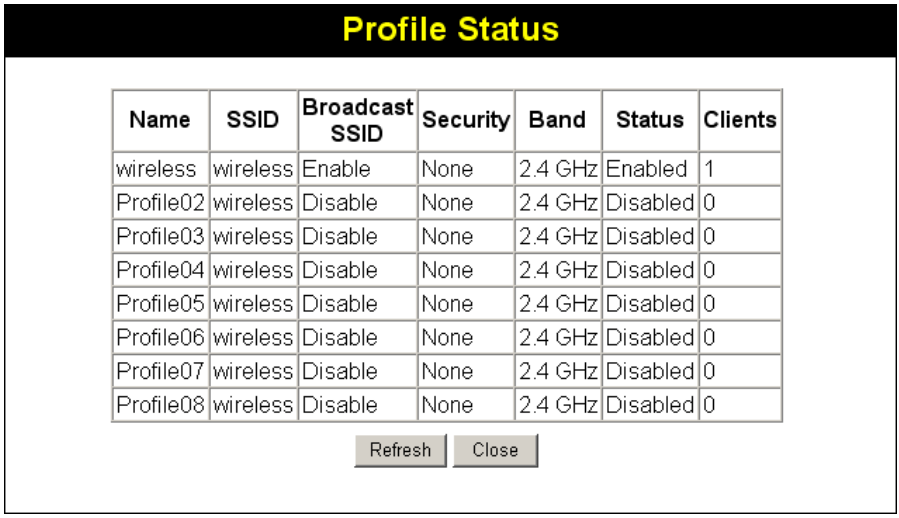

**Data - Statistics Screen**

| | |
|---|---|
| **System Up Time** | |
| **System Up Time** | This indicates the time period which the system has been running since the last restart or reboot. |
| **2.4GHz Wireless** | |
| **Authentication** | The number of "Authentication" packets received. Authentication is the process of identification between the AP and the client. |
| **Deauthentication** | The number of "Deauthentication" packets received. Deauthentication is the process of ending an existing authentication relationship. |
| **Association** | The number of "Association" packets received. Association creates a connection between the AP and the client. Usually, clients associate with only one AP at any time. |
| **Disassociation** | The number of "Disassociation" packets received. Disassociation breaks the existing connection between the AP and the client. |
| **Reassociation** | The number of "Reassociation" packets received. Reassociation is the service that enables an established association (between AP and client) to be transferred from one AP to another (or the same) AP. |
| **Wireless** | |
| **MSDU** | Number of valid Data packets transmitted to or received from Wireless Stations, at application level. |
| **Data** | Number of valid Data packets transmitted to or received from Wireless Stations, at driver level. |

| | |
|---|---|
| **Multicast Packets** | Number of Broadcast packets transmitted to or received from Wireless Stations, using Multicast transmission. |
| **Management** | Number of Management packets transmitted to or received from Wireless Stations. |
| **Control** | Number of Control packets transmitted to or received from Wireless Stations. |

### 5.3.2 Profile Status

The ***Profile Status*** screen is displayed when the *Profile Status* button on the Status screen is clicked.

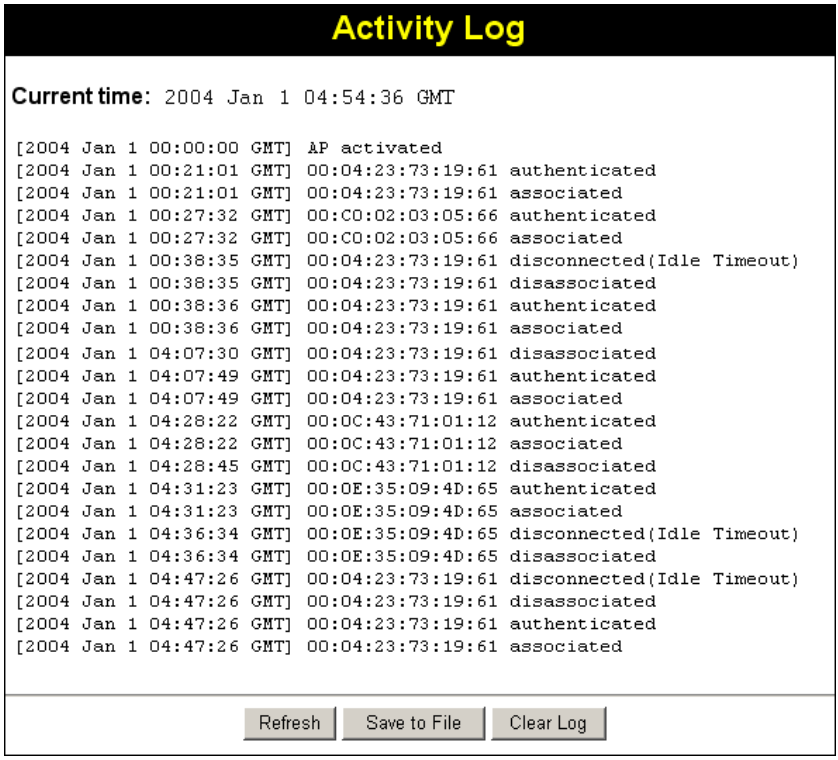



For each profile, the following data is displayed:

| | |
|---|---|
| **Name** | The name you gave to this profile; if you didn't change the name, the default name is used. |
| **SSID** | The SSID assigned to this profile. |
| **Broadcast SSID** | Indicates whether or not the SSID is broadcast. |
| **Band** | The Wireless band used by this profile. |
| **Status** | Indicates whether or not this profile is enabled. |
| **Clients** | The number of wireless stations currently using accessing this WAP-4060PE using this profile.<br>If the profile is disabled, this will always be zero. |

## 5.3.3 Activity Log

This screen is displayed when the *Log* button on the *Status* screen is clicked.




### Data - Activity Log

| Data | |
|---|---|
| **Current Time** | The system date and time is displayed. |
| **Log** | The Log shows details of the connections to the WAP-4060PE. |
| **Buttons** | |
| **Refresh** | Update the data on screen. |
| **Save to file** | Save the log to a file on your pc. |
| **Clear Log** | This will delete all data currently in the Log. This will make it easier to read new messages. |

## 5.3.4 Station List

This screen is displayed when the *Stations* button on the *Status* screen is clicked.


