LINKSYS *WCG200* Cable Modem

User's Manual

<u>**Safety Notes**</u>

For Installation

- Use only the type of power source indicated on the marking labels.
- Use only the power adapter supplied with the product.
- Do not overload wall outlet or extension cords as this may increase the risk of electric shock or file. If the power cord is frayed, replace it with a new one.
- Proper ventilation is necessary to prevent the product overheating. Do not block or cover the slots and openings on the device, which are intended for ventilation and proper operation. It is recommended to mount the product with a stack.
- Do not place the product near any source of heat or expose it to direct sunshine.
- Do not expose the product to moisture. Never spill any liquid on the product.
- Do not attempt to connect with any computer accessory or electronic product without instructions from qualified service personnel. This may result in risk of electronic shock or file.
- Do not place this product on an unstable stand or table.

For Using

- Power off and unplug this product from the wall outlet when it is not in use or before cleaning. Pay attention to the temperature of the power adapter. The temperature might be high.
- After powering off the product, power on the product at least 15 seconds later.
- Do not block the ventilating openings of this product.
- When the product is expected to be not in use for a period of time, unplug the power cord of the product to prevent it from the damage of storm or sudden increases in rating.

For Service

Do not attempt to disassemble or open covers of this unit by yourself. Nor should you attempt to service the product yourself, which may void the user's authority to operate it. Contact qualified service personnel under the following conditions:

- If the power cord or plug is damaged or frayed.
- If liquid has been spilled into the product.
- If the product has been exposed to rain or water.
- If the product does not operate normally when the operating instructions are followed.
- If the product has been dropped or the cabinet has been damaged.
- If the product exhibits a distinct change in performance.

Warning

- This equipment must be installed and operated in accordance with provided instructions and a minimum 20 cm spacing must be provided between computer mounted antenna and person's body (excluding extremities of hands, wrist and feet) during wireless modes of operation.
- 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.
- **The antenna(s) 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. "**
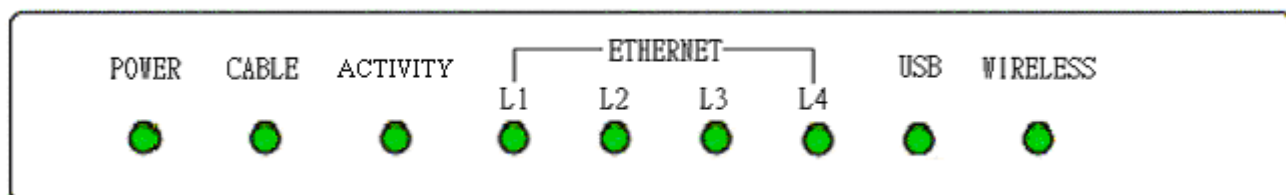
Caution

- Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

Chapter 1: Overview

1.1 Physical Outlook

1.1-1   Front Panel

The following illustration shows the front panel of the *LINKSYS WCG200 Cable Modem.*


LED Indicators

The LEDs on the front panel are described in the table below (from left to right):

LED	Color	Status	Description
POWER	Green	Off	Power off.
		On	Power on.
Cable	Green	Off	Power off or the initial test is over.
		Blinking	To indicate cable modem is on line.
Activity	Green	Off	Power off or the initial test is over.
		On	To indicate transmit RF US traffic.
LINE 1~4	Green	Off	Power off or the initial test is over.
		Blinking	To indicate Ethernet data traffic.
		On	Ethernet line is in use.
USB	Green	Off	Power off or the initial test is over.
		Blinking	To indicate USB data traffic.
		On	USB interface is in use.
Wireless	Green	Off	Power off or the initial test is over.
		Blinking	To indicate wireless data traffic.
		On	Wireless interface is in use.

1.1-2 Rear Panel
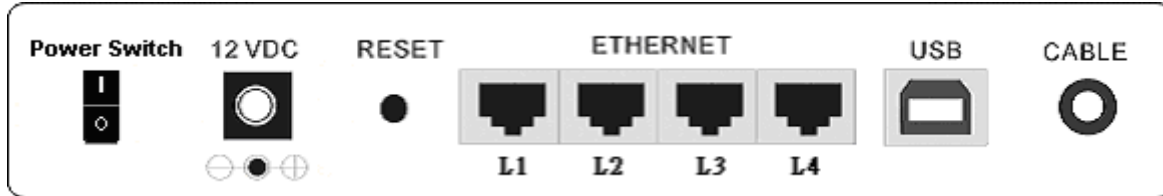
Power Switch: Standard Power Switch

12 VDC: 12V Power connector

RESET：   Reset-to-Default push button

ETHERNET(L1 to L4)：   10/100BaseTX RJ-45 connectors, 4 ports auto-sensing & auto-crossover Ethernet switch

USB：   USB Connector

CABLE：   F-Connector

Chapter 2: Installation

2.1 Connecting the Cable Modem to Your Computer

2.1-1 Installation Procedure for Ethernet Interface

Follow the steps below for proper installation:

1. Make sure your computer meets the system requirements.
2. Connect a coaxial cable (supplied by the local Cable Television Company) to the CABLE connector on the modem.
3. Plug the power adapter into the **POWER** connector of the modem.
4. Plug the other end of the power adapter into a power outlet.
5. Check CABLE LED. If it is solid ON, the Cable Modem is on-line now. If it is not, contact your service provider.
5. Connect the RJ-45 Ethernet cable to one of the **ETHERNET** connector on the modem, connect the other end with the 10/100BaseT Ethernet port on your computer.
6. When the connection is established, the client PCs can access the Internet or remote network through the *LINKSYS WCG200.*

Note: You can go to **Chapter 3.3 "Setting TCP/IP on client PC"** now

Below shows the connection status among the cable modem and your computer.
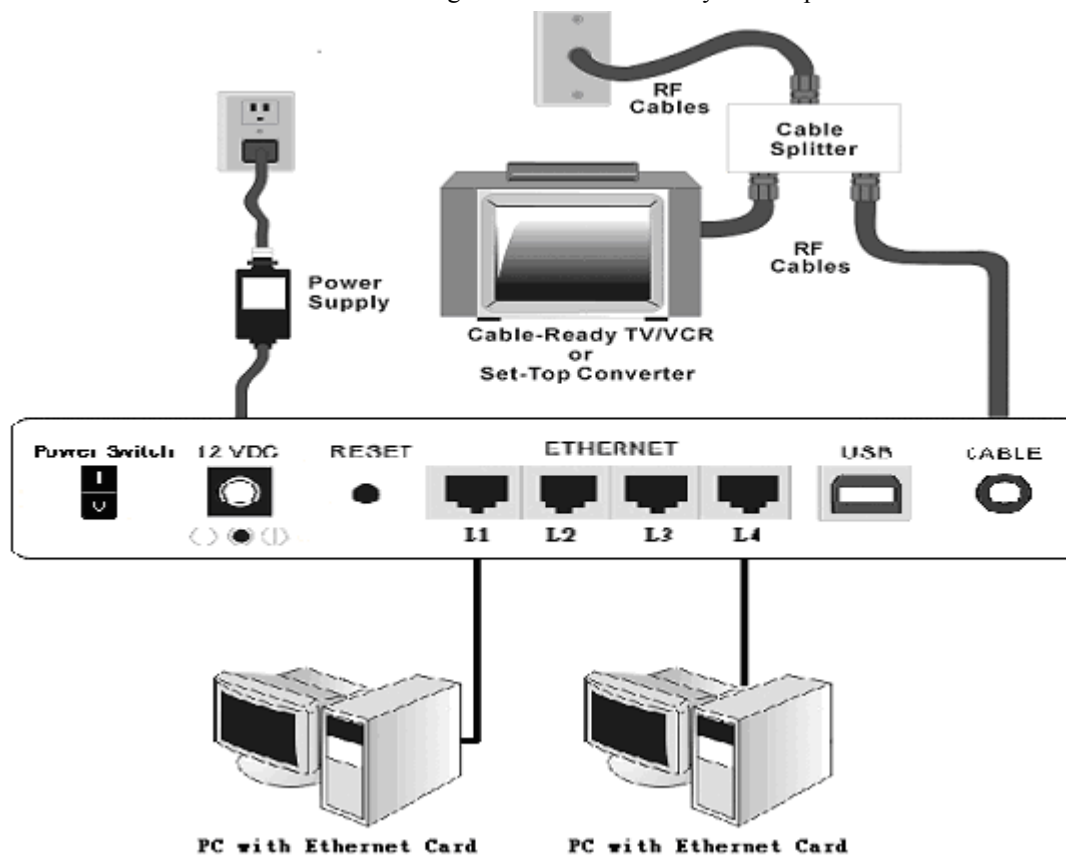
2.1-2 Installation Procedure for USB Interface

Follow the steps below for proper installation:

1. Make sure your computer meets the system requirements.
2. Connect a coaxial cable (supplied by the local Cable Television Company) to the CABLE connector on the modem.
3. Plug the power adapter into the **POWER** connector of the modem.
4. Plug the other end of the power adapter into a power outlet.
5. Check CABLE LED. If it is solid ON, the Cable Modem is on-line now. If it is not, contact your service provider.
6. Connect the USB cable to the **USB** connector on the modem.

Note: You can go to **Chapter 3.1** "**USB Driver installation**" now

7. When the connection is established, the client PCs can access the Internet or remote network through the *LINKSYS WCG200.*

