Aironet™

User's Guide

**1200 and 2200 Series
PCMCIA Wireless LAN Client Card**

Products supported:
PC1200 and PC2200
Replaces:
PC1000, PC2000, 690-900, and 690-2400

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Printed in USA

Doc 710-003945 Revision A0
March 1998

Manufacturers Federal Communication Commission Declaration of Conformity Statement

Models: 1200 and 2200
Manufacturer:

Aironet Wireless Communications, Inc.
367 Ghent Road, Suite 300
Fairlawn, OH 44334
1-800-3-WIRELESS

This device complies with Part 15 rules. Operation is subject to the following two conditions:

1) this device may cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio \ TV technician.

Department of Communications - Canada
Canadian Compliance Statement

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

Cet appareil numerique de la classe B respecte les exigences du Reglement sur le material broilleur du Canada.

This device complies with RSS-210 of Industry of Canada. Operation is subject to the following two conditions: 1) this device may cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

European Telecommunication Standards Institute
Statement of Compliance
Information to User

This equipment has been tested and found to comply with the European Telecommunications Standard ETS 300.328. This standard covers Wideband Data Transmission Systems referred in CEPT recommendation T/R 10.01.

This type accepted equipment is designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Safety Information

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radiated frequency (RF) electromagnetic energy emitted by FCC certified equipment. The Aironet products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. For proper operation of this radio according to the instructions found in this manual will result in the user exposure to be substantially below the FCC recommended limits.

- Do not touch or move the antenna while unit is transmitting or receiving
- Do not hold any component containing the radio such that the antenna is very close or touching any exposed parts of the body, especially the face or eyes, while transmitting
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use

Warning for Laptop Users

In order to comply with the FCC RF exposure limits, it is recommended that when using a laptop with the PCMCIA Wireless LAN Card, the antenna should not be positioned closer than 15 cm (6 inches) from your body or nearby persons for extended periods of time while it is transmitting (or operating). If the antenna is positioned less than 15 cm (6 inches) from the user, it is recommended that the user limit exposure time or engage the power saving features of the radio to reduce RF exposure. See the Technical Reference Manual for proper operation of power savings mode.

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About the User Guide

This guide covers the installation of your Aironet Wireless LAN Adapter. Make sure you read *Chapter 1 - Client Card Installation* before attempting to install, or use the hardware and software described in this guide.

The User Guide is arranged as follows:

Introduction

Provides you with a general introduction to the Aironet Client Card and the various system configurations that are available.

Chapter 1 - Client Card Installation

Describes the physical installation of the Client Card.

Chapter 2 - Client Card Driver Installation

Explains how to load the Client Card drivers for the supported LAN operating systems.

Chapter 3 - Utilities

Describes the procedures for setting the Aironet Client Card system configuration parameters and performing diagnostics and link tests.

Chapter 4 - Troubleshooting and Performance

Provides troubleshooting and performance tips to help you resolve problems that may occur with the Client Card.

Appendix A - Aironet Client Card Specifications

Appendix B - International Channel Sets

Appendix C - Command Line Switches

Appendix D - Current Device Parameters

Appendix E - Aironet Technical Support

Introduction

The 1200 and 2200 Series PCMCIA Wireless Client Card inserts into any notebook or Personal Computer fitted with a Type II PCMCIA slot.

The Client Card combined with the supplied network adapter drivers, and one of the major local area network programs, provides transparent, wireless communications through the following Aironet products to network nodes:

- **Radio Modules** - provide wireless communication in any portable or fixed computer.

- **Access Points** - provide wireless data communication between an Ethernet network and fixed, portable or mobile wireless computers.

- **Bridges** - provide wireless bridges between two or more Ethernet LANs and can also function as access points.

- **Client Cards** - Adapter cards that are installed in ISA and MCA computers to allow wireless communications.

The Client Card contains random access memory (RAM), and a co-processor to transfer data to and from the PC's operating system. (See **Figure 0.1** on the following page). An accompanying Radio Module with an integrated Antenna attaches to the Client Card via a tether cable, and can be mounted on the computer to ensure the best radio range.

Figure 0.1 - PCMCIA Block Diagram
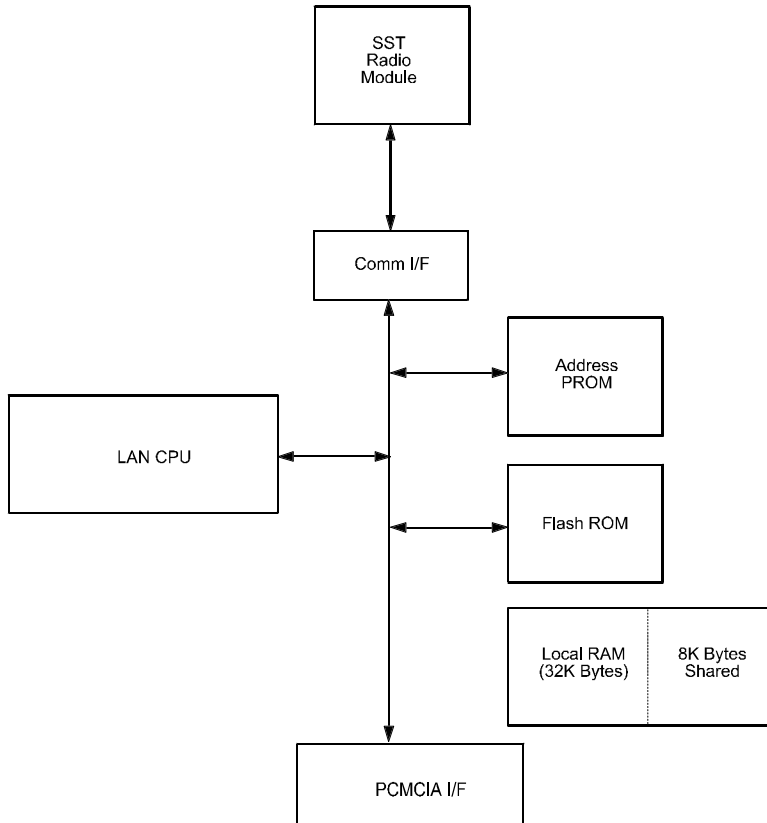
Aironet Client Card Package

The Aironet Client Card package contains:

- Client Card

- Aironet Configuration Diskette

- Radio Module

Aironet Configuration Diskette

The Aironet Configuration diskette contains Network software drivers for Novell, NDIS, ODI, TCP/IP, OS/2 and Microsoft LAN Manager, as well as diagnostic utilities.

NOTE: Before performing any task, make a copy of the Aironet Configuration diskette and store the original diskette in a safe place. Use the DOS DISKCOPY command, that is, "desktop a: b:". Do not use the DOS COPY command since the diskette contains subdirectories.

System Requirements

Installation of the Aironet Client Card requires:

- A computer with a Type II PCMCIA slot

- MS-DOS 2.0 or higher

- One free 8K expansion memory address block (ranges between■ 0xC000 and 0xDE00)

- A PCMCIA card and socket services compliant with revision 2.10 of the PCMCIA specification (or higher)

- Free memory capacity to load a LAN operating system. Depending on the LAN operating system, you will need additional free memory. Consult the relevant LAN documentation for the exact memory requirements.

Networking Compatibility

The Aironet Client Card is designed for use with industry standard network operating systems. The following Network software drivers are supplied on the Aironet Configuration diskette:

- Novell Netware including SFT/Advanced Netware 286 version 2.1 and up, Entry Level System-Level 2 (8 users), Netware 386 version 3.1 or later.

- NDIS Drivers - for NDIS-compliant LAN operating systems such as Microsoft LAN Manager and PC LAN, Windows for WorkGroups, Windows 3.1, and Windows 95.

- ODI Drivers - for Novell Netware Lite and other ODI-compliant networking systems.

- TCP/IP Packet driver - for use with third party TCP/IP products.

For information on the availability of drivers for other Network Operating Systems please contact Aironet Wireless Communications.

Radio Characteristics

The Aironet Client Card uses a radio modulation technique known as Spread Spectrum Transmission or SST. This modulation technique provides high data bandwidth and excellent immunity from interference and multipath effects.

Two versions of the Radio Module are offered which differ in their frequency band of operation:

Aironet PC1200 - 900 MHz band (902 - 928 MHz range).

Aironet PC2200 - 2.4 GHz band (2.400 - 2.485 GHz range).

Data is transmitted over a half-duplex radio channel operating at data rates up to 860 kb/s (PC1200) and 2 Mb/s (PC2200).

Radio Ranges

The Aironet Client Card Radio Module is used in indoor wireless Radio Networks. The radio range achieved depends on the following:

Data Bit Rates - Better receiver gain at lower data bit rates

Lower bit rate links have an advantage over higher bit rate links. There is a decrease in receiver threshold as the radio data rate increases. The maximum radio range is achieved at the lowest workable data bit rate.

Antenna Type and Placement - Increased range with antenna height

The key to maximizing range indoors is to place the Access Point antenna above obstacles such as cabinets, shelves, etc. An antenna mounted on the ceiling provides excellent coverage.

Openness of the Environment - Open areas are better than closed

The less cluttered the work environment, the greater the range.

Building Materials - Drywall vs Concrete

Floor-to-floor radio penetration depends on the building materials used between floors. For example, the range will be greater if the signal is passing through drywall rather than concrete blocks.

Table 0.1 provides a summary of typical radio ranges to be expected for different situations.

Table 0.1 - Typical Radio Range

Indoor Range		Aironet PC1200	Aironet PC2200
All antennas at desktop height	Open Office	76m to 122m (250 to 400 feet)	38m to 61m (125 to 200 feet)
	Cluttered Office	45m to 76m (150 to 250 feet)	23m to 38m (75 to 125 feet)
Central antenna elevated 6 feet	Open Office	91m to 182m (300 to 600 feet)	45m to 91m (150 to 300 feet)
	Cluttered Office	61m to 91m (200 to 300 feet)	30m to 45m (100 to 150 feet)

Radio Antenna

The PCMCIA Radio Module comes supplied with an integrated dipole antenna and provides omni-directional (360 degree) coverage.

