User Manual

MV500V Series
CDMA 1x EV-DO Rev. A Wi-Fi Gateway

⚠️ Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Axesstel modem are used in a normal manner with a well-constructed network, the Axesstel modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death or loss of property. Axesstel accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Axesstel modem or for failure of the Axesstel modem to transmit or receive such data.

⚠️ Safety Precautions

Do not operate the Axesstel modem:

- ➤ In areas where blasting is in progress
- ➤ Where explosive atmospheres may be present
- ➤ Near medical equipment
- ➤ Near life support equipment or any equipment that may be susceptible to any form of radio interference. In such areas, the Axesstel modem MUST BE POWERED OFF. The Axesstel modem can transmit signals that could interfere with this equipment.

Do not operate the Axesstel modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Axesstel modem MUST BE POWERED OFF. When operating, the Axesstel modem can transmit signals that could interfere with various onboard systems.

Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. The Axesstel modem may be used at this time.

The driver or operator of any vehicle should not operate the Axesstel modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offense.

⚠️ Limitation of Liability

The information in this manual is subject to change without notice and does not represent a commitment on the part of Axesstel. AXESSTEL SPECIFICALLY DISCLAIMS LIABILITY FOR ANY AND ALL DIRECT, INDIRECT, SPECIAL, GENERAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE OR ANTICIPATED PROFITS OR REVENUE ARISING OUT OF THE USE OR INABILITY TO USE ANY AXESSTEL PRODUCT, EVEN IF AXESSTEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR THEY ARE FORESEEABLE OR FOR CLAIMS BY ANY THIRD PARTY.

Notwithstanding the foregoing, in no event shall Axesstel aggregate liability arising under or in connection with the Axesstel product, regardless of the number of events, occurrences, or claims giving rise to liability.

INTRODUCTION

Thank you for purchasing the Axesstel MV500V series EV-DO Modem with VoIP feature (the Modem).   This user manual will help you setup, configure and outline best practices for maximizing your wireless home network performance with the Modem. Please be sure to read through this User Manual completely, and pay special attention to the section below entitled "Placement of Your Modem for Optimal Performance."

PLACEMENT OF YOUR MODEM FOR OPTIMAL PERFORMANCE

The closer your computer is to your Modem, the stronger your wireless connection will be. Typical indoor operating range for Wi-Fi wireless devices is between 100 and 200 feet. For EV-DO operation, placing the Modem in a line of sight with the radio base station will yield the strongest signal.

Similarly, your wireless connection and performance will degrade a bit as the distance increases between your Modem and connected devices and between your Modem and radio base station. This change may or may not be noticeable to you.

As you move your computer farther from your Modem, connection speed may decrease. This may happen due to walls, metal appliances or other elements obstructing your network's radio waves and weakening its signals..

Note: While some of the items listed below can affect network performance, they will not prohibit your wireless network from functioning. If you are concerned that your network is not operating at maximum effectiveness, this checklist may help.

1. Modem Placement

Place your Modem, the central connection point of your network, as close as possible to windows or in rooms along the perimeter of your house. If you also use the Wi-Fi feature of the Modem, place the Modem centrally within your network of wireless devices..

To achieve the best wireless network coverage:

- Ensure that your Modem's CDMA networking antennas are parallel to each other and positioned vertically (pointed toward the ceiling). If your Modem is positioned vertically, point the antennas upward as best as possible.
- In multi-story homes, place the Modem on an upper floor.
- Try not to place the Modem near a cordless phone (MV500-series only).

2. Avoid Obstacles and Interference

Avoid placing your Modem near microwave ovens and other devices that may emit radio "noise." Dense objects that can inhibit wireless communication include:

- Refrigerators
- Washers and/or dryers
- Metal cabinets
- Large aquariums
- Metallic-based, UV-tinted windows

If your wireless signal seems weak in some spots, move the Modem to another location while observing the signal strength indicator. Since you may not know the location of an EV-DO radio base station serving your Modem, call your service provider and ask for the location of the nearest base station to your home. Place your Modem as close as possible to that base station and in an unobstructed line of sight.

3. Cordless Phones

If the performance of your wireless network is impaired after addressing the above issues, and if you have a cordless phone:

- Move the cordless phone away from your Modem and wireless-enabled computers.
- Unplug and remove the battery from any cordless phone that operates on the 2.4GHz band (check the manufacturer's literature for this information). If this fixes the problem, your phone may be interfering with your wireless network's performance.
- If your phone supports channel selection, change the channel on the phone to the farthest channel from your wireless network. For example, set the phone to channel 1 and set your Modem to channel 11. See your

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phone's user manual for detailed instructions.
If necessary, consider switching to a 900MHz cordless phone.

PRODUCT OVERVIEW

In minutes, you will be able to connect your computers to the Internet, share your Internet connection and network your computers. And you will be able to make a call through VoIP. The following is a list of features that make your new Axesstel EV-DO Modem an ideal solution for your home or small office network. Implementation of these features depends on the particular service provider and account features you have chosen.

Some features described in this manual may not be supported by your service provider or may not be available with your network account. For details of the services and accounts available, contact your service provider.

CDMA 3G Services

Your Modem operates on CDMA 3G technology that provides a variety of connectivity features. Depending on your service provider and account, you may be able to access some or all of these features:

- 1xEV-DO Rev. A supports Internet connections with data rates up to 3.1 Mbps (on the downlink from the network) and 1.8 Mbps (on the uplink to the network). Average data rates are 600–1300 Kbps (on the downlink) and 300–400 Kbps (on the uplink). Actual speed depends on network conditions.

- 1xEV-DO Rev. 0 supports Internet connections with data rates up to 2.4 Mbps (on the downlink) and 153 Kbps (on the uplink). Average data rates are 400–700 Kbps (on the downlink) and 40–80 Kbps (on the uplink). Actual speed depends on network conditions.

- 1X supports Internet connections with data rates up to 153 Kbps. Actual speed depends on network conditions.

Once an Internet connection is established, you can open your browser and connect to any web site that is accessible through the Internet or access other Internet services such as email.

A connection is "active" when data transmission is occurring. If data transmission stops for a period of time (determined by the network), the connection becomes "dormant." For more information, see page 26.

VoIP Calling

Your Modem (MV500V series) features a Voice over Internet Protocol (VoIP) function that allows you to make voice calls over a VoIP network by simply connecting a wired, landline phone to your network-connected Modem.

The basic operating principles behind VoIP: the Modem receives an analog voice signal from your wired phone, converts the analog signal into a digital signal, compresses the digital signal into IP packets, and then transmits the IP packets over the internet. This process is reversed at the receiving end.

Your Modem meets standard VoIP protocol, SIP 2.0, and provides a single RJ-11 port for single-line use. Once your Modem is activated and SIP accounts have been set on your service provider's network, you can start making VoIP calls.

Plug-and-Play
Your Modem was factory-set for compatibility with a particular service provider. Thus, your Modem operates on radio channels and enables services specific to your network service provider.   Once your Modem has been activated on your service provider's network, you can connect to the Internet. (Activation is the process of setting up an account with a service provider and configuring the Modem to work on that provider's network.)

After your Modem is activated, connect it to your computer using the provided Ethernet (RJ-45) cable. You are now ready to use the Internet.

Works With PCs and Mac® Computers
Your Modem supports a variety of networking environments including Mac OS® 9.x, X v10.x, AppleTalk®, Linux®, Windows® NT®, 2000, XP, and others. You will also need an Internet browser and a network adapter that supports TCP/IP (the standard language of the Internet).

Top-View LED Display
LED lights on the top of the Modem indicate which functions are operating. The LED lights allow you to know at a glance if your Modem is in EV-DO or 1X mode, connected to the Internet and in Wi-Fi or Ethernet operation. This feature eliminates the need for advanced software and status-monitoring procedures.

