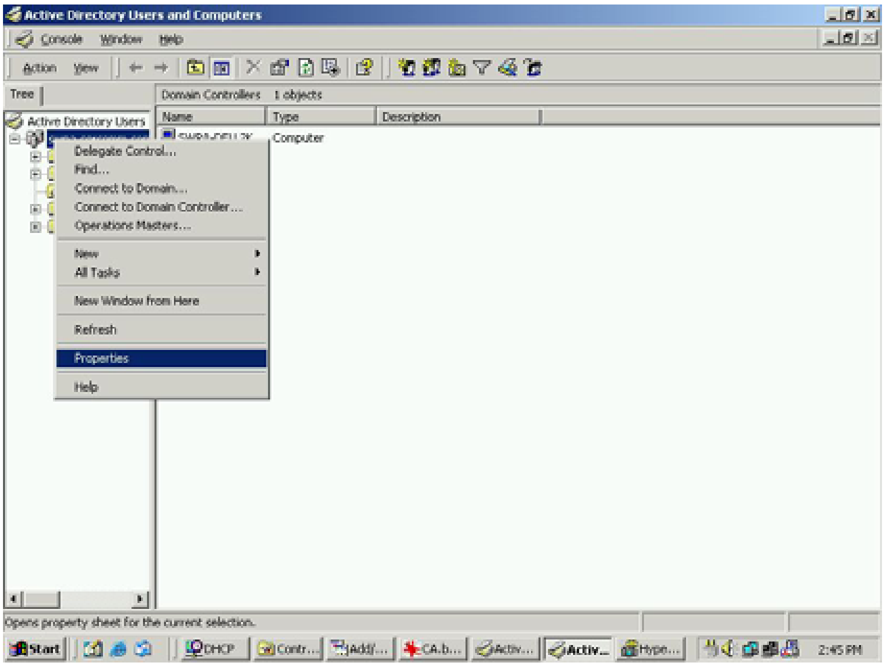
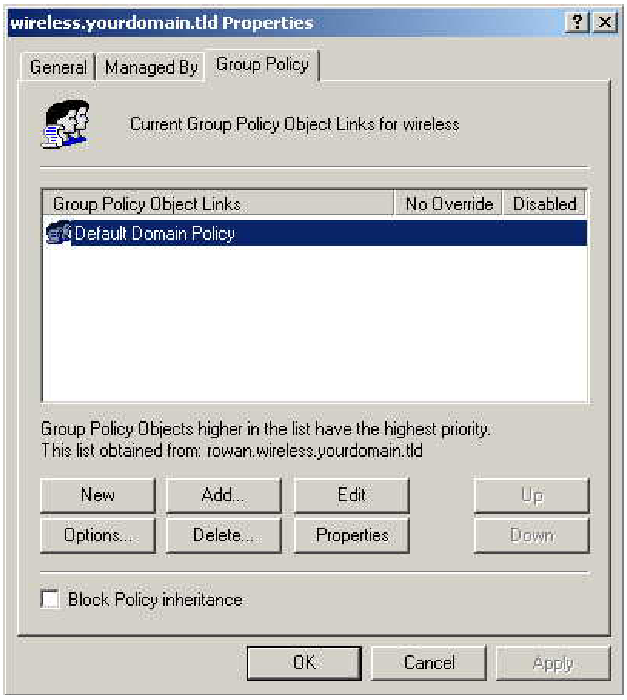


Opens property sheet for the current selection.

Figure 35: Active Directory Screen

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



Current Group Policy Object Links for wireless

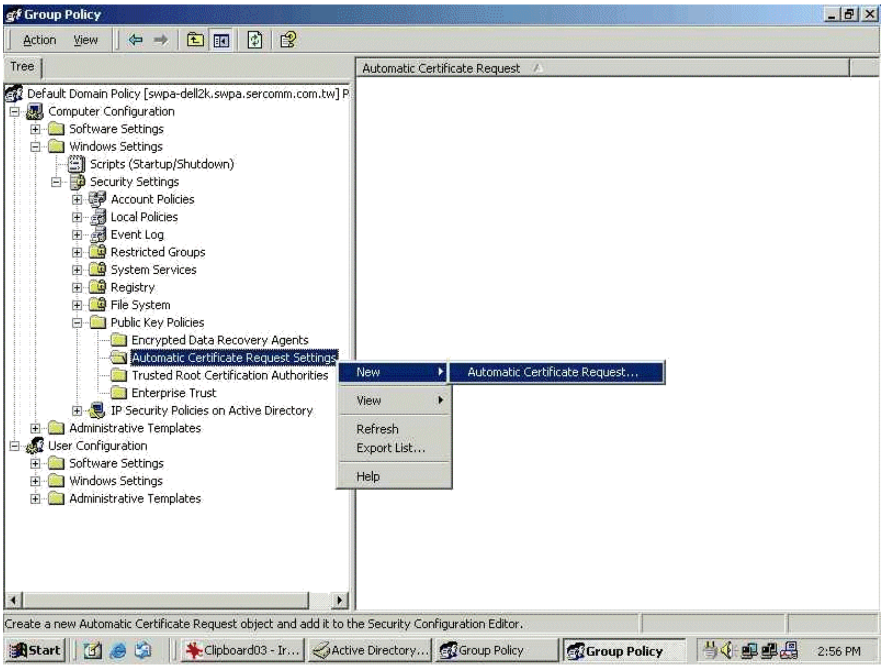
Group Policy Object Links	No Override	Disabled
Default Domain Policy		

Group Policy Objects higher in the list have the highest priority.
This list obtained from: rowan.wireless.yourdomain.tld

☐ Block Policy inheritance

Figure 36: Group Policy Tab

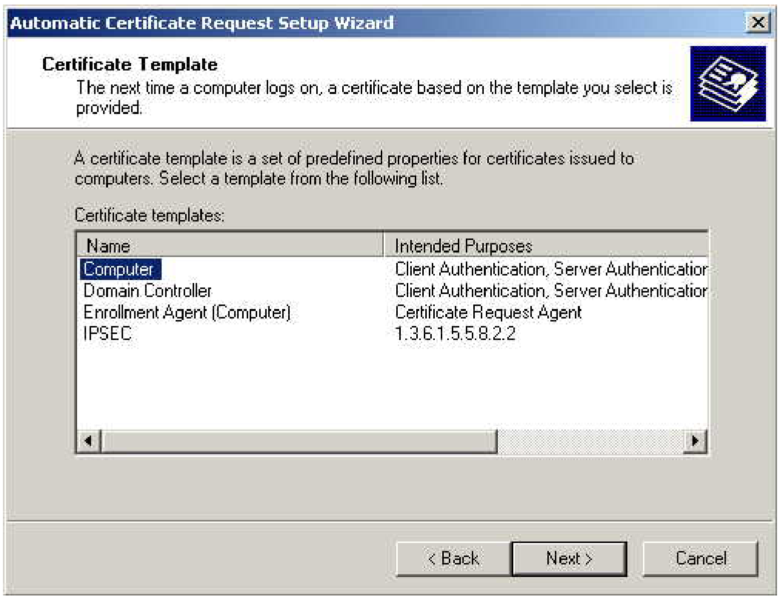
7. Select *Computer Configuration* - *Windows Settings* - *Security Settings* - *Public Key Policies*, right-click *Automatic Certificate Request Settings* - *New* - *Automatic Certificate Request*.



Create a new Automatic Certificate Request object and add it to the Security Configuration Editor.

Figure 37: Group Policy Screen

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


Automatic Certificate Request Setup Wizard

Certificate Template

The next time a computer logs on, a certificate based on the template you select is provided.

A certificate template is a set of predefined properties for certificates issued to computers. Select a template from the following list.

Certificate templates:

Name	Intended Purposes
Computer	Client Authentication, Server Authenticatior
Domain Controller	Client Authentication, Server Authenticatior
Enrollment Agent (Computer)	Certificate Request Agent
IPSEC	1.3.6.1.5.5.8.2.2

Figure 38: Certificate Template Screen

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

Internet Authentication Service (Radius) Setup

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

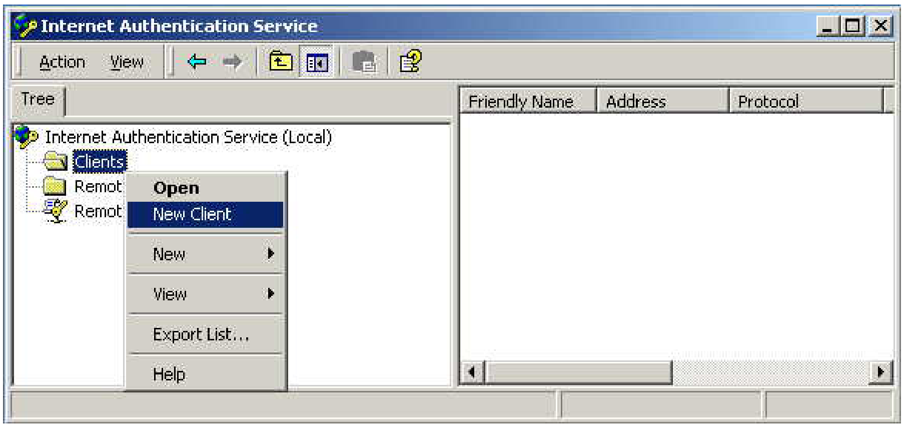
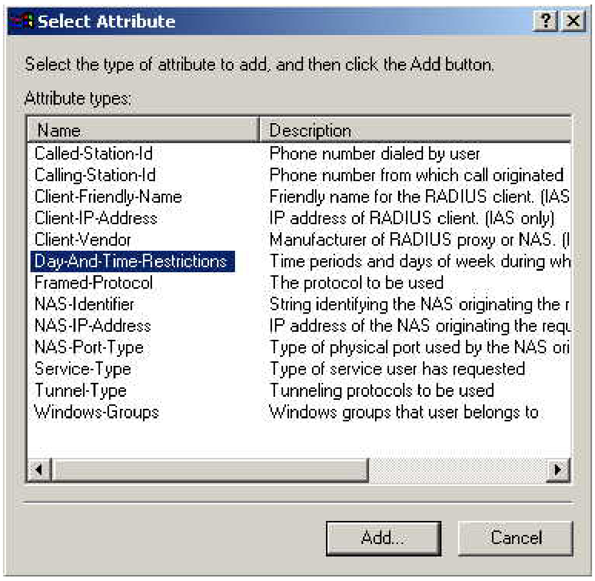


Figure 39: Service Screen

3. Enter a name for the access point, click *Next*.
4. Enter the address or name of the Wireless Access Point, and set the shared secret, as entered on the *Security Settings* of the Wireless Access Point.
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...*



Select the type of attribute to add, and then click the Add button.

