

# Cable Modem

*User Guide*

*July 29, 2002*



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# BEFORE YOU BEGIN

Your new cable modem provides high-speed access to the Internet by using a coaxial cable and an active Internet Connection through your cable service provider. This user guide describes how to set up and use the cable modem. Before installing the cable modem, you should read this user guide to ensure proper cable modem operation.

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## Understand the Cable Modem's Features

Your cable modem has the following features to help you access and use the Internet:

- Two-way design allows the cable modem to send and receive data over the cable television network.
- Cable bandwidth allows data rates of up to 38 megabits per second (Mbps)\*, which is faster than analog modems, integrated services digital network (ISDN), or asymmetric digital subscriber line (ADSL).
- Using your cable line means that the cable modem is always on, always connected, and doesn't tie up your phone line.
- Plug-and-play operation through universal serial bus (USB) ensures easy setup and installation.
- Data Over Cable Service Interface Specification (DOCSIS™) compliance ensures interoperability with DOCSIS compliant cable operators.
- Windows Hardware Quality Labs (WHQL) certification ensure interoperability with Microsoft Operating Systems

*\*NOTE: Speeds may vary based on the following factors:*

- *Computer equipment including available RAM and processor speed*
- *Software applications utilizing your computer's resources*
- *Network traffic depending on the time of day*
- *Limitations set by your Cable Service Provider*

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## Contact Your Local Cable Operator

Before installing your new cable modem, you must contact your local cable service provider to activate your Internet account. Be sure to have the cable modem's MAC address or EA available, which can be found on the underside of the cable modem.

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## Prepare Your Area for Cable Modem Installation

Before installing your cable modem, you should first prepare your area. To do this:

1. Locate your cable outlet and ensure that it is located within proper distance of your cable modem and computer. Be sure not to bend the cable as this may strain the connector and cause damage.
2. Determine if standing bracket will be used. The standing bracket allows the modem to stand vertically to preserve space on your desktop.
3. Allow sufficient airflow around the cable modem to prevent overheating.
4. Ensure that the temperature in the room where the cable modem will be operating is between 0 and 40°C (32 and 104°F)

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## Gather Supplied and Required Items

You will use a variety of items to install your cable modem. Some of the items are supplied with your cable modem.

### Supplied

Verify that these items were included in the cable modem's package:

- Cable modem
- Modem standing bracket
- Power adapter
- USB cable (1.5m)
- Ethernet cable (1.8m)
- CD containing USB drivers and this user guide

### Not Supplied

Verify that these items are available before beginning the installation:

- If using the cable modem's USB port:
  - A PC running Windows 98® Second Edition (SE), Windows Me, Windows 2000, or Windows XP. The cable modem's USB setup does not support the Macintosh® operating system, Windows 98 First Edition, and NT.
  - An active USB port on your PC.
- If using the cable modem's Ethernet port:
  - A PC running Windows 95 (or later) operating system or a Macintosh computer running system 7.6 (or later) operating system

- TCP/IP protocol installed
- An active Ethernet port on your PC

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## **Deciding whether to use USB or Ethernet**

**CAUTION:** Your cable modem allows you to use either the USB or Ethernet port. If you choose to use the Ethernet port, do not attempt to attach the USB cable to the cable modem's USB port. If using the USB port, do not attempt to attach the Ethernet cable to the cable modem's Ethernet port. If you need to switch ports, remove the power from the cable modem prior to switching ports. Then reapply power to the cable modem. Wait several minutes for the cable modem to re-establish communications with your cable service provider.

**NOTE:** Your cable service provider may allow both the USB port and Ethernet port to operate simultaneously. If this is the case, the USB port and Ethernet port must be connected to separate PCs. Contact your cable operator to determine how many PCs can be connected.

Be sure to follow the instructions provided for the port that you want to use.

Using the USB port allows you to install the cable modem more quickly and easily than using the Ethernet port, because you do not have to install and configure a network interface card (NIC).

USB, however, only enables you to connect one computer to the cable modem. Using the Ethernet port allows you to connect multiple computers to a cable modem through the use of additional equipment which is not included. Please contact your cable service provider for more information on using multiple computers.

