DOCSIS Cable Modem

User’s Manual

Product Name:	**Cable Modem**
Manual Revision:	**1.00 E580-X**
Release Date:	**June 2000**

Contents

Introduction

Overview 4
Features 4
Package Contents 4

Preparations

System Requirement 5
Installing a Network Card 5
Installing the TCP/IP Protocol 6
Changing TCP/IP Settings 6
Checking if TCP/IP is already installed 6
Adding TCP/IP in Network properties 6

Using the Cable Modem

Front Panel 7
Rear Panel 8
Installing the Cable Modem 9
Powering Up 10
Multiple Client Configuration 10

Product Certifications

FCC (Federal Communications Commission Statement) 11
UL 11
CE 11

Product Specifications

Software Specifications 12
RF Receiver/Transmitter Specifications 13
Hardware Specifications 14

Introduction

Overview

Thank you for purchasing the DOCSIS-compliant cable modem. This cable modem delivers the highest performance in data over cable technology. Ideal for home and small business users, this easy-to-use communication device offers reliable connectivity as well as remarkable data transfer rates--up to 43Mbps downstream and 10Mbps upstream, 100 times faster than a 56K dial-up modem. Once the cable modem is powered up, you are online to enjoy real-time 3D animation, video conferencing, and perform other data intensive operations.

Features

- MCNS DOCSIS 1.0 compliant
- Support for 6MHz downstream and 200K-3200KHz upstream cable channel bandwidth
- Peak data transfer rates of 38Mbps (64QAM) and 42Mbps (256QAM)
- Auto detection of 64QAM or 256QAM
- Network management protocol support for SNMPv1/v2c and DOCSIS 1.0 MIBs
- Data Encryption Standard (DES) and Baseline Privacy Interface (BPI) compliant
- Easy installation and operation
- Self-diagnoses available through front panel LEDs
- Software upgradeable
- Low power consumption with a maximum of 10Watts
- Stylish, compact design; horizontal or vertical standing

Package Contents

- ☑ (1) DOCSIS Cable Modem
- ☑ (1) AC power adapter
- ☑ (1) CAT.5 Ethernet cable (RJ-45)
- ☑ (1) User’s Manual

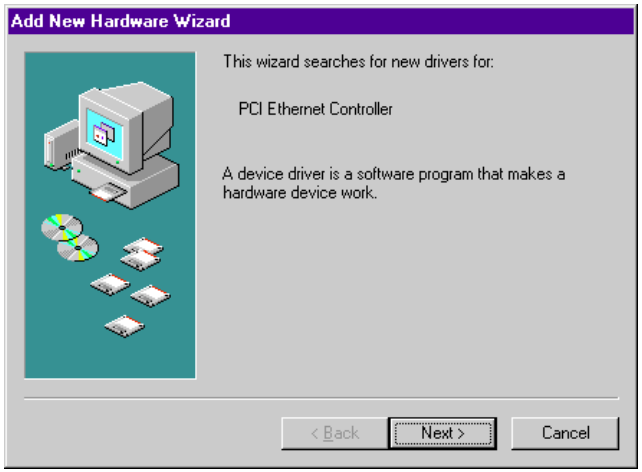
System Requirements

Before connecting the cable modem to your PC, make sure your system is equipped with a LAN controller and supports the TCP/IP protocol.

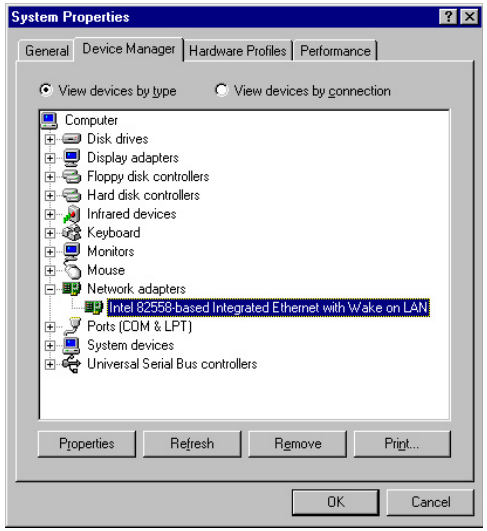
Installing a Network Card

If your system does not have an embedded LAN controller, you must install a network interface card as instructed below (assuming that you are using an Ethernet card under the operating system of Windows 98):

1. Install the PCI-L101 card on your motherboard.
2. Power up your PC and follow the **Add New Hardware Wizard**'s instructions to install the driver. When asked to restart your computer at the end of the installation, click **Yes**.