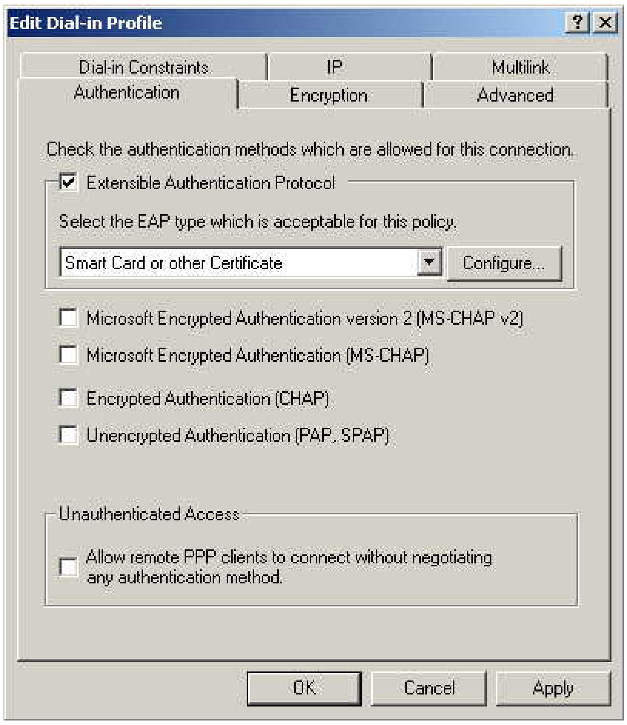
Attribute types:

Name	Description
Called-Station-Id	Phone number dialed by user
Calling-Station-Id	Phone number from which call originated
Client-Friendly-Name	Friendly name for the RADIUS client. (IAS
Client-IP-Address	IP address of RADIUS client. (IAS only)
Client-Vendor	Manufacturer of RADIUS proxy or NAS. (I
Day-And-Time-Restrictions	Time periods and days of week during wh
Framed-Protocol	The protocol to be used
NAS-Identifier	String identifying the NAS originating the r
NAS-IP-Address	IP address of the NAS originating the requ
NAS-Port-Type	Type of physical port used by the NAS ori
Service-Type	Type of service user has requested
Tunnel-Type	Tunneling protocols to be used
Windows-Groups	Windows groups that user belongs to

Figure 40: Attribute Screen

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*.



Edit Dial-in Profile

Check the authentication methods which are allowed for this connection.

☑ Extensible Authentication Protocol

Select the EAP type which is acceptable for this policy.

Smart Card or other Certificate

□ Microsoft Encrypted Authentication version 2 (MS-CHAP v2)

□ Microsoft Encrypted Authentication (MS-CHAP)

□ Encrypted Authentication (CHAP)

□ Unencrypted Authentication (PAP, SPAP)

Unauthenticated Access

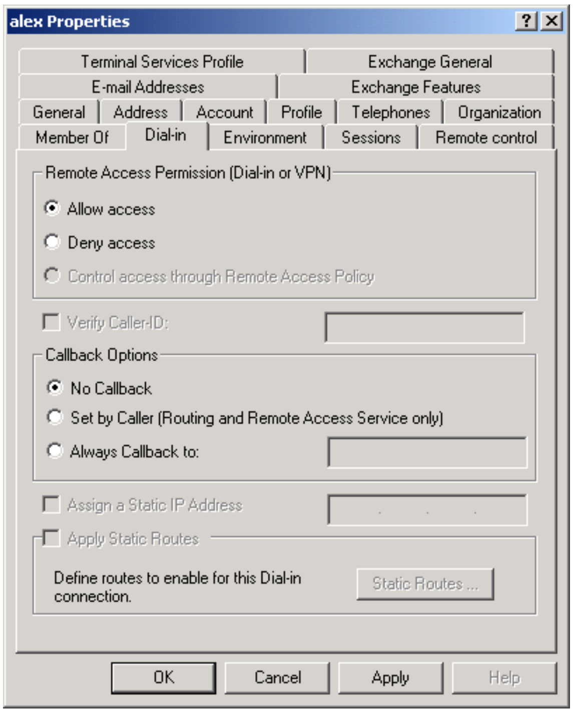
□ Allow remote PPP clients to connect without negotiating any authentication method.

Figure 41: Authentication Screen

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

Remote Access Login 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*.



Remote Access Permission (Dial-in or VPN)

● Allow access

○ Deny access

○ Control access through Remote Access Policy

□ Verify Caller-ID:

Callback Options

● No Callback

○ Set by Caller (Routing and Remote Access Service only)

○ Always Callback to:

□ Assign a Static IP Address

□ Apply Static Routes

Define routes to enable for this Dial-in connection.

Static Routes ...