Web-Based Advanced User Interface
You can easily setup the Modem's advanced functions through your AxessManager web browser and without having to install additional software onto your computer. There are no disks to install or keep track of. And, best of all, you can make changes and perform setup functions from any computer on the network—quickly and easily.

NAT IP Address Sharing
Your Modem employs **N**etwork **A**ddress **T**ranslation (NAT). NAT allows your networked computer devices to share a single IP address, saving the cost of adding IP addresses to your Internet service account.

Integrated 10/100 4-Port Switch
The Modem has a built-in, 4-port network switch to allow your wired computers to share printers, data, MP3 files, digital photos and much more. The switch features automatic detection so it will adjust to the speed, half duplex, and full duplex of connected devices. The switch transfers data between computers and the Internet simultaneously without interrupting or consuming resources.

Support for VPN Pass-Through
If you connect to your office network from home using a VPN connection, your Modem will allow your VPN-equipped computer to pass through the Modem and to your office network.

Built-In Dynamic Host Configuration Protocol (DHCP)
Built-In Dynamic Host Configuration Protocol (DHCP) makes for easiest possible networking. The DHCP server automatically assigns IP addresses to each computer, eliminating the need for a complicated networking setup.

Integrated 802.11g Wireless Access Point
802.11g is an exciting new wireless technology that achieves data rates up to

54Mbps, nearly five times faster than 802.11b.

MAC Address Filtering
For added security, you can create a list of MAC addresses (unique client identifiers) that are allowed access to your network. Every computer has its own MAC address. Enter these MAC addresses into a list using the Web-Based Advanced User Interface, and you can control access to your network.

USING YOUR MODEM

Package Contents

- EV-DO Modem
- User Manual
- Quick Installation Guide
- RJ-45 Ethernet Networking Cable
- RJ-11 phone cable for VoIP
- Power Supply and Battery

Modem Interfaces

The Modem is designed to be placed on a desktop or wall mounted. All ports at the front of the Modem are for better organization and utility. The LED indicators are easily visible on the top of the Modem to provide you with information about network activity and status.
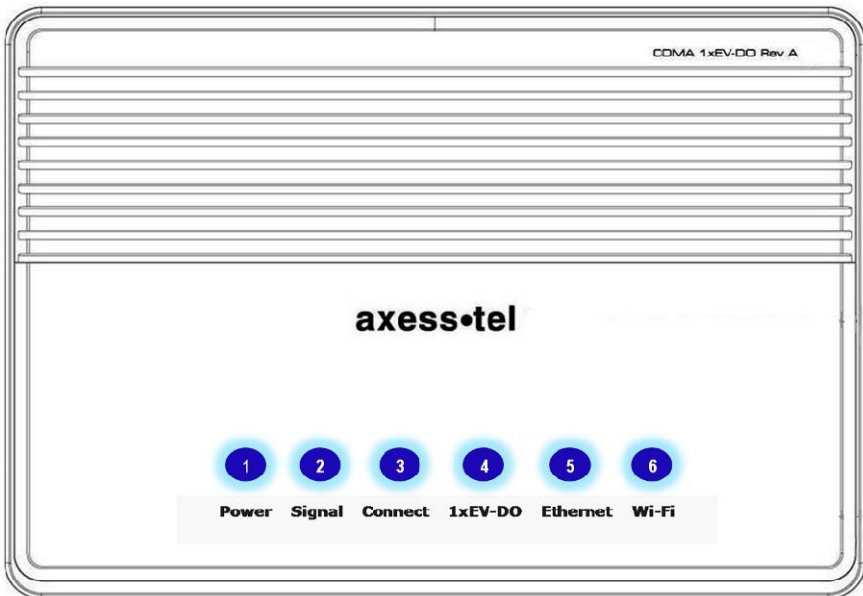
1. Power LED

LED Color	AC Mode	Battery Mode
OFF	No Power	No Power
Blue Solid	Adaptor Connected	Fully Charged
Blue Blinking	In Charging	-
Violet	-	Half Level Charged
Red	-	Low Level Charged

2. Signal Strength LED
This LED indicates the signal strength of the CDMA network serving the Modem.

LED Color	Status
OFF	No CDMA signal
Blue	Strongest Level
Violet	Medium Level
Red	Low Level

3. Connect LED
This LED informs you that the Modem is connected to a wireless network and that your user ID and password have been validated.

LED Color	Status
OFF	No connection
Blue Blinking	Voice Message Waiting
Blue	- In Data use: Connected - In VoIP call use: In use

4. 1x/EV-DO LED
This LED informs you that the Modem is tuned to a 1x or EV-DO wireless network. Your Modem is programmed to search and use an EV-DO network. If an EV-DO network is unavailable, the Modem will search for a 1x network. Please check with your Service Provider for your Modem's default setting.

| LED Color	Status
OFF	1x
Blue	EV-DO

5. Ethernet LED
This LED indicates that computers are connected to your Modem via the RJ-45 ports. A blinking LED indicates activities of data passing through.

LED Color	Status
OFF	No Ethernet connection
Blue Solid	At least one RJ-45 port is in use
Blue Blinking	Data is passing through the ports

6. Wi-Fi LED
This LED indicates that your Modem has Wi-Fi capability. When the LED is blinking, it indicates activities of data passing through.

LED Color	Status
OFF	No Wi-Fi
Blue Solid	Wi-Fi network within Modem activated
Blue Blinking	Data passing through Wi-Fi

[7]   [8]   [9]   [10]
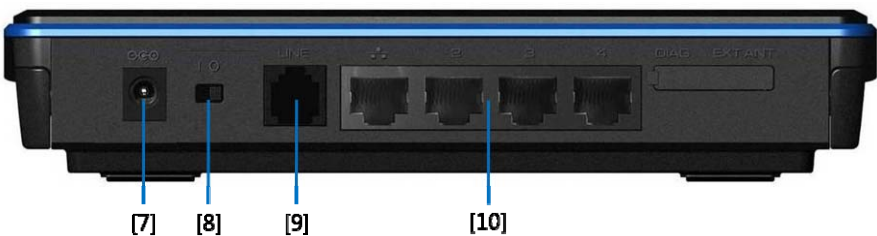
7. Power Jack
Connect the Axesstel standard 9V DC power Adaptor to this jack.

8. Power On/Off Switch

9. RJ-11 Connection Port (<u>MV500S and MV500V Series only</u>)
 ** Please refer to the function table on page 38 to understand derivative products.
 This port allows your Modem to connect to a wired landline phone for Voice
 Calls.

10. Connections to Computers (Wired Computer Ports)
 Connect your wired (non-wireless) computers to these ports. These ports are
 RJ-45, 10/100 auto-negotiation, auto up-linking ports for standard UTP
 category 5 or 6 Ethernet cable. The ports are labeled 1 through 4.

11. Rechargeable Battery Installation
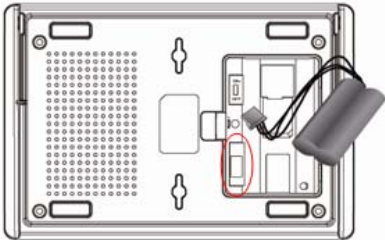
    ①   Disconnect the power supply.
    ②   Open the battery cover on the bottom.
    ③   Connect the DC power cable to the unit marked above.
    ④   Close the battery cover
    ⑤   Connect the power supply to charge as needed.

  ⚠   *Do not incinerate, disassemble, short or expose to heat.*
        Use designated charger only.
        If battery is replaced by an incorrect type, there will be a risk of explosion.

System Components

Your Modem is part of a communication system offering a wide range of
capabilities. To enable these capabilities, you must have every component of the

system. Here's what you need:

Host Computing Device

Your notebook or PC hosts the Modem and runs the communication software. The communication software includes your web browser or email application and Connection Manager, the Modem-enabling software.