Security Features

The Aironet Client Card provides secure and highly reliable data communications by employing Spread Spectrum Technology, previously developed for military "anti-jamming" and "low probability of intercept" radio systems.

Additional security is achieved through the use of a System Identifier (SID). The SID is a unique, 6 hexadecimal digit value that is attached to each packet sent out over the radio. With over 8 million possible SID settings, a high degree of privacy and security can be assured. See *Chapter 3 - Utilities* for detailed information on setting the System Identifier.

Radio Network Terminology

When configuring your system, and when reading this User Guide, keep in mind the following Radio Network terminology:

Network Tree - Conceptually, Aironet's Advanced Radio Local Area Network (ARLAN) is designed like an upside-down tree, (see **Figure 0.2**) with a Root Unit at the top, and Repeaters and Radio nodes branching down and out from the Root.

Root Unit - An Access Point which is located at the top of a Network Tree. The Root Unit is the starting point in the network and contains information in its Registration Table regarding all nodes on the network.

Repeaters - A Repeater is a wireless Access Point which is used to extend the radio range of your network. A single Access Point is limited to a specific RF range. If your system configuration includes nodes outside this range, you will need to add a Repeater in order for them to communicate.

Radio Node - A PC, notebook computer, etc. containing a Radio Card.

End Node - A Radio Node that is located at the end of the Network Tree.

Figure 0.2 - Network Tree

Wired LAN

Root Unit

Repeater
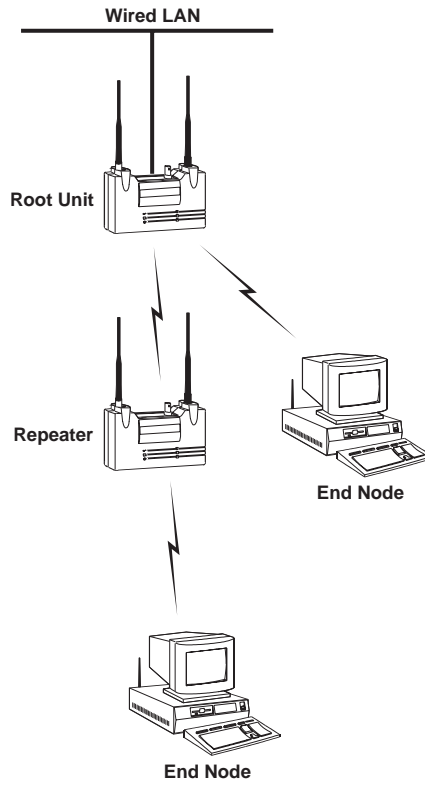
End Node

End Node

Parent/Child Node - Refers to the relationships between nodes on the Network Tree. For example, the Root Unit (at the top of the tree) would be the Parent of the Repeater and the Repeater would be the Parent of the end nodes. Conversely, the end nodes would be the Children of the Repeater and the Repeater would be the Child of the Root Unit.

Registration - Each Access Point (Repeater or Root Unit) on the Radio Network contains a Registration Table, used to control the routing of packets from the Ethernet and the Radio Network. The table controls the routing of packets by maintaining entries for all radio nodes situated below the Access Point on the Network Tree.

Power Saving Protocol (PSP) and Non-Power Saving Protocol - The Power Saving Protocol allows computers (usually portable computers) to power up only part of the time to conserve energy. If a Radio node is using the Power Saving Protocol to communicate with the network, the Access Points must be aware of this mode and implement additional features such as message store and forward. While the PSP Mode does provide greater battery life, it does increase the response time for the data.

Registration Modes

The Aironet Client Card can be used in either ARLAN (default), PSP or Non-ARLAN registration mode.

ARLAN Mode (Microcellular Architecture) - A high-traffic Radio Network with one or more Access Points placed on a cabled backbone LAN, and Aironet Client Cards installed in remote Radio nodes (PCs and notebook computers).

Each Radio node registers to and communicates with the closest, or user-specified Aironet Access Point. The Access Points perform routing functions by moving data packets to and from the cabled LAN and remote Radio nodes.

This mode provides automatic circuit hand-off and message forwarding, as an Aironet Client Card user roams between LAN Access Point microcells. In this way, large-scale, wireless LANs are configured.

PSP - Same as ARLAN Mode, except that it is used for Aironet Client Cards installed in remote *battery-powered* Radio Nodes, i.e. notebook computers. The Power Saving Protocol (PSP) conserves battery power at the cost of decreased throughput by periodically turning off the radio (See also *Power Saving Protocol* on previous page.)

Non-ARLAN Mode - A low-traffic Radio Network comprised strictly of Radio nodes (PCs, File Servers, notebook computers, etc.) fitted with the Aironet Client Card.

In Non-ARLAN Mode, Access Points are not used, and ARLAN micro-cellular architecture is not utilized, since data is transmitted directly between the Radio nodes. The Radio nodes can operate in a peer-to-peer, or in a client-server network relationship depending on the network operating system being used.

Note that Non-ARLAN mode does not support Power Saving Protocol on Radio end nodes (see **Figure 0.3**).

Aironet PCMCIA Network System Configurations

The Aironet Client Card can be used in a variety of Network system con-figurations. Examples of some common system configurations are out-lined below, and shown on the pages that follow, along with a brief description of each. All configurations shown can be created with either 900 MHz or 2.4 GHz models.

- 2.4 GHz Wireless Network without an Access Point (Non-ARLAN Mode)

- 900 MHz Wireless Workstations off an Ethernet LAN

- 2.4 GHz All Wireless LAN

- 900 MHz Multiple microcells on a Ethernet LAN

- Multiple Access Points to extend the range of your 2.4 GHz Network

Figure 0.3 - 2.4 GHz Wireless Network without an Access Point

A low-traffic Radio Network comprised strictly of Radio nodes fitted with an Aironet Client Card. The Radio nodes can operate in a Peer-to-Peer, or in a client-server network relationship depending on the network operating system being used.
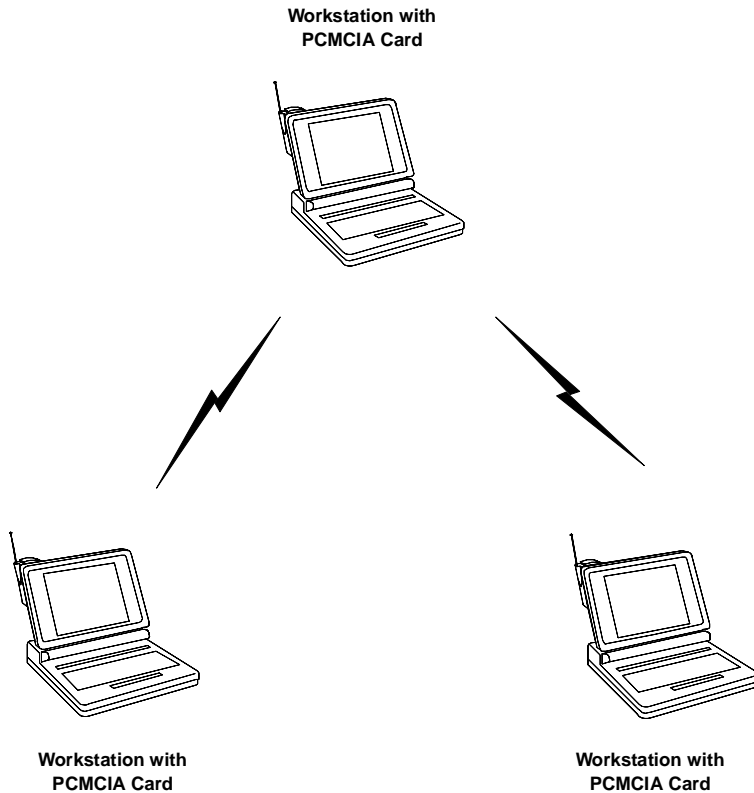
Figure 0.3 shows three Aironet Client Cards (in Non-ARLAN Mode) operating in a peer-to-peer network relationship.

Figure 0.4 - 900 MHz Wireless Workstations off a Wired LAN

One or more physically separated, workstations — each equipped with an Aironet Client Card — can link to the Ethernet LAN via an Access Point and communicate with the File Server.