Figure 42: Dial-in Screen

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 your vendor's documentation 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*
   e.g
   ```
   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*.

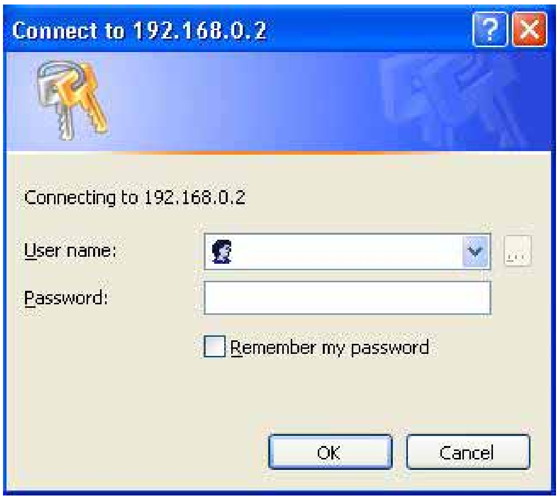
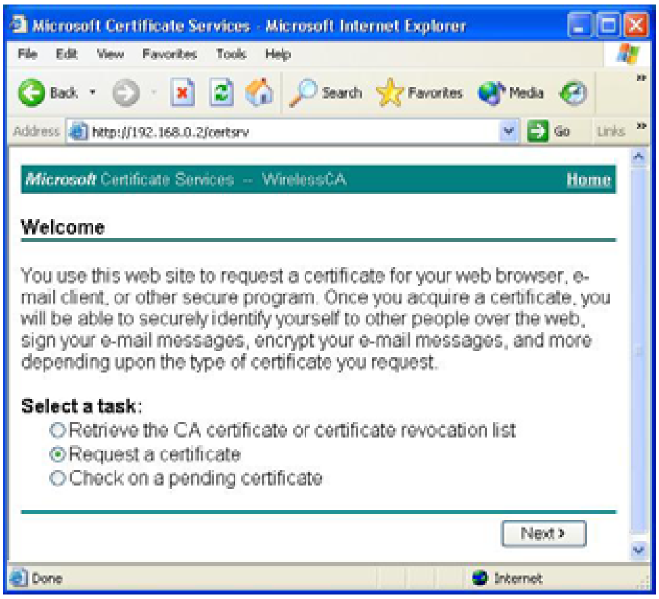


Figure 43: Connect Screen

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



Microsoft Certificate Services - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address Go Links
Done
Internet

Address: http://192.168.0.2/certsrv

Microsoft Certificate Services -- WirelessCA Home

Welcome

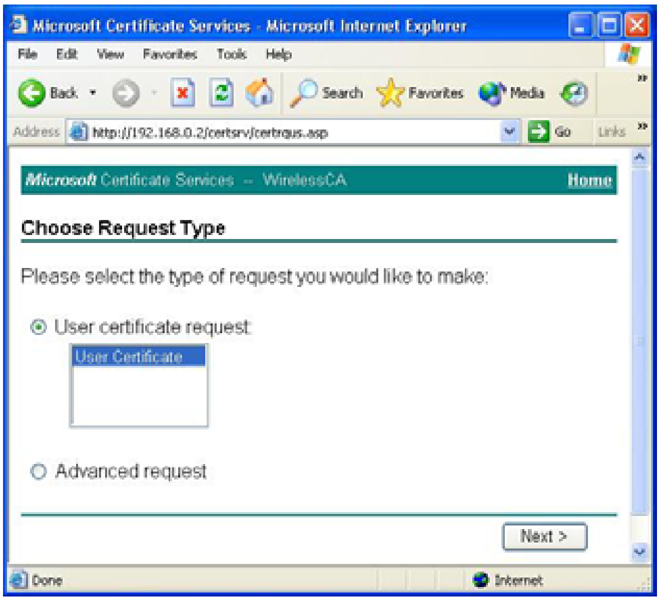
You use this web site to request a certificate for your web browser, e-mail client, or other secure program. Once you acquire a certificate, you will be able to securely identify yourself to other people over the web, sign your e-mail messages, encrypt your e-mail messages, and more depending upon the type of certificate you request.

Select a task:

○ Retrieve the CA certificate or certificate revocation list
● Request a certificate
○ Check on a pending certificate

Figure 44: Wireless CA Screen

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



Microsoft Certificate Services - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address Go Links
Done
Internet

Address: http://192.168.0.2/certsrv/certrqus.asp

Microsoft Certificate Services -- WirelessCA Home

Choose Request Type

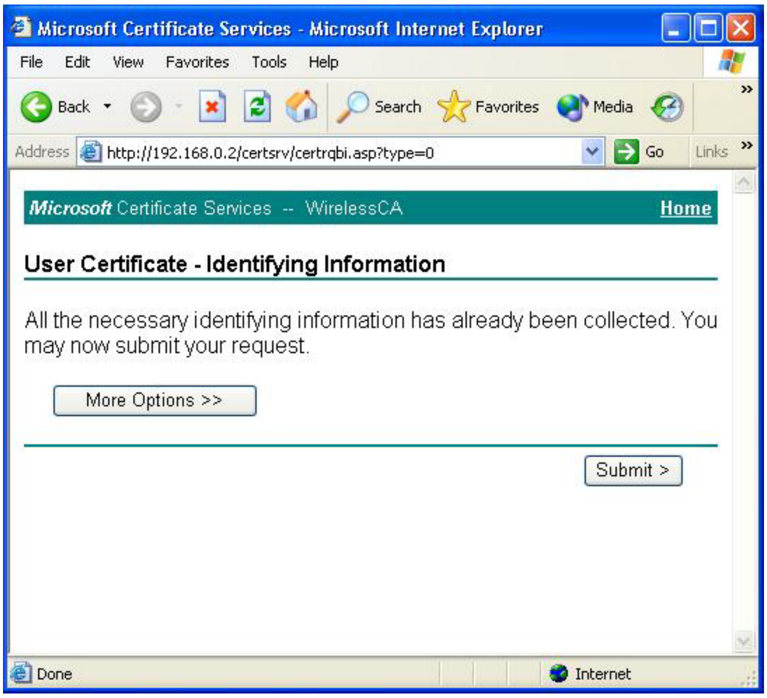
Please select the type of request you would like to make:

● User certificate request:
User Certificate

○ Advanced request

Figure 45: Request Type Screen

6. Click *Submit*.


Microsoft Certificate Services - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.0.2/certsrv/certrqbi.asp?type=0 Go Links
Microsoft Certificate Services -- WirelessCA Home

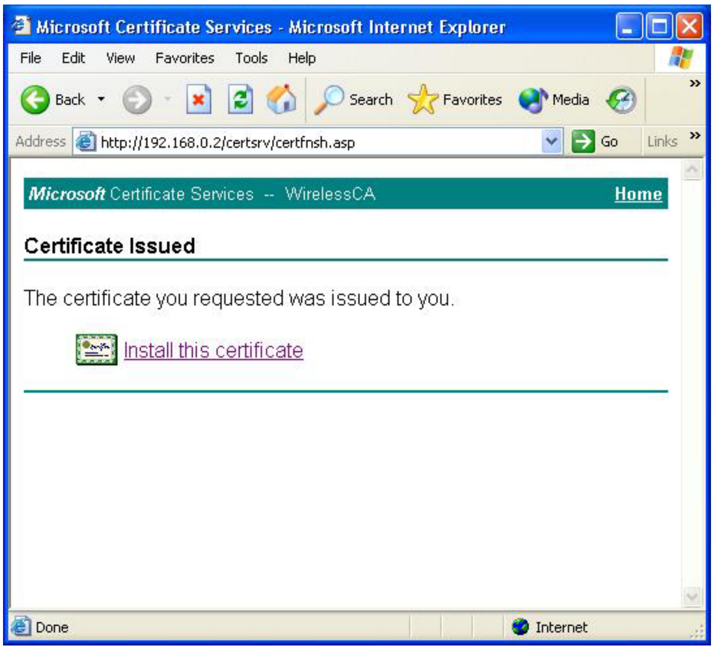
User Certificate - Identifying Information

All the necessary identifying information has already been collected. You may now submit your request.

More Options >>
Submit >
Done
Internet

Figure 46: Identifying Information Screen

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


Microsoft Certificate Services - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.0.2/certsrv/certfnsh.asp Go Links
Microsoft Certificate Services -- WirelessCA Home

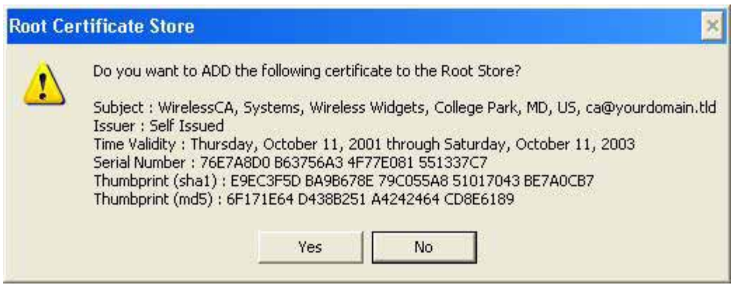
Certificate Issued

The certificate you requested was issued to you.

Install this certificate
Done
Internet

Figure 47:Certificate Issued Screen

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



Do you want to ADD the following certificate to the Root Store?

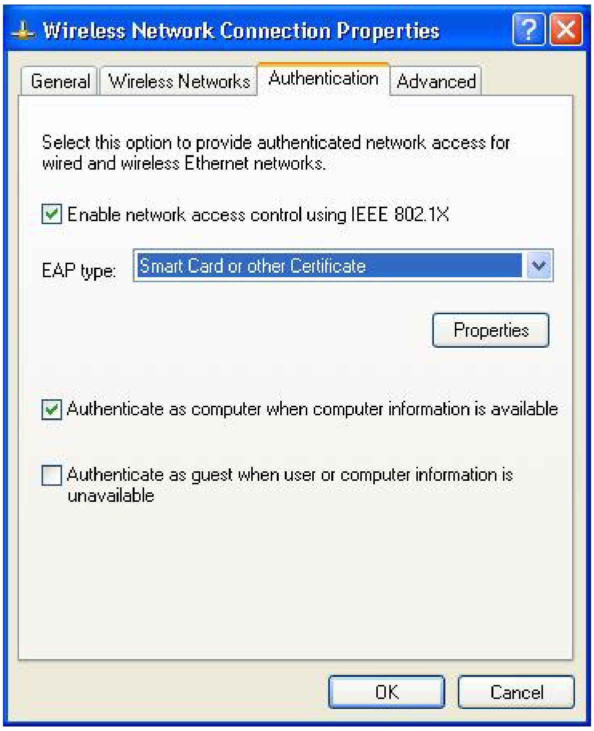
Subject : WirelessCA, Systems, Wireless Widgets, College Park, MD, US, ca@yourdomain.tld
Issuer : Self Issued
Time Validity : Thursday, October 11, 2001 through Saturday, October 11, 2003
Serial Number : 76E7A8D0 B63756A3 4F77E081 551337C7
Thumbprint (sha1) : E9EC3F5D BA9B678E 79C055A8 51017043 BE7A0CB7