### Data - Station List Screen

| Station List | |
|---|---|
| **Name** | The name of each Wireless Station is displayed. If the name is not known, "unknown" is displayed for the name. |
| **MAC Address** | The MAC (physical) address of each Wireless Station is displayed. |
| **Mode** | The mode of each Wireless Station. |
| **SSID** | This displays the SSID used the Wireless station. Because the WAP-4060PE supports multiple SSIDs, different PCs could connect using different SSIDs. |
| **Status** | This indicates the current status of each Wireless Station. |
| **Refresh Button** | Update the data on screen. |

# Chapter 6
# Management

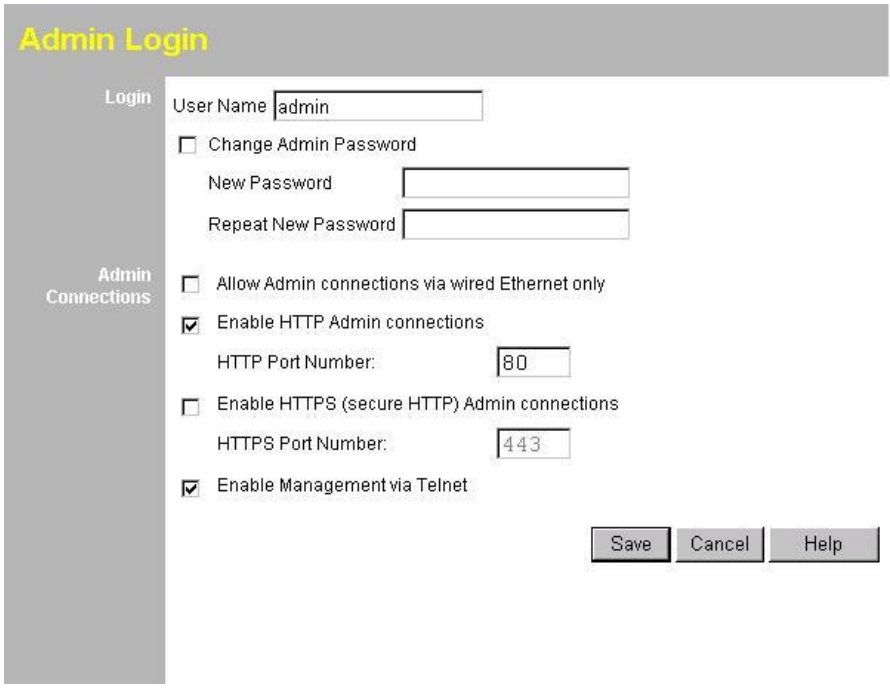
## 6.1 Overview

This Chapter covers the following features, available on the WAP-4060PE's ***Management*** menu.

- Admin Login
- Auto Config/Update
- Config File
- Log Settings
- Rogue APs
- SNMP
- Upgrade Firmware

## 6.2 Admin Login Screen

The Admin Login screen allows you to assign a password to the WAP-4060PE. This password limits access to the configuration interface. The default password is *password*. It is recommended to change it for security consideration.




**Data - Admin Login Screen**

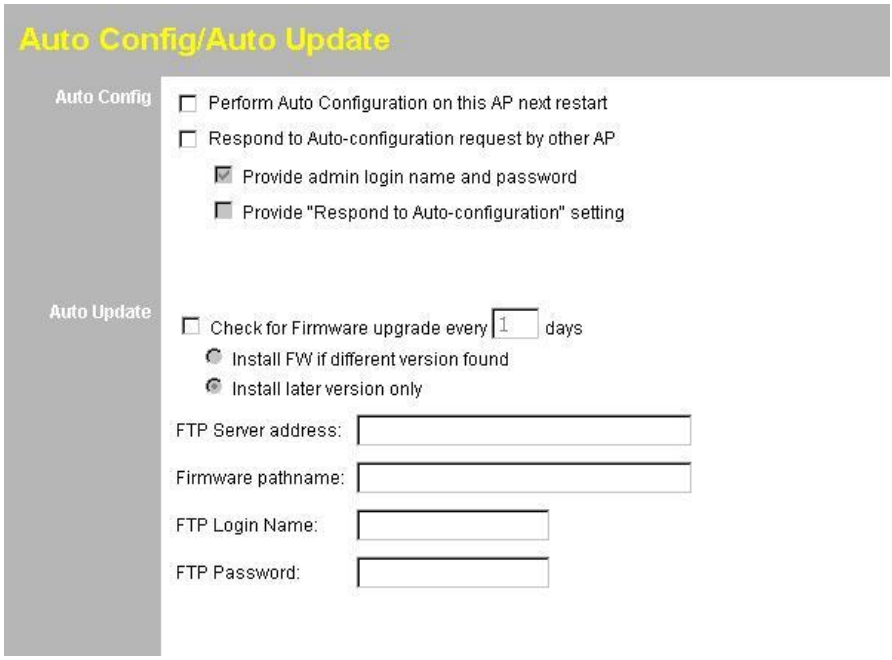
| **Login** | |
|---|---|
| **User Name** | Enter the login name for the Administrator. |

| | |
|---|---|
| **Change Admin Password** | If you wish to change the Admin password, check this field and enter the new login password in the fields below. |
| **New Password** | Enter the desired login password. |
| **Repeat New Password** | Re-enter the desired login password. |
| **Admin Connections** | |
| **Allow Admin connections via wired Ethernet only** | If checked, then Admin connections via the Wireless interface will not be accepted. |
| **Enable HTTP** | Enable this to allow admin connections via HTTP. If enabled, you must provide a port number in the field below. Either HTTP or HTTPS must be enabled. |
| **HTTP Port Number** | Enter the port number to be used for HTTP connections to this device. The default value is 80. |
| **Enable HTTPS** | Enable this to allow admin connections via HTTPS (secure HTTP). If enabled, you must provide a port number in the field below. Either HTTP or HTTPS must be enabled. |
| **HTTPS Port Number** | Enter the port number to be used for HTTPS connections to this device. The default value is 443. |
| **Enable Telnet** | If desired, you can enable this option. If enabled, you will able to connect to this AP using a Telnet client. You will have to provide the same login data (user name, password) as for a HTTP (Web) connection. |

## 6.3 Auto Config/Update

The Auto Config/Update screen provides two features:

- **Auto Config** - The Access Point will configure itself by copying data from another (compatible) Access Point.
- **Auto Update** - The Access Point will update it Firmware by downloading the Firmware file from your FTP Server.




