

Senao

2-Port Switch Wireless Router

User Guide

Model No. SL-2511SR

Before operating the unit, please read this manual thoroughly, and retain it for future reference.



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FCC 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 the FCC Rules. These limits are designed to provide reasonable protection against radio interference in a commercial environment. This equipment can generate, use and radiate radio frequency energy and, if not installed and used in accordance with the instructions in this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures are necessary to correct the interference.

CE Declaration of Conformity

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022/A1 Class B, and EN 50082-1. This meets the essential protection requirements of the European Council Directive 89/336/EEC on the approximation of the laws of the member states relation to electromagnetic compatibility.

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

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Chapter 1 Introduction

Congratulations on your purchase of this outstanding Wireless Access Point. This product is specifically designed for Small Office and Home Office needs. It provides a solution for building a LAN and sharing resources with or without wire, and is easy to configure and operate even for non-technical users. Instructions for installing and configuring this product can be found in this manual. Before you install and use this product, please read this manual carefully for fully exploiting the functions of this product.

Functions and Features

- **High speed for wireless LAN connection**
11Mbps data rate by incorporating Direct Sequence Spread Spectrum (DSSS).
- **Roaming**
Provides seamless roaming within the IEEE 802.11b WLAN infrastructure.
- **IEEE 802.11b compatible**
Allowing inter-operation among multiple vendors.
- **Auto fallback**
11M, 5M, 2M, 1M data rate with auto fallback.
- **Auto-sensing Ethernet Switch**
Equipped with a 2-port auto-sensing Ethernet switch.
- **DHCP server supported**
All of the networked computers can retrieve TCP/IP settings automatically from this product.
- **Web-based configuring**
Configurable through any networked computer's web browser.

- ◆ **MAC Address Access Control supported**

Allows you to assign different access right for different users.

- **Firmware Upgradable**

Provides firmware upgrade via Web Browser or Windows Application.

1.2 Packing List

- Wireless Access Point unit
- Installation CD-ROM
- Power adapter
- CAT-5 UTP Fast Ethernet cable

Chapter 2 Hardware Installation

2.1 Panel Layout

2.1.1. Front Panel



Figure 2-1 Front Panel

LED:

LED	Function	Color	Status	Description
POWER	Power indication	Green	On	Power is being applied to this product.
M1	System status 1	Orange	Blinking	This product is functioning properly.
WLAN	Wireless activity	Green	Blinking	Sending or receiving data via wireless
Link/Act. 1~2	Link status	Green	On	An active station is connected to the corresponding LAN port.
			Blinking	The corresponding LAN port is sending or receiving data.
10/100	Data Rate	Green	On	Data is transmitting in 100Mbps on the corresponding LAN port.

Port:

RESET

To reset system settings to factory defaults, please follow the steps:

1. Power off the device,
2. Press the reset button and hold,
3. Power on the device,
4. Keep the button pressed about 5 seconds,
5. Release the button,
6. Watch the M1 LED, they will flash 8 times and then M1 flash once

per second.

2.1.2. Rear Panel



Figure 2-2 Rear Panel

Ports:

Port	Description
12VDC	Power inlet: DC 12V, 1.5A (minimum)
Port 1-2	the ports where you will connect networked computers and other devices.
Connector	TNC connector
RS-232	RS-232 for ISDN/TA modem

2.2 Procedure for Hardware Installation

1. Decide where to place your Wireless Access Point

You can place your Wireless Access Point on a desk or other flat surface, or you can mount it on a wall. For optimal performance, place your Wireless Access Point in the center of your office (or your home) in a location that is away from any potential source of interference, such as a metal wall or microwave oven.

2. Setup LAN connection

- a. Wired LAN connection: connect an Ethernet cable from your computer's Ethernet port to one of the LAN ports (number 1-2) on the AP. Repeat the process to connect other computers to the AP. If you need to connect more than two computers to the AP, use a 10/100 Fast Ethernet switch (preferred) or hub and connect the Ethernet cable from the AP to the switch/hub's UPLINK port. You may need to switch on the UPLINK feature on the switch/hub. The AP supports up to 253 network computers and devices.
- b. Wireless LAN connection: locate this product at a proper position to gain the best transmits performance.

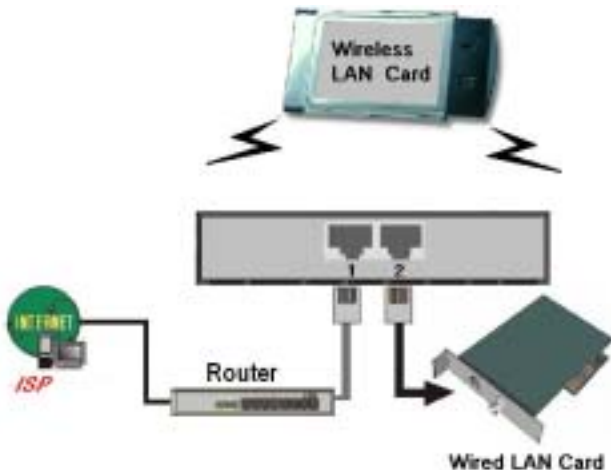


Figure 2-3 Setup of LAN connections for this product.