Thumbprint (md5) : 6F171E64 D438B251 A4242464 CD8E6189

Figure 48: Root Certificate Screen

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.



Select this option to provide authenticated network access for wired and wireless Ethernet networks.

☑ Enable network access control using IEEE 802.1X

EAP type: Smart Card or other Certificate

☑ Authenticate as computer when computer information is available

☐ Authenticate as guest when user or computer information is unavailable

Figure 49: Authentication Tab

Encryption Settings

The Encryption settings must match the APs (Access Points) on the Wireless network you wish to join.

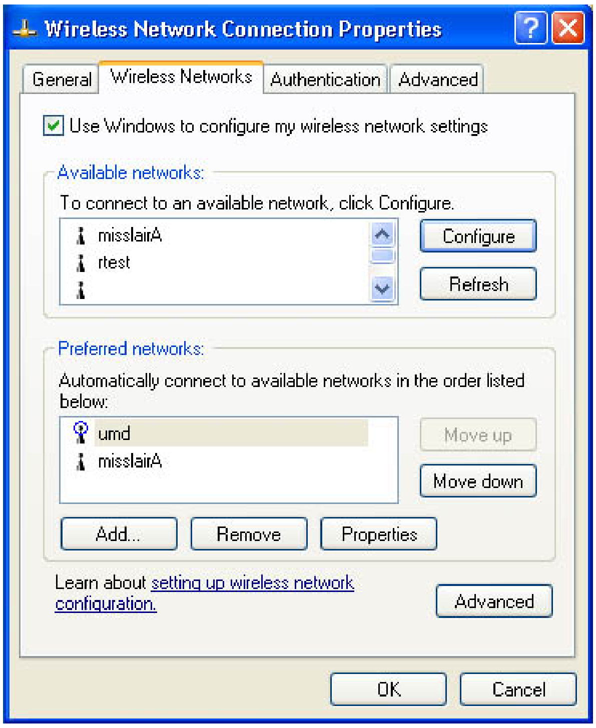
- Windows XP will detect any available Wireless networks, and allow you to configure each network independently.

- 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.



Wireless Network Connection Properties

☑ Use Windows to configure my wireless network settings

Available networks:

To connect to an available network, click Configure.

misslairA
rtest

Preferred networks:

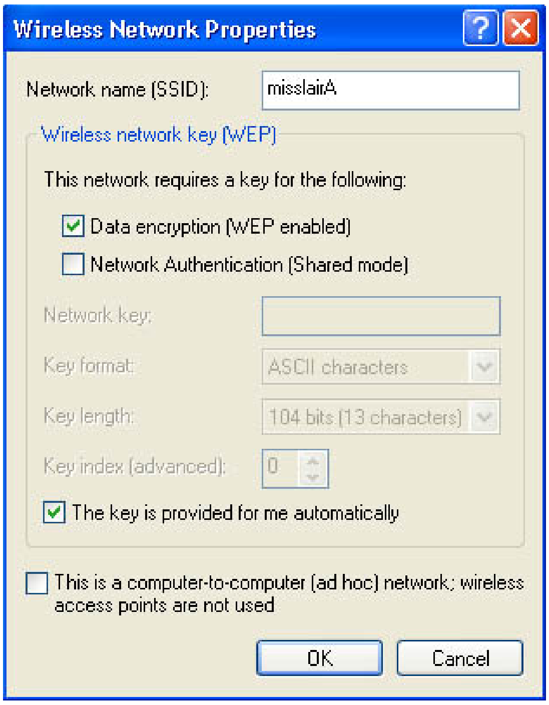
Automatically connect to available networks in the order listed below:

umd
misslairA

Learn about setting up wireless network configuration.

Figure 50: Wireless Networks Screen

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.



Network name (SSID): misslairA

Wireless network key (WEP)

This network requires a key for the following:

☑ Data encryption (WEP enabled)

□ Network Authentication (Shared mode)

Network key:

Key format: ASCII characters

Key length: 104 bits (13 characters)

Key index (advanced): 0

☑ The key is provided for me automatically

□ This is a computer-to-computer (ad hoc) network; wireless access points are not used

Figure 51: Properties Screen

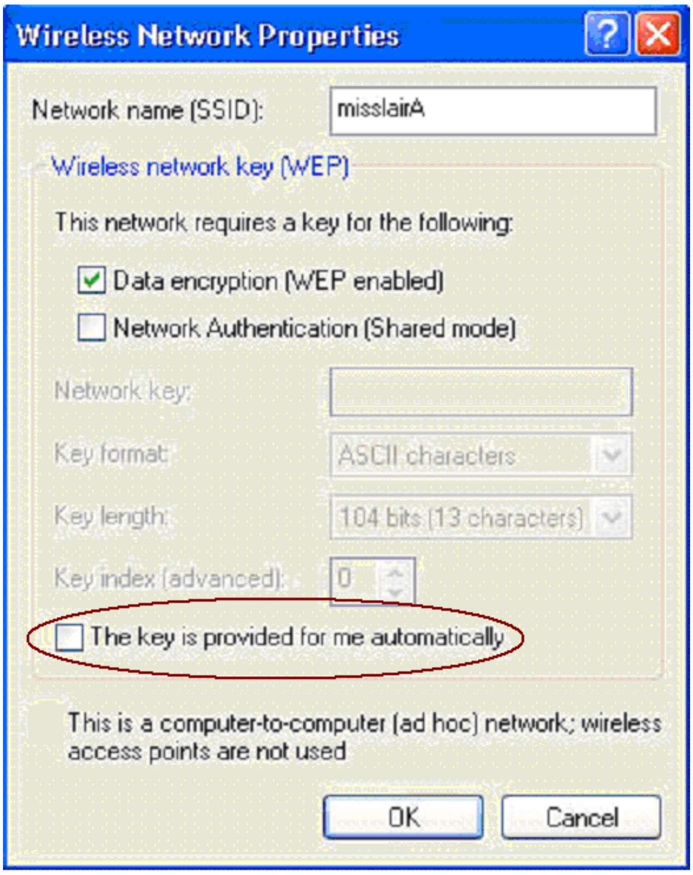
Setup for Windows XP and 802.1x client is now complete.

Using 802.1x Mode (without WPA)

This is very similar to using WPA-Enterprise.

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.



Network name (SSID): misslairA

Wireless network key (WEP)

This network requires a key for the following:

☑ Data encryption (WEP enabled)

□ Network Authentication (Shared mode)

Network key:

Key format: ASCII characters

Key length: 104 bits (13 characters)

Key index (advanced): 0

□ The key is provided for me automatically

This is a computer-to-computer (ad hoc) network; wireless access points are not used

Figure 52: Properties Screen

Note:

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

Chapter 5

Operation and Status

5

This Chapter details the operation of the Wireless Access Point and the status screens.

Operation

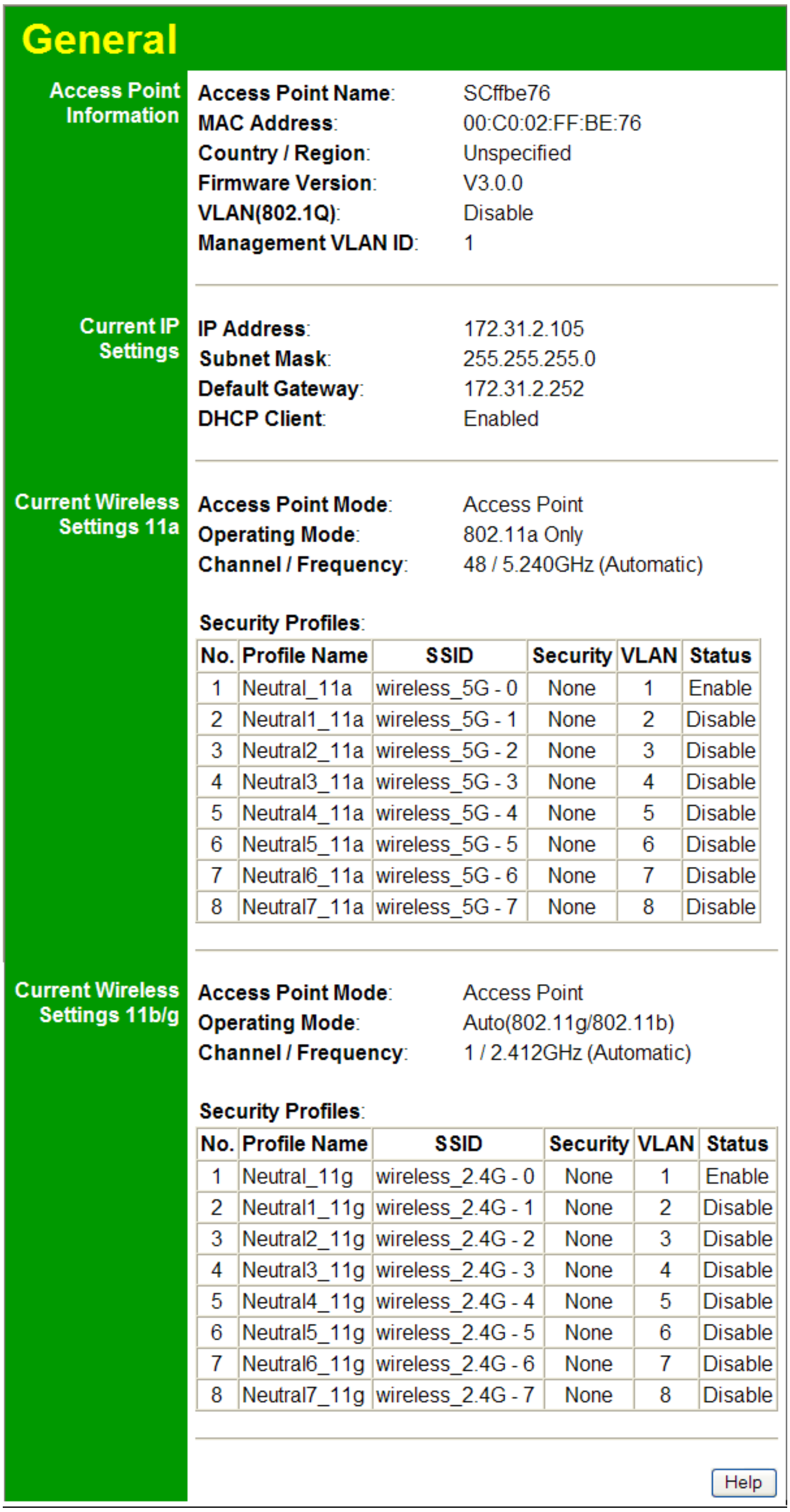
Once both the Wireless Access Point and the PCs are configured, operation is automatic.

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

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

General Screen

