DOCSIS Cable Modem User's Manual

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Introduction

Congratulations on Your Purchase!

Your new DOCSIS Cable Modem will provide you with high-speed access to the Internet through your cable TV (CATV) network. It works on any cable system that complies with MCNS DOCSIS specifications. Open your wide access gate into the Internet and you can enjoy the quality video, music, and mass information in just a click. Always-on connection makes your IP phone/fax or VPN (Virtual Private Network) connections more flexible and more convenient.

Content of Package

One MCNS DOCSIS Cable Modem
One Ethernet Cable
One AC Adaptor
One User's Manual

Please contact the place of purchase if any of the above listed item is missing or damaged.

Important Rules for Safe Operation

In addition to the careful attention devoted to quality standards in the manufacture of your DOCSIS Cable Modem, safety is a major factor in the design of every product. However, safety is your responsibility, too.

This section lists important information that will help assure your enjoyment and proper use of the Cable Modem and accessory equipment. Please read them carefully before operating and using your modem.

Read and Follow Instructions - You should read all the safety and operating instructions before operating the modem. Follow all operating instructions.

Retain Instructions - You should save all the safety and operating instructions, for your future reference.

Heed Warnings - Comply with all warnings on the products and in the operating instructions.

Check Power Sources - Operate this product only from the type of power source indicated on the product's marking label. If you are not sure of the type of power supplied to your home, consult your dealer or local power company.

Be Careful of Overloading - Do not overload wall outlets or extension cords, as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard. Periodically examine the cord, and, if its appearance indicates damage or deteriorated insulation, have it replaced by your service technician.

Protect Power Cords - Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them.

Pay particular attention to cords where they are attached to plugs and convenience receptacles, and examine the point where they exit from the product.

Check Ventilation - Slots and openings in the enclosure are provided for ventilation to ensure reliable operation of the product and to protect it from overheating. Do not block or cover these openings. Never block these openings by placing the product on a bed, sofa, rug, or other similar surface. Never place this product near or over a radiator or heat register, or any other heat source (including amplifiers). Do not place this product in a built-in installation, such as a bookcase or equipment rack, unless you provide proper ventilation.

Do Not Use Accessories - Do not use attachments, unless they are recommended by TurboComm, as they may cause electrical or fire hazards.

Use the Recommended AC Adaptor - You must use the Adaptor that comes with your TurboComm Cable Modem.

Do Not Use Near Water - Do not use this product near water - for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool, and the like.

Do Not Place Near High Temperature Source -for example near a steamer, Kitchen range fire, and the

like.

Use Caution in Mounting This Product - Do not place this product on an unstable surface or support. The product may fall, causing serious injury to a child or adult, as well as serious damage to the product.

Use Care in Moving Product-and-Cart Combinations - Quick stops, excessive, force and uneven surfaces may cause the product-and-cart combination to overturn.

Ground the Cable System - Be sure that the outside cable system is grounded, so as to provide some protection against voltage surges and built-up static charges.

Section 810 of the National Electric Code, ANSI/NFPA No. 70-1984 (Section 54 of the Canadian Electrical Code, Part 1) provides information with respect to proper grounding of the cable system.

Do not disconnect RF cable from your Cable Modem while the power to your modem is on.

Unplug Power Before Cleaning - Do not use liquid cleaner or aerosol cleaner. Use a damp cloth for cleaning.

Keep Objects Out of Openings - Never push objects of any kind into this product through openings, as they may touch dangerous voltage or "short-out" parts, which could result in a fire or electric shock. Never spill liquid on the product.

Protect From Lightning - For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet, and disconnect the cable system. This will prevent damage to the product due to lightning and power line surges.

Take at least 10 seconds between DC plug off and on.

Do Not Remove Covers - Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Unplug this product from the wall outlet carefully, as the AC adaptor may be hot.

Refer Servicing to Qualified Service Personnel Under the Conditions Listed Below

When the power supply cord or plug is damaged.

