

APPENDIX H
OWNERS MANUAL

**RangelAN802 PC Card Adapter
Model 8400**



Beta User's Guide

1. Introduction

Congratulations on your purchase of the RangeLAN802 8400, Proxim's PC Card Wireless LAN Adapter which conforms to the IEEE 802.11 wireless standard. As with all members of the RangeLAN802 family, RangeLAN802 8400 is a long range, high performance, wireless LAN adapter card with minimal power requirements. Setting it apart from the competition is its durability and the capability for you to choose the antenna best suited to your host and application.

RangeLAN802 8400 was designed to be a "plug-and-play" product. It provides a choice of antennas designed and manufactured by Proxim for long range and ease of use. Plug the adapter into your portable computer's PCMCIA Type II slot, attach an antenna, and load the driver. Then you're connected without wires to your network's existing electronic mail, printers, software applications, and other network resources. That's how simple it is!

The RangeLAN802 8400 may be placed in NetWare clients, Windows for Workgroups nodes, Windows 95 machines, or any network operating system nodes that supports ODI or NDIS drivers. Your RangeLAN802 8400 wireless clients "look" like standard network nodes to the operating system.

Today, Proxim is the leading supplier of spread spectrum radio networking technology for local area environments. Proxim's unmatched spread spectrum networking expertise, combined with the company's extensive experience serving the communications needs of the mobile computing user, are some of the reasons why Proxim's RangeLAN2 product line has won the PC Magazine "Editor's Choice" award, and has been chosen by more OEM integrators than all other alternatives combined.

The RangeLAN802 Family

RangeLAN802 8400 is part of a family of high-performance products that provides a complete wireless networking solution.

- ☐ **RangeLAN802 8520** is a wireless access point which allows for easy expandability of your wireless network by increasing range and facilitating mobility applications. It operates at the Data Link level (layer 2) of the OSI model, providing protocol-independent access for RangeLAN802 computer users into existing wired Ethernet LANs.

The Product Package

Each RangeLAN802 8400 adapter package comes with:

- ☐ A standard PC Card (PCMCIA Type II).
- ☐ An antenna unit (a flexible snap-on antenna and/or a tethered dipole antenna.) These antennas work interchangeably with the 8400 PC Card, and may be ordered with the card or separately.
- ☐ Two 3 1/2" disks -- one containing DOS drivers; one containing Windows 95 and NT drivers and utilities.
- ☐ This RangeLAN802 User's Guide.

If any of these items are missing or damaged, please contact your reseller or Proxim Technical Support.

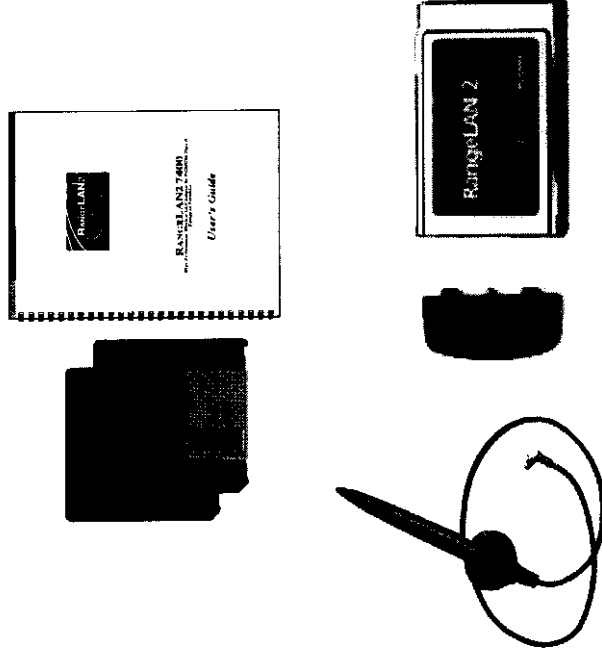


Figure 1
RangeLAN802 8400 Components

RangeLAN802 8400 LEDs

There are two LEDs on the outer edge of the RangeLAN802 8400 card.

- ☐ The yellow LED lights to indicate the card is transmitting.
- ☐ The green LED lights whenever the card detects another unit that is transmitting.

System Requirements

To begin using your RangeLAN802 8400 adapter, you need the following minimum requirements:

- ☐ A computer with a PCMCIA Type II slot. The computer must have either Card and Socket Services V 2.x or 3.0 or an Intel 82365SL PCMCIA controller chip.
- ☐ Windows 95, Windows NT or a network operating system that uses ODI or NDIS drivers like NetWare 3.1X/4.X, Personal NetWare, or Windows for Workgroups.
- ☐ At least one other RangeLAN802 product installed on the network.

2. DOS Installation

If you are unfamiliar with installing PC Card hardware, turn to Chapter 4. Chapter 2 describes the installation of the DOS driver software and utilities once the hardware is installed.

Installing Drivers Using the NOS Installation

In general, most NOS's have an installation procedure. A general overview of NOS installation procedures using the RangeLAN802 drivers is described here.

At some point in the installation, the user is asked to pick from a list of network interface cards. Look for an "OEM-supplied" option which will allow you to supply a diskette with the RangeLAN802 software drivers. The RangeLAN802 driver to be installed is usually either RL802PCM.COM or RL2PCM.DOS. RL802PCM.COM is a DOS ODI driver. RL802PCM.DOS is a DOS real-mode NDIS 2 driver.

If the installation procedure does not have an "OEM-supplied" option, choose a network interface card from the given list. This card's ODI or NDIS driver will then be installed. After installation, you will need to manually search for all instances of this driver and replace them with either RL802PCM.COM if an ODI driver was installed or RL802PCM.DOS if an NDIS driver was installed. Additionally, you will need to replace the installed driver's configuration with the RangeLAN802 options in the ASCII-editable NET.CFG or PROTOCOL.INI file for the ODI or NDIS driver respectively.

Setting Parameters for ODI and NDIS Drivers

A sample NET.CFG and PROTOCOL.INI file are listed:

ODI - NET.CFG

LINK DRIVER RL802PCM		
INT	5	Sets Interrupt (IRQ) line to be used. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
PORT	270	Sets the I/O Port Address.
MEM	D000	Sets the PCMCIA CIS memory space.
ESSID	PROXIM	Sets the ESSID for this device.
HOPPING_SET	1	This parameter is only valid when configured to operate in ad-hoc networks. Valid choices are between 1 and 3.
HOPPING_PATTERN	1	This parameter is only valid when configured to operate in ad-hoc networks. Choose between 1 and 26.
POWER_MODE	0	Determines whether or not the unit will use power management. A value of 0 means the unit is continuously awake, and a value of 1 means that the unit is operating in a power-saving mode.

NETWORK_TYPE	1	Determines whether the network will communicate with the infrastructure or to an ad-hoc network. 0 corresponds to ad-hoc, and 1 corresponds to infrastructure.
ROAMING_ALLOWED	1	Determines whether or not the unit will roam between Access Points when configured to operate in an Infrastructure network. 0 corresponds to roaming disabled, and 1 corresponds to roaming enabled.
FRAME_ETHERNET_802.3		Indicates that RangeLAN802 sends Ethernet packets that follow the 802.3 specification.

