



***802.11n Enterprise PoE Access Point***

***WNAP-3000PE***

**User's Manual**

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## 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 802.11n Enterprise PoE Access Point

Model: WNAP-3000PE

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Part No. EM-WNAP3000PE

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# Chapter 1

## Introduction

PLANET WNAP-3000PE is an advanced management class, high encryption standard but cost-effectively Enterprise PoE access point. Built-in IEEE802.11n 3 Tx (Transmit chains) / 3 Rx (Receive chains) MIMO technology, the data rate could be up to 300Mbps, as well as complaint with IEEE 802.11b/g device. Full of enterprise advanced network management features, as well as with high data rate for suitable wide bandwidth, high standard security for wireless LAN network management wherever in warehouse, campus or business environment.

### 1.1 Package Contents

Make sure that you have the following items:

- WNAP-3000PE x 1
- 2dBi Dipole Antenna x 3
- Power Adapter x 1
- Quick Installation Guide x 2
- CD-ROM x 1

**Note:**

If any of the above items are missing, contact your supplier as soon as possible.

### 1.2 Physical Details

Front panel



**LED definition**

Power **On** - Normal operation.

**Off** - No power

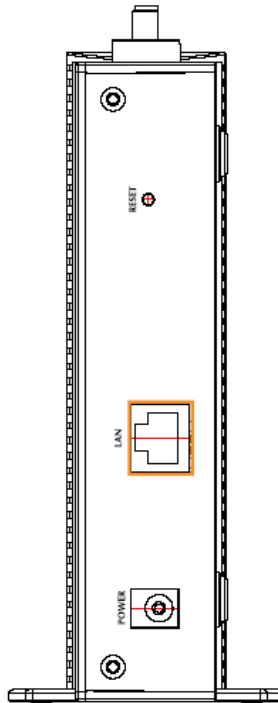
WLAN **On** - Idle

**Off** - 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.

- Status **On** - Error condition.  
**Off** - Normal operation.  
**Blinking** - During start up, and when the Firmware is being upgraded.
- LAN **On** - The LAN port is active.  
**Off** - No active connection on the LAN port.  
**Flashing** - Data is being transmitted or received via the corresponding LAN port.

## Back Panel



- Reset Button** This button has two (2) functions:
- **Reboot** - When pressed and released, the Wireless Access Point will reboot (restart).
  - **Reset to Factory Defaults** - This button can also be used to clear ALL data and restore ALL settings to the factory default values.
- To Clear All Data and restore the factory default values:
1. Hold the Reset Button until the Status (Red) LED blinks TWICE, usually more than 5 seconds.
  2. Release the Reset Button.  
The factory default configuration has now been restored, and the Access Point is ready for use.
- LAN** Use a standard LAN cable (RJ45 connectors) to connect this port to a 10/100/1000BaseT hub/switch on your LAN.
- Power** Connect the supplied power adapter (12V@1A) here.

## 1.3 Feature

- ◆ IEEE802.11n draft 2.0 compliant with IEEE802.11b/g
- ◆ Supports PoE port (IEEE802.3af compliant)
- ◆ Strong network security with WEP, WPA(PSK), 802.1X authentication
- ◆ With 3 detachable RP-SMA connectors for external antenna expanding connection distance
- ◆ High data transfer rate up to 300Mbps
- ◆ Five operation modes selectable: AP / AP Client / Wireless Bridge / Multiple Bridge / Repeater
- ◆ Adjustable output power level
- ◆ Supports 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 v1, v2, v3 supported

## 1.4 Specification

Standard	IEEE 802.11b/g, IEEE 802.11n draft 2.0
Modulation	OFDM/ CCK/ DQPSK / DBPSK
Port	10/100/1000Base-T (RJ-45) PoE port, IEEE802.3af compliant Auto-negotiation, Auto-MDI
Antenna	Detachable 3dBi Dipole Antenna * 3
Output Power	<b>For FCC:</b> 11b - 16 dBm@1TX, 19 dBm@2TX, 20.5dbm@3TX; 11g - 13 dBm@1TX, 16 dBm@2TX, 17.5dbm@3TX; 11n - 19 dBm@1TX@MCS0~4/8~12, 17 dBm@1TX@MCS 5/13, 13 dBm@1TX@MCS6/14, 11 dBm@1TX@MCS7/15, 22 dBm@2TX@MCS0~4/8~12, 20 dBm@2TX@MCS 5/13, 16 dBm@2TX@MCS6/14, 14 dBm@2TX@MCS7/15, 23.5 dBm@3TX@MCS0~4/8~12, 21.5 dBm@3TX@MCS 5/13,



	<p>17.5 dBm@3TX@MCS6/14, 15.5 dBm@3TX@MCS7/15</p> <p><b>For ETSI:</b> 11b/g/n - 13 dBm@1TX, 16 dBm@2TX, 17.5dbm@3TX</p>
Sensitivity	<p>11.b: 11Mbps@ - 88dBm 11.g: 54Mbps@ - 73dBm 11.n: 300Mbps@ -69dBm</p>
Operating Mode	AP, AP Client, Wireless Bridge, Multiple Bridge, Repeater
Security	<ul style="list-style-type: none"> <li>• WEP, WPA, and WPA-PSK authentication</li> <li>• 802.1x support</li> <li>• EAP-MD5, EAP-TLS, EAP-TTLS, PEAP</li> <li>• RADIUS based MAC authentication</li> <li>• Block inter-wireless station communication (wireless separation)</li> <li>• Block SSID broadcast</li> </ul>
Management	<ul style="list-style-type: none"> <li>• Web based configuration</li> <li>• RADIUS Accounting</li> <li>• RADIUS-On feature</li> <li>• RADIUS Accounting update</li> <li>• Telnet/CLI</li> <li>• Syslog/internal Log</li> <li>• Access Control list file support</li> <li>• Configuration file Backup/Restore</li> <li>• Statistics support</li> <li>• LLTD</li> </ul>

# Chapter 2

## Installation

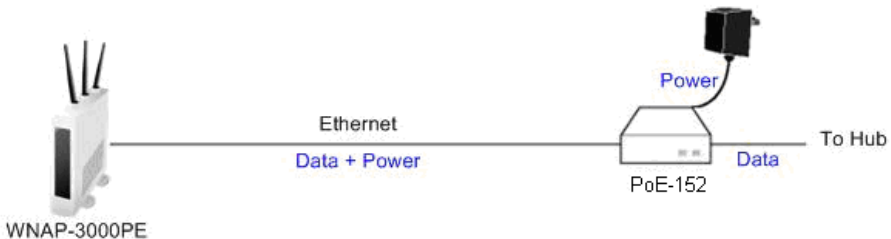
### 2.1 General installation

1. **Locate an optimum location for the WNAP-3000PE.** The best place for your WNAP-3000PE is usually at the center of your wireless network, with line of sight to all of your mobile stations.
2. **Assemble the antennas to WNAP-3000PE.** 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 WNAP-3000PE.** Connect the "LAN" port of WNAP-3000PE to your LAN switch/hub or a single PC.
4. **Plug in power adapter and connect to power source.** After power on, WNAP-3000PE will start to operate.
5. **Check the LEDs:**
  - The Status LED should flash, then turn OFF.
  - The Power, Ethernet and WLAN LEDs should be ON.For more information, please refer to LED deification.

**NOTE:** ONLY use the power adapter supplied with the WNAP-3000PE. Otherwise, the product may be damaged.

### 2.2 Using PoE (Power over Ethernet)

1. Do not connect the supplied power adapter to the WNAP-3000PE.
2. Connect one end of a standard (category 5) LAN cable to the Ethernet port on the WNAP-3000PE.
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 WNAP-3000PE to see it is drawing power via the Ethernet connection.



# Chapter 3

## Web Login

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

### Setup Procedure

Before proceeding, please install the WNAP-3000PE in your LAN, as described previously.

3. Use a PC which is already connected to your LAN, and start the Web browser.
4. In the *Address* box, enter the IP address of the WNAP-3000PE you want to configure.  
Default IP address <http://192.168.0.228>
5. You should then see a login prompt, which will ask for a *User Name* and *Password*.  
Enter *User Name*, and *Password*.  
User Name: **admin**  
Password: **password**
6. You will then see the *Status* screen, which displays the current settings and status. No data input is possible on this screen.

The screenshot shows the web interface for a Planet 802.11n Enterprise PoE Access Point. The top navigation bar includes 'Status', 'System', 'Wireless', 'Management', and 'Logout'. The 'Status' page displays the following information:

Access Point	Access Point Name	Planet
	MAC Address	00:30:4F:11:22:33
	Country/Domain	United States
	Hardware Version	Rev.00
	Firmware Version	Version 1.0 Release 00
TCP/IP	IP Address	192.168.0.228
	Subnet Mask	255.255.255.0
	Gateway	192.168.0.1
	DHCP Client	Disabled
	DHCP Server	Disabled
Ethernet	Ethernet Status	Connected
Wireless	Channel/Frequency	6
	Wireless Mode	Mixed(11n/11b/11g)
	AP Mode	Access Point

Buttons at the bottom of the status table:

Buttons at the bottom of the page:

Buttons on the left sidebar:

**If you can't connect:**

It is likely that your PC's IP address is incompatible with the WNAP-3000PE'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.

# Chapter 4

## Status

This page shows the relative information of WNAP-3000PE. Please see the below tables shown.

Status		
Access Point	Access Point Name	Planet
	MAC Address	00:30:4F:11:22:33
	Country/Domain	United States
	Hardware Version	Rev.00
	Firmware Version	Version 1.0 Release 00
TCP/IP	IP Address	192.168.0.228
	Subnet Mask	255.255.255.0
	Gateway	192.168.0.1
	DHCP Client	Disabled
	DHCP Server	Disabled
Ethernet	Ethernet Status	Connected
Wireless	Channel/Frequency	6
	Wireless Mode	Mixed(11n/11b/11g)
	AP Mode	Access Point

Buttons: Reboot, Apply, Virtual AP Status, Statistics, Log, Stations, Help

### Data - Status Screen

Access Point	
<b>Access Point Name</b>	The current name will be displayed.
<b>MAC Address</b>	The MAC (physical) address of the WNAP-3000PE.
<b>Country/Domain</b>	The region or domain, as selected on the System screen.
<b>Hardware Version</b>	The version of the hardware currently used.
<b>Firmware Version</b>	The version of the firmware currently installed.
TCP/IP	
<b>IP Address</b>	The IP Address of the WNAP-3000PE.
<b>Subnet Mask</b>	The Network Mask (Subnet Mask) for the IP Address above.
<b>Gateway</b>	Enter the Gateway for the LAN segment to which the WNAP-3000PE is attached (the same value as the PCs on that LAN segment).
<b>DHCP Client</b>	This indicates whether the current IP address was obtained from a DHCP Server on your network. It will display "Enabled" or "Disabled".

<b>DHCP Server</b>	"Enabled" or "Disabled" is displayed for the DHCP server status.
<b>Ethernet</b>	
<b>Ethernet Status</b>	The current Ethernet status is displayed.
<b>Wireless</b>	
<b>Channel/Frequency</b>	The Channel currently in use is displayed.
<b>Wireless Mode</b>	The current mode (e.g. 802.11g) is displayed.
<b>AP Mode</b>	The current Access Point mode is displayed.
<b>Bridge Mode</b>	The current Bridge mode is displayed.
<b>Security Profiles</b>	
<b>Name</b>	This displays the current name of each security profile.
<b>SSID</b>	This displays the SSID associated with the profile.
<b>Status</b>	This indicates whether or not the profile is enabled.
<b>Buttons</b>	
<b>Virtual AP Status</b>	Click this to open a sub-window displaying Virtual AP Status about the information of Name, SSID, Broadcast SSID, Security, Status and Clients.
<b>Statistics</b>	Click this to open a sub-window where you can view Statistics on data transmitted or received by the WNAP-3000PE.
<b>Log</b>	Click this to open a sub-window where you can view the activity log.
<b>Stations</b>	Click this to open a sub-window where you can view the list of all current Wireless Stations using the WNAP-3000PE.

## Virtual AP Status

This screen is displayed when the Virtual AP Status button on the Status screen is clicked.

Virtual AP Status						
Name	BSSID	SSID	Broadcast SSID	Security	Status	Clients
VAP-Name-0	00-30-4f11-22-33	wireless-0	Enable	None	Enable	0
VAP-Name-1	N/A	wireless-1	Enable	None	Disable	0
VAP-Name-2	N/A	wireless-2	Enable	None	Disable	0
VAP-Name-3	N/A	wireless-3	Enable	None	Disable	0
VAP-Name-4	N/A	wireless-4	Enable	None	Disable	0
VAP-Name-5	N/A	wireless-5	Enable	None	Disable	0
VAP-Name-6	N/A	wireless-6	Enable	None	Disable	0
VAP-Name-7	N/A	wireless-7	Enable	None	Disable	0

For each profile, the following data is displayed:

<b>Name</b>	The name you gave to this profile; if you didn't change the name, the default name is used.
<b>BSSID</b>	The MAC address of the VAP.
<b>SSID</b>	The SSID assigned to this profile.
<b>Broadcast SSID</b>	Indicates whether or not the SSID is broadcast.
<b>Security</b>	The security method used by this VAP.
<b>Status</b>	Indicates whether or not this profile is enabled.
<b>Clients</b>	The number of wireless stations currently using accessing this WNAP-3000PE using this profile. If the profile is disabled, this will always be zero.

### Statistics Screen

This screen is displayed when the Statistics button on the Status screen is clicked. It shows details of the traffic flowing through the WNAP-3000PE.

Statistics				
<b>Up Time:</b>	0:33:10			
<b>VAP0</b>				
Authentication	Deauthentication	Association	Disassociation	Reassociation
0	0	0	0	0
	Received	Transmitted		
Data	0	0		
Management	0	0		
Control	0	0		
<b>VAP1</b>				
Authentication	Deauthentication	Association	Disassociation	Reassociation
0	0	0	0	0
	Received	Transmitted		
Data	0	0		
Management	0	0		
Control	0	0		

## Data - Statistics Screen

System Up Time	
<b>Up Time</b>	This indicates the time period which the system has been running since the last restart or reboot.
2.4GHz Wireless	
<b>Authentication</b>	The number of "Authentication" packets received. Authentication is the process of identification between the AP and the client.
<b>Deauthentication</b>	The number of "Deauthentication" packets received. Deauthentication is the process of ending an existing authentication relationship.
<b>Association</b>	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.
<b>Disassociation</b>	The number of "Disassociation" packets received. Disassociation breaks the existing connection between the AP and the client.
<b>Reassociation</b>	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	
<b>Data</b>	Number of valid Data packets transmitted to or received from Wireless Stations, at driver level.
<b>Multicast Packets</b>	Number of Broadcast packets transmitted to or received from Wireless Stations, using Multicast transmission.
<b>Management</b>	Number of Management packets transmitted to or received from Wireless Stations.
<b>Control</b>	Number of Control packets transmitted to or received from Wireless Stations.

## Activity Log

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

**Activity Log**

Current time: 2008-01-01 00:53:41

Jan 1 00:10:00 Syslogd start up

## Data - Activity Log

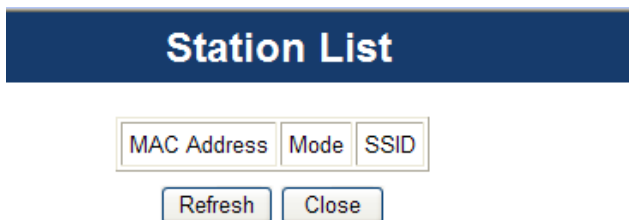
Data	
<b>Current Time</b>	The system date and time is displayed.
<b>Log</b>	The Log shows details of the connections to the WNAP-3000PE.