## Data - Auto Config/Update Screen

| Admin Connections | |
|---|---|
| **Perform Auto Configuration on this AP next restart** | If checked, this AP will perform Auto Configuration the next time it restarts.<br>• The wired LAN (NOT the Wireless LAN) will be searched for compatible APs.<br>• If a compatible AP is found, its configuration is copied. If more than one compatible AP exists, the first one found is used.<br>• Some data cannot be copied:<br>o The IP address is not copied, and will not change.<br>o The operating mode (Repeater, Bridge, etc) is not copied, and will not change.<br>**Note:** This checkbox is automatically disabled, so the Auto-configuration is only performed once. |
| **Respond to Auto-configuration request by other AP** | If checked, this AP will respond to "Auto Configuration" requests it receives. If not checked, "Auto Configuration" requests will be ignored. |
| **Provide login name and password** | If enabled, the login name and password on this AP is supplied to the AP making the Auto-configuration re-quest. If disabled, the AP making the Auto-configuration request will keep its existing login name and password. |

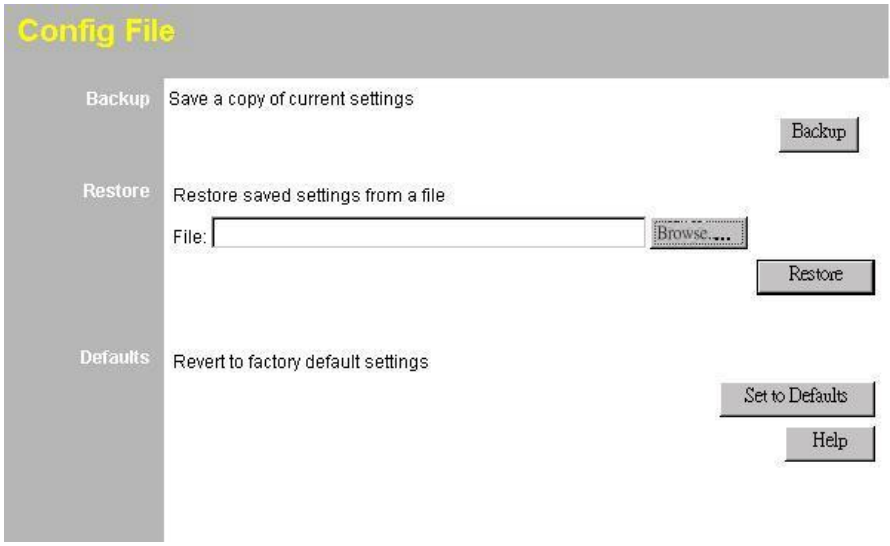
| | |
|---|---|
| **Provide "Respond to Auto-configuration" setting** | If enabled, the "Respond to Auto-configuration" setting on this AP is supplied to the AP making the Auto-configuration request. If disabled, the AP making the Auto-configuration request will keep its existing setting. |
| **Auto Update** | |
| **Check for Firmware upgrade** | If enabled, this AP will check to see if a Firmware (FW) upgrade is available on the specified FTP Server. If enabled:<br>• Enter the desired time interval (in days) between checks.<br>• Select the desired option for installation (see next item).<br>• Provide the FTP server information. |
| **Install...** | Select the desired option:<br>• **Install FW if different version found**<br>If selected, and the firmware file at the specified location is different to the current installed version, the FW will be installed. This allows "Downgrades" - installing an older version of the FW to replace the current version.<br>• **Install later version only**<br>If selected, the firmware file at the specified location will only be installed if it is a later version. |
| **FTP Server address** | Enter the address (domain name or IP address) of the FTP Server. |
| **Firmware pathname** | Enter the full path (including the FW filename) to the FW file on the FTP Server. |
| **FTP Login Name** | Enter the login name required to gain access to the FTP Server. |
| **FTP Password** | Enter the password for the login name above. |

## 6.4 Config File

This screen allows you to Backup (download) the configuration file, and to restore (upload) a previously saved configuration file.

You can also set the WAP-4060PE back to its factory default settings.

To reach this screen, select *Config File* in the **Management** section of the menu.

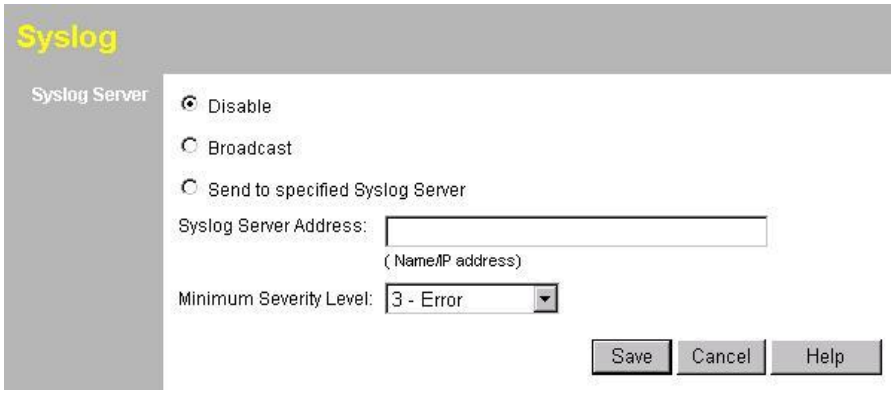



## Data - Config File Screen

| | |
|---|---|
| **Backup** | |
| **Save a copy of current settings** | Once you have the WAP-4060PE working properly, you should back up the settings to a file on your computer. You can later restore the settings from this file, if necessary.<br>To create a backup file of the current settings:<br>• Click **Back Up**.<br>• If you don't have your browser set up to save downloaded files automatically, locate where you want to save the file, rename it if you like, and click **Save**. |
| **Restore** | |
| **Restore saved settings from a file** | To restore settings from a backup file:<br>1. Click **Browse**.<br>2. Locate and select the previously saved backup file.<br>3. Click **Restore** |
| **Defaults** | |
| **Revert to factory default settings** | To erase the current settings and restore the original factory default settings, click **Set to Defaults** button.<br>**Note:**<br>• This will terminate the current connection. The WAP-4060PE will be unavailable until it has restarted.<br>• By default, the WAP-4060PE will act as a DHCP client, and automatically obtain an IP address. You will need to determine its new IP address in order to re-connect. |

## 6.5 Log Settings (Syslog)

If you have a log server on your LAN, this screen allows you to configure the WAP-4060PE to send log data to your log server.