Chapter 2 provides instructions for installing your cable modem using the USB port.

Chapter 3 provides instructions for installing your cable modem using the Ethernet port.

# INSTALLING THE CABLE MODEM USING THE USB PORT

This chapter explains the process for installing your cable modem using the USB port. First, you will install the hardware (cable modem, USB cable, coax cable, and power adapter). You will then install the cable modem drivers and verify that the modem is functioning properly.

*NOTE: The cable modem's USB setup does not support the Macintosh® operating system.*

Using the USB port allows you to install the cable modem more quickly and easily than using the Ethernet port, because you do not have to install and configure a network interface card (NIC).

USB, however, only enables you to connect one computer to the cable modem. Using the Ethernet port allows you to connect multiple computers to a cable modem through the use of additional equipment which is not included. Please contact your cable service provider for more information on using multiple computers.

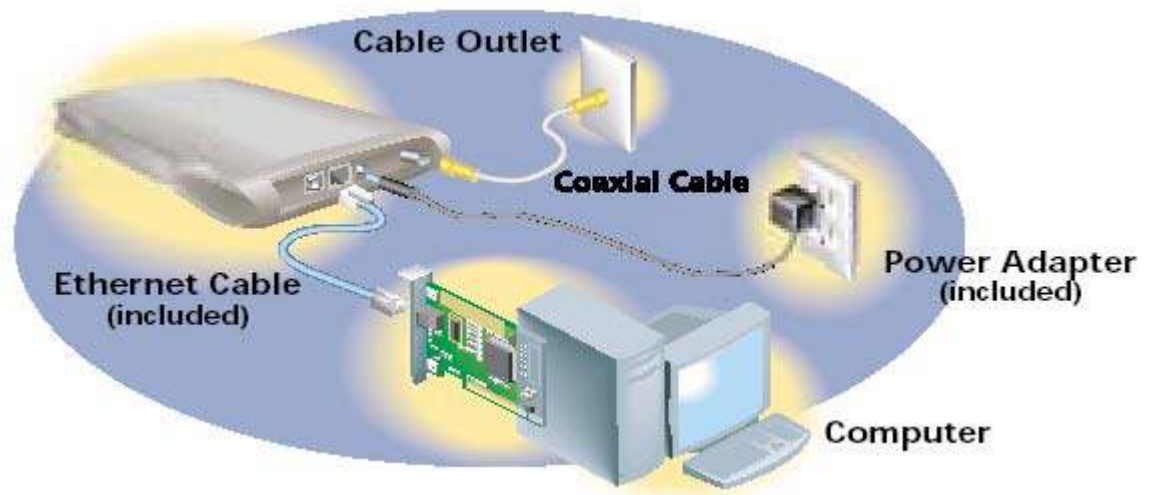
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## Installing the Hardware

This section explains how to connect the cable modem to the computer, wall cable outlet, and electrical outlet.

To install the hardware:

1. Power off the computer
2. Connect one end of the coaxial cable to the cable modem's cable connector. Connect the other end of the coaxial cable to the cable wall outlet. Be sure not to bend or over tighten the cables as this may strain the connector and cause damage. If you plan to connect the cable modem and television to the same wall outlet, you must use a cable line splitter (not included).
3. Connect one end of the USB cable to the cable modem's USB port and the other end of the cable to the USB port on the PC.
4. Plug the cable modem's power adapter into the cable modem's power jack and into a wall outlet or surge protector.
5. You are now ready to install the software drivers.



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## Installing the Software Drivers

This section explains how to install the software drivers that your PC requires for the cable modem to operate.

### Installing the Software Drivers in Windows 98 SE Operating System

**CAUTION: You must install the drivers located on the CD that ships with your cable modem. If you use the default Windows-supplied software drivers, you will not be able to properly install the cable modem.**

To install the cable modem software drivers using the Windows 98 operating system:

1. Power on your PC. After your computer boots, Windows detects the cable modem. The Found New Hardware screen appears, followed by the Add New Hardware Wizard screen.





2. Insert the CD into the PC's CD-ROM and click *Next*. You will see the following screen.



3. Select *Search for the best driver for your device (Recommended)*. Then select *Next*. You will see the following screen.