Note: You can go to **Chapter 3.3 "Setting TCP/IP on client PC"** now

Below shows the connection status among the cable modem and your computer.
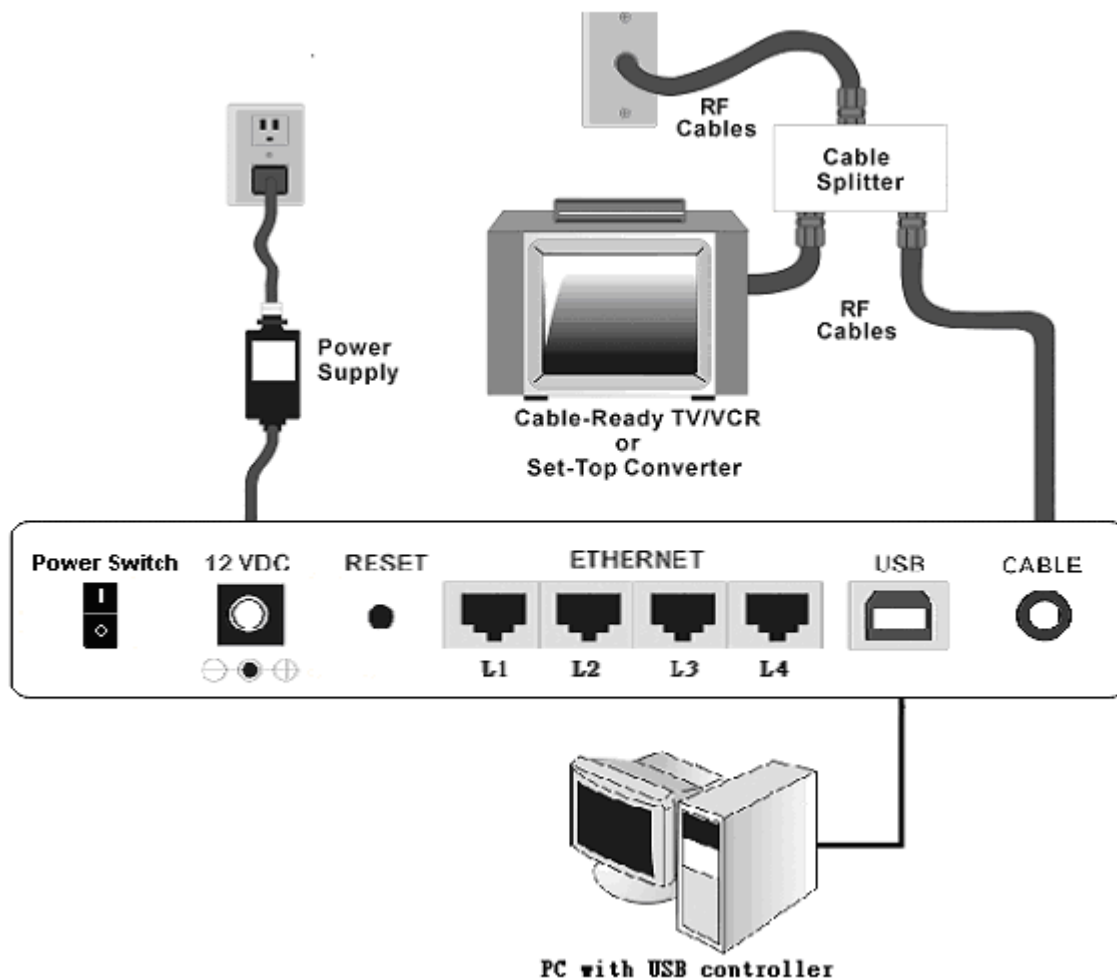
2.1-3 Installation Procedure for Wireless

1. Make sure your computer meets the system requirements.
2. Connect a coaxial cable (supplied by the local Cable Television Company) to the CABLE connector on the modem.
3. Plug the power adapter into the **POWER** connector of the modem.
4. Plug the other end of the power adapter into a power outlet.
5. Check CABLE LED. If it is solid ON, the Cable Modem is on-line now. If it is not, contact your service provider.
6. Install the wireless card driver and verify the wireless setting as below:

    ---The default SSID: **linksys**

    ---WEP encryption is **disabled**. Authentication Type is **Open System** or **Shared Key**.

    ---Use Infrastructure connection mode.

7. Check that the TCP/IP protocol is installed on your wireless client PC. Configure it to get a dynamic IP from the *LINKSYS WCG200.*

Note: You can go to **Chapter 3.3 "Setting TCP/IP on client PC"** now

8. When the connection is established, the client PCs can access the Internet or remote network through the *LINKSYS WCG200.*

Below shows the connection status among the cable modem and your computer.
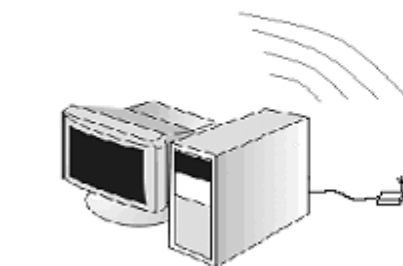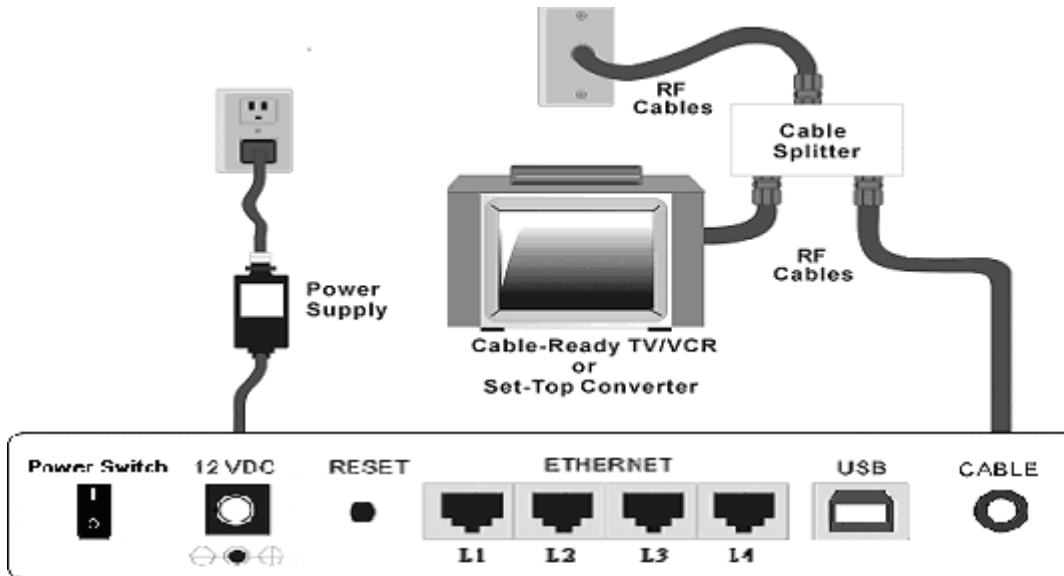
Chapter 3: Software Installation and Configuration

3.1 USB Driver Installation

3.1-1 For Windows 98/Me

1. Wait for the cable modem is running in the operational state (registration O.K.). Plug the

    USB cable into your PC USB port. You will see the next page. Click the "Next" button.

2. Select "Search for the best drivers for your device" and click the "Next" button.

3. Check "Specify a location" and browse CD-ROM:\Win9x or WinME. Click the "Next" button.

4. Select "The updated driver..." and click the "Next" button.
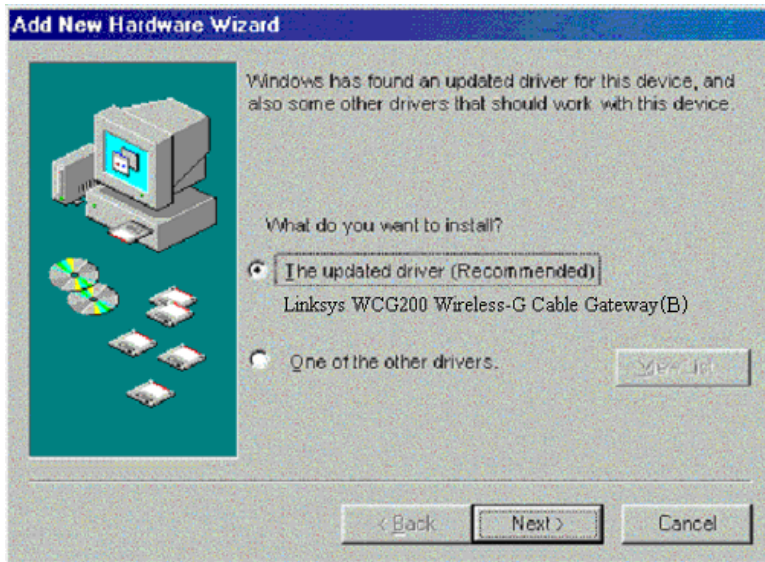
5. Click the "Next" button.

6. Installation has been completed here. Click the "Finish" button.

7. The system will ask you to restart your computer. Click "Yes" to complete the installation.
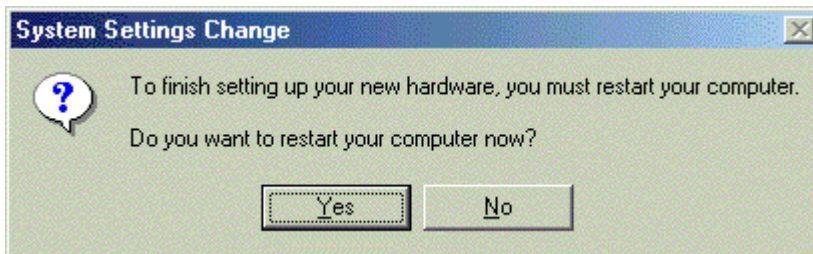
3.1-2 For Windows 2000/XP