3. After restarting the system, right-click **My Computer** on the desktop, select **Properties**, click the **Device Manager** tab, and then double-click **Network adapters** to confirm that the Ethernet driver is properly installed.



Installing the TCP/IP Protocol

• Checking if TCP/IP is already installed

1. Click the **Start** button

on the desktop. In the **Settings** menu, select **Control Panel**

.

Double-click the Network icon

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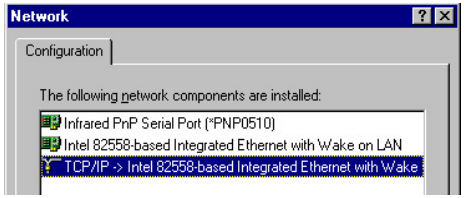
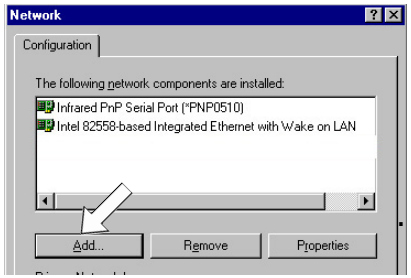
2. In the list of installed network components try to find the TCP/IP protocol. It may be followed by the name of the Ethernet controller. If you cannot locate anything that begins with **TCP/IP**, install it as described below.

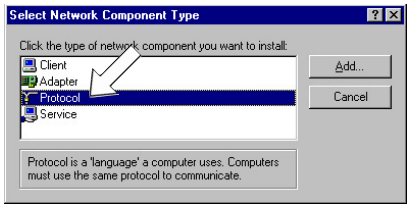


• Adding TCP/IP in Network properties

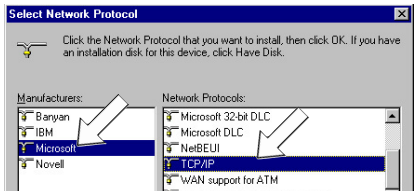
1. Click **Add**.



2. Double-click **Protocol**.



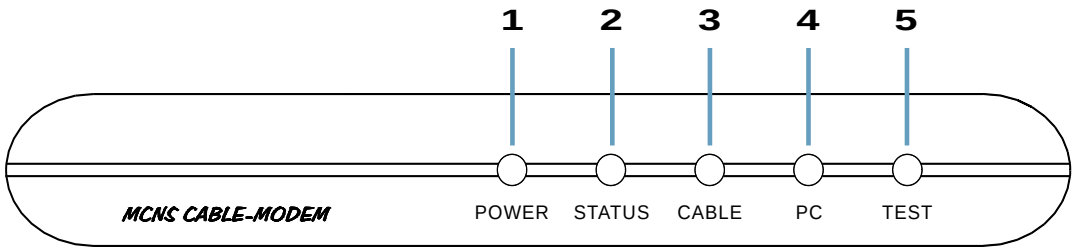
3. Select **Microsoft** from the manufacturers. In the list of network protocols browse to **TCP/IP** and then double-click it.



Changing TCP/IP Settings

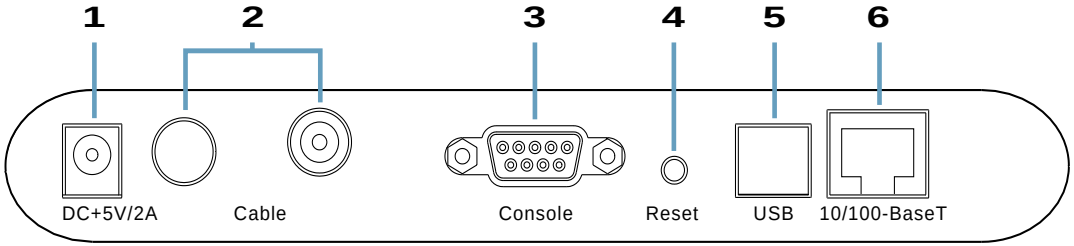
After the TCP/IP protocol is installed, restart your computer and consult the installation guide provided by your cable operator to complete TCP/IP configurations.