### Data - Log Settings Screen

| | |
|---|---|
| **Syslog Server** | Select the desired Option:<br>• **Disable** - Syslog server is not used.<br>• **Broadcast** - Syslog data is broadcast. Use this option if different PCs act as the Syslog server at different times.<br>• **Send to specified Syslog Server** - Select this if the same PC is always used as the Syslog server. If selected, you must enter the server address in the field provided. |
| **Syslog Server Address** | Enter the name or IP address of your Syslog Server. |
| **Minimum Severity Level** | Select the desired severity level. Events with a severity level equal to or higher (i.e. lower number) than the selected level will be logged. |

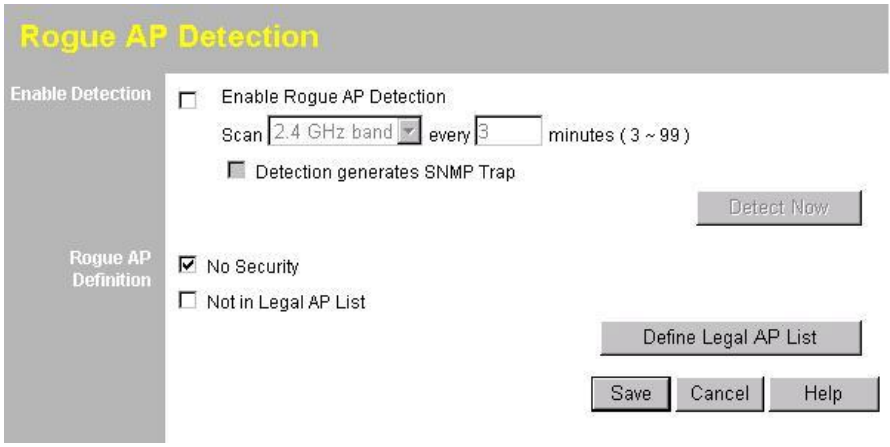
## 6.6 Rogue APs

A "Rouge AP" is an Access Point which should not be in use, and so can be considered to be providing unauthorized access to your LAN.

This WAP-4060PE can assist to locate 2 types of Rogue APs:

- APs which have Wireless security disabled.
- APs which are not in the list of valid APs which you have entered.

When a Rogue AP is located, it is recorded in the log. If using SNMP, you can also choose to have detection of a Rogue AP generate an SNMP trap.

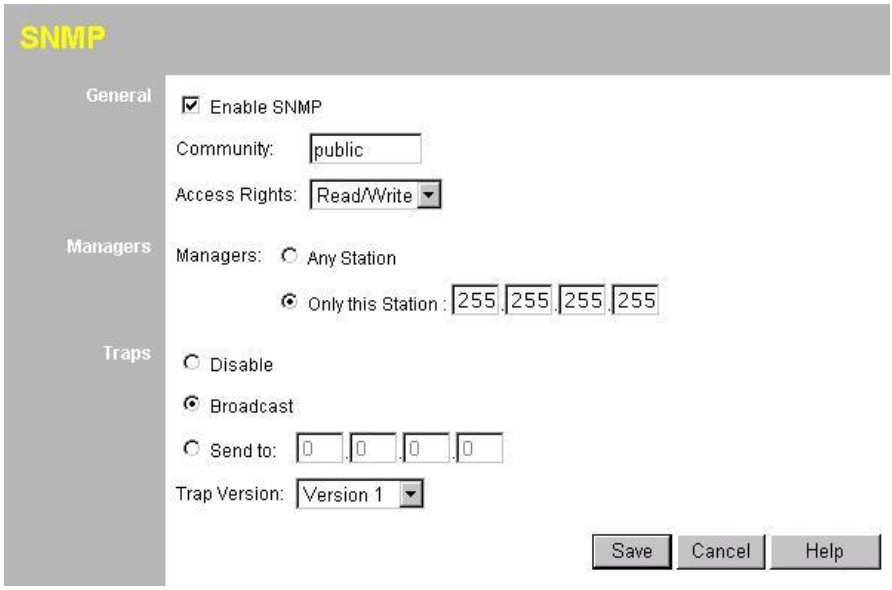



### Data - Rogue AP Screen

| **Enable Detection** | |
|---|---|
| **Enable Detection** | To use this feature, enable the "Enable Rogue AP Detection" checkbox, and select the desired wireless band and time interval. |
| **Scan** | Select the desired Wireless band to scan to Rogue APs and enter the desired time interval between each scan. |
| **Detection generates SNMP Trap** | If using SNMP, checking this option will generate a SNMP trap whenever a Rogue AP is detected. If not using SNMP, do not enable this option. |
| **Rogue Detection** | |
| **No Security** | If checked, any AP operating with security disabled is considered to be a Rogue AP. |
| **Not in Legal AP List** | If checked, any AP not listed in the "Legal AP List" is considered to be a Rogue AP. If checked, you must maintain the Legal AP List. |
| **Define Legal AP List** | Click this button to open a sub-screen where you can modify the "Legal AP List". This list must contain all known APs, so must be kept up to date. |

## 6.7 SNMP

SNMP (Simple Network Management Protocol) is only useful if you have a SNMP program on your PC. To reach this screen, select *SNMP* in the **Management** section of the menu.



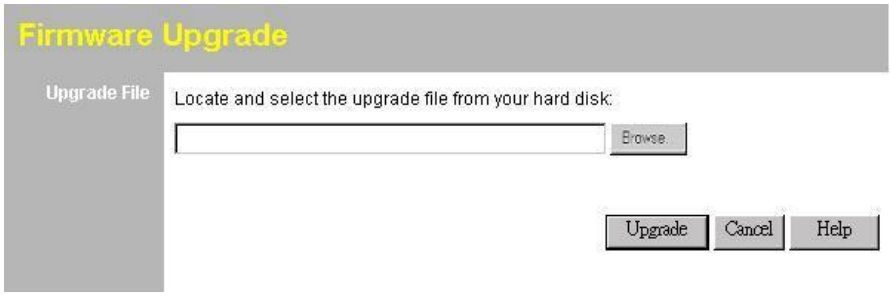

## Data - SNMP Screen

| | |
|---|---|
| **General** | |
| **Enable SNMP** | Use this to enable or disable SNMP as required |
| **Community** | Enter the community string, usually either "Public" or "Private". |
| **Access Rights** | Select the desired option:<br>• Read-only - Data can be read, but not changed.<br>• Read/Write - Data can be read, and setting changed. |
| **Managers** | |
| **Any Station** | The IP address of the manager station is not checked. |
| **Only this station** | The IP address is checked, and must match the address you enter in the IP address field provided.<br>If selected, you must enter the IP address of the required station. |
| **Traps** | |
| **Disable** | Traps are not used. |
| **Broadcast** | Select this to have Traps broadcast on your network. This makes them available to any PC. |
| **Send to** | Select this to have Trap messages sent to the specified PC only. If selected, you must enter the IP Address of the desired PC. |
| **Trap version** | Select the desired option, as supported by your SNMP Management program. |

## 6.8 Upgrade Firmware

The firmware (software) in the Wireless Access Point can be upgraded using your Web Browser.