You may also have other software on your computer that can be used wirelessly with the Modem. Such software can include file transfer applications (FTP), chat or instant messaging, VPN (Virtual Private Network) client and client software for a corporate server application.

The Modem

The Modem provides your computer with a connection to the CDMA wireless network. Every CDMA network operates on one of three radio frequency bands: 450MHz, 800MHz or 1900MHz. The Modem is available in four configurations: MV510 single-band 450MHz, MV520 single-band 800MHz, MV530 single-band 1900MHz and MV540 dual-band 800/1900MHz.

CDMA Service Provider Account

Services providers are companies that operate CDMA networks and provide access to these networks. To use the Modem, you must have an account with a CDMA service provider.

Each service provider has its own pricing options. Flat rate accounts allow you to purchase a maximum number of minutes of network usage for a fixed monthly fee. Other types of accounts charge for network usage by the minute or by the amount of data transmitted.

Your account may include a variety of other services such as SMS messaging.

Each Modem is designed for use with a particular service provider. Thus, your Modem operates with specific radio channels and enables services specific to your service provider.

Activation is the process of setting up your account. It involves action by your

service provider and over-the-network configuration of your Modem.

The CDMA Wireless Network

This is the worldwide infrastructure providing the radio coverage that allows you to stay connected. Composed of radio towers and a variety of network switches, routers and servers, the network is an interconnection of many service providers.

Note: More information about CDMA networks is available on the CDMA Development Group web site, www.cdg.org.

CDMA networks operate in frequency bands supported by the Modem throughout North America and parts of Latin America, Europe, Middle East, Africa and Asia-Pacific. Each service provider operates a network covering a limited geographical area within the overall CDMA coverage area.

Note: Some service providers have coverage maps on their web sites.

CONNECTING AND CONFIGURING YOUR MODEM

Each Modem is factory built for use with a particular service provider. Thus, each Modem is set to use particular radio channels and to enable services specific to a provider.

Once your Modem has been activated with the network, connect your computer to the Modem using the provided Ethernet (RJ-45) cable. You are now ready to use the Internet.

Step 1 │ Setting Up the Hardware

1.1 Make sure your Modem is not connected to any power source and all LEDs are OFF.

1.2 How to setup the Antennas for maximized performance:

① CDMA antennas are located on both sides of the Modem.

② Pull both antennas out until you hear clicking.

⚠ *Antennas can be broken if you do not pull them out until clicking and if you try to force them up.*

③ Make sure the antennas are upright as shown in picture 4 above. (vertically upright position)

④ Antennas rotate up to 90 degrees vertically and horizontally.

⚠ *Antennas can be broken if you force them to more than 90 degrees from upright position.*

1.3 Locate the CAT-5 Ethernet cable that is included with your Modem. Plug one end of this cable into ANY Ethernet port on your Modem. Plug the other end of the cable into the networking port on your computer.

1.4 Locate the power supply that is included with your Modem. Plug the power supply's small connector into the power port on the Modem. Plug the power

supply into an empty power outlet.

1.5   Switch on the Modem. Look at the Power LED on top of the Modem and make sure the lights are ON.

1.6   Wait for a few seconds while the Modem searches for network service. When the Modem finds a suitable network, the Signal LED turns to Red, Violet or Blue depending on the strength of the acquired signal. Refer to the Signal Strength LED description for more details.

Step 2 │ Preparing Your PC

Your Modem's Ethernet is configured with DHCP by default. This means that IP address of your PC is automatically assigned by the Modem. Make sure that your PC has the correct TCP/IP setting for its "Local Area Connection" by following the steps below.

2.1 Click "Start", select "Connect To", Scroll down to "Show all connections" and left-click it.

2.2 Right-click "Local Area Connection", Scroll down to "Properties" and left-click it.

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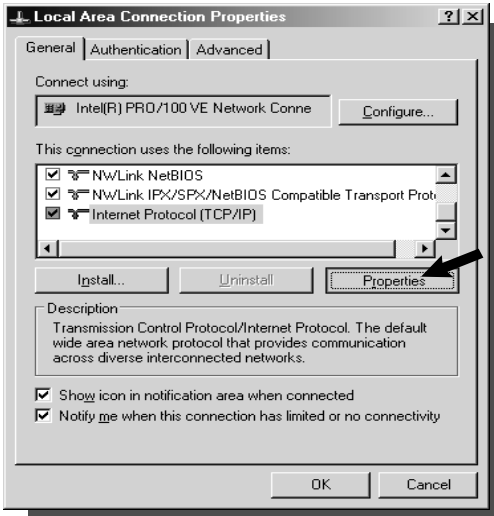
2.3 Select "Internet Protocol (TCP/IP)". Press the "Properties" button.

If no TCP/IP line is listed, you will need to install TCP/IP before continuing.
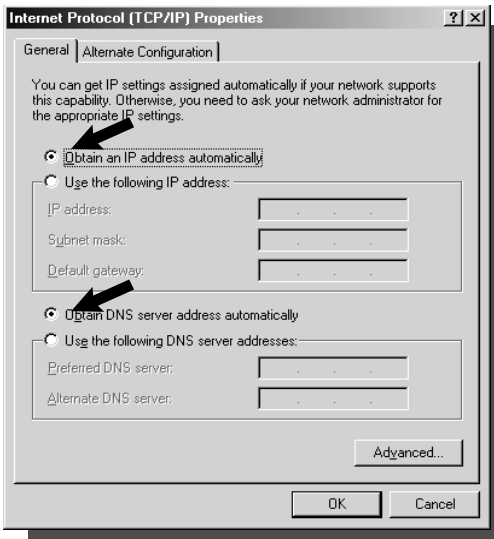
2.4 Check "Obtain an IP address automatically"

2.5 Check "Obtain DNS Server address automatically"

2.6 Click "Ok" to exit "Properties".

2.7 If asked to re-start the PC, click "YES".

CONNECTION USING ETHERNET (RJ-45) PORTS

If your Modem has been activated with the network, you can connect to the Internet through the Ethernet (RJ-45) ports.

Configuring Your PC

The Modem's Ethernet is configured with DHCP by default. This means that the EV-DO Modem automatically assigns an IP address to your PC. If your PC is unable to receive the IP address and prevented from making an Internet connection, follow these steps to check the TCP/IP setting of your "Local Area Connection."

1. Click the "Start" button, select "Settings" and then select Control Panel. Click on the "Network and Internet Connection" icon.
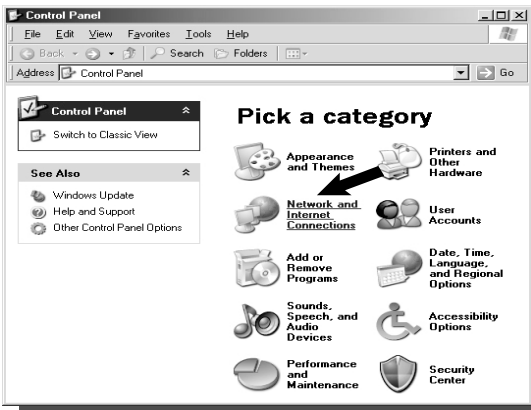
NOTE: DHCP stands for **D**ynamic **H**ost **C**onfiguration **P**rotocol. Your Modem has a built-in DHCP server. The DHCP server will automatically assign an IP address to the computers on the LAN. Be sure to set each client PC's TCP/IP settings to "obtain an IP address automatically."

1   Double-click on "Network Connection".

2   Go to "Local Area Connection Properties".
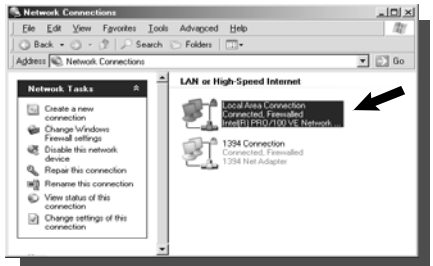
3   Select the "Internet protocol (TCP/IP)". If a TCP/IP line is not listed,
    you will need to install TCP/IP before continuing.