Front Panel



LED Indicator	State	Description
1. Power LED	ON	Modem is powered ON
	OFF	Modem is powered OFF
2. Status LED	ON	Modem successfully registered on cable operator's network
	Flashing	Modem is registering on cable operator's network
	OFF	(While Cable Link LED is flashing) searching for downstream channel
3. Cable Link LED	ON	Normal operation
	Flashing	(While Status LED is ON) data streaming down
	Flashing	(While Status LED is OFF) searching for downstream channel
	OFF	—
4. PC Link LED	ON	LAN and PC connect successfully
	Flashing	Data transmitting between LAN and PC
	OFF	No connection between LAN and PC
5. Test	ON	Error (Resetting the cable modem may help; if not, contact customer support)
	OFF	Normal operation

Rear Panel



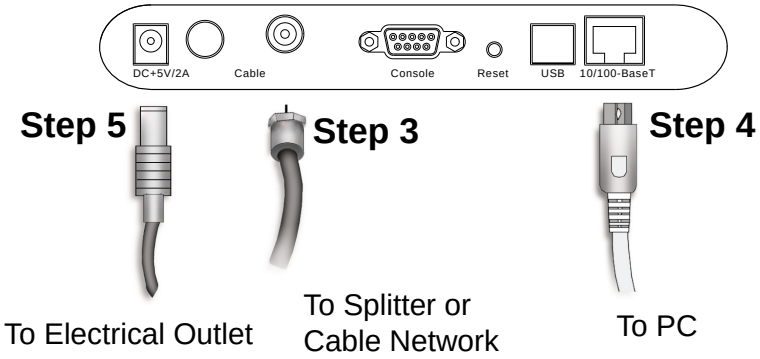
1. **DC +5V/2A Power Input Jack**
   The provided power adapter converts AC power to DC power for use with this jack. Power supplied through this jack will supply power to the cable modem.
2. **RF Connector**
   The connector may be located right next to the power input jack or the serial port. The F-Type female connector allows cable data communication between the cable modem and the cable service provider through a coaxial cable.
3. **Serial Port**
   The 9-pin D-sub serial port supports the RS-232 terminal interface for advanced cable modem management.
4. **Reset Switch**
   The reset button, when pressed, resets the cable modem without the need to unplug the power cord.
5. **USB Port (optional)**
   The optional USB port allows the modem to be connected to your computer through the USB interface.
6. **10/100-BaseT LAN Port**
   The LAN port supports 10Base-T or 100Base-TX networks. This port allows your PC or Ethernet hub to be connected to the cable modem through a CAT.5 twisted pair LAN cable.

Installing the Cable Modem

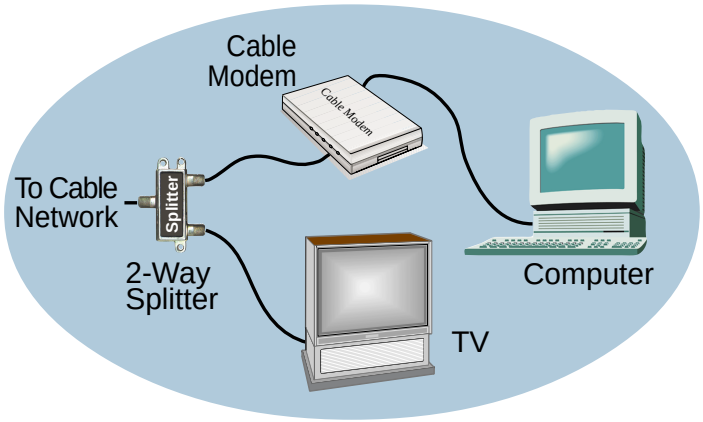
Take the following steps to accomplish the installation procedure:

1. Connect the cable TV coaxial cable to the input connector of a signal splitter.
2. Connect a coaxial cable from one of the output connectors on the splitter to the input connector of your TV set.
3. Use another coaxial cable to connect the other output connector on the splitter and the RF connector on the rear panel of the cable modem.
4. Connect the LAN cable from the LAN port on your computer to the LAN port on the rear panel of the cable modem.
5. Connect the AC power adapter to the DC +5V/2A input jack on the rear panel of the cable modem. Plug in the AC power adapter to an electrical outlet.

NOTE: If you are not using a television on the cable line, you may skip steps 1 to 3 and connect the cable TV coaxial cable directly to the RF connector on the rear panel of the cable modem.