1. Wait for the cable modem is running in the operational state (registration O.K.). Plug the USB cable into your PC USB port.
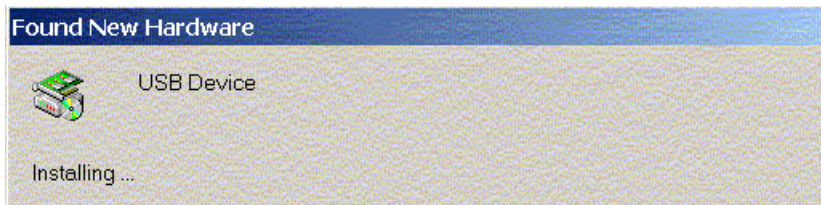
2. You will see the next page. Click the "Next" button.
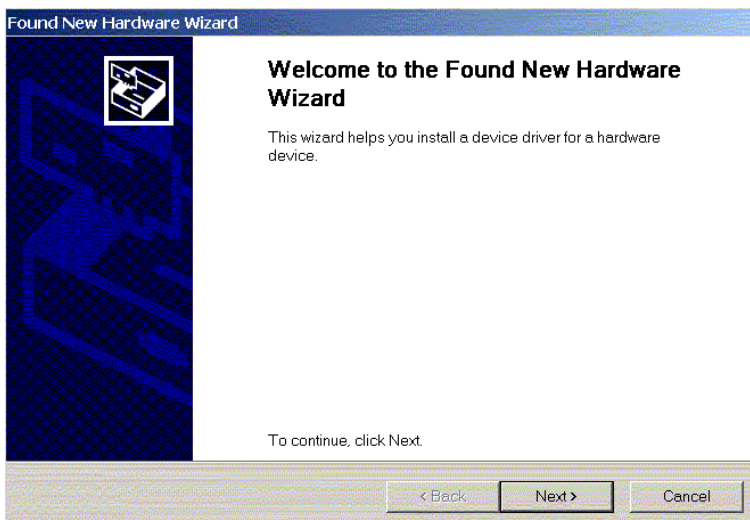
3. Select "Search for a suitable driver for my device" and click the "Next" button.
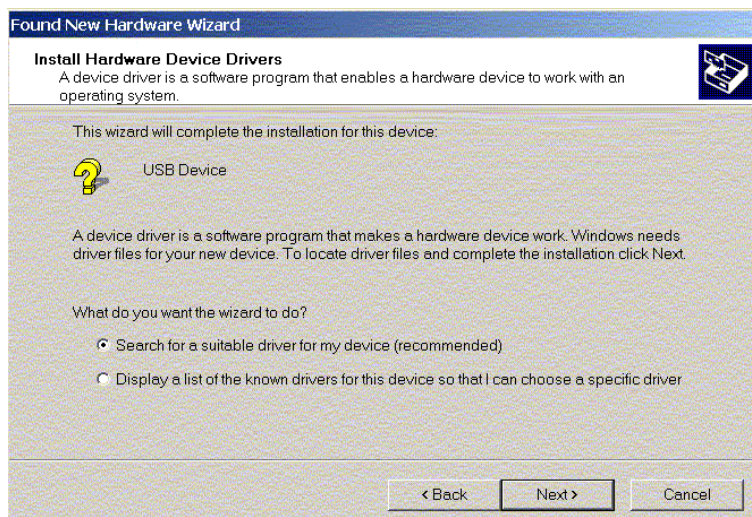
4. Insert the driver CD into CD-ROM. Select "CD-ROM drive" and clicks the "Next" button.
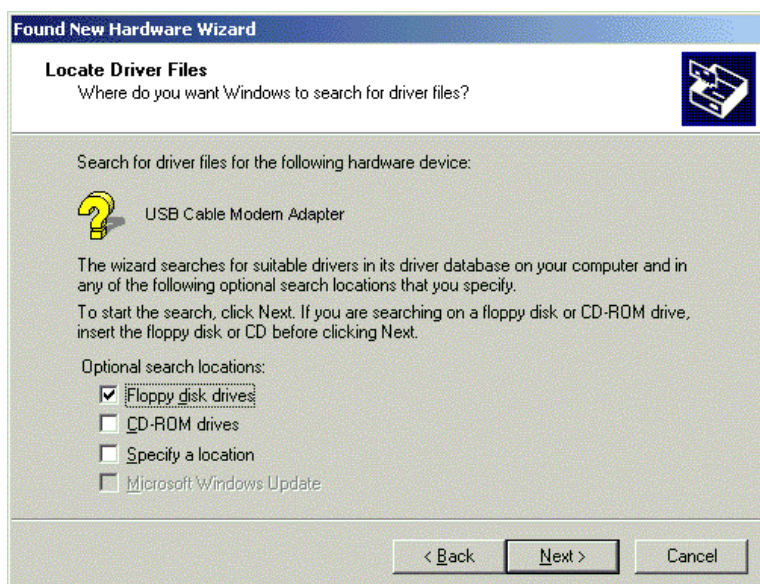
5. Click the "Next" button.

6. Installation has been completed here. Click the "Finish" button.

3.2 Uninstall USB Driver

3.2-1 For Windows 98/ME

1. Click "Start" button on your computer's taskbar, point to "Settings", and then click "Control Panel".
2. Select **Add/Remove Programs**.
3. On the **Install/Uninstall** tab, select **USB Cable Modem Adapter** from the list box. Click the **Add/Remove** button.
4. A confirmation dialog appears. Click **Yes**.
5. A dialog box appears to ask you unplug USB cable, please unplug the cable and click **OK**.

3.2-2 For Windows 2000/XP

1. Click on the **Start** menu, point to **Settings** and click on **Control Panel**.
2. Select **Add/Remove Programs**.
3. Select **USB Cable Modem Adapter** from the list box.
4. Click the **Change/Remove** button.
5. Click **Yes** button.
6. A dialog box appears to ask you unplug USB cable, please unplug the cable and click **OK**.

3.3 Setting TCP/IP on Client PC

After you successfully complete the network interface card (Ethernet card) installation task, you need to make sure the TCP/IP communications protocol used by the Ethernet card is installed and correctly configured on your system.

3.3-1 For Windows 98/Me

1. Click on the **Start** menu, point to **Settings** and click on **Control Panel**.
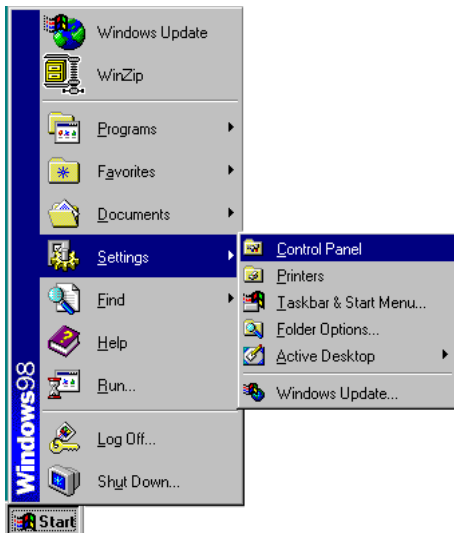
2. The Control Panel window will show up. Double-click the "Network" icon in the Control Panel window.
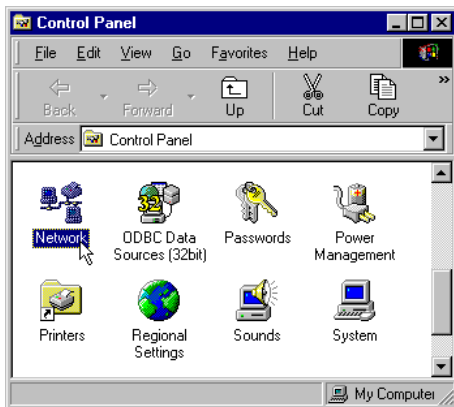
3. Windows will appear the Network dialog box. Click "Configuration" tab to bring it to the front, and on this tab, a list of installed network components appears.
   Option 1: If you have **no** TCP/IP protocol, click **Add**.
   Option 2: If you have TCP/IP protocol, go to Step 7.
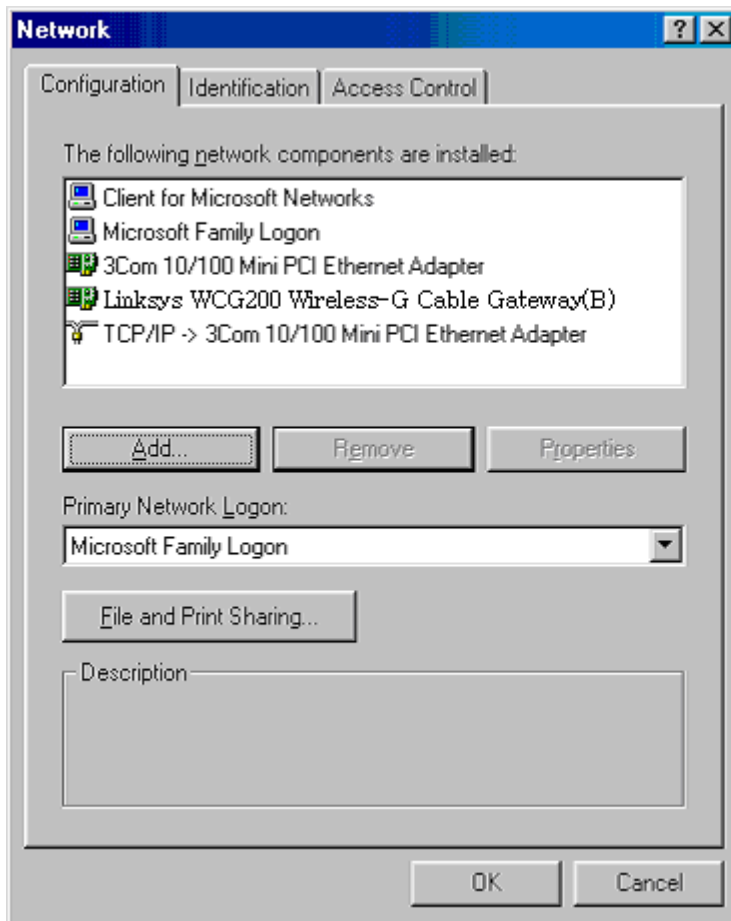
4. The Select Network Component Type dialog box will show up. Click "Protocol", and then click "Add".
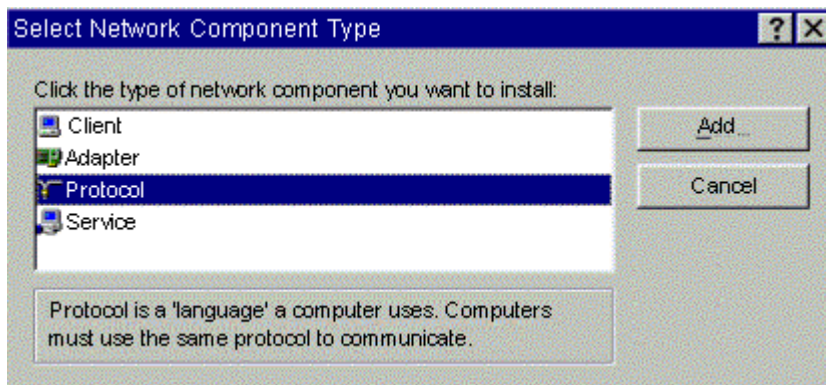
5. You will see the Select Network Protocol dialog box. Click "Microsoft" in the "Manufactures:" list, and then click "TCP/IP" in the "Network Protocols:" list. Click "OK".
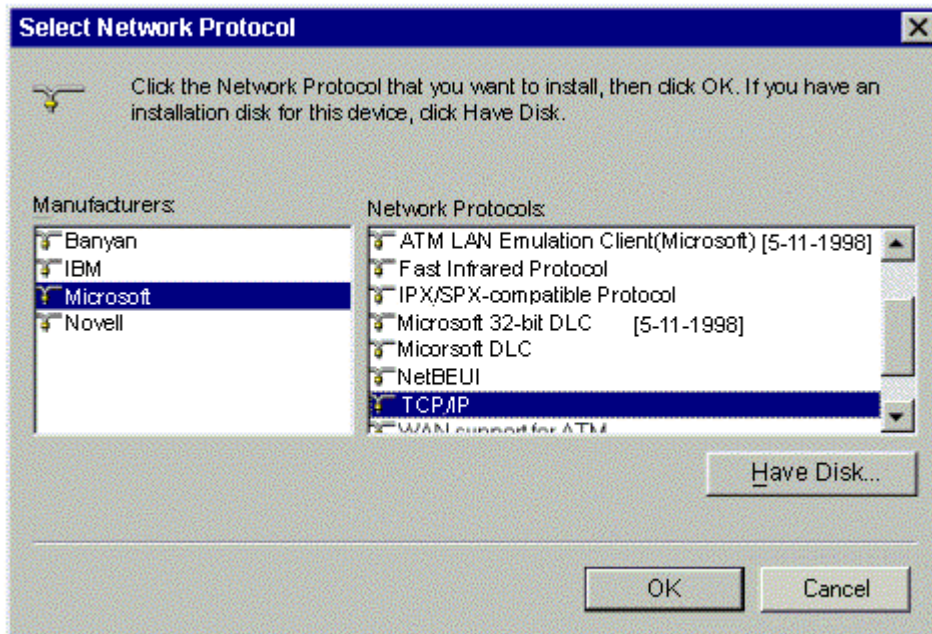
6. You will be directed back to the Network dialog box, and on the "Configuration" tab, the entry that includes TCP/IP -> followed by the Ethernet card installed in your computer will appear in the list of installed network components.