File Server

Wired LAN

**Access Point
(Root Unit)**

**Workstation with
PCMCIA Card**

**Workstation with
PCMCIA Card**
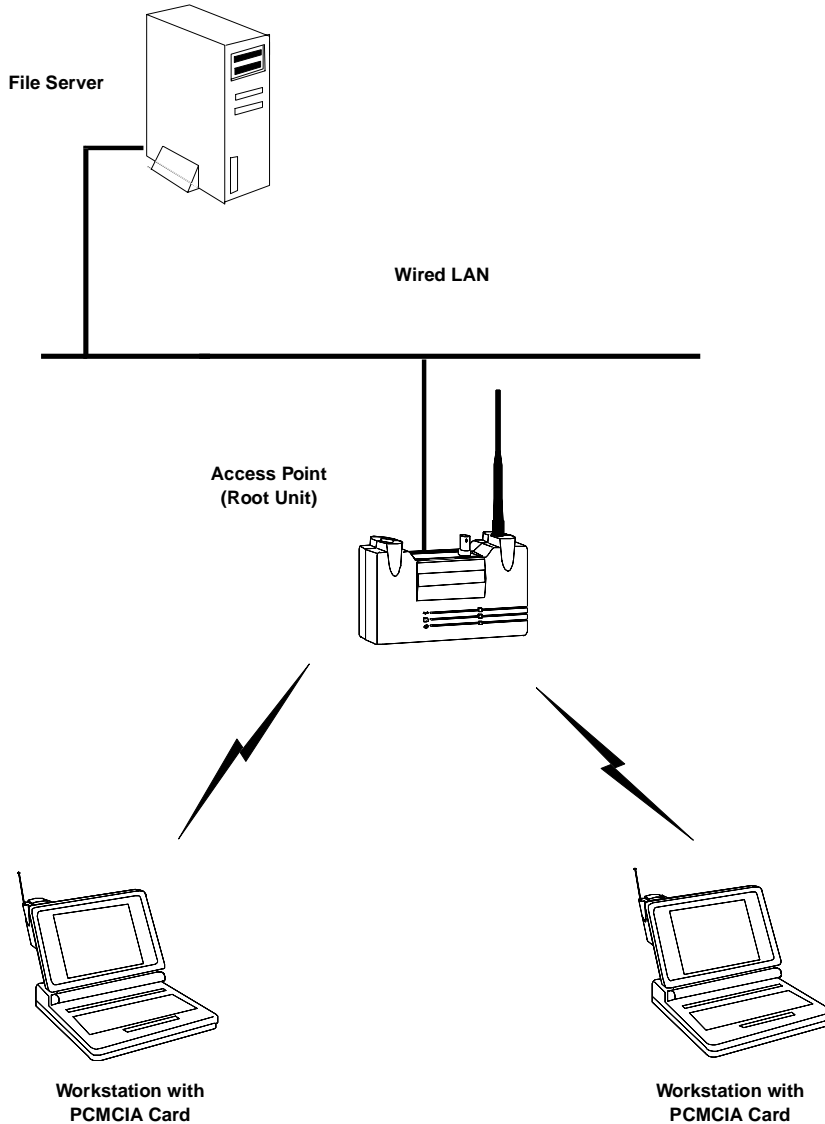
Figure 0.4 shows two Aironet Client Cards (in ARLAN Mode) registered to an Access Point. The Access Point is connected to an Ethernet LAN allowing the Aironet Client Cards to communicate with the LAN File Server.

Figure 0.5 - 2.4 GHz All Wireless LAN

In an all Wireless LAN, the workstations each equipped with an Aironet Client Card are linked to a stand-alone Access Point Root Unit which acts as a hub, linking all Radio Nodes together.
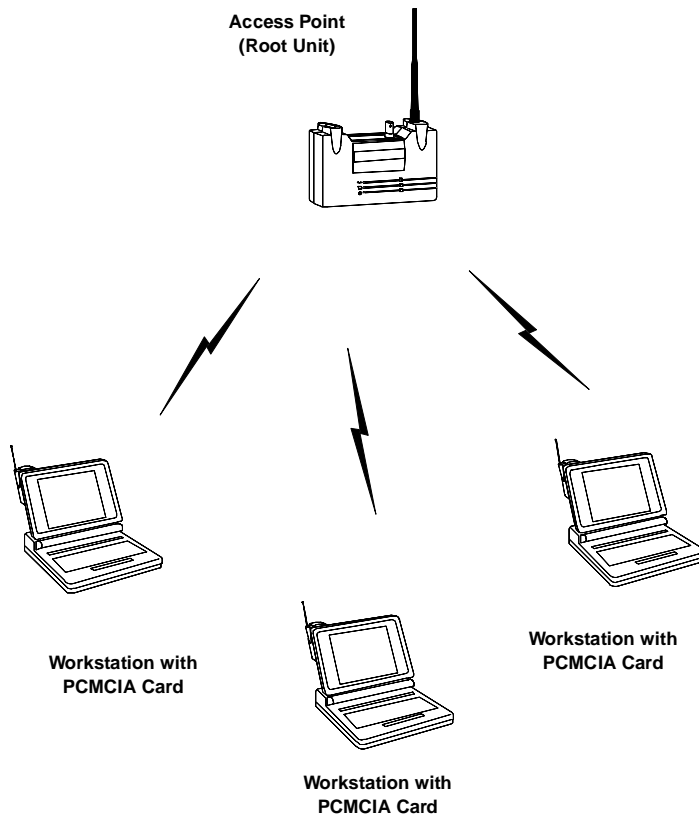
Figure 0.5 shows three Aironet Client Cards (in ARLAN Mode) registered to an Access Point. The Access Point acts as a hub, allowing communications between each of the Client Cards.

Figure 0.6 - Multiple 900 MHz Microcells on a Wired LAN

A Micro-Cellular Network can be created by placing two or more Access Points on an Ethernet LAN, and allowing remote workstations equipped with Aironet Client Cards to register to the Access Points. The ARLAN protocols allow remote workstations to move from the domain of one microcell to another. The process is seamless and transparent, and the connection to the File Server or host is maintained without disruption. This configuration is particularly useful with portable or mobile workstations.

File Server

Wired LAN

**Access Point
(Root Unit)**

**Access Point
(Root Unit)**

**Workstation with
PCMCIA Card**

**Workstation with
PCMCIA Card**
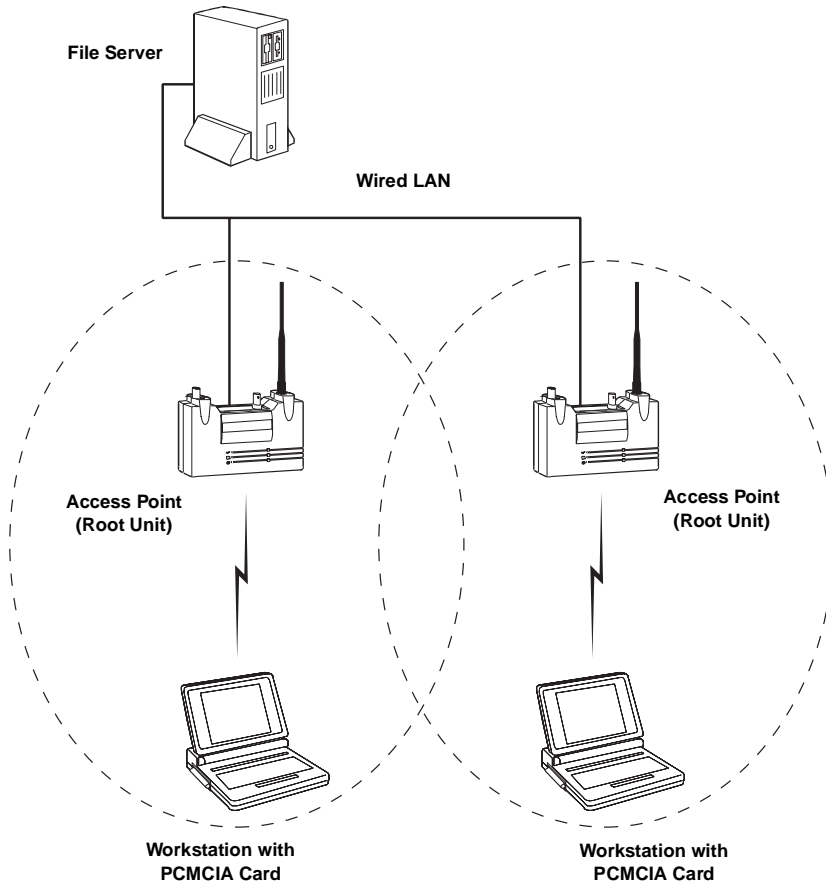
Figure 0.6 shows multiple microcells created by placing two Access Points on the Ethernet LAN. The two remote Aironet Client Cards then register with the Access Points allowing communication with each other or with the File Server on the LAN.

Figure 0.7 - Multiple Access Points to Extend the 2.4 GHz Network

The Aironet Access Point can be configured as a stand-alone Repeater to extend the range of a network, or to overcome an RF blocking obstacle. The Repeater will support remote workstations equipped with an Aironet Client Card. The Repeater will forward traffic between the workstations and the Ethernet LAN by sending packets to either another repeater, or to an Aironet Access Point configured as a backbone Root Unit. Multiple Repeater hops (up to 8) are supported in the path to the Ethernet.

File Server

Wired LAN

**Access Point
(Root Unit)**

**Access Point
(Repeater)**

1
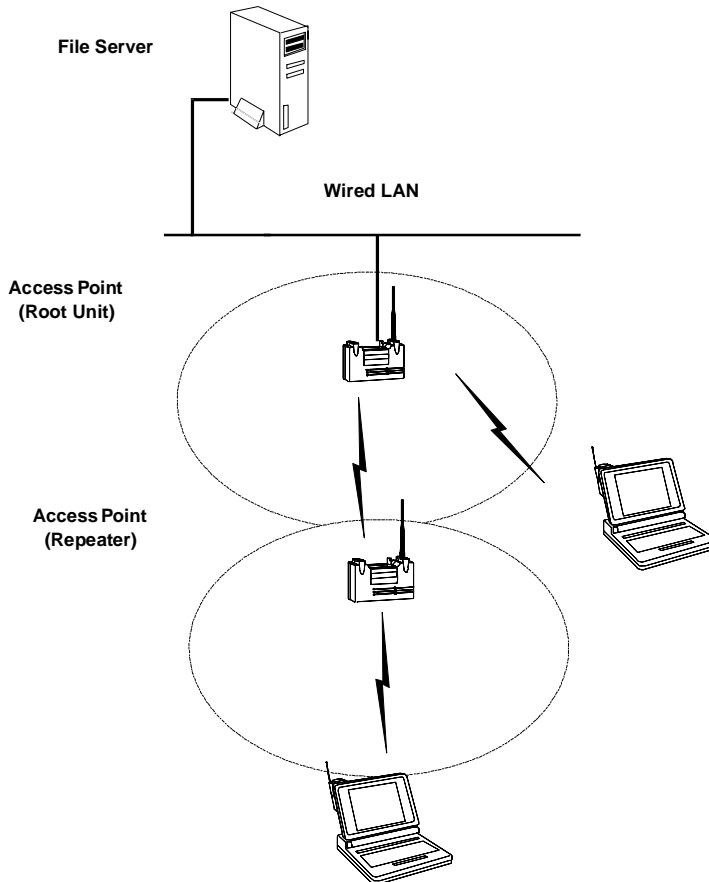
C H A P T E R 1

Client Card Installation

This chapter describes how to install the Aironet Client Card. Please refer to the documentation that came with your computer if you need additional information on how to install third-party cards.