You must first download the upgrade file, and then select *Upgrade Firmware* in the **Management** section of the menu. You will see a screen like the following.




### To perform the Firmware Upgrade:

1. Click the *Browse* button and navigate to the location of the upgrade file.
2. Select the upgrade file. Its name will appear in the *Upgrade File* field.
3. Click the *Upgrade* button to commence the firmware upgrade.

**Note:** The WAP-4060PE is unavailable during the upgrade process, and must restart when the upgrade is completed. Any connections to or through the WAP-4060PE will be lost.

# Appendix A
# Specifications

| | | |
|---|---|---|
| Model | WAP-4060PE | |
| Standard | IEEE 802.11b, 802.11g | |
| Signal Type | DSSS (Direct Sequence Spread Spectrum) | |
| Modulation | OFDM with BPSK, QPSK, 16QAM, 64QAM, DBPSK, DQPSK, CCK | |
| Port | 10/100Mbps RJ-45 port * 1, 802.3af compliant | |
| Antenna Connector | Reverse SMA male * 1 | |
| Output Power | 18dBm | |
| Sensitivity | 802.11b | 11 Mbps (CCK): -85dBm<br>5.5 Mbps (QPSK): - 89dBm<br>1, 2 Mbps (BPSK): - 90dBm<br>(typically @PER < 8% packet size 1024 and @25ºC ± 5ºC) |
| | 802.11g | 54 Mbps: -72dBm<br>48 Mbps: - 72dBm<br>36 Mbps: -76dBm<br>24 Mbps: -79dBm<br>18 Mbps: -82dBm<br>12 Mbps: -86dBm<br>9 Mbps: -89dBm<br>6 Mbps: -90dBm<br>(typically @PER < 8% packet size 1024 and @25ºC + 5ºC) |
| Operating Mode | AP, AP Client, Wireless Bridge, Multiple Bridge, Repeater | |
| Security | Open, shared, WPA, and WPA-PSK authentication<br>802.1x support<br>EAP-TLS, EAP-TTLS, PEAP<br>Block inter-wireless station communication<br>Block SSID broadcast | |

| | | |
|---|---|---|
| Management | Web based configuration<br>RADIUS Accounting<br>RADIUS-On feature<br>RADIUS Accounting update<br>CLI<br>Message Log<br>Access Control list file support<br>Configuration file Backup/Restore<br>Statistics support<br>Device discovery program<br>Windows Utility | |
| Data Rate | Super G mode | Up to 108Mbps |
| | 802.11g | Up to 54Mbps (6/9/12/18/24/36/48/54) |
| | 802.11b | Up to 11Mbps (1/2/5.5/11) |
| Dimensions (L x W x H) | 150 x 102 x 30mm | |
| Weight | 210g | |
| Environmental Specification | Operating temperature: 0 – 40 degree C<br>Storage temperature: -20 – 70 degree C<br>Relative humanity: 0% – 90% (non-condensing) | |
| Power Requirement | 24V DC, 0.5A | |
| Electromagnetic Compatibility | FCC, CE | |

# Appendix B
# Troubleshooting

***Problem 1:*** **Can't connect to the WAP-4060PE to configure it.**

**Solution 1:** Check the following:

- The WAP-4060PE is properly installed, LAN connections are OK, and it is powered ON. Check the LEDs for port status.
- Ensure that your PC and the WAP-4060PE are on the same network segment. (If you don't have a router, this must be the case.)
- If your PC is set to "Obtain an IP Address automatically" (DHCP client), restart it.
- You can use the following method to determine the IP address of the WAP-4060PE, and then try to connect using the IP address, instead of the name.

**To Find the Access Point's IP Address**

1. Open a MS-DOS Prompt or Command Prompt Window.
2. Use the Ping command to “ping” the WAP-4060PE. Enter ping followed by the Default Name of the WAP-4060PE.
   e.g.
   ping PL003318
3. Check the output of the ping command to determine the IP address of the WAP-4060PE.

If your PC uses a Fixed (Static) IP address, ensure that it is using an IP Address which is compatible with the WAP-4060PE. (If no DHCP Server is found, the WAP-4060PE will default to an IP Address and Mask of 192.168.0.228 and 255.255.255.0.) On Windows PCs, you can use *Control Panel-Network* to check the *Properties* for the TCP/IP protocol.

***Problem 2:*** **My PC can't connect to the LAN via the WAP-4060PE.**

**Solution 2** Check the following:

- The SSID and WEP settings on the PC match the settings on the WAP-4060PE.
- On the PC, the wireless mode is set to "Infrastructure"
- If using the *Access Control* feature, the PC's name and address is in the *Trusted Stations* list.
- If using 802.1x mode, ensure the PC's 802.1x software is configured correctly.

# Appendix C
# Command Line Interface

If desired, the Command Line Interface (CLI) can be used for configuration. This creates the possibility of creating scripts to perform common configuration changes. The CLI requires either a Telnet connection or a physical connection from your PC to the serial port (RS232 port) on the WAP-4060PE.

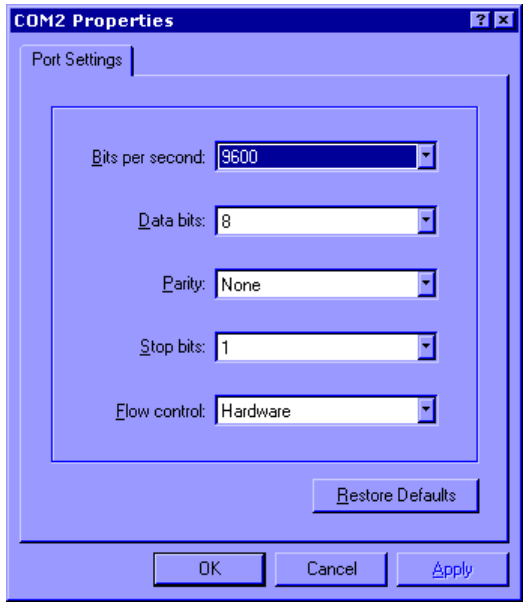
## C.1 Using the CLI - Telnet

1. Start your Telnet client, and establish a connection to the WAP-4060PE.
   e.g.

   Telnet 192.168.0.228
2. You will be prompted for the user name and password. Enter the same login name and password as used for the HTTP (Web) interface.
   The default values are **admin** for the User Name, and **password** for the Password.
3. Once connected, you can use any of the commands listed in the following **Command Reference**.