4. Check the *CD-ROM drive* check box and verify that the CD is in the CD-ROM drive. Click *Next* to have Windows search for the necessary driver files. You will see the following screen.

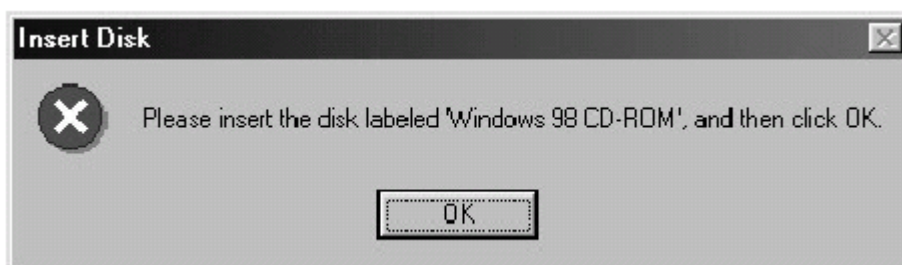


5. Select *the updated driver (Recommended) USB Cable Modem 351000* and click next. You will see the following screen.



**CAUTION:** You must verify that **Ambit USB Cable Modem** appears on the screen. If **USB Composite Device** appears, you must click *Back* twice and specify the correct location of the driver files. **DO NOT** proceed if **USB Composite Device** is displayed in the above window. Contact your cable provider for further assistance.

6. Click *Next*. The computer automatically installs the necessary driver files. You may see the following screen



7. If the above screen appears, you must insert the Windows 98 CD so that Windows can copy the remaining files. In the *Copy files from:* dialog box, point Windows to the path of the CD. Click *Next* and you will see the following screen:



8. Click *Finish* to complete the installation. You will see the following screen.



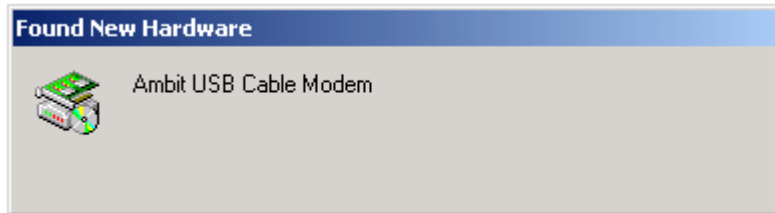
9. Choose *Yes* to restart your computer.
10. After the computer is rebooted, verify that the USB LED is lit on the front of you cable modem. If not, refer to the troubleshooting section later in this chapter.

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## Installing the Software Drivers in Windows Me Operating System

To install the cable modem software drivers using the Windows Me operating system:

1. Power on your PC. After your computer boots, Windows detects the cable modem. The Found New Hardware screen appears, followed by the Found New Hardware Wizard screen.



2. Insert the CD into the PC's CD-ROM drive and click *Next*. You will see the following screen.



3. Select *Automatic search for a better driver (Recommended)* and click (*Next*). The computer automatically copies the necessary driver files from the CD. You will see the following screen.



4. Click *Next*. The computer automatically installs the necessary driver files. You will see the following screen



5. Click *Finish* after the computer has copied the necessary files. You will see the following screen.



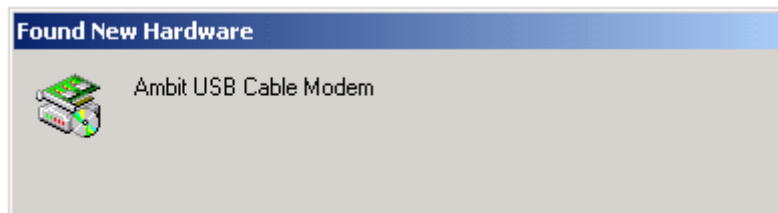
6. Click *Yes* to restart the computer

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## Installing the Software Drivers in Windows 2000 Operating System

To install the cable modem software drivers using the Windows 2000 operating system:

1. Power on your PC. After your computer boots, Windows detects the cable modem. The Found New Hardware screen appears, followed by the Found New Hardware Wizard screen.