4   Press the "Properties" button.
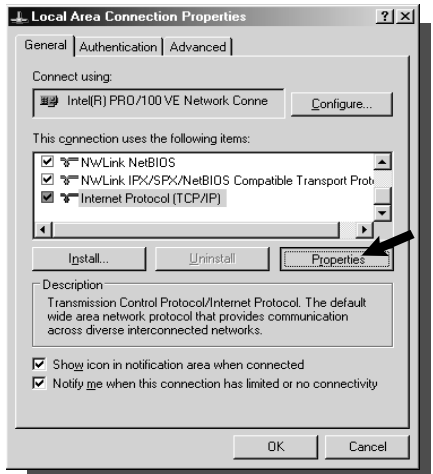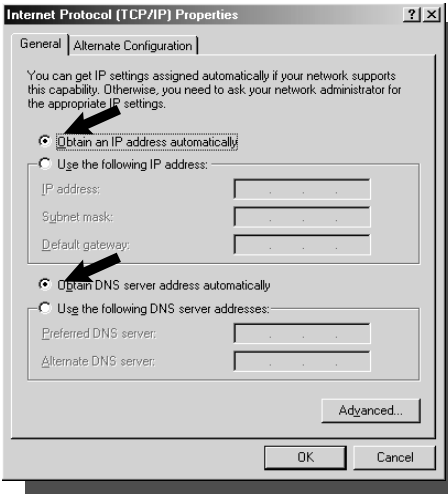
5   Check "Obtain an IP address automatically".

6   Check "Obtain DNS Server address automatically".

7   Click "OK" to exit "Properties".

8   If asked to re-start the PC, click "YES".

Configuring an Ethernet Connection

Your EV-DO Modem provides an embedded Web-based Management Utility (**WEB GUI**) to help you configure it using your web browser. Follow these steps to configure your Modem's Ethernet connection.
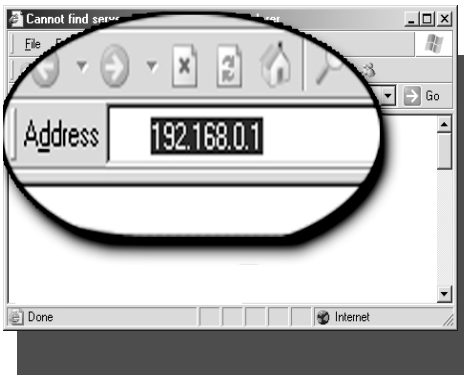
1. Open your web browser and enter 192.168.0.1 in the address bar.
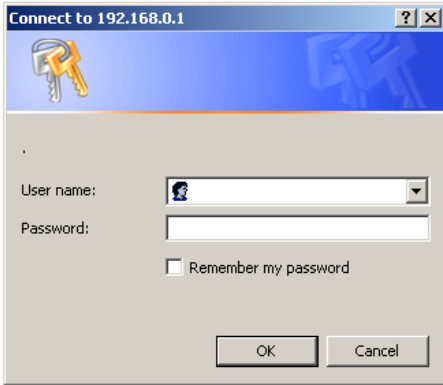
2. A pop-up window will appear. When prompted for User name and password, enter the following name and password.

> User Name: admin
> Password: admin

* If you have changed the user name and the password, enter the new user name and password.

3. After entering the correct user name and password, the pop-up window will change to a web-based window.

Follow the steps in the chapter "Web Manager User Interface", "Step 2 Navigate web-based UI", to complete the Modem's Ethernet and Wi-Fi settings.

WEB MANAGER USER INTERFACE (WEB GUI)

The Web Manager User Interface is a web-based tool that you can use to setup the Modem. You can also use it to manage advanced functions of your Modem. From the User Interface, you can perform these tasks:

- View the Modem's current settings and status

- Configure the Modem's router and VoIP account log-in function to connect to your Service Provider using the settings that they provided you

- Change current network settings such as the internal IP address, IP address pool, DHCP settings and more

- Set the Modem's firewall to work with specific applications (port forwarding)

- Setup security features such as client restrictions, MAC address filtering, WEP and WPA

- Enable the DMZ feature for a single computer on your network

- Change the Modem's internal password

- Reboot the Modem

- Back up your configuration settings

- Reset the Modem's default settings

- Update the Modem's firmware

Before you can use the Advanced User Interface, you will need to have a **User Name** and **Password** for your Modem. Please contact your Service Provider to obtain a User Name and Password.

Navigate WEB GUI

The Basic Settings page is the first page you will see when you access the Web-based Advanced User Interface (WEB GUI). This page presents a quick view of the Modem's login setting. All advanced setup pages can be reached from this page.
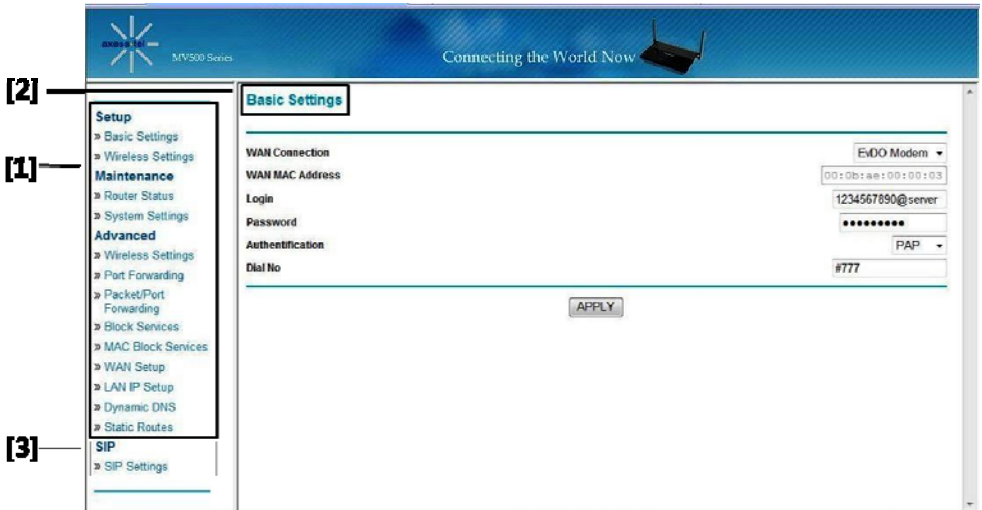
[1] Quick Navigation Links
You can go directly to any of the Modem's UI pages by clicking directly on these links. For ease in finding a particular setting, the links are divided into logical categories and grouped by tabs.

[2] Page Name
The page you are on can be identified by its page name. This User Manual sometimes refers to pages by name. For example, "Advanced > LAN IP Setup" refers to the "LAN IP Setup" page.

[3] SIP Settings
In this page, you can set SIP accounts and control for VoIP call functions.

Basic Settings

Clicking on the header of the "Basic Settings" tab will take you to the "Basic Settings" header page. From this page, the Modem's basic settings can be modified. These settings include:

- WAN Connection. A drop-down menu allows users to change the providers. The default value is EV-DO.
- MAC (Media Access Control) Address.
- PPP Login ID and password (if applicable)
- Authentication Method. A drop-down menu allows users to change the authentication method. The default value is PAP.
- Dial No.

Configuring the Wireless Network Settings

Clicking on the header of the "Wireless Settings" tab will take you to the "Wireless Settings" header page. From this page, the Modem's Wi-Fi router wireless radio can be enabled or disabled (the default setting is enabled). There are options that allow you to make changes to the Wi-Fi wireless network settings.