7. Click TCP/IP -> followed by the Ethernet card installed in your computer, and then click "Properties". The TCP/IP Properties dialog box will appear.
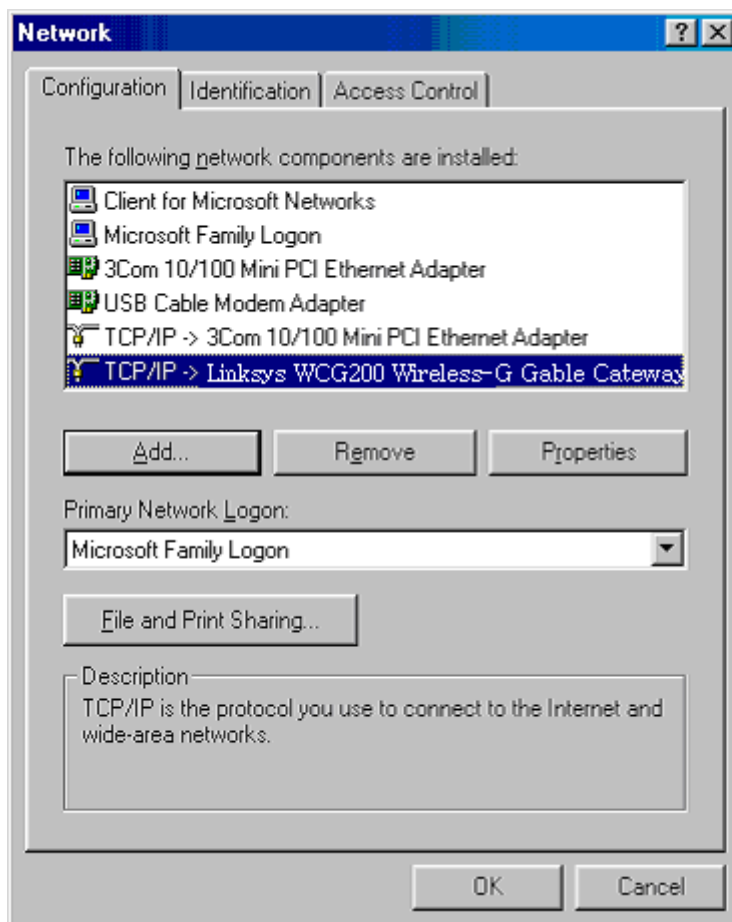
8. In the TCP/IP Properties dialog box, please follow the directions below: Click "IP Address" tab to bring it to the front, and then click "Obtain an IP address automatically" on the tab.
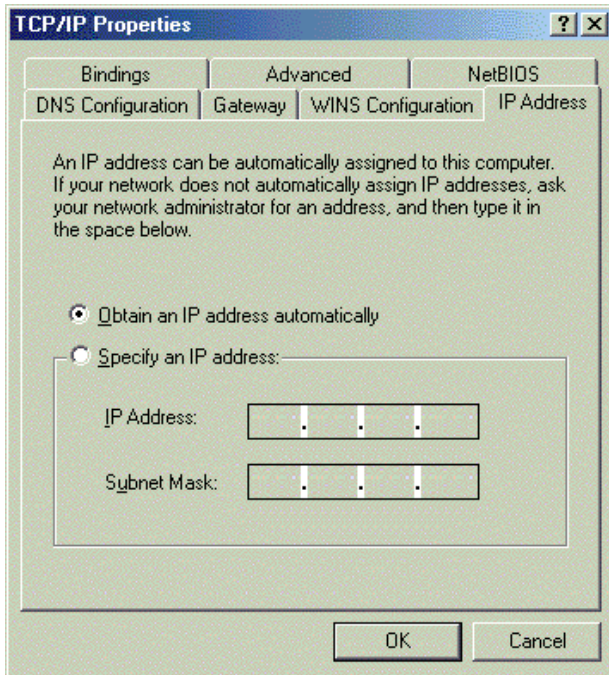
9. Click "Gateway" to bring it to the front. On this tab, leave the "New gateway:" blank. If there is the entry in the "Installed gateway:" list, click it and then click "Remove" to remove all installed gateways.
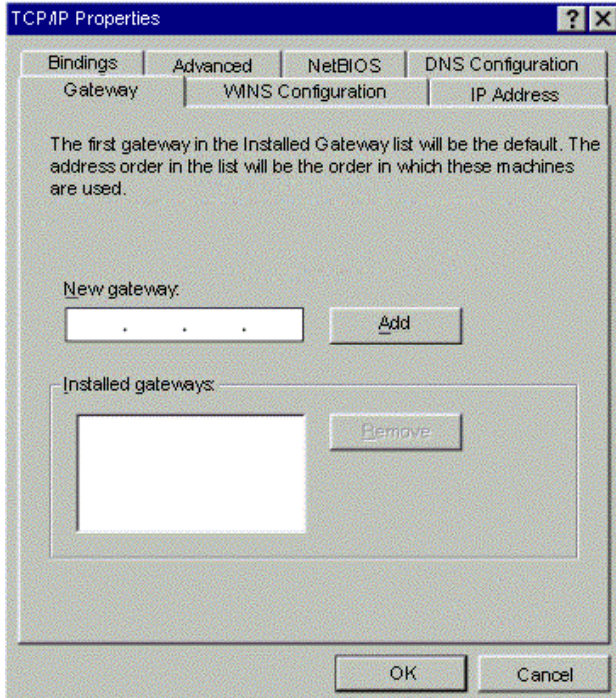
10. Click "DNS Configuration" tabs to bring it to the front, and click "Disable DNS", then click "OK" to close the dialog box.
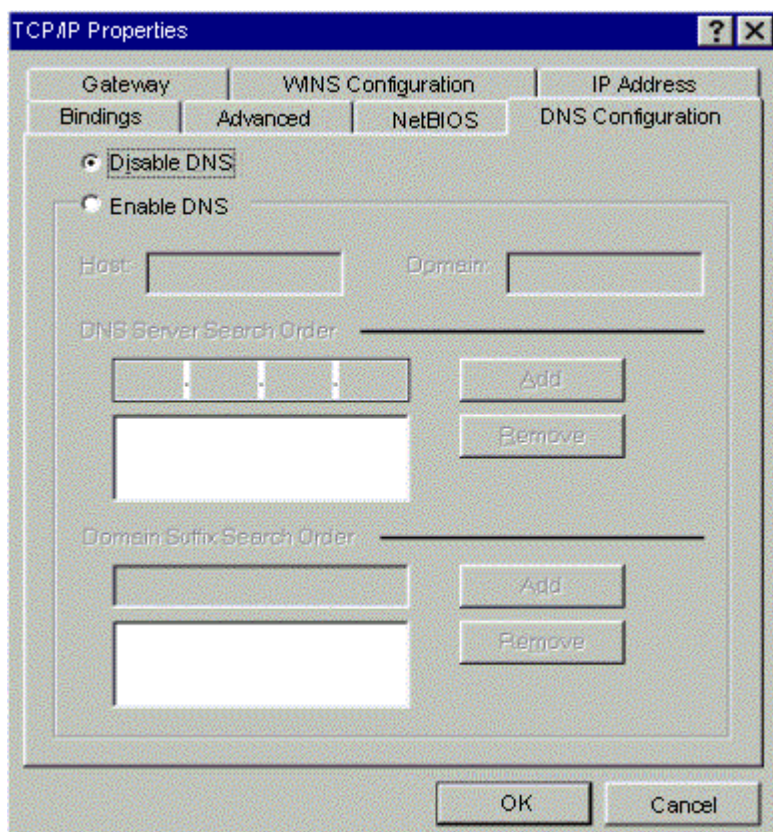
11. The Copying Files dialog box will pop up and the system will start copying files from Windows. At the first time you will be asked to insert the Windows 98 CD-ROM into the CD-ROM drive during the files copying, and follow the instructions when they show up, then click "OK". It will prompt another Copying Files dialog box. Please type the command line that Windows files located in the dialog box (For example, D:\win98). Click "OK" to continue the files copying.
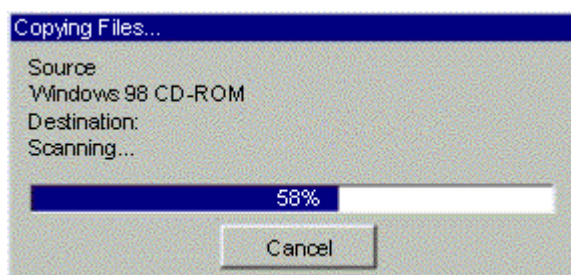
12. Windows will appear the System Settings Change dialog box and ask you if you would like to restart your computer. Click "Yes".
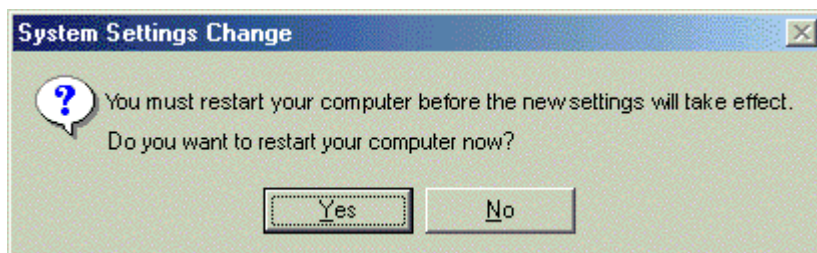
3.3-2 For Windows 2000/XP