Here's what you'll find in this chapter:

- Before You Start

- Installing the Radio Module and Client Card

- Mounting the Radio Module

- Removing the Client Card and Radio Module

- Viewing the LED Display

Before You Start

The Aironet PCMCIA consists of two components — a Client Card and a Radio Module with attached tether cable. The Radio Module attaches to the Client Card and the Adapter is inserted into any Type II PCMCIA slot on a notebook or Personal Computer.

The installation steps to follow for proper operation are as follows:

■   Attach the Radio Module tether cable to the Client Card

■   Insert the Client Card into the computer's Type II slot

■   Mount the Radio Module onto the computer

   (See *Installing the Radio Module and Client Card* for detailed installation instructions.)

Before installing the Aironet Client Card make sure you have the Operations Guide for your computer.

Figure 1.1 - Overview of the Aironet Client Card
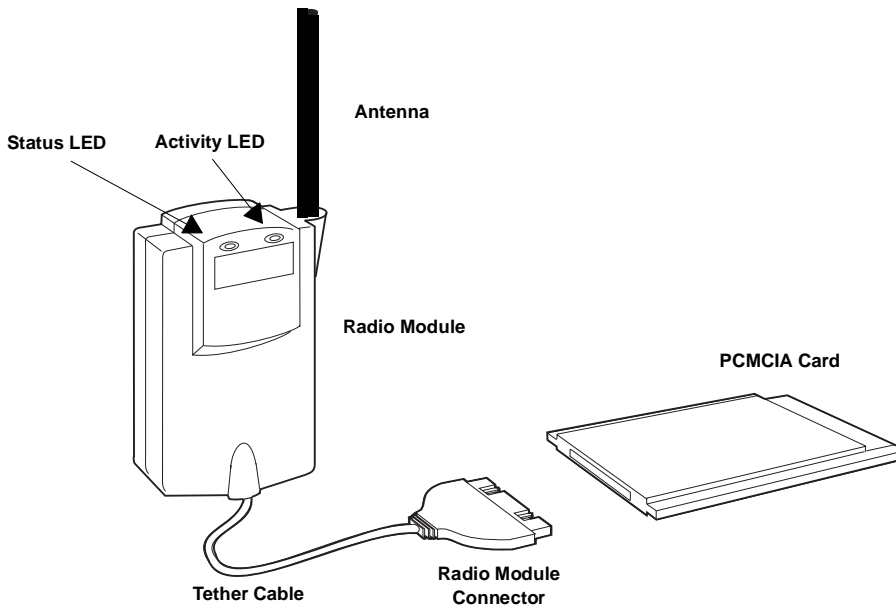
Installing the Radio Module and Client Card

NOTE: Before mounting the Radio Module, install the Client Card and ver-
ify that it is working properly with your computer. This step will also pro-
vide you with a better idea of where to mount the Radio Module so that
the tether cable is never strained.

To Mount the Radio Module:

1. Slide the mounting plate off of the bracket on the back of the Radio
    Module.

2. Peel the plastic from the back of the mounting plate to expose the
    glued surface.

3. Position the mounting plate on the computer so that when the Radio
    Module is attached, the antenna will point in an upward direction,
    and where possible, above the top edge of the computer. This
    ensures the best radio range during normal operations.

4. Slide the back of the Radio Module onto the mounting plate until the
    Radio Module is positioned firmly in place. See **Figure 1.2**.

Figure 1.2 - Mounting the Radio Module
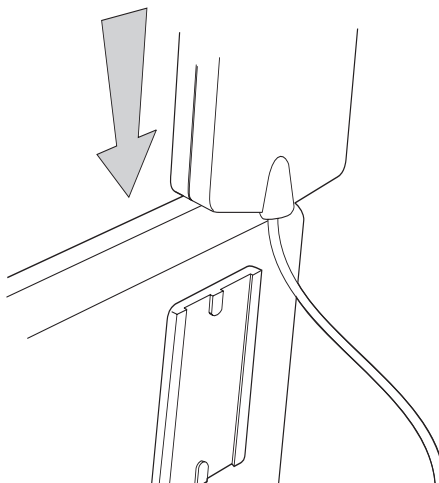
> **⚠** ***CAUTION:*** The Radio Module is power bearing and should be attached to the Client Card before inserting the Adapter into the computer. NEVER attach the Radio Module to the Client Card if the Adapter is in the computer and the computer is powered on.

To Install the Radio Module and the Client Card:

1. Turn the computer off.

2. Attach the Radio Module Tether Cable connector into the end slot of the PCMCIA Card as shown in **Figure 1.3**.

Figure 1.3 - Attaching the Radio Module to the Client Card
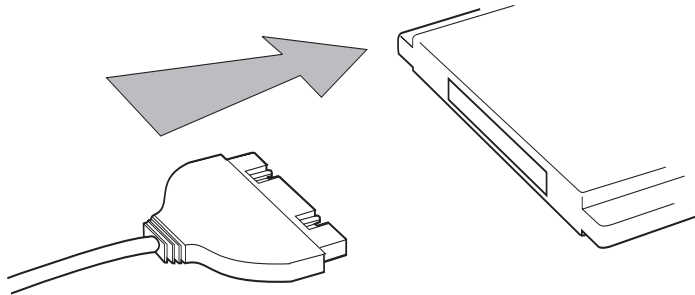
3. Locate the Type II PCMCIA slot on your computer.

4. Hold the Client Card with the label-side up and the arrow pointing toward the slot.

5. Insert the Client Card into the Type II slot as shown in **Figure 1.4**. Make sure you insert the card firmly into the slot until it clicks into position.

Figure 1.4 - Installing the Client Card
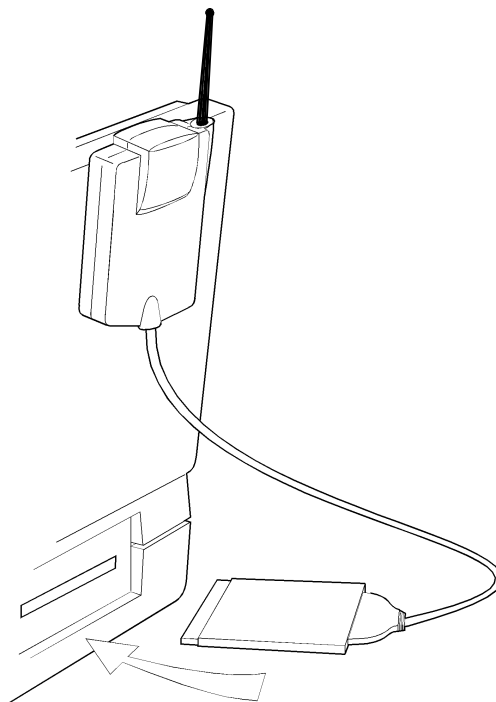
6.   Power up your computer.

If the computer powers up properly, see *Chapter 3 - Utilities*.

If the computer does not power on properly, see *Chapter 4 - Trouble-shooting and Performance*. If the problem cannot be resolved contact Aironet Technical Support.

Removing the Client Card and Radio Module

When not in use, the Client Card and Radio Module should be removed from the computer, and the Card stored in a safe place away from excessive heat and electrostatic environments.

To Remove the Client Card and Radio Module:

1. Turn off the computer.

2. Eject the Client Card PCMCIA Card.

3. Remove the Radio Module from the mounting plate.

4. Detach the Radio Module tether cable from the Client Card.

CAUTION: The Client Card PCMCIA Card can be left in the computer without the Radio Module attached. However, NEVER connect the Radio Module to the Card with the computer powered on.

Viewing the LED Display

The LED Display is located on the front of the Radio Module as shown in **Figure 1.5** and as described in **Table 1.1**.

Figure 1.5 - LED Display

Status LED
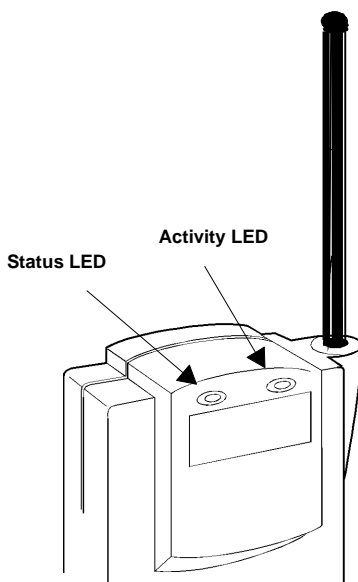
Activity LED

Table 1.1 - LED Display

Status LED	Activity LED	Description
Amber	Amber	Aironet Client Card PCMCIA Card is functional but the non-volatile memory is not configured. (See *Chapter 3 - Utilities* for System Configuration)
Blinking Green	Green Flash	Aironet Client Card not registered to an Access Point
Green	Off	Normal idle state. No data transmission or receive activity
Green	Green Flash	Normal active state. Sending or receiving data or registration maintenance packet.
Red	Amber	Hardware failure
Red	Red	Radio Module failure

When viewing the LED Display, keep in mind the following:

■ When the PC is initially powered up, all LEDs will be off, unless a network driver was loaded during power up. After a driver is loaded, the Status LED is either steady or flashing and the Activity LED is off. If the power on self-test finds a failure, then one of the two failure indicators will be displayed instead.

■ When the Activity LED is flashing green, this indicates the successful reception or transmission of a packet over the radio.

■ When configured in ARLAN mode, the Aironet PCMCIA Status LED will blink green until the Card has registered with an Access Point. Once registered, the Status will go steady green.

■ If there is a suspected problem, as indicated by the LEDs, run either the ARLANDGS or WinDGS diagnostic utility (see *Chapter 3 - Utilities*).

2

Client Card Driver Installation

This chapter explains how to install the Aironet Client Card drivers with the supported LAN operating systems.

