Digital RoamAbout 915/2400 DS/PC Card and ISA Network Adapter

Installation and Configuration

Revision/Update Information:	This manual has been revised to include DS/ISA Network Adapters.
Reader's Comments:	Your comments and suggestions help us to improve the quality of our documentation. You can respond to the documentation manager at:
	Email: doc_quality@lkg.mts.dec.com
	FAX: 508 486 5655

FCC NOTICE – Class B Computing Device

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.

Any changes or modifications made to this equipment may void user's authority to operate this equipment.

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 the receiver.
  – Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

CE NOTICE – Class A Computing Device:

Warning!

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Achtung!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention!

Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

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Preface

The Digital RoamAbout 915/2400 DS/PC Card and ISA network adapters (also referred to in this manual as a network adapter) use direct sequence spread-spectrum frequency modulation communications technology to bring the benefits of wireless connectivity to the mobile computer user.

The Digital RoamAbout 915/2400 DS/PC Card network adapter is designed for use with stations (such as laptops, notebooks, notepads, and other mobile PCs) that are equipped with a PCMCIA Type II card slot.

The Digital RoamAbout 915/2400 DS/ISA network adapter is a network adapter designed for use in an Industry Standard Architecture (ISA) Personal Computer AT or compatible.

Additionally, the PC Card network adapter is designed for use with the Digital RoamAbout Access Point, which is a 2-port transparent bridge that provides connectivity between the wireless stations and a wired Ethernet local area network (LAN).

Purpose

This manual describes how to install and configure the Digital RoamAbout DS/PC Card and ISA network adapters in a station. It also describes how to troubleshoot problems that can arise during installation or operation.

---------------------------------- **Note** ----------------------------------

Refer to the *Digital RoamAbout Access Point Owner's Manual* for instructions on installing the Digital RoamAbout DS/PC Card network adapter in a Digital RoamAbout Access Point (AP).

Intended Audience

This manual is for the network adapter installer and network manager. This manual assumes that you have a working knowledge of basic PC operations and are familiar with network driver installation procedures.

Terminology

The following terms are used throughout this manual. You should be familiar with these terms before you continue.

Term	Definition
Digital RoamAbout Access Point	A 2-port transparent bridge that connects a wireless LAN to a wired Ethernet LAN.
Digital RoamAbout DS/PC Card Network Adapter	A PC Card network adapter, consisting of a radio module and a PC Card, that installs in a Digital RoamAbout Access Point or laptop PC to provide wireless connectivity in a LAN environment. Also referred to in this manual as a network adapter.
Digital RoamAbout DS/ISA Network Adapter	An ISA network adapter, consisting of a radio module and an ISA card that installs in a desktop PC to provide wireless connectivity in a LAN environment. Also referred to in this manual as a network adapter.
Station	Any portable computer such as a PC, laptop, notebook, or PDA that uses a wireless network adapter for LAN connectivity.
PC Card	A wireless network adapter component, using PCMCIA standards, that provides the digital interface between the host and the radio module.
PCMCIA	Personal Computer Memory Card International Association (PCMCIA), which is a standards organization for mobile computing peripherals.
radio module	A wireless network adapter component that consists of an antenna and radio circuitry.
wireless LAN	A collection of end-user systems connected together using a medium such as radio frequency or infrared technology.

Conventions

This manual uses the following conventions.

Convention	Meaning
Courier type	indicates system output or user input.
UPPERCASE TEXT	Uppercase letters in command lines indicate keywords you enter. You can enter keywords in either uppercase or lowercase.
italic text	Italic text indicates complete titles of manuals and variables.
[F10]	Text enclosed in square brackets indicates a key on the keyboard.
Note	Provides information that might be of special importance to the user.

Associated Documents

Contact your Digital reseller or Digital Services representative for additional copies of this documentation.

The following documents are available to help you install and operate your Digital RoamAbout PC Card network adapter:

Digital RoamAbout Access Point Owner's Manual	This manual explains how to install, configure, and troubleshoot the Digital RoamAbout Access Point.
README.TXT File	The README.TXT file on the Digital RoamAbout 915/2400 DS/PC Card and ISA network adapter software disk contains information not included in this document.

1

Introducing the Digital RoamAbout 915/2400 DS/PC Card and ISA Network Adapter

This manual discusses the Digital RoamAbout 915/2400 DS/PC Card network adapter and the Digital RoamAbout 9152400 DS/ISA network adapter. Hereafter in this manual, these products will be referred to as the the network adapter.

The Digital RoamAbout network adapter is a device that provides connectivity between stations in a wireless LAN. A station is any portable computer (such as a mobile PC, laptop, notebook computer, notepad or hand-held scanner), a PDA that is equipped with an ISA card slot for ISA network adapters, or a PCMCIA Type II card slot for PC Card network adapters.

Additionally, the PC Card network adapter is used with the Digital RoamAbout Access Point, which is a device that provides bridging functions to connect a wireless LAN to a wired LAN.

Using direct sequence spread-spectrum communications technology, the network adapter brings the benefits of wireless connectivity to users of stations.

The PC Card network adapter supports the PCMCIA Release 2.0 Card Standard and is fully interoperable with the Digital RoamAbout Access Point, the Digital RoamAbout DS/ISA network adapter, Digital WaveLAN, and other compatible wireless WaveLAN products.

Network Adapter Features

The Digital RoamAbout 915/2400 DS/PC Card and ISA network adapters conform to industry standards and supports industry-standard network operating systems. In addition, the network adapter provides:

- 2 Mb/s LAN throughput

- Available with or without encryption for 2.4 GHz network adapters

- Auto-connect (ISA only) automatically connects network adapters to a Digital RoamAbout Access Point providing relocatability without reconfiguring stations in environments where Access Points are present

- Frequency select (2.4 GHz only) provides the ability to set the network adapter's frequency to any 2.4 GHz channel (subject to national regulatory availability). This enables more efficient management of the on-premises radio spectrum usage and better protection against interference.

- Compliance with European (ETS), USA (FCC), Canadian (ISC), and Japanese (MPT) requirements

- The half-size ISA network adapter is available in 915 MHz and 2.4 GHz

- Hot swap capable (PC Card only)

- Direct-sequence, spread-spectrum RF technology

- Large in-building coverage area in a semi-open office environment averaging 11k square meters (125k square feet) for a 915 MHz network adapter, and 8k square meters (85k square feet) for a 2.4 GHz network adapter.

- Reliable Bit Error Rate transmission of 10^{-8} or better

- Typical RF output power 15 dBm

- Station mobility at pedestrian speed (PC Card only)

- Seamless roaming between coverage areas (cells) (PC Card only)

PC Card Network Adapter Components

The PC Card network adapter kit consists of a PC Card (formally called a PCMCIA Card), a radio module, and PC Card network adapter software. The following sections describe these components.

Digital RoamAbout PC Card

The PC Card is a credit card size device that fits in a PCMCIA Type II card slot in a Digital RoamAbout Access Point (AP) or station. Together with its radio module, the PC Card enables a PC Card equipped station or AP to connect to a wireless network.

Radio Module

The radio module is a compact device containing the radio circuitry and antenna. It connects to the PC Card using a 45 cm (18 in) cable, which allows you to mount the radio module on a wall, ceiling, or other surface (or directly on a station) using the bracket provided.

LED indicators on the radio module provide status information (Power On/Off, Transmit, Receive).

Digital RoamAbout PC Card Network Adapter Software

The RoamAbout software consists of:

- An Installation program for Card and Socket Services that sets up the interface between the PC Card and the station's PCMCIA controller. This program enables the network driver and utilities loaded on the station to access the PC Card.

- An Enabler program, which can be used instead of Card and Socket Services, that sets up the interface between the PC Card and the station's PCMCIA controller. This program enables the network driver and utilities loaded on the station to access the PC Card.

- Utilities to configure your PC Card with its wireless parameters.

- Network drivers for using the PC Card in a NetWare/ODI, NDIS2 or NDIS3.1 compatible environment.

- Diagnostic utilities to monitor and diagnose your network and help you to position radio modules and stations for best performance.

- Power management currently available for the ODI environment. Refer to Appendix A for power management parameters.

ISA Network Adapter Components

The ISA Network Adapter kit consists of an ISA network adapter, an Omnidirectional Antenna Module kit and ISA network adapter software. The following sections describe these components.

RoamAbout Network Adapter

The RoamAbout ISA network adapter is a printed circuit board that acts as an interface between your PC and the rest of the network. The ISA network adapter is installed in an ISA slot inside the PC. It contains a radio-frequency modem in addition to the circuitry needed to process the signals exchanged between your PC and other stations on the network.

Omnidirectional Antenna Module Kit

The Omnidirectional Antenna Module kit includes the module and a coaxial cable. The module is accompanied by a mounting bracket that you can use to attach it to the wall or stand it upright on a flat horizontal surface, such as a PC base, desktop, wall, or filing cabinet.

Digital RoamAbout ISA Network Adapter Software

The RoamAbout software disk consists of:

- Utilities to configure your network adapter after it is installed in the PC
- Network driver files enabling you to use your network adapter in a NetWare or NDIS-compatible environment
- Diagnostic utilities allowing you to position stations and antennas for best performance, and to monitor and diagnose your network

Additional RoamAbout Components

The additional components for the RoamAbout include the following:

- Antenna extension cable (ISA only) — Moves the antenna away from areas of excessive interference, or increases its height to provide a better transmission path in difficult environments (30 feet).

- RoamAbout Access Point — Connects RoamAbout wireless clients to a wired Ethernet LAN.

- Remote Boot ROM for NetWare (ISA only) — Enables a NetWare client to boot from the server.

- Encryption security feature (2.4GHz only)— Provides extra network security by encrypting all data transmitted on the network. If this option is selected, it must be installed in all stations in the RoamAbout network.

PC Card Kit Contents

The PC Card network adapter, shown in Figure 1–1, comes in three versions: a 915 GHz network adapter without built-in encryption, a 2.4 GHz network adapter with built-in encryption using the Data Encryption Standard (DES), and a 2.4GHz network adapter without built-in encryption.

Figure 1–1 PC Card Kit Contents
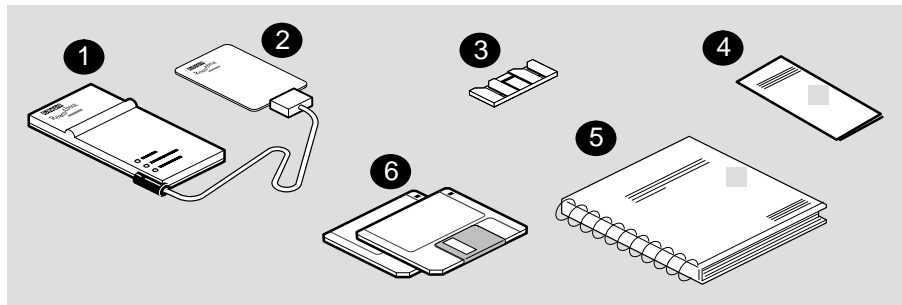
LKG-8695-93I

Item	Description
1	Radio module
2	PC Card network adapter
3	Radio module mounting clip
4	*Digital RoamAbout 915/2400 DS/PC Card Network Adapter Quick Start*
5	*Digital RoamAbout 915/2400 DS/PC Card and ISA Network Adapter Installation and Configuration* manual
6	Digital RoamAbout PC Card Network Adapter software disks

ISA Kit Contents

The ISA network adapter, shown in Figure 1–2, comes in three versions: a 915 GHz network adapter without built-in encryption, a 2.4 GHz network adapter with built-in encryption using the Data Encryption Standard (DES), and a 2.4GHz network adapter without built-in encryption.

Figure 1–2 ISA Kit Contents
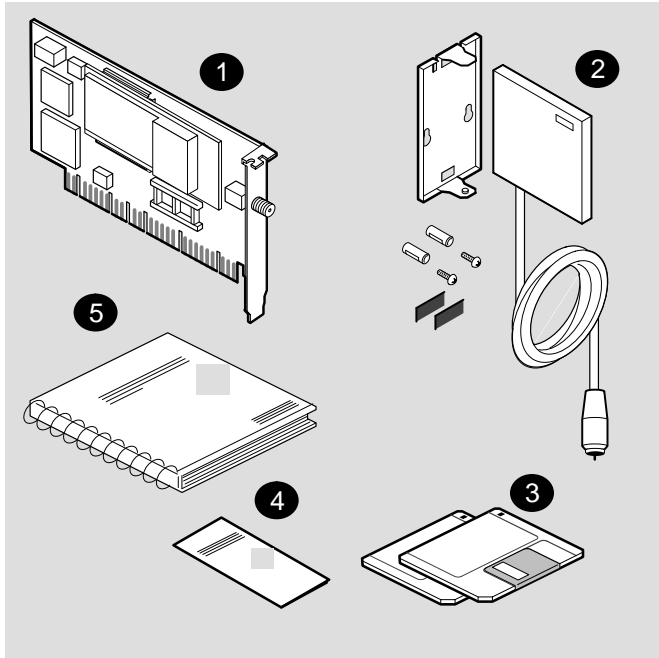
LKG-8194-93I

Item	Description
1	ISA network adapter
2	Antenna and mounting bracket
3	Digital RoamAbout ISA Network Adapter software disks
4	*Digital RoamAbout 915/2400 DS/ISA Network Adapter Quick Start*
5	*Digital RoamAbout 915/2400 DS/PC Card and ISA Network Adapter Installation and Configuration* manual

PC Card Product Specifications

Table 1–1 lists the 915/2400 DS/PC Card specifications.

Table 1–1 Digital RoamAbout 915/2400 DS/PC Card Specifications

Parameter	915 DS/PC Card	2400 DS/PC Card
Physical Specifications		
PC Card		
– Dimensions	8.5 cm x 5.4 cm x 0.5 cm	(3.4 in x 2.1 in x 0.2 in)
– Weight	30 g (1.05 oz)	
Radio Module		
– Dimensions	11.8 cm x 6.5 cm x 1.6 cm	(4.7 in x 2.6 in x 0.6 in)
– Weight	117 g (4.09 oz)	
Cable		
– Length	45 cm (18 in)	
– Weight	32 g (1.12 oz)	
Total Weight	179 g (6.26 oz)	
Power Consumption		
Sleep Mode	0.175 W	0.175 W
Receive Mode	1.475 W	1.575 W
Transmit Mode	3.00 W	1.825 W
R-F Specification		
Frequency	902 – 928 MHz	2400 – 2500 MHz
Modulation Technique	Spread-Spectrum DQPSK	Spread-Spectrum DQPSK
Output Power	250 mW	50 mW
FCC Regulations	No site license required	No site license required
Data Communications		
Data Rate	2 Mb/s	
Media Access Protocol	Ethernet (CSMA/CA)	
Bit Error Rate	Better than 10^{-8}	

ISA Product Specifications

Table 1–2 lists the 915/2400 DS/ISA specifications.

Table 1–2 Digital RoamAbout 915/2400 DS/ISA Specifications

Parameter	915 DS/ISA	2400 DS/ISA
Physical Specifications		
ISA network adapter		
– Dimensions	half-length ISA card	
Power Consumption		
+5 Vdc	7.0 W	6.0 W
–12 Vdc	0.1 W	0.1 W
R-F Specification		
Frequency	902 – 928 MHz	2400 – 2500 MHz
Modulation Technique	Spread-Spectrum DQPSK	Spread-Spectrum DQPSK
Output Power	200 mW	60 mW
FCC Regulations	No site license required	No site license required
Data Communications		
Data Rate	2 Mb/s	
Media Access Protocol	Ethernet (CSMA/CA)	
Bit Error Rate	Better than 10^{-8}	

Range Specifications

Table 1–3 lists the 915/2400 DS/PC Card and ISA network adapter range specifications.

Table 1–3 Digital RoamAbout 915/2400 DS Range Specifications

Range Parameter	915 DS Network Adapters	2400 DS Network Adapters	Example
Open Office Environment	244 m (800 ft)	200 m (656 ft)	A workspace in which the radio modules are installed in such a way that there is a straight line of view between them and there are no physical obstructions between the radio modules.
Semi-Open Office Environment	60 m (200 ft)	50 m (164 ft)	A workspace that is divided by shoulder-height, hollow-wall elements such as modular office partitions; radio modules are at desktop level.
Closed Office Environment	32 m (105 ft)	25 m (82 ft)	A completely enclosed work-space with nonmetallic, nonconcrete walls from floor to ceiling.

Distribution Disk Contents

Table 1–4 through Table 1–6 list the files on the Digital RoamAbout network adapter software distribution disks and briefly describes each file. Refer to the README.TXT file for a complete listing of files.

Table 1–4 PC Card DOS and Windows 3.X Disk

System Files	Description
README.TXT	Supplementary information, including a list of the files on the disk and a brief description of each file
WVLAN05.COM NET.CFG	ODI Network driver for NetWare
WVLAN05.INS	OEM file for Personal NetWare
OEMSETUP.INF OEMSETUP.WFW OEMSETUP.IBM	OEM file for Windows for Workgroups
VLMUP4.EXE	NetWare VLM protocol stack
WAVECLI.EXE	Card and Socket Services client driver
INSTALL.EXE	Installation program used with Card and Socket Services
WVLAN09.DOS WVLAN09.NIF	NDIS driver
PROTOCOL.INI	PROTOCOL.INI file
ENABLER.SYS WAVELAN.ODI WAVELAN.NDI	Point Enabler program for PCs that do not use Card and Socket Services
SETCONF.EXE INSTCONF.EXE CPY2HDSK.BAT UTL2BOOT.BAT	Configuration utilities
PTPDIAG.EXE	Point-to-Point Diagnostics utility
WMONITOR.EXE	Site survey tool
WFREQSEL.EXE	Frequency Select utility for the Digital RoamAbout 2400 DS/PC Card network adapter
CIS.OUT	
MIBS.ZIP	Digital RoamAbout Access Point MIBs

Table 1–5 ISA DOS and Windows 3.X Disk

System Files	Description
README.TXT	Supplementary information, including a list of the files on the disk and a brief description of each file
WVLAN05.COM NET.CFG	ODI Network driver for NetWare
WVLAN05.INS	OEM file for Personal NetWare
OEMSETUP.INF OEMSETUP.WFW OEMSETUP.IBM	OEM file for Windows for Workgroups
INSTALL.EXE	Installation program used with Card and Socket Services
WVLAN09.DOS WVLAN09.NIF	NDIS driver
WVLAN10.OS2 WVLAN10.NIF	OS/2 NDIS driver
PROTOCOL.INI	PROTOCOL.INI file
SETCONF.EXE INSTCONF.EXE CPY2HDSK.BAT UTL2BOOT.BAT CONFIG.SYS AUTOEXEC.BAT	Configuration utilities
PTPDIAG.EXE	Point-to-Point Diagnostics utility
VLMUP4.EXE	NetWare VLM protocol stack
WFREQSEL.EXE	Frequency Select utility for the Digital RoamAbout 2400 DS/PC Card network adapter
SETIRQ.BAT	Sets IRQ parameters
IRQ.EXE	Displays IRQ parameters

Table 1–6 Windows 95, Windows NT and Utilities Disk

System Files	Description
README.TXT	Supplementary information, including a list of the files on the disk and a brief description of each file
WVLAN22.SYS	Windows 95 and Windows NT network driver
WVLAN22.DLL	Windows 95 and Windows NT setup file
WVLAN22.HLP	Windows 95 and Windows NT help file
WVLAN22.INF	OEM Windows 95 setup file
OEMSETUP.INF	OEM Windows NT setup file
Utility Files	
SETCONF.EXE INSTCONF.EXE CONFIG.SYS AUTOEXEC.BAT	Configuration utilities
PTPDIAG.EXE	Point-to-Point Diagnostics utility
WFREQSEL.EXE	Frequency Select utility for the Digital RoamAbout 2400 DS/PC Card network adapter
WMONITOR.EXE	Site survey tool
DSCARDUP.EXE	
CIS.OUT	

2

PC Card Installation and Configuration

What You Need

Before you begin the installation procedure, ensure that your site is equipped with the following:

- A personal computer, laptop, notebook, or notepad with a PCMCIA Type II slot conforming to the PCMCIA Version 2.0 Standard. The computer must provide the following peak power to the PC Card:
  – 3 watts if using a 915 DS/PC Card
  – 2 watts if using a 2400 DS/PC Card

- One of the following network operating environments supporting the NDIS standard, such as:

  – Windows 95

  – Windows NT

  – PATHWORKS, LAN Manager or Windows for Workgroups

  – Novell NetWare Version 2.1*x* or higher, Version 3.1*x*, Version 4.0, NetWare Lite, or Personal NetWare

- DOS Version 5.0 or higher, Windows 95 or Windows NT

- For wireless-to-wired LAN connectivity, a Digital RoamAbout Access Point.