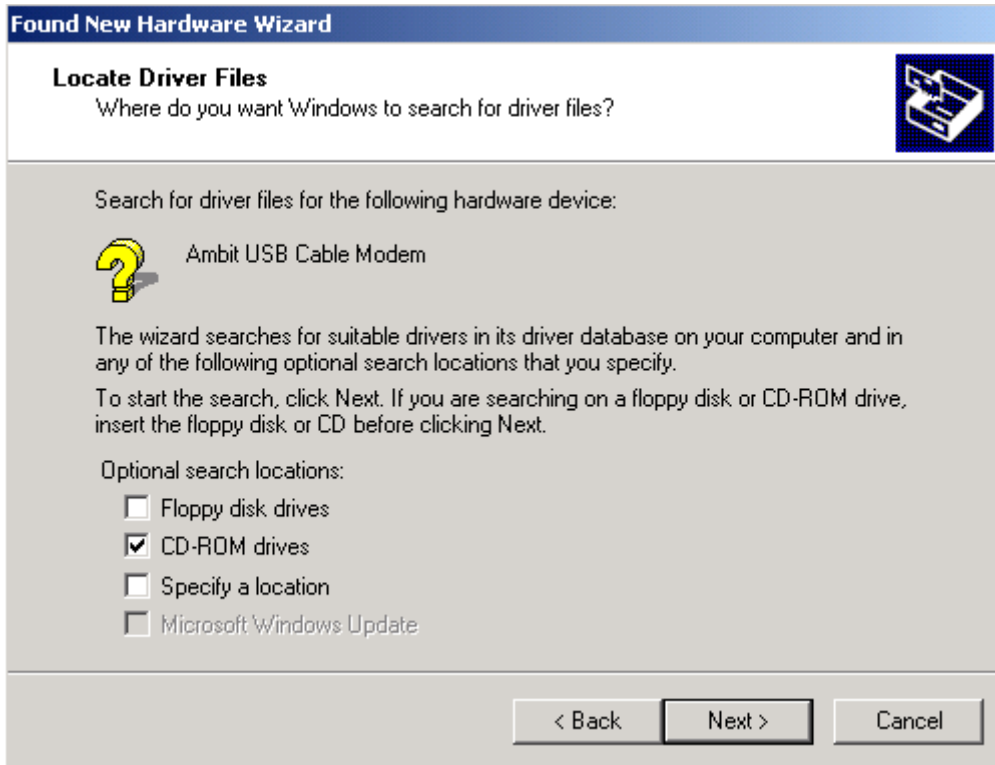


2. Insert the CD into the PC's CD-ROM Drive and click *Next*. You will see the following screen.



3. Select *Search for a suitable driver for my device (recommended)*. Then select *Next*. You will see the following screen





4. Check the *CD-ROM drive* check box and verify that the CD is in the CD-ROM drive. Click *Next* to have Windows locate the necessary driver files. You will see the following screen.



5. Click *Next* to install the driver files for the cable modem. You will see the following screen.



7. Click *Finish* to complete the installation.
8. After the installation is completed, verify that the USB LED is lit on the front of you cable modem. If not, refer to the troubleshooting section later in this chapter.

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## Installing the Software Drivers in Windows XP Operating System

1. Power on your PC. After your computer boots, Windows detects the cable modem. The Found New Hardware screen appears, followed by the Found New Hardware Wizard screen.



2. Choose *Install the software automatically (Recommended)*. Verify that the CD is in the CD-ROM drive. Click *Next* to have Windows locate the necessary driver files. You will see the following screen.



3. Click *Finish* to complete the installation.

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## Troubleshooting the USB Installation