Here's what you'll find in this chapter:

- NDIS Driver Installation, including:
  DOS
  OS/2
  Windows for Workgroups
  Windows 95

- ODI Driver Installation

- Packet Driver Installation

Overview

The Aironet Client Card drivers which are located on the Aironet Configuration diskette support the following LAN operating systems:

- ■ NDIS Drivers - for NDIS-compliant LAN operating systems such as Microsoft LAN Manager, PC LAN, Windows for Workgroups and Windows 95.

- ■ ODI Drivers - for Novell NetWare Lite and other ODI-compliant networking systems.

- ■ Packet drivers - for use with third party software such as FTP.

- ■ OS/2 drivers - for use with OS/2 NDIS compliant operating systems.

The Aironet Client Card drivers are grouped by driver type in separate subdirectories on the Aironet Configuration diskette. In each of the subdirectories there is a readme file explaining the file of the directory. (READNDIS.TXT, READODI.TXT and READPKT.TXT).

NOTE: Installation guideline hints for particular operating systems (such as Windows for Work Groups, OS/2, etc.) can be found on the Aironet BBS. See *Appendix E - Aironet Customer Support* for BBS information.

NDIS Driver Installation

You can install the Aironet Client Card in a NDIS-compliant DOS environment such as Microsoft LAN Manager and PC LAN.

This installation procedure requires the following software:

- ■ DOS 2.0 or higher

- ■ Aironet Configuration diskette

In some cases, follow the installation procedure from the client sub-system (i.e. Windows, etc.). Refer to the applicable LAN operating system documentation for instructions on installing third-party drivers and use the following procedures as guidelines.

Installation Guidelines

1. Copy the **A:\NDIS\DOS**\1200-2200**AWCN**1200-2200**.DOS** driver file from the Aironet Configuration diskette to the network directory on the boot disk.

2. Modify the **CONFIG.SYS** file by adding the following after the line containing, Device=PROTMAN.DOS.

   Device=[drive:][path]AWCN1200-2200.DOS

3. Edit your current PROTOCOL.INI file to include the following lines. These lines are in the sample file **A:\NDIS\DOS**\1200-2200**PROTOCOL.INI.**

If you are using an Aironet 1200:

```
[AIRONET]
Driver Name=ARLAN$
SystemId=0x000002          ;Even Number 6-hex digit system id

Channel=11                 ;Defines which radio channel to
                           ;use
```

(See *Appendix B - International Channel Sets* for a list of the available channels and *Chapter 3 - Utilities* for a description of how to select a channel.)

```
TMA=ON                     ;Defines if ARLAN Mode is used
                           ;   OFF - Peer-to-Peer Mode
                           ;   ON  - Normal ARLAN Mode
                           ;   PSP - Power Saving ARLAN Mode
Mem=0xD000                 ;PCMCIA Shared RAM address
                           ;0xC000-0xDE00 valid

Int=5                      ;PCMCIA IRQ 2-15 valid

Socket=1                   ;PCMCIA Socket, 1 or 2 valid
```

If you are using an Aironet 2200:

```
[AIRONET]
Driver Name=ARLAN$
SystemId=0x000002          ;Even Number 6-hex digit system id

DataRate=4                 ;Defines which data rate to use

Channel=3                  ;Defines which frequency to use
```

(See *Appendix B - International Channel Sets* for a list of the available channels and *Chapter 3 - Utilities* for a description of how to select a channel.)

```
TMA=ON                          ;Defines if ARLAN Mode is used.
                                ;  OFF - Peer-to-Peer Mode
                                ;  ON  - Normal ARLAN Mode
                                ;  PSP - Power Saving ARLAN Mode
```

4.   Reboot the system to activate the NDIS Driver.

Windows 95 Installation Guidelines

This procedure is for Aironet Client Card. You will need the following:

■   Windows 95 system installation files (hard disk, floppy disk, or CD)

■   Aironet driver diskette

1.   Power up your computer and start Windows 95.

2.   Insert the Aironet Wireless Client Card.

3.   When the *New Hardware Found* dialog box appears, select *Driver from disk provided by hardware manufacturer* and click *OK*.

4.   Insert the Aironet driver diskette into A:\ and click *OK*.

5.   When prompted for the file location, type **A:\NDIS3** and click *OK*.

6.   When the Advanced properties box is displayed, enter the information appropriate to your RF network and click *OK*.

7.   Windows 95 will begin to copy the appropriate system files.

8.   When installation is complete, Windows 95 will prompt for Restart.

9.   Remove the Aironet driver diskette and click *OK*.

Installation of the card and driver is complete.

Windows NT Installation Guidelines

You will need the following:

■ Windows NT system installation files (hard disk, floppy disk, or CD)

■ Aironet driver diskette

1. Insert the Aironet Wireless Client Card into your computer.

2. Power up your computer and allow Windows NT to start.

3. Double click on *My Computer.*

4. Double click on *Control Panel*.

5. Double click on *Devices*.

6. Verify the following configuration is in the Devices list:
   PCMCIA   STARTED   BOOT

7. Click on *Close*.

8. Under Control Panel, double click on *Network*.

9. Select the *Adapter* tab.

10. Click *ADD*.

11. Select *Have Disk*.

12. Insert the Aironet driver diskette in A:.

13. When prompted for the file location, insert the Aironet driver diskette in drive A: and type **A:\NDIS3**.

14. Highlight the appropriate Aironet Wireless Client Adapter and click *OK*.

15. Enter the information appropriate to your RF network.

16. Click *OK* to the warning message:
    "The current netcard parameters are not verifiably correct..."

17. Click *Apply*.

18. Click *OK*.

19. Shut down Windows NT and reboot to initialize the card.

Installation of the card and driver is complete.

Windows for Workgroups Installation Guidelines

1. Start Windows.

2. From the *Main* program group, click on *Windows set-up*.

3. Click *Options* and select *Change Network Settings*.

4. Click *Networks* and select *Install Microsoft Windows Network* and click *OK*.

5. Click *Network Setup* and select *Drivers*.

6. Select *Add Adapters*. If the Aironet drivers were previously installed they will show in the list that displays.

7. Click *Add Adapter* and select the appropriate driver based on the model of the adapter (1200 or 2200). If the Aironet adapters do not appear:

    a. Select *Unlisted* or *Updated Network Drivers*. A message appears that prompts for the Aironet driver disk.

    b. Insert the Aironet Configuration diskette in drive A: and click *OK*.

    c. Select the appropriate Aironet driver and click *OK*.

    d. If the selected driver is displayed in the Network Drivers, click *Setup* and make changes to match the Aironet system.

ODI Driver Installation

You can install the Aironet Client Card in an ODI-compliant DOS environment such as Novell Netware.

This installation procedure requires the following software.

- DOS 2.0 or higher

- Aironet Configuration diskette

Refer to the applicable LAN operating system documentation for instructions on installing third-party drivers and use the following procedures as guidelines.

Installation Guidelines

1. Copy the **A:\ODI\DOS**\1200-2200**AWCO1200-2200.COM** driver from the Aironet Configuration diskette to the network directory on the boot disk.

2. Copy the **A:\ODI\DOS**\1200-2200**NET.CFG** file from the Aironet Configuration diskette to the network directory on the boot disk (do not copy over the existing NET.CFG file), or edit your current **NET.CFG** file to include the following lines:

If you are using an Aironet1200:

```
Link Driver AWCO1200

    SystemId      000002       ;Even Number 6-hex digit system id

    Channel       11           ;Defines which radio to use
```

(See *Appendix B - International Channel Sets* for a list of the available channels and *Chapter 3 - Utilities* for a description of how to select a channel.)

```
    TMA           ON           ;Defines if ARLAN Mode is used
                               ;   OFF - Peer-to-Peer Mode
                               ;   ON  - Normal ARLAN Mode
                               ;   PSP - Power Saving ARLAN Mode

    Mem           #1 D0000     ;PCMCIA Shared RAM address
                               ;0xC000-0xDE00 valid

    Int           #1 5         ;PCMCIA IRQ 2-15 valid
```

```
Socket          1                ;PCMCIA Socket, 1 or 2 valid
Frame ETHERNET_802.3             ;ONLY define frames needed
Frame ETHERNET_II
Frame ETHERNET_802.2
Frame ETHERNET_SNAP
```

NOTE: When using the Aironet Token Ring Access Point, put Frame ETHERNET_802.2 as the first frame type in the list.

If you are using an Aironet 2200:

```
SystemId        000002      ;Even Number 6-hex digit system id

DataRate        4           ;Defines which data rate to use
```

(See *Appendix B - International Channel Sets* for a list of the available channels and *Chapter 3 - Utilities* for a description of how to select a channel.)

```
Channel         3        ;Defines which radio to use

TMA             ON       ;Defines if ARLAN Mode is used
                         ;   OFF - Peer-to-Peer Mode
                         ;   ON  - Normal ARLAN Mode
                         ;   PSP - Power Saving ARLAN Mode

Mem             #1 D0000 ;PCMCIA Shared RAM address
                         ;0xC000-0xDE00 valid

Int             #1 5     ;PCMCIA IRQ 2-15 valid

Socket          1        ;PCMCIA Socket, 1 or 2 valid
Frame ETHERNET_802.3     ; ONLY define frames needed
Frame ETHERNET_II
Frame ETHERNET_802.2
Frame ETHERNET_SNAP
```

NOTE: When using the Aironet Token Ring Access Point, put Frame ETHERNET_802.2 as the first frame type in the list.

3. Run the following drivers (you should probably add the following lines to the AUTOEXEC.BAT file in the root directory):

```
LSL
AWCO1200
IPXODI
NETX
```

NOTE: Using a VLM driver supplied by Novell instead of NETX can increase system throughput by up to 30 percent.

Packet Driver Installation

You can install the Aironet Client Card in a DOS environment that uses third party products such as FTP software.

The installation procedure requires the following software:

- DOS 2.0 or higher

- Aironet Configuration diskette

Refer to the applicable LAN operating system documentation for instructions on installing third-party drivers and use the following procedures as guidelines.