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



General

Access Point Information

Access Point Name: SCffbe76
MAC Address: 00:C0:02:FF:BE:76
Country / Region: Unspecified
Firmware Version: V3.0.0
VLAN(802.1Q): Disable
Management VLAN ID: 1

Current IP Settings

IP Address: 172.31.2.105
Subnet Mask: 255.255.255.0
Default Gateway: 172.31.2.252
DHCP Client: Enabled

Current Wireless Settings 11a

Access Point Mode: Access Point
Operating Mode: 802.11a Only
Channel / Frequency: 48 / 5.240GHz (Automatic)

Security Profiles:

No.	Profile Name	SSID	Security	VLAN	Status
1	Neutral_11a	wireless_5G - 0	None	1	Enable
2	Neutral1_11a	wireless_5G - 1	None	2	Disable
3	Neutral2_11a	wireless_5G - 2	None	3	Disable
4	Neutral3_11a	wireless_5G - 3	None	4	Disable
5	Neutral4_11a	wireless_5G - 4	None	5	Disable
6	Neutral5_11a	wireless_5G - 5	None	6	Disable
7	Neutral6_11a	wireless_5G - 6	None	7	Disable
8	Neutral7_11a	wireless_5G - 7	None	8	Disable

Current Wireless Settings 11b/g

Access Point Mode: Access Point
Operating Mode: Auto(802.11g/802.11b)
Channel / Frequency: 1 / 2.412GHz (Automatic)

Security Profiles:

No.	Profile Name	SSID	Security	VLAN	Status
1	Neutral_11g	wireless_2.4G - 0	None	1	Enable
2	Neutral1_11g	wireless_2.4G - 1	None	2	Disable
3	Neutral2_11g	wireless_2.4G - 2	None	3	Disable
4	Neutral3_11g	wireless_2.4G - 3	None	4	Disable
5	Neutral4_11g	wireless_2.4G - 4	None	5	Disable
6	Neutral5_11g	wireless_2.4G - 5	None	6	Disable
7	Neutral6_11g	wireless_2.4G - 6	None	7	Disable
8	Neutral7_11g	wireless_2.4G - 7	None	8	Disable

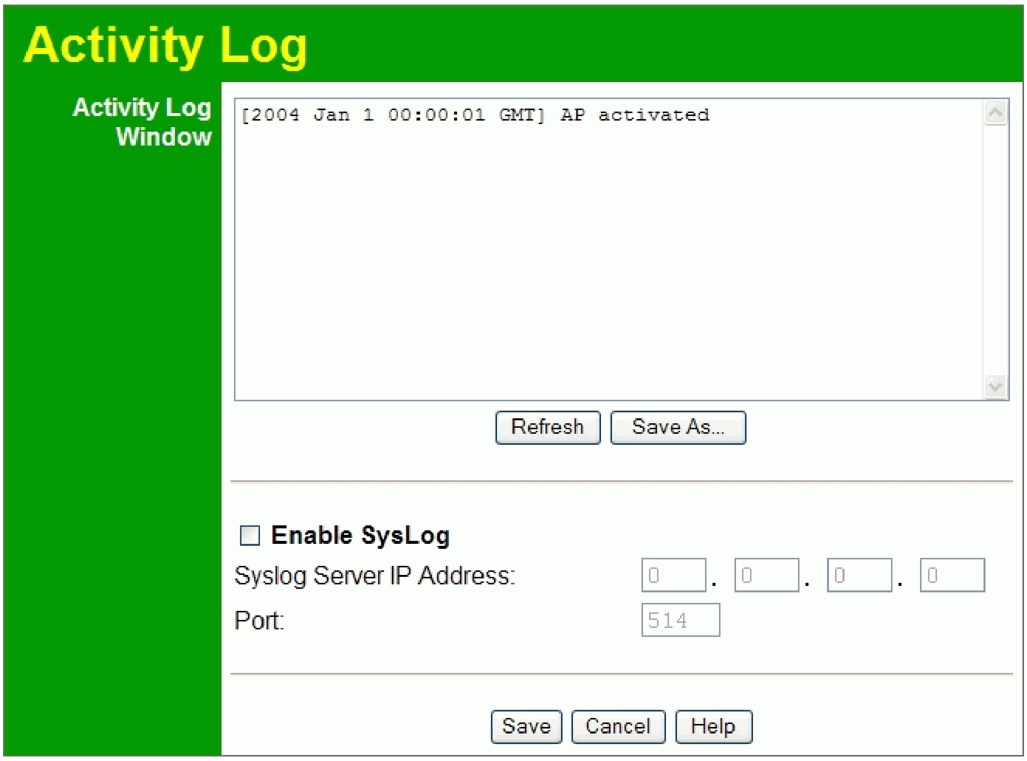
Figure 53: General Screen

Data - General Screen

Access Point Information	
Access Point Name	The current name will be displayed.
MAC Address	The MAC (physical) address of the Wireless Access Point.
Country/Region	The region or domain, as selected on the Basic Wireless screen.
Firmware Version	The version of the firmware currently installed.
VLAN	The current VLAN status will be displayed.
Management VLAN ID	The current VLAN ID used for management.
Current IP Settings	
IP Address	The IP Address of the Wireless Access Point.
Subnet Mask	The Network Mask (Subnet Mask) for the IP Address above.
Default Gateway	The Gateway for the LAN segment to which the Wireless Access Point is attached (the same value as the PCs on that LAN segment).
DHCP Client	This indicates whether the current IP address was obtained from a DHCP Server on your network. It will display "Enabled" or "Disabled".
Current Wireless Settings	
Access Point Mode	The current Access Point mode is displayed.
Operation Mode	The current operational mode is displayed.
Channel/Frequency	The Channel currently in use is displayed.
Security Profiles	
Profile Name	The current profile name is displayed.
SSID	The current SSID.
Security	This displays the current Security setting.
VLAN	This displays the current VLAN ID.
Status	The current status of each Wireless Station is displayed.

Activity Log

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.