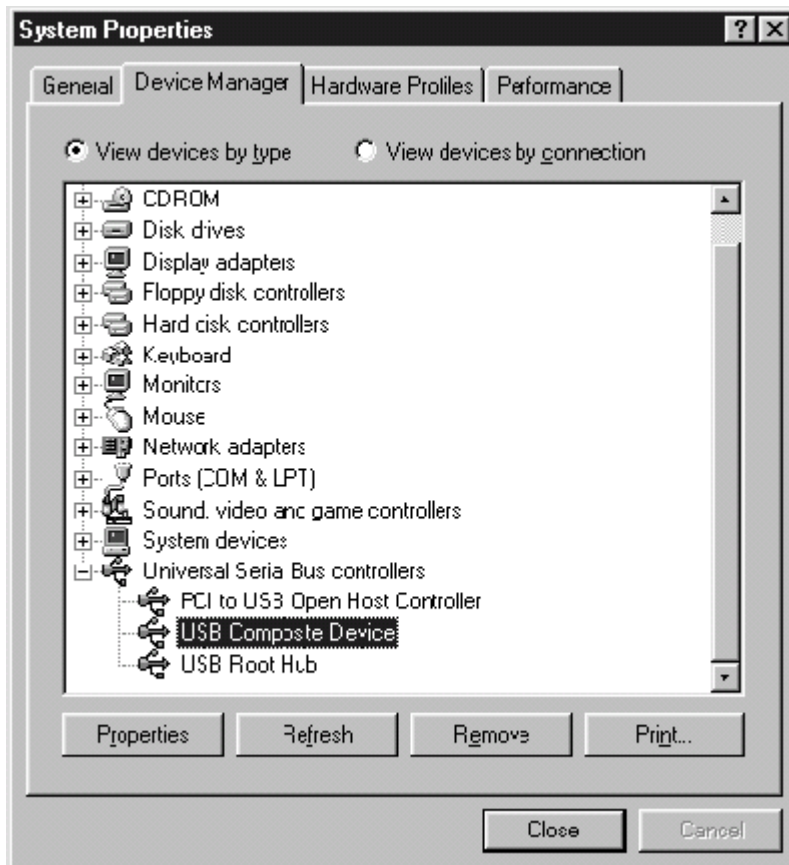
### **None of the LEDs are on when I power on the cable modem.**

Check the connection between the power adapter and the cable modem. If the problem still exists, you may have a hardware problem. Please contact your cable service provider for a possible replacement.

### **When attempting to install the USB driver in Windows 98 SE, I receive the following error message: Device not installed at this time. Driver not found.**

This usually occurs when the wrong driver has been installed. To remove the wrong driver and install the correct driver:

1. Right-click on the *My Computer* icon on your desktop and choose *Properties*.
2. Click the *Device Manager* tab
3. Click the plus sign next to *Universal Serial Bus controllers* to view the list of installed USB device drivers



4. Select *USB Composite Device* and click *Remove*
5. Click *Refresh*

The Add New Hardware Wizard window appears, displaying the device name *USB Composite Device*. Refer to the proper operating system instructions in this chapter for information on reinstalling the driver properly.

**All of the LEDs on the front of my modem look correct, but I cannot access the Internet.**

- If the POWER, USB, SYNC, and READY are solidly lit, the cable modem is working properly. Use the following procedures to verify connectivity between the PC and the cable modem:
  - Launch Your PC's Internet Browser (e.g., Netscape, IE)
  - Enter <http://192.168.100.1> into your browser. This URL connects you directly to the web server within your cable modem. A successful connection indicates that the PC is able to communicate with the cable modem. The next step is to enter a public URL to ensure connectivity between the cable modem and your cable service provider. If this fails, please contact your cable service provider for further assistance.
- Try restarting the computer so that it could re-establish a connection with the cable

modem.

- Power cycle the cable modem by removing the power adapter from the electrical outlet and plugging it back in. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- Remove any other USB devices from your computer and connect the cable modem's USB cable directly to the USB port on your computer.
- If you are using a cable splitter, try removing the splitter and connect the cable modem directly to the cable wall outlet. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- Your USB or coaxial cable may be damaged. Try using another cable.
- If none of these suggestions work, contact your cable service provider for further assistance.

## Uninstalling the USB Driver

1. Insert the supplied CD into your CD-ROM drive
2. Click on the *My Computer* icon on your desktop. Then click on the icon that belongs to your CD-ROM Drive.
3. Locate the file called "Uninstall" and double-click on the file. You will see the following screen.



4. Click *Next* to have Windows remove all the necessary driver files. You will see the following screen.



5. Click *Finish* to complete the Uninstall. You will see the following screen.



6. Click *Finish* to reboot your PC. The necessary driver files are now removed from your PC.



# INSTALLING THE CABLE MODEM USING THE ETHERNET PORT

This chapter explains the process for installing your cable modem using the Ethernet port.