Use the DOS DISKCOPY command to create a working copy of your PC Card disk. Use your working copy in all card configuration and driver installation procedures. Store the original in a safe place.

RoamAbout Installation Worksheet

The RoamAbout Installation Worksheet, located in Appendix C, is designed to help you carry the information you need through the various installation steps. It also serves as a hardcopy record of your installation to help you maintain your RoamAbout network or adapt it to meet changing requirements.

Before you can use your PC Card network adapter to communicate with others devices, you need to complete the following tasks:

- Enable the PC Card network adapter using Card and Socket Services (CSS) or the Point Enabler.
- Install the network driver.

Installing the PC Card Network Adapter

To install the PC Card network adapter, follow these instructions:

1. Connect the radio module cable to the PC Card.
2. Slide the PC Card into the PCMCIA slot in the station. Figure 2–1 illustrates how the PC Card is inserted into the front slot of a notebook computer.

_____ **Note** _____

You will feel a slight resistance as you slide the card into the PCMCIA slot. Push the card firmly into the slot until it is completely seated.

_____

Figure 2–1 Inserting the PC Card (Front Slot)
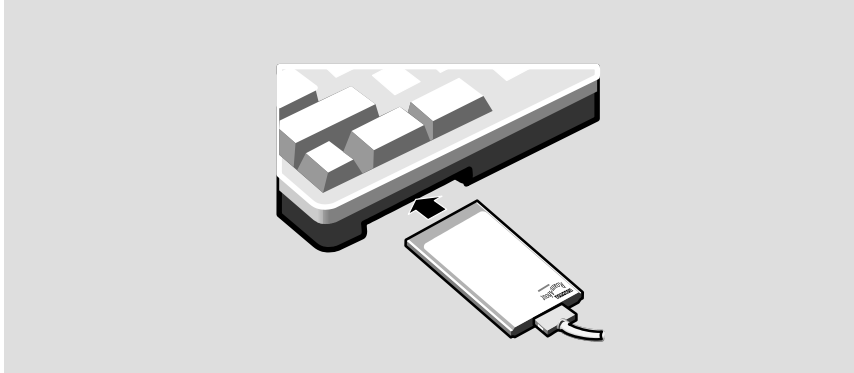
LKG–8901–94C

To install the radio module to your PC, follow these instructions:

1. Slide the radio module onto the mounting bracket.

2. Select a location for the radio module on the PC that extends the radio module 1/2–inch to 1–inch beyond the top of the PC (see Figure 2–2).

3. Remove the protective strip from the adhesive pad on the mounting bracket and press the bracket firmly in position.

You can now remove and remount the radio module whenever you wish.

Figure 2–2 Inserting the PC Card (side slot)

Radio Module
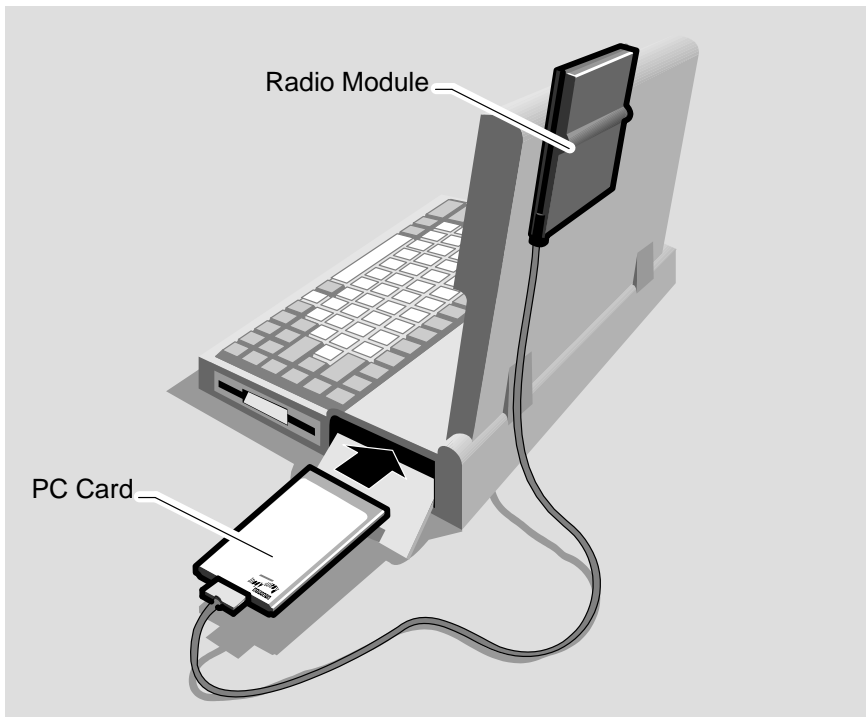
PC Card

LKG–8880–94C

Configuring a PC Card Network Adapter

Configuring your PC Card network adapter requires that your PC contains
Card and Socket Services software, or Point Enabler software for PCs
containing an Intel 82365 PCMCIA controller.

To configure your PC Card network adapter:

Step	Action
1	Ensure that the PC Card is installed. The PC Card must be installed before you can run INSTALL. Refer to page 2–2.
2	Install either: a. Network drivers for Windows 95 or Windows NT. Refer to Chapter 5. b. Network operating system and network driver. Refer to Chapter 4.
3	Install network parameters. a. If your PC does not have CSS, run the Point Enabler. See Appendix A. b. If your PC does not have CSS, run INSTALL. Refer to page 2–5.

Running the INSTALL Program

Before running INSTALL, be sure that your PC contains Card and Socket Services software.

The INSTALL program uses Card and Socket Services to update the PROTOCOL.INI file (for NDIS drivers) or NET.CFG file (for ODI drivers), and CONFIG.SYS file. It then asks you to select a:

- Network operating system
- Network ID (provided by your network manager)
- Beacon Key (provided by your network manager)
- Domain ID (provided by your network manager)
- Encryption enable/disable key

_____ **Note** _____

You must use the same Encryption Key for all RoamAbout Access Points and RoamAbout devices in the network environment.

_____

To run INSTALL, perform the following steps:

1. Insert the Install program disk into drive A and type:
   `install` [Enter].
2. Follow the instructions on the screen to configure your device.
3. Reboot your system when the program is completed.

During the installation program, you can use any of the following keys to interact with the program:

- Edit keys (backspace, delete, arrow keys, and so forth) are used to change the values supplied as default settings.
- [Enter] key moves you to the next program segment.
- [F1] can be pressed any time during the program to provide you with Help information. Pressing any key returns you to the installation program.
- [F10] brings you back to the previous screen.
- [Esc] pressed twice exits you from the program.

The installation program automatically updates your system files and lets you rename and save your original files.

Before the installation program copies the files onto your system, you can view, accept, or modify the configuration settings you selected during the program setup. If you accept the settings, the files will be copied without letting you review your settings. If you view the settings, the following information appears on your screen:

- Directory names where the network drivers will be copied
- Your network adapter's configuration settings, including IRQ, I/O port, NWID, Beacon Key, Domain ID and network frame type

If you want to change any of the settings that you selected during the installation, use the Modify option to incorporate changes.

At the completion of the installation program, you must reboot your system before using the network adapter.

Using DES With Your Digital RoamAbout Access Point

_____ **Note** _____

To use DES in a wireless LAN configuration, the Digital
RoamAbout Access Point firmware must be at V2.2 or higher.

To use the DES feature with the award-winning Digital RoamAbout Access
Point in a wireless LAN:

Step	Action
1	Ensure that your PC is configured with a DOS-based system.
2	With a PC Card installed in your PC, boot your PC with either Card and Socket Services or the Point Enabler, and do not start the network (netstart or startnet).
3	At the DOS prompt, change to the ROAMABT directory and run the SETCONF utility.
4	While running the SETCONF utility: a. load the input filename, INSTCONF b. Set the network ID to any four hexadecimal characters using values 0100 – FFFF (this field is not used, but it must be filled in). c. Enable DataLink Security. d. Set the encryption key, press Enter and then press [F10]. e. Select Save Configuration Installation File to exit the utility.
5	At the DOS prompt, run INSTCONF to write out the encryption key to the PC Card.
6	Remove the PC Card from the PC and insert it into your RoamAbout Access Point.

_____ **Note** _____

You must use the same Encryption Key for all RoamAbout Access Points
and RoamAbout devices in the network environment.

Encryption Key Guidelines

These guidelines will help you to select safe encryption keys for use in the security-featured PC Card network adapter. These guidelines apply to PC Card network adapters equipped with built-in encryption.

Encryption keys are specified during the configuration setup stage of the PC Card network adapter installation. When entering encryption keys manually, observe the following guidelines for valid key values:

- Keys consist of 16 hexadecimal (0–9, A–F) digits, arranged as 8-digit pairs. The second digit of each pair must be even (0, 2, 4, 6, 8, A, C, E).

   For example:

   Valid   –   34 FC 66 74 9A D0 12 14

   Invalid –   34 FF 66 74 9A D1 12 14

- Some key values, although valid, are considered "weak" or "dual" for the encryption algorithm. The Configuration Setup utility does not accept weak or dual keys.

_____ **Note** _____

To be able to communicate with each other, all stations and supporting RoamAbout Access Points *must* use the same encryption key.

3

ISA Installation and Configuration

What You Need

To install a Digital RoamAbout 915/2400 DS/ISA network adapter, you must have the following:

- A PC-AT compatible with a free ISA network adapter slot
- MS-DOS Version 3.2 or higher, OS/2 Version 1.2*x* or higher, or Windows 95 or Windows NT
- One of the following network operating environments supporting the NDIS standard, such as:
  - Windows 95 (see Note below)
  - Windows NT (see Note below)
  - PATHWORKS, LAN Manager, Windows for Workgroups, or Windows NT
  - Novell NetWare Version 2.1*x* or higher, Version 3.1*x*, Version 4.0, NetWare Lite, or Personal NetWare
- The basic RoamAbout component set, which consists of a network adapter, an Omnidirectional Antenna Module kit, and software disks
- The appropriate tools for removing the cover of your PC
- For wireless-to-wired LAN connectivity, a Digital RoamAbout Access Point.

_____ **Note** _____

Windows 95/NT ISA network adapter installations are performed after completing the Windows 95 NDIS3 software driver installation. Refer to Chapter 5 for NDIS3 driver installation procedures.

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RoamAbout Installation Worksheet

The RoamAbout Installation Worksheet, located in Appendix D, is designed to help you carry the information you need through the various installation steps. It also serves as a hardcopy record of your installation to help you maintain your RoamAbout network or adapt it to meet changing requirements.

Unpacking the Network Adapter

Use the following guidelines when handling the network adapter.

1. Carefully open the antistatic shipping bag.

Caution

Static electricity can severely damage the interface card. To prevent damage when unpacking and handling the card, make sure you touch a grounded metal surface, such as the chassis of your PC, to discharge the excess static electricity from your body.

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2. Hold the network adapter by its edges when you remove it from its shipping bag. Do not touch any of the components or the edge connectors along the bottom of the network adapter.
3. Place the network adapter on the antistatic bag on a flat surface.

Installing the NetWare Remote Boot Feature

To install the NetWare Remote Boot ROM on the network adapter, follow these steps:

1. Following the instructions described above about static electricity, carefully remove the boot ROM from its antistatic packaging.

2. Examine and familiarize yourself with the chip and the socket (see Figure 3–1). Make sure that none of the connection pins is bent.

3. Make sure the chip is correctly aligned. The notch at one end of the chip should line up with the notch in the socket. (This correctly orients pin 1 in the socket with pin 1 on the boot ROM.)

4. Holding the chip lengthways between your finger and thumb, engage the pins on one side with the corresponding row of holes in the socket, and gently manipulate the chip until the pins on both sides are engaged. Carefully push the chip into its socket.

Figure 3–1 Installing the Boot ROM
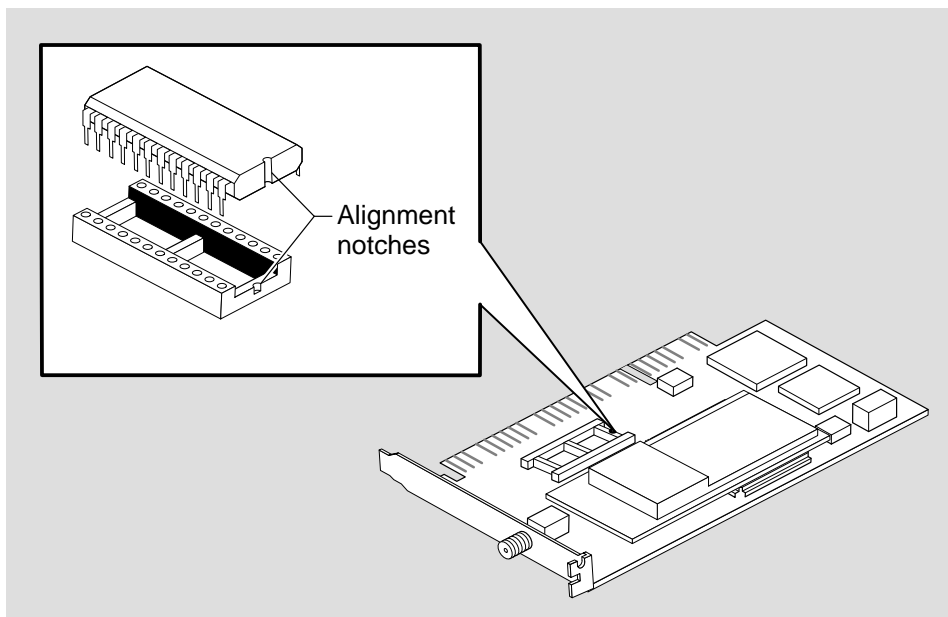
LKG-10142-96I

Verifying the Hardware Configuration Switches

The RoamAbout network adapter has a switch block containing four switches (Figure 3–2). Switches 1 and 2 are used to set the card's I/O base address. Switches 3 and 4 are used to select the remote boot address or to disable the remote boot ROM.

To set the switches, use a small flat–blade screwdriver. Then record the settings on the RoamAbout Installation Worksheet in Appendix D.

Figure 3–2 Hardware Configuration Switches

915 or 2400

I/O Base address: SW1, SW2

Boot ROM: SW3, SW4

LKG-09841-95I
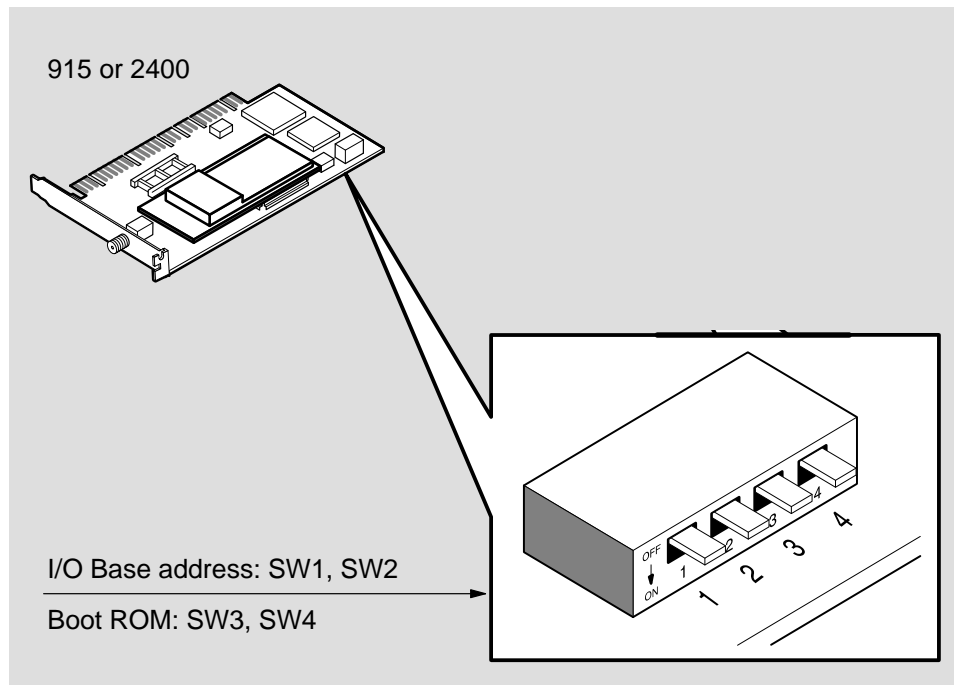
Setting the I/O Base Address

The I/O base address switches are factory preset to address 0300H. Change this setting only if another device already installed in your computer is using this address. Use a small flat–blade screwdriver to set the switches. Then record the settings on the RoamAbout Installation Worksheet in Appendix D. Table 3–1 shows the available I/O base addresses.

Table 3–1 I/O Base Address Switch Settings

I/O Address	Switch 1	Switch 2
0300 – 030FH	OFF	OFF (default)
0390 – 039FH	OFF	ON
03C0 – 03CFH	ON	OFF
03E0 – 03EFH	ON	ON

_____ **Note** _____

I/O address 03C0H is used by many EGA and VGA video adapter
cards. If your video adapter is using this I/O address, do not use it
for the RoamAbout network adapter .

_____

Setting the Remote Boot Base Address

If you are using the remote boot feature, use the information in this section to
set the remote boot base address.

The remote boot address switches are factory preset to disable remote boot.
Change the settings only if you have installed the remote boot ROM and plan
to use it immediately. Table 3–2 shows the available remote boot addresses.

Table 3–2 Remote Boot Base Address Switch Settings

Base Address	Switch 3	Switch 4
Disabled	OFF	OFF (default)
C8000 – CBFFFH	OFF	ON
D0000 – D3FFFH	ON	OFF
D8000 – D8FFFH	ON	ON

_____ **Note** _____

If you have installed the remote boot ROM but are not going to use
this feature immediately, or if you later discontinue using it, make
sure to reset the switches to disable remote boot.

_____

Installing the Network Adapter in Your PC

The following directions apply to most PCs. Refer to your PC owner's manual for more information on how to install an adapter board.

_____ **Caution** _____

Static electricity can severely damage the interface card. To prevent damage when unpacking and handling the card, make sure you touch a grounded metal surface, such as the chassis of your PC, to discharge the excess static electricity from your body.

_____

1. Turn off the power switch to your PC and any attached devices. Disconnect the power cord and other cables.

_____ **Warning** _____

Do not attempt to install the interface card without disconnecting the power cord and other cables from your PC. If you fail to take this precaution, you could receive a severe electrical shock or cause damage to your PC.

_____

2. Remove the cover of your PC (refer to your PC owner's manual for specific instructions).
3. Choose an available ISA expansion slot and remove the I/O cover plate. The cover plate is attached by a single screw on the top.
4. Install the network adapter by aligning the edges of the card with the expansion slot and gently pressing on the top of the card until the edge connector is seated (Figure 3–3).