Rear Panel Connections



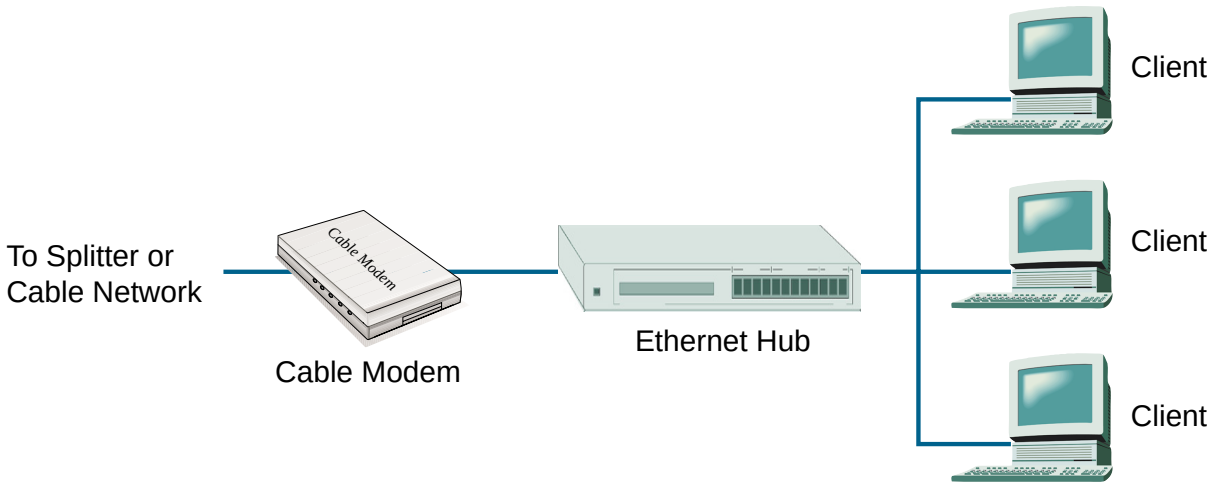
Cable Service Connections

Powering Up

When all connections have been properly made and the power is ON, the cable modem will automatically start the self-test and search for the active cable channel provided by your cable operator. Now you are all set and ready to surf the internet at a marvelous speed!

Multiple Client Configuration

The cable modem supports up to 15 pieces of consumer premises equipment. If you can obtain multiple IP addresses from your cable operator, you can hook up as many computers to the cable modem as the number of the IP addresses, using a hub inbetween (as shown below). Each connected client PC will then be assigned one dynamic IP address by the cable operator.



Multiple Client Configuration Diagram

FCC (Federal Communications Commission Statement)

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.

UL

This product meets all safety requirements per UL-1950 standard.

CE

This certificate of conformity is based on an evaluation of the cable modem that is in compliance with the Low Voltage Directive 73/23/EEC and the Amendment Directive 93/68/EEC.

Product Specifications

Software Specifications	
Protocol Support	• MCNS DOCSIS 1.0, TCP/IP, UDP, ARP, ICMP, SNMP, TFTP, TOD, BOOTP, SYSLOG
Bridging	• Support for unicast, broadcast, and multicast IP packets • Variable-length packet cable Meida Access Control (MAC) transport layer
Management Operations	• SNMPv1/v2c • RFC 1902: SMIv2 • RFC 1903: Texture conventions
MIBs Support	• RFC 1907: System group, SNMP group, SNMPv2 group • RFC 2011: IP group, ICMP group • RFC 2013: UDP group • RFC 2233: Interface group • RFC 2358: Ethernet-like Interface group • RFC 2571: Architecture for describing SNMP management frameworks • RFC 1493: Bridge • RFC 2669: MCNS Cable Device • RFC 2670: MCNS Radio Frequency Interface • IETF Draft: MCNS Baseline Privacy Interface

RF Receiver/Transmitter Specifications		
	Downstream (Receiver)	**Upstream (Transmitter)**
Frequency Range	• 88 to 860 MHz	• 5 to 42 MHz
Modulation	• 64QAM • 256QAM	• QPSK • 16QAM
Signal Rate	• 30Mbps/64QAM • 42.8Mbps/256QAM	• QPSK 320Kps to 5.12Mbps • 16QAM 640Kbps to 10.24Mbps
Channel Bandwidth	• 6MHz	• 200K, 400K, 800K 1.6M, 3.2MHz
FEC	• RS (128, 122) Trellis	• Reed Solomon
Level Range	• -15 ~ +15dBmV	• QPSK: +8 ~ +58dBmV • 16QAM: +8 ~ +55dBmV
Security	• DES decryption: DOCSIS Baseline Privacy (BPI), 56-bit DES and 168-bit triple-DES encryption, as controlled by the headend and configuration files	

Product Specifications

Hardware Specification	
RF Infterface	• F-Type female 75ohm connector
Console	• UART serial interface
CPE Interface	• 10Base-T/100Base-TX Ethernet (RJ-45) • USB (optional)
Dimensions (H x W x D)	• 34.60 x 202.95 x 182.50mm
Weight	• 470g
Power Consumption	• 10W (max.)
DC Input Voltage	• DC +5V
Operating Temperature	• 32° ~ 104° F (0° ~ 40° C)
Non-operating Temp.	• -4° ~ 149° F (-20° ~ 65° C)