Changing the Wireless Network Name (SSID)

To identify your wireless network, SSID (Service Set Identifier) is used. The default SSID of your Modem is "AxessMV500". You can change the SSID to anything you want, or you can leave it unchanged. If there are other wireless networks operating in your area, you will want to make sure that your SSID is unique (does not match the SSID of another wireless network in your area). To change the SSID, type in the SSID name that you want to use in the "SSID" field and click "Apply Changes.". The change is immediate. If you make a change to the SSID, your wireless-equipped computers may also need to be reconfigured to be able to connect to your new network name. Refer to the documentation of your wireless network adapter for information on making this change.

Using the Wireless Mode Switch

Your Modem can operate in three different wireless modes: "g and b", "g only", and "b only".

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g and b Mode

In this mode, the Modem is simultaneously compatible with 802.11b and 802.11g wireless clients. This is the factory default mode and ensures successful operation with all Wi-Fi compatible devices. If you have a mix of 802.11b and 802.11g clients in your network, we recommend setting the Modem to g and b mode. This setting should only be changed if you have a specific reason to do so.

g only Mode

g only mode works only with 802.11g clients. This mode is recommended if you want to prevent 802.11b clients from accessing your network. To switch modes, select the desired mode from the "Wireless Mode" drop-down box. Then, click "Apply Changes".

b only Mode

We recommend you DO NOT use this mode unless you have a very specific reason to do so. This mode exists only to solve unique problems that may occur with some 802.11b client adapters and is NOT necessary for interoperability of 802.11g and 802.11b standards.

When to use b only Mode

In some cases, older 802.11b clients may not be compatible with 802.11g wireless. These adapters tend to be of inferior design and may use older drivers or technology. Switching to this mode can solve problems that sometimes occur with these clients. If you suspect that you are using a client adapter that falls into this category of adapters, first check with the adapter vendor to see if there is a driver update. If no driver update is available, switching to b only mode may fix your problem. Please note that switching to b only mode will decrease 802.11g performance.

Changing the Wireless Channel

There are a number of operating channels you can choose from. In the United States and Australia, there are 11 channels. In the United Kingdom and most of Europe, there are 13 channels. In a small number of other countries, there are other channel requirements. Your Modem is configured to operate on the proper channels for the country you reside in. The default channel is 11 (unless you are in a country that does not allow channel 11). The channel can be

changed, if necessary. If there are other wireless networks operating in your area, your network should be set to operate on a channel that is different from the other wireless networks. For best performance, use a channel that is at least five channels away from other wireless networks. For example, if another network is operating on channel 11, then set your network to channel 6 or below. To change the channel, select the channel from the drop-down list and click "Apply Changes". The change is immediate.

Frequency channel only 1-11 channels are available in USA, other channels will be disabled by software

Securing Your Wi-Fi® Network

Here are a few different ways you can maximize the security of your wireless network and protect your data from prying eyes and ears. This section is intended for the home, home office, and small office user. At the time of this User Manual's publication, two encryption methods are available.

WEP (Wired Equivalent Privacy)

WEP (Wired Equivalent Privacy) is a common protocol that adds security to all Wi-Fi compliant wireless products. WEP was designed to give wireless networks the equivalent level of privacy protection as a comparable wired network.

WPA (Wi-Fi Protected Access) – PSK

WPA (Wi-Fi Protected Access) is a Wi-Fi standard that was designed to improve upon the security features of WEP. To use WPA security, the drivers and software of your wireless equipment must be upgraded to support WPA. These updates will be found on the wireless vendor's web site. There are two types of WPA security, WPA-PSK (no server) and WPA (with radius server).

WPA-PSK (no server) uses a pre-shared key as the network key. A network key is a password that is between eight and 63 characters long. It can be a combination of letters, numbers or characters. Each client uses the same network key to access the network. Typically, this mode is used in a home environment.

WPA 2(Wi-Fi Protected Access 2) – PSK

WPA 2 is an advanced version of WPA and is complying with an advanced

protocol implementing full standard. Especially, it introduces a new AES-based algorithm, CCMP, which is considered completely secure. MV500 Series support WPA2 personal mode or personal use.

Maintenance: Router Status

Clicking on the header of the "Router Status" tab will take you to the "Router Status" header page. A quick description of the functions can be found here.

IP Address
The "IP address" is the internal IP address of the Modem. The default IP address is "192.168.0.1". To access the web-based Advanced User Interface, type this IP address into the address bar of your browser. This address can be changed, if necessary.

Subnet Mask

This is a unique, advanced feature of your Axesstel Modem. It is possible to change the subnet mask, if necessary. Do NOT make changes to the subnet mask unless you have a specific reason to do so. The default setting is "255.255.255.0".

On this page, you can see all settings associated with the Modem's router network functions. These functions include:

- Account Name and Firmware Version

- WAN Port: MAC Address, IP Address, DHCP choice, IP Subnet Mask and Domain Name Server Address

- LAN Port: MAC Address, IP Address, DHCP choice and IP Subnet Mask

- Wireless Port *: SSID, Region, Channel, Mode, Wireless AP status (ON/OFF) and Broadcast Name status (ON/OFF)

- SIP Status: Showing the SIP registration status. If SIP is not registered, "No Service" is displayed.

Click the button "Show Statistic" to see a graphic display of the router performance.

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Port Forwarding

Clicking on the "Port Forwarding"   sub-heading in the "Advanced" list will take you to the "Port Forwarding" page. "Port Forwarding" allows you to route incoming (Internet) calls for services such as a web server (port 80), FTP server (Port 21), or other applications through your router to your internal network. Because your internal computers are protected by a firewall, computers outside your network (other computers connected to the Internet) cannot "see" or reach your computers. A list of common applications has been provided in case you need to configure the "Port Forwarding" function for a specific application. If you do, contact the application vendor to find out which port settings you need.
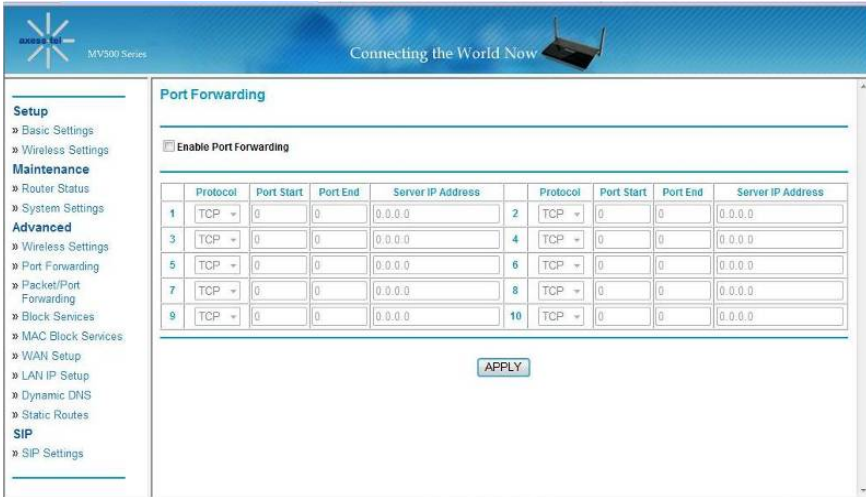
Note: This advanced feature should be employed only by technically skilled users.

Enable Port Forwarding

To activate Port Forwarding, check the "Enable Port Forwarding" box.

Entering Settings into Port Forwarding

To enter settings into Port Forwarding, first select the appropriate service from the "Protocol" drop-down box. You will see a list of common applications (FTP, HTTP, Net-Meeting, and more). Select an application, enter the IP address and port number for your internal server into the provided spaces, and click "Apply". Note: Opening ports in your firewall can pose a security risk. You can enable and disable settings very quickly. It is recommended that you disable these settings when you are not using a specific application.