Figure 3–3 Inserting the ISA Network Adapter
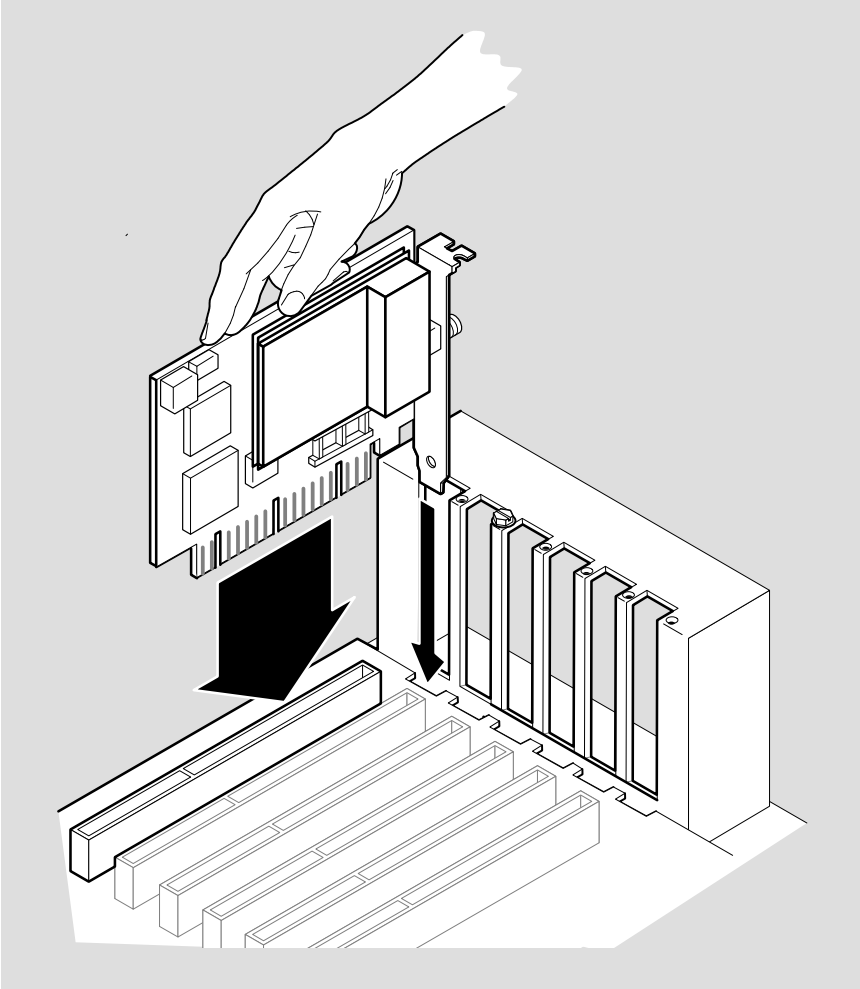
LKG-09840-95I

Omnidirectional Antenna

The omnidirectional antenna is a compact, high–performance antenna designed for easy installation and flexible usage in an indoor work group environment, such as an office or department store. The antenna module is fitted with a coaxial cable that allows it to be placed on the desktop or mounted on a wall or other surface adjacent to the PC.

The antenna kit includes:

- Antenna module with cable
- Support bracket for vertical or horizontal placement
- Support bracket mounting accessories:
  - Screws and wall anchors
  - Adhesive-backed Velcro fastening strips

Connecting the Antenna

Follow these steps to connect the RoamAbout antenna (Figure 3–4):

1. To connect the antenna to the RoamAbout card, simply push the cable end connector onto the connector in the middle of the card's end bracket until it clicks into place.

2. Reattach the PC's cover. Move your PC to its intended location and attach the power cord and other cables.

Figure 3–4 Connecting the Antenna
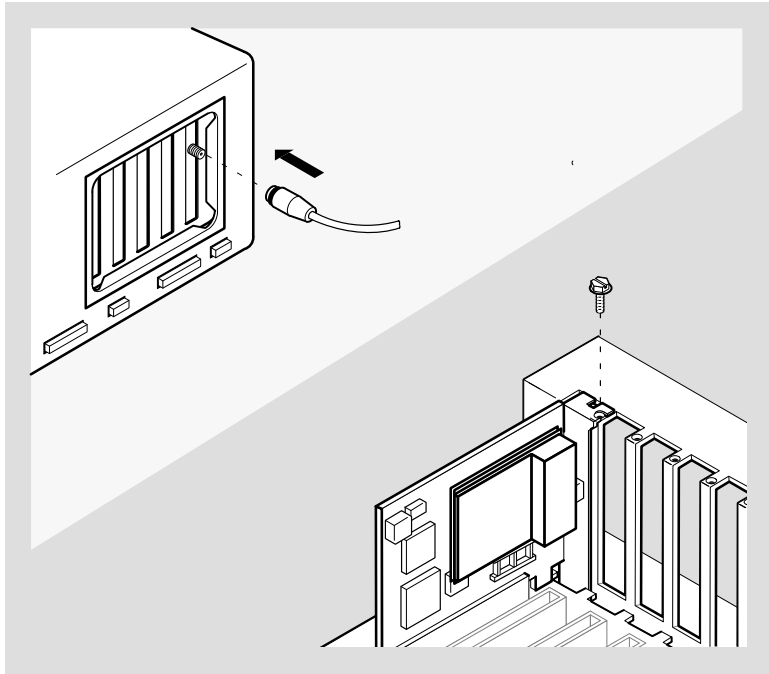
LKG-10141-95I

Antenna Placement

The antenna performs best in an open environment with as few obstructions as possible (Figure 3–5). Signal strength can be significantly affected by closeness to metal surfaces and, to a lesser extent, by concrete walls, thick masonry walls, and solid high–density materials. To ensure the best performance:

- Ensure the antenna is securely connected to the RoamAbout network adapter in your PC.

- Position the antenna at right angles to the mounting surface.

- Place the antenna as high as possible.

- Avoid leaving the antenna where it may be concealed by working materials such as books or papers.

- Avoid placing the antenna flat against a metal, concrete, or masonry surface.

ISA Installation and Configuration **3–9**

Figure 3–5 Typical Antenna Position
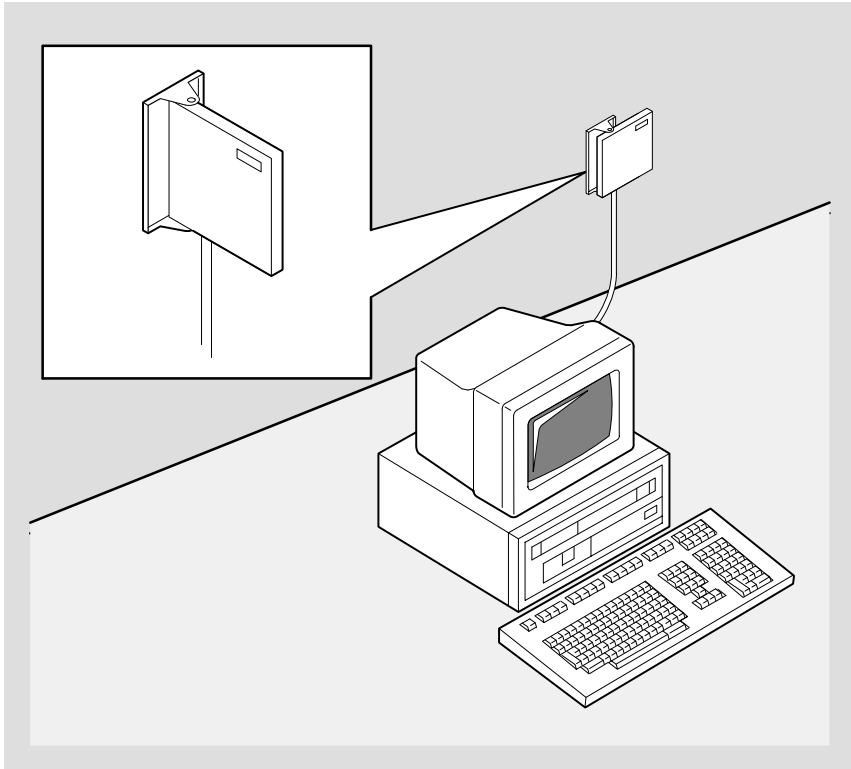
LKG-09846-95I

Using the Antenna Support Bracket

The antenna module is constructed to snap onto its support bracket in one of two positions (Figure 3–6):

- At its midpoint, allowing the module to sit flat against the support bracket. This method is suitable for windows and smooth hollow partitions. It is not recommended for metal, concrete, masonry, or solid wood surfaces.

- At its edge, positioned at a right angle to the support bracket. This is the preferred method, allowing the antenna module to hang from a vertical surface or stand on a horizontal one.

Figure 3–6 Using the Antenna Mounting Bracket
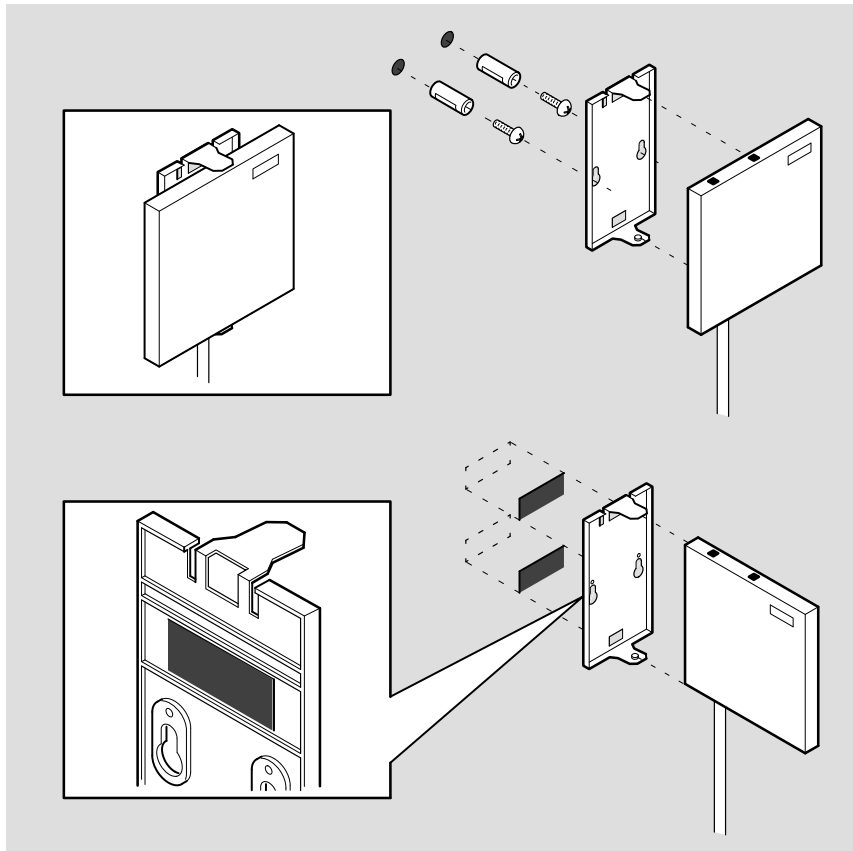
LKG-6985-92I

You can affix the support bracket to a vertical surface in one of two ways:

- With the wall anchors and screws provided. This method is recommended for concrete and masonry walls, either papered or wall having rough surfaces.

- With the Velcro fastening strips. Use this method for smooth, hollow surfaces, such as half–height office dividing walls and filing cabinets or windows. On cloth–covered walls, attach only the Velcro to antenna.

Configuring an ISA Network Adapter

To configure your ISA network adapter follow these steps:

Step	Action
1	Install the Digital RoamAbout software. a. Choose a directory name on your hard disk to store the files. For example: **c:\roamabt** b. Place the RoamAbout disk into drive A: c. Make drive A: the current drive and run the batch file CPY2HDSK.BAT to the ROAMABT directory. For example: **cpy2hdsk c:\roamabt**
2	Install the network operating system. Refer to the Installing the Network Operating System section in this chapter for instructions or refer to your vendor-supplied documentation for detailed information.
3	Configure the network drivers. Refer to the following section for configuration parameters.
4	Create a WAVELAN.INI file. a. Use an ASCII text editor and create a WAVELAN.INI file. b. For ODI drivers insert, for example, the following two lines: **filename=c:\nwclient\net.cfg** **filetype=netc** c. For NDIS drivers insert, for example, the following two lines: **filename=c:\windows\protocol.ini** **filetype=prot** d. Copy the WAVELAN.INI file to the utilities disk created in step 2 above.
5	Verify the installation. Reboot your computer to verify that the network driver loads correctly. For successful NDIS2 installations, the following message appears: **DOS NDIS 2 Driver vX.xx** **ISA XXXX MHz Roaming enabled NWID=xxxx Security Feature disabled** For successful ODI installations, the following message appears: **DOS ODI vX.xx (YYMMDD)** **ISA XXXXMHz Roaming enabled Domain ID = xxxx Default NWID=xxxx** **Security Feature disabled**

_____ **Note** _____

Digital RoamAbout ISA network adapters are factory preset to use interrupt request line (IRQ) 10. To change the IRQ, refer to Appendix C to run SETIRQ.BAT.

Setting Up the Network Driver

To set up the network driver, edit the PROTOCOL.INI file (for NDIS drivers) or the NET.CFG file (for ODI drivers) in your network operating directory. For example, edit:
NDIS drivers – <NOS directory>\PROTOCOL.INI
ODI drivers – <NOS directory>\NET.CFG

Refer to Table 3–3 and Table 3–4 for a complete list of NDIS and ODI parameters.

For a detailed description of the power management parameters associated with the NDIS and ODI drivers, refer to Appendix B.

Table 3–3 NDIS2 Driver Configuration Parameters

Parameter[1]	Value Range	Usage
AT_Address = 0x0*nnn*	'*n*' in the set [300, 390, 3c0, 3e0]	Identifies the network adapter's I/O base address (default 300). Value must correspond to I/O base address set by the switches on the adapter (refer to page 3–4). Optional parameter if 300.
NWID = 0x*nnnn*	'*nnnn*' hexadecimal value in the range 0100_{16} – $FFFF_{16}$	Identifies the network adapter Network ID. Required if no roaming. If a value is used, it must be the same for all network adapters in the network. The default value is 0100_{16}. Using this value can result in unintentional overlap with adjacent RoamAbout cells.
Domain_ID = 0x*nnnn*	'*nnnn*' hexadecimal value in the range 0000_{16} – $FFFF_{16}$	This parameter enables roaming. If a value is not used, or if it is set to $0x0000_{16}$, the station cannot roam. If a value is used, it must be the same for all network adapters in the domain. Default value is $0x0001_{16}$.
Beacon_Key = 0x*nnnn*	'*nnnn*' hexadecimal value in the range 0000_{16} – $FFFF_{16}$	Used to encode the NWID transmitted by a roaming access point. If a value is used, it must be the same for all network adapters in the domain. Value $0x0000_{16}$ = no encoding Default value is $0x0001_{16}$.
Station_Address = 0x*nn*, 0x*nn*, ...	Six groups of 2 hexadecimal digits (*nn*) separated by commas	Overrides the network adapter's factory-installed universal MAC address. The second digit of the first digit pair must be a 2, 6, A, or E. Digital recommends not to change this value.
Station_Name = *x...x*	Any alphanumeric string (max 31 chars no spaces allowed)	Can only be used by the Point-to-Point Diagnostic utility.
Encryption_Key = 0x*nn*, 0x*nn*, ...	Eight groups of 2 hexadecimal digits (*nn*) separated by commas or 0.	A 16-hexadecimal-digit value enables encryption. A value of 0_{16} disables encryption.

[1] Required Parameters

If the network adapter is installed into a roaming workstation, a Domain ID is required. All other parameters are optional. However, for security reasons Digital recommends changing the Domain ID and Beacon Key.

If the network adapter is not going to be used in a roaming environment, the Domain ID must be set to $0x0000_{16}$ and the NWID must match other stations and Access Points.

Table 3–4 ODI Driver Configuration Parameters

Parameter[1]	Value Range	Usage
PORT xxx	'x' in the set [300, 390, 3c0, 3e0]	Identifies the network adapter's I/O base address (default 300). Value must correspond to I/O base address set by the switches on the adapter (refer to page 3–4). Optional parameter if 300.
NWID *xxxx*	'xxxx' hexadecimal value in the range $0100_{16} - FFFF_{16}$	Identifies the network adapter Network ID. Required if no roaming. If a value is used, it must be the same for all network adapters in the network. The default value is 0100_{16}. Using this value can result in unintentional overlap with adjacent RoamAbout cells.
DOMAIN ID *xxxx*	'xxxx' hexadecimal value in the range $0000_{16} - FFFF_{16}$	This parameter enables auto-connect. If a value is not used, or if it is set to 0000_{16}, the station cannot auto-connect to an Access Point with a different NWID. If a value is used, it must be the same for all network adPCMCIA card socket ("X,x" – use first found)apters in the domain. Default value is $0x0001_{16}$.
BEACON KEY *xxxx*	'xxxx' hexadecimal value in the range $0000_{16} - FFFF_{16}$	Used to encode the NWID transmitted by a roaming access point. If a value is used, it must be the same for all network adapters in the domain. Value 0000_{16} = no encoding. Default value is $0x0001_{16}$.
NODE ADDRESS *xxxxxxxxxxxx*	12 hexadecimal digits	Overrides the network adapter's factory-installed universal MAC address. The second digit must be a 2, 6, A, or E. Digital recommends not to change this value.
STATION NAME *x...x*	Any alphanumeric string (max 31 chars no spaces allowed)	Can only be used by the Point-to-Point Diagnostic utility.
ENCRYPTION KEY *xxxxxxxxxxxxxxxx*	16 hexadecimal digits (or 0)	A 16-hexadecimal-digit value enables encryption. A value of 0_{16} disables encryption.

[1] Required Parameters

If the network adapter is installed into a roaming workstation, a Domain ID is required. All other parameters are optional. However, for security reasons Digital recommends changing the Domain ID and Beacon Key.

If the network adapter is not going to be used in a roaming environment, the Domain ID must be set to $0x0000_{16}$ and the NWID must match other stations and Access Points.

4

Installing a Network Operating System on Windows 3.X and DOS

This chapter describes how to install a network operating system and how set up the network driver. The following network operating system installation procedures are discussed:

- PATHWORKS V5
- PATHWORKS V4
- Windows for Workgroups
- NetWare Lite
- Personal NetWare
- NetWare Version 4
- NetWare Version 3
- IBM OS/2 LAN Server

Follow the vendor-supplied documentation for a complete description of the installation procedure.

Installing PATHWORKS V5

To use a PATHWORKS V5 workstation as a station in a RoamAbout wireless network, perform the following steps during the PATHWORKS installation:

1. Run the PATHWORKS Setup program from the network (or from the PATHWORKS setup disk).

    `pwsetup` (using the network)
    or
    `a:\setup` (using the Setup disk)

2. When the list of NDIS drivers is displayed, choose "Other."

3. The PATHWORKS Setup program prompts you for various driver information, depending on whether you are installing PATHWORKS from the network or from the setup disk. The following is a list of the information you may be need to supply:

NDIS driver path:	`c:\roamabt\`
NDIS driver file:	`wvlan09.dos`
NDIS driver name:	`wvln09$`
Driver file:	`c:\roamabt\wvlan09.dos`
PROTOCOL.INI stub:	`c:\roamabt\protocol.ini`
PROTOCOL.INI parameters:	Change these parameters when prompted (see Setting Roaming Parameters section)
Domain_ID:	0x0001
Beacon_key :	0x0001

4. Continue responding to the setup questions to complete the PATHWORKS installation.

Installing PATHWORKS V4

To use a PATHWORKS V4 workstation as a station in a RoamAbout wireless network, perform the following steps during the PATHWORKS installation:

1. Run the PATHWORKS V4 setup program.

   ```
   netsetup
   ```

2. Select the Other NDIS driver when prompted for a driver during the PATHWORKS installation.

3. When the system prompts you for the driver, enter the following:

   ```
   c:\roamabt\wvlan09.dos
   ```

   Enter the following for the PROTOCOL.INI stub:

   ```
   c:\roamabt\
   ```

Installing Windows for Workgroups

The network adapter software distribution disk includes an OEMSETUP.INF file for installing the network adapter in a Windows for Workgroups environment.

To use a Windows for Workgroups PC as a station in a RoamAbout wireless network, perform the following steps:

1. Locate the Network group in the Windows for Workgroups Program Manager window.

2. Select the Network Setup ICON.

3. Select Drivers...

4. Select Add Adapter...

5. Select 'Unlisted or Updated Network Adapter'.

6. Insert the RoamAbout disk into drive A: and press Enter. The 'RoamAbout NDIS2 Driver' name is displayed.

7. Press Enter again to install the RoamAbout driver.

8. The PROTOCOL.INI file in C:\WINDOWS will include the driver name, NWID, Domain ID and Beacon Key. You can add or modify any of these parameters.