```
[2004 Jan 1 00:00:01 GMT] AP activated
```

☐ Enable SysLog

Syslog Server IP Address: 0 . 0 . 0 . 0

Port: 514

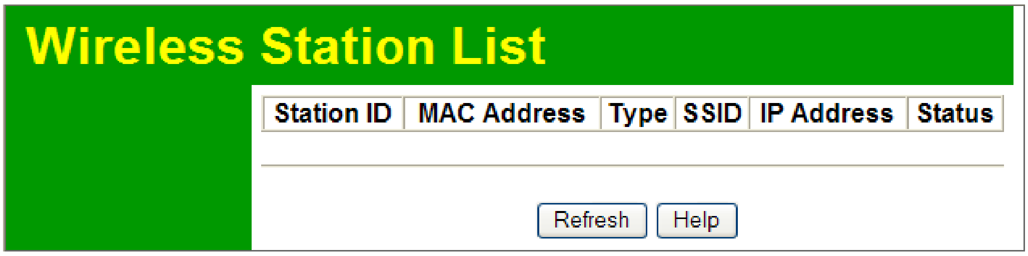
Figure 54: Activity Log Screen

Data - Activity Log Screen

Activity Log Window	
Current Time	The system date and time is displayed.
Log	The Log shows details of the connections to the Wireless Access Point.
Enable Syslog	If enabled, log data will be sent to your Syslog Server.
Syslog Server IP Address	Enter the IP address of your Syslog Server.
Port	Enter the port number of your Syslog Server.
Buttons	
Refresh	Update the data on screen.
Save As	Save the log to a file on your pc.

Wireless Station List

This screen is displayed when the *Wireless Station List* is clicked.



Wireless Station List

Station ID	MAC Address	Type	SSID	IP Address	Status

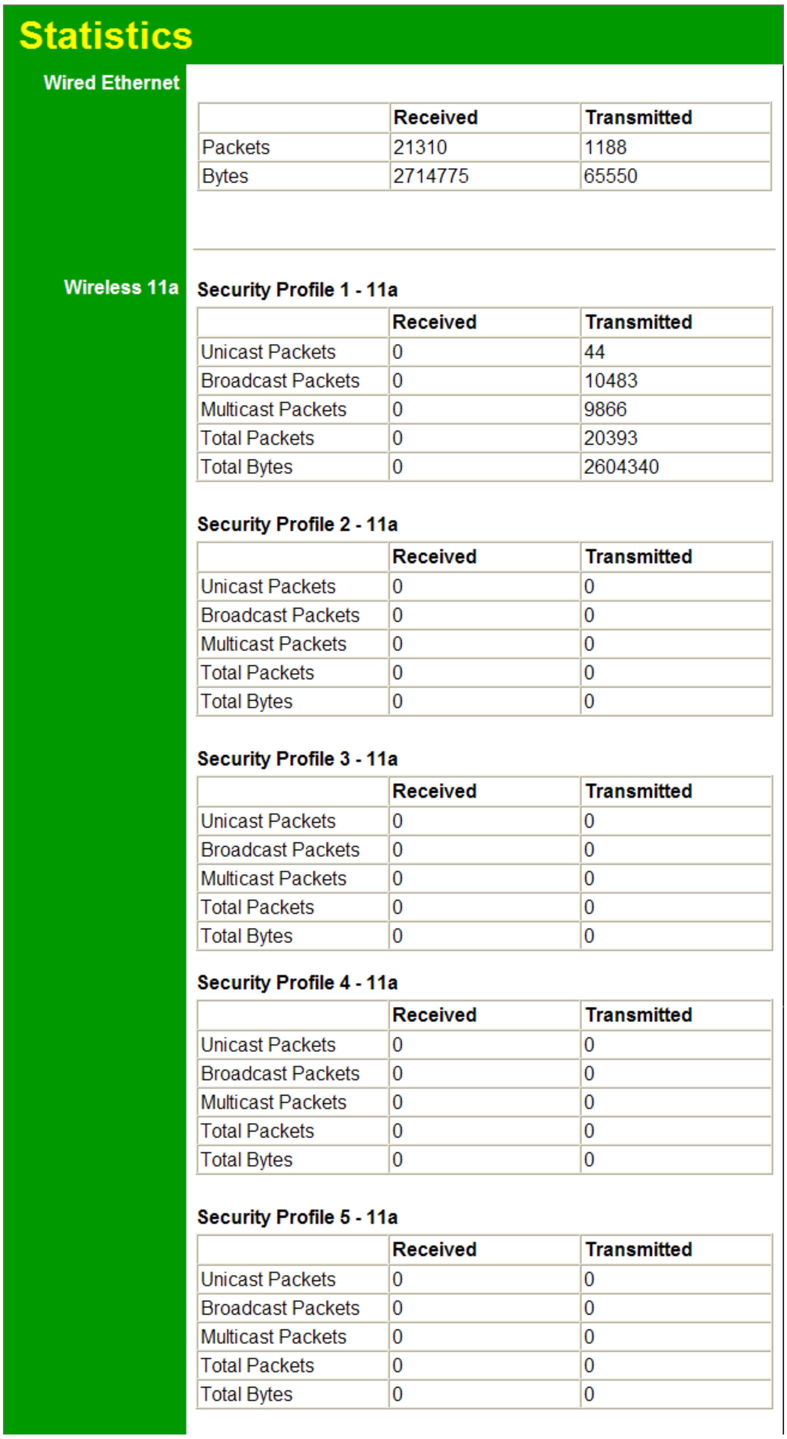
Figure 55 Wireless Station List Screen

Data - Wireless Station List Screen

Wireless Station List	
Station ID	The ID of each Wireless Station is displayed.
MAC Address	The MAC (physical) address of each Wireless Station is displayed.
Type	The type of each Wireless Station.
SSID	This displays the SSID used the Wireless station. Because the Wireless Access Point supports multiple SSIDs, different PCs could connect using different SSIDs.
IP Address	This indicates the current IP Address of each Wireless Station.
Status	This indicates the current status of each Wireless Station.
Refresh Button	Update the data on screen.

Statistics Screen

This screen is displayed when the *Statistics* is clicked. It shows details of the traffic flowing through the Wireless Access Point.



Statistics

Wired Ethernet

	Received	Transmitted
Packets	21310	1188
Bytes	2714775	65550

Wireless 11a

Security Profile 1 - 11a

	Received	Transmitted
Unicast Packets	0	44
Broadcast Packets	0	10483
Multicast Packets	0	9866
Total Packets	0	20393
Total Bytes	0	2604340

Security Profile 2 - 11a

	Received	Transmitted
Unicast Packets	0	0
Broadcast Packets	0	0
Multicast Packets	0	0
Total Packets	0	0
Total Bytes	0	0

Security Profile 3 - 11a

	Received	Transmitted
Unicast Packets	0	0
Broadcast Packets	0	0
Multicast Packets	0	0
Total Packets	0	0
Total Bytes	0	0

Security Profile 4 - 11a

	Received	Transmitted
Unicast Packets	0	0
Broadcast Packets	0	0
Multicast Packets	0	0
Total Packets	0	0
Total Bytes	0	0

Security Profile 5 - 11a

	Received	Transmitted
Unicast Packets	0	0
Broadcast Packets	0	0
Multicast Packets	0	0
Total Packets	0	0
Total Bytes	0	0

Figure 56: Statistics Screen

Data - Statistics Screen

Wired Ethernet	
Packets	The number of packets transmitted to or received from the wired Ethernet.
Bytes	The number of bytes transmitted to or received from the wired Ethernet.
Wireless	
Unicast Packets	Unicast transmission, in which packets are sent or received from a single source to a specified destination
Broadcast Packets	Broadcast transmission, in which packets are sent or received from a single source to other destinations.
Multicast Packets	Multicast transmission, in which packets are sent or received from one or more sources to other destinations.
Total Packets	Number of the total packets transmitted to or received from Wireless Stations.
Total Bytes	Number of the total bytes transmitted to or received from Wireless Stations.

Chapter 6

Other Settings & Features

6

This Chapter explains when and how to use the Wireless Access Point's "Management" Features.

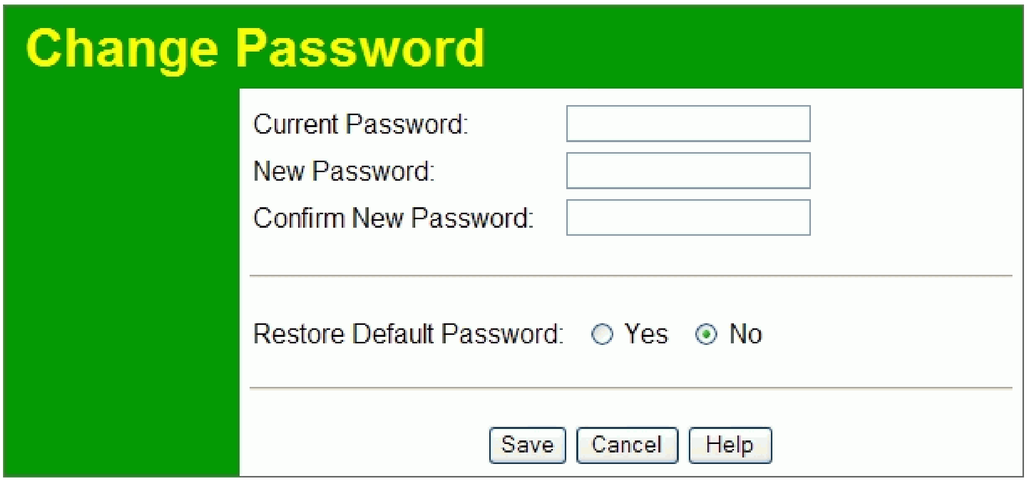
Overview

This Chapter covers the following features, available on the Wireless Access Point's ***Management*** menu.

- Change Password
- Remote Management
- Upgrade Firmware
- Backup/Restore Settings
- Reboot AP

Change Password Screen

The *Change Password* screen allows you to assign a password to the Wireless Access Point. This password limits access to the configuration interface. The default password is *password*. It is recommended that this be changed, using this screen.


Change Password

Current Password:

New Password:

Confirm New Password:

Restore Default Password: ○ Yes ● No

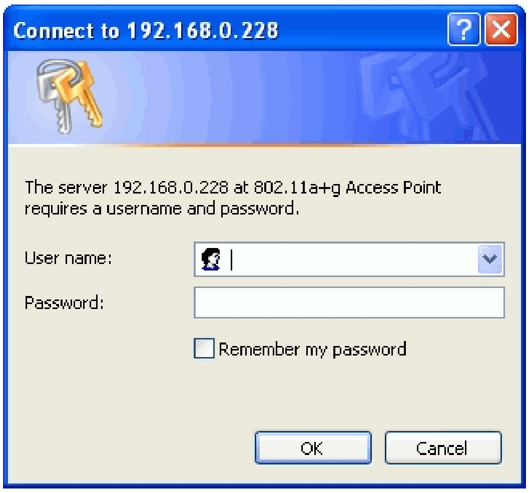
Figure 57: Change Password Screen

Data - Change Password Screen

Current Password	Enter the current password here.
New Password	Enter the new password here.
Confirm New Password	Re-enter the new password in this field.

Restore Default Password	Click *Yes* to clear and restore password settings to the factory default values.

You will be prompted for the password when you connect, as shown below.



Connect to 192.168.0.228

The server 192.168.0.228 at 802.11a+g Access Point requires a username and password.

User name:

Password:

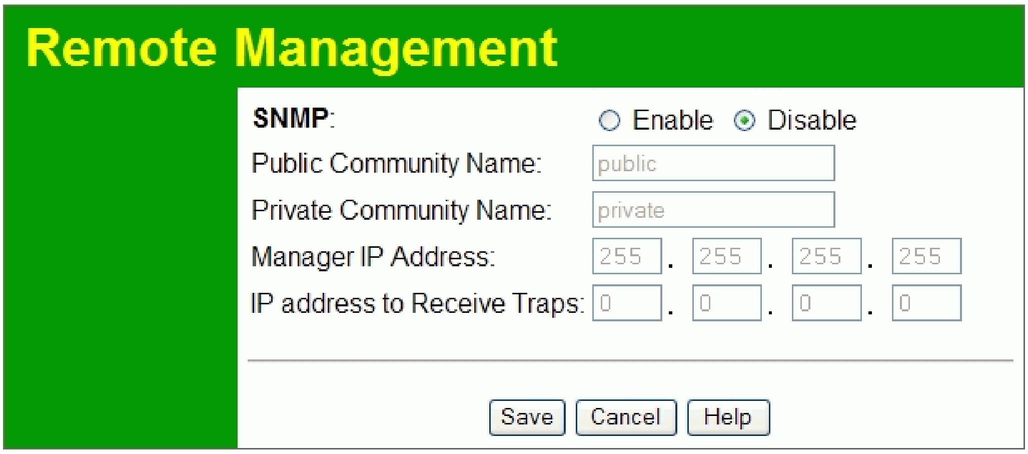
□ Remember my password

Figure 58: Password Dialog

Enter the *User Name* and *Password*, as set on the *Change Password* screen above.

Remote Management

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



SNMP: ○ Enable ● Disable

Public Community Name: public

Private Community Name: private

Manager IP Address: 255 . 255 . 255 . 255

IP address to Receive Traps: 0 . 0 . 0 . 0

Figure 59: Remote Management Screen

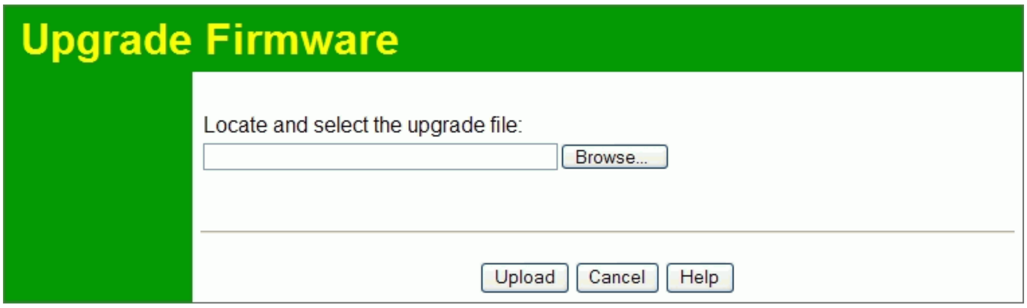
Data - Remote Management Screen

Remote Management	
SNMP	Enable or disable SNMP as required
Public Community Name	Enter the public community string, usually "Public".
Private Community Name	Enter the private community string, usually "Private".
Manager IP Address	Enter the IP address of the required station.
IP address to..	Enter the IP Address of the desired PC.

Firmware Upgrade

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.



Upgrade Firmware

Locate and select the upgrade file:

Figure 60: Firmware Upgrade Screen

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 *Upload* button to commence the firmware upgrade.

Note!

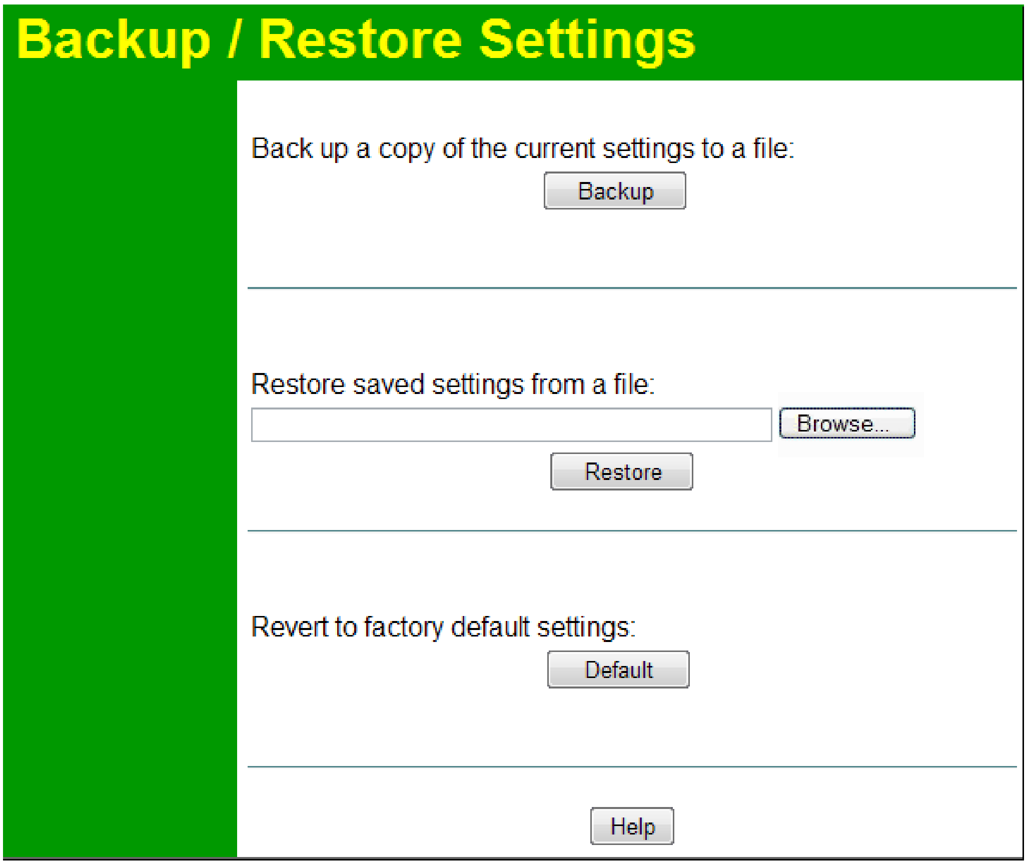
The Wireless Access Point is unavailable during the upgrade process, and must restart when the upgrade is completed. Any connections to or through the Wireless Access Point will be lost.

Backup/Restore Settings

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

You can also set the Wireless Access Point back to its factory default settings.

To reach this screen, select *Backup/Restore Settings* in the **Management** section of the menu.



Backup / Restore Settings

Back up a copy of the current settings to a file:

Restore saved settings from a file:

Revert to factory default settings:

Figure 61: Backup/Restore Settings Screen

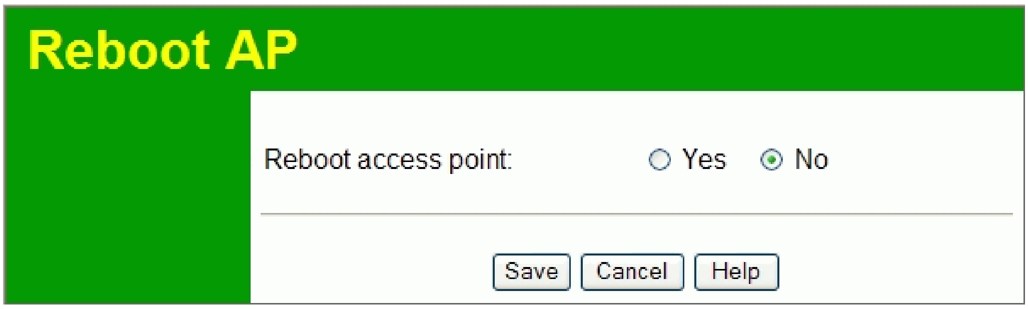
Data - Backup/Restore Screen

Backup	
Back up a copy of the current settings to a file	Click the *Backup* button to download the current settings to a file on your PC.

Restore	
Restore saved settings from a file	If you have a previously-saved configuration file, you can use this to restore those settings by uploading the file. 1. Click the *Browse* button and navigate to the location of the configuration file. 2. Select the upgrade file. Its name will appear in the *File* field. 3. Click the *Restore* button to commence the upload. 4. The Wireless Access Point will need to restart, and will be unavailable during the restart. All exiting connections will be broken.
Default	
Default	Use this to set the Wireless Access Point back to its factory default settings. • Click *Default* to start the procedure. • The Wireless Access Point will need to restart, and will be unavailable during the restart. All exiting connections will be broken.

Reboot AP

To reach this screen, select *Reboot AP* in the **Management** section of the menu.



Reboot AP

Reboot access point: ○ Yes ● No

Figure 62: Reboot AP Screen

Data - Reboot AP Screen

Reboot AP	
Reboot access point	Click *Yes* to restart the Wireless Access Point.

Appendix A

Specifications

Wireless Access Point

Hardware Specifications

CPU	AR5312
Radio-on-Chip	AR2112+AR5112
DRAM	16 Mbytes
Flash ROM	4 Mbytes
LAN port	1 x Auto-MDIX RJ 45 for 10/100Mbps PoE port IEEE 802.3af comliance
11G/B	Network Standard IEEE 802.11b (Wi-Fi™) and IEEE 802.11g compliance
	Operating Frequencies 2.412. - 2.462GHz(FCC), 2.412. - 2.472GHz(EU)
11A	Network Standard IEEE 802.11a compliance
	Operating Frequencies: FCC: 5.15 - 5.25GHz, 5.725 - 5.825GHz Europe: 5.15 - 5.35GHz, 5.47 - 5.725GHz Japan: 4.90 - 5.00GHz, 5.03 - 5.091GHz, 5.15 - 5.125GHz
Antennae	2x5dbi detachable single band antennae. One for 5GHz, the other for 2.4GHz
Operating temperature	0~45℃
Storage temperature	-20℃~70℃
Power Adapter	DC 12V/1000mA
Dimensions	189mm (W) x 125mm (D) x 34mm (H)

Software Specifications

Feature	Details
Wireless	• Access point support • Roaming supported • IEEE 802.11a/11g/11b compliance • Auto Sensing Open System / Share Key authentication • Wireless Channels Support • Automatic Wireless Channel Selection

	• MBSSID support • WMM support • Tx Power Adjustment • Transmit Data Rate • Domain Selection • Preamble Type: long or short support • RTS Threshold Adjustment • Fragmentation Threshold Adjustment • Beacon Interval Adjustment • SSID assignment • Short Slot time support • CTS-only &CTS/RTS protect mechanism support • DFS(Dynamic Frequency Selection) Support • TPC (Transmit Power Control) Support
Operation Mode	• Common AP • PTP Bridge • PTMP Bridge • Repeater
Security	• Open, Shared, WPA, WPA-PSK and WPA2-PSK authentication • 64bit/128bit/152bit WEP, TKIP, AES-CCMP support • 802.1x support • EAP-MD5, EAP-TLS, EAP-TTLS, PEAP • RADIUS based MAC authentication • Block inter-wireless station communication (wireless separation) • Block SSID broadcast
Management	• Web based configuration • Configurable Web port • RADIUS Accounting • RADIUS-On feature • RADIUS Accounting update • Message Log • Access Control list file support • Configuration file Backup/Restore • Statistics support • RADIUS DNS name • SNMP v1 & v2c • Device discovery program/Windows Utility
Other Features	• DHCP client • WINS client • Radius client • Enable/Disable Wireless
Firmware Upgrade	HTTP

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the 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 of the following measures:

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

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

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Appendix B

B

Troubleshooting

Overview

This chapter covers some common problems that may be encountered while using the Wireless Access Point and some possible solutions to them. If you follow the suggested steps and the Wireless Access Point still does not function properly, contact your dealer for further advice.

General Problems

Problem 1: **Can't connect to the Wireless Access Point to configure it.**

Solution 1: Check the following:

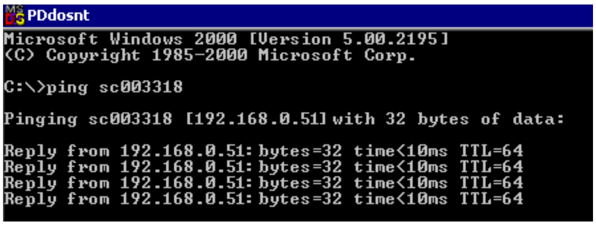
- The Wireless Access Point is properly installed, LAN connections are OK, and it is powered ON. Check the LEDs for port status.
- Ensure that your PC and the Wireless Access Point are on the same network segment. (If you don't have a router, this must be the case.)
- If your PC is set to "Obtain an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

To Find the Access Point's IP Address

1. Open a MS-DOS Prompt or Command Prompt Window.
2. Use the Ping command to “ping” the Wireless Access Point. Enter `ping` followed by the Default Name of the Wireless Access Point. e.g.