Buttons	
<b>Refresh</b>	Update the data on screen.
<b>Save to file</b>	Save the log to a file on your pc.
<b>Clear Log</b>	This will delete all data currently in the Log. This will make it easier to read new messages.

## Station List

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



### Data - Station List Screen

Station List	
<b>MAC Address</b>	The MAC (physical) address of each Wireless Station is displayed.
<b>Mode</b>	The mode of each Wireless Station.
<b>SSID</b>	This displays the SSID used the Wireless station. Because the WNAP-3000PE supports multiple SSIDs, different PCs could connect using different SSIDs.
<b>Refresh Button</b>	Update the data on screen.

# Chapter 5

## System

### 5.1 Basic Settings

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

**System Basic Settings**

Access Point Name:

Description:

Country/Domain:  ▼

TCP/IP  DHCP Client  
 Fixed IP Address

IP address:  .  .  .

Subnet Mask:  .  .  .

Gateway:  .  .  .

DNS:  .  .  .

DHCP Server: Start IP Address:  .  .  .   
 End IP Address:  .  .  .

Wins Server Name/IP Address:

TimeZone:  ▼

Adjust for Daylight Saving Time

NTP Server Name/IP Address:

Current Time: 2008-01-01 00:09:07

**Figure 1: System Basic Settings Screen**

#### Data - System Basic Settings Screen

Identification	
<b>Access Point Name</b>	Enter a suitable name for this Access Point.

<b>Description</b>	If desired, you can enter a description for the Access Point.
<b>Country Domain</b>	The country or domain which is matching your current location.
<b>MAC Address</b>	The MAC address is displayed.
<b>IP Settings</b>	
<b>DHCP Client</b>	Select this option if you have a DHCP Server on your LAN, and you wish the Access Point to obtain an IP address automatically.
<b>Fixed IP Address</b>	<p>If selected, the following data must be entered.</p> <ul style="list-style-type: none"> <li>• <b>IP Address</b> - The IP Address of this device. Enter an unused IP address from the address range on your LAN.</li> <li>• <b>Subnet Mask</b> - The Network Mask associated with the IP Address above. Enter the value used by other devices on your LAN.</li> <li>• <b>Gateway</b> - The IP Address of your Gateway or Router. Enter the value used by other devices on your LAN.</li> <li>• <b>DNS</b> - Enter the DNS (Domain Name Server) used by PCs on your LAN.</li> </ul>
<b>DHCP Server</b>	<ul style="list-style-type: none"> <li>• If Enabled, the Access Point will allocate IP Addresses to PCs (DHCP clients) on your LAN when they start up. The default (and recommended) value is Enabled.</li> <li>• The <b>Start IP Address</b> and <b>Finish IP Address</b> fields set the values used by the DHCP server when allocating IP Addresses to DHCP clients. This range also determines the number of DHCP clients supported.</li> </ul>
<b>Wins Server Name/IP Address</b>	Enter the server name or IP address of the Wins Server.
<b>TimeZone</b>	
<b>TimeZone</b>	<p>Choose the Time Zone for your location from the drop-down list. If your location is currently using Daylight Saving, enable the <b>Adjust for Daylight Saving Time</b> checkbox.</p> <p><b>You must UNCHECK this checkbox when Daylight Saving Time finishes.</b></p>
<b>NTP Server Name/IP Address</b>	Enter the server name or IP address of the NTP.

## 5.2 Advanced Settings

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

### System Advanced Settings

VLAN  Enable 802.1Q VLAN

Native Vlan:

AP Management Vlan:

VAP Name	VLAN ID	Priority
VAP-Name-0	<input type="text" value="1"/>	0 ▾
VAP-Name-1	<input type="text" value="1"/>	0 ▾
VAP-Name-2	<input type="text" value="1"/>	0 ▾
VAP-Name-3	<input type="text" value="1"/>	0 ▾
VAP-Name-4	<input type="text" value="1"/>	0 ▾
VAP-Name-5	<input type="text" value="1"/>	0 ▾
VAP-Name-6	<input type="text" value="1"/>	0 ▾
VAP-Name-7	<input type="text" value="1"/>	0 ▾

Network Integrity Check

Enable Bonjour

Enable Link Layer Topology Discovery (LLTD)

Enable Spanning Tree Protocol (802.1d)

802.1X Supplicant  Enable 802.1X Supplicant on Ethernet Network

Authentication via MAC Address

### Data - System Advanced Settings Screen

VLAN	
<b>Enable 802.1Q VLAN</b>	This option is only useful if the hubs/switches on your LAN support the VLAN standard.
<b>Native VLAN</b>	Enter the desired value for the Native VLAN. Default value is 1.
<b>AP Management VLAN</b>	Define the VLAN ID used for management.

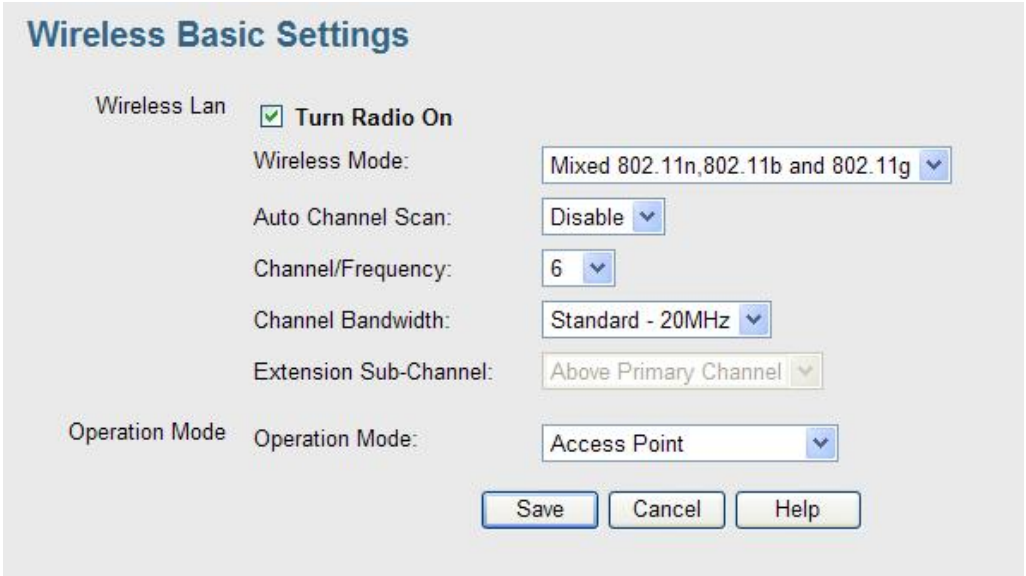
<b>VLAN List</b>	Define the unique ID value (1 - 4094) for each VAP.
<b>Network Integrity Check</b>	
<b>Enable Network Integrity Check</b>	If enabled, the AP will disable the wireless connection if the wired connect of AP is invalid.
<b>LLTD</b>	
<b>Enable Link Layer Topology Discovery</b>	Enable this if you want to use Link Layer Topology Discovery protocol (LLTD) feature.
<b>STP</b>	
<b>Enable Spanning tree Protocol</b>	Enable this if you want to use this feature.
<b>802.1x Supplicant</b>	
<b>Enable 802.1x Supplicant</b>	Enable this if your network requires this AP to use 802.X authentication in order to operate.
<b>Authentication</b>	<ul style="list-style-type: none"> <li>• <b>Authentication via MAC Address</b> Select this if you want to Use MAC Address for Authentication.</li> <li>• <b>Authentication via Name and Password</b> Select this if you want to Use name and password for Authentication.</li> </ul>

# Chapter 6

## Wireless

### 6.1 Basic Settings

The settings on this screen must match the settings used by Wireless Stations. Click Basic Settings on the Wireless menu to view a screen like the following.



#### Data - Wireless Basic Settings Screen

Operation	
<b>Turn Radio On</b>	Enable this to use the wireless feature.
<b>Wireless Mode</b>	<p>Select the desired option:</p> <ul style="list-style-type: none"> <li>• <b>Disable</b> - select this if for some reason you do not this AP to transmit or receive at all.</li> <li>• <b>802.11b</b> - if selected, only 802.11b connections are allowed. 802.11g wireless stations will only be able to connect if they are fully backward-compatible with the 802.11b standard.</li> <li>• <b>802.11g</b> - only 802.11g connections are allowed. If you only have 802.11g, selecting this option may provide a performance improvement over using the default setting.</li> <li>• <b>802.11n</b> - only 802.11n connections are allowed. If you only have 802.11n, selecting this option may provide a performance improvement over using the default setting.</li> <li>• <b>802.11b and 802.11g</b> - this will allow connections by both 802.11b and 802.11g wireless stations.</li> <li>• <b>802.11n and 802.11g</b> - this will allow connections by both 802.11n and 802.11g wireless stations.</li> <li>• <b>Mixed 802.11n/802.11g/802.11b</b> - this is the default, and will allow connections by 802.11n, 802.11b and 802.11g wireless stations.</li> </ul>

<b>Auto Channel Scan</b>	If "Enable" is selected, the Access Point will select the best available Channel.
<b>Channel /Frequency</b>	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.
<b>Channel Bandwidth</b>	Select the desired bandwidth from the list.
<b>Extension Sub-Channel</b>	Select Above or Below Primary Channel from the list.
<b>Operation Mode</b>	<p>Select the desired mode:</p> <ul style="list-style-type: none"> <li>• <b>Access Point</b> - operate as a normal Access Point</li> <li>• <b>Bridge (Point-to-Point)</b> - Bridge to a single AP. You must provide the MAC address of the other AP in the PTP Bridge AP MAC Address field.</li> <li>• <b>Bridge (Multi-Point)</b> - 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".</li> <li>• <b>Wireless Client/Repeater</b> - Act as a client or repeater for another Access Point. If selected, you must provide <b>Remote SSID</b> and the address (MAC address) of the other AP in the <b>Remote AP MAC Address</b> field. In this mode, all traffic is sent to the specified AP.</li> <li>• <b>Wireless Detection</b> - This mode will turn the access point into a wireless Monitor. A "Rogue AP" is an Access Point which should not be in use, and so can be considered to be providing unauthorized access to your LAN. <ul style="list-style-type: none"> <li>• No Security - If checked, then any AP operating with security disabled is considered to be a Rogue AP.</li> <li>• Not in Legal AP List - If checked, then 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.</li> <li>• Define Legal AP - Click this 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.</li> </ul> </li> </ul>
<b>Remote MAC Address</b>	You must enter the MAC address(es) of other AP(s) in the fields.
<b>Select Remote AP</b>	If the other AP is on-line, you can click the "Select Remote AP" button and select from a list of available APs.

## 6.2 Virtual AP Settings

Clicking the Virtual APs link on the Wireless menu will result in a screen like the following.

### Virtual AP Setting

VAPs

VAP Name	[SSID]	Security
*VAP-Name-0	[wireless-0]	None
VAP-Name-1	[wireless-1]	None
VAP-Name-2	[wireless-2]	None
VAP-Name-3	[wireless-3]	None
VAP-Name-4	[wireless-4]	None
VAP-Name-5	[wireless-5]	None
VAP-Name-6	[wireless-6]	None
VAP-Name-7	[wireless-7]	None

\* Indicates virtual AP is currently enabled.

Isolation  Isolate all Virtual APs from each other

### Data - Virtual AP Settings Screen

VAPs	
<b>VAP List</b>	All available VAPs are listed. For each VAP, the following data is displayed: <ul style="list-style-type: none"> <li>• * If displayed before the name of the VAP, this indicates the VAP is currently enabled. If not displayed, the VAP is currently disabled.</li> <li>• VAP Name The current VAP name is displayed.</li> <li>• [SSID] The current SSID associated with this VAP.</li> <li>• Security System The current security system (e.g. WPA-PSK ) is displayed.</li> </ul>
<b>Enable Button</b>	Enable the selected VAP.
<b>Configure Button</b>	Change the settings for the selected VAP.
<b>Disable Button</b>	Disable the selected VAP.
Isolation	
<b>Isolate all Virtual APs from each other</b>	If this option is enabled, wireless clients using different VAPs (different SSIDs) are isolated from each other, so they will NOT be able to communicate with each other. 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.



## Virtual AP Settings Screen

This screen is displayed when you select a VAP on the Virtual AP Settings screen, and click the Configure button.

### Virtual AP

VAP    VAP Name:

      SSID:

      Broadcast SSID:     Disable  Enable

      Isolation within VAP:  Disable  Enable

Security    Security System:  ▼

Enter the desired settings for each of the following:

<b>VAP Name</b>	Enter a suitable name for this VAP.
<b>SSID</b>	Enter the desired SSID. Each VAP must have a unique SSID.
<b>Broadcast SSID</b>	<p>If Disabled, no SSID is broadcast.</p> <p>If enabled, 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.</p>
<b>Isolation within VAP</b>	If enabled, then each Wireless station using the Access Point is invisible to other Wireless stations. In most business stations, this setting should be Disabled.

## 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 frequently.

- **WPA2-PSK** - This is a further development of WPA-PSK, and offers even greater security, using the AES (Advanced Encryption Standard) method of encryption.
- **WPA-PSK and WPA2-PSK** - This method, sometimes called "Mixed Mode", allows clients to use EITHER WPA-PSK (with TKIP) OR WPA2-PSK (with AES).
- **WPA with Radius** - 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 Access Point 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.
  - **WPA2 with Radius** - This version of WPA2 requires a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using the WPA2 standard.
- If this option is selected:
- This Access Point must have a "client login" on the Radius Server.
  - Each user must authenticate on the Radius Server. This is usually done using digital certificates.
  - Each user's wireless client must support 802.1x and provide the Radius authentication data when required.
  - All data transmission is encrypted using the WPA2 standard. Keys are automatically generated, so no key input is required.
  - **WPA and WPA2 with Radius** - EITHER WPA or WPA2 require a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using EITHER WPA or WPA2 standard.

If this option is selected:

- This Access Point must have a "client login" on the Radius Server.
- Each user must authenticate on the Radius Server. This is usually done using digital certificates.
- Each user's wireless client must support 802.1x and provide the Radius authentication data when required.
- All data transmission is encrypted using EITHER WPA or WPA2 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 this option is selected:

- This Access Point 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.

## Security Settings - None

### Virtual AP

VAP	VAP Name:	<input type="text" value="VAP-Name-0"/>
	SSID:	<input type="text" value="wireless-0"/>
	Broadcast SSID:	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Isolation within VAP:	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Security	Security System:	<input type="text" value="None"/>

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

## Security Settings - WEP

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

### Virtual AP

VAP	VAP Name:	<input type="text" value="VAP-Name-0"/>
	SSID:	<input type="text" value="wireless-0"/>
	Broadcast SSID:	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
	Isolation within VAP:	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Security	Security System:	<input type="text" value="WEP"/>
	Data Encryption:	<input type="text" value="64 bit"/>
	Authentication:	<input type="text" value="Open System"/>
	<b>WEP Keys</b>	
	Key input:	<input checked="" type="radio"/> Hex (0~9 and A~F) <input type="radio"/> ASCII
	Key 1:	<input checked="" type="radio"/> <input type="text"/>
	Key 2:	<input type="radio"/> <input type="text"/>
	Key 3:	<input type="radio"/> <input type="text"/>
	Key 4:	<input type="radio"/> <input type="text"/>
	Passphrase:	<input type="text"/> <input type="button" value="Generate Key"/>

## Data - WEP Screen

WEP	
<b>Data Encryption</b>	<p>Select the desired option, and ensure your Wireless stations have the same setting:</p> <ul style="list-style-type: none"><li>• <b>64 Bit Encryption</b> - Keys are 10 Hex (5 ASCII) characters.</li><li>• <b>128 Bit Encryption</b> - Keys are 26 Hex (13 ASCII) characters.</li><li>• <b>152 Bit Encryption</b> - Keys are 32 Hex (16 ASCII) characters.</li></ul>
<b>Authentication</b>	<p>Normally, you can leave this at "Automatic", so that Wireless Stations can use either method ("Open System" or "Shared Key").</p> <p>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.</p>
<b>Key Input</b>	<p>Select "Hex" or "ASCII" depending on your input method. (All keys are converted to Hex, ASCII input is only for convenience.)</p>
<b>Key Value</b>	<p>Enter the key values you wish to use. The default key, selected by the radio button, is required. The other keys are optional. Other stations must have matching key values.</p>
<b>Passphrase</b>	<p>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).</p>

## 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.

### Virtual AP

VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security System: WPA-PSK ▼

Network Key:

WPA Encryption: TKIP ▼

**Key Updates**

Group Key Update    Key Lifetime:  minutes

Update Group Key when any membership terminates

### Data - WPA-PSK Screen

WPA-PSK	
<b>Network Key</b>	Enter the key value. Data is encrypted using a 256Bit key derived from this key. Other Wireless Stations must use the same key.
<b>WPA Encryption</b>	The encryption method is TKIP. Wireless Stations must also use TKIP.
<b>Group Key Update</b>	This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly.
<b>Key Lifetime</b>	This field determines how often the Group key is dynamically updated. Enter the desired value.
<b>Update Group key when any membership terminates</b>	If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the Access Point.