9. Refer to your Windows for Workgroups documentation and follow the instructions for installing and configuring network adapter drivers.

Installing NetWare Lite

To install NetWare Lite Version 1.1 with the RoamAbout PCMCIA ODI driver, follow these steps:

1. Place the NetWare Lite Program disk in drive A and type `a:install`. The NetWare Lite Main Menu appears. From the main menu, choose one of the following:

   a. Client

   b. Client and Server

   c. Server

2. At the Network Interface Card selection, move the cursor to highlight "other cards" in the Network Interface Cards list.

3. When prompted, place the RoamAbout software disk in drive A and press [Esc].

4. Choose WVLAN05.COM from the Drivers list and press [Return].

5. When prompted, place the NetWare Lite Program disk in drive A and press [Esc].

6. Press [Esc] again to accept the current installation values.

   NetWare Lite is now installed on your personal computer.

7. When the following message appears, place the RoamAbout PCMCIA software disk in drive A again and press [Esc]:

   `Insert the disk with the other LAN drivers into drive A:`

8. Copy the file NET.CFG from the RoamAbout PCMCIA disk to replace the one created on the hard disk by the NetWare Lite installation.

Installing Personal NetWare

To install Personal NetWare Version 1.0 with the RoamAbout PCMCIA ODI driver, follow these steps:

1. Place the Personal NetWare disk 1 in drive A and type `a:install`.

2. When prompted for Primary Network Interface Card, choose OEM Supplied Driver.

3. When prompted, place the RoamAbout software disk in drive A and press [Return].

4. Select RoamAbout from the Drivers list and press [Return].

5. Select the appropriate Media Frame Type for your network. The default is Ethernet 802.2.

6. When prompted, place the Personal NetWare disk back in drive A and press [Return].

7. Continue with the Personal NetWare installation until the installation is complete.

Installing NetWare Version 4

To install the RoamAbout PCMCIA driver for use in a NetWare Version 4 workstation, follow these steps:

1. Insert the NetWare Version 4 WSDOS disk in drive A and type `a:install`.

2. Step 4 of the NetWare Version 4.0 installation prompts you to insert the OEM-supplied disk. Place the RoamAbout software disk in drive A and press [Return].

3. Select RoamAbout from the Drivers list and press [Return].

4. Select the appropriate Media Frame Type for your network. The default is Ethernet 802.2. (Earlier versions of NetWare used Ethernet 802.3 and Ethernet II as defaults.)

5. When prompted, place the NetWare Program disk in drive A and press [Return].

6. Continue with the NetWare Version 4.0 installation until the installation is complete.

Installing NetWare Version 3

To install the RoamAbout PCMCIA driver for use in a NetWare Version 3 workstation, follow these steps:

1. Insert the NetWare WSGEN disk in drive A.

2. Copy the NetWare DOS/ODI support files to the C:\ROAMABT directory.

   For example:

   ```
   xcopy a:\netx.com c:\ROAMABT\
   xcopy a:\lsl.com c:\ROAMABT\
   xcopy a:\ipxodi.com c:\ROAMABT\
   ```

   For some NetWare versions, these files are provided on a separate DOS ODI WORKSTATION SERVICES disk.

3. Edit the workstation's AUTOEXEC.BAT file, and add the following lines (in the order shown) at the end of the file:

   ```
   CD \ROAMABT
   LSL
   WVLAN05
   IPXODI
   NETX
   CD \
   ```

IBM OS/2 LAN Server

To install the RoamAbout driver in LAN Server, you should first install a driver for an IBM-supported ETHERAND network adapter, and then replace that driver software and PROTOCOL.INI file by the respective RoamAbout files. The network card used for this purpose is the Western Digital card because its characteristics, from an installation viewpoint, are closest to the RoamAbout network adapter.

_____ **Note** _____

If you are installing RoamAbout in an existing configuration where the selected adapter is not a Western Digital card (a Token Ring card, for example), you must remove LAN Requester from your system and do a complete reinstallation. This is necessary to ensure that CONFIG.SYS and PROTOCOL.INI are correctly set up.

_____

In the Basic Configuration Services Main menu, choose the LAN Services, and select the Western Digital adapter, Universal Address.

In the Communication Manager, Advanced Configuration function, LAN Features selection, Western Digital selection, and IEEE 802.2 selection, make sure that the 802.3 protocol and Universal Address are installed.

Copy the NDIS Driver from the RoamAbout disk to C:\CMLIB. The driver is WVLAN02.OS2 in directory:
\MSLANMAN.OS2\DRIVERS\ROAMABT

Setting Roaming Parameters

Before completing the installation of your network adapter, you need to set the following roaming parameters in your PROTOCOL.INI file (for NDIS) or NET.CFG file (for ODI):

- Domain ID
- Beacon Key

The Domain ID and Beacon Key provide a means of authorizing a station to roam from the coverage area of one AP into the coverage area of another AP, even though the Network IDs are different. The Domain ID/Beacon Key are contained in a beacon that is transmitted by the AP. All APs (with roaming enabled) continuously issue beacons. When a station roams into the area of another AP, the Domain ID and Beacon Key are checked to verify that they match the new area's Domain ID and Beacon Key.

Enabling Roaming

By default, roaming is enabled. Table 4–1 shows the initial settings of the Domain ID and Beacon Key in the PROTOCOL.INI and NET.CFG files.

Table 4–1 Default Values for the Roaming Parameters

PROTOCOL.INI File	NET.CFG File
Domain_ID = 0x0001	Domain ID 0001
Beacon_key = 0x0001	Beacon Key 0001
NWID = 0x0100	NWID 0100

It is recommended that you change the default Domain ID and Beacon Key on all the stations and APs in your wireless network for security reasons.

――――――――――――――――――― **Note** ―――――――――――――――――――

For instructions on changing the Domain ID and Beacon Key on the AP, refer to the *RoamAbout Access Point Owner's Manual.*

―――

To change the Domain ID and Beacon Key on the station, edit the PROTOCOL.INI file (for NDIS) or NET.CFG file (for ODI) and change the value of the Domain ID and Beacon Key to any value from 0x0002 through 0xffff (for NDIS), or 0002 through ffff (for ODI). It is important to note that every station and AP within your wireless network must have the same Domain ID and Beacon Key. (It is not necessary for the Domain ID and Beacon Key to match.)

_____ **Note** _____

If you fail to change the default values, a station (equipped with a network adapter) from a different wireless network may be able to gain access to your network.

Disabling Roaming

To disable roaming, edit the PROTOCOL.INI file (for NDIS) or NET.CFG file (for ODI) set the Domain ID to 0 and the NWID to the same value as the Access Point. Refer to Table 4–2 for values.

Table 4–2 Disabling Roaming

PROTOCOL.INI File	NET.CFG File
Domain_ID = 0X0000	Domain ID 0000
NWID = 0X0100 – 0XFFFF	NWID 0100 – FFFF

After disabling roaming, ensure that the station has the same Network ID as your AP.

5

Installing Driver Software
on Windows 95 and Windows NT

This chapter describes how to install your Digital RoamAbout network adapter driver software on Windows 95 and Windows NT V3.51 operating systems. It also provides instructions for removing or updating earlier Beta versions of this driver in a Windows NT environment.

The Digital RoamAbout DS network adapters can be used with either Windows 95 or Windows NT V3.51 operating systems.

—————————————— **Note** ——————————————

Windows 95 and Windows NT V3.51 NDIS 3.1 network drivers do not require additional software (Enabler or Card and Socket Services) to support the RoamAbout DS PC Card. It relies completely on the functionality provided by Windows 95 and Windows NT. Be sure that the Enabler is not active in the CONFIG.SYS file.

————————————————————————————————————

Installing PC Card Drivers On Windows 95

These instructions assume that Windows 95 software is loaded and operating properly, although you will need the Windows 95 distribution CD/disks to complete the installation. To install your network adapter software:

Step	Action
1	Be sure that the Enabler is not active in the CONFIG.SYS file.
2	Copy the WVLAN22.SYS and WVLAN22.INF files to the root directory of a floppy disk.
3	Restart your PC (with or without the RoamAbout DS PC Card inserted). When the system is operating properly, it recognizes that new hardware has been installed, and then a setup wizard prompts you to insert a floppy disk.
4	Insert the floppy disk and follow setup wizard's instructions.

The setup wizard prompts you for the RoamAbout specific parameters. These parameters (NetWork ID, Domain ID, Beacon Key, etc.) must match your RoamAbout Access Point parameters

After you complete the setup wizard instructions for inserting the network parameters, reboot the PC to enable the new network parameters.

To change the network parameters at any time:

Step	Action
1	Select the `My Computer` icon from the Windows 95 desktop.
2	Click on `Control Panel`.
3	Click on `Network`.
4	Click on `Digital RoamAbout DS ....`
5	Click on `Properties`.
6	Click on `Advanced`.
7	Set the values for the Beacon Key, Domain ID and Station Name (optional), then reboot.

Your system can now operate in a wireless environment.

If the network driver is not functioning properly, check the NDISLOG.TXT file in the WINDOWS directory. This file contains additional information about the problem. Whenever making a support call, be sure to have the information in the file available.

Installing ISA Drivers On Windows 95

Installing an ISA network adapter on Windows 95 operating system requires that you check the interrupt request vector (IRQ) and install the RoamAbout NDIS3 driver software.

These instructions assume that Windows 95 software is loaded and operating properly, and that your ISA network adapter is not installed.

Checking the Interrupt Request Vector (IRQ)

The ISA network adapter is factory configured for an interrupt request vector (IRQ) of 10. Before installing the ISA network adapter, you must determine if IRQ 10 is available. To determine which IRQs are available to use:

Step	Action
1	With the **right** mouse button, Select the `My Computer` icon from the Windows 95 desktop.
2	Select `Properties`.
3	Select the `Device Manager` tab.
4	Double-click on the `Computer` icon in the display window.
5	In the Computer Properties window: a. Select the View Resources tab. b. Click on `Interrupt request [IRQ]` to view the IRQ settings. c. If IRQ 10 is not allocated, click the OK button to proceed to Installing the RoamAbout NDIS3 Driver Software section.
6	If IRQ 10 is allocated, select an available IRQ and write it down. During installation you will change the network adapter's IRQ factory setting to this new value. Valid network adapter IRQ values are: 03, 04, 05, 07, 10, 11, 12 and 15. Appendix C provides instructions to change the default IRQ setting.
7	Proceed to Installing the RoamAbout NDIS3 Driver Software section.

Installing NDIS3 Drivers on Windows 95

To install the RoamAbout NDIS3 software driver on Windows 95, you must inform the operating system that a RoamAbout network adapter has been installed. Windows 95 does not automatically recognize the RoamAbout ISA network adapter. To install the NDIS3 driver software:

Step	Action
1	From the Windows 95 status bar, click on the `Start` button.
2	Move the cursor to `Settings` and then click on `Control Panel`.
3	Double-click on the `Add New Hardware` icon.
4	Click on the `Next>` button.
5	Select **No** when the prompt asks `Do you want Windows to search for your new hardware?, and then click on ` the `Next>` button.
6	From the list of hardware types in the Select Device window, select `Network Adapters,` and then click on the `Next>` button and open the `Select Device` window.

Windows 95 `Select Device` window displays a listing of manufacturers names and their associated network adapters, and a list of detected network drivers. To install the RoamAbout NDIS3 driver:

Step	Action
1	From the Selcet Device window, click on the `Have Disk...` button.
2	Insert the Windows 95, Windows NT, Utilities disk into drive A.
3	From the Install From Disk window, click the `OK` button. A list of RoamAbout NDIS3 drivers appear.
4	Select the Digital RoamAbout DS/ISA NDIS 3.1 Miniport Driver and click the `OK` button.
5	Record the I/O Base Address switch settings that Windows 95 Add New Hardware Wizard selected for you. You will be asked use this setting during the ISA network adapter installation procedure in Chapter 3 to set your network adapter I/O Base Address switches.
6	Click on the Next> button. Windows 95 will start copying files from the Windows 95 installation disk and the RoamAbout disk.
7	If you do not have a network installed yet, Windows 95 prompts you to identify a computer and a workgroup name for your computer. Click the `OK` button, and then specify computer and workgroup names. Once you have entered names, press Enter. The Advanced tab window is displayed.
8	In the Advanced tab window, set the Beacon Key and Domain ID values to match the values assigned to the Digital RoamAbout Access Point.
9	Click on the `Finish` button to complete the installation. Windows 95 prompts you to shut down your computer.
10	Proceed to Chapter 3 to install the ISA network adapter.

Removing NDIS3 Drivers from Windows 95

To remove field test versions of the NDIS3 Driver for Windows 95:

Step	Action
1	Record all network parameters, including Donain ID, Beacon Key, Encryption Key, Network Protocols (IP, NetBEUI, IPX) and the IP address and any other IP related information.
2	Double-click on the `My Computer` icon.
3	Double-click on the `Control Panel` icon.
4	Double-click on the `System` icon.
5	Click on the `Device Manager` tab
6	Click on the `Digital RoamAbout DS/ISA NDIS3 Miniport Driver`
7	Click on the `Remove` button.
8	Click `OK`
9	Delete the old WVLAN22.INF file. This can be done using the Explorer or it can be done at the DOS level. The location of the file is: \windows\system\wvlan22.sys\windows\inf\wvlan22.inf
10	Reboot the PC and return to the previous section to install your new driver.

Installing PC Card Drivers On Windows NT

Installing a PC Card network adapter on Windows NT 3.51 operating system requires that you check the interrupt request vector (IRQ) and port status, and install the RoamAbout NDIS3 driver software.

These instructions assume that Windows NT 3.51 software is loaded and operating properly, and that your PC Card network adapter is not installed.

Checking the Interrupt Request Vector (IRQ)

The PC Card network adapter is factory configured for an interrupt request vector (IRQ) of 10. Before installing the PC Card network adapter, you must determine if IRQ 10 is available. To determine which IRQs are available to use:

Step	Action
1	From the Program Manager window, double-click on the `Administrative Tools` program group.
2	Double-click on the `Windows NT Diagnostics` icon.
3	On the Diagnostics window, click on the `IRQ/Port Status...` button.
4	Scroll through the Interrupts field to check if IRQ (Vector) 10 is allocated.
5	If IRQ 10 is allocated, select an available IRQ and write it down. During installation you will change the network adapter's IRQ factory setting to this new value. Valid network adapter IRQ values are: 03, 04, 05, 07, 10, 11, 12 and 15. Appendix C provides instructions to change the default IRQ setting.
6	Install the PC Card network adapter. Proceed to Chapter 2 and follow the procedures. Once you install the PC Card network adapter, return to the following section to complete the driver installation.

Installing NDIS3 Drivers on Windows NT

To install the RoamAbout NDIS3 software driver on Windows NT, you must inform the operating system that a RoamAbout network adapter has been installed. Windows NT does not automatically recognize the RoamAbout PC Card network adapter. To install the NDIS3 driver software:

Step	Action
1	Copy the WVLAN22.SYS, WVLAN22.DLL, WVLAN22.HLP and OEMSETNT.INF files to the root directory of a floppy disk.
2	From the Program Manager window, double-click on the `Main` program group.
3	Double-click on the `Control Panel` icon.
4	Double-click on the `Network` icon.
5	Click on the Add Adapter... button from the Network Icon.
6	In the Add Adapter window, set the Network ID, Beacon Key, Domain ID, etc values to match the values assigned to the Digital RoamAbout Access Point.
7	Reboot the PC for these new parameters to take effect.

If the driver does not functions properly, check the Event Log. This file contains additional information about the problem that occurred.

Changing the Interrupt Request Vector (IRQ)

The PC Card network adapter is factory configured for an interrupt request vector (IRQ) of 10. To change the IRQ value:

Step	Action
1	From the Program Manager window, double-click on the `Administrative Tools` program group.
2	Double-click on the `Windows NT Diagnostics` icon.
3	From the pull down menu of the Windows NT Diagnostics menu bar, select `Tools`, and then `Registry Editor`.
4	In the registry editor, go to the Services directory by opening the following folders: HKEY_LOCAL_MACHINE, SYSTEM, CurrentControlSet, Services
5	From the Services directory, open the WVLAN221 directory, Parameters folder.
6	Scroll down the displayed list of parameters on the right and double-click on the `InterruptNumber` parameter to open the DWORD Editor.
7	Select `Decimal` in the Radix field of the DWORD Editor window.
8	Change the Data value to correspond to the IRQ you want to use.
9	Click the `OK` button to exit the DWORD EDitor.
10	Close all Registry Editor windows and restart Windows NT.
11	Follow the procedures for checking the IRQ to verify that Windows NT is now using the correct IRQ.

Installing ISA Drivers On Windows NT

Installing an ISA network adapter on Windows NT 3.51 operating system requires that you check the interrupt request vector (IRQ) and port status, and install the RoamAbout NDIS3 driver software.

These instructions assume that Windows NT 3.51 software is loaded and operating properly, and that your ISA network adapter is not installed.

Checking the Interrupt Request Vector (IRQ)

The ISA network adapter is factory configured for an interrupt request vector (IRQ) of 10. Before installing the ISA network adapter, you must determine if IRQ 10 is available. To determine which IRQs are available to use:

Step	Action
1	From the Program Manager window, double-click on the `Administrative Tools` program group.
2	Double-click on the `Windows NT Diagnostics` icon.
3	On the Diagnostics window, click on the `IRQ/Port Status...` button.
4	Scroll through the Interrupts field to check if IRQ (Vector) 10 is allocated.
5	If IRQ 10 is allocated, select an available IRQ and write it down. During installation you will change the network adapter's IRQ factory setting to this new value. Valid network adapter IRQ values are: 03, 04, 05, 07, 10, 11, 12 and 15. Appendix C provides instructions to change the default IRQ setting.
6	Install the ISA network adapter. Proceed to Chapter 3 and follow the procedures. Once you set the switches (I/O Base Address and IRQ) and install the network adapter, return to the following section to complete the driver installation.

Installing NDIS3 Drivers on Windows NT

To install the RoamAbout NDIS3 software driver on Windows NT, you must inform the operating system that a RoamAbout network adapter has been installed. Windows NT does not automatically recognize the RoamAbout ISA network adapter. To install the NDIS3 driver software:

Step	Action
1	Copy the WVLAN22.SYS, WVLAN22.DLL, WVLAN22.HLP and OEMSETNT.INF files to the root directory of a floppy disk.
2	From the Program Manager window, double-click on the `Main` program group.
3	Double-click on the `Control Panel` icon.
4	Double-click on the `Network` icon.
5	Click on the Add Adapter... button from the Network Icon.
6	In the Add Adapter window, set the Network ID, Beacon Key, Domain ID, etc values to match the values assigned to the Digital RoamAbout Access Point.
7	Reboot the PC for these new parameters to take effect

If the driver does not functions properly, check the Event Log. This file contains additional information about the problem that occurred.

Upgrading NDIS3 Drivers from Windows NT

To upgrade from an earlier version of Windows NT NDIS3 driver:

Step	Action
1	Record all network parameters, including Donain ID, Beacon Key, Encryption Key, Network Protocols (IP, NetBEUI, IPX) and the IP address and any other IP related information.
2	From the Program Manager window, double-click on the `Main` program group.
3	Double-click on the `Control Panel` icon.
4	Double-click on the `Network` icon.
5	On the Network Settings window from the Installed Network Software window, select the RoamAbout Adapter Driver.
6	Click on the `Update` button.
7	Insert the Windows 95, Windows NT, Utilities disk when requested.
8	Update the RoamAbout parameters.

If the above procedure does not work correctly, click on `Remove` and then start the installation again. You should reboot the PC between removing and installing.

6

Point–to–Point Diagnostic Utility

The Point-to-Point Diagnostic utility is a PC Card and ISA Network Adapter tool that allows you to verify the communications path between a station and an Access Point (AP), or between two stations. The Point-to-Point Diagnostic utility helps to determine if:

- PC Cards or ISA network adapters and radio modules function correctly to allow exchange of messages
- Radio module positioning is optimal
- Stations are within operating range of each other

You can also use the utility to get information about local RF noise and environmental suitability. You can save measurement data to a disk file.