## C.2 Using the CLI - Serial Port

1. Use a standard serial port cable to connect your PC to the serial (RS232) port on the WAP-4060PE.
2. Start your communications program. For example, in Windows, use HyperTerminal. (This program may not be installed. If so, you can install it using *Start - Settings - Control Panel - Add or Remove Programs*. Then select *Windows Setup* or *Add/Remove Windows Components*, depending on your version of Windows.)
3. Configure the connection properties:
   - **Name** - use a suitable name, such as “AP”
   - **“Port” or “Connect Using”** - Select the Serial Port that the cable is connected to. (Do not select your modem.)
   - **Port Settings** - Use 9600, N, 8, 1, with hardware flow control, as shown below.




4. Use the “Connect” command to start the connection.
5. You will be prompted for a user name and password.
   Enter the current user name and password for the AP you are connecting to.
   The default values are **admin** for the User Name, and **password** for the Password.
6. You will then see the prompt, and can use any of the commands listed in the following **Command Reference**.

## C.3 Command Reference

The following commands are available.

| | |
|---|---|
| ? | Display CLI Command List |
| admin | Temporary factory admin |
| config wlan | config wlanX |
| config profile | config profile |
| del acl | Delete Access Control List |
| del key | Delete Encryption key |
| find bss | Find BSS |
| find channel | Find Available Channel |
| find all | Find All BSS |
| format | Format flash filesytem |
| bootrom | Update boot rom image |
| ftp | Software update via FTP |

| | |
|---|---|
| get 11gonly | Display 11g Only Allowed |
| get 11goptimize | Display 11g Optimization Level |
| get 11goverlapbss | Display Overlapping BSS Protection |
| get acl | Display Access Control List |
| get aging | Display Aging Interval |
| get antenna | Display Antenna Diversity |
| get association | Display Association Table |
| get authentication | Display Authentication Type |
| get autochannelse-lect | Display Auto Channel Select |
| get basic11b | Display Basic 11b Rates |
| get basic11g | Display Basic 11g Rates |
| get beaconinterval | Display Beacon Interval |
| get burstSeqThresh-old | Display Max Number of frames in a Burst |
| get burstTime | Display Burst Time |
| get calibration | Display Noise And Offset Calibration Mode |
| get cckTrigHigh | Display Higher Trigger Threshold for CCK Phy Errors for ANI Control |
| get cckTrigLow | Display Lower Trigger Threshold for CCK Phy Errors for ANI Control |
| get cckWeakSigThr | Display ANI Parameter for CCK Weak Signal Detection Threshold |
| get channel | Display Radio Channel |
| get cipher | Display Encryption cipher |
| get compproc | Display Compression scheme |
| get compwinsize | Display Compression Window Size |
| get config | Display Current AP Configuration |
| get countrycode | Display Country Code |
| get ctsmode | Display CTS mode |
| get ctsrate | Display CTS rate |

| | |
|---|---|
| get ctstype | Display CTS type |
| get domainsuffix | Display Domain Name Server suffix |
| get dtim | Display Data Beacon Rate (DTIM) |
| get enableANI | Display Adaptive Noise Immunity Control On/Off |
| get encryption | Display Encryption Mode |
| get extendedchan-mode | Display Extended Channel Mode |
| get firStepLvl | Display ANI Parameter for FirStepLevel |
| get fragmentthresh-old | Display Fragment Threshold |
| get frequency | Display Radio Frequency (MHz) |
| get gateway | Display Gateway IP Address |
| get gbeaconrate | Display 11g Beacon Rate |
| get gdraft5 | Display 11g Draft 5.0 compatibility |
| get groupkeyupdate | Display Group Key Update Interval (in Seconds) |
| get hardware | Display Hardware Revisions |
| get hostipaddr | Display Host IP Address |
| get ipaddr | Display IP Address |
| get ipmask | Display IP Subnet Mask |
| get keyentrymethod | Display Encryption Key Entry Method |
| get keysource | Display Source Of Encryption Keys |
| get login | Display Login User Name |
| get minimumrate | Display Minimum Rate |
| get nameaddr | Display IP address of name server |
| get nf | Display Noise Floor |
| get noiseImmunityLvl | Display ANI Parameter for Noise Immunity Level |
| get ofdmTrigHigh | Display Higher Trigger Threshold for OFDM Phy Errors for ANI Control |
| get ofdmTrigLow | Display Lower Trigger Threshold for OFDM Phy Errors for ANI Control |
| get ofdmWeakSigDet | Display ANI Parameter for OFDM Weak Signal Detection |

| | |
|---|---|
| get overRidetxpower | Display Tx power override |
| get operationMode | Display Operation Mode |
| get power | Display Transmit Power Setting |
| get quietAckCtsAllow | Display if Ack/Cts frames are allowed during quiet period |
| get quietDuration | Display Duration of quiet period |
| get quietOffset | Display Offset of quiet period into the beacon period |
| get radiusname | Display RADIUS server name or IP address |
| get radiusport | Display RADIUS port number |
| get rate | Display Data Rate |
| get remoteAp | Display Remote Ap's Mac Address |
| get hwtxretries | Display HW Transmit Retry Limit |
| get swtxretries | Display SW Transmit Retry Limit |
| get rtsthreshold | Display RTS/CTS Threshold |
| get shortpreamble | Display Short Preamble Usage |
| get shortslottime | Display Short Slot Time Usage |
| get sntpserver | Display SNTP/NTP Server IP Address |
| get softwareretry | Display Software Retry |
| get spurImmunityLvl | Display ANI Parameter for Spur Immunity Level |
| get ssid | Display Service Set ID |
| get ssidsuppress | Display SSID Suppress Mode |
| get station | Display Station Status |
| get SuperG | Display SuperG Feature Status |
| get systemname | Display Access Point System Name |
| get telnet | Display Telnet Mode |
| get timeout | Display Telnet Timeout |
| get tzone | Display Time Zone Setting |
| get updateparam | Display Vendor Default Firmware Update Params |
| get uptime | Display UpTime |
| get watchdog | Display Watchdog Mode |

