

PRELIMINARY

MERLIN PC CARD MODEM

REFERENCE GUIDE/USER MANUAL

Warning:

This product is not to be used in any environment where radio frequency equipment is prohibited or restricted in its use. This includes aircraft/airports, hospitals, and other sensitive electronic areas.

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been certified 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 residential situation. 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 the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, you are encouraged to try to correct the interference by one or more of the following measures;

- Reorient or relocate the receiving antenna of the affected television, radio, or cordless telephone.
- 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/television technician for additional suggestions.

ICES-003 STATEMENT

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Novatel Technologies Inc Liability

Novatel Wireless, Inc. assumes no responsibility for any damage or loss resulting from the use of its products. Novatel Wireless assumes no responsibility for any loss or claims by third parties, which may arise through the use of its products. Novatel Wireless assumes no responsibility for any damage or loss caused by the deletion or loss of data as a result of malfunctions or repairs. Be sure to make backup copies of all important data on other media to protect against data loss.

The information disclosed herein is the exclusive property of Novatel Wireless and no part of this publication may be reproduced or transmitted in any form or by any means including electronic storage, reproduction, execution or transmission without the prior written consent of Novatel Wireless. The information contained in this document is

subject to change without notice and should not be construed as a commitment by Novatel Wireless unless such commitment is expressly given in a covering document.

HOW TO INSTALL YOUR MERLIN

PCMCIA/ PC Card Slots in Computers

Some computers come with special slots into which peripheral hardware can be inserted. Known as PC cards or PCMCIA cards, this hardware can be of four distinct sizes. These sizes are known as Type I, Type II, Type III, and Type IV cards. Different computers will have a different number, type, and locations for their slots. Your new MERLIN is a type II card.

Inserting the MERLIN into Your Computer

Your MERLIN is inserted into the type II slot of your computer. The card can only be inserted in one way for it to function correctly. Please review any user documentation that was included with your computer on the proper insertion of PC cards.

When inserting your MERLIN take care not to press down, bend, or unduly distort the antenna as this could damage the antenna and prevent the proper functioning of your PC card. The card should be inserted with the logo label facing upwards (assuming your computer is laying flat and is face up), with the pin connectors pointing into the computer, and firmly pushed into the slot until the NRM-6831 fits snugly and completely into the slot.

Because some computers may use a variety of proprietary Type II slot openings the best method to insert the NRM-6831 is the one recommended by your computer manufacturer. Do not try to force the card into the slot, or attempt to twist it out if it gets stuck.

USING YOUR MERLIN

Your MERLIN is designed to work with the following computer operating systems:

- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Windows NT
- Microsoft Windows 2000
- Microsoft Windows CE

Please be sure to read the instructions that are specific to the operating system of your computer.

When You Can Insert and Remove the MERLIN

You can remove your MERLIN during normal computer operation without affecting the performance of your computer if it is not in use. It is not recommended to remove the MERLIN when it is in operation or when any software application is using it. You can always insert and remove the MERLIN when your computer is either shut off or when no software application is making use of it. Your MERLIN should be treated with the same care as other PCMCIA cards that you may have for your computer.

If you are using Windows 95, you can insert, remove, or swap any PC cards when your computer is on. You can do this by the following steps:

Start->Settings->Control Panel->PC Card

- The PC Card Properties window will appear
- Select the default, Socket Status tab.
- Select the card slot your PC card is inserted into or select the specific PC card by its displayed name.
- Click the stop button.

You can now remove the MERLIN. After you have removed the MERLIN from the slot you can insert a different card in its place. The computer will automatically identify the new card when it is inserted.

The alternate, and easier method, is to double click on the PC Card icon in the System Tray, displayed in the bottom left hand corner of your computer screen. This will bring up the PC Card Properties window.

How Your Computer "Sees" the MERLIN

Windows 95/98/CE

Your operating system, Windows 95/98/CE, automatically "sees" the MERLIN as soon as it is inserted into the computer when the computer is running. As with all PCMCIA cards, this identification of the modem is automatic. You do not need to do anything for your computer to recognize the MERLIN or the software that is loaded for it.