Packet/Port Forwarding

This feature helps forward a Packet from a specific port to a specific host in your

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LAN by changing the port number.

Note: This advanced feature should be employed only by technically skilled users.

Enable Packet/Port Forwarding

To activate this feature, check the "Enable Packet/Port Forwarding" box.

Block Services

Your Modem can be configured to restrict access to the Internet, email or other network services at specific days and times. Restrictions can be set for a single computer, a range of computers or multiple computers.

For example, to restrict Internet access for a single computer, enter the IP address of the computer you wish to restrict access to in the IP field. Next, enter "80" in both port fields. Select "Block".

MAC Block Services

The MAC address filter is a powerful security feature that allows you to specify which computers are allowed on your network. Any computer attempting to access your network must be specified in the filter list or it will be denied access. When you enable this feature, you must enter the MAC address of each client (computer) on your network in order to allow network access to each.

MAC Services Blocking can be set in three modes.

- **Disable**. In this mode, there are no restrictions on any devices connected to the Modem, whether through Wi-Fi or Ethernet ports

- **Deny**. In this mode, the service table shows the client MAC address being blocked by the Modem.

- **Allow.** In this mode, the service table shows the client MAC address allowed by the Modem.

To modify the service table (add, change address or remove clients), enter the correct value and click "Apply".

Note: You will not be able to delete the MAC address of the computer you are using to access the Router's administrative functions.

WAN Setup

Clicking on the "WAN Setup" sub-heading in the "Advanced" list will take you to the "WAN Setup" page. This is where you can enable or disable the Modem's DMZ, Internet Ping, and HTTP-related items.

Enabling the Modem's Demilitarized Zone (DMZ)

The DMZ feature allows you to specify one computer on your internal network to be placed outside the firewall. This may be necessary if the firewall is causing problems with a game, video conferencing, or other application. Use this feature on a temporary basis. The computer in the DMZ is NOT protected from hacker attacks.

WAN Ping Blocking

Computer hackers use what is known as "pinging" to find potential victims on the Internet. By pinging a specific IP address and receiving a response, a hacker can determine that something of interest might be at that IP address. You can set your Modem so it will not respond to a hacker's ICMP ping, increasing the level of security provided by your Modem.

If it is necessary to turn on the ping response, select "Respond to Ping on Internet Port" and click "Apply". The Modem will respond to an ICMP ping.

Respond to HTTP on Internet Port

You can access Web GUI through WAN by clicking the "**Respond to HTTP on Internet Port"** box. The Modem will respond to an HTTP ping.

Respond to HTTP on Wi-Fi

You can access Web GUI through Wi-Fi mode by clicking the "Respond to

HTTP on Wi-Fi" box. The factory default setting is "Off".

Enable Auto Ping

Regular pinging between a base transceiver station (BTS) and your Modem is

necessary to maintain an IP session connection.   To turn on this feature, check the "Enable Auto Ping" box and enter into the "IP Address or URL" box the Destination IP information of the equipment that will be sending the pings.

LAN IP Setup

Clicking on the header of the "LAN IP Setup" tab will take you to its header page.

LAN TCP/IP Setup

All settings for the internal LAN setup of the Router can be viewed and changed here.

IP Address: The "IP address" is the internal IP address of the Modem. The default IP address is "192.168.2.1". To access the Web Manager User Interface, type this IP address into the address bar of your browser. This address can be changed, if necessary. To change the IP address, type in the new IP address and click "Apply". The IP address you choose should be a non-routable IP.

Examples of a non-routable IP are:
192.168.x.x (where x is anything between 0 and 255), and10.x.x.x (where x is

anything between 0 and 255).

Subnet Mask: There is no need to change the subnet mask. This is a unique, advanced feature of your Modem. It is possible to change the subnet mask, if necessary. Do NOT make changes to the subnet mask unless you have a specific reason to do so. The default setting is "255.255.255.0".

Use Router as DHCP Server

The DHCP server function makes setting up a network very easy by assigning IP addresses to each computer on the network automatically. The DHCP server can be turned OFF, if necessary. To do so, you must manually set a static IP address for each computer on your network. To turn off the DHCP server, de-select "Use Router As DHCP Server" and click "Apply".

Dynamic DNS

Dynamic DNS (Domain Name Service) is a method for Dynamic IP users to notify a domain name server to change, in real time (ad-hoc) the active DNS configuration of its configured hostnames, addresses, or other information stored in DNS. Your Modem supports Dynamic DNS.

To use Dynamic DNS, check the "Use a Dynamic DNS Service" box and complete the following items.

Service Provider: Select the appropriate Service Provider from the drop-down menu and input the Host Name, User Name, and your Password. This information should be the same information that you registered with your Dynamic DNS service provider.

Use Wildcards: Click "Use Wildcards" to enable wildcards for this host or keep the box unchecked to disable wildcards for this host. The wildcard alias *.yourhost.ourdomain.ext is the same address as yourhost.ourdomain.ext.

Static Route

A static IP address connection type is less common than other connection types. If your ISP uses static IP addressing, you will need your IP address, subnet mask and ISP gateway address. This information is available from your ISP or on the paperwork that your ISP gave you. Type in your information and click "Apply".

IP Address: Provided by your ISP. Enter your IP address here.
Subnet Mask: Provided by your ISP. Enter your subnet mask here.
ISP Gateway Address: Provided by your ISP. Enter the ISP gateway address here.

WAN Maintenance: UIM PIN Information

Note: This feature is applicable to RUIM version Modem only.

Setting a PIN code allows you to lock the Modem's UIM card, protecting your

Modem against unauthorized use. Check the "PIN Lock" box to activate this feature.
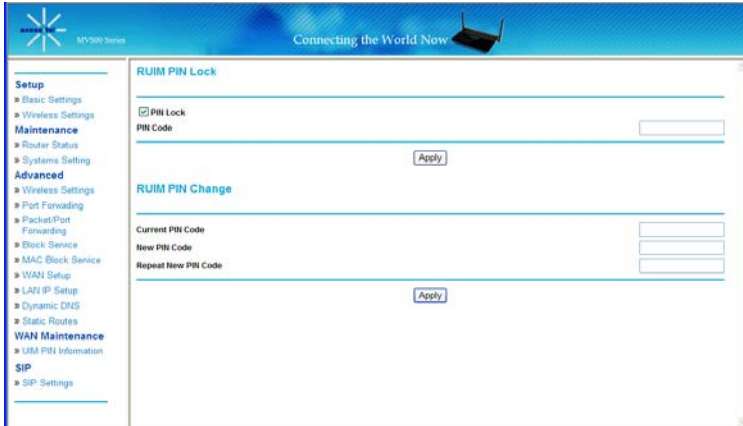
RUIM PIN Lock: Create a 4-digit PIN code, enter it into the "PIN Code" column box, and click "Apply".

Once you set a RUIM PIN code, your Modem will ask you to enter this code into the Web GUI's UIM PIN Information screen. You will see the screen shown below when your Modem boots up for internet use.

Enter your PIN Code in the column box and click "Apply"..
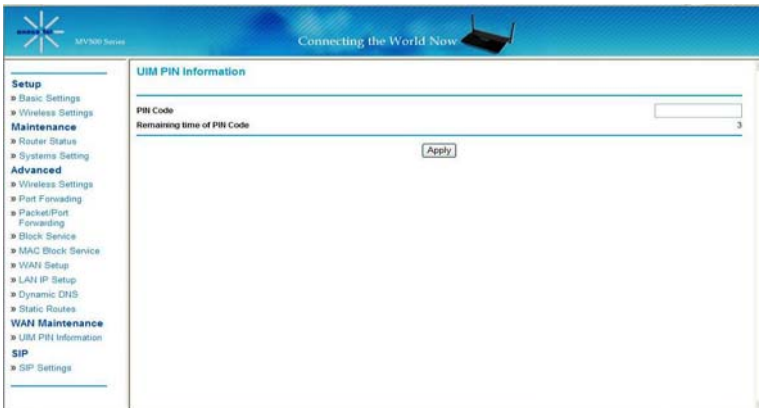
RUIM PIN Change: To change your PIN Lock code:

1. Enter your current 4-digit PIN Code in the "Current PIN Code" box.
2. Enter a new 4-digit PIN Code in the "New PIN Code" box.
3. Re-enter your new PIN Code in the "Repeat New PIN Code" box.
4. Click the "Apply" button

Note: If you forget or lose your PIN code and enter an incorrect PIN 5 times in succession, you must enter the PUK code to unlock the Modem. Contact your service provider for help.