Note: If an UPLINK port is not available, simply connect a crossover Ethernet cable from the AP to the switch/hub.

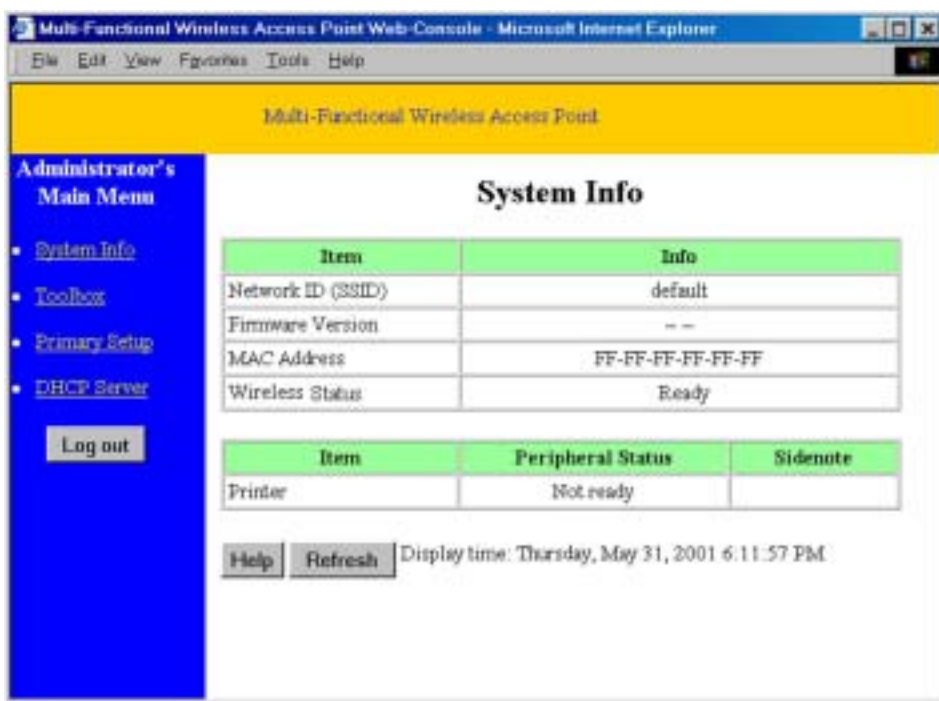
3. Power on

Connecting the power cord to power inlet and turning the power switch on, this product will automatically enter the self-test phase. When it is in the self-test phase, the indicators M1 will be lighted ON for about 10 seconds, and then M1 will be flashed 3 times to indicate that the self-test operation has finished. Finally, the M1 will be continuously flashed once per second to indicate that this product is in normal operation.

Chapter 3 Configuring Wireless Access Point

This product provides Web based configuration scheme, that is, configuring by your Web browser, such as Netscape Communicator or Internet Explorer. This approach can be adopted in any MS Windows, Macintosh or UNIX based platforms.

3.1 Start-up and Log in



The screenshot shows a web browser window titled "Multi-Functional Wireless Access Point Web-Console - Microsoft Internet Explorer". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The page content is titled "Multi-Functional Wireless Access Point" and features a blue sidebar for the "Administrator's Main Menu" with links to "System Info", "Toolbox", "Primary Setup", and "DHCP Server", along with a "Log out" button. The main content area is titled "System Info" and contains two tables. The first table lists system parameters, and the second table shows peripheral status.

Item	Info
Network ID (SSID)	default
Firmware Version	--
MAC Address	FF-FF-FF-FF-FF-FF
Wireless Status	Ready

Item	Peripheral Status	Sidenote
Printer	Not ready	

At the bottom of the page, there are "Help" and "Refresh" buttons, and a display time of "Thursday, May 31, 2001 6:11:57 PM".