Windows NT

If your computer's operating system is Windows NT, then it will not automatically recognize the presence of any PC cards when the computer is running. For any PC cards to be recognized under Windows NT (any version), you will need to insert the card into the computer before it is started, then start the computer. During the start-up procedure, Windows NT will search for connected hardware and make that hardware available to use by the installed software. This procedure also applies to removing any PC cards when the computer is running. PC cards cannot be hot swapped under Windows NT. It will be necessary to shut down the computer and insert the card, and then restart the computer for the computer to be able to recognize the presence of the new card.

The alternative to rebooting or shutting down your computer under Windows NT is to install a type of utility software program known as an "enabler" for PC cards. This allows for the "hot swapping" of PC cards, removing and inserting different PC cards when the computer is running. You may have an enabler installed in your computer if it came with the Windows NT operating system preinstalled.

Please review the Windows NT Readme included on the CDROM for further information about enablers for Windows NT.

How to Align the Antenna

Your MERLIN comes with an integrated antenna. It should be aligned vertically to achieve the best signal. Care should be taken when moving the antenna. Although it is built on a three way pivoting mounting, you should never force the antenna in a direction that would put undue pressure on either it or its mounting.

TECHNICAL SPECIFICATIONS AND PERFORMANCE MEASURES OF THE MODEM

Host Interface: PC Card (PCMCIA) Type II

Air Interface: CDPD Version 1.1

Dimensions: Standard TYPE II PC Card

RF Output Power: 600 mW Maximum

Frequency Range:

Transmitting 824-849 MHz

Receiving 869-894 MHz

Antenna Connector: 50 Ohm MMCX

Antenna: Fixed Folding Monopole

Operating Temp: 0° to 55° C

Storage Temp: -20° to 65° C

Humidity: 95% Relative Humidity (Non-Condensing)

Power Consumption:

Voltage: 5 Volts from PC Card slot

Current: Receive Mode: 140 mA Maximum

Transmit Burst: 850 mA Maximum

Sleep Mode: 20 mA Maximum

Air Interface Data Rate:

19,200 kbps Full Duplex¹

Modem Protocols Supported:

At Command Set

Built-in TCP/IP, PPP, UDP, and SLIP

Regulatory Compliance:

FCC Title 47, Part 15(B), and Part 22

Industry Canada RSS-118

Air Interface Data encryption:

RSA 128-bit RC-4 Symmetric Stream Cipher

Operating Systems Supported:

Microsoft Windows 95

Microsoft Windows 98

Microsoft Windows NT

Microsoft Windows 2000

Microsoft Windows CE

¹ Overhead Requirements for CDPD Air Interface reduces effective user data throughput to a 12.5 kbps maximum.

Introduction to Wireless Configuration Wizard and the Wireless Modem Manager

Your MERLIN comes included with two specific software application programs, the Wireless Configuration Wizard and the Wireless Modem Manager. Both applications can be found on the CD-ROM that was included with your MERLIN.

The Wireless Configuration Wizard is used to quickly guide you through the subscription process and configure your MERLIN. Using a Windows "Wizard" to prompt you through a series of configuration steps, the Wireless Configuration Wizard will have you quickly using your new MERLIN.

The Wireless Modem Manager is the software that you will use most often to:

- Start your MERLIN
- Connect to the Internet
- Monitor your MERLIN's status and connection
- Make any configuration changes

The Wireless Modem Manager also includes diagnostics capabilities to monitor and adjust your MERLIN's settings for connecting to your Wireless IP Service Provider.

Both the Wireless Configuration Wizard and the Wireless Modem Manager feature built-in context sensitive help. The help feature of both programs can be accessed from within the programs themselves or they can be referenced independently of the programs from the CD-ROM. You will find the stand-alone versions of the help on the CD-ROM folder for your specific operating system.

Installing the Software

Both the Wireless Configuration Wizard and the Wireless Modem Manager software applications can be found on the PC Card Modem CD-ROM.

Running the setup for the you specific operating system, either Windows 95/98/NT, or Windows CE will install the both the Wireless Configuration Wizard and the Wireless Modem Manager to your computer.

The stand-alone version of the help files can also be copied over to your computer.

Locating the Specific Software for your Operating System

On the included CD-ROM you will find the folder named after your computer's operating system.

Open this folder and double click on the Setup icon. This will load the required software directly onto your computer.