## Security Settings - WPA2-PSK

This is a further development of WPA-PSK, and offers even greater security, using the AES (Advanced Encryption Standard) method of encryption.

### Virtual AP

VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security System: WPA2-PSK ▼

Network Key:

WPA Encryption: AES ▼

**Key Updates**

Group Key Update    Key Lifetime:  minutes

Update Group Key when any membership terminates

### Data - WPA2-PSK Screen

WPA2-PSK	
<b>Network Key</b>	Enter the key value. Data is encrypted using a 256Bit key derived from this key. Other Wireless Stations must use the same key.
<b>WPA Encryption</b>	The encryption method is AES. Wireless Stations must also use AES.
<b>Group Key Update</b>	This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly.
<b>Key Lifetime</b>	This field determines how often the Group key is dynamically updated. Enter the desired value.
<b>Update Group key when any membership terminates</b>	If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the Access Point.

## Security Settings - WPA-PSK and WPA2-PSK

This method, sometimes called "Mixed Mode", allows clients to use EITHER WPA-PSK (with TKIP) OR WPA2-PSK (with AES).

### Virtual AP

VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security System:

Network Key:

WPA Encryption:

**Key Updates**

Group Key Update Key Lifetime:  minutes

Update Group Key when any membership terminates

## Data - WPA-PSK and WPA2-PSK Screen

WPA-PSK and WPA2-PSK	
<b>Network Key</b>	Enter the key value. Data is encrypted using this key. Other Wireless Stations must use the same key.
<b>WPA Encryption</b>	The encryption method is TKIP for WPA-PSK, and AES for WPA2-PSK.
<b>Group Key Update</b>	This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly.
<b>Key Lifetime</b>	This field determines how often the Group key is dynamically updated. Enter the desired value.
<b>Update Group key when any membership terminates</b>	If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the Access Point.

## Security Settings - WPA with Radius

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.

### Virtual AP

VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security System:

WPA Encryption:

**Key Updates**

Group Key Update Key Lifetime:  minutes

Update Group Key when any membership terminates

## Data - WPA with Radius Screen

WPA with Radius	
<b>WPA Encryption</b>	The encryption method is TKIP. Wireless Stations must also use TKIP.
<b>Group Key Update</b>	This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly.
<b>Key Lifetime</b>	This field determines how often the Group key is dynamically updated. Enter the desired value.
<b>Update Group key when any membership terminates</b>	If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the Access Point.



## Security Settings - WPA2 with Radius

This version of WPA2 requires a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using the WPA2 standard.

### Virtual AP

VAP VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security Security System:

WPA Encryption:

**Key Updates**

Group Key Update Key Lifetime:  minutes

Update Group Key when any membership terminates

## Data - WPA2 with Radius Screen

WPA2 with Radius	
<b>WPA Encryption</b>	The encryption method is AES. Wireless Stations must also use AES.
<b>Group Key Update</b>	This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly.
<b>Key Lifetime</b>	This field determines how often the Group key is dynamically updated. Enter the desired value.
<b>Update Group key when any membership terminates</b>	If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the Access Point.

## Security Settings - WPA and WPA2 with Radius

EITHER WPA or WPA2 require a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using EITHER WPA or WPA2 standard.

### Virtual AP

VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security System:

WPA Encryption:

**Key Updates**

Group Key Update Key Lifetime:  minutes

Update Group Key when any membership terminates

## Data - WPA and WPA2 with Radius Screen

WPA and WPA2 with Radius	
<b>WPA Encryption</b>	The encryption method is TKIP for WPA, and AES for WPA2.
<b>Group Key Update</b>	This refers to the key used for broadcast transmissions. Enable this if you want the keys to be updated regularly.
<b>Key Lifetime</b>	This field determines how often the Group key is dynamically updated. Enter the desired value.
<b>Update Group key when any membership terminates</b>	If enabled, the Group key will be updated whenever any member leaves the group or disassociates from the Access Point.

## Security Settings - 802.1x

This uses the 802.1x standard for client authentication, and WEP for data encryption. If this option is selected:

- This Access Point 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. See Chapter4 for details of user configuration.
- Each user's 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.

### Virtual AP

VAP Name:

SSID:

Broadcast SSID:  Disable  Enable

Isolation within VAP:  Disable  Enable

Security System:

WEP Key Size:

Dynamic WEP key (EAP-TLS, PEAP etc)

Key Exchange with lifetime of  minutes

Static WEP Key (EAP-MD5)

WEP Key :  (hex)

WEP Key Index:

## Data - 802.1x Screen

802.1x	
<b>WEP Key Size</b>	Select the desired option: <ul style="list-style-type: none"> <li>• <b>64 Bit</b> - Keys are 10 Hex (5 ASCII) characters.</li> <li>• <b>128 Bit</b> - Keys are 26 Hex (13 ASCII) characters.</li> <li>• <b>152 Bit</b> - Keys are 32 Hex (16 ASCII) characters.</li> </ul>
<b>Dynamic WEP Key</b>	Click this if you want the WEP keys to be automatically generated. <ul style="list-style-type: none"> <li>• The key exchange will be negotiated. The most widely supported protocol is EAP-TLS.</li> <li>• The following Key Exchange setting determines how often the keys are changed.</li> <li>• Both Dynamic and Static keys can be used simultaneously, allowing clients using either method to use the Access Point.</li> </ul>

<b>Key Exchange</b>	This setting is only available if using Dynamic WEP Keys. If you want the Dynamic WEP keys to be updated regularly, enable this and enter the desired <b>lifetime</b> (in minutes).
<b>Static WEP Key (EAP-MD5)</b>	Enable this if some wireless clients use a fixed (static) WEP key, using EAP-MD5. Note that both Dynamic and Static keys can be used simultaneously, allowing clients using either method to use the Access Point.
<b>WEP Key</b>	Enter the WEP key according to the <b>WEP Key Size</b> setting above. Wireless stations must use the same key.
<b>WEP Key Index</b>	Select the desired index value. Wireless stations must use the same key index.

## 6.3 Radius Server Settings

Clicking the Radius Server Settings link on the Wireless menu will result in a screen like the following.

### Radius Server Settings

Primary Authentication Server

IP Address:  .  .  .

Port Number:

Shared Secret:

Secondary Authentication Server

IP Address:  .  .  .

Port Number:

Shared Secret:

Primary Accounting Server

IP Address:  .  .  .

Port Number:

Shared Secret:

Secondary Accounting Server

IP Address:  .  .  .

Port Number:

Shared Secret:

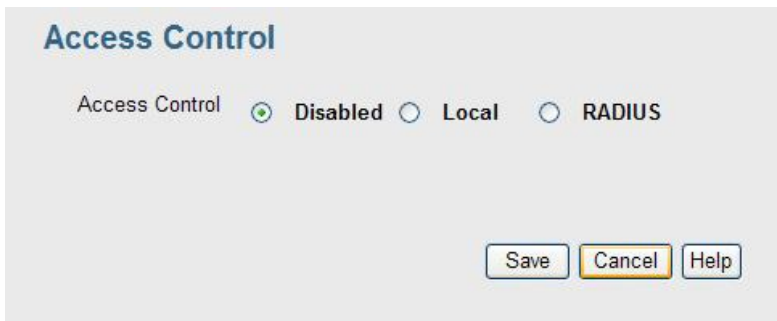
## Data - Radius Server Settings Screen

Authentication Server	
<b>Primary Authentication Server</b>	Enter the name or IP address of the Radius Server on your network.
<b>Port Number</b>	Enter the port number used for connections to the Radius Server.
<b>Shared Secret</b>	Enter the key value to match the Radius Server.
<b>Secondary Authentication Server</b>	The Secondary Authentication Server will be used when the Primary Authentication Server is not available.
Accounting Server	
<b>Primary Accounting Server</b>	Enter the IP address in the following fields if you want this Access Point to send accounting data to the Radius Server.
<b>Port Number</b>	The port used by your Radius Server must be entered in the field.
<b>Shared Secret</b>	Enter the key value to match the Radius Server.
<b>Secondary Accounting Server</b>	The Secondary Accounting Server will be used when the Primary Accounting Server is not available.

## 6.4 Access Control

This feature can be used to block access to your LAN by unknown or entrusted wireless stations.

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



## Data - Access Control Screen

<b>Access Control</b>	<p>Select the desired option, as required</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b> - The Access Control feature is disabled.</li> <li>• <b>Local</b> - Select <i>Allow only following MAC addresses</i> or <i>Deny following MAC addresses</i>.</li> <li>• <b>Radius</b> - The Access Point will use the MAC address table located on the external Radius server on the LAN for Access Control.</li> </ul> <p><b>Warning !</b> Ensure your own PC is in the "Trusted Wireless Stations" list before enabling this feature.</p>
<b>Local Trusted Stations</b>	<p>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:</p> <ul style="list-style-type: none"> <li>• Name - the name of the Wireless station.</li> <li>• MAC Address - the MAC or physical address of each Wireless station.</li> <li>• Connected - this indicates whether or not the Wireless station is currently associates with this Access Point.</li> </ul>
<b>Buttons</b>	
<b>Modify List</b>	<p>To change the list of Trusted Stations (Add, Edit, or Delete a Wireless Station or Stations), click this button. You will then see the <i>Trusted Wireless Stations</i> screen, described below.</p>
<b>Read from File</b>	<p>To upload a list of Trusted Stations from a file on your PC, click this button.</p>
<b>Write to File</b>	<p>To download the current list of Trusted Stations from the Access Point to a file on your PC, click this button.</p>

## 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.

Trusted Wireless Stations

Trusted Wireless Stations

Other Wireless Stations

Name:

Address:  (Physical/MAC address)

## Data - Trusted Wireless Stations

<b>Trusted Wireless Stations</b>	This lists any Wireless Stations which you have designated as "Trusted".
<b>Other Wireless Stations</b>	This list any Wireless Stations detected by the Access Point, which you have not designated as "Trusted".
<b>Name</b>	The name assigned to the Trusted Wireless Station. Use this when adding or editing a Trusted Station.
<b>Address</b>	The MAC (physical) address of the Trusted Wireless Station. Use this when adding or editing a Trusted Station.
<b>Buttons</b>	
<<	<p>Add a Trusted Wireless Station to the list (move from the "Other Stations" list).</p> <ul style="list-style-type: none"> <li>• Select an entry (or entries) in the "Other Stations" list, and click the "&lt;&lt;" button.</li> <li>• Enter the Address (MAC or physical address) of the wireless station, and click the "Add" button.</li> </ul>
>>	<p>Delete a Trusted Wireless Station from the list (move to the "Other Stations" list).</p> <ul style="list-style-type: none"> <li>• Select an entry (or entries) in the "Trusted Stations" list.</li> <li>• Click the "&gt;&gt;" button.</li> </ul>
<b>Select All</b>	Select all of the Stations listed in the "Other Stations" list.
<b>Select None</b>	De-select any Stations currently selected in the "Other Stations" list.
<b>Edit</b>	<p>To change an existing entry in the "Trusted Stations" list, select it and click this button.</p> <ol style="list-style-type: none"> <li>7. Select the Station in the "Trusted Station" list.</li> <li>8. Click the "Edit" button. The address will be copied to the "Address" field, and the "Add" button will change to "Update".</li> <li>9. Edit the address (MAC or physical address) as required.</li> <li>10. Click "Update" to save your changes.</li> </ol>
<b>Add</b>	To add a Trusted Station which is not in the "Other Wireless Stations" list, enter the required data and click this button.
<b>Clear</b>	Clear the <i>Name</i> and <i>Address</i> fields.

## 6.5 Advanced Setting

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

### Wireless Advanced Settings

Options  Worldwide Mode (802.11d)

WMM  Enable WMM (Wi-Fi Multimedia) Support

Parameters

Disassociated Timeout (0-99):  Minutes

Fragmentation Length (256-2346):

Beacon Interval (20-1000):  ms

RTS/CTS Threshold (1-2347):

Preamble Type  ▾

802.11B Protection Mode  ▾

### Data - Advanced Settings Screen

Options	
<b>Worldwide Mode (802.11d)</b>	Enable this setting if you wish to use this mode, and your Wireless stations support this mode.
WMM	
<b>Enable WMM Support</b>	Check this to enable WMM (Wi-Fi Multimedia) support in the Access Point. If WMM is also supported by your wireless clients, voice and multimedia traffic will be given a higher priority than other traffic.
<b>No Acknowledgement</b>	If enabled, then WMM acknowledgement is disabled. Depending on the environment, disabling acknowledgement may increase throughput slightly.
Parameters	
<b>Disassociated Timeout</b>	This determines how quickly a Wireless Station will be considered "Disassociated" with this AP, when no traffic is received. Enter the desired time period.
<b>Fragmentation Length</b>	Enter the preferred setting between 256 and 2346. Normally, this can be left at the default value.
<b>Beacon Interval</b>	Enter the preferred setting between 20 and 1000. Normally, this can be left at the default value.



<b>RTS/CTS Threshold</b>	Enter the preferred setting between 1 and 2347. Normally, this can be left at the default value.
<b>Preamble Type</b>	Select the desired option. The default is "Long". The "Short" setting takes less time when used in a good environment.
<b>802.11b Protection Mode</b>	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 a 802.11g transmission is in progress.) Normally, this should be left at "Auto".

## 6.6 Wi-Fi Protected Setup

Click WiFi Protected Setup on the Wireless menu to view a screen like the following:

### WiFi Protected Setup

Use one of the following for each WPS-supported device:

Press the device's button, then click

Enter the device's PIN number , then click

Enter AP's PIN number **09013667** into your device.

---

You can change the Access Point's PIN number:

Enter the new PIN number

---

WPS Status: Unconfigured  
 Network Name(SSID): wireless-0  
 Security: None  
 Passphrase: no

### Data - WPS Screen

WPS	
<b>Use one of the following..</b>	<ul style="list-style-type: none"> <li>If the first option is selected, press the WPS button on the client device, then click the <i>Push button</i>.</li> <li>If the second option is selected, enter the PIN code from the client device in this field and click <i>Register</i> button.</li> <li>If the third option is selected, enter the displayed PIN code to the client device.</li> </ul>
<b>Change AP Settings</b>	Enter the desired pin value manually or click the <i>Auto generate</i> button to have the new pin code displayed in the field.
<b>WPS Status</b>	It displays the current WPS status.
<b>Network Name</b>	It displays the network name in use.
<b>Security</b>	The current security method is displayed.
<b>Passphrase</b>	The current status of Passphrase is displayed.