Using the Ethernet port allows you to connect multiple computers to a cable modem through the use of additional equipment which is not included. Please contact your cable service provider for more information on using multiple computers.

See Chapter 2 “Installing the Cable Modem Using the USB Port” for instructions on installing the cable modem using the USB port.

You can use the cable modem’s Ethernet port if you have:

- A PC running Windows 95 (or later) operating system or a Macintosh computer running system 7.6 (or later) operating system
- TCP/IP protocol installed
- An active Ethernet port on your PC

Before you begin, verify that your Network Interface Card (NIC) has been installed and configured for use with your cable modem. The cable modem requires TCP/IP to be installed. Contact your cable service provider for assistance with installing and configuring TCP/IP.

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## Installing the Hardware

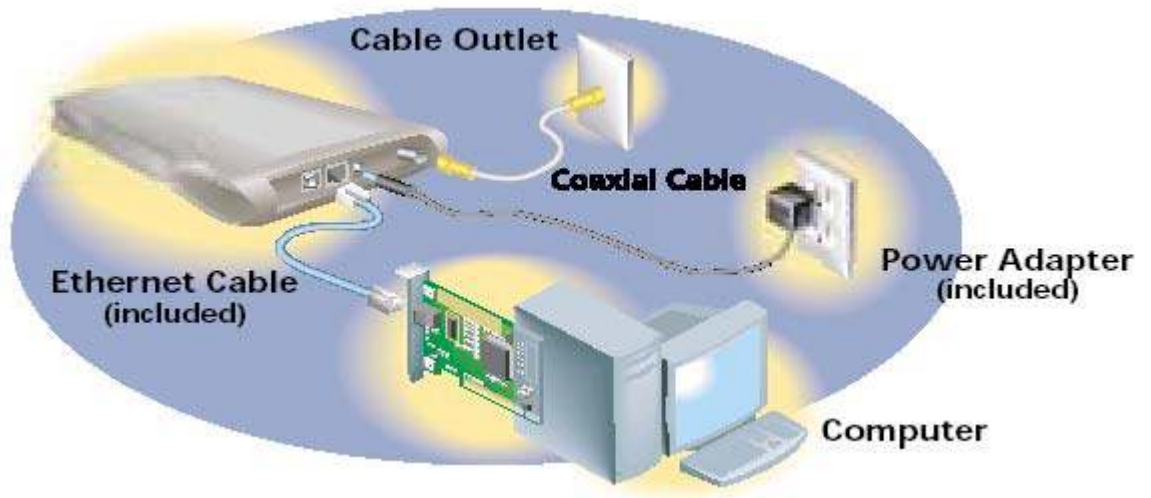
This section explains how to connect the cable modem to the computer, wall cable outlet, and electrical outlet.

To install the hardware:

6. Power off the computer
7. Connect one end of the coaxial cable to the cable modem’s cable connector. Connect the other end of the coaxial cable to the cable wall outlet. Be sure not to bend or over tighten the cables as this may strain the connector and cause damage. If you plan to connect the cable modem and television to the same wall outlet, you must use a cable line splitter (not included).
8. Connect one end of the Ethernet cable to the cable modem’s Ethernet port and the other end of the cable to the Ethernet port on the PC or network interface card (NIC).
9. Plug the cable modem’s power adapter into the cable modem’s power jack and into a

wall outlet or surge protector.

10. If the POWER, USB, SYNC, and READY LEDs are solidly lit, the cable modem is working properly.



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## Troubleshooting the Ethernet Installation

### **None of the LEDs are on when I power on the cable modem.**

Check the connection between the power adapter and the cable modem. If the problem still exists, you may have a hardware problem. Please contact your cable service provider for a possible replacement.

### **The ENET LED on my cable modem is not lit.**

- Try restarting the computer so that it could re-establish a connection with the cable modem.
- Check for a resource conflict (Windows users only). To do this:
  - 1) Right-click on the *My Computer* icon on your desktop and choose *Properties*.
  - 2) Click the *Device Manager* tab and look for a yellow exclamation point or red X over the NIC in the *Network Adapters* field. If you see either one, you may have an IRQ conflict. Refer to the manufacturer's documentation or your cable service provider for further assistance.
- Verify that TCP/IP is the default protocol for your network interface card (NIC)
- Power cycle the cable modem by removing the power adapter from the electrical outlet and plugging it back in. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- Your Ethernet cable may be damaged. Try another cable.