SIP (VoIP Call Settings)

SIP Settings

Phone No.: The default phone number that appears in this box is based on your ISP's setting value. If you do not see a number in the Phone No. box on

your screen, contact your ISP and ask for the correct number..

User Domain: The default User Domain that appears in this box is based on your ISP's setting value. If you do not see a User Domain from the box, contact your ISP and ask for the correct User Domain.

User Name: The default User Name that appears in this box is based on your ISP's setting value. If you do not see a User Name from the box, contact your ISP and ask for the correct User Name.

Password: The default Password that appears in this box is based on your ISP's setting value. If you do not see a Password from the box, contact your ISP and ask for the correct Password.

  SIP On: Check the box to turn the VoIP feature on. Uncheck the box to turn it off.

VoIP CALL FUNCTIONS

Note: Your Modem's CDMA and VoIP accounts must be properly
activated for VoIP call functions to work.

To setup your wired, landline phone for VoIP calling, plug the phone's RJ-11 cable into the "Line" port on your Modem as shown below.
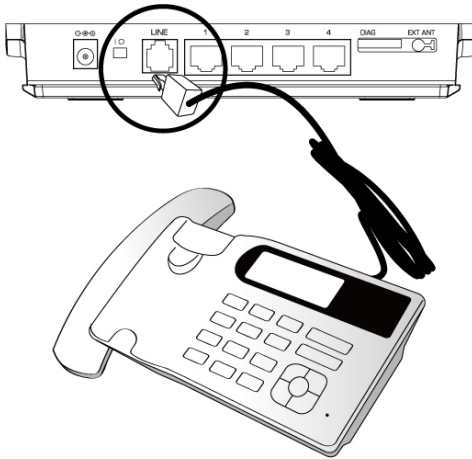
PLACING VOICE CALLS

1. Turn on the Modem.

2. Lift the handset from your phone.

3. When you hear a dial tone, use the phone's

   numeric keypad to dial the desired phone number, and then quickly press the

   <#> button to launch the call.

4. Wait several seconds while the Modem places the call.

Note: Be sure to press <#> immediately after entering a phone number. Pressing

<#> activates the modem to place the call..This sequence could be varying up to your service provider's dial plan and Digit Map.

5. When your call is answered, begin the conversation.

6. To disconnect a call, replace the handset on the phone.

RECEIVING VOICE CALLS

The telephone(s) connected to the Modem ring when receiving an incoming call.

1. Lift the telephone's handset to answer a call.
2. To disconnect a call, replace the handset on the phone.

Note 1: For the phone to ring, its ringer must be enabled.

Note 2: To answer an incoming call while you are holding the receiver, press any key on the phone's numeric keypad.

CALL WAITING

The Call Waiting feature alerts you to a call that's coming in while you are talking on the phone with someone else. Contact your service provider to activate or deactivate Call Waiting feature.

1. When Call Waiting is activated, a beep in your earpiece alerts you to a second incoming call.
2. Press the hook quickly to answer the second call.
3. Press the hook again to return to the first call.

THREE-WAY CALLING

Your Modem supports Three-Way Calling which enables you to set up a phone conversation between yourself and two additional phone users.. Contact your service provider to activate or deactivate Three-way Calling service. To initiate a three-way call:

1. Place the first call.
2. When the first call is answered, press the phone hook quickly and place the second call.
3. When the second call is answered, lightly press the hook to start your three-way call.

CALL HOLDING

In the event of Call Waiting, the Call Holding feature allows you to put an active call on hold while you answer a second incoming call by pressing Hook Switch on the phone.

Note: The Call Holding features could not be available according to your service provider's network condition.

VOICE MAIL SERVICE

When a voice message is received, your Modem's "Connect" LED blinks in Blue along with single time indicating sound. After you check your voice messages, the LED turns off. Contact your Service Provider to activate or deactivate voice mail service.

Clearing Voice Mail:
After calling the voice mail access number, please follow the instruction to set-up, listen and delete voice messages.

SETTING CALLER ID

If the phone connected to your Modem is Caller ID-enabled, you can set the Modem to display a caller's identification number or name on your phone's LCD display. To set Caller ID through the Modem:

1. Lift the handset from your phone.
2. Press <*><*><2><1><0><#> to disable Caller ID. [Disable or Enable? Why explaining disabling first?]
3. Press <*><*><2><1><1><#> to enable DTMF Standard Type.
4. Press <*><*><2><1><2><#> to enable FSK (Bellcore) Type.

Note: The default setting for Caller ID is DTMF Type.

TROUBLESHOOTING

Problem:

- I am unable to connect to the Internet. The Modem's "Signal" light is on and the "Connect" light is off.

Solution:

If you cannot connect to the Internet while the "Signal" light is on and the "Connect" light is off, it could be that your connection type may not match the ISP's connection.

- If you have a "static IP address" connection, your ISP must assign you the IP address, subnet mask and gateway address. Please refer to the section entitled "Alternate Setup Method" for details on changing this setting.

- If you are still unable to access the Internet after verifying these settings, please contact your Service Provider Technical Support.

Problem:

- I am unable to connect to the Internet. The Modem's "Signal" light is on and the "Connect" light is on.

Solution:

If the "Signal" light is on and the "Connect" light is on but you are unable to access the Internet, it could be that third-party firewall software was installed on the computer attempting to access the Internet. Examples of third-party firewall software are ZoneAlarm, BlackICE PC Protection, McAfee Personal Firewall and Norton Personal Firewall.

If you do have firewall software installed on your computer, please make sure that you properly configured it. You can determine if the firewall software is preventing Internet access by temporarily turning it off. If the firewall is disabled and Internet access works properly, you will need to change the firewall settings to function properly when it is turned on.

Please refer to the manual provided by the publisher of your firewall software for instructions on configuring the firewall to allow Internet access.

If you are still unable to access the Internet after disabling any firewall software, please contact your Service Provider Technical Support.

Problem:

I can't connect to the Internet wirelessly from my computer but it works if I use the Ethernet cable.

Solution:

If you are unable to connect to the Internet from a wireless computer, please do the following:

1. Look at the lights on your Modem. Your Modem's lights should be as follows:

   - The "Power" light should be on.
   - The "Connected" light should be on and not blinking.
   - The "WAN" light should be on or blinking.

2. Open your wireless utility software by clicking on the icon in the system tray at the bottom, right-hand corner of your screen.

3. The exact window that opens will vary depending on the model of wireless card you have. However, each utility should have a list of "Available Networks" which are the wireless networks your Modem can connect to.

Problem:

My wireless network performance is inconsistent.

Data transfer is sometimes slow.
Signal strength is poor.
I am having difficulty establishing and/or maintaining a Virtual Private Network (VPN) connection.

Solution:

Because wireless technology is radio-based connectivity and throughput performance between devices decreases as the distance between devices increases. Signal degradation is also caused by obstructions such as walls

and metal appliances (metal is generally the worst culprit). As a result, the typical indoor range of your wireless devices will be from 100 to 200 feet. Note, too, that connection speed may decrease as you move farther away from the Modem or network access point.