# Chapter 7

## Management

### 7.1 Basic Settings

The Admin Login screen allows you to assign a password to the WNAP-3000PE. 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	
<b>User Name</b>	Enter the login name for the Administrator.
<b>Change Admin Password</b>	If you wish to change the Admin password, check this field and enter the new login password in the fields below.
<b>New Password</b>	Enter the desired login password.
<b>Repeat New Password</b>	Re-enter the desired login password.
Admin Connections	
<b>Allow Admin connections via wired Ethernet only</b>	If checked, then Admin connections via the Wireless interface will not be accepted.

<b>Enable HTTP</b>	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.
<b>HTTP Port Number</b>	Enter the port number to be used for HTTP connections to this device. The default value is 80.
<b>Enable HTTPS</b>	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.
<b>HTTPS Port Number</b>	Enter the port number to be used for HTTPS connections to this device. The default value is 443.
<b>Enable Telnet</b>	If desired, you can enable this option. If enabled, you will be 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.

## 7.2 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 its Firmware by downloading the Firmware file from your FTP Server.

### Auto Config/Auto Update

Auto Config  Perform Auto Configuration on this AP  
 Respond to Auto-configuration request by other AP  
 Provide admin login name and password  
 Provide "Respond to Auto-configuration" setting

Auto Update  Check for Firmware upgrade every  days

FTP Server address:

FTP Firmware pathname:

FTP Login Name:

FTP Password:

## Data - Auto Config/Update Screen

Admin Connections	
<b>Perform Auto Configuration on this AP next restart</b>	<p>If checked, this AP will perform Auto Configuration the next time it restarts.</p> <ul style="list-style-type: none"> <li>• The wired LAN (NOT the Wireless LAN) will be searched for compatible APs.</li> <li>• If a compatible AP is found, its configuration is copied. If more than one compatible AP exists, the first one found is used.</li> <li>• Some data cannot be copied: <ul style="list-style-type: none"> <li>○ The IP address is not copied, and will not change.</li> <li>○ The operating mode (Repeater, Bridge, etc) is not copied, and will not change.</li> </ul> </li> </ul> <p><b>Note:</b> This checkbox is automatically disabled, so the Auto-configuration is only performed once.</p>
<b>Respond to Auto-configuration request by other AP</b>	<p>If checked, this AP will respond to "Auto Configuration" requests it receives. If not checked, "Auto Configuration" requests will be ignored.</p>
<b>Provide login name and password</b>	<p>If enabled, the login name and password 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 login name and password.</p>
<b>Provide "Respond to Auto-configuration" setting</b>	<p>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.</p>
Auto Update	
<b>Check for Firmware upgrade</b>	<p>If enabled, this AP will check to see if a Firmware (FW) upgrade is available on the specified FTP Server. If enabled:</p> <ul style="list-style-type: none"> <li>• Enter the desired time interval (in days) between checks.</li> <li>• Select the desired option for installation (see next item).</li> <li>• Provide the FTP server information.</li> </ul>

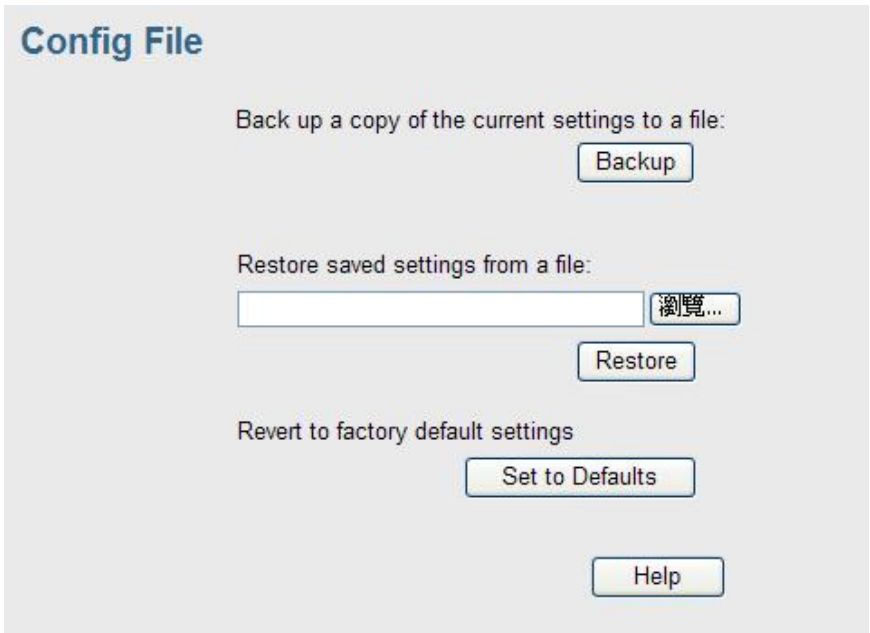
<b>Install...</b>	Select the desired option: <ul style="list-style-type: none"> <li>• <b>Install FW if different version found</b> If selected, and the firmware file at the specified location is different to the current installed version, the FW will be installed. This allows "Downgrades" - installing an older version of the FW to replace the current version.</li> <li>• <b>Install later version only</b> If selected, the firmware file at the specified location will only be installed if it is a later version.</li> </ul>
<b>FTP Server address</b>	Enter the address (domain name or IP address) of the FTP Server.
<b>Firmware pathname</b>	Enter the full path (including the FW filename) to the FW file on the FTP Server.
<b>FTP Login Name</b>	Enter the login name required to gain access to the FTP Server.
<b>FTP Password</b>	Enter the password for the login name above.

## 7.3 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 WNAP-3000PE back to its factory default settings.

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



**Data - Config File Screen**

<b>Backup</b>	
<b>Save a copy of current settings</b>	<p>Once you have the WNAP-3000PE 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.</p> <p>To create a backup file of the current settings:</p> <ul style="list-style-type: none"> <li>• Click <b>Back Up</b>.</li> <li>• 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 <b>Save</b>.</li> </ul>
<b>Restore</b>	
<b>Restore saved settings from a file</b>	<p>To restore settings from a backup file:</p> <ol style="list-style-type: none"> <li>1. Click <b>Browse</b>.</li> <li>2. Locate and select the previously saved backup file.</li> <li>3. Click <b>Restore</b></li> </ol>
<b>Defaults</b>	
<b>Revert to factory default settings</b>	<p>To erase the current settings and restore the original factory default settings, click <b>Set to Defaults</b> button.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• This will terminate the current connection. The WNAP-3000PE will be unavailable until it has restarted.</li> <li>• By default, the WNAP-3000PE 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.</li> </ul>

## 7.4 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.

### SNMP Settings

**General**

SNMP: Disable ▾

Read Only Community:

Read/Write Community:

**SNMPv3**

Username:

Authentication Protocol: None ▾

Authentication Key:

Privacy Protocol: None ▾

Privacy Key:

**Managers**

Any Station

Only this Station: ...

**Traps**

Version: Version 1 ▾

Receiver: ...

### Data - SNMP Screen

General	
<b>Enable SNMP</b>	Use this to enable or disable SNMP as required
<b>Community</b>	Enter the community string, usually either "Public" or "Private".
<b>Access Rights</b>	Select the desired option: <ul style="list-style-type: none"> <li>Read-only - Data can be read, but not changed.</li> <li>Read/Write - Data can be read, and setting changed.</li> </ul>
Managers	
<b>Any Station</b>	The IP address of the manager station is not checked.
<b>Only this station</b>	The IP address is checked, and must match the address you enter in the IP address field provided.  If selected, you must enter the IP address of the required station.
Traps	
<b>Disable</b>	Traps are not used.
<b>Broadcast</b>	Select this to have Traps broadcast on your network. This makes them available to any PC.



<b>Send to</b>	Select this to have Trap messages sent to the specified PC only. If selected, you must enter the IP Address of the desired PC.
<b>Trap version</b>	Select the desired option, as supported by your SNMP Management program.

## 7.5 Log Settings

If you have a Syslog Server on your LAN, this screen allows you to configure the Access Point to send log data to your Syslog Server.

Figure 2: Syslog Settings Screen

### Data - Syslog Settings Screen

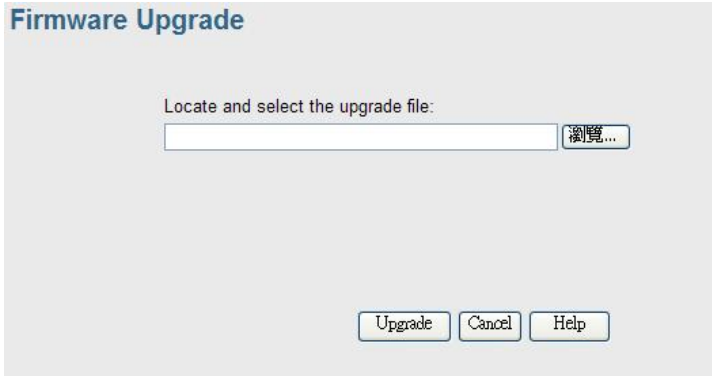
<b>Syslog Server</b>	<p>Select the desired Option:</p> <ul style="list-style-type: none"> <li>• <b>Disable</b> - Syslog server is not used.</li> <li>• <b>Broadcast</b> - Syslog data is broadcast. Use this option if different PCs act as the Syslog server at different times.</li> <li>• <b>Unicast</b> - 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.</li> </ul>
<b>Server Name/IP Address</b>	Enter the name or IP address of your Syslog Server.
<b>Minimum Severity Level</b>	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.
<b>Email Alerts</b>	
<b>Email Alerts</b>	If enabled, an e-mail will be sent. If enabled, the e-mail address information (below) must be provided.
<b>Log Queue Length</b>	Enter the desired length of the log queue. The default is 20 entries.

<b>Log Time Threshold</b>	Enter the preferred value between 60 and 600, which determine how often the log will be emailed to you. Normally, this can be left at the default value. The default is 600 seconds.
<b>SMTP Mail Server</b>	Enter the domain name or IP address of the SMTP (Simple Mail Transport Protocol) server you use for sending e-mails.
<b>Email Address for Alert Logs</b>	Enter the e-mail address the log is to be sent to.
<b>E-mail Log Now</b>	Press this button to let the log to be e-mailed immediately.
<b>Log</b>	
<b>Email Alerts</b>	<p>Use these checkboxes to determine which events are included in the log. Checking all options will increase the size of the log, so it is good practice to disable any events which are not really required.</p> <ul style="list-style-type: none"> <li>• <b>Unauthorized Login Attempt</b> - If checked, the unauthorized users who attempted to login to the Access Point are logged.</li> <li>• <b>Authorized Login</b> - If checked, this will log the authorized login TO this Access Point.</li> <li>• <b>System Error Message</b> - If checked, the system error message will be logged.</li> <li>• <b>Configuration Changes</b> - If checked, the changes of configuration will be logged.</li> </ul>

## 7.6 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.



The screenshot shows a web interface titled "Firmware Upgrade". Below the title, there is a text prompt "Locate and select the upgrade file:" followed by a text input field and a "浏览..." (Browse...) button. At the bottom of the interface, there are three buttons: "Upgrade", "Cancel", and "Help".

### 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 WNAP-3000PE is unavailable during the upgrade process, and must restart when the upgrade is completed. Any connections to or through the WNAP-3000PE will be lost.

## Chapter 8

# PC and Server configuration

### 8.1 Overview

All Wireless Stations need to have settings which match the Wireless Access Point. These settings depend on the mode in which the WNAP-3000PE 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 WNAP-3000PE, 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.

### 8.2 Using WEP

For each of the following items, each Wireless Station must have the same settings as the WNAP-3000PE.

<b>Mode</b>	On each PC, the mode must be set to <b><i>Infrastructure</i></b> .
<b>SSID (ESSID)</b>	This must match the value used on the WNAP-3000PE. The default value is <b>wireless</b> <b>Note: The SSID is case sensitive.</b>
<b>Wireless Security</b>	<ul style="list-style-type: none"><li>• Each Wireless station must be set to use WEP data encryption.</li><li>• The Key size (64 bit, 128 bit, 152 bit) must be set to match the WNAP-3000PE.</li><li>• The keys values on the PC must match the key values on the WNAP-3000PE.</li></ul> <b>Note:</b> 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.

### 8.3 Using WPA-PSK

For each of the following items, each Wireless Station must have the same settings as the WNAP-3000PE.

<b>Mode</b>	On each PC, the mode must be set to <b><i>Infrastructure</i></b> .
<b>SSID (ESSID)</b>	This must match the value used on the WNAP-3000PE. The default value is <b>wireless</b> <b>Note: The SSID is case sensitive.</b>
<b>Wireless</b>	On each client, Wireless security must be set to WPA-PSK.

<b>Security</b>	<ul style="list-style-type: none"> <li>• The <b>Pre-shared Key</b> entered on the WNAP-3000PE must also be entered on each Wireless client.</li> <li>• The <b>Encryption</b> method (e.g. TKIP, AES) must be set to match the WNAP-3000PE.</li> </ul>
-----------------	---

## 8.4 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 WNAP-3000PE.

<b>Mode</b>	On each PC, the mode must be set to <b>Infrastructure</b> .
<b>SSID (ESSID)</b>	<p>This must match the value used on the WNAP-3000PE.</p> <p>The default value is <b>wireless</b></p> <p><b>Note: The SSID is case sensitive.</b></p>
<b>802.1x Authentication</b>	Each client must obtain a Certificate which is used for authentication for the Radius Server.
<b>802.1x Encryption</b>	<p>Typically, EAP-TLS is used. This is a dynamic key system, so keys do NOT have to be entered on each Wireless station.</p> <p>However, you can also use a static WEP key (EAP-MD5); the WNAP-3000PE supports both methods simultaneously.</p>

### 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 WNAP-3000PE itself.
- The WNAP-3000PE 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 WNAP-3000PE, must match the *Shared Secret* value on the Radius Server.
- **Encryption** settings must be correct.

## 8.5 802.1x 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:

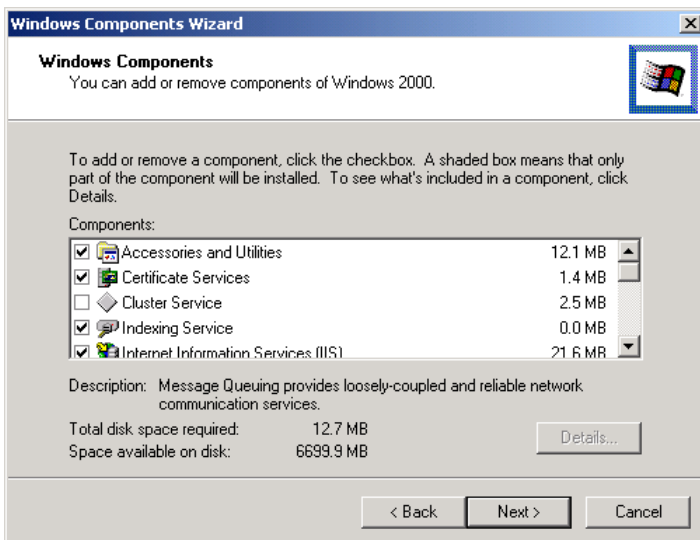
- dhcpd
- dns
- rras
- webserver (IIS)
- Radius Server (Internet Authentication Service)
- Certificate Authority

## Windows 2000 Domain Controller Setup

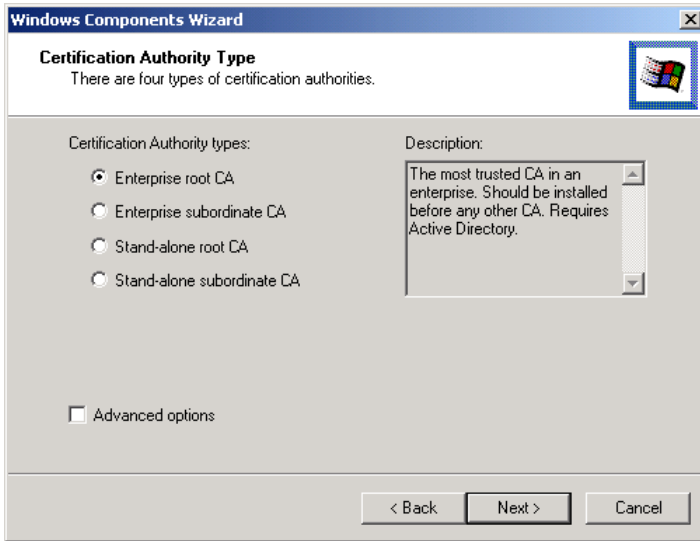
1. Run *dcpromo.exe* from the command prompt.
2. Follow all of the default prompts, ensure that DNS is installed and enabled during installation.