NDIS - PROTOCOL.INI

[RL802PCM]		
DRIVERNAME=RL802PCM\$		Sets Interrupt (IRQ) line. Valid options are 3, 4, 5, 7, 10, 11, 12, or 15.
INT=5		
PORT=0x270		Sets the I/O Port Address. This Port must match the dip switch setting.
MEMORY_ADDRESS=D000		Sets the PCMCIA CIS memory space.
ESSID=PROXIM		Sets the ESSID for this device.

HOPPING_SET=1

This parameter is only valid when configured to operate in ad-hoc networks. Valid choices are between 1 and 3.

HOPPING_PATTERN=1

This parameter is only valid when configured to operate in ad-hoc networks. Choose between 1 and 26.

POWER_MODE=0

Determines whether or not the unit will use power management. A value of 0 means the unit is continuously awake, and a value of 1 means that the unit is operating in a power-saving mode.

NETWORK_TYPE=1

Determines whether the network will communicate with the infrastructure or to an ad-hoc network. 0 corresponds to ad-hoc, and 1 corresponds to infrastructure.

ROAMING_ALLOWED=1

Determines whether or not the unit will roam between Access Points when configured to operate in an Infrastructure network. 0 corresponds to roaming disabled, and 1 corresponds to roaming enabled.

When the RangeLAN802 8400 card is being used in an ad-hoc network, you will use the parameters Hopping Set and Hopping Pattern.

When the RangeLAN802 8400 card is being used in an infrastructure setting, you do not need to set the Hopping Set or Hopping Pattern parameters. If set, they will be ignored. The card will adopt those parameters from any Access Point to which it associates.

3. Windows 95 and Windows NT Installation

If you are unfamiliar with installing PC Card hardware, turn to Chapter 4. Chapter 3 describes the installation of the Windows 95 and Windows NT driver software and utilities once the hardware is installed.

Installing the Windows 95 Drivers and Tools

The RangeLAN802 Windows 95 driver install just as any other network card driver.

Under Windows 95, the first time you insert the RangeLAN802 8400 PC Card, the New Hardware Found wizard will begin and prompt you for a driver diskette. Insert the driver diskette and follow the on-screen instructions. Reboot your computer when prompted to do so by the New Hardware Found wizard.

If the PC Card hardware is not recognized when the card is inserted for the first time, DO NOT manually install the driver. Instead, check under Device Manager located in the System icon in the Control Panel and look for Unknown Devices or Other Devices with a "?" or "X" next to the description. Remove these devices by highlighting them and clicking the Remove button. They may be causing conflicts with the RangeLAN802 driver.

Close the System window and open the PC Card icon in Control Panel. The PCMCIA slots containing the RangeLAN802 8400 PC Card should report as empty. If the machine believes there is a device in the slot, highlight the entry and click Stop. You will get a dialog box indicating that you may remove the card. Remove the card and reinsert it. Windows 95 should now auto-detect the card and run the New Hardware Found wizard.

Reboot your computer when prompted to do so by the New Hardware Found wizard.

After the computer reboots, the RangeLAN802 Windows 95 driver should be loaded. To confirm that the driver has loaded correctly, open the Device Manager located in the System icon and look for the Proxim RangeLAN802 PC Card Adapter entry listed under the Network adapters category. The card should not have a "?" or "X" next to the description. Double-click on the entry to view the properties for the card. The Device status for the card should read, "This device is working properly."

If the RangeLAN802 PC Card Adapter entry has a "?" or "X" next to the description, then the card did not install properly. Most likely, the card has a resource conflict and is trying to use an Interrupt Level (IRQ), I/O Base Address, or Memory Range which is either already in use or not available for use by the card. Double-click on the Device Manager entry to view the properties for the card. Click on the Resources tab to see what system resources, if any, the card is trying to use. Manually change the resource settings for the card to find available resources which the card can use. See Chapter for more troubleshooting suggestions.

If you already have existing network components installed when loading the RangeLAN802 Windows 95 driver, the 8400 card will bind to the existing networking client and protocols, and add Client for Microsoft Networks, Client for Netware Networks, and the IPX/SPX compatible Protocol, if they are not already loaded. If no network components exist before the RangeLAN802 driver is installed, the driver will add Client for Microsoft Networks, Client for Netware Networks, and the IPX/SPX compatible Protocol.

The installation procedure will also install the RangeLAN802 Utilities and a protocol called RL802API. This protocol is

required for the RangeLAN802 Utilities to run in Windows 95.

The utilities are added to a new folder in the Start Menu/Group called RangeLAN802 utilities. It will contain the RangeLAN802 Site Survey & Configuration Tool and the RangeLAN802 Status Monitor. The RangeLAN802 Status Monitor is also added to the Startup folder, and will be launched each time the operating system starts.

Reinstalling the Windows 95 Driver

If you need to reinstall the Windows 95 driver or install a new version of it, follow these steps:

- ☐ Remove the driver from Control Panel / Network icon.
- ☐ Restart the computer. Insert the RangeLAN802 8400 card into the PCMCIA slot. The New Hardware Found wizard will detect the card and begin the driver installation.
- ☐ Reinstall the driver following the above instructions.
- ☐ Reset the required parameters in Control Panel / Network work.

Installing the Windows NT Drivers and Tools

Since Windows NT is not a plug and play network, the RangeLAN802 8400 card will not be autodetected when first inserted into the PCMCIA slot. Also, because Windows NT configures devices during boot-up, it is important to have the RangeLAN802 8400 card inserted into the PCMCIA slot before the computer is turned on.

To install the driver, go to the Network icon in the Control Panel and choose the Adapter Tab. Click on the Add button, and when prompted, insert the Proxim RangeLAN802 NT driver diskette into the disk drive. Follow the on-screen instructions to complete the installation. Install or configure any other network configuration such as Services or Protocols. Restart your computer when prompted to do so.

After the computer reboots, the RangeLAN802 Windows NT driver should be loaded. To confirm that the driver has loaded correctly, open the PC Card icon in the Control Panel and look for the Proxim RangeLAN802 PC Card Adapter entry. The card should not have an "X" next to the description, and the device status should read: "This device works."

If the RangeLAN802 PC Card Adapter entry has an "X" next to the description or if the device status indicates that the card is not working, then the card did not install properly. Most likely, the card has a resource conflict and is trying to use an Interrupt Level (IRQ), I/O Base Address, or Memory Range which is either already in use or not available for use by the card. Check the Windows NT Diagnostics in the Administrative Tools section of the Start Menu to view the resources currently in use by the computer. Next, click on the Adapters tab of the Network Icon in the Control Panel and view the properties for the RangeLAN802 8400 Card Adapter. Manually change the resource settings for the card to match available resources which the card can use. See Chapter for more troubleshooting suggestions.

The installation procedure will also install the RangeLAN802 Utilities. The utilities are added to a new folder in the Start Menu/Group called RangeLAN802 utilities. It will contain the RangeLAN802 Site Survey & Configuration Tool and the RangeLAN802 Status Monitor. The RangeLAN802 Status

Monitor is also added to the Startup folder, and will be launched each time the operating system starts.

Reinstalling the Windows NT Driver

If you need to reinstall the Windows NT driver or install a new version of it, follow these steps:

- ☐ Remove the device from the Adapters list in the Network icon.
- ☐ Restart the computer with the RangeLAN802 8400 card inserted in the PCMCIA slot.
- ☐ Reinstall the driver following the above instructions.

4. Installing the RangeLAN802 Hardware

This chapter provides guidelines for installing the RangeLAN802 8400 card and antenna. **Install the hardware before installing the network driver software.**

Installing the RangeLAN802 8400 Card

The exact installation procedure for the card varies depending on the model of computer you are using. The computer must have a Type II PCMCIA slot.