The software will be installed into a folder on your computer. You can choose the default location or a location of your own. The software can be accessed from the Windows START button in the same way as any other software. The programs are located in the Novatel Wireless program group.

If you are using the Windows CE operating system the setup will install the necessary files from your desktop computer directly to your Windows CE computer. There is no need to use the Microsoft Windows CE Services Application Manager to transfer the files to your Windows CE computer as this is automated in the setup and install routines of the software.

TIP: You can also create a quick launch icon on the task bar to launch either the Wireless Configuration Wizard or Wireless Modem Manager. From the Start button select the Programs->Novatel Wireless-> PC Modem. Click and hold down the mouse on either Wireless Modem Manager or Wireless Configuration Wizard and drag the program down to the task bar. This will place the program icon in the task bar for quick launching and remove it from the Start menu.

Running the Wireless Configuration Wizard

The Wireless Configuration Wizard will automatically start when software setup is completed. It can be run again at a later date by selecting it from the Novatel Wireless program group.

What the Wireless Configuration Wizard Does

The Wireless Modem Manager guides you through a number of steps, prompting you along the way to enter specific information. The eight steps are:

- Step 1: Welcome – The Configuration Wizard will guide through the steps that are required to configure your MERLIN for use on your computer.
- Step 2: Check System Configuration –The Configuration Wizard will check your computer for the presence of required specific software and hardware.
- Step 3: Select Wireless Internet Provider – You will be prompted to choose which provider you wish to subscribe to.
- Step 4: Provide Information - You should contact the Wireless IP Service Provider that you chose in Step 3.
- Step 5: Enter Configuration Information - You will need to enter the information that your Wireless IP Service Provider will have given you when you subscribed to their service.
- Step 6: Register Your Wireless IP Modem - The Wireless Configuration Wizard will attempt to connect with the Wireless IP network of your chosen Wireless IP Service Provider.
- Step 7: Verify Your DNS - In this step the Wireless Configuration Wizard will confirm the DNS addresses that you entered are valid.
- Step 8: Setup Complete - This Wireless Configuration Wizard verifies that your MERLIN has registered onto the network. It will also prompt you to launch the Wireless Modem Manager to connect you to the Internet.

Every step of the Wireless Configuration Wizard includes context sensitive on-line help.

Running the Wireless Modem Manager

The Wireless Modem Manager can be started by selecting it from the Novatel Wireless program group in the Start->Programs of the Start Button. You can also start it by clicking on a quick start icon on the Windows Task Bar on the desktop.

TIP: To create a quick launch icon on the task bar to launch the Wireless Modem Manager do the following. From the Start button select the Programs->Novatel Wireless-> PC Modem. Click and hold down the mouse on the Wireless Modem Manager and drag the program down to the task bar. This will place the program icon in the task bar for quick launching and remove it from the Start menu.

To be able to use your MERLIN you must first start the Wireless Modem Manager to have your MERLIN register on to the network before you can start an application that uses it for connectivity.

Once you start the Wireless Modem Manager and your MERLIN successfully registers you will see an icon displayed in the system tray on the Windows Task Bar. The icon looks like a small PC card. It will be green if registration was successful and red if registration was unsuccessful.

TIP: Clicking on the icon in the system tray will maximize the Wireless Modem Manager, if it is already minimized, and will minimize the Wireless Modem Manager if it already maximized.

What the Wireless Modem Manager Does

It also allows for detailed diagnostics of your MERLIN's performance and the network connections.

The Wireless Modem Manager is composed of eight detailed screens showing the real-time performance of your MERLIN. The eight screens are:

- **Status Bar:** The Status Bar displays your MERLIN's current status, channel information and the current carrier.
- **Usage:** From this window you can monitor the amount of data that your MERLIN has transferred
- **Diagnostics:** This window shows a variety of information that is used in the diagnoses of potential problems with your MERLIN's network connection or the software settings you are using to connect you to your Wireless IP Service Provider service.
- **Advanced Diagnostics:** This window shows detailed information for diagnosing network and connectivity problems by customer support representatives of your Wireless IP Service Provider and Novatel Wireless.
- **Ping:** This window allows you to "Ping" or send a test message to a network to see if it can respond and is available for you to communicate with.
- **Configuration:** The Configuration window displays the controls that you use to make the network connections to your Wireless IP Service Provider. If you relocate to an area where you need to access a different network you will need to enter new settings for a new Wireless IP Service Provider so as to be able to access the new network.
- **Provider:** This window allows you to select the Wireless IP Service providers that you wish to scan for service when you are "roaming" for a channel.
- **Channel Setup:** This window shows the list of channels that your modem will scan to use for service.