| | |
|---|---|
| get wds | Display WDS Mode |
| get wep | Display Encryption Mode |
| get wirelessmode | Display Wireless LAN Mode |
| get 80211d | Display 802.11d mode |
| get http | Display http Enable/Disable |
| get HttpPort | Display http port number |
| get https | Display https Enable/Disable |
| get HttpsPort | Display https port number |
| get syslog | Display syslog Disable/Broadcast/Unicast |
| get syslogSeverity | Display syslog Severity level |
| get syslogServer | Display unicast syslog server IP/name |
| get manageOnlyLan | Display Management only via LAN Enable/Disable |
| get roguedetect | Display Rogue AP Detection Enable/Disable |
| get rogueinteval | Display Minutes of every Rogue AP Detection(Range: 3 ~ 99) |
| get rogueband | Display Rogue AP Detection band(s) |
| get roguetype | Display Rogue AP definition |
| get roguesnmp | Display Rogue AP Detection SNMP Trap Enable/Disable |
| get roguelegal | Display Legal AP List of Rogue AP |
| get autoConfig | Display Auto Config Enable/Disable |
| get autoResponse | Display Respond to Auto Config request Enable/Disable |
| get autoChan-geName | Display Provide admin login name and password Enable/Disable |
| get autoSetResp | Display Provide respond to Auto Config request Enable/Disable |
| get autoUpdate | Display Auto Update Enable/Disable |
| get autoUpgradeOnly | Display Install later version only Enable/Disable |
| get autoUpdateInter-val | Display Auto Update Interval(1~31days) |
| get ftpServer | Display FTP Server address |
| get fwPathname | Display Firmware Pathname |

| | |
|---|---|
| get ftpLogin | Display FTP Login Name |
| get ftpPassword | Display FTP Password |
| get activeCurrentProfile | Display active Current Profile |
| get profileName | Display Profile Name |
| get profileVlanId | Display Profile VLAN ID |
| get APPrimaryProfile | Display AP Primary Profile |
| get WDSPrimaryProfile | Display WDS Primary Profile |
| get securityMode | Display Security Mode |
| get Accounting | Display Accounting Enable/Disable |
| get Accountingport | Display Accounting port number |
| get keyValue | Display Encryption Key Value |
| get keyLength | Display Encryption Key Length |
| get keyIndex | Display Encryption Key Index |
| get UAM | Display UAM Authentication Enable/Disable |
| get UAMMethod | Display UAM Authentication Method |
| get UAMLoginURL | Display UAM Authentication Login URL |
| get UAMLoginFailURL | Display UAM Authentication Login Fail URL |
| get macAuth | Display Mac Authentication Enable/Disable |
| get snmpMode | Display SNMP Mode |
| get snmpCommunity | Display SNMP Community Name |
| get snmpAccessRight | Display SNMP Access Right |
| get snmpAnyStaMode | Display SNMP Any Station Mode |
| get snmpStationIPAddr | Display SNMP Station Addr |
| get trapMode | Display Trap Mode |
| get trapVersion | Display Trap Version |
| get trapSendMode | Display Trap Send Mode |

| | |
|---|---|
| get trapRecvIp | Display Trap Receiver IP |
| get wdsMacList | Display WDS Mac Address List |
| get enableWireless-Client | Display Wireless Client Enable/Disable |
| get isolationType | Display Isolation Type |
| get winsEnable | Display WINS Server Enable/Disable |
| get winsserveraddr | Display IP address of WINS server |
| get wirelessSeparate | Display wireless seprate Mode |
| get description | Display Access Point Description |
| get dhcpmode | Display dhcp mode |
| get wlanstate | Display wlan state |
| help | Display CLI Command List |
| Lebradeb | Disable reboot during radar detection |
| ls | list directory |
| mem | system memory statistics |
| np | Network Performance |
| ns | Network Performance Server |
| ping | Ping |
| radar! | Simulate radar detection on current channel |
| reboot | Reboot Access Point |
| rm | Remove file |
| run | Run command file |
| quit | Logoff |
| set 11gonly | Set 11g Only Allowed |
| set 11goptimize | Set 11g Optimization Level |
| set 11goverlapbss | Set Overlapping BSS Protection |
| set acl | Set Access Control List |
| set aging | Set Aging Interval |
| set antenna | Set Antenna |

| | |
|---|---|
| set authentication | Set Authentication Type |
| set autochannelse-lect | Set Auto Channel Selection |
| set basic11b | Set Use of Basic 11b Rates |
| set basic11g | Set Use of Basic 11g Rates |
| set beaconinterval | Modify Beacon Interval |
| set burstSeqThresh-old | Set Max Number of frames in a Burst |
| set burstTime | Set Burst Time |
| set calibration | Set Calibration Period |
| set cckTrigHigh | Set Higher Trigger Threshold for CCK Phy Errors For ANI Control |
| set cckTrigLow | Set Lower Trigger Threshold for CCK Phy Errors For ANI Control |
| set cckWeakSigThr | Set ANI Parameter for CCK Weak Signal Detection Threshold |
| set channel | Set Radio Channel |
| set cipher | Set Cipher |
| set compproc | Set Compression Scheme |
| set compwinsize | Set Compression Window Size |
| set countrycode | Set Country Code |
| set ctsmode | Set CTS Mode |
| set ctsrate | Set CTS Rate |
| set ctstype | Set CTS Type |
| set domainsuffix | Set Domain Name Server Suffix |
| set dtim | Set Data Beacon Rate (DTIM) |
| set enableANI | Turn Adaptive Noise Immunity Control On/Off |
| set encryption | Set Encryption Mode |
| set extendedchan-mode | Set Extended Channel Mode |
| set factorydefault | Restore to Default Factory Settings |
| set firStepLvl | Set ANI Parameter for FirStepLevel |