Install the RangeLAN802 8400 card by following the instructions in the hardware manual provided with your computer for general installation of PCMCIA Type II cards.

The following figure shows a typical installation of the RangeLAN802 8400 card with the dipole antenna in a notebook computer.

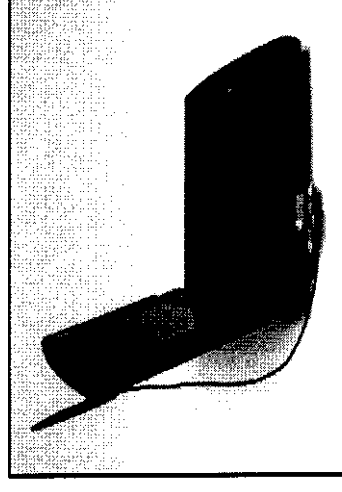


Figure 2
RangeLAN802 8400 Installation with Dipole Antenna

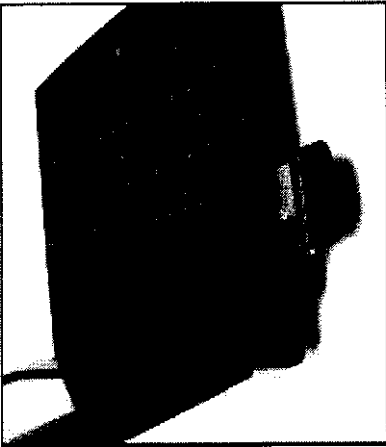


Figure 3
RangeLAN802 8400 Installation with Snap-On Antenna

Attaching the Snap-On Antenna

After you install the RangeLAN802 8400 PC Card in your computer, you can connect the antenna unit to the card. There are two antenna choices for the RangeLAN802 8400 unit.

- ☐ The flexible snap-on antenna plugs directly into the PCMCIA card and extends less than one inch. To attach it, hold down the two buttons on the bottom of the antenna. Make sure the connector and slots are aligned and the Proxim logo is facing up.
- ☐ It may be easier to install the snap-on antenna to the card prior to inserting the card into the computer's slot.



Figure 4
*Pressing the Buttons for the Snap-On Antenna
(Back of Card and Back of Antenna Shown)*



Figure 5
*Pressing the Buttons for the Snap-On Antenna
(Back of Card and Back of Antenna Shown)*

Detaching the Snap-On Antenna

Proxim recommends that you leave the snap-on antenna inserted at all times to increase connector life. If you must remove the antenna, first press the two buttons on the bottom of the antenna.

Attaching the Dipole Antenna

- The connector on the end of the tether plugs into the PCMCIA card. The antenna is supplied with a mounting bracket (or "clip") that is attached to the back of a notebook computer or handheld device. Ensure that the cable is long enough to reach from the PC Card slot to the location in which you plan to mount the antenna.

Before attaching the clip, make sure the laptop cover surface is clean. Clean the surface with a low strength solvent such as Isopropyl Alcohol (rubbing alcohol). Then attach the clip to the laptop with the antenna inserted.

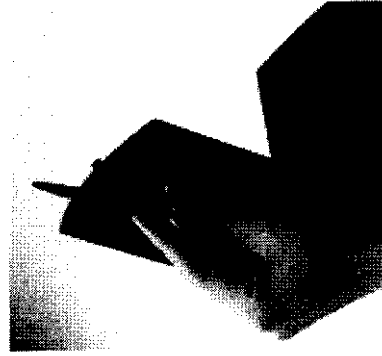


Figure 6
Attaching the Dipole Antenna

The clip should be positioned so that the holder opens towards the outside edge of the computer. After attaching the clip, you should wait at least 24 hours before attempting to insert, remove, or rotate the antenna.



Figure 7
The Clip
(Shown Mounted on a Notebook Cover)

The antenna can be stationed in four positions, so if the clip is diagonal the antenna will not stay in an upright position.

Storage Position of the Dipole Antenna

Rotate the antenna 90 degrees for storage, but be careful not to bend the antenna cable more than 1" radius or you may cause damage.



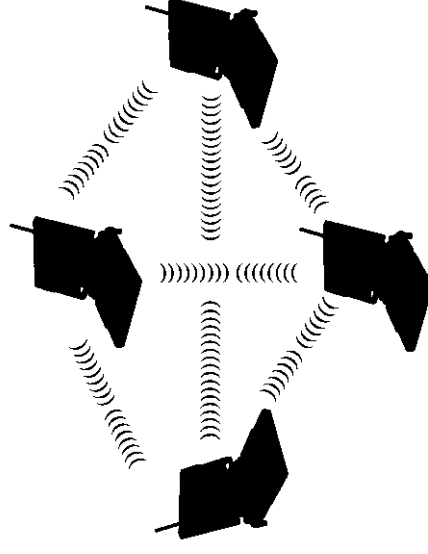
*Figure 8
Rotating the Dipole Antenna for Storage*

5. Wireless Topologies

RangeLAN802 products look and operate similar to Ethernet products. The only difference is that a radio replaces the wire between various nodes. This means that all of your existing applications that operate over Ethernet will work with RangeLAN802 without any special wireless networking software. Wireless products are typically used in several network topologies described in this chapter.

Ad Hoc Networking

With wireless LANs, one or more computers easily establish an ad hoc network when the units are in range of each other. Each computer can dynamically connect and reconnect to the others with no additional configuration, using off-the-shelf peer-to-peer network operating systems. With this capability, many companies are developing applications optimized for ad hoc networks.



*Figure 9
Ad Hoc*

Infrastructure

Many companies have an existing Ethernet or wired LAN infrastructure and want to be able to extend that capability to wireless nodes. This is accomplished by attaching an Access Point to the wired LAN. This allows the wireless clients to access the network resources.

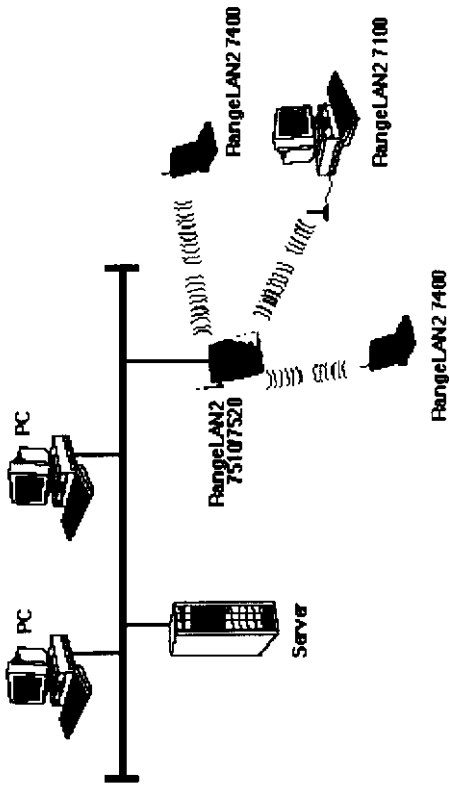


Figure 10
Single AP

For larger environments, RangeLAN802 products support the ability to roam from one wireless cell to another while maintaining the same network connection. The Access Points establish coverage areas or cells similar in concept to those of a cellular phone network. The mobile clients will connect with any Access Point that is within range.