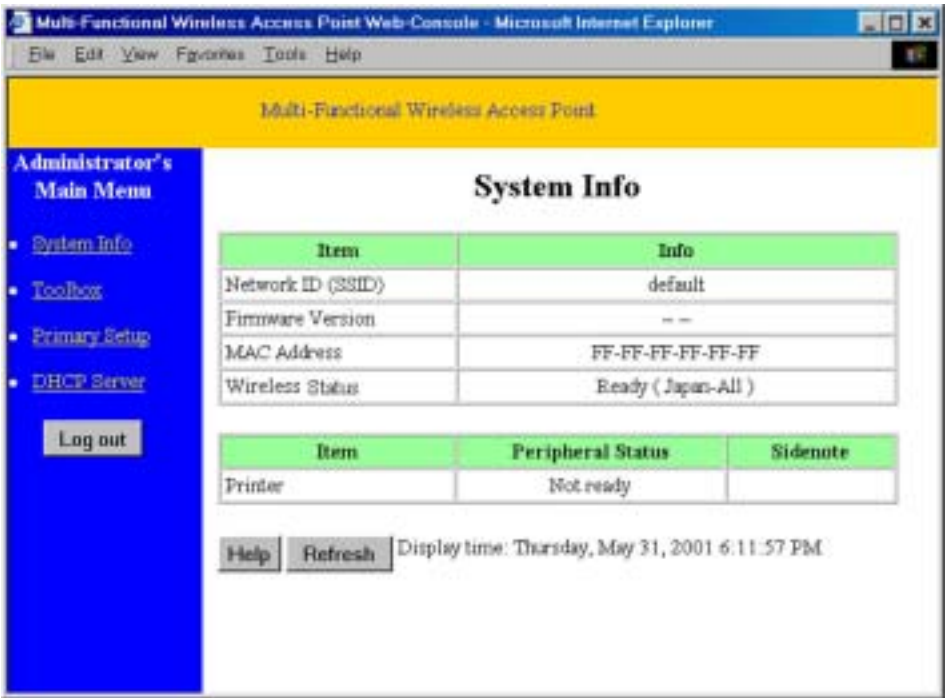
Activate your browser, and *disable the proxy* or *add the IP address of this product into the exceptions*. Then, type this product's IP address (the factory setting is **192.168.123.254**) in the *Location* (for Netscape) or *Address* (for IE) field and press

ENTER.

After the connection is established, you will see the web user interface of this product. There are two appearances of web user interface: *for general users* and *for system administrator*.

To log in as an administrator, enter the system password (the factory setting is "*admin*") in the *System Password* field and click on the **Log in** button. If the password is correct, the web appearance will be changed into administrator configure mode. As listed in its main menu, there are several options for system administration.

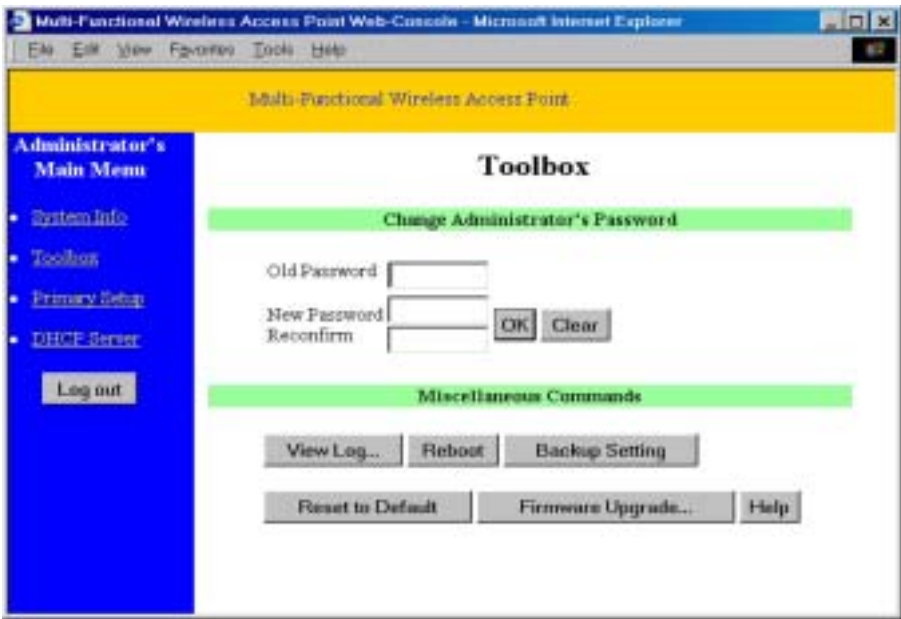
3.2 System Info.



This option provides the function for observing this product's settings and working status:

- A. **Network ID (SSID):** The current setting of SSID
- B. **Firmware Version:** The current firmware version on this device
- C. **MAC Address:** The MAC address of this device

3.3 Toolbox



This option enables you to change the administrator password.