Running the Point-to-Point Diagnostic Utility

If you have installed the RoamAbout client driver for CSS in a DOS environment, you can run the program from the RoamAbout subdirectory of the hard disk while the network driver is running (the driver becomes temporarily inactive). Type:

```
cd \roamabt
ptpdiag
```

To run the utility in all other environments (ISA, PC Card, Enabler, Windows 95 and Windows NT):

1. Put the Windows 95, Windows NT, Utilities disk into drive A:.
2. Change the disk to a boot disk by typing: `sys A:` Return.
3. Reboot the station.
4. Type: `ptpdiag` Return

Once you press Return, a menu screen is displayed, as shown in Figure 6–1.

Figure 6–1 Selecting the Address

PC Card Display

```
┌──────────────────────────────────────────────────────────────┐
│          POINT–TO–POINT DIAGNOSTIC UTILITY                     │
├──────────────────────────────────────────────────────────────┤
│         WaveLAN(TM) wireless communication technology of       │
│              AT&T Global Information Solutions Company          │
│                                                                │
│              AT Address      PCMCIA Socket                     │
│                 300                                            │
│                 390               A/B                          │
│                 3C0                                            │
│                 3E0                                            │
│                                                                │
│  Select the Socket number of the card to be diagnosed and press [ENTER] to │
│  continue.                                                      │
│  The Socket Number indicates the physical location of the card.│
│  The card mounted in the lowest–numbered slot is the first card, the card │
│  mounted in the socket with the higher number is the second card, etc. │
│                                                                │
├──────────────────────────────────────────────────────────────┤
│  [F1] – Help                                      [F10] Exit   │
└──────────────────────────────────────────────────────────────┘
```

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ISA Display

```
┌──────────────────────────────────────────────────────────────┐
│          POINT–TO–POINT DIAGNOSTIC UTILITY                     │
├──────────────────────────────────────────────────────────────┤
│         WaveLAN(TM) wireless communication technology of       │
│              AT&T Global Information Solutions Company          │
│                                                                │
│                   AT Address                                   │
│                      300                                       │
│                      390                                       │
│                      3C0                                       │
│                      3E0                                       │
│                                                                │
│  Select the Socket number of the card to be diagnosed and press [ENTER] to │
│  continue.                                                     │
│  The card you select should correspond to the one set using the configuration │
│  switches, when the card was physically installed in this network station. │
│                                                                │
├──────────────────────────────────────────────────────────────┤
│  [F1] – Help                                      [F10] Exit   │
└──────────────────────────────────────────────────────────────┘
```

LKG–9407–94I

Choose the appropriate address by pressing either the arrow keys or Tab key. Once you select the appropriate address, press [Return].

After running card diagnostics, the menu shown in Figure 6–2 is displayed.

Figure 6–2 Selecting a Test Connection

```
┌──────────────────────────────────────────────────────────────┐
│            POINT–TO–POINT DIAGNOSTIC UTILITY                   │
├──────────────────┬─────────────────────────┬─────────────────┤
│   This Station   │  Other Stations (Total 0)│   Link Quality  │
├──────────────────┼─────────────────────────┼─────────────────┤
│ WaveLAN 915      │                         │                 │
│ Security : No    │                         │                 │
│                  │                         │                 │
│                  │                         │                 │
│ NWID : 1234      │                         │                 │
│ Name : [08 00 0E 20 82 EF]                │                 │
│  Search for Other Stations                │                 │
├──────────────────┴─────────────────────────┴─────────────────┤
│ If you press [ENTER], this station will send out a broadcast  │
│ to all stations in this network. Stations able to perform     │
│ Point–to–Point Diagnostics will respond.                      │
├──────────────────────────────────────────────────────────────┤
│ [F1] – Help                                    [F10] Exit     │
└──────────────────────────────────────────────────────────────┘
```

LKG–9409–94I

Point–to–Point Diagnostic Utility   **6–3**

This screen allows you test the connection between other stations or Access Points, or to specify a different Network ID to test against. Figure 6–3 shows an example of specifying a different Network ID.

_____ **Note** _____

To find out the Network ID (NWID) of the AP in your area, contact your network administrator.

_____

Figure 6–3 Specifying a Different Network ID

```
┌─────────────────────────────────────────────────────────┐
│                                                          │
│  ┌────────────────────────────────────────────────────┐ │
│  │          POINT–TO–POINT DIAGNOSTIC UTILITY         │ │
│  ├───────────────────┬──────────────────┬─────────────┤ │
│  │    This Station   │ Other Stations   │ Link Quality│ │
│  │                   │    (Total 0)     │             │ │
│  ├───────────────────┼──────────────────┼─────────────┤ │
│  │ WaveLAN 915       │                  │             │ │
│  │ Security : No     │                  │             │ │
│  │                   │                  │             │ │
│  │                   │                  │             │ │
│  │ NWID : FFFF       │                  │             │ │
│  │ Name : [08 00 0E 20 82 EF]           │             │ │
│  │ Search for Other Stations            │             │ │
│  ├───────────────────┴──────────────────┴─────────────┤ │
│  │ If you press [ENTER], this station will send out a  │ │
│  │ broadcast to all stations in this network. Stations │ │
│  │ able to perform Point–to–Point Diagnostics will     │ │
│  │ respond.                                            │ │
│  ├─────────────────────────────────────────────────────┤ │
│  │ [F1] – Help                             [F10] Exit  │ │
│  └─────────────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────┘
```

LKG–9409–94I

6–4 Point–to–Point Diagnostic Utility

When you press [Return] to test the link between your station and another station or AP, the RoamAbout network adapter transmits an explore message in an attempt to establish peer-to–peer communications, as shown in Figure 6–4.

Figure 6–4 Awaiting Response

```
┌────────────────────────────────────────────────────────────┐
│  ┌──────────────────────────────────────────────────────┐  │
│  │          POINT–TO–POINT DIAGNOSTIC UTILITY           │  │
│  └──────────────────────────────────────────────────────┘  │
│  ┌─────────────────┬────────────────────────┬───────────┐  │
│  │   This Station  │  Other Stations (Total 0) │ Link Quality │
│  ├─────────────────┼────────────────────────┼───────────┤  │
│  │ WaveLAN 915     │                        │           │  │
│  │ Security : No   │                        │           │  │
│  ├─────────────────┤                        │           │  │
│  │ ▐Explore active▌│                        │           │  │
│  ├─────────────────┤                        │           │  │
│  │ NWID : FFFF     │                        │           │  │
│  │ Name : [08 00 0E 20 82 EF] │             │           │  │
│  ├─────────────────┤                        │           │  │
│  │ Search for Other Stations │              │           │  │
│  └─────────────────┴────────────────────────┴───────────┘  │
│   If you press [ENTER], this station will send out a broadcast to all │
│   stations in this network. Stations able to perform Point–to–Point   │
│   Diagnostics will respond.                                            │
│  ┌──────────────────────────────────────────────────────┐  │
│  │ [F1] – Help                              [F10] Exit  │  │
│  └──────────────────────────────────────────────────────┘  │
└────────────────────────────────────────────────────────────┘
```

LKG–9410–94I

Figure 6–5 shows two responders (one AP and one station). Highlight the peer that you want to communicate with and press [Return].

Figure 6–5 Selecting a Responder

```
┌──────────────────────────────────────────────────────────────┐
│                                                                │
│   ┌──────────────────────────────────────────────────────┐    │
│   │            POINT–TO–POINT DIAGNOSTIC UTILITY           │    │
│   ├──────────────────┬─────────────────────┬─────────────┤    │
│   │   This Station   │ Other Stations (Total 2) │ Link Quality │ │
│   ├──────────────────┼─────────────────────┼─────────────┤    │
│   │ WaveLAN 915      │ RoamAbout Access Point │           │    │
│   │ Security : No    │ [08 00 0E 20 40 93]    │           │    │
│   ├──────────────────┤                        │           │    │
│   │ Explore active   │                        │           │    │
│   ├──────────────────┤                        │           │    │
│   │ NWID : FFFF      │                        │           │    │
│   │ Name : [08 00 0E 20 82 EF] │              │           │    │
│   ├──────────────────┤                        │           │    │
│   │ Search for Other Stations │               │           │    │
│   └──────────────────┴─────────────────────┴─────────────┘    │
│                                                                │
│   Use the [Up], [Down], [PgUp] and [PgDn] keys to select a station. │
│   Press the [ENTER] or [RETURN] key to start an RF link test with the │
│   selected other station.                                       │
│                                                                │
│   [F1] – Help                          [P5] Address   [F10] Exit │
│                                                                │
└──────────────────────────────────────────────────────────────┘
```
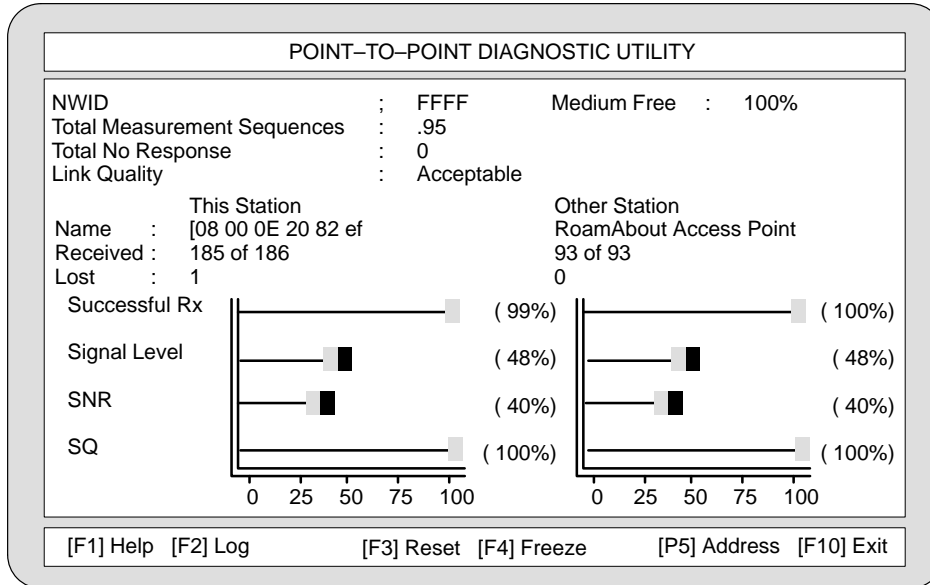
LKG–9411–94I

After you press [Return], the link quality assessment is made, as shown in Figure 6–6.

Figure 6–6 Link Quality Assessment Display

```
┌──────────────────────────────────────────────────────────────────┐
│                                                                    │
│  ┌──────────────────────────────────────────────────────────────┐ │
│  │            POINT–TO–POINT DIAGNOSTIC UTILITY                  │ │
│  └──────────────────────────────────────────────────────────────┘ │
│                                                                    │
│  ┌─────────────────────┬─────────────────────────┬──────────────┐ │
│  │     This Station    │  Other Stations (Total 2)│ Link Quality │ │
│  ├─────────────────────┼─────────────────────────┼──────────────┤ │
│  │ WaveLAN 915         │ RoamAbout Access Point  │ █Acceptable█ │ │
│  │ Security : No       │ [08–00–0E–20–40–93]     │              │ │
│  ├─────────────────────┤                         │              │ │
│  │ RF Link test active │                         │              │ │
│  ├─────────────────────┤                         │              │ │
│  │ NWID : FFFF         │                         │              │ │
│  │ Name : [08 00 0E 20 82 EF]                    │              │ │
│  ├─────────────────────┤                         │              │ │
│  │ Search for Other Stations                     │              │ │
│  └─────────────────────┴─────────────────────────┴──────────────┘ │
│  This station is now sending frame sequences to the selected station. │
│  The result of the RF link test is displayed behind the name of the selected station. │
│  If you press the [ENTER] key, more details will be displayed.     │
│                                                                    │
│  [F1] – Help [F2] Log                      [P5] Address [F10] Exit │
│                                                                    │
└──────────────────────────────────────────────────────────────────┘
```
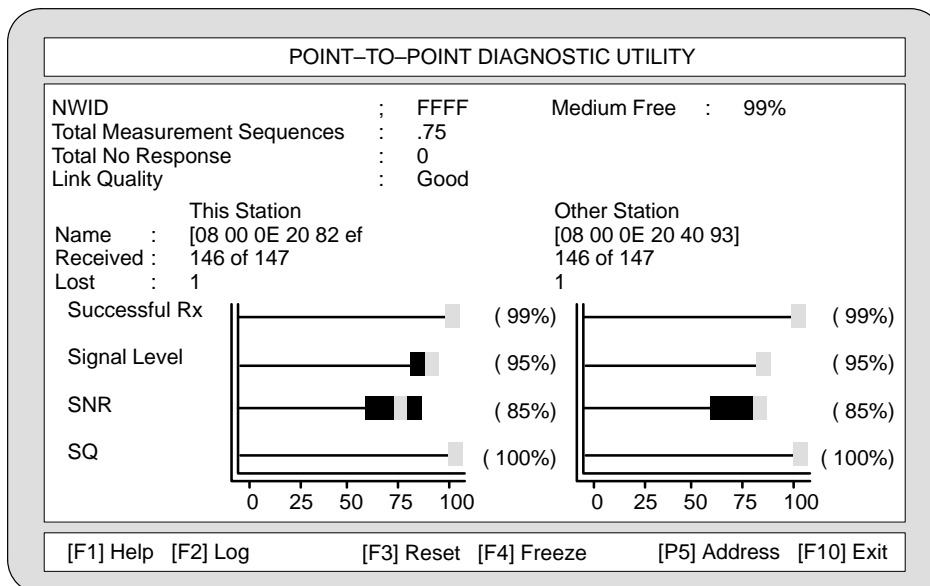
LKG–9413–94I

To view more detailed link quality assessment information, press [Return]. Figure 6–7 shows how the link quality assessment information appears for a connection to an AP. Figure 6–8 shows how the information appears for a connection to another station.

Figure 6–7 Link Quality Assessment – Access Point

```
┌─────────────────────────────────────────────────────────────────┐
│  ┌─────────────────────────────────────────────────────────────┐ │
│  │           POINT–TO–POINT DIAGNOSTIC UTILITY                 │ │
│  ├─────────────────────────────────────────────────────────────┤ │
│  │ NWID                        ;   FFFF      Medium Free :  100%│ │
│  │ Total Measurement Sequences :   .95                         │ │
│  │ Total No Response           :   0                           │ │
│  │ Link Quality                :   Acceptable                  │ │
│  │           This Station              Other Station           │ │
│  │ Name    : [08 00 0E 20 82 ef        RoamAbout Access Point  │ │
│  │ Received: 185 of 186                93 of 93                │ │
│  │ Lost    : 1                         0                       │ │
│  │   Successful Rx    ████████████ ( 99%)   ████████████ (100%)│ │
│  │   Signal Level     █████ ( 48%)          █████ ( 48%)       │ │
│  │   SNR              ████ ( 40%)           ████ ( 40%)        │ │
│  │   SQ               ████████████ (100%)   ████████████ (100%)│ │
│  │        0  25  50  75  100            0  25  50  75  100      │ │
│  ├─────────────────────────────────────────────────────────────┤ │
│  │ [F1] Help  [F2] Log      [F3] Reset  [F4] Freeze  [P5] Address  [F10] Exit │ │
│  └─────────────────────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────────────┘
```

LKG–9414–94I

Figure 6–8 Link Quality Assessment – Station

```
┌─────────────────────────────────────────────────────────────────┐
│  ┌─────────────────────────────────────────────────────────────┐ │
│  │           POINT–TO–POINT DIAGNOSTIC UTILITY                 │ │
│  ├─────────────────────────────────────────────────────────────┤ │
│  │ NWID                        ;   FFFF      Medium Free :  99% │ │
│  │ Total Measurement Sequences :   .75                         │ │
│  │ Total No Response           :   0                           │ │
│  │ Link Quality                :   Good                        │ │
│  │           This Station              Other Station           │ │
│  │ Name    : [08 00 0E 20 82 ef        [08 00 0E 20 40 93]     │ │
│  │ Received: 146 of 147                146 of 147             │ │
│  │ Lost    : 1                         1                       │ │
│  │   Successful Rx    ████████████ ( 99%)   ████████████ ( 99%)│ │
│  │   Signal Level     █████████ ( 95%)      █████████ ( 95%)   │ │
│  │   SNR              ███████ ( 85%)        ███████ ( 85%)     │ │
│  │   SQ               ████████████ (100%)   ████████████ (100%)│ │
│  │        0  25  50  75  100            0  25  50  75  100      │ │
│  ├─────────────────────────────────────────────────────────────┤ │
│  │ [F1] Help  [F2] Log      [F3] Reset  [F4] Freeze  [P5] Address  [F10] Exit │ │
│  └─────────────────────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────────────┘
```

LKG–9412–94I

For each station or AP, the following measurements are displayed:

- Signal Quality (SQ)
- Signal-to-Noise Ratio (SNR)
- Signal Level
- Packets transmitted from the remote station
- Packets received at this station
- Percentage of successful packets received

The Link Quality assessment is based on the Signal Quality (SQ) and Signal-to-Noise Ratio (SNR) measurements, as described in Table 6–1.

Table 6–1 Signal Quality and Signal-to-Noise Ratio Measurements

Measurement	Description
Signal Quality	Signal Quality indicates the clarity of the signals received. It can be affected by the number and position of radio-frequency reflecting surfaces (such as exposed steel structural components of some buildings) in the environment of the signal path.
Signal-to-Noise Ratio	Signal-to-Noise Ratio (SNR) is based on the strength of the received signal relative to local noise. The received signal level is displayed alongside the SNR measurement.

Troubleshooting Point-to-Point Diagnostics

Refer to the following descriptions for troubleshooting with Point-to-Point Diagnostics.

Problem: You start "`Search for other Stations`" and nothing happens, that is, "`Explore Active`" continues to be displayed.

Action: Return to the previous screen and try again. If the search still fails, check the Network ID and also verify that the other station or AP is within operating range.

Problem: Signal too weak. The radio module is completely shielded by a radio frequency barrier or the stations are too far apart.

Action: Relocate the radio module and/or the station.

Problem:	Local noise level too high for signal measurement. The radio module is too close to a local radio-frequency (RF) noise source.
Action:	Relocate the radio module and/or the station, or eliminate the local noise source.
Problem:	Security feature mismatch. If the network adapter is equipped with the built-in encryption feature, it is possible that one of the stations does not have encryption enabled or that the encryption key values are different.
Action:	Check your installation records. Ensure that both stations have security enabled and are using the same encryption key, or that both stations are configured to have security disabled.
Problem:	The network adapter or radio module is defective.
Action:	Replace the network adapter.

Radio Module Positioning

The Signal Quality and Signal-to-Noise Ratio displays give you an opportunity to interactively find the best radio module placement by watching the display as you try various positions.

Some environments can cause pockets of reduced Signal Quality to occur in an unpredictable way. A small relocation of the radio module is often enough to give a significant improvement. If the signal quality is not appropriate, refer to Table 6–2 for suggestions on what to do.

Table 6–2 Solving Poor Signal Quality Problems

If This Situation Occurs...	Try This...
If SNR is poor (<20) and the signal level is high, the radio module is too close to a local RF noise source.	Relocate the radio module and/or the station, or eliminate the local RF noise source.
If SNR is poor (<20) and the signal level is low (<20), the problem is most likely signal attenuation caused by radio module shielding or stations situated too far apart.	Remove shielding or relocate the radio module and/or station.

Saving the Measurement Data

By pressing [F10] you can save the measurement data to a log file. You can choose between spreadsheet-compatible (comma-separated value or CSV) or ASCII file format. An example of measurement data saved in ASCII format is shown in Figure 6–9.