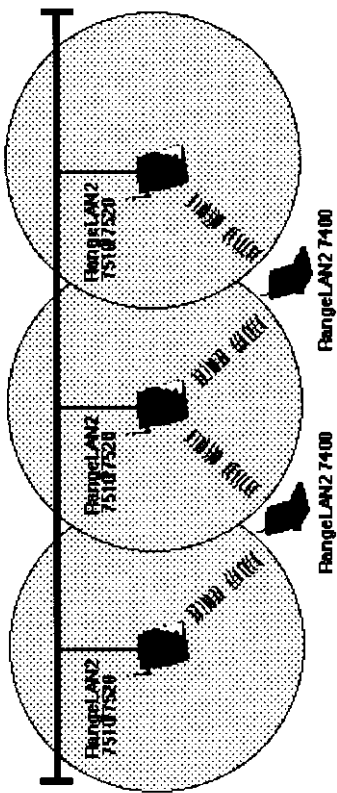


Figure 11
Roaming - Light Overlap

With RangeLAN802's multiple hopping pattern architecture, Access Points can be placed within the same cell area to increase the aggregate throughput supported by the network. In addition, the overlapping cells offer redundancy of coverage required in networks where downtime is not tolerable.

sion range of one RangeLAN802 Access Point, the software automatically polls the other RangeLAN802 Access Point(s) in the same Domain to continue the network connection.

See the previous illustrations for examples of networks set up with RangeLAN802 roaming domains. **Note that the cells must overlap to ensure that there are no gaps in coverage, and that the roaming PC will always have a connection available.**

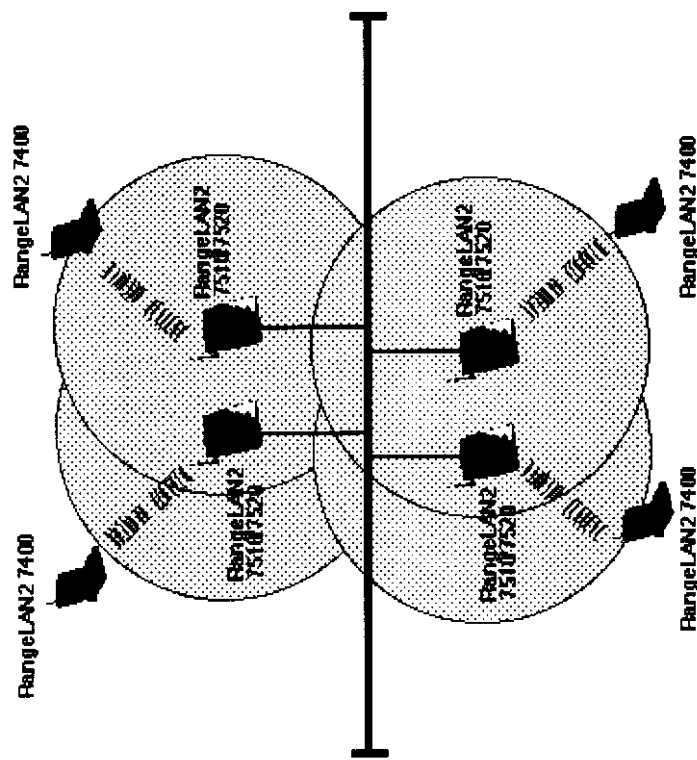


Figure 12
Roaming - Heavy Overlap

Each RangeLAN802 Access Point within a roaming network must be configured with the same Hopping Set but a different Hopping Pattern, but must have the same ESSID. The portable PCs are equipped with RangeLAN802 8400 cards which are also set to the same ESSID. As the portable PC *seamlessly* switches from cell to cell, its network connectivity is preserved.

The user can move freely between the RangeLAN802 Access Points in the network. When the roaming PC leaves the transmis-

Guidelines for Roaming

- ☐ Roaming occurs between RangeLAN802 Access Points.
- ☐ All RangeLAN802 Access Points must have the same ESSID.
- ☐ All RangeLAN802 Access Points have the same Hopping Set but a unique Hopping Pattern.
- ☐ All workstations with RangeLAN802 8400 cards are configured with an ESSID matching the RangeLAN802 Access Points they will roam between.
- ☐ For contiguous coverage, the cells created by RangeLAN802 Access Points must overlap.
- ☐ Roaming will not occur across routers unless using a roaming protocol like Mobile IP or Mobile IPX.

6. Understanding RangeLAN802

This chapter lays the background for understanding the options that can be set when a RangeLAN802 8400 is installed. Refer to Chapters 2 & 3 for instructions on installing the software driver.

RangeLAN802 radios use a radio technology called frequency hopping spread spectrum. This means that the radio signal is constantly moving from one frequency to another while sending packets of data. This hopping technique allows for multiple hopping patterns to be used in the same area and minimizes interference.

RangeLAN802 Software Parameters

ESSID	<i>default=PROXIM</i>
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In order for communications to occur between RangeLAN802 products, each unit must be set to the same ESSID. The ESSID is a string of characters that acts as a means of identification to gain access to a wireless network.

In an Infrastructure environment, the ESSID must match on all communicating RangeLAN802 Access Points and clients involved in a roaming network.

In an Ad Hoc network operating systems without a RangeLAN802 Access Point, each machine must still have a matching ESSID to participate in the network. The ESSID may be up to 32 characters long and the product ships with the default setting of PROXIM.

Hopping Set	<i>default=1</i>
This parameter is only used when the RangeLAN802 card is used in an Ad-Hoc network. Each RangeLAN2 card participating in this network must have the same Hopping Set and Hopping Pattern. If set, this parameter is ignored if the RangeLAN802 card is set to operate in Infrastructure mode. The Hopping Set is a number between 1 and 3 with 1 being the default setting.	
Hopping Pattern	<i>default=1</i>

Like Hopping Set, this parameter is only used when the RangeLAN802 card is used in an Ad-Hoc network. If parameter will be ignored when the RangeLAN802 card is set to operate in Infrastructure mode.

All RangeLAN802 cards which participate in an Ad-Hoc network must be set to the same Hopping Set and Hopping Pattern.

There are 26 Hopping Patterns available with 1 being the default setting. This means that there are 26 different sequences of frequency hops. Each Hopping Pattern is at a different frequency at a different time.

For networks with multiple Access Points (like in a roaming environment), each Access Point should be set to a different Hopping Pattern but to the same Hopping Set to minimize interference.

Power Mode	<i>default=Continuously Awake</i>
The RangeLAN802 card may be configured to operate in Power Mode which will help conserve battery life at the expense of data throughput. This parameter is set so that the RangeLAN802 card will remain continuously awake. The Power Mode settings are as follows: ☐ Continuously Awake = 0 ☐ Power Mode = 1	
Network Type	<i>default=Infrastructure</i>

This parameter allows you to configure the type of network that the RangeLAN802 card will use; either Infrastructure or Ad Hoc.

This parameter is set so that the RangeLAN802 card will operate in an Infrastructure network by default.

The Network Type settings are as follows:

☐ Ad-Hoc = 0
 ☐ Infrastructure = 1

This parameter is only set when operating in an Infrastructure network. Roaming can not occur in an Ad-Hoc environment. If set to 1 or Enabled, then the 8400 PC card may roam from one Access Point to another in an Infrastructure environment.

To disable roaming, set this parameter to 0 in the NET.CFG or PROTOCOL.INI, or to Disabled in the Windows 95 and Windows NT Site Survey & Configuration Tool utility.