There are some useful buttons in this page:

View Log View the system logs

Reboot Reboot this device

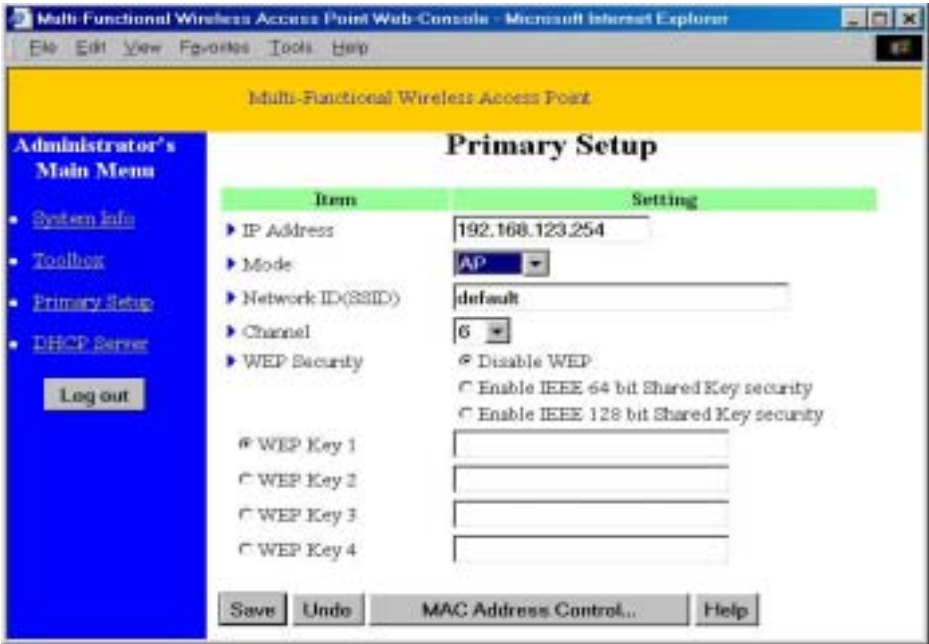
Backup Setting You can backup your settings by clicking this button and save it as a bin file. Once you want to restore these settings, please click **Firmware Upgrade** button and use the bin file you saved.

Reset to Default Reset the settings of this device to the default values

Firmware Upgrade Prompt the administrator for a file and upgrade it to this device

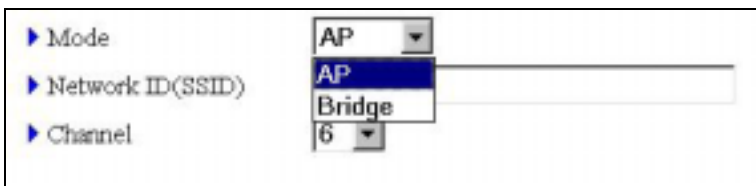
Note: we strongly recommend you to change the system password for security reason.

3.4 Primary Setup



This option is primary to enable this product to work properly.

1. **IP Address:** the IP address of this device. You can change it if necessary.



2. **Mode:** the operating mode of this device. The default mode is “AP”, which is the normal operation mode of a wireless AP. You can change it to the “Bridge” mode if you want this product to work as a **wireless bridge** * .

3. **Network ID(SSID):** Network ID is used for identifying the Wireless LAN (WLAN). Client stations can roam freely over this product and other Access Points that have the

same Network ID. (The factory setting is “*default*”).

Note: This item won’t take effect in “Bridge” mode.

- 4. **Channel:** The radio channel number. The permissible channels depend on the Regulatory Domain.

The factory setting is as follows:

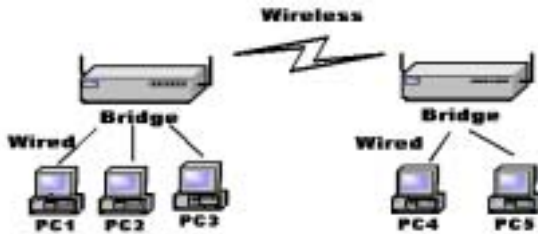
USA/Canada Europe/Australia (ETSI) Japan (All)	Channel 6
Spain, France	Channel 10
Japan	Channel 14

- 5. **WEP Security:** Select the data privacy algorithm you want. Enabling the security can protect your data while it is transferred from one station to another. The standardized IEEE 802.11 WEP (64-bit or 128-bit) is used here.
- 6. **WEP Key 1, 2, 3 & 4:** When you enable the 64-bit or 128-bit WEP key security, please select one WEP key to be used and then input 10 or 26 hex-decimal (0-9, A-F) digits.

MAC Access Control Setup MAC addresses to control which wireless clients can associate to the wireless LAN.