Figure 6–9 Link Test Report

```
*****LINK TEST REPORT*****
Description          : Description
Link Quality         : Good
Start Link test      : 19 July 1994, 13:50
End Link test        : 19 July 1994, 13:51
NWID                 : FFFF
Total Sequences      : 261
Total No Response    : 6
This Station         : 08 00 0E 20 82 FF – [08 00 0E 20 82 EF]
Other Station        : 08 00 0E 20 40 93 – [08 00 0E 20 40 93]

                              This station            Other station

                              Aver. Min. Max.         Aver. Min. Max.
% Successful Rx   (0–100)      97.0   –    –            97.0   –    –
Signal Quality    (0–100)     100   100  100            99    93  100
SNR               (0–100)      79    60   80            70    51   78
Signal Level      (0–100)      83    75   84            85    75   86

                              Date      Time          Date      Time
Signal quality,   Max. at     19/09/93  13:51         19/09/93  13:51
                  Min. at     19/09/93  13:51         19/09/93  13:51
SNR               Max. at     19/09/93  13:51         19/09/93  13:51
                  Min. at     19/09/93  13:51         19/09/93  13:51
Signal level      Max. at     19/09/93  13:50         19/09/93  13:51
                  Min. at     19/09/93  13:50         19/09/93  13:51

*****END LOG*****
```

LKG-8702-93I

You can append data to an existing file or save to a new file, and you can choose to save the data either once or at regular intervals during the test.

Command Line Parameters

When running the Point-to-Point diagnostics, you can use any of the parameter options specified in Table 6–3.

Table 6–3 Point-to-Point Diagnostics Command Line Parameters

Parameter	Description
–M	Sets the Video mode to monochrome. Improves legibility on monochrome screens. Use this parameter if you have difficulty viewing the display.
–Sx (PC Card only)	Specifies the PCMCIA socket to use, where x is any value from 1 to 4.
–Px (ISA only)	Specifies card base I/O address, where x is any value from 1 to 4, as follows: x=1: base I/O address 300 x=2: base I/O address 390 x=3: base I/O address 3C0 x=4: base I/O address 3E0
–Nxx	Specifies the station's name, where xx is a string up to 20 characters.
–I*xxxx*	Specifies the Network ID to be used, where *xxxx* is any hexadecimal value from 0100 to ffff.

The following is an example of a command line parameter used to set the Network ID to ffff:

```
ptpdiag   –Iffff
```

7

PC Card WaveMONITOR Utility

The WaveMONITOR utility is a site survey tool used with PC Card network adapters that assists you in selecting the placement of your Digital RoamAbout Access Point or for troubleshooting mobile network problems.

Running the WaveMONITOR Utility

You must run the WaveMONITOR utility before running your network operating software.

If you have installed the RoamAbout client driver for CSS in a DOS environment, you can run the program from the RoamAbout subdirectory of the hard disk while the network driver is running (the driver becomes temporarily inactive). Type:

```
cd \roamabt
wmonitor   Return
```

To run the utility in all other environments (PC Card, Enabler, Windows 95 and Windows NT):

1. Put the Windows 95, Windows NT, Utilities disk into drive A:.
2. Change the disk to a boot disk by typing: `sys A:` Return.
3. Reboot the station.
4. Type: `wmonitor` Return

Once you press [Return], the WaveMONITOR MAIN MENU is displayed, as shown in Figure 7–1.

The first time you use the utility, you should access the options in the following order:

- Setup sets your Domain ID and Beacon Key
- Configure WaveMONITOR sets your configuration parameters
- Run WaveMONITOR determines the placement of your Access Point

For specific information on any option or parameter, refer to the online Help.

Figure 7–1 WaveMONITOR Main Menu

WaveAROUND	WaveMONITOR	Version 2.x

– MAIN MENU –

Run WaveMONITOR

Configure WaveMONITOR

Quit

Use the cursor keys to select an option and press [ENTER]

WaveLAN(TM) wireless communication technology of AT&T

[F1] – general Help   [F5] – Setup   [F6] Domain Detect Mode
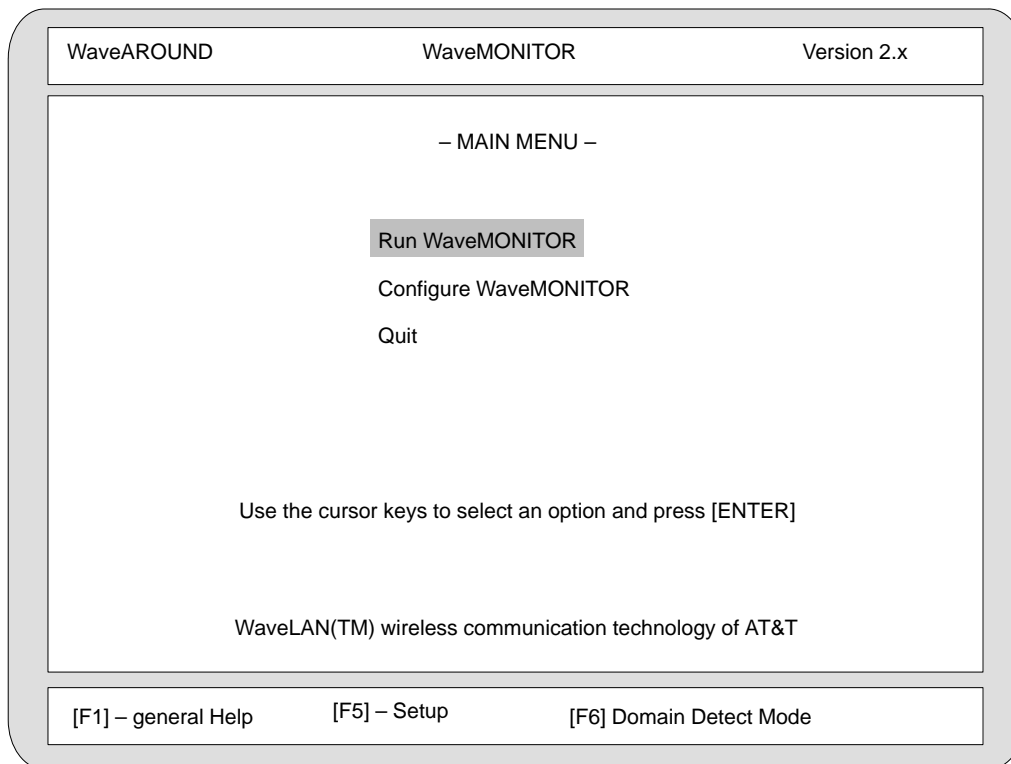
WaveMONITOR Setup

WaveMONITOR Setup allows you to configure your Domain ID and Beacon Key parameters in your roaming PC using a Setup routine. You only have to run the Setup routine once while you remain in the same Domain. To run Setup, perform the following steps:

At the WaveMONITOR MAIN MENU screen:

1. Press [F5]. The SETTINGS menu now is displayed.
2. Enter the same Domain ID and Beacon Key values that you use in your Access Point.
3. Press [Esc].
4. Press [Return] to save the changes and return to the MAIN MENU.

Configure WaveMONITOR

WaveMONITOR allows you to set four main configuration parameters. Each main parameter contains a list of associated parameter values that you can change.

To access the configuration menu, select the Configure WaveMONITOR option from the MAIN MENU. The CONFIGURATION SCREEN is displayed, as shown in Figure 7–2.

The Display Options configuration parameter lets you choose up to four parameters simultaneously. Since the signal-to-noise ratio is the primary indicator to use in monitoring the domain, Digital recommends that you select the Signal to Noise Ratio (SNR) as one of your parameters.

Figure 7–2 Configure WaveMONITOR Screen

WaveAROUND	WaveMONITOR	Version 2.x

– CONFIGURATION SCREEN –

Window Size	7
Display Mode	Moving Window
Display Options	◇ – Access Point Name – Signal Level – Local Noise Level – Remote Noise Level ◇ – Signal to Noise Ratio – Signal Quality ◇ – % of beacons Received
Logging	Off
Exit Configuration	

Use space bar to toggle option, press [ENTER] to select option

[F1] – Help   [F2] – Set Defaults

Run WaveMONITOR

To run WaveMONITOR, select Run WaveMONITOR from the MAIN
MENU. Choosing the Signal to Noise Ratio parameter (see Figure 7–3)
allows you to determine the SNR value. In a roaming environment, at least
one Access Point should record an SNR value of 24 or higher for acceptable
performance and an SNR value of 30 or higher for optimum performance.

Figure 7–3 Run WaveMONITOR Screen

8
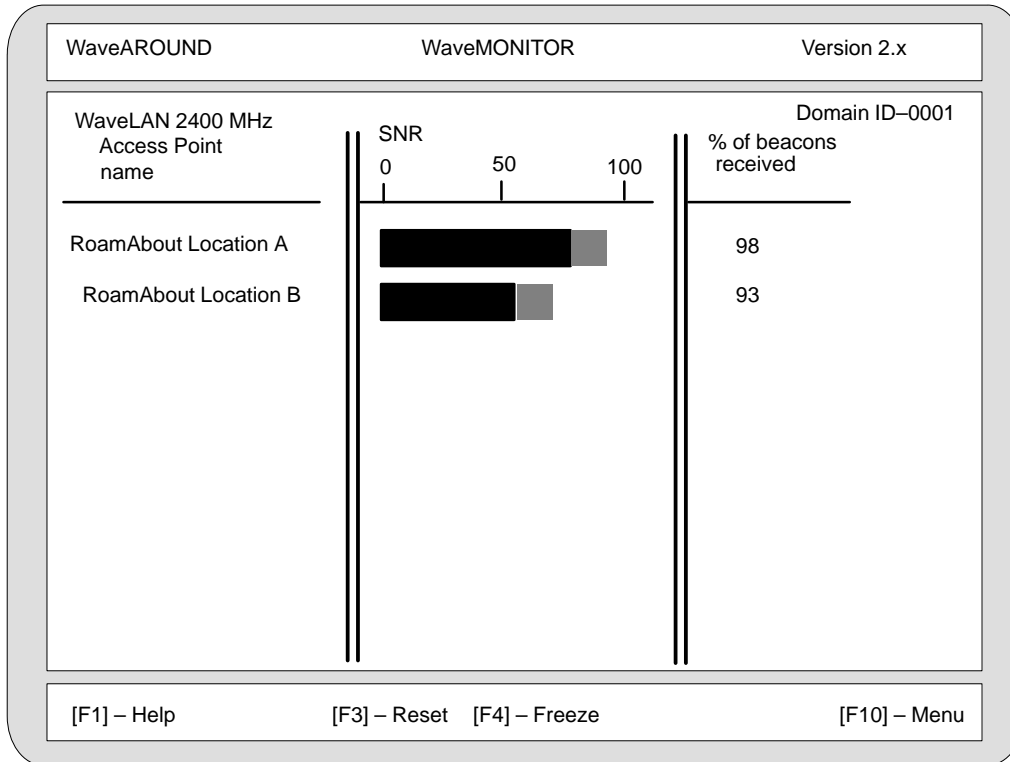
Frequency Select Utility

About the Frequency Select Utility

The Frequency Select utility allows you to change the operating frequency used by the Digital RoamAbout 2400 DS/PC Card and ISA Network Adapter. You can also use the utility to verify the current operating frequency of your network adapter.

Note

The Frequency Select utility is not applicable to the Digital RoamAbout 915 DS/PC Card and ISA Network Adapters.

The factory-installed operating frequency is 2.422 GHz. Use the utility to select a different frequency when:

- Your existing network adapter operates at another frequency
- Your wireless network suffers from interference by other RF devices
- Increase usable bandwidth in a highly concentrated wireless user environment by dividing users into selectable non-overlapping 22MHz (0.0220 GHz) channels.

Running the Frequency Select Utility

The Frequency Select utility runs on PCs equipped with a Digital RoamAbout 2400 DS/PC Card or ISA Network Adapter.

[If you have installed the RoamAbout client driver for CSS in a DOS environment, you can run the program from the RoamAbout subdirectory of the hard disk while the network driver is running (the driver becomes temporarily inactive). Type:

```
cd \roamabt
wfreqsel
```

To run the utility in all other environments (ISA, PC Card, Enabler, Windows 95 and Windows NT):

1. Put the Windows 95, Windows NT, Utilities disk into drive A:.
2. Change the disk to a boot disk by typing: `sys A:` Return.
3. Reboot the station.
4. Type: `wfreqsel` Return

Once you press `Return`, a menu screen is displayed.

For PC Cards only, the program asks you to select the PCMCIA card socket. Use the cursor control keys to select the socket, and press `Return`.

Selecting a New Frequency

The program diagnoses the card settings and displays the current operating frequency, along with a list of optional frequencies supported by the network adapter.

Use the cursor control keys to select another frequency from the displayed list. Figure 8–1 illustrates two sets of available country-dependent operating frequencies.

Press [Enter] to program this operating frequency into your network adapter. The network adapter will use the new frequency until the Frequency Select Utility is run again.

Press the [F10] key to quit the utility.

Figure 8–1 Frequency Select Utility Screen

(Frequency Set 1)

```
                    Frequency Select Utility

             Actual Frequency :  2.4220 GHz

                   ┌──────────────────────┐
                   │ 2.4220 GHz           │
                   └──────────────────────┘
                     2.4250 GHz (Type A)
                     2.4305 GHz (Type D)
                     2.4320 GHz
                     2.4420 GHz
                     2.4520 GHz
                     2.4600 GHz (Type B)
                     2.4620 GHz

   Select new operating frequency by moving the highlighted field with the
   cursor keys.
   Hit the [Enter] key, to program the frequency into your network adapter.


   [F1] – Help                                              [F10] Exit
```

(Frequency Set 2)

```
                    Frequency Select Utility

             Actual Frequency :  2.4220 GHz

                   ┌──────────────────────┐
                   │ 2.4120 GHz           │
                   └──────────────────────┘
                     2.4220 GHz
                     2.4320 GHz
                     2.4420 GHz
                     2.4520 GHz
                     2.4620 GHz



   Select new operating frequency by moving the highlighted field with the
   cursor keys.
   Hit the [Enter] key, to program the frequency into your network adapter.


   [F1] – Help                                              [F10] Exit
```

Command Line Parameter

You can use the parameter option **-m** on the MS–DOS command line to
select a Monochrome Display mode. Try this parameter if you have
difficulty viewing the display in normal color mode.

Example: **wfreqsel –m**

9

Problem Solving

This chapter provides information to help troubleshoot your wireless network.

Wireless Network Characteristics

A wireless local area network (LAN) behaves in much the same way as a wired LAN. However, due to the nature of the transmission medium, wireless (radio-frequency) networks are more sensitive to:

- Signal interference (noise, multipath, and fading)
- Signal attenuation

Signal Interference

Signal interference (or noise) consists of radio-frequency signals detected by a receiving radio module, which were not transmitted by any station in the receiving station's network. The source of the interfering signal may be one of the following:

- An adjacent RoamAbout wireless network with a different Network ID
- Another (not RoamAbout) radio-frequency network
- Non-network sources such as:
  - Security gates (like those often placed near the entrances of shops and department stores)
  - Elevator motors
  - Photocopiers
  - Microwave ovens
  - 900 MHz cordless telephones
  - 2–way radios

For most non-network noise sources, the effect is localized and you eliminate it by relocating the station or radio module.

Users of 2.4 GHz network adapters can often resolve a signal interference problem by selecting another frequency. Refer to Chapter 8.

Signal Attenuation

Signal attenuation is a loss of signal strength, which occurs naturally over distance, but which also can be caused by radio-frequency barriers in the signal path. Examples of barriers include:

- Metal surfaces surrounding a radio module
- Enclosed locations with concrete walls, floor, and ceiling

Nearly every object (partitions, furniture, or people) in the path of the signal causes some slight degree of attenuation. In most cases, this does not have a significant effect on network performance.

Note

In environments where there are many obstructions or excessive distances, consider splitting the wireless network and adding another Digital RoamAbout Access Point (AP).

Problem Determination

Problems in a RoamAbout network can be related to:

- Component failure (of the radio module or network adapter)
- Environment and operation
- Incorrect configuration

Component Failure

Component failure is normally detected by a startup diagnostics routine built into programs that use the network adapter.

Environment and Operation

Environment and operation-related problems can be caused by one or more of the following:

- Placing the station in an area where there is excessive radio-frequency (RF) noise (for example, near an arc welder or around other high-power radio transceivers)
- Path defects (barriers, distance, and so forth)
- Competition from adjacent wireless networks (which is likely to reduce throughput)
- Network loading

You can use the Point-to-Point Diagnostic utilities (described in an earlier chapter) to diagnose and resolve environmental and operational problems.

Table 9–1 identifies some common symptoms of environmental or operational problems and suggest solutions.

Incorrect Configuration

The devices in the wireless network must be correctly configured to communicate with each other. For example:

- For a non-roaming environment, ensure that the Digital RoamAbout Access Point (AP) and all stations in the wireless LAN are configured with the same Network ID.
- For a roaming environment, ensure that all APs and stations in the wireless LAN are configured with the same Domain ID and Beacon Key.
- If the network adapters are equipped with the built-in encryption feature, ensure that the AP and all stations in the wireless network are using the same encryption key.
- Ensure that all APs in your wireless network have different Network IDs.

Table 9–1 Environmental and Operational Problems

Problem	Card	Possible Cause	Action
Unable to log on to network	Both	Antenna not connected	Check antenna connection
	Both	Network adapter or antenna defective, or station out of range	**a.** Run Point-to-Point Diagnostics between this station and one known to work. **b.** Run Point-to-Point Diagnostics between this station and a RoamAbout Access Point.
	Both	Different NWID	Check NWID parameter in driver initialization (NET.CFG or PROTOCOL.INI)
	Both	Operating frequency mismatch	Run the WFREQSEL utility to check the frequency of this and the other network adapters in the network, and correct as necessary.
	Both	Security mismatch	Check security feature present on all stations and security enabled and all have same Encryption key, or security disabled on all stations.
	PC Card	Enabler or client driver (WAVECLI.EXE) not run	Reboot. Check Enabler runs okay, or check WAVECLI.EXE `device` statement in CONFIG.SYS.
	ISA	Auto-connect not correctly enabled	Check Domain ID in driver initialization same as RoamAbout

Table 9–1 Environmental and Operational Problems (Cont)

Problem	Card	Possible Cause	Action
Utility unable to detect other stations (network using encryption)	ISA	The utility cannot find a WAVELAN.INI file which is needed to locate the network configuration file (NET.CFG or CONFIG.SYS) containing the Encryption key parameter	Create a WAVELAN.INI file on the Utilities disk.
Performance loss or "Out of Range" condition seen when the station is relocated (Auto-connect on), or when moving away from the Access Point	Both	No closer Access Point to hand over to	Install another Access Point to extend the roaming area.
	Both	Roaming not enabled at the new, closer Access Point	Check installation records. Ask the network administrator to run WaveMONITOR to check that the Access Point is sending Beacons, Signal Quality is okay and Domain ID is correct.
	Both	Domain ID or Beacon Key mismatch with new Access Point	Same as above.
	Both	Station's MAC address not in new Access Point access control table	Check the access control table data or reload configuration with access control disabled.
	Both	Encryption Key mismatch on new Access Point	Check the security feature status and Encryption Key of the new Access Point corresponds to that of other Access Point's and stations in the Domain.
Performance less than expected	ISA	Local noise level high, wrong frequency bandwidth , local traffic high (bandwidth nearly full) or station out of range	Run Point-to-Point Diagnostics (and Frequency Select utility) to establish cause, then take appropriate action.
	PC Card	Local noise level high or local traffic (bandwidth nearly full) or station out of range	Run Point-to-Point Diagnostics to establish cause, then take appropriate action.