The RangeLAN802 8400 card will have roaming enabled by default.

This section gives the user some ideas as to how to increase performance and network satisfaction on a wireless network.

Running Large Executable Files Efficiently

You may notice that certain executable files like Novell's LOGIN program can take a long time to start up. You can make this more efficient if you copy the file to your local hard disk. This way the server is only accessed to read data files, which will allow for better performance.

Novell's VLM Technology

The RangeLAN802 8400 ODI driver supports Novell's VLM technology which is the standard interface for NetWare and Personal NetWare clients. If you choose to use VLM.EXE instead of NETX.EXE when attaching a NetWare or Personal NetWare client, you will achieve greater performance by up to 82%, according to Novell's Systems Research Department tests. On a NetWare 3.11 server, you must load PBURST.NLM in order for the VLM technology's performance enhancements to take effect.

Microwave Ovens

Microwave ovens operate in the same frequency band as RangeLAN802. Therefore, if you use a microwave within range of RangeLAN802 you may notice network performance degradation. However, both your microwave and your RangeLAN802 network will continue to function.

Range

Every environment is unique with different obstacles, barriers, materials, etc. and, therefore, it is difficult to determine the exact range that will be achieved without testing. The site survey tool was developed to aid in this process. Additionally, Proxim has developed some guidelines to estimate the range that users will see when the product is installed in their facility, but there are no hard and fast specifications.

Radio signals may reflect off obstacles or be absorbed by others depending on their construction. For example, with two RangeLAN802 radios you may achieve up to 1000' in open space outdoors where the two antennas are line of sight, meaning they see each other with no obstacles. However, the same two units will only achieve up to 500' of range when they have to travel through the cubicles usually used in modern offices. If there are office walls to penetrate, the signal range may decrease even further to up to 300'.

Proper antenna placement can help improve RangeLAN802 performance. Try to place the antenna so that it extends above the top of the computer.

8. Troubleshooting

RangeLAN802 8400 is designed to be very easy to install and operate. If you do experience difficulties, however, use the information in this chapter to help diagnose and solve the problem. If you cannot resolve the problem, contact Proxim, as described in Appendix E, "How to Reach Technical Support."

How to Obtain Help with Your LAN Installation

If you require assistance to install your LAN, Proxim can put you in touch with a RangeLAN802 Reseller in your area. The reseller is an expert in the design, installation, and maintenance of LANs and will be able to examine your needs and recommend the most cost-effective solution for your LAN whether you are installing a new LAN or adding on to an existing one. For the location of the RangeLAN802 reseller nearest you, contact Proxim at 800-229-1630 and ask for the Sales Department.

General Problems

This section discusses some of the most common problems encountered when using RangeLAN2 and the possible solutions.

1. **IRQ, I/O Port Address, and Memory Address conflicts.**
If you are using an expanded memory manager such as Microsoft's EMM386 or Quarterdeck's QEMM, you have to exclude the region in memory that is used by RangeLAN802 8400.

If RangeLAN802 8400 is using memory space D000 (the default), and EMM386 is your memory manager, you need to exclude the region D000-D3FF when the memory manager loads in your CONFIG.SYS file with the parameter x=D000-D3FF. (For more information on this parameter, see the manual that came with your expanded memory manager.) If you are using Windows for Workgroups, you also need to set the EMMEExclude parameter in Windows' SYSTEM.INI file to exclude the same region of memory. If RangeLAN802 8400 is using memory space D000, add the parameter EmmExclude=D000-D3FF. For more information, see your Windows manual.

2. **Invalid Int, Port, Memory Address, ESSID, Hopping_Set, Hopping_Pattern, Power_Mode, or Network_Type.** Make sure that the selections you've chosen are valid options.
3. **Wrong socket.** Make sure you have specified the correct socket in which RangeLAN802 8400 is installed. If, however, you are using Card and Socket Services, the software will automatically determine the correct socket.
4. **Card and Socket Services.** In order to run with a RangeLAN802 8400 card, your computer must either have an Intel 82365SL controller chip or Card and Socket Services software revision 2.x or 3.0.
5. **Out of range problems.** If the two RangeLAN802 cards are not within range you will be unable to establish reliable communication.

6. **Mismatched ESSIDs.** If you are able to load the software driver successfully, but cannot communicate with another machine on the network, it is possible that you do not have the same ESSID as on the other machine.
7. **Sleep mode.** The computer to which the RangeLAN802 unit is attached may enter a sleep mode. In this mode, the RangeLAN802 card will not receive any radio signals. If the computer is set up as a server, disable sleep mode.
8. **Wrong frame type.** If you are able to load the RangeLAN802 driver on both a NetWare server and workstation, but they do not communicate, they may be using different frame types. Verify they are both set to the same frame type. For example, you may need to add the line FRAME ETHERNET_802.3 to the NET.CFG file. Or, you may need to specify a different frame type on the NetWare file server with the line FRAME=ETHERNET_802.3.

RangeLAN802 8400 LEDs

There are two LEDs on the RangeLAN802 8400 card. They are visible through the stub antenna on the RangeLAN802 8400.

- ☐ The yellow LED lights to indicate the card is transmitting.
- ☐ The green LED lights whenever the card detects another unit that is transmitting.

Commonly Asked Technical Support Questions

Q. Why can't I log in to the network?

A. You may not be in range of your RangeLAN802 Access Point. Run a site survey to determine if you are in range.

Q. Why can't I associate with an Access Point?

A. You may have a different ESSID. Also, confirm that the Network Type is set to Infrastructure.

Q. Why can't I communicate with other RangeLAN802 cards in my Ad-Hoc network?

A. You may have a different ESSID. Also, confirm that the Network Type is set to Ad-Hoc.

Q. The driver failed to load.

A. Check that you do not have an I/O, IRQ or memory conflict.

Q. I installed the driver, but it doesn't find the card.

A. Verify you installed the correct driver for the correct product.

Q. What happens if I go out of range?

A. This is determined by the network and the amount of time you are out of range, but you may be logged off the network. The same thing will happen if you unplugged a wired Ethernet cable.

Q. How do I know if I'm out of range?

A. When running in Windows 95 or Windows NT, use the RangeLAN802 Utilities. The Status Monitor will indicate if the card is out range and the Site Survey and Configuration Tool will determine the strength of a radio connection. With a Link Quality lower than 5, you are not at optimal range. If you are running in a DOS-based environment, there is no

utility available to tell if the card is out of range of other RangeLAN802 products.

Q. Is my computer compatible with RangeLAN802 8400?

A. If you computer had Windows 95 or Windows NT pre-installed when it was shipped to you, the RangeLAN802 8400 card should be compatible. If your computer is running DOS, Windows 3.1, or Windows for Workgroups, it is compatible if it loads Card and Socket Services V2.x or higher in the CONFIG.SYS or if it has an Intel 365 controller chip.

Q. How do I know if my computer has an Intel 365 controller chip?

A. Check the manual for the computer.

Q. How do I know if I have Card and Socket Services V2.x or higher?

A. When the machine boots, you should notice files loading from CONFIG.SYS. One is called Card Services and usually displays a revision number; another is called Socket Services also displayed with a revision number.