1. Click "Start" button on your computer's taskbar, point to "Settings", and then click "Network and Dial-up Connections".
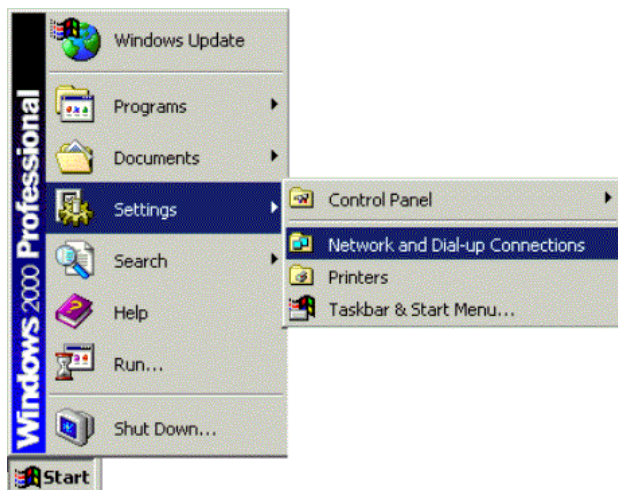
2. The Network and Dial-up Connections window will show up. Double-click "Local Area Connection" icon in the Network and Dial-up Connections window.
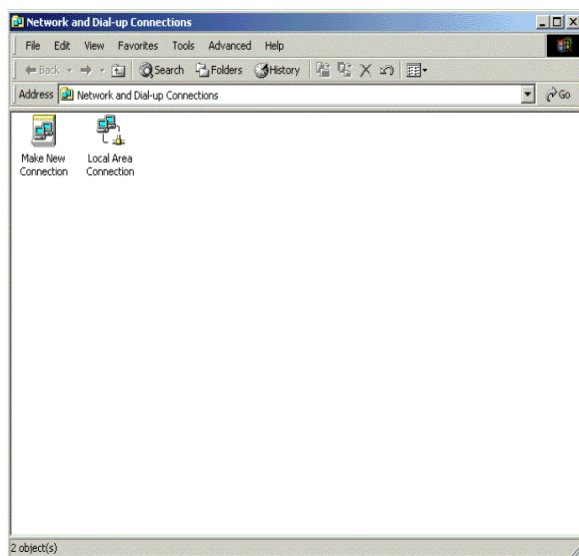
3. The Local Area Connection status window will show up. Click the "Properties" button.
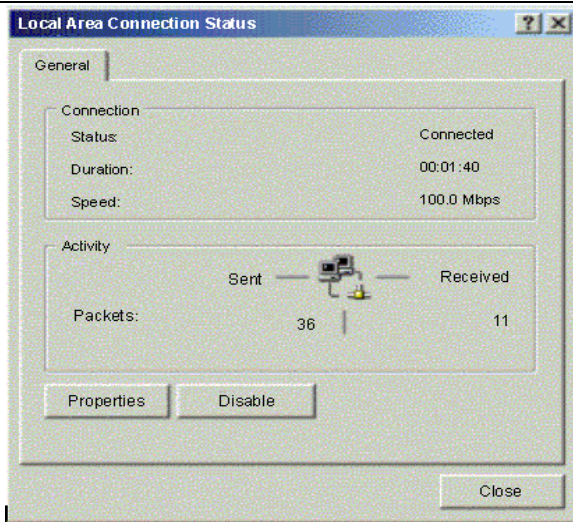
4. Click "Internet Protocol (TCP/IP)" and then click "Properties".
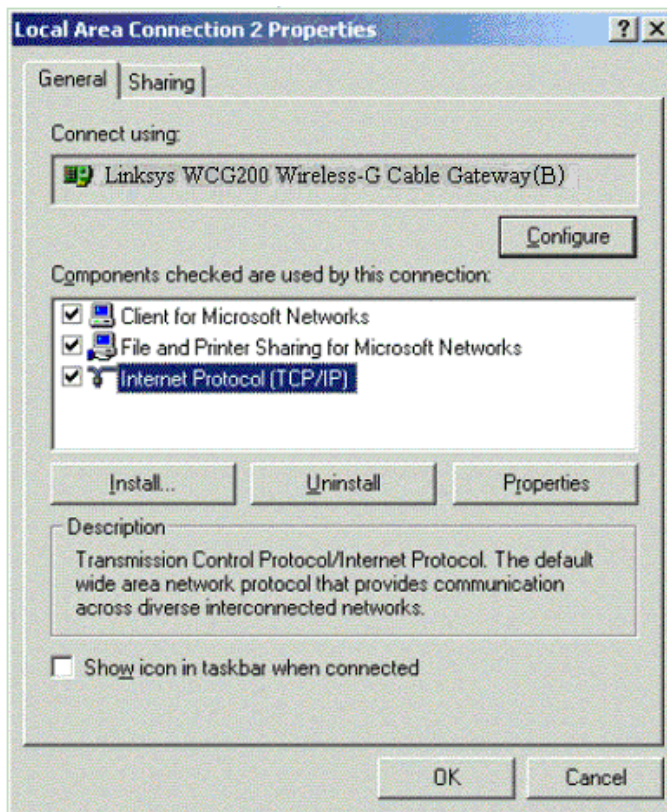
5. The Internet Protocol (TCP/IP) Properties dialog box appears. Click "Obtain an IP address automatically". Click "Obtain DNS server address automatically". Click "OK" to close the dialog box.
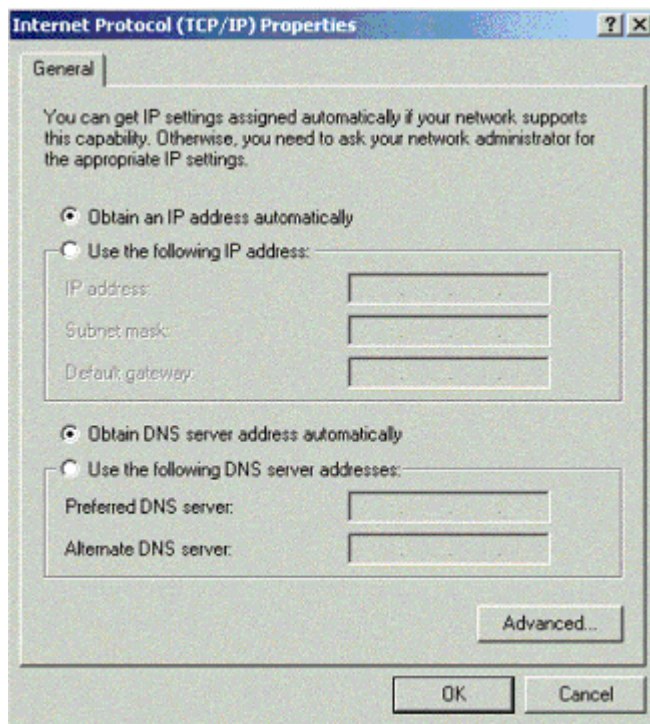
6. Windows will appear the System Settings Change dialog box and ask you if you would like to restart your computer. Click "Yes".
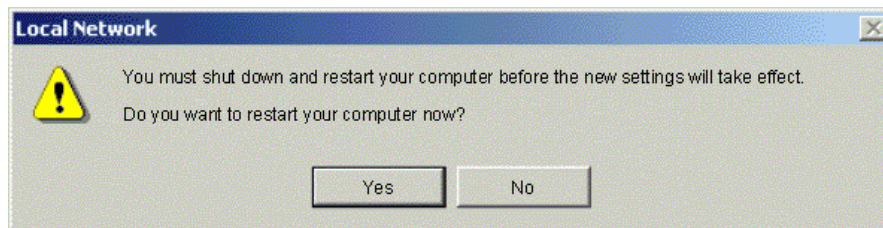
3.4 DHCP Server

PC connected to the cable modem can automatically get a private IP address from the DHCP server of cable modem before cable modem is on line. The following steps will show you how to get an IP address from DHCP server of cable modem before cable modem is on line.

3.4-1 For Windows 98/Me

1. Click "Start", point to "Run", and click to open the "Run" windows.
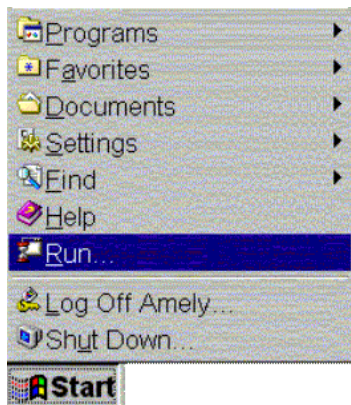
2. Enter "winipcfg" in the "Open" field. Click "OK" to execute the winipcfg and show the "IP Configuration" window.
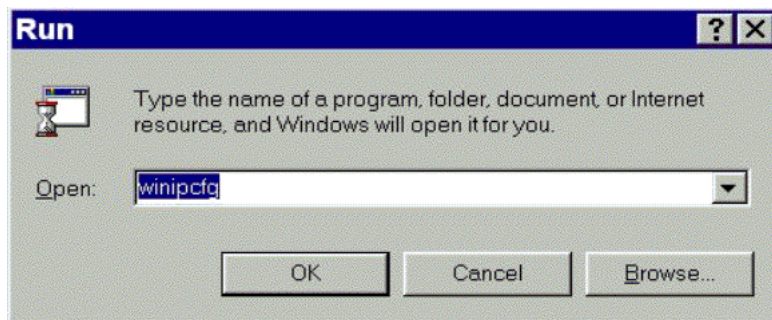
3. Select the "Ethernet adapter" to show the IP address. Press "Release" and "Renew" if the PC is not accessing the Internet. After the cable modem is on line, you need to press the "Release" and "Renew" to get a new IP address from your ISP's server.
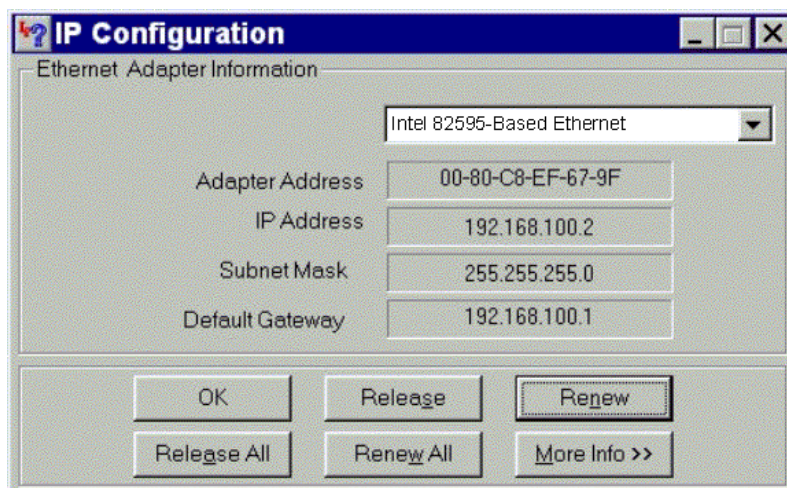
3.4-2 For Windows NT/2000/XP