If liquid has been spilled or objects have fallen into the product.

If the product has been exposed to rain or water.

If the product does not operate normally by following the operating instructions.

If the product has been dropped or the cabinet has been damaged.

When the product exhibits a distinct change in performance, such as the inability to perform basic functions - this indicates a need for service.

Require Safety Check - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks recommended by service point to determine that the product is in safe operating condition.

Installing the Cable Modem

To avoid thermal problems, allow at least one inch spacing between the ventilation holes and any object to either side of the unit. It's best to have no obstructions on top of the unit. The top of the unit should be at least two inches from any obstruction.

Connect the cable modem using the following steps, referring to the figure below.

1. Connect the Cable TV coax to the input connector of a signal splitter.
2. Connect a coaxial cable from one of the output connectors of the splitter to the input connector of the television set.
3. Connect a coaxial cable from the other output connector of the splitter to the RF input connector on the cable modem rear panel.
4. Connect the 10Base-T signal cable from your computer to the 10Base-T connector on the cable modem rear panel.
5. Connect the AC adapter to the DC IN 12V 1A jack on the cable modem rear panel. Then plug in the AC adapter to the wall electrical outlet.

The power indicator LED on the modem front panel will light, if power is present at the outlet. The modem will start operating once power is connected. No additional operator intervention is required. It will automatically find the data channel, register and connect to your computer.

Check the cable modem status. The front panel indicators (LEDs) show that the cable modem is operating properly when they are in the following condition:

POWER – lit

CABLE - lit

PC - lit

DATA - flashing or not lit

TEST - not lit

Diagnostics

The Cable Modem has five status LEDs for diagnostics. You can monitor the LEDs during installation and when you are using.

Table 1 shows Cable Modem status LEDs and identifies what each LED light means. This table will help you to diagnose problems.

Function	Definition
Power	- dark for power off - solid for power on
Cable	- dark for no downstream RF carrier present or power off - flashing slowly for downstream RF carrier present and ranging in progress - flashing fast for registration in progress - solid for the Cable Modem registered and ready to transfer data
PC	- dark for no Ethernet carrier present or power off - solid for Ethernet carrier present
Data	- dark for no user data going through the Cable Modem or power off - flashing for user data going through the Cable Modem
Test	- dark for initial self-test of the Cable Modem OK or power off - flashing for initial self-test of the Cable Modem in progress or software down loading of the Cable Modem in progress - solid for self-test failure of the Cable Modem

Table 1 Status LEDs

Consumer Cable Modem FAQ's

How does a cable modem work?

As you know, digital signals are represented by high and low electrical voltage levels. And how fast these levels can switch and still be transmitted is determined by the "bandwidth" of the transmission system. The pair of wires used in a telephone connection have greatly limited bandwidth, because of their electrical characteristics. So what we do is connect a device called a modem between the computer output and the phone line. The modem generates an electrical wave whose strength and phase change in step with the highs and lows of the computer's digital output. It's because of the "smoothness" of the resultant signal that a higher data rate can be transmitted.

A cable modem MOdulates and DEModulates electrical signals in the same sense that the telephone modem does. However, since coaxial cable can carry much higher wave frequencies, cable modems are far more sophisticated. Their internals can include a tuner, a bridge, a router, an encryption/decryption device, an SNMP agent and an Ethernet hub. Furthermore, none of the activity caused by these circuits and codes disturbs your regular cable TV reception.

How does a cable modem connect to a computer?

The 10BaseT Ethernet connection used in this Cable Modem is emerging as the most popular. This connection has been used for years to allow business computers to talk to each other in a LAN (Local Area Network).

The new DOCSIS standard may change this in the future. But for now, an Ethernet card must be installed in your computer for the Cable Modem to work.

What is DOCSIS?