Q. I've heard about hot swapping PCMCIA cards. Do I have to install the card before the driver will load?

A. Yes, the card must be in the socket when the driver is attempting to load. Once the driver is loaded, you can put the card in and out of the socket if operating in a DOS-based environment. If operating in Windows 95, you may remove the card after stopping its operation in the PC Slot icon located in the Control Panel. However, when the card is not in the socket you will not be able to access the network. If operating in Windows NT, do not remove the card without first shutting down the system.

Q. What do the green and yellow LEDs do?

A. The yellow LED indicates the card is transmitting. The green LED indicates a RangeLAN802 product is transmitting somewhere within range of this unit — it does not necessarily mean the packet is destined for this device.

Q. What happens when my computer goes to sleep?

A. The RangeLAN802 8400 card will also go to sleep. It will be unable to send and receive messages to the network until the computer wakes up. Depending on the network configuration and the amount of time the machine is asleep, you may lose your network connection.

Other

If there is additional information that becomes available after the printing of this manual, there will be a README file on the Proxim distribution diskette included in your package.

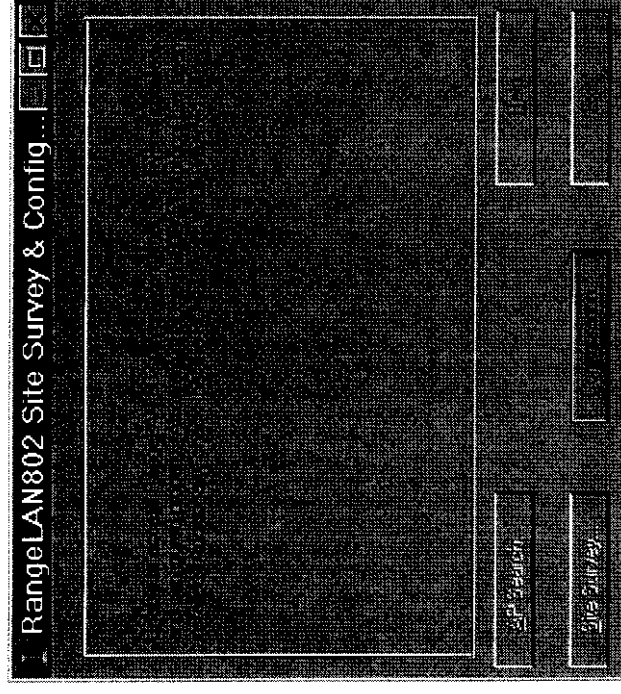
A. RangeLAN802 Utilities

RangeLAN802 Site Survey & Configuration Tool

The RangeLAN802 Site Survey & Configuration Tool runs only in Windows 95 and Windows NT. No diagnostic program is available for the DOS-based operating systems, such as Windows 3.1 or Windows for Workgroups.

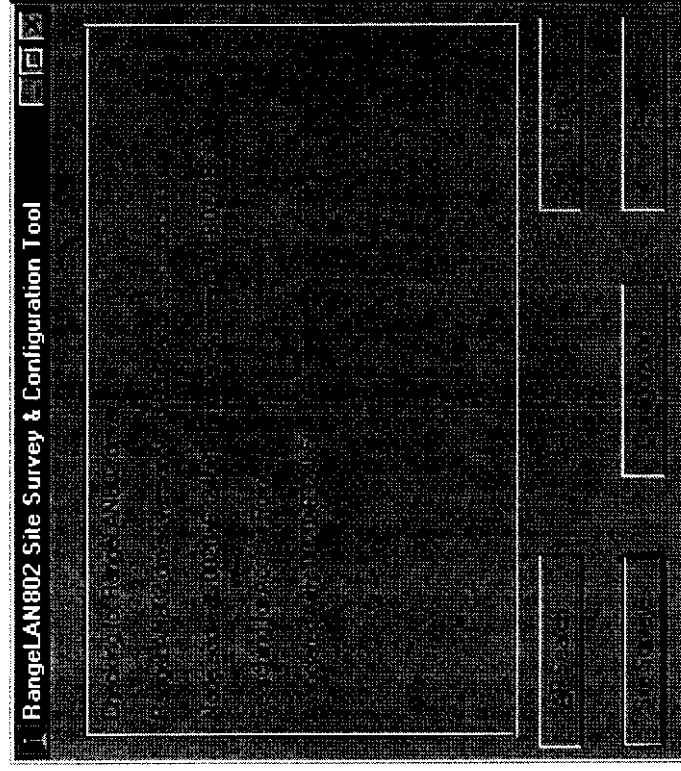
The RangeLAN802 Site Survey & Configuration Tool is automatically installed when the RangeLAN802 Windows 95 or Windows NT drivers are installed for the first time.

If you have a hardware conflict between RangeLAN802 8400 and another card in your computer, you will see the following error message:



This error message will also appear if the RangeLAN802 8400 card is not inserted in the PCMCIA slot when the RangeLAN802 Site Survey & Configuration Tool is opened.

Otherwise, the node address, ROM version, and association status of the RangeLAN802 8400 card will be displayed as shown below:



Site Survey

The purpose of the site survey tool is to enable users to configure their network with the appropriate number and placement of Access Points for their wireless networks. Start the site survey tool using the <Site Survey> button on the Windows tool. This screen will show the Link Quality and Signal Strengths of the other RangeLAN802 products on the network.

Node address lists the RangeLAN802 card's node address. When in Infrastructure mode, the Access Point is always listed first with its node address.

The higher the Link Quality number from a particular node, the greater the communication path. A Link Quality number of 0 indicates that the node is no longer responding at all. This is the most important parameter to watch to verify that you will be able to maintain a reliable wireless connection.

An asterisk in the Activity column indicates that the last packet sent was answered. The lack of an asterisk means that the receiving unit did not respond to the packet.

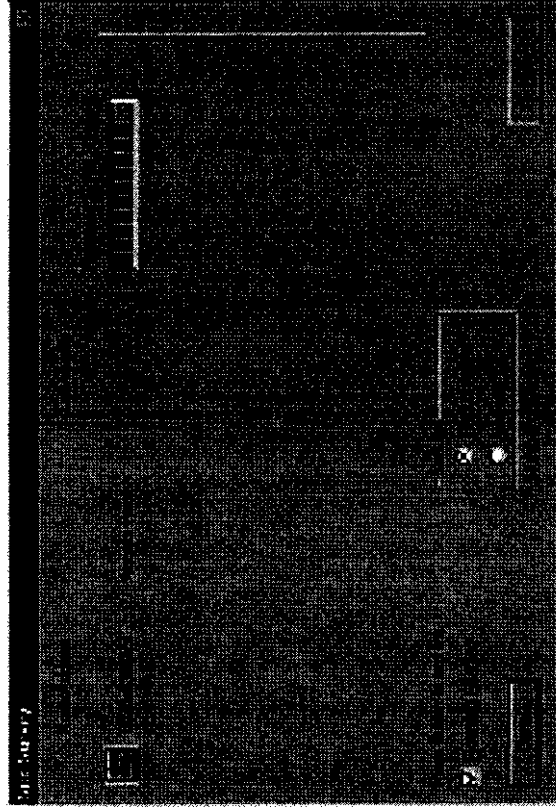
Received signal strength indicates how strong a signal was received from a particular node. It is not necessarily indicative of the throughput on the link.

If you check the Roaming Enabled box, you can roam about your environment and as you leave the range of one Master, the site survey will continue as you seamlessly re-synchronize to another Master.