### **All of the LEDs on the front of my modem look correct, but I cannot access the**

**Internet.**






- If the If the POWER, USB, SYNC, and READY LEDs are solidly lit, the cable modem is working properly. Try restarting the computer so that it could re-establish a connection with the cable modem.
- Power cycle the cable modem by removing the power adapter from the electrical outlet and plugging it back in. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- If your PC is connected to a hub or gateway, try connecting the PC directly into the cable modem.
- If you are using a cable splitter, try removing the splitter and connect the cable modem directly to the cable wall outlet. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- Your Ethernet or coaxial cable may be damaged. Try using another cable.
- If none of these suggestions work, contact your cable service provider for further assistance.

# CABLE MODEM LEDS AND CONNECTORS

This chapter describes the functions of the cable modem's LEDs and connectors.

If the POWER, USB, SYNC, and READY LEDs are lit, the cable modem is working properly. The USB or ENET LED should also be lit depending on what port is being used.

The following table provides an overview of the LED indicator lights on the front of the cable modem and what the LEDs mean.

Icon	LED Name	LED Color	Normal State	Description
	POWER	Green	On	Indicates that the cable modem is properly powered on.
	USB	Green	On/Flashing (Off when the USB port is not used)	Indicates that the cable modem is properly connected to the computer's USB port. Flashing when the cable modem is transferring data over the USB cable.
	ENET	Green	On/Flashing (Off when the Ethernet port is not used)	Indicates that the cable modem is properly connected to the computer's Ethernet port. Flashes when the cable modem is transferring data over the Ethernet cable.
	SEND	Green	Random	Flashes when the cable modem sends data to the Internet.
	RECEIVE	Green	Random	Blinks when the cable modem receives data from the Internet.  During initialization, LED flashes slowly to indicate that the cable modem is searching for a downstream channel



SYNC

Green

On

Indicates that the cable modem has established a downstream channel.



READY

Green

Flashing/On

Flashes slowly to indicate that the modem is gathering upstream parameters.

Flashes quickly to indicate that the modem is downloading the configuration file.

When lit, indicates that the modem has ranged and registered on the CM network and is ready to send/receive data.

When off (POWER and SYNC are lit), indicates that the modem is disabled for service.

Installation problems with the cable modem are commonly due to the cable network and its topography. LEDs on the front panel of the cable modem reveal operational status and help you determine problem areas.

### Cable Modem Power-On and Initialization Sequence

When the cable modem is connected and powered on, it executes automatic self-diagnostic and installation procedures. You can view the status from the LED indicators on the front panel of the cable modem.

LED light off = O

LED light on = @

LED blinking = B

Not Applicable = X

STATUS	POWER	USB	ENET	SEND	RECV	SYNC	READY
<b>Initialization Sequence</b>							
Power ON	@	@	X	O	O	@	@
Hardware Testing	@	B	X	X	B	B	B
Search Downstream Channel	@	X	X	X	B	O	O
Downstream Locked	@	X	X	X	X	@	O

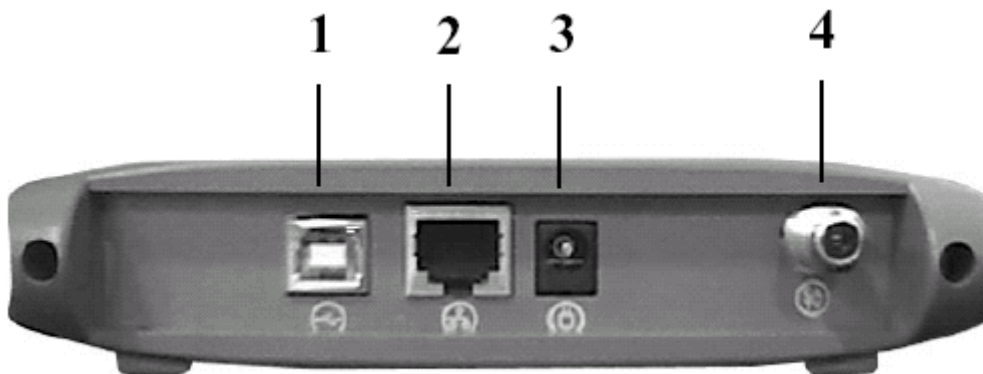
Search Upstream Channel	@	X	X	B	X	@	O
Ranging OK and Registration Success	@	X	X	X	X	@	@
<b>Data Transmission (use Ethernet cable)</b>							
Send Data	@	O	B	B	X	@	@
Receive Data	@	O	B	X	B	@	@
<b>Data Transmission (use USB cable)</b>							
Send Data	@	@	X	B	X	@	@
Receive Data	@	@	X	X	B	@	@