```
ping SC003318
```

3. Check the output of the ping command to determine the IP address of the Wireless Access Point, as shown below.



PDdosnt

```
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\>ping sc003318

Pinging sc003318 [192.168.0.51] with 32 bytes of data:

Reply from 192.168.0.51: bytes=32 time<10ms TTL=64
Reply from 192.168.0.51: bytes=32 time<10ms TTL=64
Reply from 192.168.0.51: bytes=32 time<10ms TTL=64
Reply from 192.168.0.51: bytes=32 time<10ms TTL=64
```

Figure 63: Ping

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

Solution 2 Check the following:

- The SSID and WEP settings on the PC match the settings on the Wireless Access Point.
- 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. See Chapter 4 for details of setup for the Windows XP 802.1x client. If using a different client, refer to the vendor's documentation.

Appendix C

Windows TCP/IP

Overview

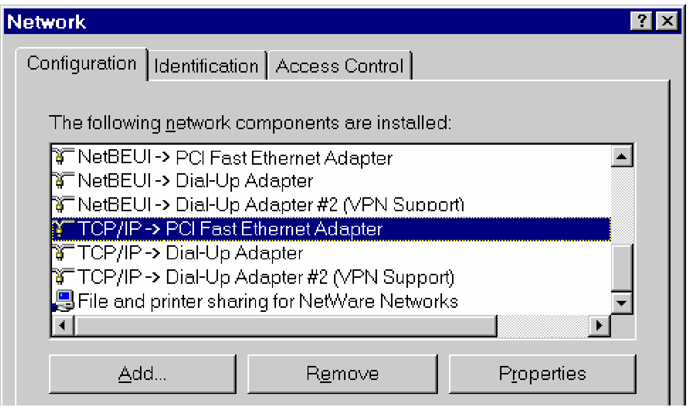
Normally, no changes need to be made.

- 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:

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

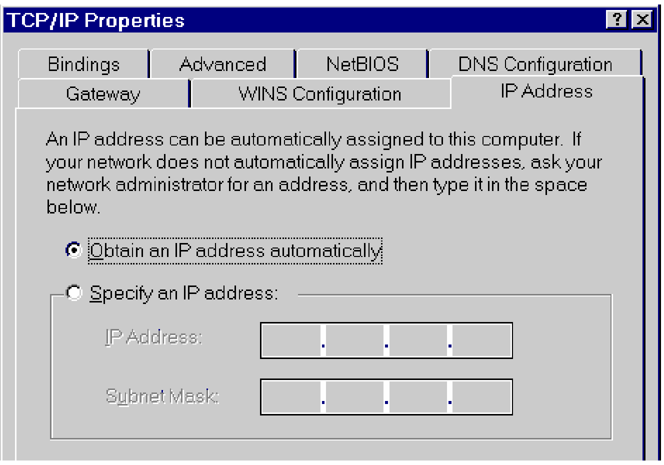


The following network components are installed:

- NetBEUI -> PCI Fast Ethernet Adapter
- NetBEUI -> Dial-Up Adapter
- NetBEUI -> Dial-Up Adapter #2 (VPN Support)
- TCP/IP -> PCI Fast Ethernet Adapter
- TCP/IP -> Dial-Up Adapter
- TCP/IP -> Dial-Up Adapter #2 (VPN Support)
- File and printer sharing for NetWare Networks

Figure 64: Network Configuration

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



An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.

● Obtain an IP address automatically

○ Specify an IP address:

IP Address: . . .

Subnet Mask: . . .

Figure 65: 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.

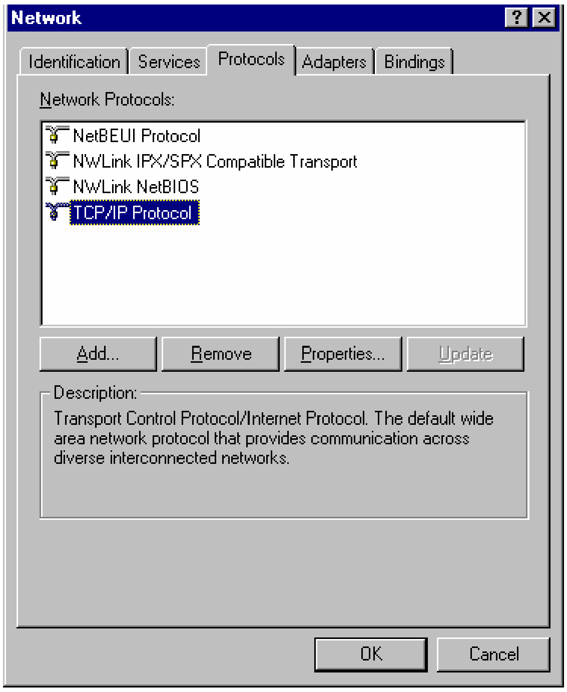
Using "Specify an IP Address"

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.



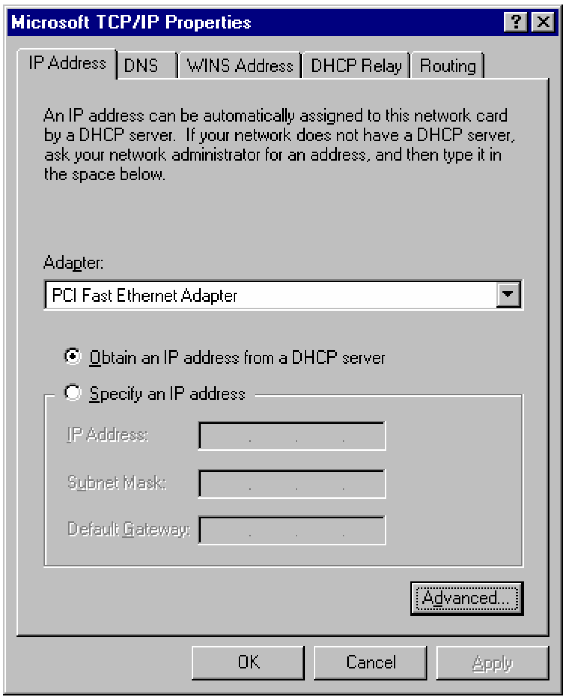
Network Protocols:

- NetBEUI Protocol
- NWLink IPX/SPX Compatible Transport
- NWLink NetBIOS
- TCP/IP Protocol

Description:
Transport Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

Figure 66: Windows NT4.0 - TCP/IP

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



An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.

Adapter: PCI Fast Ethernet Adapter

● Obtain an IP address from a DHCP server

○ Specify an IP address

IP Address: . . .

Subnet Mask: . . .

Default Gateway: . . .

Figure 67: 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.

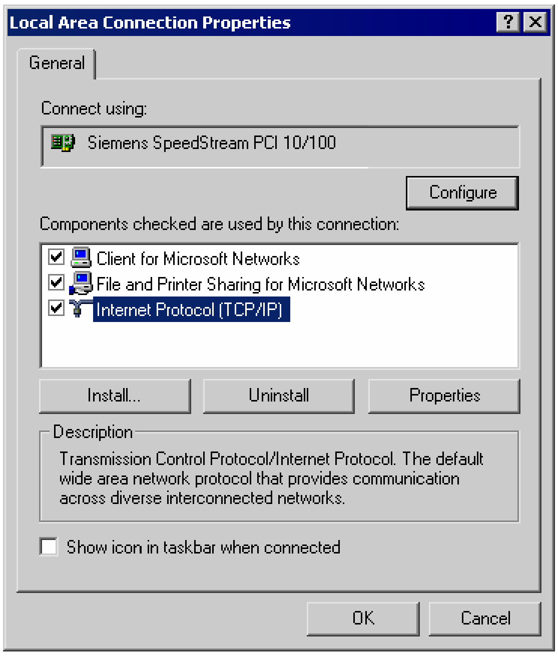
Using "Specify an IP Address"

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:



Local Area Connection Properties

General

Connect using:

Siemens SpeedStream PCI 10/100

Components checked are used by this connection:

☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ Internet Protocol (TCP/IP)

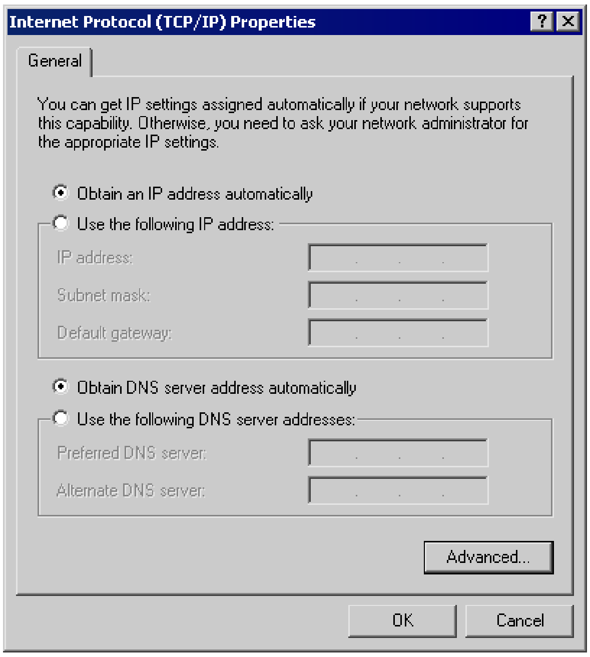
Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☐ Show icon in taskbar when connected

Figure 68: 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.



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically
○ Use the following IP address:

IP address: . . .
Subnet mask: . . .
Default gateway: . . .

● Obtain DNS server address automatically
○ Use the following DNS server addresses:

Preferred DNS server: . . .
Alternate DNS server: . . .

Figure 69: 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.

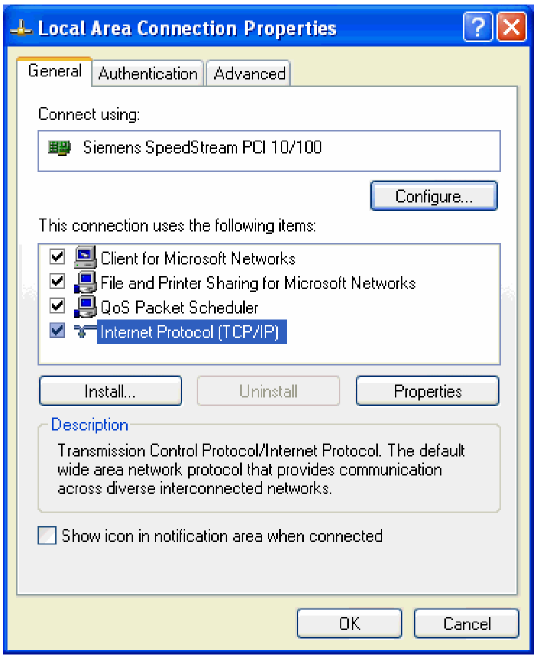
Using a fixed IP Address ("Use the following IP Address")

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:



Local Area Connection Properties

General | Authentication | Advanced

Connect using:

Siemens SpeedStream PCI 10/100

This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ Internet Protocol (TCP/IP)

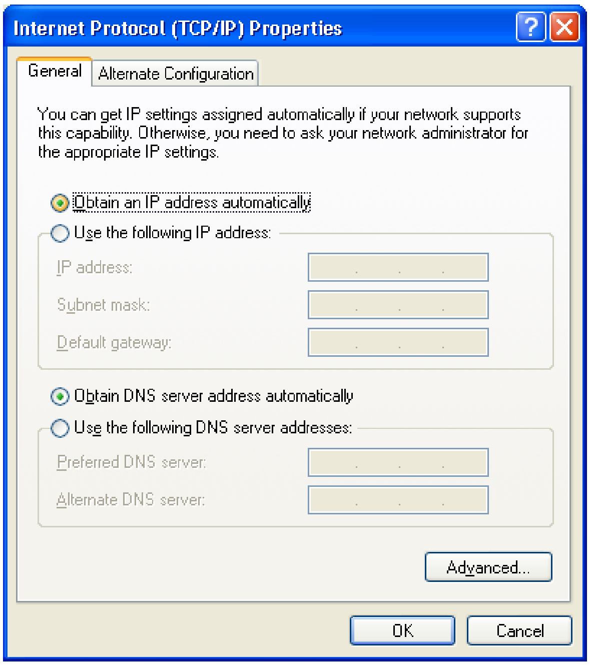
Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☐ Show icon in notification area when connected

Figure 70: 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.



Internet Protocol (TCP/IP) Properties

General | Alternate Configuration

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically

○ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

Figure 71: 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.

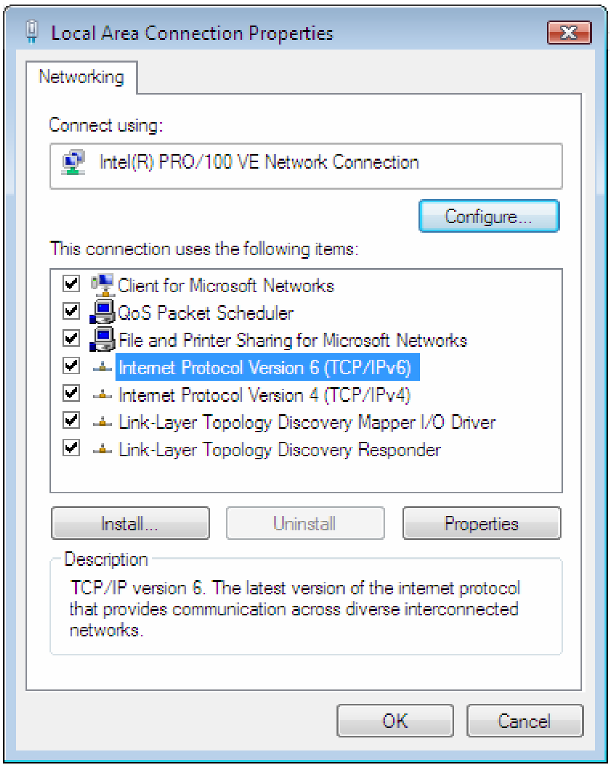
Using a fixed IP Address ("Use the following IP Address")

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:



Local Area Connection Properties

Networking

Connect using:

Intel(R) PRO/100 VE Network Connection

This connection uses the following items:

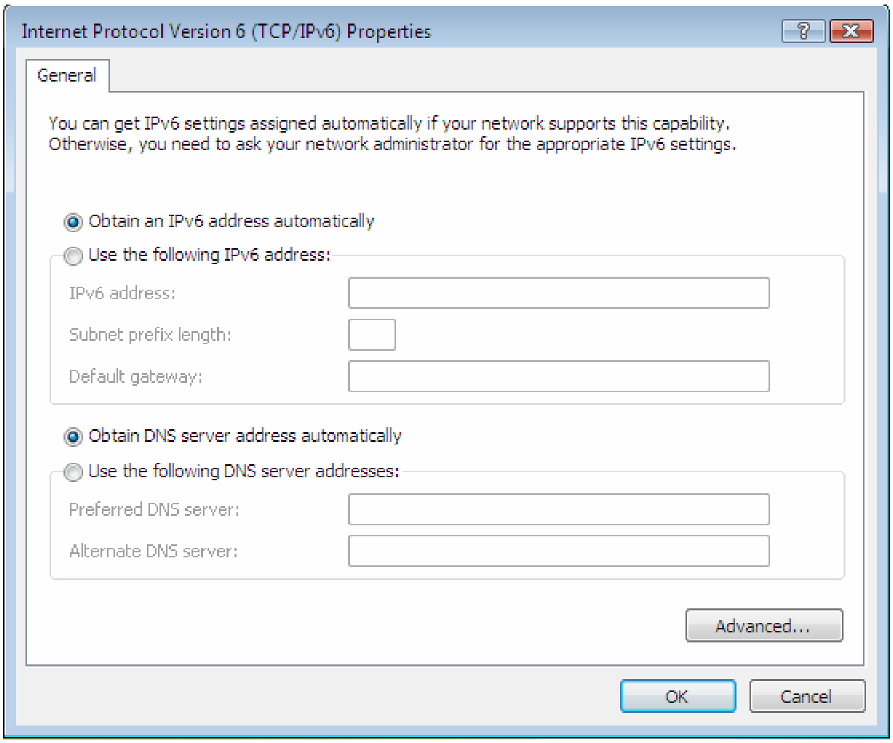
- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

TCP/IP version 6. The latest version of the internet protocol that provides communication across diverse interconnected networks.

Figure 72: 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.



Internet Protocol Version 6 (TCP/IPv6) Properties

General

You can get IPv6 settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IPv6 settings.

● Obtain an IPv6 address automatically

○ Use the following IPv6 address:

IPv6 address:

Subnet prefix length:

Default gateway:

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

Preferred DNS server:

Alternate DNS server:

Figure 73: 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 D

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.

Note!

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.

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.

Regulatory Approvals

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the 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 of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

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

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Channel

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. In the USA and Canada, 11 channel are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- 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.

CAUTION:

1) To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.