You can sort the listed units by order of arrival or by node address of the packets. Additionally, the bottom of the screen

shows how many units responded to this site survey, meaning how many are within range and on the same Domain and Security ID as this unit.

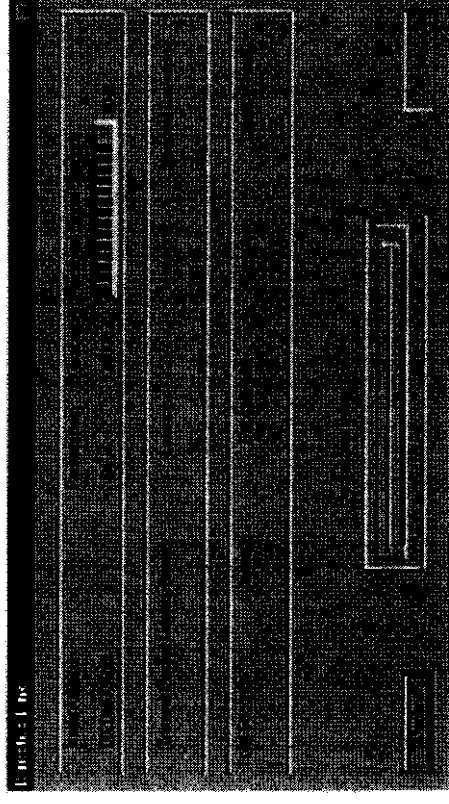
You may check the link between this machine and other displayed nodes by a click of the mouse on the icon to the left of the node address. If you choose to check the link with another unit, it may decrease the performance of that unit.



Point to Point Site Survey

An additional feature of the Windows 95 and Windows NT utilities is the ability to determine the Link Quality between two specific machines. In the Windows utility, click on the icon next to the MAC address. The Received Signal Strength, Packets per second, and Kilobytes per second are displayed giving

you an indication of the Link Quality between the surveying machine and the node you selected. You can vary the packet sizes to simulate network performance.



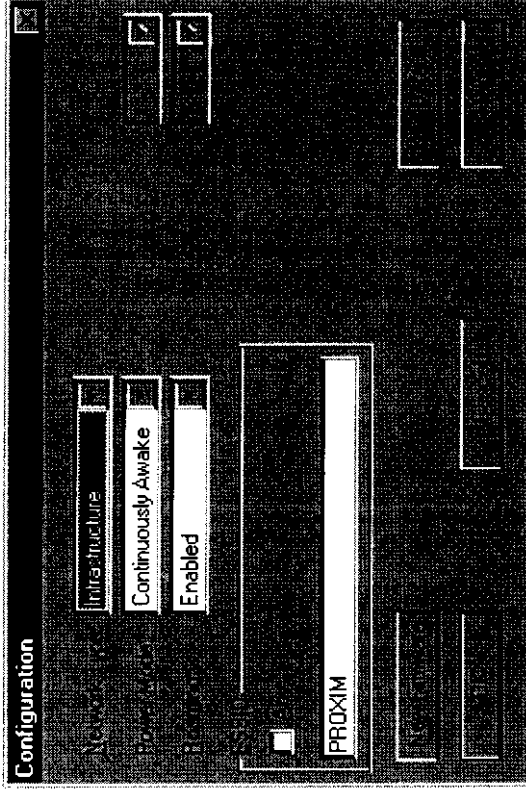
AP Search

If you use the Roaming feature of the RangeLAN802 family, you may be interested in knowing which Access Points are within range. To display all Access Points within range along with their node addresses, ESSIDs, Hopping Sets, and Hopping Patterns, choose the <AP Search> button from the main window of the configuration tool. Additionally, you can survey the other units connected to a particular Access Point by highlighting the Access Point from the list and clicking on either the <Test Link> or <View Cell> buttons.

<Test Link> performs a point-to-point site survey between your unit and the highlighted Access Point. <View Cell> performs a site survey for the highlighted Access Point and allows you to view how many other units are currently associated with this Access Point.

Configuration Changes

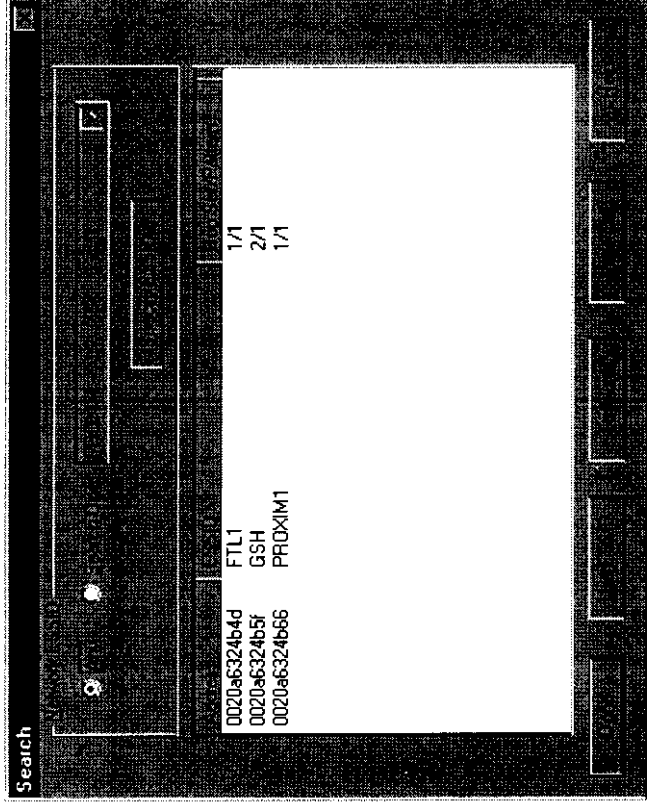
Change the driver settings from the <Configuration> button of the Windows tool. You should then see a configuration screen similar to the one shown below:



This screen shows the configuration settings for a RangeLAN802 8400 card which is set to Infrastructure mode in Network Type.

At any time, you may choose to revert to the software defaults for the 8400 card by clicking on the <Use Defaults> button.

This screen allows you to configure the Network Type, Power Mode, Roaming, and ESSID for the 8400 card. The Hopping Set and Hopping Pattern parameters are grayed out when set to Infrastructure mode.

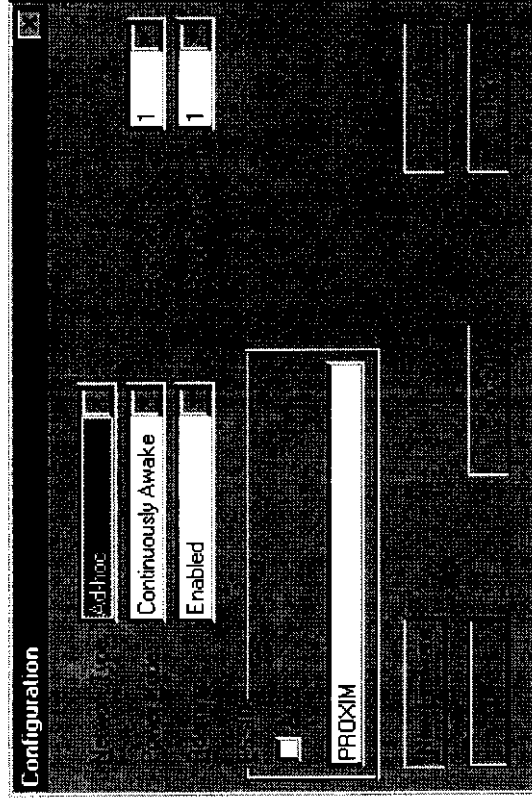


Network Search

If you configure the RangeLAN802 8400 card to operate in an Ad Hoc network, you may be interested in knowing what other Ad Hoc networks are within range. To display all other Ad Hoc networks within range along with their Network identification number, ESSIDs, Hopping Sets, and Hopping Patterns, choose the <Network Search> button from the main window of the configuration tool. Additionally, you can survey the other units connected to a particular network by highlighting the network from the list and clicking on the <View Cell> button.