1. Click "Start", point to "Run", and click to open the "Run" windows.
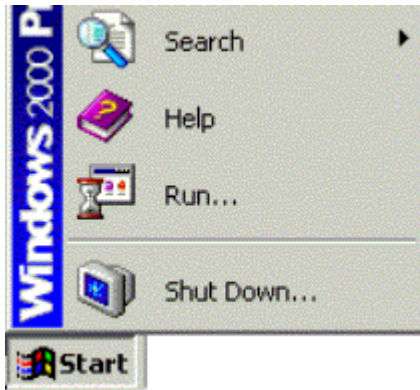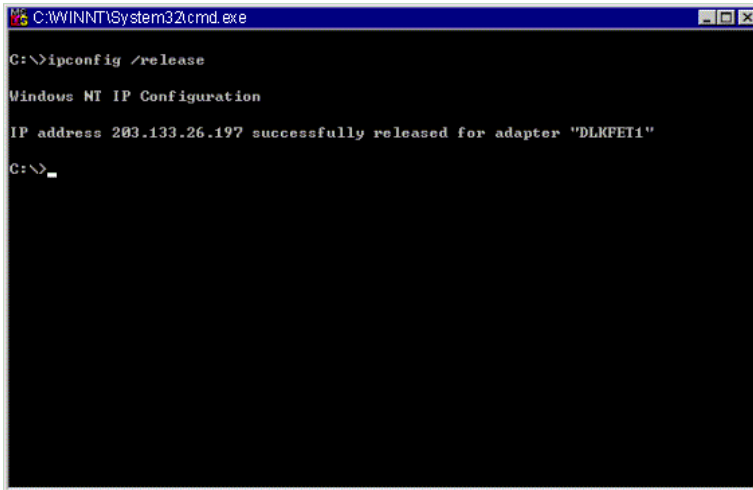
2. The Run dialog box appears. Type "cmd" in the "Open" field, and then click "OK" to execute the command.
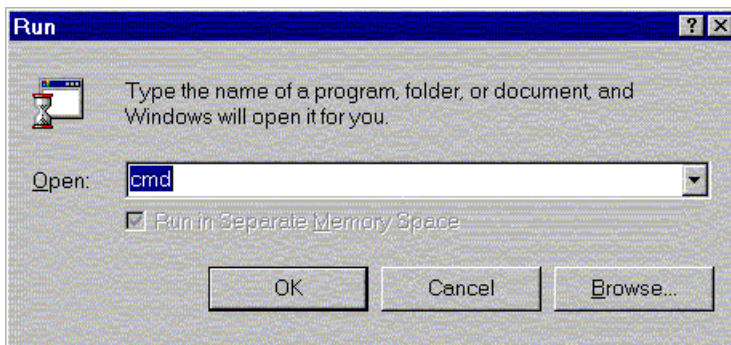
3. You will enter the dos mode, type "ipconfig", press "Enter" on your keyboard, and you will see the IP address your computer get from the cable modem.
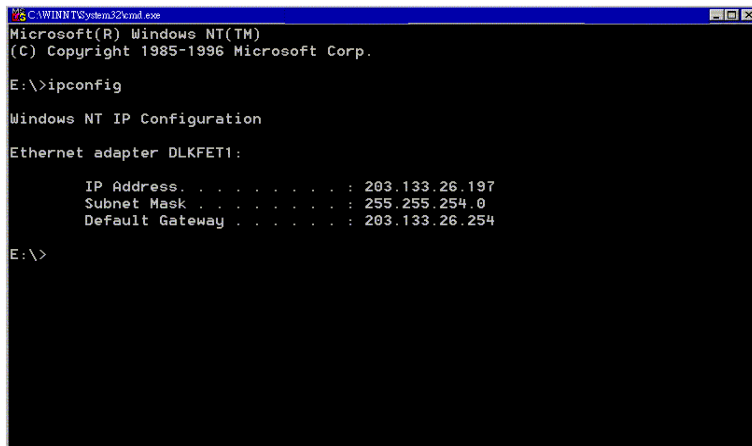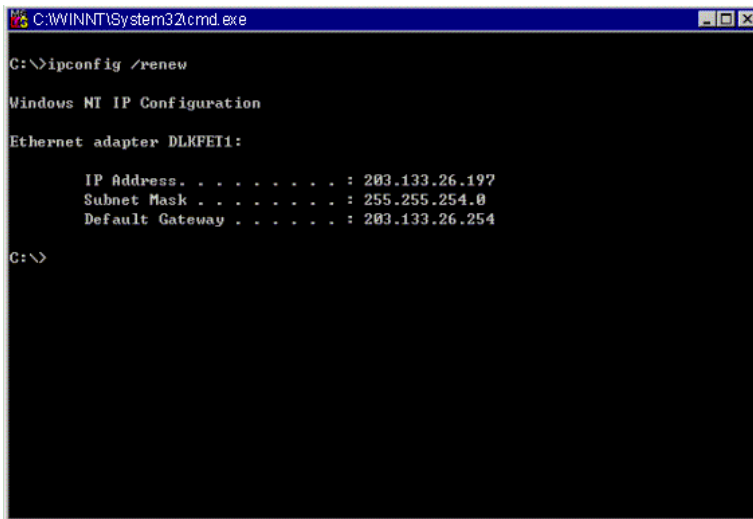
4. If PC is not access Internet, type "ipconfig /release", and press "Enter" on your keyboard to release the IP.

5. Type "ipconfig /renew", and press "Enter" on your keyboard to renew the IP. You can repeat the steps until your computer gets the correct IP.

3.4-3 For Apple Macintosh

1. Click "Apple menu", point to "Control Panels", and click "TCP/IP" to open the "TCP/IP" window.
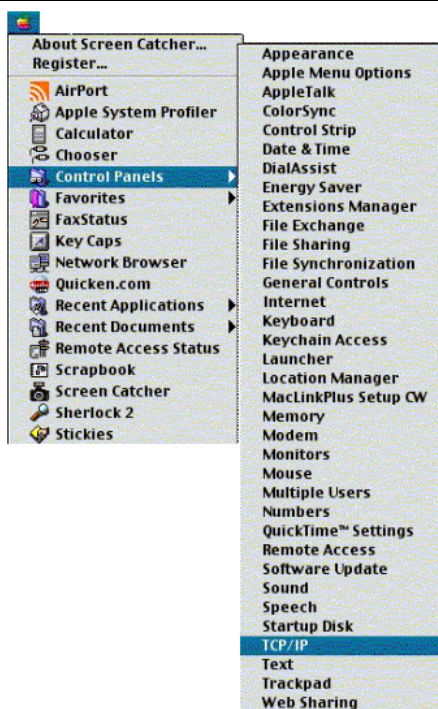
2. If the iMac gets an invalid IP, select "Using DHCP Server" in "Configure" field. Click the "Close box" at the upper left corner to close the "TCP/IP" window.
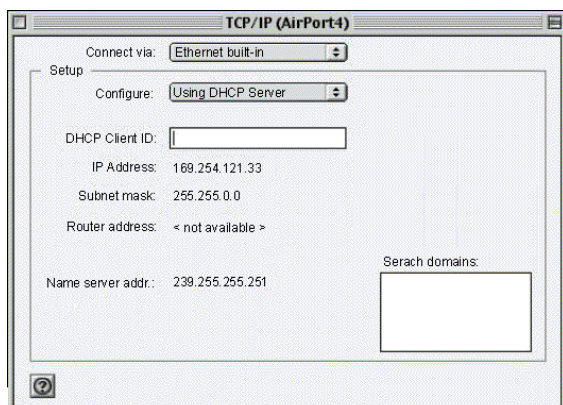
3. Click the "Save" in the prompted message box.
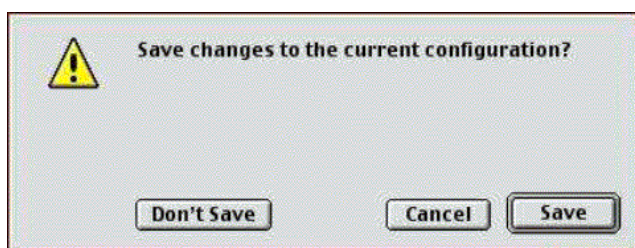
4. You need to wait about 2 minutes and open "TCP/IP" window to see the new TCP/IP status.

3.5 Renew PC IP Address

There is a chance that your PC does not renew its IP address after cable modem is on line and the PC cannot access the Internet. Please follow the procedures below to renew PC's IP address after the cable modem is on line.

1.   Click "Start", point to "Run", and click to open the "Run" windows.
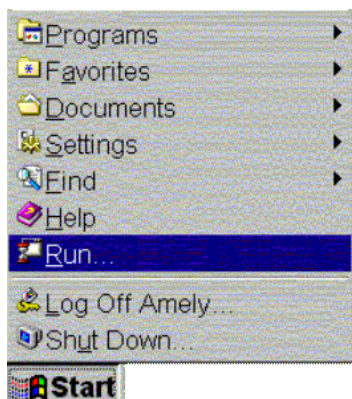
2.   Enter winipcfg in the "Open" field. Click "OK" to execute the winipcfg and show the "IP Configuration" window.
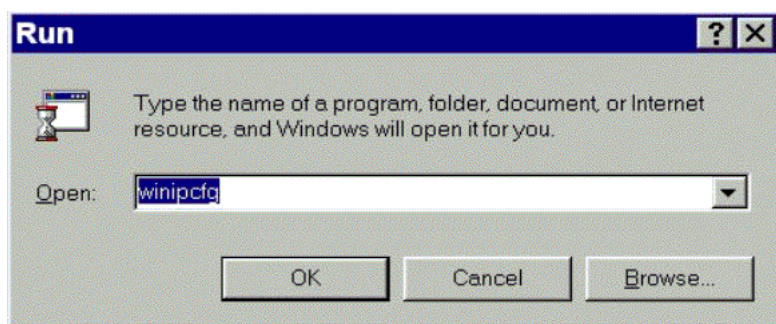
3.   Select the "Ethernet adapter" to show the IP address. Press "Release" and "Renew" to get a new IP address from your ISP's server.
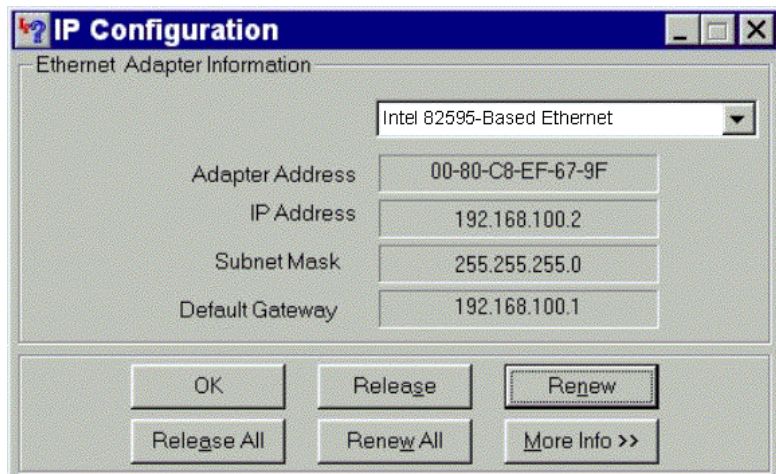
4.   Select the "OK" to close the IP Configuration window.

Chapter 4: Access Internet through Cable Modem

For making sure that you can get into Internet successfully, please make sure the following first.

1. **Make sure the connection (through Ethernet or USB) between the cable modem and your computer is OK.**

2. **Make sure the TCP/IP protocol is set properly.**

3. **Subscribe to Cable Television Company and.**

Accessing Internet

When you are sure all above is Ok, you can open the Browser (such as I.E.) to open the homepage for the browser. See the following example.