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|---|---|
| set fragmentthresh-old | Set Fragment Threshold |
| set frequency | Set Radio Frequency (MHz) |
| set gateway | Set Gateway IP Address |
| set gbeaconrate | Set 11g Beacon Rate |
| set groupkeyupdate | Set Group Key Update Interval (in Seconds) |
| set gdraft5 | Set 11g Draft 5.0 compatibility |
| set hostipaddr | Set Host IP address |
| set ipaddr | Set IP Address |
| set ipmask | Set IP Subnet Mask |
| set keyentrymethod | Select Encryption Key Entry Method |
| set keysource | Select Source Of Encryption Keys |
| set login | Modify Login User Name |
| set minimumrate | Set Minimum Rate |
| set nameaddress | Set Name Server IP address |
| set noiseImmunityLvl | Set ANI Parameter for Noise Immunity Level |
| set ofdmTrigHigh | Set Higher Trigger Threshold for OFDM Phy Errors for ANI Control |
| set ofdmTrigLow | Set Lower Trigger Threshold for OFDM Phy Errors for ANI Control |
| set ofdmWeakSigDet | Set ANI Parameter for OFDM Weak Signal Detection |
| set overRidetxpower | Set Tx power override |
| set operationMode | Set operation Mode |
| set password | Modify Password |
| set passphrase | Modify Passphrase |
| set power | Set Transmit Power |
| set quietAckCtsAllow | Allow Ack/Cts frames during quiet period |
| set quietDuration | Duration of quiet period |
| set quietOffset | Offset of quiet period into the beacon period |
| set radiusname | Set RADIUS name or IP address |

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|---|---|
| set radiusport | Set RADIUS port number |
| set radiussecret | Set RADIUS shared secret |
| set rate | Set Data Rate |
| set rate | Set Data Rate |
| set rate | Set Data Rate |
| set rate | Set Data Rate |
| set rate | Set Data Rate |
| set regulatorydomain | Set Regulatory Domain |
| set remoteAP | Set Remote AP's Mac Address |
| set hwtxretries | Set HW Transmit Retry Limit |
| set swtxretries | Set SW Transmit Retry Limit |
| set rtsthreshold | Set RTS/CTS Threshold |
| set shortpreamble | Set Short Preamble |
| set shortslottime | Set Short Slot Time |
| set sntpserver | Set SNTP/NTP Server IP Address |
| set softwareretry | Set Software Retry |
| set spurImmunityLvl | Set ANI Parameter for Spur Immunity Level |
| set ssid | Set Service Set ID |
| set ssidsuppress | Set SSID Suppress Mode |
| set SuperG | Super G Features |
| set systemname | Set Access Point System Name |
| set telnet | Set Telnet Mode |
| set timeout | Set Telnet Timeout |
| set tzone | Set Time Zone Setting |
| set updateparam | Set Vendor Default Firmware Update Parameters |
| set watchdog | Set Watchdog Mode |
| set wds | Set WDS Mode |
| set wep | Set Encryption Mode |
| set wlanstate | Set wlan state |

| | |
|---|---|
| set wirelessmode | Set Wireless LAN Mode |
| set 80211d | Set 802.11d mode |
| set http | Set http Enable/Disable |
| set HttpPort | Set http port number |
| set https | Set https Enable/Disable |
| set HttpsPort | Set https port number |
| set syslog | Set syslog Disable/Broadcast/Unicast |
| set syslogSeverity | Set syslog Severity level |
| set syslogServer | Set unicast syslog server IP/name |
| set manageOnlyLan | Set Management only via LAN Enable/Disable |
| set roguedetect | Set Rogue AP Detection Enable/Disable |
| set rogueinteval | Set Minutes of every Rogue AP Detection(Range: 3 ~ 99) |
| set rogueband | Set Rogue AP Detection band(s) |
| set roguetype | Set Rogue AP definition |
| set roguesnmp | Set Rogue AP Detection SNMP Trap Enable/Disable |
| set roguelegal | Add/Delete one AP MAC/OUI into/from Rogue AP Legal List |
| set autoConfig | Set Auto Config Enable/Disable |
| set autoResponse | Set Respond to Auto Config request Enable/Disable |
| set autoChan-geName | Set provide admin login name and password Enable/Disable |
| set autoSetResp | Set Provide respond to Auto Config request Enable/Disable |
| set autoUpdate | Set Auto Update Enable/Disable |
| set autoUpgradeOnly | Set Install later version only Enable/Disable |
| set autoUpdateInter-val | Set Auto Update Interval(1~31days) |
| set ftpServer | Set FTP Server address |
| set fwPathname | Set Firmware Pathname |
| set ftpLogin | Set FTP Login Name |
| set ftpPassword | Set FTP Password |

| | |
|---|---|
| set activeCurrentProfile | Set active Current Profile |
| set profileName | Set Profile Name |
| set profileVlanId | Set Profile Vlan Id |
| set APPrimaryProfile | Set AP's Primary Profile |
| set WDSPrimaryProfile | Set WDS's Primary Profile |
| set securityMode | Set Security Mode |
| set Accounting | Set Accounting Enable/Disable |
| set Accountingport | Set Accounting port number |
| set keyValue | Set Encryption Key Value |
| set keyLength | Set Encryption Key Length |
| set keyIndex | Set Encryption Key Index |
| set UAM | Set UAM Authentication Enable/Disable |
| set UAMMethod | Set UAM Authentication Method |
| set UAMLoginURL | Set UAM Authentication Login URL |
| set UAMLoginFailURL | Set UAM Authentication Login Fail URL |
| set macAuth | Set Mac Authentication Enable/Disable |
| set snmpMode | Set SNMP Mode |
| set snmpCommunity | Set SNMP Community Name |
| set snmpAccessRight | Set SNMP Access Right |
| set snmpAnyStaMode | Set SNMP Any Station Mode |
| set snmpStationIPAddr | Set SNMP Station Address |
| set trapMode | Set Trap Mode |
| set trapVersion | Set Trap Version |
| set trapSendMode | Set Trap Send Mode |
| set trapRecvIp | Set Trap Receiver IP |
| set description | Set Access Point Description |

| | |
|---|---|
| set dhcpMode | Set Dhcp Mode |
| set wdsMacList | Set WDS Mac Address List |
| set enableWireless-Client | Set  Wireless Client Enable/Disable |
| set isolationType | Set Isolation Type |
| set winsEnable | Set WINS Server Enable/Disable |
| set winsServerAddr | Set WINS Server IP address |
| set wirelessSeparate | Set wireless separate Mode |
| set sdSet | Set debug level |
| set sdAdd | Add debug level |
| set sdDel | Del debug level |
| start wlan | Start the current wlan |
| stop wlan | Stop the current wlan |
| timeofday | Display Current Time of Day |
| version | Software version |