***Wireless Bridge:**

Two of this device will be able to communicate with each other when they are working in the “Bridge” Mode. You can connect two wired LANs together via wireless connection with wireless bridge function. The connection is as follows:

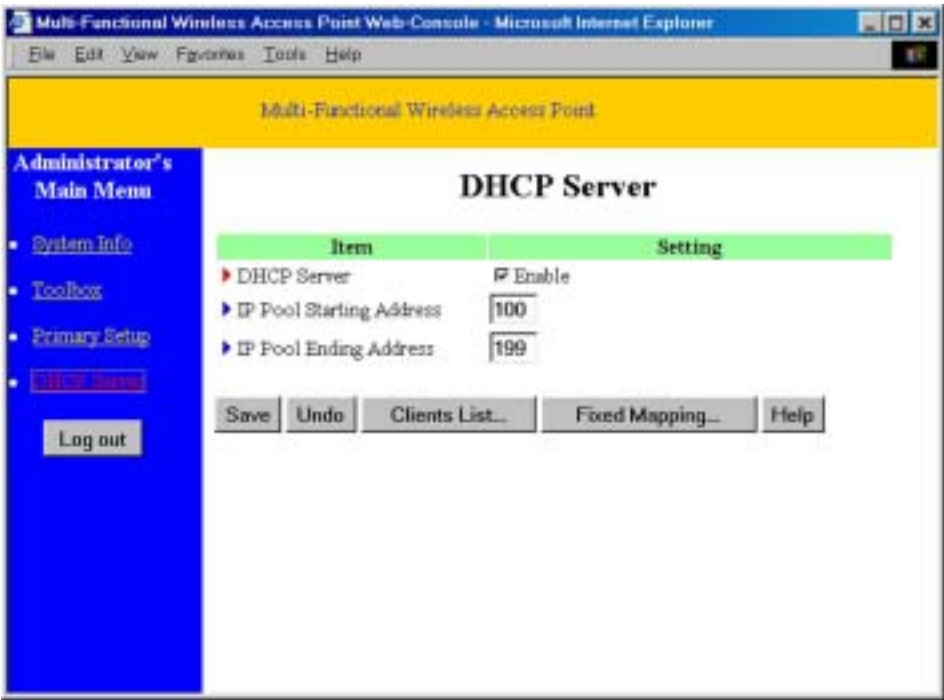


To let two devices communicate with each other via wireless, just set these two devices to “Bridge” mode and set the “Channel” to the same channel number.

Note: This device can’t be a wireless AP when it is operating as a wireless bridge. This means there is no wireless client can associate to this device when it’s in the bridge mode.

B“Bridge” mode. “Bridge” mode.

3.5 DHCP Server



The settings of a TCP/IP environment include host IP, Subnet Mask, Gateway, and DNS configurations. It is not easy to manually configure all the computers and devices in your network. Fortunately, DHCP *Server* provides a rather simple approach to handle all these settings. This product supports the function of DHCP server. If you enable this product's DHCP server and configure your computers as "automatic IP allocation" mode, then when your computer is powered on, it will automatically load the proper TCP/IP settings from this product. The settings of DHCP server include the following items:

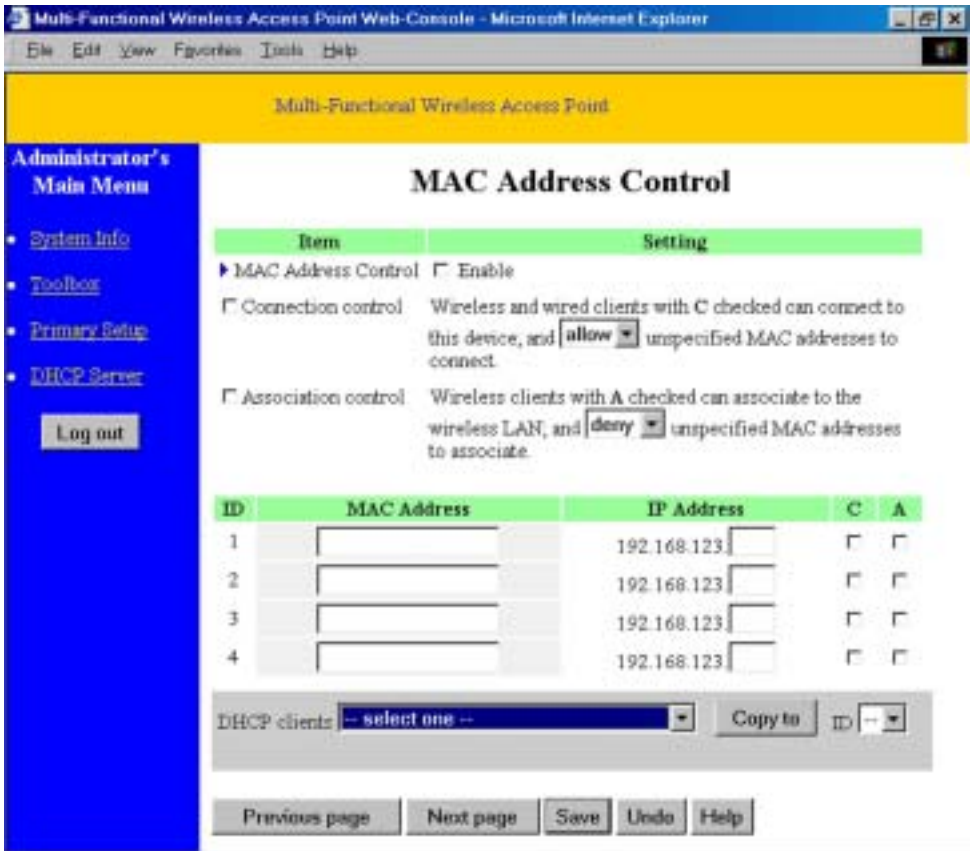
1. **DHCP Server:** Check "Enable" to enable the DHCP server function. All the settings in this page will take effect only if "Enable" is checked.