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## Connectors on the Back of the Modem

This list of connectors describes where to connect the cables and power adapter when installing the cable modem.

1. **USB Port:** This is where you plug the included USB cable. The other end connects to the USB port on your PC
2. **Ethernet Port:** This is where you plug the included Ethernet cable. The other end connects to the Ethernet Jack on the PC or NIC.
3. **Power Jack:** This is where you plug the include power adapter. Remember to use only the power adapter that came with the cable modem.
4. **Cable Connector:** This is where you connect the coaxial cable (not included) that leads to the cable splitter (not included) or the cable wall outlet.



# PRODUCT SPECIFICATIONS

This chapter describes the cable modem's operating and hardware specifications.

ITEM	DOWNSTREAM (RECEIVER)	UPSTREAM (TRANSMITTER)
Frequency Range	88MHz ~ 860MHz	5MHz ~ 42MHz
Channel Bandwidth	DOCSIS: 6MHz	200K, 400K, 800K, 1.6M, 3.2MHz
Modulation	64QAM/256QAM	QPSK/16QAM
Symbol Rate	5.057/5.361 Msymbols/sec	160, 320, 640, 1280, 2560 Ksymbols/sec
Data Rate	30Mbps/sec (64QAM) 43Mbps/sec (256QAM)	0.32 ~ 5.12Mbps (QPSK) 0.64 ~ 10.24Mbps (16QAM)
Input Output Power	-15dBmV ~ +15dBmV	+8dBmV ~ +58dBmV (QPSK) +8dBmV ~ +55dBmV (16QAM)
Carrier To Noise Ratio @BER<10 <sup>-8</sup>	64QAM: 23.5dB, 256QAM: 30dB	
RF Cable Interface	75Ω F-type female connector	
PC Host Interface	Ethernet or USB cable	
Power Dissipation	< 6 Watts	
MAC, LLC/SNAP, IP and CPE Filter	DOCSIS-RFI	
ARP, ICMP, IP, TCP/UDP, IGMPv2	RFC826, RFC792, RFC791, RFC768/793 RFC2236	Internet Protocol Stack
DHCP, TFTP, ToD client	RFC2131/2132, RFC1350, RFC867	Applications for Provisioning usage
SNMP v2c	RFC1905	SNMP Protocol
MIBs Support	RFC1213, RFC2011, RFC2012, RFC2013, RFC2669, RFC2670, RFC2233, RFC1907, RFC1493, draft-ietf-ipcdn-mens-bpi-mib-0 1	MIB-2, Interface and Cable, Security MIB support
Syslog client	Send event to syslog server	

Description	Specification
Dimensions (H x W x D)	2.0 x 13.0 x 19.5cm
AC Power (Input)	Linear: AC 100 ~ 120 Volt (50 ~ 60 Hz) or AC 220 ~ 240 Volt (50 ~ 60 Hz) Switching: AC 100 ~ 240 Volt (Optional)

Power Consumption	8 to 10W
Temperature	Operating: 32°F to 104°F (0°C to 40°C) Non-operating: 14°F to 158°F (-10°C to 70°C)
Humidity	5 to 90% non-condensing
Cable Interface	Type F coaxial connector
LAN Interface	Ethernet 10/100BaseT (RJ-45)
USB Interface	USB Series B Connector
Regulatory Compliance	FCC part 15, UL/CSA C22.2, CB, VCCI