Installation Guidelines

1. Copy the **A:\PKT**\1200-2200**AWCP**1200-2200**.COM**, **A:\PKT**\1200-2200**PKTCFG.EXE** and **A:\PKT\1200-2200\PCM-CFG.EXE** drivers from the Aironet Configuration diskette to the network directory on the boot disk.

2. Copy the **A:\PKT**\1200-2200**PKT.INI** file from the Aironet Configuration diskette to the network directory on your boot disk and edit as follows:

If you are using an Aironet 1200:

```
[SpreadPacket]
    SystemID=2
    Channel=11
    Registration=1
```

> **(See *Appendix B - International Channel Sets* for a list of the available channels and *Chapter 3 - Utilities* for a description of how to select a channel.)**

If you are using an Aironet 2200:

```
[SpreadPacket]
    SystemID=2
    Bitrate=4
    Channel=3
    Registration=1
```

3. Edit the PCMCIA.INI file as follows:

```
[PCMCIA]
    Mem=0x0D000
    Int=3
    Port=0x300
    Socket=1
```

4. Run PKTCFG PKT.INI

5. Run PCMCFG PCMCIA.INI

6. Run the Packet Driver as follows:

```
AWCPKT[-nwumi] <int_number>
where:
-n  allow usage with BYU Novell-Packet Driver Converter
-w  allow usage with windows
-u  unload Packet Driver TSR
-m  put driver into monitor mode. For use with the
    monitor mode ROM.
-i  specify drive-path-filename of default configuration
    file PKT.CFG
<int_number> software interrupt for the packet driver to
    use < > is a number between 0x60 and 0x6F
```

3

Utilities

This chapter describes the procedures for testing the Aironet Client Card and configuration parameters.

Here's what you'll find in this chapter:

- WinDGS Overview

- WinDGS Menus

- ARLANDGS Overview

- Performing Quick Setup

- Editing the ARLAN.CFG File

- Performing Diagnostics

- Configuring the Client Card

- Performing a Linktest

- Viewing the Registration Table

- Upgrading Firmware

- Checking the LED Display

Overview of WinDGS

WinDGS is used to perform user level diagnostics on your Aironet Wireless LAN Adapter Card when using Windows 95 or Windows NT.

Commands Menu

The Commands Menu includes:

- Loading New Firmware

- Edit Properties

- Statistics

- Status

- Linktest

- Radio Off/On

- Exit

Loading New Firmware

To load new firmware:

1. Make sure the 1200/2200 is up and running.

2. Select *Commands*.

3. Select *Load New Firmware*.

4. Select *Look In...* Use the drop down button to select the appropriate path and image file.

5. Select *Open*. This will flash the card with the selected image.

Edit Properties

WinDGS allows you to change the configuration parameters of your currently installed Aironet Client Card. Depending on the preferences you have set, WinDGS can save the current properties to the registry. See *Save Properties Options* for more information.

Statistics

The Statistics screen shows the current statistics from the Aironet Client Card. Statistics are updated at the rate specified by the Screen Update Timer. Clear the current statistics by clicking on the Reset button. Exit the Statistics screen by clicking on OK, or by clicking on the X in the upper right hand corner of the dialog box.

Status

The Status screen shows the current status from the Aironet Client Card. Status is updated at the rate specified by the Screen Update Timer. Exit the Status screen by clicking on OK, or by clicking on the X in the upper right hand corner of the dialog box.

Linktest

WinDGS may be used to assess the performance of RF links. TCP/IP protocol must be installed to run this link test. See the Help section of Windows 95/NT for more information on installing and setting up TCP/IP. An IP address must also be configured for the Access Point.

1. From the link test command menu, enter the following parameters:

■   IP address of Aironet Access Point:
    This parameter specifies the IP address of the Access Point with which you want to test the RF link. Set this value before running the link test.

■   Number of Packets:
    This parameter specifies the number of packets the link test will attempt to send. The display will show the number of packets of the specified size that are successfully transmitted and received.

■   Packet Size:
    This parameter specifies the size of the data packet to be sent to the Aironet Access Point. Be aware that the TCP/IP stack that comes with Windows 95 will fragment packets greater than 512 bytes. Therefor, the number of packets transmitted will not match the number of packets received (even if none are lost) if the packet size is greater than 512 bytes.

2. Once the parameters have been entered, click on the Start button at the bottom of the dialog box to start the link test. When the link test is running, necessary statistics will be displayed and updated periodically.

3. To stop the link test, click on Stop, OK, or Cancel at the bottom of the dialog box. Once the link test has sent the number of packets specified, the Stop button will toggle back to a Start button.

Radio Off/On

Radio Off/On allows you to selectively turn off or on the power to the radio. Turning the radio off prevents all RF energy from being transmitted by the Aironet Client Card.

Exit

Closes all windows and exits WinDGS.

Options Menu

The Options Menu includes:

■   Preferences

■   Screen Update Timer

■   Save Properties Options

Preferences

The WinDGS Preferences allow you to customize various parameters that control the operation of WinDGS. For example, you can set the rate at which the values are updated in the status and statistics screens via the Screen Update Timer. You can also set the Save Properties Options, which controls what is done with changes to the current settings.

Screen Update Timer

The Screen Update Timer controls how often the statistics and status screens are updated. The screen can be updated in one second increments, from once a second to once every 60 seconds. The default is once every five seconds. You can use either the edit box or the slider to change this value.

Save Properties Options

Use Save Properties Options to select the default operations for saving the current adapter configuration. Choose either:

■   Save Properties to the Registry:
    This option allows you to save the configuration to the Windows Registry. The configuration will be restored the next time you execute WinDGS.

■   Save Properties to the Adapter:
    This option saves the current configuration to non-volatile memory in the adapter.

■   Always Prompt the User:
    This option, when checked, will prompt the user to save the current settings to the Registry. If the box is not checked, the operation will default to "Save Properties to the Registry".

Edit Menu

The Edit Menu includes:

■   System Parameters

■   Network Parameters

■   ARLAN Parameters

■   PSP Parameters

■   DDP Parameters

■   MAC Parameters

System Parameters

System parameters include:

- Name

- SID

- Registration Mode

- Specified Router

- Channel Number, Bitrate and Frequency

- Priority

Name

The station name is displayed in the table of connected devices on the Access Point. It provides a logical name to determine which machines are connected without having to memorize every MAC address. The name can be up to 16 characters.

Setting the System Identifier

The SID is a 4-byte, hexadecimal digit value that is attached to each packet sent out over the radio. Establishing a SID allows you to group nodes into a microcellular network and exclude those nodes that are within radio range on other networks.

The SID value must be an even number, cannot exceed 8 digits and must start with 00 or 02. An example of valid SID values are: 00000102, 0200AA14, 00013A18, 007F6380. The default SID is 00000002.

Since nodes will only receive packets from other nodes with a matching SID, you must make sure that the Aironet PCMCIA Client Card is set with the same SID as other nodes on your Radio Network.

The System Identifier option also allows you to have the system automatically set a SID value for you. To generate an automatic SID value, click once on AUTO with the mouse, or press F10.

NOTE: All other units in the system must be manually set to this value.

Registration Mode

Use the Registration Mode parameter to specify whether you are operating in ARLAN, PSP or Non-ARLAN mode. The default setting is ARLAN Mode.

■ Set to **"ARLAN"** when operating with Aironet Access Points

■ Set to "PSP" when operating with battery-powered devices

■ Set to "Non-ARLAN" when operating in Peer-to-Peer mode with other Aironet Client Cards and no Aironet Access Points (see *Registration Modes* for a detailed explanation).

Setting the Specified Router

This parameter only applies to the ARLAN and PSP registration modes.

Use the Specified Router parameter to specify a Parent Access Point for the Aironet PCMCIA Client Card to register to.

■ If you want the Aironet PCMCIA Client Card to register to a specific Parent Access Point, you should enter the Network Address of that Access Point. All other Access Points will be ignored even if their radio link would be better.

  Keep in mind, however, if the specified router is not heard from within the Specified Router Timeout time, then the unit will register with the Access Point at the root of the Radio Network Tree, or the Access Point that is closest to the top of the Radio Network tree, and that is within radio range (see *Setting Advanced Radio Parameters* for information on Specified Router Timeout).

■ If you do not want to specify a specific Parent Access Point, you should leave the parameter at the default value of "Not Specified". With this value, the Client Card will automatically register to the Access Point at the root of the Radio Network Tree or the Access Point that is closest to the top of the Radio Network tree, and that is within radio range.

Selecting a Channel Number, Bitrate and Frequency

The Channel Number parameter appears for all 1200 Series models and the Bitrate and Frequency parameters appear for the Aironet 2200 Series only.

Keep in mind the following when selecting Channel Numbers, Bitrates and Frequencies:

- *Appendix B* contains both North American and International bit rates, frequencies and channel sets which can be used as a guide in selecting the appropriate combinations for both 900 Mhz and 2.4 GHz models.

- The tendency is to select the highest data rate available for the Client Card. The trade-off, however, is that the higher the rate, the lower the quality of the radio signal, and therefore, the shorter the range a packet may be sent successfully.

- If you find excessive interference on the channel or bitrate\frequency you have chosen, try other channels, or combinations until you find one that is more reliable.

- Use the Linktest option to test the transmission quality between the Client Card and other nodes on the Radio Network.

When you select the Channel Number parameter for 1200 Series models, the 900 MHz Channel Set appears. Choose a **channel number** from the available channel set.

When you select the Bitrate and Frequency parameter for the 2200 Series, the 2.4 GHz Bitrate and Frequency window appears. Choose a bitrate and frequency combination from the set.

Setting the Priority

The priority setting is used by the radio MAC (Media Access Control) to allocate access to the radio link. The higher the priority, the more likely the Wireless LAN Adapter will be first to successfully transmit a packet when multiple Aironet devices are trying to transmit at the same time. The percentage of devices that are not using normal priority should be kept low (10% or less).