2. **Range of IP Address Pool:** Whenever there is a request, the DHCP server will automatically allocate an unused IP address from the *IP address pool* to the requesting computer. You must specify the starting and ending address of the IP address pool.

Clients List List the current mapping of the IP and MAC address for each DHCP client.

Fixed Mapping In general, DHCP server assigns an IP address chosen from the IP addresses pool randomly. **Fixed Mapping** allows you to assign a specific IP address to the specified MAC address.

3.6 MAC Address Control



MAC Address Control allows you to assign different access right for different users and to assign a specific IP address to a certain MAC address.

MAC Address Control Check “Enable” to enable the “MAC Address Control”. All of the settings in this page will take effect only when “Enable” is checked.

Connection control Check "Connection control" to enable the controlling of which wired and wireless clients can connect to this device. If

a client is denied to connect to this device, it means the client can't access to the Internet either. Choose "allow" or "deny" to allow or deny the clients, whose MAC addresses are not in the "Control table" (please see below), to connect to this device.

Association control

Check "Association control" to enable the controlling of which wireless client can associate to the wireless LAN. If a client is denied to associate to the wireless LAN, it means the client can't send or receive any data via this device. Choose "allow" or "deny" to allow or deny the clients, whose MAC addresses are not in the "Control table", to associate to the wireless LAN.

Control table

"Control table" is the table at the bottom of the "MAC Address Control" page. Each row of this table indicates the MAC address and the expected IP address mapping of a client. There are four columns in this table:

MAC Address	MAC address indicates a specific client.
IP Address	Expected IP address of the corresponding client. Keep it empty if you don't care its IP address.
C	When " Connection control " is checked, check " C " will allow the corresponding client to connect to this device.
A	When " Association control " is checked, check " A " will allow the corresponding client to associate to the wireless LAN.

In this page, we provides the following Combobox and button to help you to input the MAC address.

A screenshot of a web interface. It features a horizontal bar with a light purple background. On the left, the text "DHCP clients" is followed by a dropdown menu containing "-- select one --". To the right of this is a grey button labeled "Copy to". Further right is another dropdown menu labeled "ID" containing "--".

You can select a specific client in the “DHCP clients” Combobox, and then click on the “Copy to” button to copy the MAC address of the client you select to the ID selected in the “ID” Combobox.

Previous page and Next Page

To make this setup page simple and clear, we have divided the “Control table” into several pages. You can use these buttons to navigate to different pages.

Appendix A TCP/IP Configuration for Windows 95/98

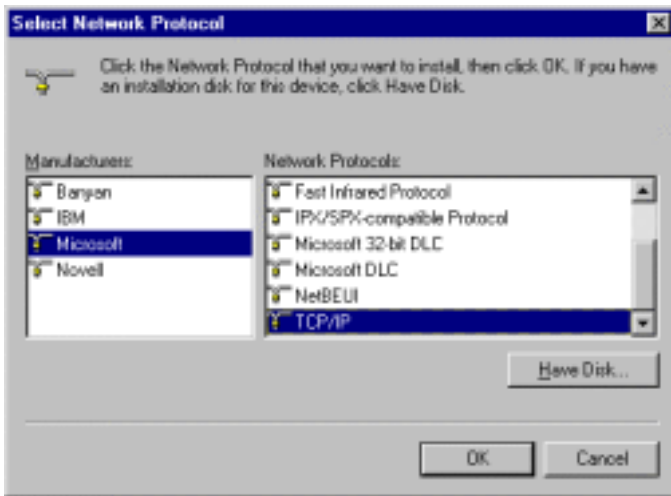
This section introduces you how to install TCP/IP protocol into your personal computer. And suppose you have been successfully installed one network card on your personal computer. If not, please refer to your network card manual. Moreover, the Section A.2 tells you how to set TCP/IP values for working with this device correctly.

A.1 Install TCP/IP Protocol into Your PC

1. Click **Start** button and choose **Settings**, then click **Control Panel**.
2. Double click **Network** icon and select **Configuration** tab in the Network window.
3. Click **Add** button to add network component into your PC.
4. Double click **Protocol** to add TCP/IP protocol.