## Services Installation

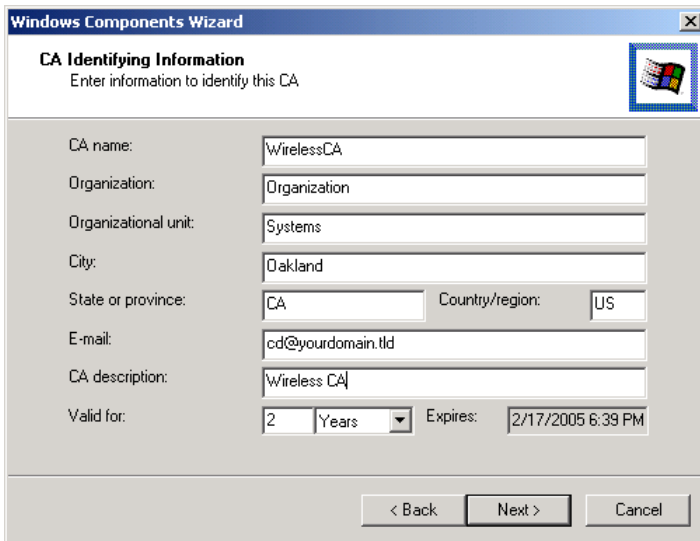
1. Select the Control Panel - Add/Remove Programs.
2. Click *Add/Remove Windows Components* from the left side.
3. Ensure that the following components are activated (selected):
  - *Certificate Services*. After enabling this, you will see a warning that the computer cannot be renamed and joined after 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*.

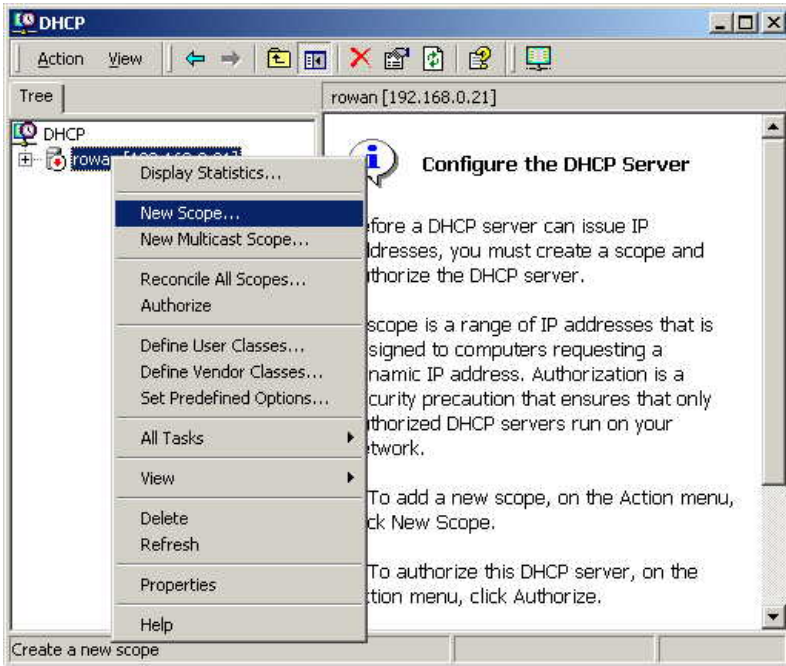


7. Click *Next* if you don't want to change the CA's configuration data.
8. Installation will warn you that Internet Information Services are running, and must be stopped before continuing. Click *Ok*, then *Finish*.

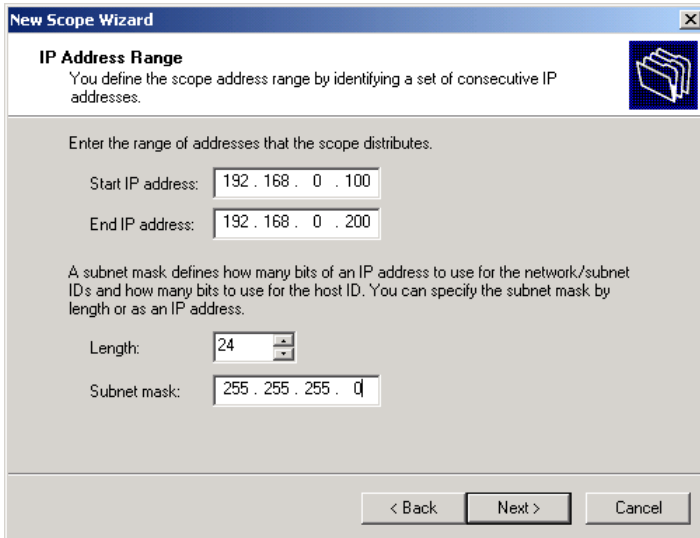
## DHCP server configuration

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

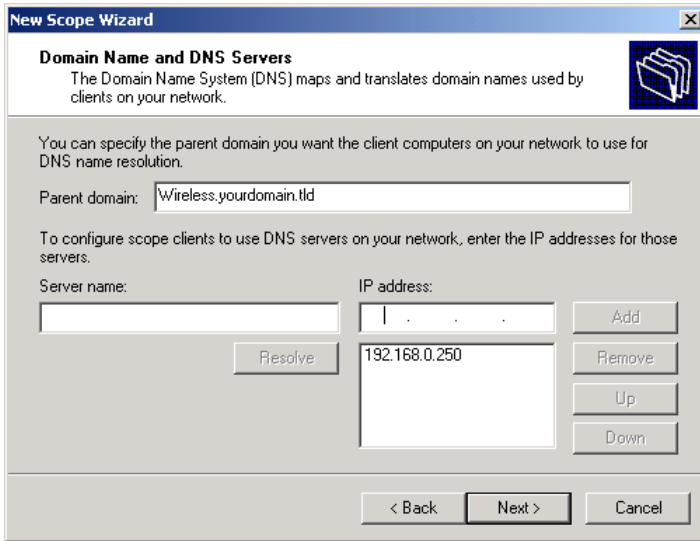




3. Click *Next* when the New Scope Wizard Begins.
4. Enter the name and description for the scope, click *Next*.
5. Define the IP address range. Change the subnet mask if necessary. Click *Next*.



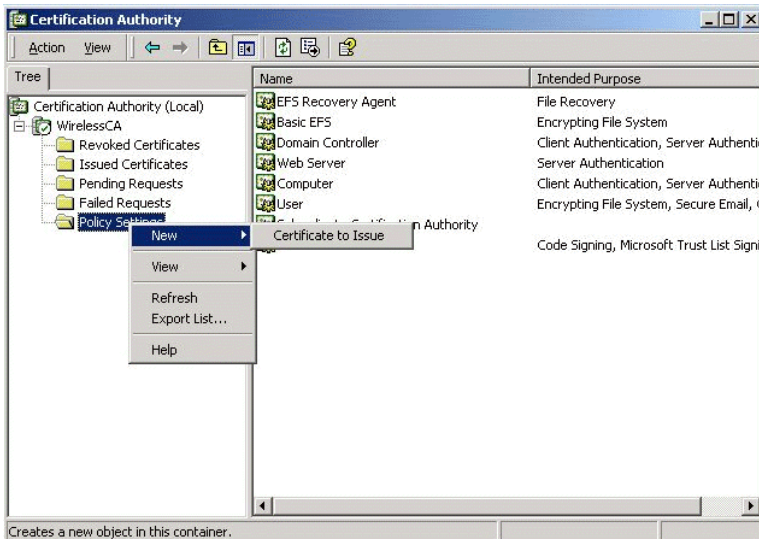
6. Add exclusions in the address fields if required. If no exclusions are required, leave it blank. Click *Next*.
7. Change the *Lease Duration* time if preferred. Click *Next*.
8. Select *Yes, I want to configure these options now*, and click *Next*.
9. Enter the router address for the current subnet. 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*.



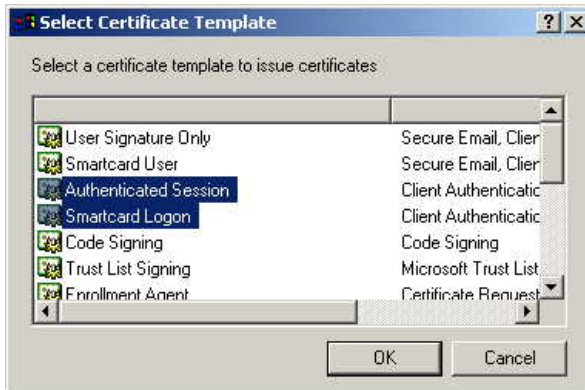
11. If you don't want a WINS server, just click *Next*.
12. Select *Yes, I want to activate this scope now*. Click *Next*, then *Finish*.
13. Right-click on the server, and select *Authorize*. It may take a few minutes to complete.

## Certificate Authority Setup

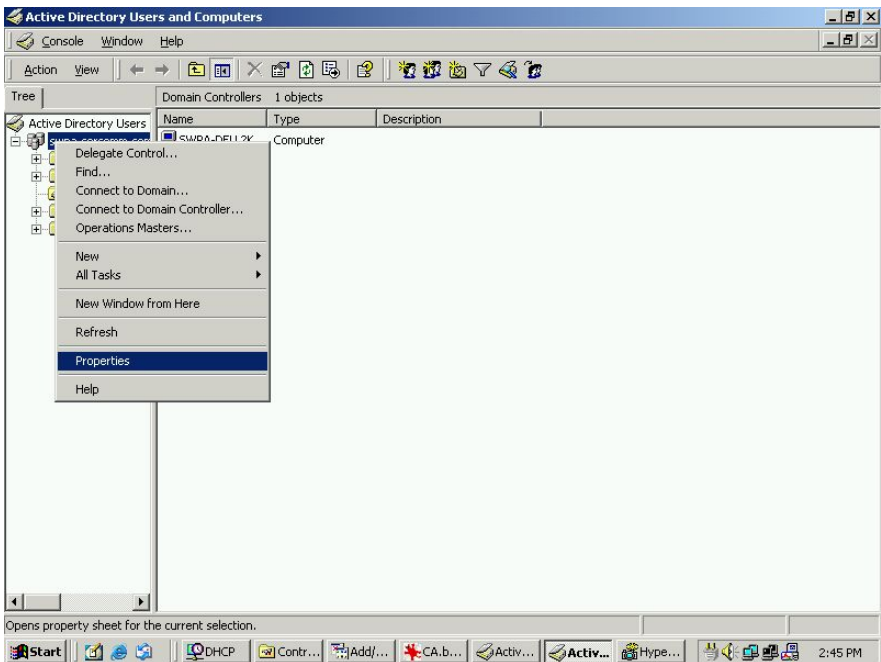
1. Select Start - Programs - Administrative Tools - Certification Authority.
2. Right-click *Policy Settings*, and select *New - Certificate to Issue*.



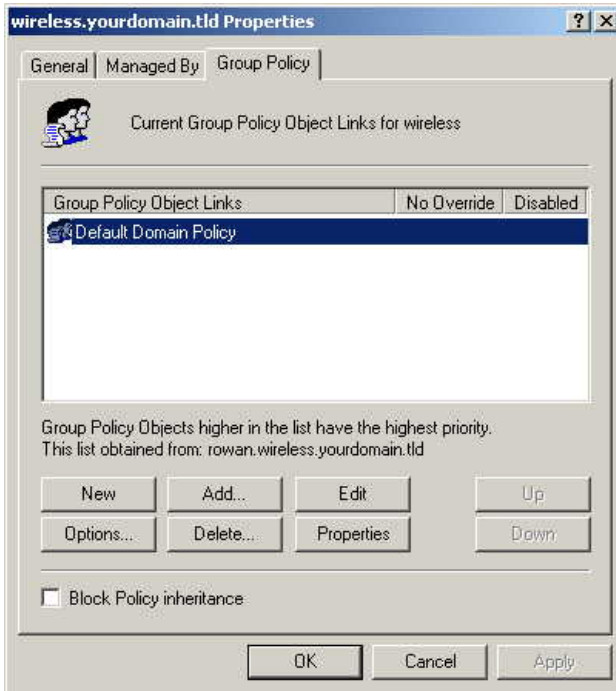
3. Select *Authenticated Session* and *Smartcard Logon* (select more than one by holding down the Ctrl key). Click OK.



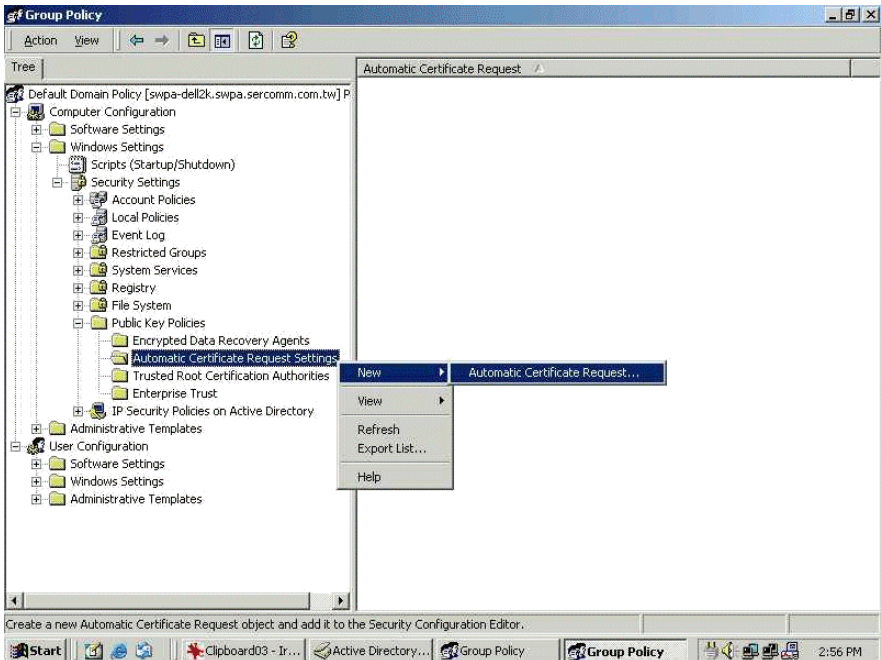
4. Select *Start - Programs - Administrative Tools - Active Directory Users and Computers*.
5. Right-click on your active directory domain, and select *Properties*.



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*.

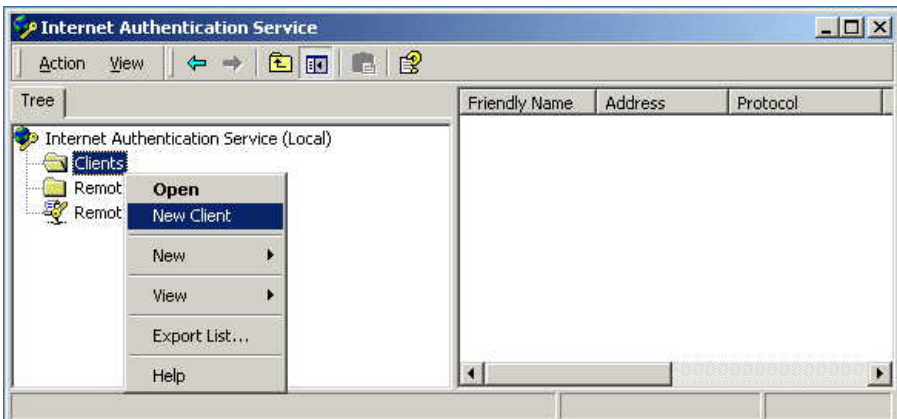
9. Select *Computer*, then click *Next*.