Continued on next page

Table 9–1 Environmental and Operational Problems (Cont)

Problem	Card	Possible Cause	Action
Windows PC beeps for unusually long time when PC Card is removed or reinserted	PC Card	Exact cause unknown but related to 'TimerCriticalSection=' statement in the SYSTEM.INI file	Use SYSEDIT or NOTEPAD to edit the Windows SYSTEM.INI file. Change the parameter to 'TimerCriticalSection=100'
Windows for Workgroups hangs when RoamAbout driver is loaded	PC Card	This problem is related to Phantom Binding, which means the driver started without the network adapter present	The problem is under investigation. Windows for Workgroup users should ensure that the network adapter is inserted when starting Windows.
Computer no longer beeps when the network adapter is removed or reinserted (CSS based systems)	PC Card	CSS may be using an IRQ number which is not available for the required function on the specific PC	Check the CSS documentation supplied with the PC. Use the CSS supplied utility to modify the list of available IRQs.
Roaming station no longer logged on	PC Card	Network timeout while station out of range	Ensure station is within range and reboot. Extend disconnected timer values in network server.
	PC Card	PC's power management scheme is use	Disable the PC's power management scheme.
	PC Card	RoamAbout power management values not compatible with network timer values	Adjust Power Up, Power Down values in NET.CFG or PROTOCOL.INI
Utility unable to detect other stations (Enabler-based installation with encryption)	PC Card	The encryption key is given as a parameter in the network configuration file (NET.CFG or CONFIG.SYS). (WAVELAN.INI) points to the location of the network configuration file. The utility cannot fine WAVELAN.INI (and the encryption key)	Create a WAVELAN.INI file on the utilities disk.

Unable to communicate with the server

1. Check the following:
   – Ensure that the radio module is securely connected to the network adapter and that the card is properly inserted into the station or AP.
   – In a nonroaming environment, ensure that all the devices (the AP and stations) in the wireless network have the same Network ID.
   – In a roaming environment, ensure that all the devices (APs and stations) in the wireless network have the same Domain ID and Beacon Key.
   – If security is enabled (for example, your network adapters are equipped with the encryption feature), ensure that all the devices are using the same key. If the network is configured without the security option, ensure that the security option is disabled on all the devices in the wireless network.

2. Verify that another station can communicate with the server or AP.

3. Run the Point-to-Point Diagnostic utility between this station and the AP (or between this station and another station) to verify that the two can communicate with each other.

Poor station performance relative to the network average

Run the Point-to-Point Diagnostic utility between this station and the AP or between this station and another station to verify the path (for example, attenuation between the AP and the station is too high).

Error Messages

This section contains ISA and PC Card error and warning messages. The Messages are displayed with a prefix, or suffix depending on the utility program. These messages show only the body of the message.

Example: **Card not found**

An example of the actual message display for **Card not found** appears as:

Utility	Actual Message Display
Configuration Installation utility	**Card not found – press [ENTER]**
Configuration Installation utility and the network drivers	**RoamAbout: Card not found**
NetWare Version 2 (server) operating system	**Error initializing LAN driver: Card not found**

Antenna is not connected

Cause The antenna is not connected to the network adapter.

Action Connect the antenna.

Bad initialization parameter type for keyword PCMCIA_Socket

Cause The driver has detected an invalid PCMCIA Socket parameter value in the PROTOCOL.INI file.

Action Correct the PCMCIA Socket parameter and reload the driver. Valid values are: A, B, C, D, E, F, G, H, X, a, b, c, d, e, f, g, h, x.

Call code not available

Cause The network adapter has no call code (required in Japan).

Action Contact your local supplier.

Card not connected

Cause No network adapter inserted into the expected slot, or the network adapter was not properly inserted (Note: the driver will still load.).

Action Insert or reinsert the card.

Card in use by another program

Cause Another program was using the network adapter when this program attempted to access it. The most likely occurrence of this message is when an attempt is made to install a configuration or start a diagnostic program while the network driver (Enabler-based installations for PC Cards) is running.

Action Disable automatic startup of the driver, and reboot the station. Run this program again.

Card not found

Cause The Enabler (PC Cards only), the driver or the utility could not detect a network adapter, or the driver could not find a card at the specified socket (PC Card) or slot (ISA).

Action **PC Card –** Make sure the network adapter is inserted in a PCMCIA slot and that the Socket parameter in NET.CFG or PROTOCOL.INI correctly identifies the slot being used (Enabler based systems). Run the INSTALL program (CSS based systems).

Action **ISA –** Make sure the PORT parameter in NET.CFG or AT_Address in PROTOCOL.INI corresponds to that set with the switches on the network adapter.

Card not functioning correctly

Cause Startup diagnostics detected a malfunction in one of the card components and the card cannot be used.

Action This may be a transient or permanent problem. Try the program reporting the error again. If the message persists, replace the network adapter. If possible, try the network adapter in another PC to verify that the problem is with the network adapter and not the environment.

Client Driver Failure nn

Cause This message is generated by the RoamAbout client driver usually as a result of a problem with the CSS interface, where *nn* is the error code.

Action Refer to Table 9–2. Your CSS documentation may provide additional suggestions. If you are unable to resolve the problem, contact your Digital reseller, or reinstall using the Enabler.

Table 9–2 Client Driver Failure Codes

Code	Probable Cause	Action
02	The Client Driver was unable to reserve I/O ports for the network adapter when the RoamAbout driver was started with the network adapter not present.	Try rebooting with the network adapter inserted into a PCMCIA socket.
03	A request for I/O ports for the net-work adapter failed.	Review the resources used by your PC that may be using I/O ports. If possible, try to temporarily remove a resource and try the RoamAbout network adapter again.
04	The Client Driver was unable to reserve an IRQ line for the net-work adapter when the Roam-About driver was started with the network adapter not present.	Try rebooting with the network adapter inserted into a PCMCIA socket.
05	A request for IRQ lines for the net-work adapter failed.	Review the resources used by your PC that may be using an IRQ line. If possible, try to temporarily remove a resource and try the RoamAbout network adapter again.
07	Attempt to start a RoamAbout driver when a RoamAbout driver is already active.	Check the network configuration file NET.CFG or PROTOCOL.INI for multiple occurrences of the RoamAbout driver.
08	Older version of CSS driver does not support starting the Roam-About driver with the network adapter out.	Try rebooting with the network adapter inserted into a PCMCIA socket.
09	Internal failure of the network adapter or PCIC controller.	Try the network adapter in another PC, or another network adapter in this PC, to determine where the problem lies.
0A	Unable to use a previously reserved I/O port.	Inform the local support group or your reseller.
0B	Unable to use a previously reserved IRQ line.	Inform the local support group or your reseller.

Client Driver not available

Cause No client driver or Enabler has been loaded.

Action Verify that the CONFIG.SYS file contains one of the following statements:
```
device=enabler.sys
wavecli.exe
```

Configuration Install utility should be run

Cause The network adapter has not been properly configured, or the configuration data has become corrupt.

Action Run the utilities SETCONF.EXE and INSTCONF.EXE. These utilities are in the \UTIL directory on the RoamAbout software disk.

Could not find driver named WVLN09$

Cause The RoamAbout NDIS driver could not find the device name in the PROTOCOL.INI file. This is most likely caused by an invalid device name in the DRIVERNAME= statement in the PROTOCOL.INI file.

Action Correct the DRIVERNAME= statement and reload the driver.

Duplicate or out of range IOBase parameter [0300–03f8], check /B= options
Duplicate or out of range IRQ parameter [3, 4, 5, 7, 9, 10, 11, 12, 14, 15],
check /I= options
Duplicate or out of range memory parameter [0xC000–0xEF00],
check /M= options

Cause The Enabler DEVICE line in the CONFIG.SYS file contains an invalid parameter value or the same value occurs more than once. The error message shows which parameter is at fault, and the permitted range of values.

Action Edit the CONFIG.SYS file to correct the Enabler DEVICE line, and reboot.

Enabler has not been run successfully

Cause The Enabler was not run, or the PC's power management scheme caused Enabler information to be lost.

Action Ensure that the Enabler is specified correctly in the CONFIG.SYS file. Disable the PC's power management scheme, if used, and reboot.

Error opening WAVELAN.INI file

Cause In a CSS based system, an attempt was made to start a utility and the utility could not find the WAVELAN.INI file created by the INSTALL program.

Action Rerun INSTALL. If you need to run the utility from a floppy disk, ensure that WAVELAN.INI and the network configuration file are also on the disk and that WAVELAN.INI contains the correct path to the network configuration file (NET.CFG or PROTOCOL.INI).

Error writing new configuration to the card

Cause A hardware malfunction prevented the card configuration from being updated.

Action This may be a transient or permanent problem. Try to install the new configuration again. If the message persists, replace the network adapter. If possible, try the network adapter in another PC to verify that the problem is with the network adapter and not the environment.

Invalid Combination of keywords

Cause More than one network adapter location keyword is present in the configuration file (NET.CFG or PROTOCOL.INI).

Action **PC Card –** Select one network adapter location keyword to specify the correct network adapter location: **port** (ISA), **socket** (Micro Channel) or **slot** (PCMCIA). If no location is specified, the driver automatically selects the first network adapter found.__

Action **ISA –** Select one network adapter location keyword to specify the correct network adapter location: **port** (NET.CFG) or AT_Address (PROTOCOL.INI). If no location is specified, the driver automatically selects the first network adapter found.

Invalid <parameter>
<parameter> =   FRAME
**   STATION ADDRESS, STATION_ADDRESS**
**   NWID**

Cause An invalid parameter value was passed to the driver in the NET.CFG or PROTOCOL.INI file.

Action Edit the NET.CFG or PROTOCOL.INI file to correct the parameter value, and reload the driver.

IRQ Conflict or Card not functioning correctly

Cause   Network adapter malfunction, or IRQ number is used by another program.

Action   Check if the IRQ is already in use by another program. If so, specify another IRQ for PC Card network adapters, or run SETIRQ.BAT for ISA network adapters. If possible, try the network adapter in another PC to verify that the problem is in the network adapter and not its environment.

Memory window not available, check /M= options

Cause   The memory window specified in the Enabler `Device` statement on CONFIG.SYS is in use by another device (or has not been excluded from use by MS Windows).

Action   Select another value for the /M parameter in the Enabler `Device` statement. Check the CONFIG.SYS (and SYSTEM.INI) file to verify that the memory window used is excluded.

Parameter group not complete, check command line options

Cause   A parameter is missing from the Enabler `Device` statement in the CONFIG.SYS file. All three parameters (/B, /M, /I) are required.

Action   Edit the CONFIG.SYS file to include the missing parameter in the Enabler `Device` statement, and reboot.

PCMCIA Access module not available

Cause   No client driver or Enabler has been loaded.

Action   Verify that the CONFIG.SYS file contains one of the following statements:
device=enabler.sys
wavecli.exe

PCMCIA Enabler module not compatible

Cause   The Enabler that was loaded is not compatible with the network driver.

Action   Make sure that the Enabler and driver are installed from the same RoamAbout software disk.

PCMCIA Interface not supported or missing

    Cause   The Enabler was unable to detect a compatible PC Card Interface Controller (PCIC) in this PC.

    Action   The RoamAbout Enabler currently supports the Intel 82365 PCIC only. Check your PC system setup to ensure the PCMCIA interface has been enabled.

Security Feature not functioning correctly

    Cause   Startup diagnostics have determined that the security feature is defective.

    Action   Replace the network adapter, or run with security disabled (refer to the next error message for appropriate action).

Security Feature not available

    Cause   The configuration installed on the card indicates that Datalink Security is enabled, but the network adapter is not equipped with the security feature.

    Action   Replace the network adapter with one that includes the security feature, or reconfigure to disable Datalink Security.
                Note: If you decide to disable Datalink Security you will have to disable it for all RoamAbout stations and Access Points.

Software incompatible with Card

    Cause   The program version you are using does not match the version of the network adapter installed.

    Action   Use only software from the disk which were supplied with the RoamAbout network adapter, or later releases.

Too many drivers loaded

    Cause   An attempt was made to load more copies of one driver than could be handled by the driver software.

    Action   Edit the AUTOEXEC.BAT file to remove excessive load commands of the same driver.

Unrecognized NET.CFG keyword on line <n>

Cause   Invalid keyword in NET.CFG or the spacing is wrong on the parameter line..

Action   Check the parameters in NET.CFG. Check to ensure that words that are part of a keyword are separated by a single space.

Unrecognized parameter on Command Line

Cause   The command line contained a string that did not match the MS–DOS conventions for program file names or was not a valid command line parameter.

Action   Correct the command line.

Utility not compatible with Enabler

Cause   The Enabler that was loaded is not compatible with the Configuration Install utility.

Action   Make sure all the programs you use are from the same RoamAbout software disk.

WARNING: possible memory window conflict, verify /M= option

Cause   The Enabler has detected that the specified memory window contains data.

Action   On some PCs this may be due to memory not resetting at boot time. You may want to try another /M setting. Check the CONFIG.SYS (and SYSTEM.INI) file to verify that the memory window you have specified is not in use by another device (or by MS Windows).

A

Point Enabler Configuration

This appendix describes how to configure your Digital RoamAbout 915/2400 DS/PC Card network adapter using the Point Enabler. This method of configuring your network adapter is used for PCs that do not have Card and Socket Services (CSS), or for PCs containing an Intel 82365 PCMCIA controller..

You must load the ENABLER.SYS utility before any drivers or other utilities can access the card.

The following sections explain how to use these programs to configure your device.

Configuring with Point Enabler

When you use the Point Enabler program, ENABLER.SYS, to configure your network adapter, you must first copy the distribution disk to your hard drive and then run ENABLER.SYS. Once ENABLER.SYS is loaded, you can configure your network operating system as described in Chapter 4.

Copying the RoamAbout Software

Insert the RoamAbout software disk in a floppy drive and use the DOS XCOPY command to copy all files and subdirectories to your personal computer's hard disk. For example:

```
xcopy a:\*.* c:\ROAMABT\  /v
```

_____ **Note** _____

The examples in this manual use C:\ROAMABT as the root directory for all files. However, you can use a different location to store these files.

_____

Running the ENABLER.SYS Program

For systems that do not support Card and Socket Services, you must load the Enabler program before any other program (network driver or utility) can access the network adapter. To ensure that the Enabler is always loaded at startup, execute it as a DEVICE line in the CONFIG.SYS file.

Use a DOS editor to add a DEVICE line to the CONFIG.SYS file for the RoamAbout Enabler.

You can set parameters in the DEVICE line for the following:

- Memory space address (of 4096-byte space)
- I/O base address
- Interrupt-request line number (IRQ)

The following is the format of the DEVICE line:

```
device=<path>enabler.sys /m=xxxx /b=xxxx /i=nn
```

The following is an example of a DEVICE line:

```
device=c:\roamabt\enabler.sys /m=d000 /i=5 /b=300
```

The Enabler uses memory addresses d0000h – d0fffh, I/O base address 300h, and IRQ 5.

Table A–1 describes the DEVICE line parameters.

Table A–1 Enabler DEVICE Line Parameters

Parameter	Description
[...]	Enclose optional parameters. (Do not type brackets.)
<path>	Disk drive and directory containing ENABLER.SYS
/m=xxxx	Memory space address (4-digit hexadecimal)
	Valid range: C000 – EF00 in increments of 100 (C000, C100, C200...)
/b=xxxx	I/O base address (3-digit hexadecimal)
	Valid range: 300 – 3F8 in increments of 8 (300, 308, 310, 318...)
/i=xx	IRQ (1- or 2-digit decimal)
	Valid values: 3, 4, 5, 7, 9, 10, 11, 12, 14, 15 (PCs with sound cards of XXX use IRQ = 5)

If you are using a memory manager such as EMM386, exclude the 4K memory required by the Enabler. For the example above, add the following line:

```
device=c:\dos\emm386.exe noems x=d000-d0ff
```

If Microsoft® Windows™ is installed, add a statement to the SYSTEM.INI file to protect the Enabler's memory space. Add the statement to the 386Enh: section of the SYSTEM.INI file. For example, enter the following statement:

```
[386Enh]
...
EMMExclude=D000-D0FF
...
```

Your RoamAbout 2400 DS network adapter is set to a default frequency of 2.422 GHz (the RoamAbout 915 DS network adapter supports only one frequency). If the frequency setting in your Digital RoamAbout Access Point is different than this default and you want to change the setting in your network adapter, you must run the Frequency Select Utility. Refer to Chapter 8 for instructions to run this utility.

If you are configuring your wireless network to enable roaming (as described in the Setting Roaming Parameters in Chapter 4), proceed to the next section.

A network adapter configuration consists of setting the Network ID (NWID) and several other optional parameters. These parameters include the following:

- MAC Address Type (Universal or Local)
- MAC Address (if Type is Local)
- Datalink Security (Enable or Disable)
- Encryption Key (if security is enabled)

The RoamAbout Network ID is a required entry used to differentiate one RoamAbout network's traffic from another's if more than one wireless network is located in the same area.

In a nonroaming environment, all stations (stations and Access Points) *must* have the same Network ID.

In a roaming environment, the stations can have different Network IDs but all must use the same Domain ID and Beacon Key. Refer to Setting Roaming Parameters in Chapter 4 for information on setting the Domain ID and Beacon Key.

The MAC addressing parameters allow a locally administered card addressing scheme in place of the UNIVERSAL (Ethernet) addressing scheme normally used for interface cards.

Digital recommends that you use the UNIVERSAL (Ethernet) addressing scheme.

If your network adapter has the built-in encryption feature, the Security and Encryption parameters allow you to enable data encryption and generate an encryption key.

Configuring the network adapter is a 2-step process:

1. Use the Configuration Setup utility, SETCONF.EXE, to set the parameter values common to all stations in the network (all parameters except MAC Address). The values are written to the executable configuration installation file, INSTCONF.EXE (or the name you assigned).

2. Run the executable configuration installation file to install the parameter values on the network adapter.

Running SETCONF.EXE

To run the SETCONF.EXE utility, change to the C:\ROAMABT directory on the hard disk and enter the following at the DOS prompt:

setconf

Once you enter the setconf command and press [Return], the screen shown in Figure A–1 is displayed.

Figure A–1 SETCONF Parameter Screen 1

```
          CONFIGURATION SETUP UTILITY [PCMCIA]
          Copyright (c) Digital Equipment Corporation, 1992


          Load Configuration Install File

          Save Configuration Install File

          Quit without Saving


      Use cursor keys to select option and press [Enter]

 Load – Loads the Configuration Install Utility file you wish to display or
          modify

 Save – Saves the changes you have made, and exits from the program

 Quit  – Exits from the program without saving

                    [F1] – General Help
```

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Select the letter L from the menu to load the configuration installation file. The software prompts you to enter the file that you want to load. Enter the following file name:

instconf

Once you enter the instconf command and press [Return], the screen shown in Figure A–1 is displayed.

Figure A–2 SETCONF Parameter Screen 2

```
               CONFIGURATION SETUP UTILITY [PCMCIA]

Input Filename:        INSTCONT.EXE

Description:       Original file

Network ID:                    None
MAC Address Type:              Universal
Datalink Security:             Disabled
                  Press [ENTER] to accept field entry
 ┌──────────────────────────────────────────────────────────────┐
 │ Enter up to 50 characters of text.                             │
 │                                                                │
 │ Use of this field is optional. Enter any descriptive information you wish │
 │ to record for your own reference, e.g. your name, date of installation,  │
 │ department name etc. This information is displayed when you run the install │
 │ Utility.                                                       │
 │                                                                │
 │ [ESC] cancel text input and restores the previous description. │
 └──────────────────────────────────────────────────────────────┘
      [F1] – General Help                  [F10] – Return to previous menu
```

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Table A–2 lists the SETCONF parameters.

Table A–2 SETCONF Parameters

Parameter	Description
Description	Use this optional entry to record any information here that helps you document your RoamAbout configuration activity. The information you enter here is displayed when you install the configuration, and also if you run the Setup utility again, using the same input file.
Network ID	A unique Network ID logically connects the stations in a RoamAbout wireless network (just as cabling physically connects stations in a wired network). The Network ID is used to distinguish one wireless network's traffic from that of another wireless network in the vicinity.
	You *must* enter a Network ID the first time you run the Configuration Setup utility. You can enter a 4-digit hexadecimal number in the range of 0100–FFFF, or press [F2] to generate a random value.
MAC Address Type	Every network adapter contains a unique factory-installed address conforming to the universal MAC address convention. If you prefer to use a locally determined addressing system, select LOCAL; however, Digital recommends that you use the factory-installed universal MAC address.
Datalink Security	If your network adapter has the security feature (built-in encryption), use this parameter to turn encryption on or off. If you select ENABLED, the software displays the current value of the encryption key. If the value is NONE (which is the case when you use the program for the first time), you must enter a valid 16-digit hexadecimal key. The easiest way to accomplish this is to press [F2] to generate one.