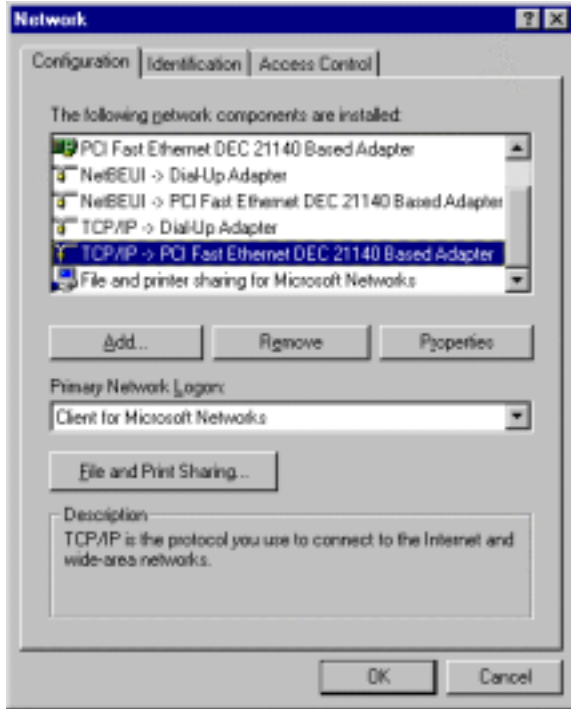
5. Select **Microsoft** item in the *manufactures* list. And choose **TCP/IP** in the *Network Protocols*. Click **OK** button to return to Network window.



6. The TCP/IP protocol shall be listed in the Network window. Click **OK** to complete the install procedure and restart your PC to enable the TCP/IP protocol.

A.2 Set TCP/IP Protocol for Working with This Device

1. Click **Start** button and choose **Settings**, then click **Control Panel**.
2. Double click **Network** icon. Select the TCP/IP line that has been associated to your network card in the **Configuration** tab of the Network window.



3. Click **Properties** button to set the TCP/IP protocol for this device.
4. Now, you have two setting methods:
 - A. Get IP via DHCP server

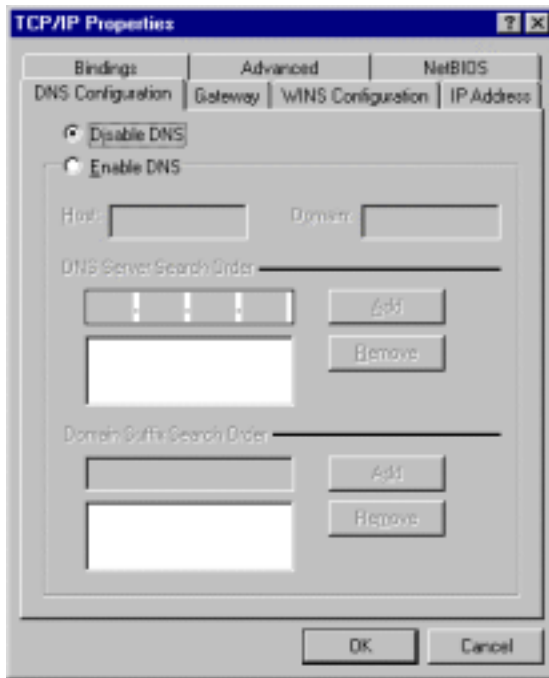
- a. Select *Obtain an IP address automatically* in the *IP Address* tab.



- b. Don't input any value in the *Gateway* tab.

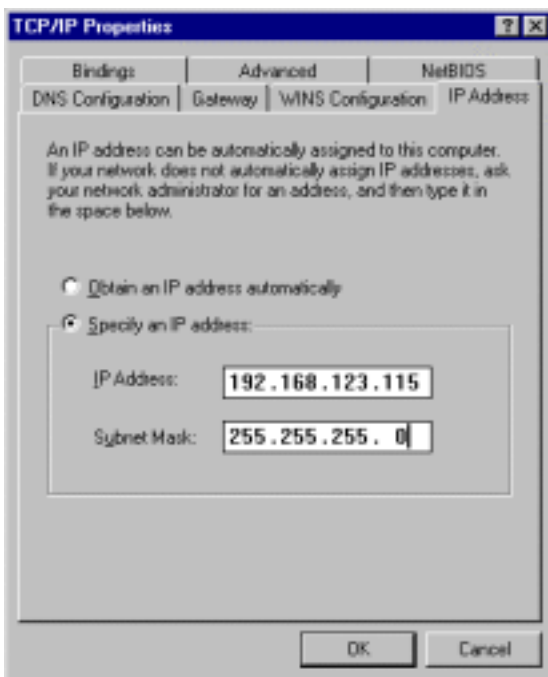


- c. Choose **Disable DNS** in the *DNS Configuration* tab.