Every tab of the Wireless Configuration Wizard includes context sensitive on-line help.

Using Software Applications With Your Modem

Your MERLIN's connection to the Internet allows you to use a wide variety of software. Such things as "surfing the web", sending and receiving email, teleconferencing, chat, and remote connections to corporate networks are all possible applications that can be run with your MERLIN.

It is recommended that your MERLIN be started before an application. Although it is not necessary to start your MERLIN before starting an application, you might receive an error message because the application could not connect to the Internet.

Once your MERLIN is started and it displays the message "Ready", then you can start your application and it will automatically connect remotely to the Internet. You will also see an icon in the Windows system tray. This is the Wireless Modem Manager (a green PC Card with an antenna) and the Dial-Up Networking session (two computer screens blinking green), indicating that the modem has registered onto a wireless network and is ready to be used with your applications.

Power Saving Tips

The power consumption of any wireless modem varies depending on its pattern of use. Your MERLIN is designed with state-of-the-art power saving features to maximize your computer's battery life. Understanding the power use of your MERLIN can help to conserve battery life.

- **Transmitting:** The modem consumes the greatest amount of power when transmitting. Some wireless data technologies require that the modem transmitter run continuously during any data transaction. This is not true for your MERLIN, which operates using Wireless IP technology. Your MERLIN transmitter only operates when it needs to send data or acknowledge data to the network. For most applications, this results in substantial power savings. For example, you may be "connected" and browsing the Internet with your MERLIN, but the transmitter will not turn on unless the modem needs to send data to a website.
- **Sleep Mode:** Your MERLIN is equipped with an advanced power saving feature called sleep mode. Sleep mode allows your MERLIN to shut off almost all power consumption during times when it is registered with the Wireless IP network, but has no data to send or receive. In this mode, your MERLIN checks for incoming data periodically (about once per minute) instead of continuously. If your MERLIN senses that there is data to send or receive, it will resume normal operation. Sleep mode will only operate when your MERLIN is registered on the network, so it must be in a region with Wireless IP coverage. Sleep mode is normally enabled on your MERLIN, but can be disabled using the Wireless Modem Manager.
- **Power Down:** The most power savings can be achieved by powering off the MERLIN when not in use. Some computers will turn off the PC Card socket power when you close the Wireless Modem Manager, but with other computers it may be necessary to remove the MERLIN from the socket. Consult the user documentation for your computer to learn how it manages the power to the PC Card.

Troubleshooting Introduction

You will find a troubleshooting guide on the CD-ROM that is included with your MERLIN. The troubleshooting guide includes the on-line context sensitive help for both the Wireless Configuration Wizard and the Wireless Modem Manager as stand alone versions that can be viewed without running either of the two applications.

Also included in the CD-ROM troubleshooting guide are a list of resources of CDPD service providers, Windows NT PCMCIA card enablers, and the Novatel Wireless website

- Where to find the troubleshooting/FAQ on the CD-ROM/website
- Coverage/roaming/service providers issues
- Where to find further information on the CD-ROM/website

NOVATEL WIRELESS CUSTOMER SUPPORT

How to Contact Customer Support

Technical and Customer Support can be contact toll-free by telephone at 1-888-888-9231 or by using our general support email address at support@novatelwireless.com

What Information They Might Need From You

The information that you will need to provide customer support is as follows:

- Your computer operating system (Win 98, NT, CE).
- The version of the operating system (e.g.: Windows 95 Version B, NT 4, and CE 2.1).
- The Electronic Identification number of the modem.
- The version of the modem manager software.

What Customer Support Can Do For You

Customer support can assist you in the following ways:

- Technical support to help you get your get the modem operating.
- General information on all of Novatel Wireless Technology products and services.
- Direct sales of Novatel Wireless Technology products and services.
- Information on 3rd party solutions and vendors.
- CDPD service activation.