Network Parameters

User modifiable parameters are limited to the your choice of MAC Address:

- **Factory MAC Address**: This is the unique hardware factory MAC address which is guaranteed to be unique. Unless you have a very good reason to define your own MAC address, it is STRONGLY RECOMMENDED that you use the factory MAC address.

- **User Defined MAC Address**: If you must define your own MAC address, you can enter it here. If you do not use a unique value, you may not be able to communicate to your wired network at all. For this reason, it is STRONGLY RECOMMENDED that you use the factory MAC address. The MAC address is 12 hexadecimal digits. You do not need to use delimiters, but you can use spaces or the colon character.

Setting ARLAN, MAC, DDP, and PSP Parameters

These parameters should only be set or modified by experienced users. For details, see the on-line help in WinDGS.

ARLANDGS Overview

(Router and Access Point are used interchangeably throughout this Chapter)

Client cards are configured everytime the client card network driver is loaded. Aironet's DOS based diagnostic utility (ARLANSDGS) provides a method for testing configuration, parameters, hardware, and radio performance.

Table 3.1 below lists the files (from the configuration disk) you will need to run ARLANDGS. These files are located in the Root Directory of the Aironet Configuration diskette.

Table 3.1 - Client Card Diagnostic Utilities

File	Description
ARLANDGS.EXE	The ARLAN Diagnostic/Setup Utility Program allows you to: ■ Display the existing system configuration parameters for the Aironet Client Card ■ Edit and set the system configuration parameters ■ Run hardware diagnostics ■ Test the radio link.
ARLAN.CFG	The System Configuration File: ■ Holds the system configuration parameters ■ Saves the parameters after they have been edited.
ARLANDGS.RES	National language text resource file
ARLANDGS.COL	User defined color configuration file

Steps for Diagnostic Testing

The procedures for completing the Aironet PCMCIA diagnostic testing are described in detail throughout the chapter. In general, the basic steps are as follows:

1. Run ARLANDGS.EXE.

2. Select the found Client Card and view the current system configuration parameters.

3. Perform Quick Setup (if new to Aironet products).

4. Save the configuration.

5. Configure the Aironet Client Card with the new parameters (tests hardware).

6. Run a Linktest to test the link quality.

Navigating ARLANDGS Menus

ARLANDGS uses a DOS-based Graphical User Interface (GUI) consisting primarily of menus. You can navigate through the menus using the keyboard or the mouse (assuming a mouse driver has been installed).

Using the Mouse

To Select Menu Items

Move the mouse cursor over the item you want to select and click once with the left-mouse button.

To View On-Line Help

Move the mouse cursor over the item you want help for and click once with the right-mouse button.

Using the Keyboard

ARLANDGS offers many ways to move around the screen and manipulate the windows with the keyboard.

To	Use these keys
Move selection bar up/down	Up/down arrow keys
Move selection bar left/right	Left/right arrow keys
Help for field selection	Press F1
General Help	Press F2
Choose random SID in SID editing window and generic name in Name window.	F10
Toggle edit mode	Up arrow key
Display About window	ALT+A
Abort/Abort Changes/Exit	Press Escape

Running ARLANDGS.EXE

1. Insert in Drive "A or B" the backup copy of the Aironet Configuration diskette.

NOTE: If you have not yet made a backup copy of the Aironet Configuration diskette, do so by running the DOS DISKCOPY command. Do not use the DOS COPY command since the diskette contains subdirectories.

2. Type:

   A: or B:

   ARLANDGS [switches]

   (See *Appendix C - Command Line Switches*)

   The Diagnostics/Setup Utility title screen appears.

3. Click on the OK button or press ENTER.

   A message appears: "Scanning for Aironet devices."

   ARLANDGS will scan the PC's memory (including serial and parallel ports if selected on the command line) to find all the Aironet Client Cards which are attached.

   If your PC has more than one Aironet Client Card present the Device Menu will appear, otherwise the Main Screen appears.

4. From the Device Menu, select the applicable card.

Viewing the Main Screen

After an Aironet Client Card has been selected, the main ARLANDGS
Screen similar to the following appears.

```
┌──────────────── Present Device Configuration ─────────────────┐
│                                                               │
│  Status            Registered     Mode           TMA          │
│  Hardware Type     Arlan 6XX      System ID      00 00 00 02  │
│  Firmware          V1.10          Address        00:40:96:10:06:7D │
│  Base Address      D000:0000      Router         Not Specified │
│  IRQ               IRQ 5          Name                         │
│  Radio Type        025-1A         Data Rate      2000 kb/s    │
│  Channel Set       North Amer     Frequency      2442 MHz     │
│  Socket            SKT1                                        │
│                                                               │
└───────────────────────────────────────────────────────────────┘
```

```
        ┌─ [.] ────── Main Menu ──────┐
        │                             │
        │     Perform Quick Setup     │
        │  Edit Configuration- ARLAN.CFG │
        │     Perform Diagnostics     │
        │      Configure Device       │
        │      Perform Link Test      │
        │      Upgrade Firmware       │
        │       Exit ARLANDGS         │
        │                             │
        └─────────────────────────────┘
```

F1: Field Help   F2:Help   ESCape:Exit   ALT-A: About   PGUP,PGDN,Cursor Keys:Select

Viewing the Present Device Configuration

The Present Device Configuration section displays the current settings
for the Client Card and are described in detail in *Appendix D - Current
Device Parameters*.

The items shown in the Present Device Configuration will differ
slightly, depending on the Client Card installed, and can be edited using
the **Edit Configuration-ARLAN.CFG** option under Main Menu (see
Editing the ARLAN.CFG File).

Using the Main Menu

The Main Menu contains the following options:

Quick Setup: Allows the novice user to setup any Aironet Client Card with the minimum requirements.

Edit Configuration-ARLAN.CFG: Allows you to edit all parameters in the ARLAN.CFG file.

Perform Diagnostics: Allows you to run a diagnostics test on the Client Card installed.

Configure Device: Configures the Client Card with the parameters you have set.

Perform Linktest: Allows you to test the link quality between the Client Card and other nodes on the Radio Network.

Upgrade Firmware: Allows you to upgrade the firmware for the Client Card.

Exit ARLANDGS: Used to exit out of ARLANDGS.

Performing Quick Setup

Quick setup allows novice users with little knowledge of Aironet equipment to setup a network with the minimum requirements. Experienced users should select **Edit Configuration-ARLAN.CFG**. Quick setup presents you with a series of screens, and will prompt you to enter values for several different fields.

To Use Quick Setup:

1. Choose Perform Quick Setup from the Main Menu.

    A screen appears providing you with a brief description of Quick Setup.

2.   If you wish to continue with Quick Setup, press **Y** or click on Yes with the mouse.

3.   A series of screens will appear, prompting you for the following values—Channel number, System ID and Device Name.

4.   Once you have entered all the required values, you will be prompted to save them to the ARLAN.CFG file.

See *Editing the ARLAN.CFG File* for detailed information on the Quick Setup values.

Editing the ARLAN.CFG File

Use the Edit Configuration - ARLAN.CFG option to set and edit the system parameters contained in the ARLAN.CFG file. When you select Edit Configuration - ARLAN.CFG, the Edit Parameter Menu appears.

```
           Edit Parameters- ARLAN.CFG
                 Hardware Settings
                 System Parameters
                 Radio Parameters
              Advanced Radio Parameters
               Reset to Factory Settings
             Edit ARLANDGS Color Scheme
                     FILE MENU
```
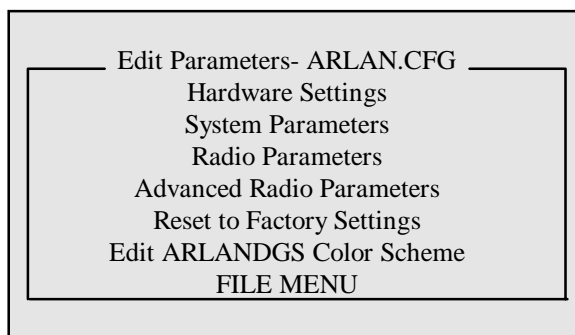
Hardware Settings

The Hardware Settings option is used to set the Base Address and IRQ level. When you select the Hardware Settings option, the following window appears:

```
          Hardware Settings- ARLAN.CFG
         Base Address                 D000
         IRQ                          IRQ5
```
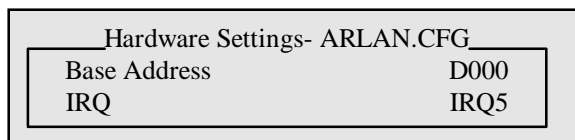
Setting the Base Address and IRQ Levels

The IRQ level is not required to be set for an Aironet PCMCIA.

The Base Address must match that of your computers available memory.

Setting System Parameters

Use the System Parameters option to set the Aironet Client Card system configurations. When you select the System Parameters option the following window appears:

```
┌─────────────────────────────────────────────┐
│  ┌──── System Parameters- ARLAN.CFG ────┐    │
│  │ Registration Mode              ARLAN  │    │
│  │  System ID                00 00 00 02 │    │
│  │ NID                    NOT SPECIFIED  │    │
│  │ Specified Router       NOT SPECIFIED  │    │
│  │ Device Name                           │    │
│  │ Priority                      Normal  │    │
│  │                                       │    │
│  └───────────────────────────────────────┘    │
└─────────────────────────────────────────────┘
```

Registration Mode

Use the Registration Mode parameter to specify whether you are operating in ARLAN, PSP or Non-ARLAN mode. The default setting is ARLAN Mode.

- Set to "ARLAN" when operating with Aironet Access Points

- Set to "PSP" when operating with battery-powered devices

- Set to "Non-ARLAN" when operating in Peer-to-Peer mode with other Aironet Client Cards and no Aironet Access Points (see *Registration Modes* for a detailed explanation).