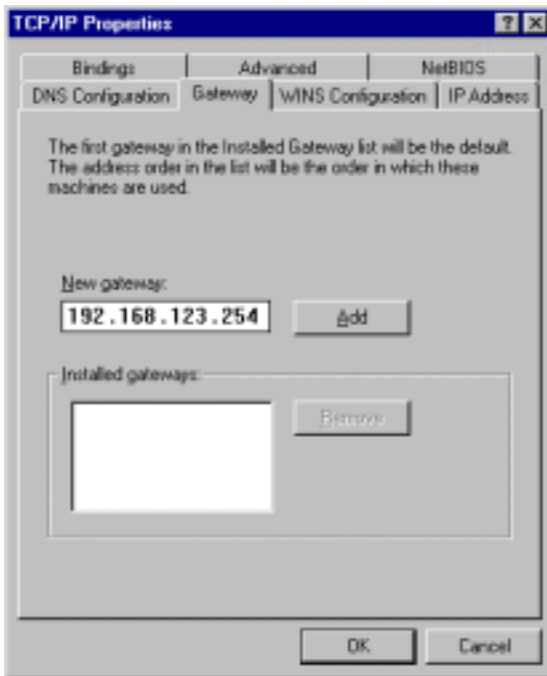


B. Configure IP manually

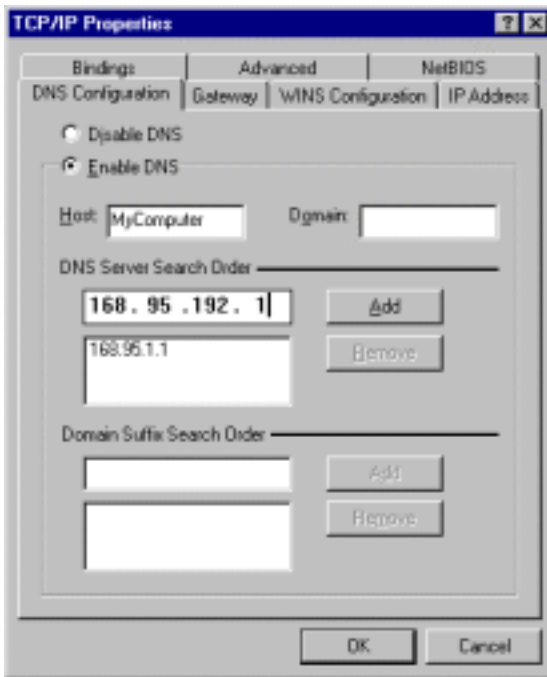
- a. Select *Specify an IP address* in the *IP Address* tab. The default IP address of this product is 192.168.123.254. So please use 192.168.123.xxx (xxx is between 1 and 253) for *IP Address* field and 255.255.255.0 for *Subnet Mask* field.



- b. In the *Gateway* tab, add the IP address of the gateway you use in the *New gateway* field and click **Add** button.



- c. In the *DNS Configuration* tab, add the DNS values which are provided by the ISP into *DNS Server Search Order* field and click **Add** button.



A.3 Specifications

General

Data Transfer Rate	11, 5.5, 2 and 1 Mbps, Auto Fall-Back
Range (open environment)	11 Mbps – 250m 5.5 Mbps – 300m 2 Mbps – 400m 1 Mbps – 600m
Regulation Certifications	FCC Part 15, ETSI 300/328/CE
Compatibility	Fully interoperable with IEEE802.11b compliant products
LED Indicators	Power, WLAN active, Ethernet Link active , WAN link active

Network Information

Interface	10Mbps RJ-45 for DSL/Cable Modem 10/100 RJ45 Port for LAN RS-232 for ISDN TA/modem TNC connector
Roaming	Seamless roaming (IEEE802.11b compliant)
IP Sharing	Supports PAT/NAT
Security	64/128-bit WEP data encryption

Management

Remote Configuration	Web
Firmware Upgrade	Upgrade via Web
IP Auto-configuration	Supports DHCP client/server

Radio

Frequency Band	2.4 – 2.484 GHz
Radio Type	Direct Sequence Spread Spectrum (DSSS)
Modulation	CCK (11, 5.5Mbps) DQPSK (2Mbps) DBPSK (1Mbps)
Operation Channels	11 for North America, 14 for Japan, 13 for Europe, 2 for Spain, 4 for France
RF Output Power	16dBm + 2dBm
Antenna	High sensitivity antenna

Environmental

Temperature Range	0 to 55 C, 32 to 131 F (operating) -20 to 80 C , -4 to 176 F (storage)
Humidity (non-condensing)	5% to 95% typical

Physical Specifications

Dimensions	145(L) mm x 220(W) mm x 40(H) mm
Weight	750 g

A.4 Regulatory Compliance Information

Radio Frequency Interference Requirements

This device complies with Part 15 of FCC Rules and Canada RSS-210.

Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.
3. To comply with RF safety requirements, you must maintain a distance of 20 cm from the antenna when operating the device.
4. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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 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.

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 this equipment.