To determine if wireless issues are related to range, temporarily move your computer, if possible, five to 10 feet away from the Modem.

Changing the Wireless Channel - Depending on local wireless traffic and interference, switching the wireless channel of your network can improve performance and reliability. Your Modem's default channel is channel 11. You may choose from several other channels, depending on your region (see "Changing the Wireless Channel" on page 41 for instructions on how to choose other channels).

Limiting the Wireless Transmit Rate - Limiting the wireless transmit rate can help improve your network's maximum wireless range and connection stability. Most wireless cards have the ability to limit the transmission rate. To change this property, go to the Windows Control Panel, open "Network Connections" and double-click on your wireless card's connection. In the "Properties" dialog, select the "Configure" button on the "General" tab (Windows 98 users will have to select the wireless card in the list box and then click "Properties"). Choose the "Advanced" tab and select the rate property. Wireless client cards are usually set to automatically adjust the wireless transmit rate for you, but doing so can cause periodic disconnects when the wireless signal is too weak. As a rule, slower transmission rates are more stable.

Experiment with different connection rates until you find the best one for your environment. Note that all available transmission rates should be acceptable for browsing the Internet. For more assistance, see your wireless card's user manual.

Technical Specifications

CDMA Channel Bandwidth	1.23 MHz	
RX/TX Frequency Range	450 MHz A block: RX 462.5 ~ 467.5Mhz / TX 452.5 ~ 457.5Mhz	
	450 MHz H block: RX 461.3 ~ 465.8Mhz / TX 451.3 ~ 455.8Mhz	
	450 MHz L block: RX 420.0 ~ 424.5Mhz / TX 410.0 ~ 414.5Mhz	
	800 MHz: RX 869.64 ~ 893.37 MHz / TX 824.64 ~ 848.37 MHz	
	1900 MHz: RX 1930 ~ 1990 MHz / TX 1850 ~ 1910 MHz	
Wi-Fi Operating Frequency	2.4 GHz ~ 2.4835 GHz ISM band	
VoIP Voice Interface	1 port (RJ-11)	
External Appearance (mm)	127.50 (L) x 185.00 (W) x 36.10 (H)	
Weight	435g (Gateway with battery)	
Temperature of Operation	-10 °C ~ +60 °C	
Temperature of Storage	-30 °C ~ +70 °C	
Relative Humidity	5% ~ 90%	
Adapter	Input: AC 90~280 V 47~63 Hz	
Battery (Li-Ion Rechargeable Battery 2100 mAh)	Standby Time	4 Hrs
	Operation Time	150 Min
	VoIP Talk Time	2 Hrs
	Charging Time	8 Hrs
Wall Mounting	Yes	

Note: Battery Operation Time mentioned above may be varying up to network condition.

Modem Functions by Model

Model	Frequency	Ethernet	Wi-Fi	VoIP	RUIM	1x Voice
MV510	450	**O**	**O**	-	**O**	-
MV520	800	**O**	**O**	-	**O**	-
MV530	1900	**O**	**O**	-	**O**	-
MV540	800/1900	**O**	**O**	-	**O**	-
MV510S	450	**O**	**O**	-	**O**	**O**
MV520S	800	**O**	**O**	-	**O**	**O**
MV530S	1900	**O**	**O**	-	**O**	**O**
MV540S	800/1900	**O**	**O**	-	**O**	**O**
MV510V	450	**O**	**O**	**O**	**O**	-
MV520V	800	**O**	**O**	**O**	**O**	-
MV530V	1900	**O**	**O**	**O**	**O**	-
MV540V	800/1900	**O**	**O**	**O**	**O**	-

Certifications

CE: MV510VR

FCC: TBD

RoHS: MV510VR

Appendix A: Glossary

1X	One Times Radio Transmission Technology (the "one times" refers to the frequency spectrum). Supports Internet connections with data rates up to 153 Kbps. Actual speed depends on network conditions. Compare to 1x EV-DO.
1x-EVDO	A high speed standard for cellular packet data communications.
	Rev. A supports Internet connections with data rates up to 3.1 Mbps (on the downlink from the network) and 1.8 Mbps (on the uplink to the network).
	Rev. 0 supports Internet connections with data rates up to 2.4 Mbps (on the downlink from the network) and 153 Kbps (on the uplink to the network).
	Average data rates: for Rev. A, 600–1300 Kbps (on downlink) and 300–400 Kbps (on uplink); for Rev. 0, 400–700 Kbps (on downlink) and 40-80 Kbps (on uplink).
	Actual speed depends on network conditions. Compare to 1X.
bps	Bits Per Second—Actual data speed over a transmission medium.
CDMA	Code Division Multiple Access—A wideband spread spectrum technique used in digital cellular, personal communications services and other wireless networks. Wide channels (1.25 MHz) are obtained through spread spectrum transmissions, allowing many active users to share the same channel. Each user is assigned a unique digital code which differentiates individual conversations on the same channel.
CDMA 1X	Also known as 1X, this is a high-speed standard for CDMA cellular communications.
Dormant	The packet data connection keeps the logical PPP session open while the underlying physical link (radio channel) is released. When traffic resumes, a radio channel is reacquired and the original PPP session also resumes.

DNS   Domain Name Service

ESN   Electronic Serial Number—The unique first-generation serial number assigned to the Modem for cellular network use. Compare to MEID.

FCC   Federal Communications Commission. The U.S. federal agency that is responsible for interstate and foreign communications. The FCC regulates commercial and private radio spectrum management, sets rates for communications services, determines standards for equipment and controls broadcast licensing. Consult www.fcc.gov.

Firmware   Software stored in flash memory. These essential programs (CDMA Firmware and Router Firmware) remain even when the system is turned off. Firmware is easier to change than hardware but more permanent than software stored on disks.

Host   1. A computer that uses a Modem or similar device to answer a calling computer.

                     2. A source or destination in the communication network.

                     3. A computer that contains data or files to be accessed by client computers. Also known as a server.

IS   Interim Standard—After receiving industry consensus, the TIA forwards the standard to ANSI for approval.

IS-95   The standard for CDMA.

Kbps   Kilobits per second—Actually 1000, not 1024, as used in computer memory size measurements of kilobytes.

LAN   Local Area Network.

LED   Light Emitting Diode—A semiconductor diode that emits visible or infrared light.

MEID   Mobile Equipment Identifier—The unique second-generation serial number assigned to the Modem for cellular network use. Compare to ESN.

MHz   Megahertz—One million cycles per second.

Mbps   Megabits Per Second.

Packet	A short, fixed-length block of data including a header that is transmitted as a unit in a communication network.
PCS	Personal Communications Services—A cellular communication infrastructure that uses a different frequency range than AMPS.
Roaming	The ability for a cellular subscriber to utilize voice, data and other cellular services of a visited network when traveling outside the geographical coverage area of the subscriber's home network.
RUIM	Removable User Identity Module. Allows CDMA users to change phones and keep their phone numbers by simply swapping the cards.
SMS	Short Message Services—A feature that allows users of a wireless device on a wireless network to receive or transmit short, electronic alphanumeric messages (usually up to 160 characters).
System tray	Typically located in the lower-right corner of your screen.
SIP	Session Initiation Protocol
TIA	Telecommunications Industry Association—A standards-setting trade organization whose members provide communications and information technology products, systems, distribution services and professional services in the United States and around the world. Consult www.tiaonline.org.
VPN	Virtual Private Network
VoIP	Voice Over Internet Protocol

<15.105>

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one 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.

—Consult the dealer or an experienced radio/TV technician for help.

Caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC ID: PH7MV540V

	Warning: Exposure to Radio Frequency Radiation The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 20 cm during normal operation. The gain of the antenna for Cellular band must not exceed 0.28 dBi. The gain of the antenna for PCS band must not exceed 2.66 dBi.