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 `secdit /refreshpolicy machine_policy`  
This command may take a few minutes to take effect.

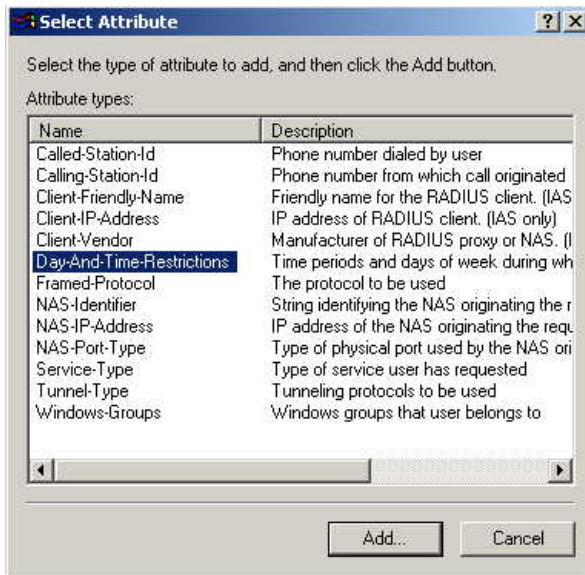
## Internet Authentication Service (Radius) Setup

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

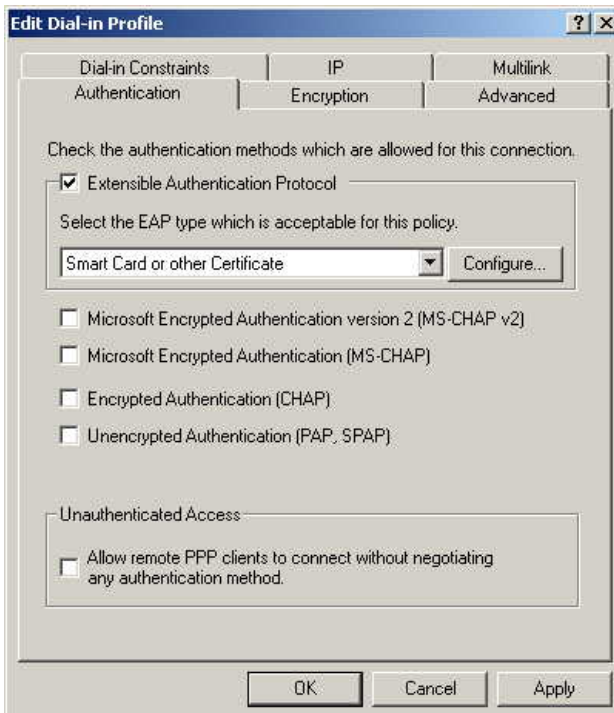


3. Enter a name for the access point, click *Next*.
4. Enter the IP address of the WNAP-3000PE, and set the shared secret, as entered on the Security Profile screen of the WNAP-3000PE.
5. Click *Finish*.
6. Right-click on *Remote Access Policies*, select *New Remote Access Policy*.
7. Assuming you are 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...*



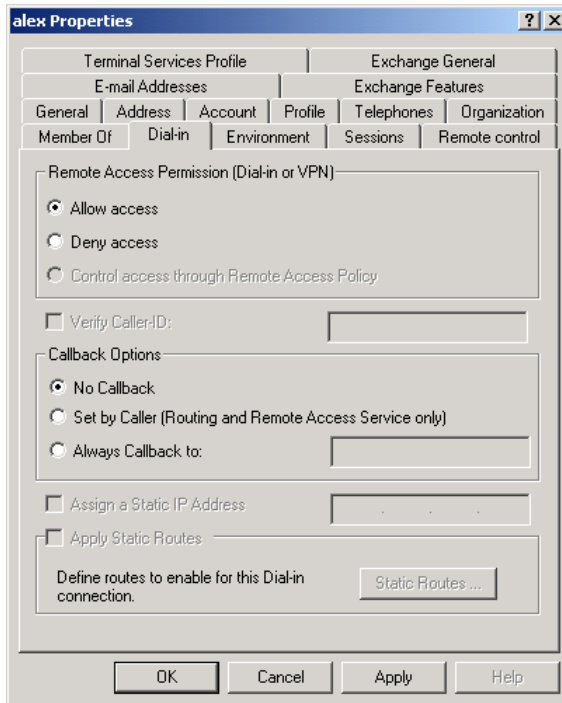
9. Click *Permitted*, then *OK*. Select *Next*.
10. Select *Grant remote access permission*. Click *Next*.
11. Click *Edit Profile...* and select the *Authentication* tab. Enable *Extensible Authentication Protocol*, and select *Smart Card or other Certificate*. Deselect other authentication methods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



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

## 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*.



## 8.6 802.1x 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.

### Client Certificate Setup

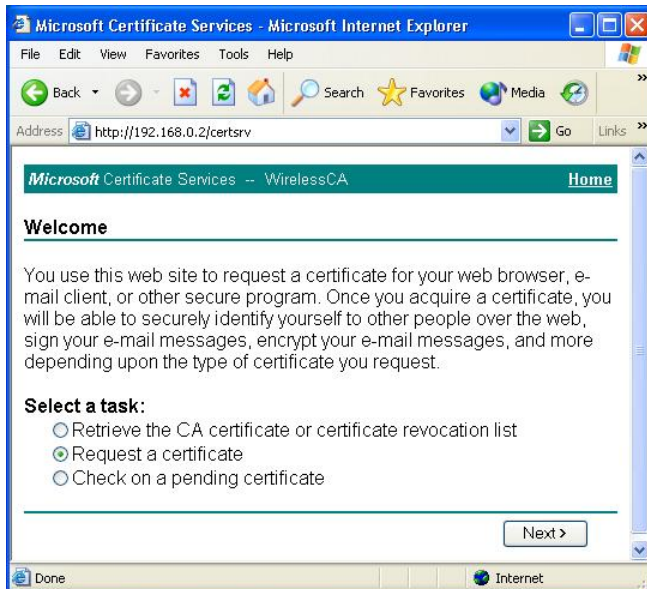
1. Connect to a network which doesn't require port authentication.
2. Start your Web Browser. In the *Address* box, enter the IP address of the Windows 2000 Server, followed by */certsrv*

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*.

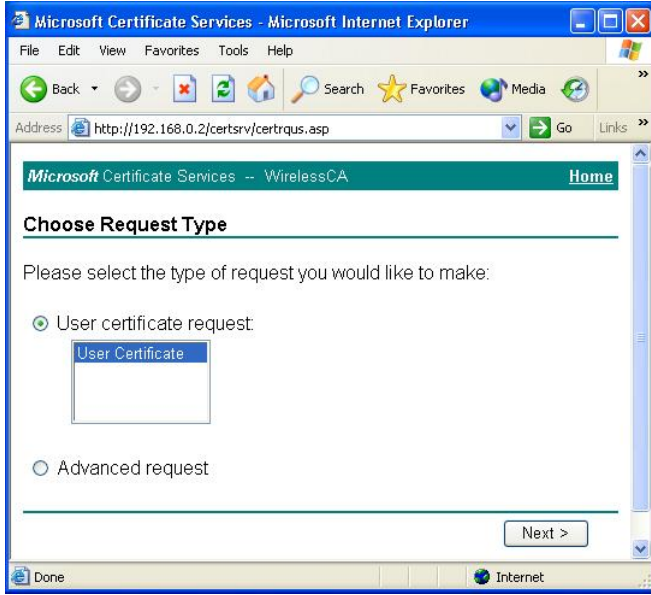


4. On the first screen (below), select *Request a certificate*, click *Next*.

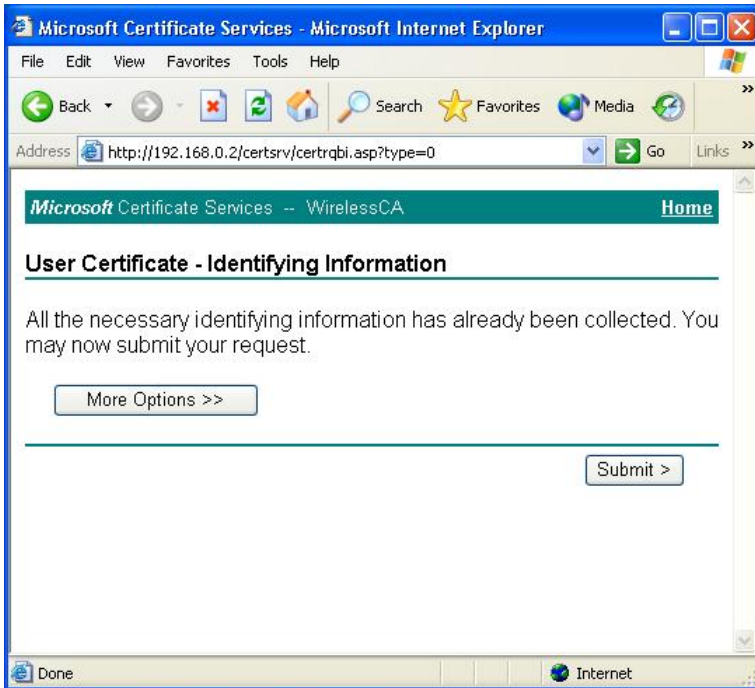




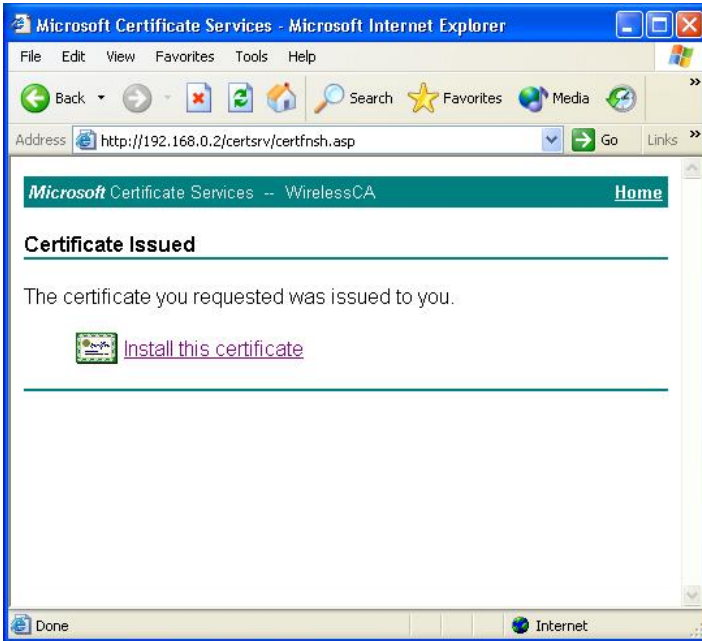
5. Select *User certificate request* and select *User Certificate*, then click *Next*.



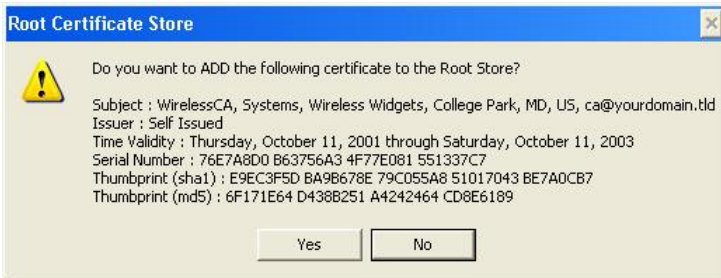
6. Click *Submit*.



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.

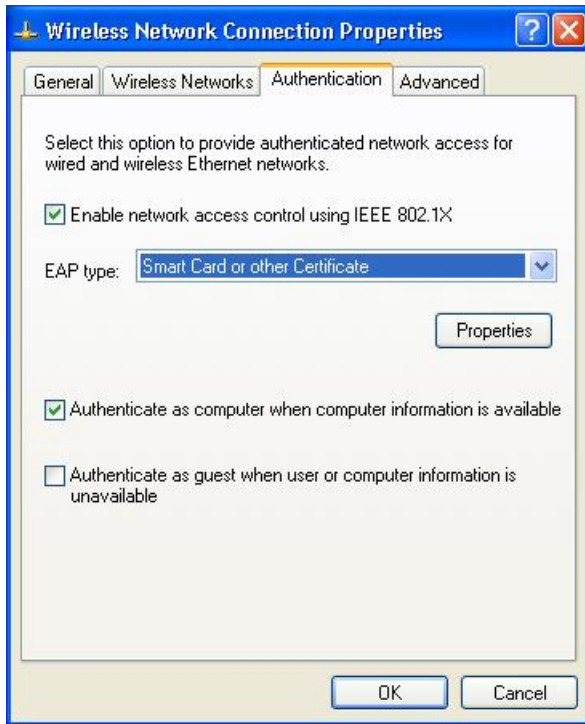


9. Certificate setup is now complete.

## 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

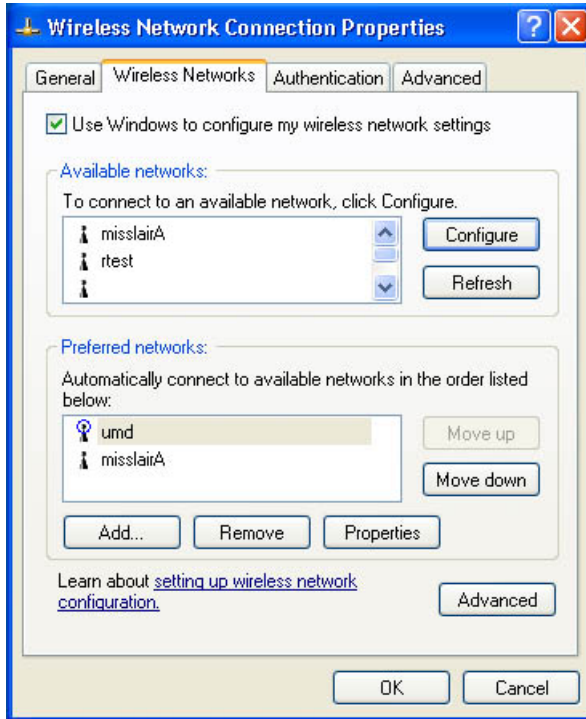
The Encryption settings must match the APs (WNAP-3000PE) on the Wireless network you want to join.

- 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.

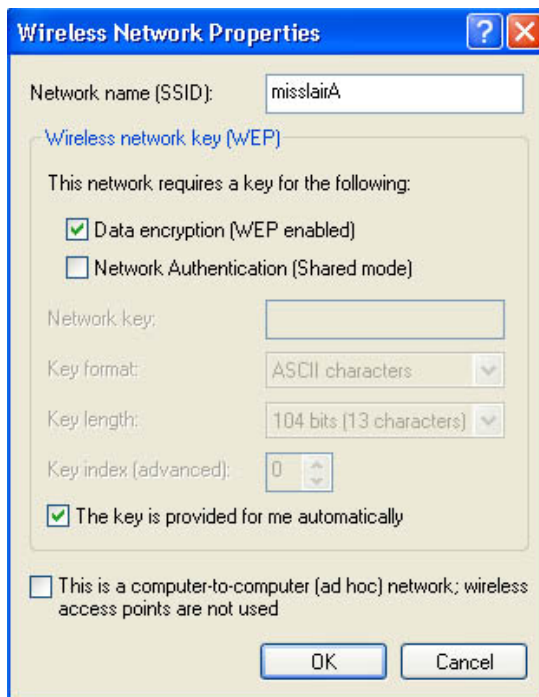
## Enabling Encryption

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.