Chapter 5: Web Manager

Once your host PC is properly configured, please proceed as follows:

Start your web browser and type the private IP address of the cable modem in the URL field: **192.168.0.1.   Type the IP address as the figure shown below.**

After connecting to the device, you will be prompted to enter username and password. By default, the username is **empty** and the password is **admin**, and click **OK** to enter the next step.   See the following example for running under Windows XP.

5.1 Setup

This page allows you to select the connection type. You can set up static IP or obtain IP address automatically. Also you can set up Gateway IP and DHCP.

Internet Connection Type: You can select **Obtain IP Address Autmatically** when there is a DHCP server. Or you have to set Static IP Address mannually.

Optional Settings: You have to type the **Host name** and **Domain name** if required by some ISPs.

After all settings are ready, click **Save Settings**.

Gateway IP: You have to provide a gateway IP address for the Local Network.

Network Address Server Settings(DHCP): In this frame, you can enable the DHCP function of Linksys WCG200. Give the starting IP address and the number of addresses to complete the settings. After all settings are ready, click on **Save Settings**.

5.2 Wireless

5.2-1 Basic Wireless Settings

This page allows you to configure the wireless setting.

Wireless Network Settings:

Wireless Network: You can select Wireless Network Type in **Mixed**, or **802.11b only** or **802.11g only.**

SSID: Enter the SSID for your service provider. The default SSID is **linksys**

Wireless Channel: Select the channel for your service provider. The default channel is **6**.

After all settings are ready, click on **Save Settings**.

5.2-2 Wireless Security

This page you to to setup the SSID Broadcast and WEP encryption.

Wireless Security settings:

Wireless Network Name Broadcast: To broadcast SSID, click **Enable**. To hide it, click **Disable**.

Wireless Encryption Level: There are **No Encryption**, **64-bit WEP** and **128-bit WEP** respectively.

Passphrase for keys: you can type any characters and generate into HEX type. **(64-bit WEP Only)**

Dafault key: Select the number as the default key for WEP encryption.

Key 1 ~ Key 4: Please enter HEX type characters that you want to set for the WEP encryption.

After all settings are ready, click on **Save Settings**.

5.2-3 Wireless Network Access

This page allows you to filter the Wireless Clients by their MAC addresses.

Wireless Network Access: In this page, you can filter the Wireless clients according to their MAC addresses. If you want the list of wireless clients to access, select **Enable**. On the other hand, if you want to block them, select **Disable**. After all settings are ready, click on **Save Settings**.

5.2-4 Advanced Wireless Settings

This page allows you to have further configuration of wireless settings.

Advanced Wireless Settings:

Basic Data Rates: It decides the speed of the management packet transmission.

Supported Rates: It decides the speed of the data packet transmission.

Beacon Interval: Enter the beacon interval number. The range is from 0 to 65535 ms and the default is 100 ms.

DTIM Interval: Enter the DTIM interval number. The range is from 1 to 255 ms and the default is 1 ms.

Fragmentation Threshold: It decides the packet size. If the packet size is over the number that you typed here, it will be fragmented automatically. The maximum number is 2346 that means no packet size will be fragmented.

RTS Threshold: If the packet size is over the value that you type here, system will use RTS (Request To Send) mechanism to transmit the data.

Authentication Type: There are three authetication types: **Open System, Shared key** and **Both**. This should be considered with the WEP (Wired Equivalent Privacy) mechanism.

After all settings are ready, click **on Save Settings**.

5.3 Security

5.3-1 Firewall

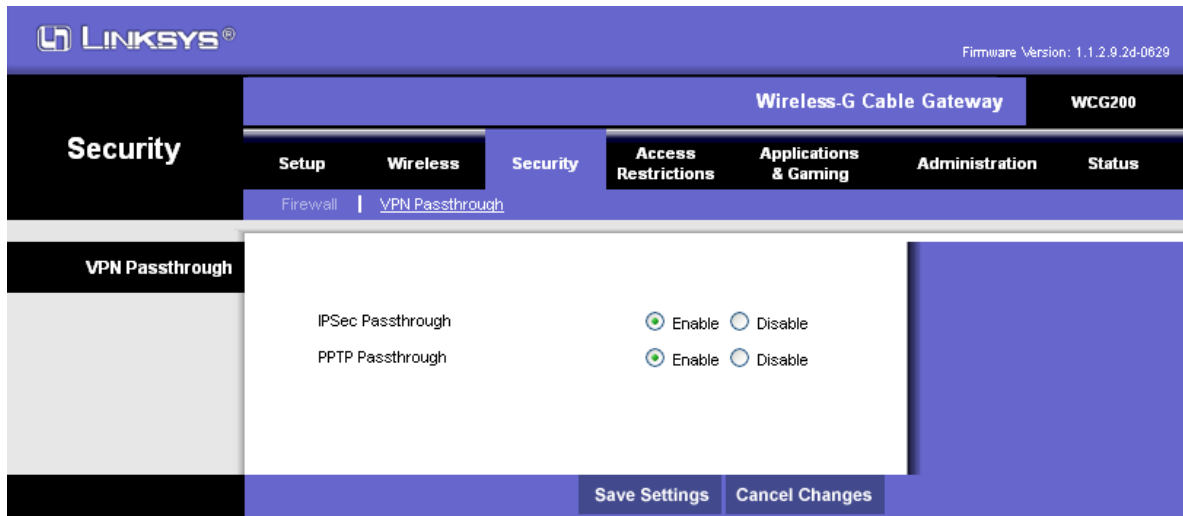This page allows you to enable the Firewall functions.

Firewall: Select **Enable** to use Firewall Protection. To filter **Proxy, Java Applets, ActiveX, Multicast,** select **Enable**. If not, select **Disable**.

Block Anonymous Internet Requests: To block Anonymous Internet Requests, select **Enable**.

After all settings are ready, click on **Save Settings**.

5.3-2 VPN Passthrough

This page allows you to enable VPN Passthrough.

VPN Passthrough: There are **IPsec** and **PPTP** Passthroughs respectively. Clcik **Enable** to enable them, then clcik on **Save Settings.**

5.4 Access Restrictions

5.4-1 Website Blocking

This page allows you to block the website.

Website Blocking: Add the new website to the website list. Then select whether to **Deny** or **Allow** them.

After all settings are ready, select **Enable** and click on **Save Settings**.

5.4-2 Timed Access

This page allow you the futher configuration of Access restriction by Time blocked.

Timed Access: To limit Network Computers by Timed Access, enter their MAC Addresses. Add them in the list and then Click on **Save Settings**.

5.4-3 Filter Internet Traffic

This page allows you to filter Inter Traffic by IP or Port Range.

Filter Internet Traffic by IP or Port Range:

Start IP: Enter the Start IP number of the range.

End IP: Enter the End IP number of the range.

All IP: To filter all IPs, click on it.

Start Port: Enter the Start port number of the range.

End Port: Enter the End port number of the range.

All Port: To filter all Ports, click on it.

Protocol: On the same line, select **TCP**, **UDP** or **Both**.

After all settings are ready, click on **Enable** in the last row. Then click on **Save Settings** to enable them.

5.5 Application & Gaming

5.5-1 Port Range Forwarding

This page allows you to run a server on the LAN by specifying the mapping of TCP/UDP ports to local PC.

Port Range Forwarding:

Start Port: Enter the Start port number of the range.

End Port: Enter the End port number of the range.

Protocol: On the same line, select **TCP**, **UDP** or **Both**.

IP Address: Enter the IP Address of the server that you want Internet users to be able to access.

After all settings are ready, click on **Enable** in the last row. Then click on **Save Settings** to enable them.

5.5-2 Port Triggering

Port Triggering is similar to Port Forwarding except that they are not static ports held open.

Port Triggering:

Triggerred Range: Enter the Start Port and the End Port.

Forwarding Range: Enter the Start Port and the End Port.

Protocol: On the same line, select **TCP**, **UDP** or **Both**.

After all settings are ready, click on **Enable** in the last row. Then click on **Save Settings** to enable them.

5.5-3 DMZ

DMZ hosting (also commonly referred to as "exposed host") allows you to specify the "default" recipient of WAN traffic that NAT is unable to translate to a known local PC. The DMZ Host page is shown below.

DMZ: To exposure one computer, enter the computer's IP address and select **Enable**. Then click on **Save Settings**.

5.6 Administration

5.6-1 Security, Reporting, Logs

This page allows you to change the Access **Username** or **Password** and enable remote Gateway Access. Also you can set up the reporting E-mail and Logs.

Security: If you want to change the Access **Username** and **Password**, type the new ones. Also if you want to use Remote Administrations, select **Enable**. After all settings are ready, click **Save Settings**.

Reporting: You can enable E-mail Alerts and enter the Contact Email Address and the SMTP Server. Individual emails can be sent out automatically, each time the WAN Port is under attack.

Logs: You can check your E-mail logs by click on **E-mail Log**. Or you can clean E-mail Logs by clcik on **Clear Log**.

5.6-2 Ping Test

You can check the IP diagnostics by Ping Test.

Ping Test: Enter the Ping Target IP address and Click **Start Test** to view the ping test log. You can also fix the **Ping Size, No. of Pings, Ping Interval, Ping Timeout.**

5.6-3 Restore to Factory Defaults

This page allows you to restore all the setiings to Factory Defaults.
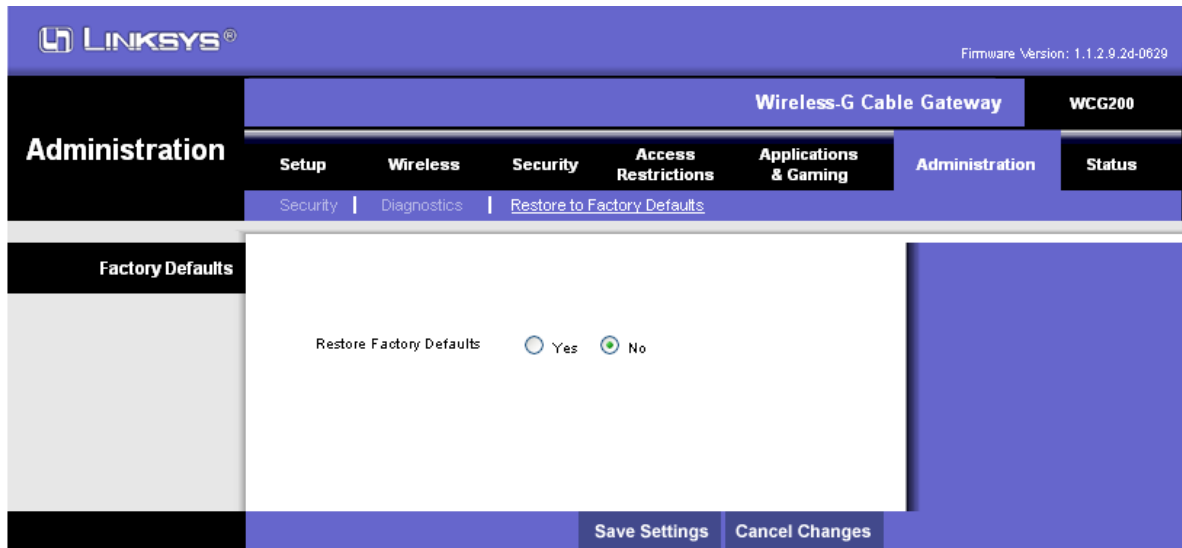
Factory Default: To retore Factory Default, select **YES** and click on **Save Settings**.