Note

You *must* use the same encryption key on *all* stations within your wireless network. Guidelines for valid key values are given in this chapter. If you intend to enter the encryption key manually, read these guidelines carefully before you do so.

Saving the Configuration Parameters

To save the configuration parameters, press [F10] to return to the initial screen and select the Save option.

Running INSTCONF.EXE

Run the saved INSTCONF.EXE executable file to install the RoamAbout configuration parameters on the network adapter. To run the installation file INSTCONF.EXE, type the following at the DOS prompt:

```
instconf
```

Once you enter the `instconf` command and press [Return], the Configuration Update screen appears, as shown in Figure A–3.

_____ **Note** _____

If you have a monochrome display, use the –m option with the instconf command. For example:

```
instconf -m
```

If you choose to run the INSTCONF.EXE executable file in batch mode, use the –b option with the `instconf` command. If you use the –b option, the Configuration Update screen is not displayed.

_____

Figure A–3 Configuration Update Screen

```
          CONFIGURATION INSTALL UTILITY [PCMCIA]


  Description:            Department A Network

                         –New Values–            –Card Values–
  Network ID:            FE–30                    None
  MAC Address Type:      Universal                Universal
  MAC Address:           08–00–0E–20–00–01        08–00–0E–20–00–01
  DataLink Security:     Disabled                 Disabled

                         Update Card Configuration
                         Exit
  ┌───────────────────────────────────────────────────────────┐
  │      Use cursor keys to select option and press [ENTER]     │
  │                                                             │
  │                                                             │
  └───────────────────────────────────────────────────────────┘
                         [F1] – Help
```

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The Configuration Update screen shows the following:

- The configuration parameter values currently on the network adapter. In Figure A–3, these are the original values installed at the factory.

- The new values to be installed by the Configuration Installation utility.

—————————————————— **Note** ——————————————————

If security is enabled, the value of the encryption key is kept hidden.

If the MAC Address Type is changed from Universal to Local, you must enter a local MAC address before the update can take place.

When both old and new MAC Address Types are Local, an entry of a new Local MAC Address Type is not required.

The MAC Address entry consists of eight hexadecimal digits, and must be a unique value within this wireless network.

——

To install the new configuration parameters onto the network adapter, choose Update Card Configuration from the Configuration Update screen; otherwise, choose Exit to cancel the update operation.

If you choose Update Card Configuration, you can choose Exit at any time to abandon the program.

Setting Up the Network Driver

To set up the network driver, edit the PROTOCOL.INI file (for NDIS drivers) or the NET.CFG file (for ODI drivers) in your network operating directory. For example, edit:
NDIS drivers – <NOS directory>\PROTOCOL.INI
ODI drivers – <NOS directory>\NET.CFG

Refer to Table A–3 and Table A–4 for a complete list of NDIS and ODI parameters.

For a detailed description of the power management parameters associated with the NDIS and ODI drivers, refer to Appendix B.

Table A–3 NDIS2 Driver Configuration Parameters

Parameter[1]	Value Range	Usage
PCMCIA_Socket = *x*	'*x*' in the range [A–H, X, a–h, *x*]	Identifies the PCMCIA card socket ("*X,x*" – use first found). Optional parameter, defaults to "*X*".
NWID = 0*xnnnn*	'*nnnn*' hexadecimal value in the range 0100_{16} – $FFFF_{16}$	Identifies the network adapter Network ID. Required if no roaming. If a value is used, it must be the same for all network adapters in the network. The default value is 0100_{16}. Using this value can result in unintentional overlap with adjacent RoamAbout cells.
Domain_ID = 0*xnnnn*	'*nnnn*' hexadecimal value in the range 0000_{16} – $FFFF_{16}$	This parameter enables roaming. If a value is not used, or if it is set to $0x0000_{16}$, the station cannot roam. If a value is used, it must be the same for all network adapters in the domain. Default value is $0x0001_{16}$.
Beacon_Key = 0*xnnnn*	'*nnnn*' hexadecimal value in the range 0000_{16} – $FFFF_{16}$	Used to encode the NWID transmitted by a roaming access point. If a value is used, it must be the same for all network adapters in the domain. Value $0x0000_{16}$ = no encoding Default value is $0x0001_{16}$.
Station_Address = 0*xnn*, 0*xnn*, ...	Six groups of 2 hexadecimal digits (*nn*) separated by commas	Overrides the network adapter's factory-installed universal MAC address. The second digit of the first digit pair must be a 2, 6, A, or E. Digital recommends not to change this value.
Station_Name = *x...x*	Any alphanumeric string (max 31 chars no spaces allowed)	Can only be used by the Point-to-Point Diagnostic utility.
Encryption_Key = 0*xnn*, 0*xnn*, ...	Eight groups of 2 hexadecimal digits (*nn*) separated by commas or 0.	A 16-hexadecimal-digit value enables encryption. A value of 0_{16} disables encryption.

[1] Required Parameters
  If the network adapter is installed into a roaming workstation, a Domain ID is required. All other parameters are optional. However, for security reasons Digital recommends changing the Domain ID and Beacon Key.
  If the network adapter is not going to be used in a roaming environment, the Domain ID must be set to $0x0000_{16}$ and the NWID must match other stations and Access Points.

Table A–4 ODI Driver Configuration Parameters

Parameter[1]	Value Range	Usage
SOCKET*x* (PC Card only)	'*x*' in the range [A–H, X, a–h, *x*]	Identifies the PCMCIA card socket ("*X,x*" – use first found).
NWID *xxxx*	'*xxxx*' hexadecimal value in the range 0100_{16} – $FFFF_{16}$	Identifies the network adapter Network ID. Required if no roaming. If a value is used, it must be the same for all network adapters in the network. The default value is 0100_{16}. Using this value can result in unintentional overlap with adjacent RoamAbout cells.
DOMAIN ID *xxxx*	'*xxxx*' hexadecimal value in the range 0000_{16} – $FFFF_{16}$	This parameter enables roaming. If a value is not used, or if it is set to 0000_{16}, the station cannot roam. If a value is used, it must be the same for all network adapters in the domain. Default value is $0x0001_{16}$.
BEACON KEY *xxxx*	'*xxxx*' hexadecimal value in the range 0000_{16} – $FFFF_{16}$	Used to encode the NWID transmitted by a roaming access point. If a value is used, it must be the same for all network adapters in the domain. Value 0000_{16} = no encoding Default value is $0x0001_{16}$.
STATION ADDRESS *xxxxxxxxxxxx*	12 hexadecimal digits	Overrides the network adapter's factory-installed universal MAC address. The second digit must be a 2, 6, A, or E. Digital recommends not to change this value.
STATION NAME *x...x*	Any alphanumeric string (max 31 chars no spaces allowed)	Can only be used by the Point-to-Point Diagnostic utility.
ENCRYPTION KEY *xxxxxxxxxxxxxxxx*	16 hexadecimal digits (or 0)	A 16-hexadecimal-digit value enables encryption. A value of 0_{16} disables encryption.
POWER UP *x...x*	Decimal value in the range 0–65535	If power management is used, the value represents the time in seconds that the card is in normal power-consuming Receive mode. Refer to Appendix B.
POWER DOWN *x...x*	Decimal value in the range 0–65535	The value represents the time in seconds that the card is in low power-consuming "sleep" mode. If it is not used, or if the value is 0, power management is disabled. Refer to Appendix B.

[1] <u>Required Parameters</u>

If the network adapter is installed into a roaming workstation, a Domain ID is required. All other parameters are optional. However, for security reasons Digital recommends changing the Domain ID and Beacon Key.

If the network adapter is not going to be used in a roaming environment, the Domain ID must be set to $0x0000_{16}$ and the NWID must match other stations and Access Points.

B

Power Management Parameters

This appendix contains additional power management configuration parameters for the Power Up and Power Down parameters in an ODI environment as described in Table 3–4.

RoamAbout power management allows you to put your PC Card into a low power-consuming sleep state during periods when no active communication is taking place. In this state, power consumption is about 15 percent of the power used in active Receive mode, resulting in improved battery life in mobile stations.

RoamAbout power management is used in NetWare environments in conjunction with the NetWare watchdog timer to reduce power consumption while remaining connected to the network.

Power management parameters, Power Up and Power Down, are stored in the NET.CFG ODI network driver. The format for these two parameters are:

Parameter	Range	Default	Normal[1]
Power Down	0 – 65365 seconds	0 (no power mgmt)	420 seconds
Power Up	0 – 65365 seconds	120 seconds	120 seconds

[1] Recommended settings for NetWare roaming default watchdog timers.

The normal power management parameter values in the above table provide near-optimum power management performance in all NetWare environments where the default watchdog timers are used.

───────────────── **Note** ─────────────────

When editing the NET.CFG file, be sure to indent the RoamAbout Power Up and Power Down parameters and place them directly after the "link driver" statement.

Before enabling power management, first check with your network administrator to ensure that the default watchdog timer settings are being used. If they are not used, your network administrator must understand the relationship between power management and the watchdog timer, and provide the most effective power management settings before proceeding.

NetWare Watchdog Timer

The watchdog timer in a NetWare server monitors the connections with stations logged into that server by sending a watchdog message at regular intervals to each station. If no response is received from a station after a specified number of messages, the station is logged out. This happens as a result of the station being powered down, or being out of range for a specified amount of time.

Figure B–1 shows an active watchdog timer timing interval for a station that is logged out by a NetWare server after a short period of active communication, and is then powered down. The values shown correspond in minutes to the defaults for NetWare servers.

Figure B–1 Watchdog Timer Logging Out a Powered Down Station
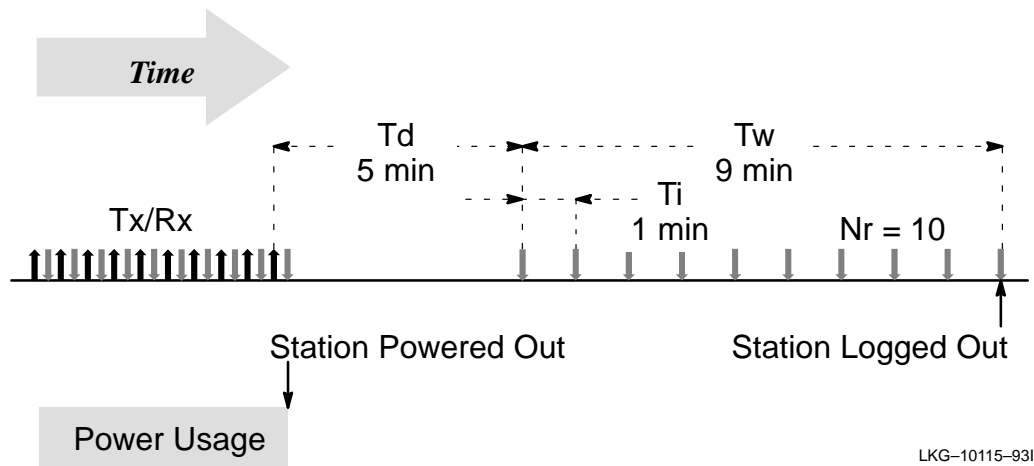
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Legend		Description
Tx	↑	Station transmit
Rx	↓	Station receive
Tw		Watchdog time (Nr −1) x Ti

The three NetWare server parameters associated with Figure B–1 are:

Server Parameter	Description
Td	Delay time before the first watchdog message is sent
Ti	Time interval between watchdog messages
Nr	Number of watchdog messages before station logout

Figure B–2 shows how the connection is maintained when the station remains powered up and it is within signal range.

Figure B–2 Watchdog Timing Sequence with Station Powerup

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Legend		Description
Tx	↑	Station transmit
Rx	↓	Station receive
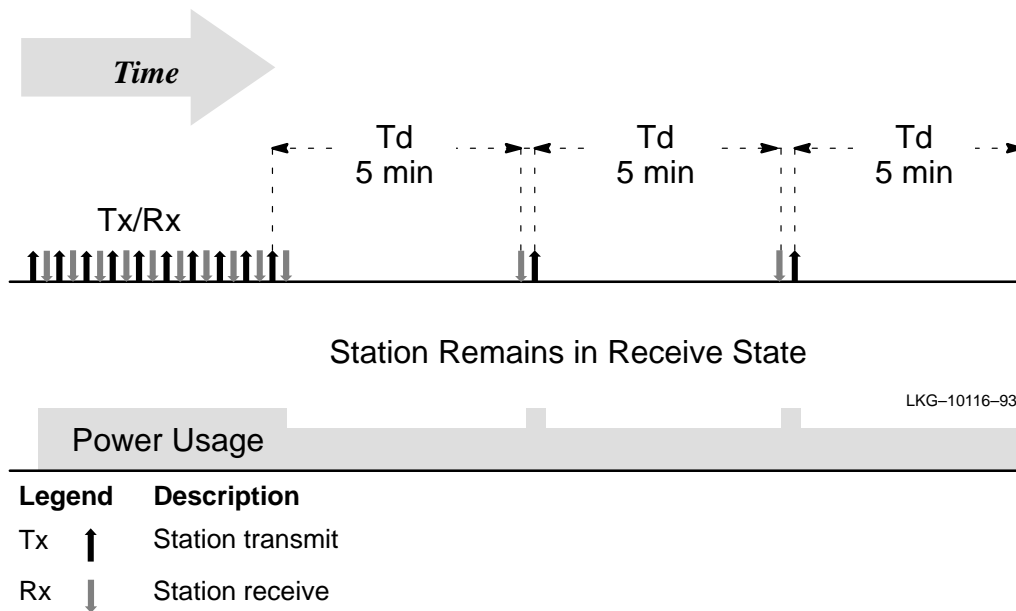
Power Management Settings for Single Servers

Power management parameter settings for single servers in a network are set to ensure that the PC Card becomes active during the watchdog time (Tw), and that the PC Card is active long enough to receive two consecutive watchdog messages. The power calculation is:

Powerup = 2 x Ti
Powerdown = Tw – Powerup

Using the default values for NetWare servers (Td = 300, Ti = 60, Nr = 10), the following power management values are obtained:

Power Up = 120 seconds
Power Down = 420 seconds

Figure B–3 shows the effect on power consumption when you use these settings.

Figure B–3 Watchdog Timing Sequence for Single Servers
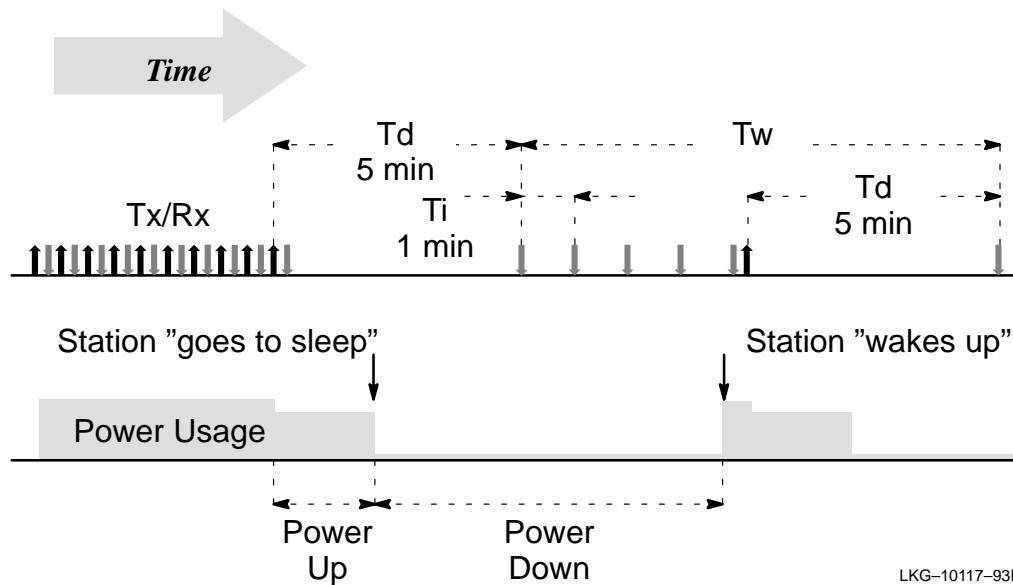
You can reduce power consumption by increasing the watchdog time (Tw) as a result of increasing the number of watchdog messages (Nr). Delay time (Td) does not affect the power management settings and thus can be decreased to compensate for an increase in Tw, if required.

If a station connects to only one network server, or if all network servers use the default watchdog timer power management settings, then your NET.CFG file should include the following power management information:

```
LINK DRIVER WVLAN05
<other options...>
POWER DOWN          420
POWER UP            120
<other options...>
```

Note

The default Power Up value of 120 seconds is acceptable.

Using the above default values, the power consumption during Power Down is about 15 percent of the power consumption during Power Up. The average power consumption as a percentage of normal power consumption is estimated at 33.75% as shown below:

$$\frac{(120 \times 100) + (420 \times 15)}{(120 + 420)} = \frac{18225}{540} = 33.75\%$$

The percentage given above is an estimation of reduced power consumption for the PC Card only. The real effect on the battery lifetime is less because other system components require power, also.

Power Management Restrictions

There are configurations where power management should be used with caution, or not at all.

For example, if the ODI driver is used in peer-to-peer communication, such as Personal NetWare or Windows for Workgroups, communication problems can occur. These problems are resolved by disabling power management by setting the Power Down value to zero (POWER DOWN = 0).

The Point-to-Point Diagnostics utility (described in Chapter 4), when run from a remote station, will not detect stations that have power management active. To run Point-to-Point Diagnostics, you either have to disable power management (POWER DOWN = 0), or boot from a utilities disk.

If other power management schemes are installed on your station, you will normally have to disable them to run power management. However, some selective power management schemes, which operate only on hard disks or displays, can work in combination with power management.

C

Changing the Default IRQ

Digital RoamAbout ISA network adapters are factory preset to use interrupt request line (IRQ) 10. If this IRQ cannot be used because another device in your PC is using it, you can reconfigure the network adapter to use another IRQ by running SETIRQ batch file.

To run SETIRQ.BAT:

Step	Action
1	Insert the Windows 95, Windows NT, Utilities disk into drive A of the computer.
2	Ensure that the disk is a boot disk by typing: `SYS A:`
3	Reboot your computer.
4	At the completion of the reboot, type: `setirq xxx nn Return.` where: *xxx* is the I/O Base address of the network adapter. This value must correspond to the I/O Base address switches on the network adapter(see Figure 3–2 and Table 3–1). Valid values are: 300, 390, 3c0, and 3e0. *nn* is the new IRQ number you want to use. Be sure the new IRQ number is not used by another device in your PC. Valid IRQ values are: 03, 04, 05, 07, 10, 11, 12, and 15.
5	Your station is now ready to use.

D

Installation Worksheet

Installation Worksheet

The RoamAbout Installation Worksheet on the following page is designed to help you carry the information you need through the various installation steps. It also serves as a hardcopy record of your installation, which will help you maintain your RoamAbout network or adapt it to meet changing requirements.

RoamAbout Installation Worksheet

Station:_____   Installer:_____

Date:_____

Hardware Installation (ISA Only):

I/O Base Address Switch Settings (Switches 1 and 2):

☐   SW 1: off   SW 2:   off   Address: 0300H
☐   off   on   Address: 0390H
☐   on   off Address: 03C0H
☐   on   on   Address: 03E0H

Remote Boot Address Switch Settings (Switches 3 and 4):

☐   SW 3: off   SW 4:   off   Address: Disabled
☐   off   on   Address: C8000H
☐   on   off   Address: D0000H
☐   on   on   Address: D8000H

Configuration Installation:

Description:_____

_____

Network ID:_____   Domain ID:_____   Beacon Key:_____

MAC Address Type: ☐ Universal   ☐ Local

Local Address _____

Encryption Feature equipped: ☐ Yes   ☐ No

– Datalink Security: ☐ Enabled   ☐ Disabled
– Encryption Key:_____

Interrupt Request Line (IRQ) (ISA only):   10 11 12 15 3 4 5 7

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