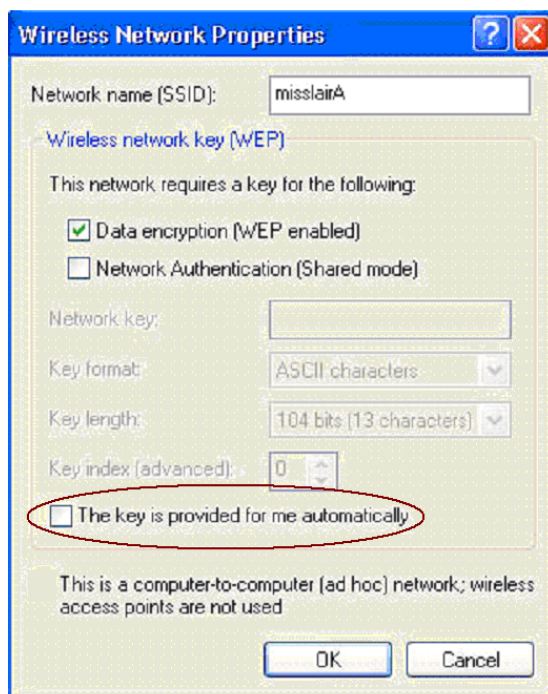
Setup for Windows XP and 802.1x client is now complete.

## 8.7 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.

# Appendix A

## Troubleshooting

**Problem 1: Can't connect to the WNAP-3000PE to configure it.**

**Solution 1:** Check the following:

- The WNAP-3000PE is properly installed, LAN connections are OK, and it is powered ON. Check the LEDs for port status.
- Ensure that your PC and the WNAP-3000PE 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 WNAP-3000PE, and then try to connect using the IP address, instead of the name.

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

4. Open a MS-DOS Prompt or Command Prompt Window.
5. Use the Ping command to "ping" the WNAP-3000PE. Enter ping followed by the Default Name of the WNAP-3000PE.  
e.g.  

```
ping PL003318
```
6. Check the output of the ping command to determine the IP address of the WNAP-3000PE.

If your PC uses a Fixed (Static) IP address, ensure that it is using an IP Address which is compatible with the WNAP-3000PE. (If no DHCP Server is found, the WNAP-3000PE 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 WNAP-3000PE.**

**Solution 2** Check the following:

- The SSID and WEP settings on the PC match the settings on the WNAP-3000PE.
- 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 B

## Windows TCP/IP

### Overview

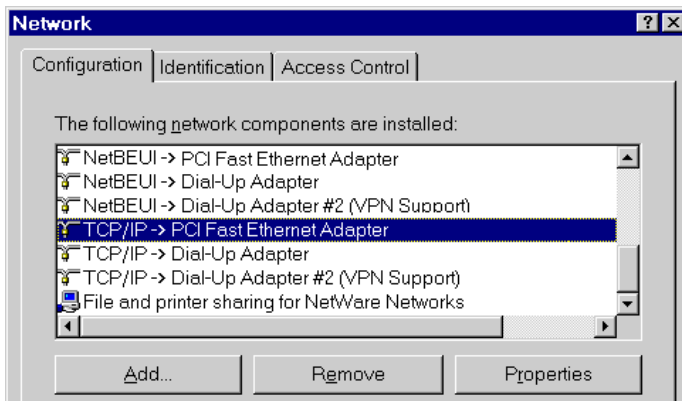
Normally, no changes need to be made.

- By default, the Wireless Access Point will act as a DHCP client, automatically obtaining a suitable IP Address (and related information) from your DHCP Server.
- If using Fixed (specified) IP addresses on your LAN (instead of a DHCP Server), there is no need to change the TCP/IP of each PC. Just configure the Wireless Access Point to match your existing LAN.

The following sections provide details about checking the TCP/IP settings for various types of Windows, should that be necessary.

### Checking TCP/IP Settings - Windows 9x/ME:

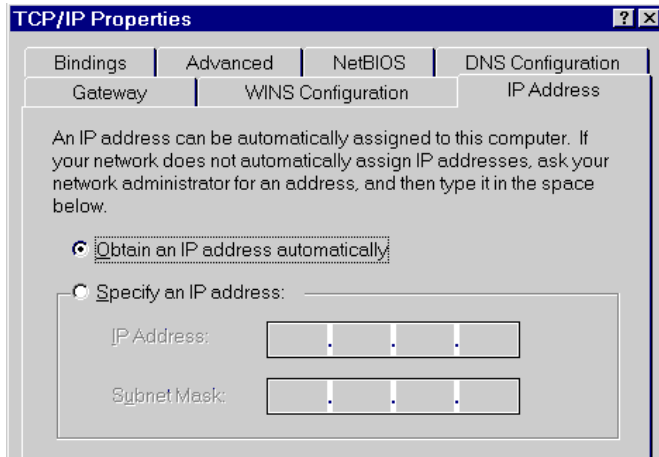
7. Select *Control Panel - Network*. You should see a screen like the following:



**Figure 3: Network Configuration**

8. Select the *TCP/IP* protocol for your network card.

9. Click on the *Properties* button. You should then see a screen like the following.



**Figure 4: IP Address (Win 95)**

Ensure your TCP/IP settings are correct, as follows:

### **Using DHCP**

To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows settings. To work correctly, you need a DHCP server on your LAN.

### **Using "Specify an IP Address"**

If your PC is already configured for a fixed (specified) IP address, no changes are required.

(The Administrator should configure the Wireless Access Point with a fixed IP address from the same address range used on the PCs.)



## Checking TCP/IP Settings - Windows NT4.0

1. Select *Control Panel - Network*, and, on the *Protocols* tab, select the TCP/IP protocol, as shown below.

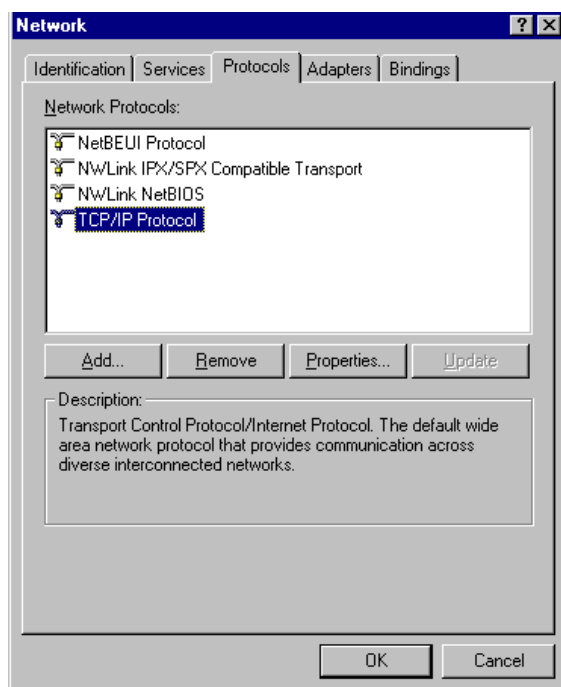


Figure 5: Windows NT4.0 - TCP/IP

2. Click the *Properties* button to see a screen like the one below.

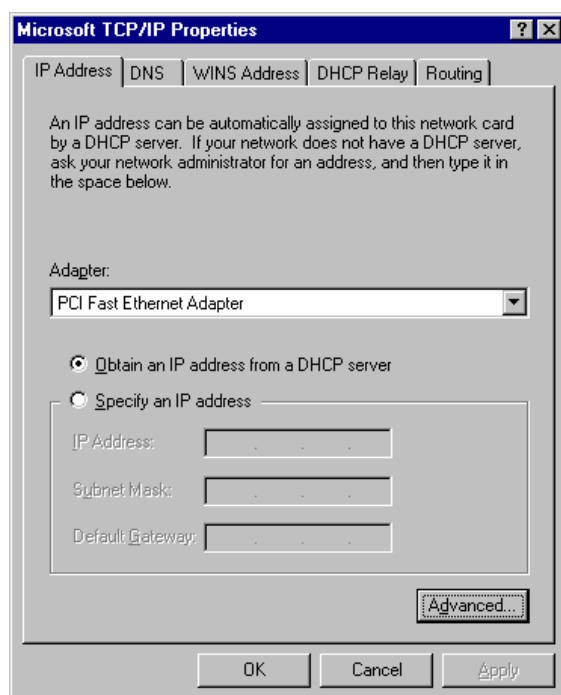


Figure 6: Windows NT4.0 - IP Address

3. Select the network card for your LAN.

4. Select the appropriate radio button - *Obtain an IP address from a DHCP Server* or *Specify an IP Address*, as explained below.

### **Obtain an IP address from a DHCP Server**

This is the default Windows setting. This is the default Windows settings. To work correctly, you need a DHCP server on your LAN.

### **Using "Specify an IP Address"**

If your PC is already configured for a fixed (specified) IP address, no changes are required.

(The Administrator should configure the Wireless Access Point with a fixed IP address from the same address range used on the PCs.)

## Checking TCP/IP Settings - Windows 2000

1. Select Control Panel - Network and Dial-up Connection.
2. Right click the *Local Area Connection* icon and select *Properties*. You should see a screen like the following:

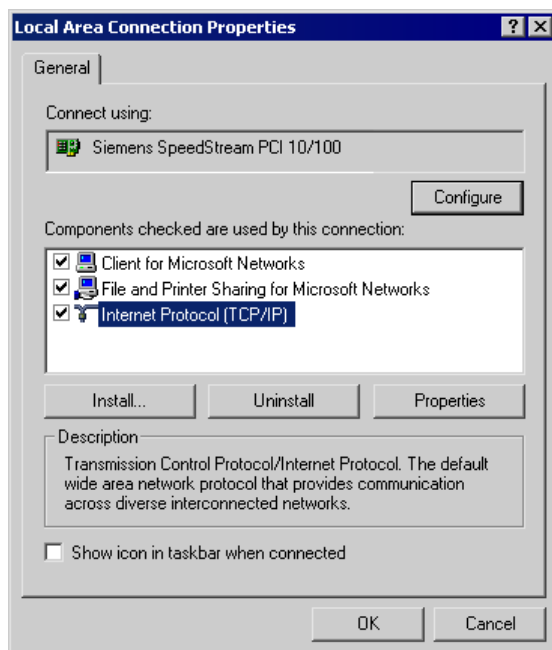


Figure 7: Network Configuration (Win 2000)

3. Select the *TCP/IP* protocol for your network card.
4. Click on the *Properties* button. You should then see a screen like the following.

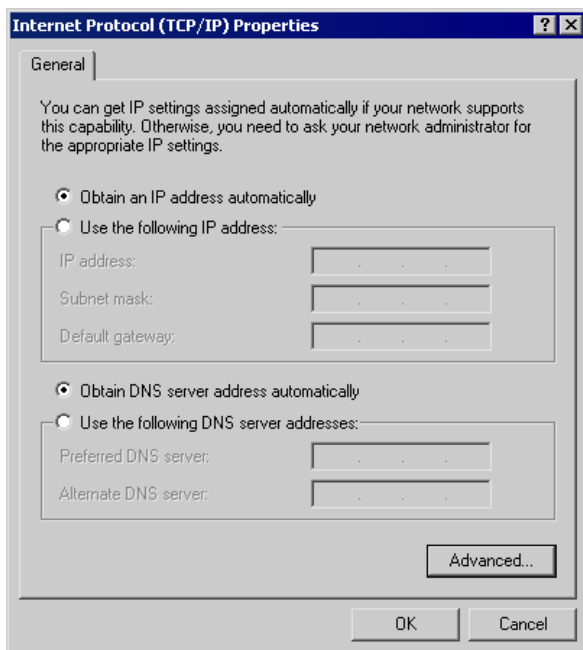


Figure 8: TCP/IP Properties (Win 2000)

5. Ensure your TCP/IP settings are correct:

### **Using DHCP**

To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows setting. This is the default Windows settings. To work correctly, you need a DHCP server on your LAN.

### **Using a fixed IP Address ("Use the following IP Address")**

If your PC is already configured for a fixed (specified) IP address, no changes are required.

(The Administrator should configure the Wireless Access Point with a fixed IP address from the same address range used on the PCs.)

## Checking TCP/IP Settings - Windows XP

1. Select Control Panel - Network Connection.
2. Right click the *Local Area Connection* and choose *Properties*. You should see a screen like the following:

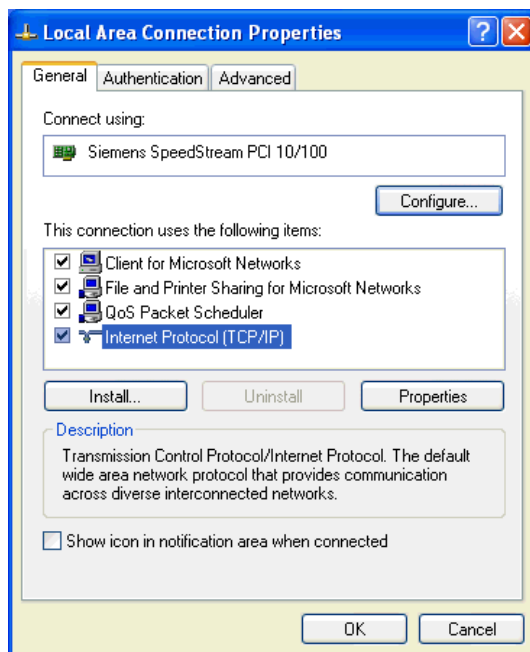


Figure 9: Network Configuration (Windows XP)

3. Select the *TCP/IP* protocol for your network card.
4. Click on the *Properties* button. You should then see a screen like the following.

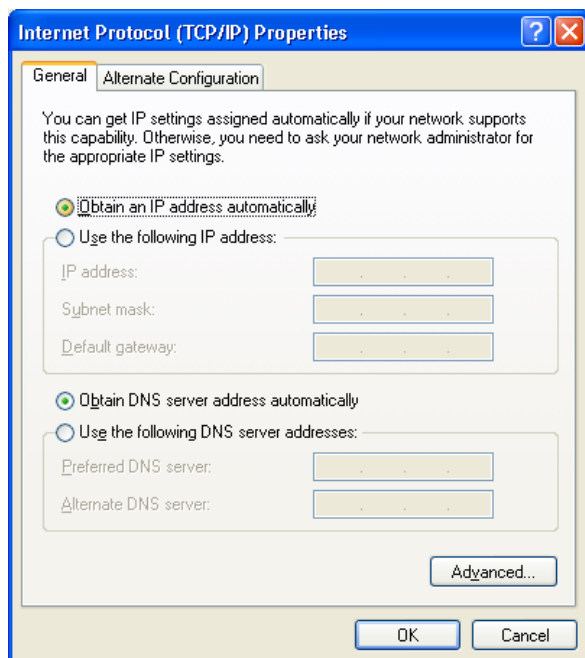


Figure 10: TCP/IP Properties (Windows XP)

5. Ensure your TCP/IP settings are correct.

### **Using DHCP**

To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows setting. To work correctly, you need a DHCP server on your LAN.

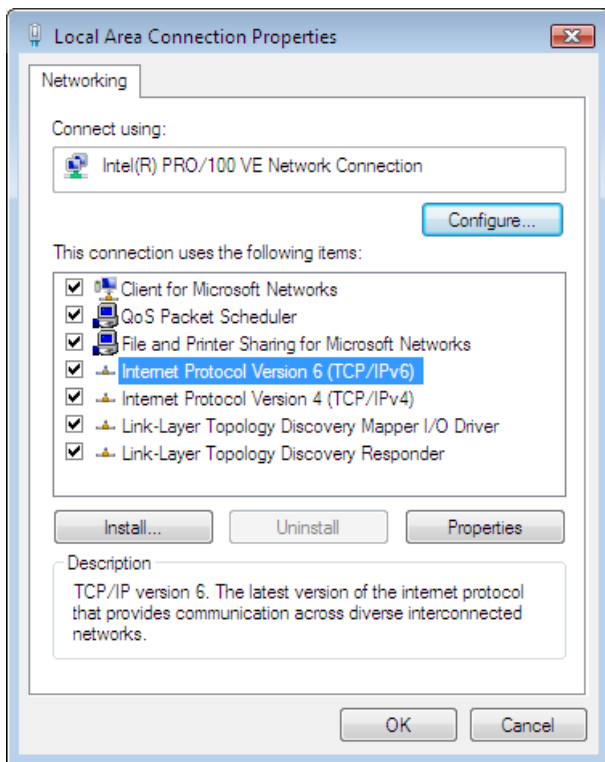
### **Using a fixed IP Address ("Use the following IP Address")**

If your PC is already configured for a fixed (specified) IP address, no changes are required.