Note that you may enter a ESSID string or check the box to the right of Any to allow the 8400 card to search through all available ESSIDs.

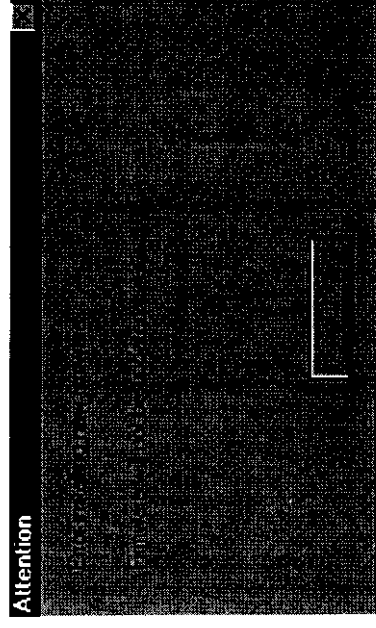
If you configure the card to operate in Ad-Hoc mode, the appearance of the Configuration screen will alter slightly, as shown below:



The Hopping Set and Hopping Pattern are not grayed out and may be set so that the 8400 card will communicate with an existing Ad Hoc network operating on the same Hopping Set and Hopping Pattern.

The Configuration screen also has a button to facilitate upgrading the RangeLAN802 software. After you have received a new version of software from your reseller, Proxim's Web page, or Proxim Technical Support, choose the <New Firmware> and follow the on-screen instructions.

If you choose this button but do not have a new version of firmware to install, you will receive the following error message:



RangeLAN802 Status Monitor

In Windows 95 or Windows NT, after the Site Survey & Configuration Tool is installed, the RangeLAN802 Status Monitor will also be installed and loaded each time the operating system starts. The icon will change to indicate whether or not this node is within range of the Master.

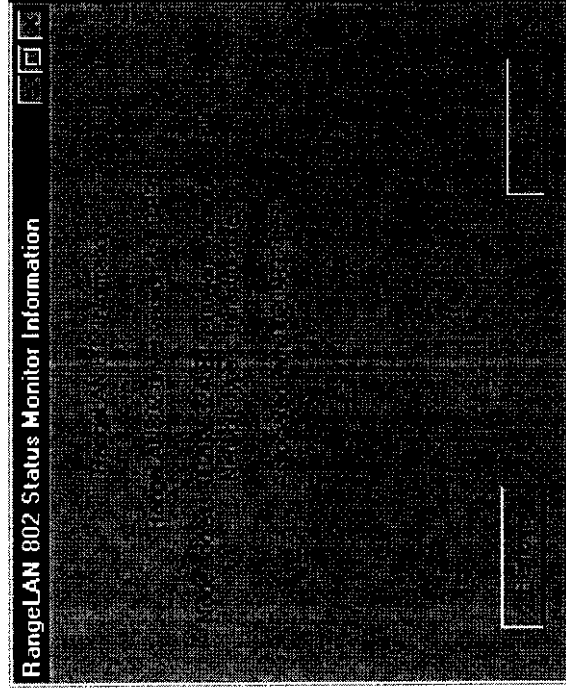
When within range, the icon will look like this:



When not in range, the icon will look like this:



You can also right click on this icon to get more information about the current synchronization status. The following screen will appear:



Double-clicking the icon with the left button launches the Site Survey & Configuration program.

B. Glossary

Access Point - An internetworking device that seamlessly connects wired and wireless networks together.

Bandwidth — The size (in Hertz) of the frequency range that a signal transmission occupies. Typical narrow band signals occupy a 25 KHz bandwidth. The RangeLAN802 signal occupies a 1 MHz bandwidth.

CSMA/CA — (Carrier Sense Multiple Access/Collision Avoidance) — CSMA is a protocol in which each node senses whether or not a channel is in use before attempting to transmit information. CA is an optimization by which channel time is reserved to avoid collisions.

Frequency Hopping — A spread spectrum technique by which the band is divided into a number of channels and the transmissions hop from channel to channel in a pre-specified sequence.

Interference — A situation that occurs when an unwanted RF signal occupies the same frequency band as a desired signal.

Narrow Band — A channel of about 25 KHz bandwidth in the RF spectrum. The FCC allocates Narrow Band channels and issues a license to the user. Each user of a specific narrow band frequency range must obtain a site license from the FCC.

Spread Spectrum — A radio data transmission modulation technique by which the transmitted signal is spread over a bandwidth wider than the information bandwidth. Spread Spectrum bands are designated by the FCC and require no user license.

C. Parameters

Parameter Name	Range	Default
Port Address	100, 120, 140, 218, 270, 280, 290, 298, 2A0, 2A8, 2E0, 300, 310, 358, 360, 310, 358, 360, 368	270
IRQ	3, 4, 5, 7, 10, 11, 12, 15	5
Memory Address	0xA000-0xFFFF	0xD000
ESS ID	0-32 characters	PROXIM
Hopping Set *	1-3	1
Hopping Pattern *	1-26	1
Power Mode	Continuously Awake or Power Mode	Continuously Awake
Network Type	Ad-Hoc or Infrastructure	Infrastructure
Roaming	Enabled or Disabled	Enabled

* This parameter is only valid when Network Type is set to Ad-Hoc.

D. Specifications

The following technical specification is for reference purposes only. Actual product's performance and compliance with local telecommunications regulations may vary from country to country. Proxim, Inc. will only ship products that are type approved in the destination country.

Bus Interface	PCMCIA 2.0, Type II slot
Range	Up to 500' Indoors Up to 1000' Outdoors
Data Rate	2 Mbps
Media Access Protocol	RangeLAN802 CSMA/CA
Ethernet compatibility	Ethernet packet types and Ethernet Addressing
Frequency Band	2.4-2.483 GHz (in the U.S.) (spread spectrum frequency hopping)
Output Power	100 mW
Size	PCMCIA Type II card
ETSI Testing	For purposes of ETS 300 328 type testing, the RangeLAN802 8400 Card Wireless LAN Adapter was tested in host computers over a temperature range of +5C to +35C.

If you're having a problem using RangeLAN802 8400 PC Card Adapter and can't resolve it with the information in Chapter 8, gather the following information and contact Proxim Technical Support:

- ☐ What are the configuration settings?
- ☐ What were you doing when the error occurred?
- ☐ What error message did you see?
- ☐ Can you reproduce the problem?
- ☐ What version of the Serial Adapter software are you using?

You can reach Proxim Technical Support by voice, fax, email BBS, or mail:

Tel: 800-4PROXIM or 650-526-3640
 Fax: 650-960-1106
 Web: <http://www.proxim.com>
 Email: support@proxim.com
 BBS: 650-960-2419 (14400 bps, N/8/1)

Proxim, Inc.
 Attn: Technical Support
 295 N. Bernardo Ave.
 Mountain View, CA 94043

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