Data Over Cable Service Interface Specifications. DOCSIS defines interface requirements for cable modems involved in high-speed data distribution over a cable television network. On November 17, 1997, Cable Television Laboratories, Inc. (Cable Labs) and its members established a formal path of certification for cable modem equipment suppliers to obtain an interoperability seal for their products based on the DOCSIS specification. This certification process provides cable modem equipment suppliers with a fast, market-oriented method for attaining cable industry acknowledgment of compliance with DOCSIS.

The seal is meant to provide the purchaser with a way to be confident that the modem equipment to be purchased is compliant with the specification, and that the equipment interoperates with DOCSIS products made by other vendors.

What equipment do I need to use a Cable Modem?

- A cable operator that provides the MCNS high-speed data service
- A Computer (the Cable Modem is platform independent so it does not matter what kind)
- A standard 10BaseT Ethernet connection (installed in your computer)

Can I still watch cable TV while using Cable Modem?

Yes, you cable wire is split at your home so both may be used at the same time.

Can I have cable modem service but not subscribe to cable TV?

Yes, you may have one, or both.

How much faster is Cable Modem connection than other internet connections.

The Cable Modem connection is many times faster than other internet connections. Cable Modem is transfer data in bursts and the maximum downstream data rate is 40Mbps. However, in the field, you can mostly you can have 4 ~ 10Mbps steady downstream data flow. Take a 10MB file download time as an example.

MODEM SPEED/ TYPE	TRANSFER TIME
9.6Kbps Telephone Modem	2.3 Hours
14.4Kbps Telephone Modem	1.5 Hours
28.8Kbps Telephone Modem	46 Minutes
56Kbps Telephone Modem	24 Minutes
128Kbps ISDN Modem	10 Minutes
1.54Mbps T1 Connection	52 Seconds
4Mbps Cable Modem	20 Seconds
10Mbps Cable Modem	8 Seconds

Transfer Rate for a 10-Megabyte File

How long does it take to log on?

Your MCNS Cable Modem is always on, a connection is always open, so you never have to wait for a slow log on procedure.

Specifications

The EC100 DOCSIS Cable Modem is MCNS DOCSIS compliant.

Downstream

Demodulation:	64QAM / 256QAM
Physical Speed:	30 Mbps (64QAM) / 40 Mbps (256QAM)
Error Correction:	Reed Solomon + Trellis (Enhances Annex B)
Frequency range:	88 MHz to 860 MHz (edge-to-edge) in 62.5 kHz steps
Bandwidth:	6 MHz
Input signal level:	-15dBmV to+15dBmV
Input impedance:	75 ohms
Return loss:	> 6 dB from 88 MHz to 860 MHz

Upstream

Demodulation:	QPSK / 16QAM
Physical Speed:	320,640,1280,2560,5120Kbps(QPSK)
	640,1280,2560,5120,10240Kbps(16QAM)
Error Correction:	Reed Solomon
Frequency range:	5 to 42 MHz (edge-to-edge), in 1Hz steps
Bandwidth:	200, 400, 800, 1600, 3200 kHz
Output signal level:	8 dBmV to 58 dBmV (QPSK)
	8 dBmV to 55 dBmV (16QAM)

SNMP Management

MIB Group:	MIB II, MCNS MIB

Interface

DTE:	IEEE802.3/10Base-T
Cable:	F type female 75ohm

Power

Modem power input	12VDC
Power consumption:	8 W (Max)

Mechanical

Size:	1.96 in. (width) x 8.07 in. (depth) x 5.96 in. (height)
Weight:	2.1 lb

Environmental

Operating temperature:	0℃ ~ 40℃ degrees Fahrenheit
Humidity:	10 % ~ 90 % (non-condensing)
Storage temperature:	-20℃ ~ 60℃
Safety:	UL1310, UL1950
Emission:	FCC part 15, class B

FCC Compliance

This DOCSIS Cable Modem has been tested and found to comply with the limits for a Class B personal computer and peripherals, 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 unit does cause harmful interference to radio or television reception, which can be determined by turning the unit off and on, the user is encouraged to try to correct the interference by one or more 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.