(The Administrator should configure the Wireless Access Point with a fixed IP address from the same address range used on the PCs.)

## Checking TCP/IP Settings - Windows Vista

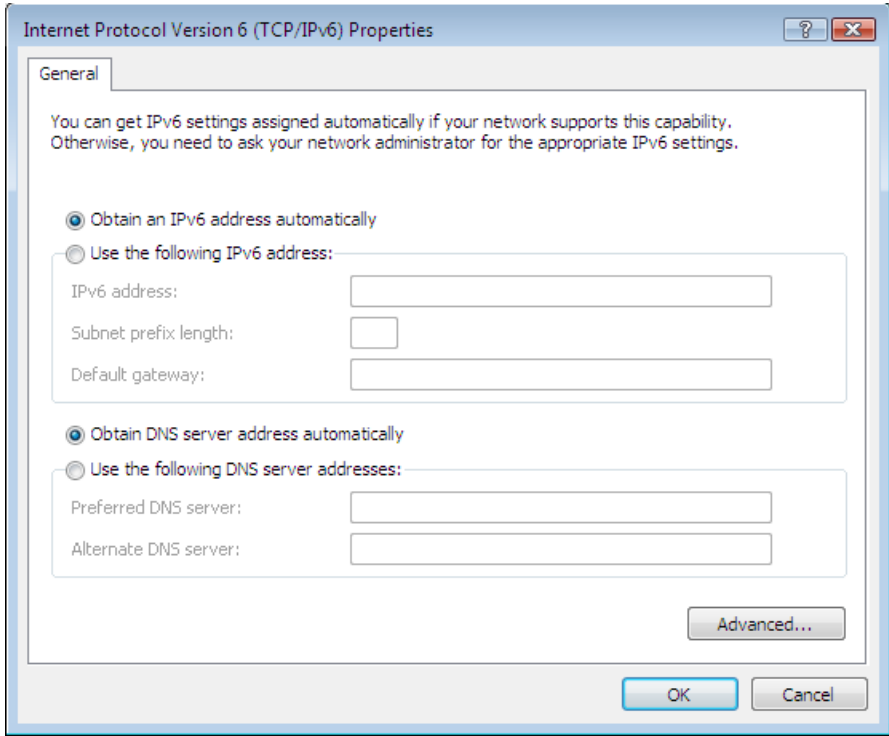
1. Select Control Panel - Network Connections.
2. Right click the *Local Area Connection Status* and choose *Properties*. Click *Continue* to the *User Account Control* dialog box, then you should see a screen like the following:



**Figure 11: Network Configuration (Windows Vista)**

3. Select the *TCP/IP* protocol for your network card.

4. Click on the *Properties* button. You should then see a screen like the following.



**Figure 12: TCP/IP Properties (Windows Vista)**

5. Ensure your TCP/IP settings are correct.

### **Using DHCP**

To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows setting. To work correctly, you need a DHCP server on your LAN.

### **Using a fixed IP Address ("Use the following IP Address")**

If your PC is already configured for a fixed (specified) IP address, no changes are required.

(The Administrator should configure the Wireless Access Point with a fixed IP address from the same address range used on the PCs.)



# Appendix C

## About Wireless LANs

### Overview

Wireless networks have their own terms and jargon. It is necessary to understand many of these terms in order to configure and operate a Wireless LAN.

### Wireless LAN Terminology

#### Modes

Wireless LANs can work in either of two (2) modes:

- Ad-hoc
- Infrastructure

#### Ad-hoc Mode

Ad-hoc mode does not require an Access Point or a wired (Ethernet) LAN. Wireless Stations (e.g. notebook PCs with wireless cards) communicate directly with each other.

#### Infrastructure Mode

In Infrastructure Mode, one or more Access Points are used to connect Wireless Stations (e.g. Notebook PCs with wireless cards) to a wired (Ethernet) LAN. The Wireless Stations can then access all LAN resources.



**Access Points can only function in "Infrastructure" mode, and can communicate only with Wireless Stations which are set to "Infrastructure" mode.**

### SSID/ESSID

#### BSS/SSID

A group of Wireless Stations and a single Access Point, all using the same ID (SSID), form a Basic Service Set (BSS).

**Using the same SSID is essential.** Devices with different SSIDs are unable to communicate with each other. However, some Access Points allow connections from Wireless Stations which have their SSID set to "any" or whose SSID is blank ( null ).

#### ESS/ESSID

A group of Wireless Stations, and multiple Access Points, all using the same ID (ESSID), form an Extended Service Set (ESS).

Different Access Points within an ESS can use different Channels. To reduce interference, it is recommended that adjacent Access Points SHOULD use different channels.

As Wireless Stations are physically moved through the area covered by an ESS, they will automatically change to the Access Point which has the least interference or best performance. This capability is called **Roaming**. (Access Points do not have or require Roaming capabilities.)

## Channels

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. For 802.11g, 13 channels are available in the USA and Canada., but 11channels are available in North America if using 802.11b.
- If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference. The recommended Channel spacing between adjacent Access Points is 5 Channels (e.g. use Channels 1 and 6, or 6 and 11).
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using "Ad-hoc" mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing "Ad-hoc" group they can join.

## WEP

WEP (Wired Equivalent Privacy) is a standard for encrypting data before it is transmitted. This is desirable because it is impossible to prevent snoopers from receiving any data which is transmitted by your Wireless Stations. But if the data is encrypted, then it is meaningless unless the receiver can decrypt it.

**If WEP is used, the Wireless Stations and the Wireless Access Point must have the same 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.

## WPA2-PSK

This is a further development of WPA-PSK, and offers even greater security, using the AES (Advanced Encryption Standard) method of encryption.

## WPA-Enterprise

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 used:

- The Access Point 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-Enterprise instead, because WPA encryption is much stronger than WEP encryption.

If this option is used:

- The Access Point 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.

## Appendix D

# Command Line Interface

### Overview

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 a Telnet connection to the Wireless Access Point.

### Using the CLI - Telnet

1. Start your Telnet client, and establish a connection to the Access Point.  
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**.

### Command Reference

The following commands are available.

config vap	Config Virtual AP X
?	Display CLI Command List
help	Display CLI Command List
get 11nampdu	Set 11n A-MPDU Aggregation Mode
get 11namsdu	Set 11n A-MSDU Aggregation Mode
get 11nguardinterval	Set 11n Guard Interval Mode
get 11nsubchannel	Set 11n Extension Sub-Channel
get 11nradioband	Set 11n Radio Band
get 802.11d	Display 802.11d Mode
get acctserver	Display Accounting Server
get acctport	Display Accounting Port
get acctsecret	Display Accounting Secret
get acl	Display Access Control Status
get active	Display VAP Active (up) Mode
get aging	Display Idle Timeout Interval
get authentication	Display Authentication Type of WEP

get beaconinterval	Display Beacon Interval
get channel	Display Radio Channel
get country	Display Country/Domain
get defaultkey	Display Default Key Index
get description	Display Access Point Description
get dhcp	Display DHCP Mode
get dhcpserverendip	Display DHCP Server End IP Address
get dhcpserverstartip	Display DHCP Server start IP Address
get dnsserver	Display IP Address of DNS Server
get dot1xdynkeyupdate	Display 802.1x Dynamic Key Update Mode
get dot1xdynkeylife	Display 802.1x Dynamic Key Life Time (in Minutes)
get dot1xkeytype	Display 802.1x Distribute Key Method
get fragthreshold	Display Fragment Threshold
get gateway	Display Gateway IP Address
get gtkupdate	Display Group Key Update Mode
get gtkupdateinterval	Display Group Key Update Interval (in Seconds)
get http	Display HTTP Mode
get httpport	Display HTTP Port Number
get https	Display HTTPS Mode
get httpsport	Display HTTPS Port Number
get ipaddr	Display IP Address
get ipmask	Display IP Subnet Mask
get isolation	Display Isolate All Virtual APs State
get key	Display WEP Key Value
get keylength	Display WEP Key Length
get lltd	Display LLTD Mode
get md5supplicant	Display 802.1x MD5 Supplicant Mode
get md5suppname	Display 802.1x Supplicant MD5 Name
get md5supppassword	Display 802.1x Supplicant MD5 Password
get md5supptype	Display 802.1x MD5 Supplicant Type
get nativevlanid	Display Native VLAN ID
get ntp	Display NTP Server IP Address
get operationmode	Display Operation Mode
get password	Display Login Password

get psk	Display Pre-shared Key
get radiusserver	Display RADIUS Server IP Address
get radiusport	Display RADIUS Port Number
get radiussecret	Display RADIUS Shared Secret
get remoteptmp	Display PTMP's Remote MAC Address List
get remoteptp	Display PTP's Remote MAC Address
get roguedetect	Display Rogue AP Detection Mode
get rogueinterval	Display Interval of Every Rogue AP Detection
get roguelegal	Display Legal AP List of Legal AP
get roguetransmit	Display Rogue AP Detection Send SNMP Trap Mode
get roguetype	Display Rogue AP Definition
get rtsthreshold	Display RTS/CTS Threshold
get security	Display Wireless Security Mode
get shortpreamble	Display Short Preamble Usage
get snmpreadcommunity	Display SNMP Read Community
get snmpwritecommunity	Display SNMP Write Community
get snmpmode	Display SNMP Mode
get snmpmanagermode	Display SNMP Manager Mode
get snmptrapmode	Display SNMP Trap Mode
get snmptrapversion	Display SNMP Trap Version
get snmpv3username	Display SNMP v3 User Name
get snmpv3authproto	Display SNMP v3 Authentication Protocol
get snmpv3authkey	Display SNMP v3 Authentication Key
get snmpv3privproto	Display SNMP v3 Private Protocol
get snmpv3privkey	Display SNMP v3 Private Key
get ssid	Display Service Set ID
get ssidbroadcast	Display SSID Broadcast Mode
get stp	Display STP Mode
get strictgtkupdate	Display Group Key Update Strict Status
get syslog	Display Syslog Mode
get syslogport	Display Syslog Port
get syslogserver	Display Unicast Syslog Server Address
get syslogseverity	Display Syslog Severity Level

get systemname	Display Access Point System Name
get telnet	Display Telnet Mode
get time	Display Current System Time
get timezone	Display Time Zone Setting
get uptime	Display Access Point Up Time
get username	Display Login User Name
get vapname	Display Virtual AP Name
get version	Display Firmware Version
get vlan	Display VLAN Operational State
get vlanid	Display the VLAN ID
get wirelessmode	Display Wireless LAN Mode
get wirelessseparate	Display Wireless Separate Mode
get wmm	Display WMM Mode
get wmmnoack	Display WMM No Acknowledgement status
set 11nampdu	Set 11n A-MPDU Aggregation Mode
set 11namsdu	Set 11n A-MSDU Aggregation Mode
set 11nguardinterval	Set 11n Guard Interval Mode
set 11nsubchannel	Set 11n Extension Sub-Channel
set 11nradioband	Set 11n Radio Band
set 802.11d	Set 802.11d Mode
set acctserver	Set Accounting Server
set acctport	Set Accounting Port
set acctsecret	Set Accounting Secret
set acl	Set Access Control
set active	Set Active (up) Mode
set aging	Set Idle Timeout Interval
set authentication	Set Authentication Type of WEP
set beaconinterval	Set Beacon Interval
set channel	Set Radio Channel
set country	Set Country/Domain
set defaultkey	Set Default Key Index
set description	Set Access Point Description
set dhcp	Set DHCP Mode
set dhcpserverendip	Set DHCP Server End IP Address
set dhcpserverstartip	Set DHCP Server start IP Address

set dnsserver	Set DNS Server IP Address
set dot1xdynkeyupdate	Set 802.1x Dynamic Key Update Mode
set dot1xdynkeylife	Set 802.1x Dynamic Key Life Time (in Minutes)
set dot1xkeytype	Set 802.1x Distribute Key Method
set fragthreshold	Set Fragment Threshold
set gateway	Set Gateway IP Address
set groupkeyupdate	Set Group Key Update Mode
set groupkeyupdateinterval	Set Group Key Update Interval (in Minutes)
set http	Set HTTP Mode
set httpport	Set HTTP Port Number
set https	Set HTTPS Enable/Disable
set httpsport	Set HTTPS Port Number
set ipaddr	Set IP Address
set ipmask	Set IP Subnet Mask
set isolation	Set Isolate All Virtual APs State
set key	Set WEP Key Value
set keylength	Set WEP Key Length
set lltd	Set LLTD Mode
set md5supplicant	Set 802.1x MD5 Supplicant Mode
set md5suppname	Set 802.1x Supplicant MD5 Name
set md5supppassword	Set 802.1x Supplicant MD5 Password
set md5supptype	Set 802.1x MD5 Supplicant Type
set nativevlanid	Set Native VLAN ID
set ntp	Set NTP Server IP Address
set operationmode	Set operation Mode
set password	Modify Login Password
set psk	Modify Pre-shared Key
set radiusserver	Set RADIUS IP Address
set radiusport	Set RADIUS Port Number
set radiussecret	Set RADIUS Shared Secret
set remoteptmp	Set PTMP's Remote MAC Address List
set remoteptp	Set Remote PTP MAC Address
set roguedetect	Set Rogue AP Detection Mode
set rogueinterval	Set Interval of Rogue AP Detection(Range: 3 ~ 99)



set roguelegal	Add/Delete Legal AP MAC/OUI
set roguesnmp	Set Rogue AP Detection SNMP Trap Mode
set roguetype	Set Rogue AP Definition
set rtsthreshold	Set RTS/CTS Threshold
set security	Set Wireless Security Mode
set shortpreamble	Set Short Preamble
set snmpreadcommunity	Set SNMP Read Community
set snmpwritecommunity	Set SNMP Write Community
set snmpmode	Set SNMP Mode
set snmpmanagementmode	Set SNMP Manager Mode
set snmptrapmode	Set SNMP Trap Mode
set snmptrapversion	Set SNMP Trap Version
set snmpv3username	Set SNMP v3 User Name
set snmpv3authproto	Set SNMP v3 Authentication Protocol
set snmpv3authkey	Set SNMP v3 Authentication Key
set snmpv3privproto	Set SNMP v3 Private Protocol
set snmpv3privkey	Set SNMP v3 Private Key
set ssid	Set Service Set ID
set ssidsuppress	Set SSID Broadcast Mode
set stp	Set STP Mode
set strictgtkupdate	Set Group Key Update Strict Status
set syslog	Set Syslog Mode
set syslogport	Set Syslog Port
set syslogserver	Set Unicast Syslog Server Address
set syslogseverity	Set Syslog Severity Level
set systemname	Set Access Point System Name
set telnet	Set Telnet Mode
set timezone	Set Time Zone Setting
set username	Modify Login User Name
set vlan	Set VLAN Operational State
set vlanid	Set the VLAN Tag
set wirelessmode	Set Wireless LAN Mode
set wirelessseparate	Set Wireless Separate Mode

set wmm	Set WMM Mode
set wmmnoack	Set WMM No Acknowledge
factoryrestore	Restore to Default Factory Settings
apply	To make the changes take effect
exit	Quit the telnet