5.7 STATUS

5.7-1 Information and Status

This page shows information and Status of the Gateway.

Renew DHCP Lease: To release WAN IP Address, click on **Renew DHCP Lease**.

Appendix: Specification

Product Overview

LINKSYS WCG200 is a DOCSIS 1.1 compliant wireless cable residential gateway that provide high-speed connectivity to residential, commercial, and education subscribers on public and private networks via an existing cable infrastructure. ***LINKSYS WCG200*** is equipped with 4-port Ethernet switch, USB, and IEEE802.11g Wireless interfaces. ***LINKSYS WCG200*** can inter-operate with any DOCSIS compliant headend equipment. It provides high-speed access to local area networks and high-speed Internet access. The data security secures upstream and downstream communications.

Features

General
- F-Connector for the cable interface
- Four ports 10/100BaseT Ethernet switch with auto-negotiation function and auto-media dependent interface crossover (MDIX)
- USB Connector for USB interface
- IEEE802.11g Wireless Access Point
- Clear LED Display
- Plug and Play
- UPnP support

CableLabs DOCSIS 1.0/1.1 Standard Compliant
- Up to 42.88 Mbps downstream and up to 10.24 Mbps upstream
- Frequency agility
- Bridging wired & wireless segments of network
- Security with X.509 Authentication / RSA protected Key Exchange / 56 bits DES Data Encryption
- Interoperable with any DOCSIS compatible headend equipment

Two-Way Cable Residential
- NAT (Network Address Translation) to support

Gateway	multiple users with one IP account for routing mode

- One to Many
- Many to Many
- Reverse NAT
- PPTP, L2TP & IPSec Pass-Through
- Advanced Application Level Gateways (ALG) Support

- Transparent bridging for IP traffic for bridge mode
- DHCP Client/Server
- DNS Proxy
- DNS Server
- Dynamic DNS
- Firewall Function
- Virtual Servers for Web, FTP, and Mail

Wireless	

- Fully 802.11g (Draft) Compatible
- Fully 802.11b Compatible
- Up to 54 Mbps Data Rate
- Auto Channel Selection
- Seamless Link Quality Around Home & Business Office
- Support Efficient Power Management
- 64/128 bit WEP Encryption for Wireless Security
- Support Wi-Fi Protected Access (WPA)
- Support Temporal Key Integrity Protocol (TKIP)
- IEEE 802.1x Port-Based Authentication with RADIUS Client, support MD5, TLS, TTLS
- Support Authentication: Open System, Shared Key
- Wireless LAN MAC Filtering

	• Association Control List (ACL) for Wireless Clients Management
Firewall	• IP Filtering
	• Stateful Packet Inspection (SPI)
	• Intrusion Detection System (IDS)
	• Application Content Filtering
	• Configurable Access Policy
	• Web-Based User Interface Management and Administration
	• Remote User Access
	• Logging & Alert
	• DMZ Hosting
Management & Maintenance	• Support Web pages and private DHCP server for status monitoring
	• SNMP v1/v2c/v3 Management
	• Remote secured operating firmware downloading
	• Reset To Default Settings by RESET Push Button
	• Syslog (Remote)
	• Event Log (Local)

Specifications

Cable RF :

	Downstream	**Upstream**
Operating Frequency Range	88-860MHz	5-42MHz
Frequency Channel	HRC, IRC, STD	
Frequency Selection	Auto Scanning	Controlled by Headend
Bandwidth	6MHz	Programmable (200*N KHz) N=1, 2, 4, 8, 16
Characteristic Impedance	75Ω Nominal	75Ω Nominal
Signal Level Range	-15 to +15dBmV/64QAM	+8 to +58dBmV/QPSK

	-15 to +15dBmV/256QAM	+8 to +55dBmV/16QAM
Modulation	64QAM/256QAM	QPSK/16QAM
Modulation Rate	5.056941/5.360537 Msym/sec	160/320/640/1280/2560 Ksym/sec
Maximum Bit Rate	42.88Mbps/256QAM	10.24Mbps/16QAM
	30.34Mbps/64QAM	5.12Mbps/QPSK
Forward Error Correction (FEC)	RS(128,122)/Trellis	Reed Solomon
Signal to Noise Ratio (SNR)		>30
Bit Error Rate (BER)	1×10^{-8} @ C/N=23.5dB, 64QAM with FEC	
	1×10^{-8} @ C/N=30dB, 256QAM with FEC, received power = -6dBmV to +15dBmV	
	1×10^{-8} @ C/N=33dB, 256QAM with FEC, received power = -15dBmV to −6dBmV	

Physical & Hardware:

Dimensions
- L = 186 mm
- W = 154.5 mm
- H = 63 mm

Weight
- TBD

Ports
- 4 * 10/100 Ethernet Port (RJ-45)
- USB port (Type B)

Antenna
- Dual External Antenna

Case	• Lay down
LEDs	• Power

Green Blink - Booting / Diagnostics

Green ON   - Power On / Device Ready

Orange ON   - Error

• Cable|Activity (Green color)

OFF|Blink   - Scanning D/S channels

OFF|ON   - D/S channel acquired, Start ranging
        process

Blink|OFF   - Ranging complete, start DHCP
        /TFTP/ToD/Registration

ON|OFF   - Registered

ON|Blink   - Traffic (Send / Receive)

• LAN 1 – 4

OFF   - No Ethernet Link

Green ON   - Ethernet Link

Green Blink - Traffic

Orange Blink- Collision

• USB LED

OFF   - No USB Link or PC Off

Orange Blink-USB cable attached / but drivers not
        loaded

Green ON   - USB Link / drivers loaded and port
        functional

Green Blink - Traffic

• Wireless LED

OFF   - No 802.11g module installed or
        Disabled

In Web UI (Default Enabled)

Orange Blink- 802.11g module installed but error
condition

Green ON   - 802.11g module is functional

Green Blink - Traffic

Reset Button	• Restore Factory Default Settings

Power	•	12VDC, 1.2 A

Wireless:

Media Access Control	•	CSMA/CA with ACK for unicast data frames
	•	CSMA/CA with ACK for broadcast data frames and management frames

Data Rate	•	802.11g
	➢	54, 48, 36, 24, 18, 12, 9, 6 Mbps
	•	802.11b
	➢	11, 5.5, 2, 1 Mbps

Frequency Range	•	2.4 GHz ~ 2.4835 GHz ISM Band
	•	N.America/FCC: 2.412~2.462GHz (1 - 11Channels)
	•	Europe CE/ETSI: 2.412~2.472GHz (1 - 13Channels)
	•	Japan /TELEC: 2.412~2.484GHz (1 - 14Channels)

Modulation	•	802.11g
	➢	OFDM
	•	802.11b
	➢	Barker (1Mbps, 2Mbps)
	➢	CCK (5.5Mbps, 11Mbps)
	•	

Receiver Sensitivity	•	-80 dbm @ 11Mbps
Output Power	•	14 dbm
Operating Range	•	Indoors:

20m @ 54Mb

30m @ 18Mb

35m @ 11Mb

40m @ 5.5Mb

45m @ 2Mb

50m @ 1Mb

- Outdoors:

50m @ 54Mb

70m @ 18Mb

100m @ 11Mb

150m @ 5.5Mb

250m @ 2Mb

300m @ 1Mb

Standards & Protocols:

Standards
- DOCSIS 1.0/1.1 Compliant
- IEEE 802.11g
- IEEE 802.11b
- IEEE 802.3
- IEEE 802.3u
- IEEE 802.1x
- USB v1.1

Protocols
- TCP/IP
- DHCP
- NAT
- RIP
- DNS
- ICMP

- ARP

- SNMP v1/v2c/v3

- Syslog

- HTTP

- TFTP

- UPnP

- Kerberos

- WPA / TKIP

MIB Support:

- MIB 2
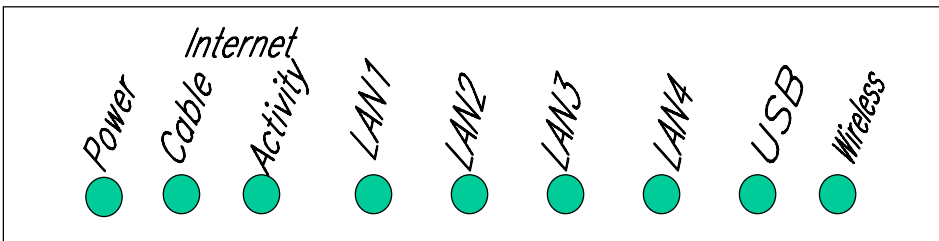
- RFC2786

- RFC2669

- CableLabs Private MIBs

Environment:

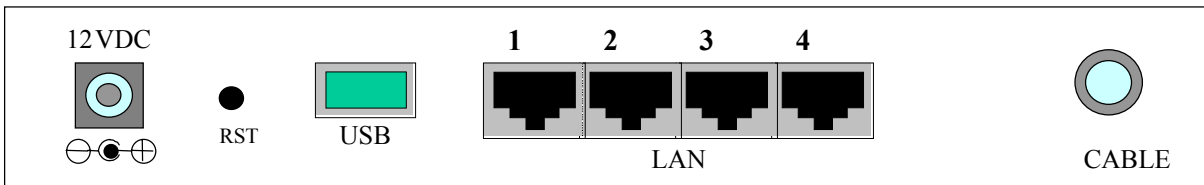|		
Operating Temperature	•	32°F ~ 104°F (0°C to 40°C)
Storage Temperature	•	-4°F ~ 158°F (-20°C to 70°C)
Humidity	•	20% ~ 90% Non-condensing

Certification:

Standards	•	DOCSIS / WHQL
Safety	•	UL

EMC	•	FCC Part 15 Class B
	•	CE 300, 328-2
	•	Telec & VCCI
Wireless	•	Wi-Fi Compliant
UPnP	•	UIC

Front View:

Rear View:

- CABLE: F-Connector

- USB: USB Connector

- ETHERNET: Four ports RJ-45 10/100BaseT Ethernet switch

- RST: Reset-to-Default push button

- 12VDC: Power connector