Setting System Identifier

The SID is a 4-byte, hexadecimal digit value that is attached to each packet sent out over the radio. Establishing a SID allows you to group nodes into a microcellular network and exclude those nodes that are within radio range on other networks.

The SID value must be an even number, cannot exceed 8 digits and must start with 00 or 02. An example of valid SID values are: 00000102, 0200AA14, 00013A18, 007F6380. The default SID is 00000002.

Since nodes will only receive packets from other nodes with a matching SID, you must make sure that the Aironet Client Card is set with the same SID as other nodes on your Radio Network.

The System Identifier option also allows you to have the system automatically set a SID value for you. To generate an automatic SID value, click once on AUTO with the mouse, or press F10.

NOTE: All other units in the system must be manually set to this value.

Setting the Radio Node ID

The Radio Node ID represents the last 2-bytes of the 6-byte Network Identifier, and is used to customize the radio address for the Aironet Client Card.

If your LAN addresses are locally administered, you may want to set the 2-byte Radio Node ID to match those used on your LAN. If not, you should ignore this parameter and use the Network Identifier outlined below.

Setting the Network Identifier (NID)

The Network Identifier represents the 6-byte radio address of the Aironet Client Card. In using the NID, keep in mind the following:

- The NID will override the 2-byte Radio Node ID address.

- The address must be unique across the entire network.

- If the NID is left at the default of 00:00:00:00:00:00 it will use a factory assigned address.

Setting the Router ID

The Router ID is not required for the Aironet Client Card.

Setting the Specified Router

This parameter only applies to the ARLAN and PSP registration modes.

Use the Specified Router parameter to specify a Parent Access Point for the Aironet Client Card to register to.

- If you want the Aironet Client Card to register to a specific Parent Access Point, you should enter the Network Address of that Access Point. All other Access Points will be ignored even if their radio link would be better.

  Keep in mind, however, if the specified router is not heard from within the Specified Router Timeout time, then the unit will register with the Access Point at the root of the Radio Network Tree, or the Access Point that is closest to the top of the Radio Network tree, and that is within radio range (see *Setting Advanced Radio Parameters* for information on Specified Router Timeout).

- If you do not want to specify a specific Parent Access Point, you should leave the parameter at the default value of "Not Specified". With this value, the Client Card will automatically register to the Access Point at the root of the Radio Network Tree or the Access Point that is closest to the top of the Radio Network tree, and that is within radio range.

Setting Root or Repeater Mode

The Mode parameter is not required for the Aironet Client Card.

Establishing a Device Name

The Device Name parameter is used to establish a 15-byte ASCII name for the Aironet Client Card. The Device Name is optional and may be left blank.

If you choose to assign a name, and you are operating in ARLAN mode, the name will appear in the Aironet Access Point's Registration Table. Duplicate names are allowed.

To have the system generate an automatic name, click once on AUTO with the mouse, or press F10.

Setting the MAC (Media Access Control) Priority

Use the Priority parameter to set the priority of the Aironet Client Card's Radio MAC to —normal, high or highest. The higher the priority set, the more likely this unit will be first to successfully transmit a packet when multiple units are trying to transmit at the same time.

The percentage of units on your Network that you set to other than "normal" should be kept small—10 percent or less.

Setting the Radio Parameters

Use the Radio Parameters to select a Channel Number or Bitrate and Frequency. When you select the Radio parameters a window similar to the following appears.

```
┌──────Radio Parameters- ARLAN.CFG──────┐
│ Data Rate                2000  kbp/s   │
│ Frequency                2442  MHz     │
│ Radio Type               DEFAULT       │
│                                        │
└────────────────────────────────────────┘
```

Selecting a Channel Number, Bitrate and Frequency

The Channel Number parameter appears for all 1200 Series models and the Bitrate and Frequency parameters appear for the Aironet 2200 Series only.

Keep in mind the following when selecting Channel Numbers, Bitrates and Frequencies:

- *Appendix B* contains both North American and International bit rates, frequencies and channel sets which can be used as a guide in selecting the appropriate combinations for both 900 Mhz and 2.4 GHz models.

- The tendency is to select the highest data rate available for the Client Card. The trade-off, however, is that the higher the rate, the lower the quality of the radio signal, and therefore, the shorter the range a packet may be sent successfully.

- If you find excessive interference on the channel or bitrate\frequency you have chosen, try other channels, or combinations until you find one that is more reliable.

- Use the Linktest option to test the transmission quality between the Client Card and other nodes on the Radio Network.

When you select the Channel Number parameter for 1200 Series models, the 900 MHz Channel Set appears. Choose a **channel number** from the available channel set.

When you select the Bitrate and Frequency parameter for the 2200 Series, the 2.4 GHz Bitrate and Frequency window appears. Choose a bitrate and frequency combination from the set.

Setting the Radio Type

Use the Radio Type parameter to force a specific radio type. This parameter is for test purposes only and should be left at default.

Setting Advanced Radio Parameters

Use the Advanced Radio Parameters to set configurations for the following parameters—ARLAN, PSP, DDP and MAC.

When you select the Advanced Radio parameters the following window appears.

```
┌─────────────────────────────────────────┐
│     ┌──── Advanced Radio Parameters ────┐ │
│     │       TMA Parameters              │ │
│     │       PSP Parameters              │ │
│     │       DDP Parameters              │ │
│     │       MAC Parameters              │ │
│     │                                   │ │
│     └───────────────────────────────────┘ │
└─────────────────────────────────────────┘
```
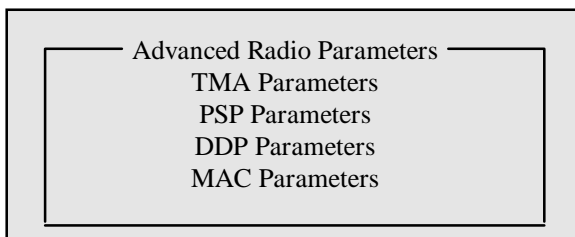
Configuring ARLAN Parameters

Use the ARLAN parameters to affect how the Aironet Client Card registers and to specify when it should try to find a new Router. **These parameters apply only to the ARLAN and PSP registration modes and should only be modified by experienced users.** When you select ARLAN Parameters, the following Window appears.

```
┌──────────────────────────────────────────┐
│  ┌──── ARLAN Parameters -ARLAN.CFG ────┐  │
│  │ Registration Fill            ENABLED │  │
│  │ Spec. Router Time         0000H <0>  │  │
│  │ Refresh Period            0000H <0>  │  │
│  │ ARL Threshold             00H   <0>  │  │
│  │ ARL Decay                 00H   <0>  │  │
│  │                                      │  │
│  └──────────────────────────────────────┘  │
└──────────────────────────────────────────┘
```

Menu Descriptions

Registration Fill - Specifies whether FIND_ROUTER packets transmitted during the registration process have a 1500-byte filler or not. This filler is used to ensure only Routers with a good radio link to this device will be considered in the registration process. The default setting is enabled.

Spec. Router Time - Only used if Specified Router parameter is set (see *Setting the Specified Router*).

Sets the time-out after which the Aironet Client Card gives up trying to register to the specified Router and tries to register to the best Router it can hear. The units of this parameter are 0.1 seconds. The value 65535 (FFFFH) cause an infinite time to be used thus forcing the device to register to the specified Router and only that Router.

Refresh Period - Only applies to the ARLAN (Non-PSP) registration mode. Sets the time that the device will wait to refresh its registration is no other transmission has occurred. The units of this parameter are 0.01 second. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes a time of 60 seconds to be used, while a value of 65535 (FFFFH) causes an infinite time to be used, thus disabling refresh.

ARL Threshold - Sets the ARL (Average Retry Level) Threshold. When the cumulative ARL level reaches the threshold, the Aironet Client Card will attempt to find a better Router to register to. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes a threshold of 8 to be used. The value 255 (FFH) causes an infinite threshold to be used (see also *ARL Decay*).

ARL Decay - Sets the ARL (Average Retry Level) Decay. After each successful transmission, the cumulative ARL level is increased by the number of retries that occurred and then decreased by this Decay. The value 0 causes a decay of 1 to be used (see also *ARL Threshold*)

Configuring PSP Parameters

Use the PSP parameters to configure the PSP (Power Saving Protocol). These parameters affect throughput, response time, and battery conservation and apply only to the PSP registration modes. **The parameters should only be modified by experienced users**.

 When you select PSP Parameters, the following Window appears.

```
┌──────── PSP Parameters -ARLAN.CFG ────────┐
│  Poll Period                   0000H <0>   │
│  Fast Poll Delay               0000H <0>   │
│  Fast Poll Period              0030H <48>  │
│  Fast Poll Decay               00H    <0>  │
└────────────────────────────────────────────┘
```

Menu Descriptions

Poll Period - Sets the time that the Aironet Client Card will wait to poll the Router for waiting data, if no other transmissions have occurred. The units of this parameter are 0.001 seconds. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes a time of 2.000 seconds to be used.

Fast Poll Delay - Specifies the time before the Fast Poll Period takes effect after the transmission of a data packet. This parameter is useful in transaction based environments where the host takes a minimum amount of time to generate a response. Values can be entered in Decimal Mode or Hexadecimal Mode.

Fast Poll Period - Sets the time that the device will wait to poll the Router for waiting data, once a non-empty data frame is either received or transmitted. This time must be less than the Poll Period to have an effect. The units of this parameter are 0.001 seconds. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes a time of 0.125 seconds to be used. Only used in PSP registration mode.

Fast Poll Decay - Controls how fast polling slows down after a non-empty data packet is either received or transmitted. It sets the number of polls that are sent before the Poll Rate Backoff is doubled. The Poll Rate Backoff will not increase beyond the Poll Period. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes a decay of 2 to be used.

Setting DDP Parameters

Use the DDP parameters to configure the DDP (Datagram Delivery Protocol). *These parameters affect maximum retries and maximum datagram size. These parameters apply to all registration modes and should only be modified by experienced users.* When you select DDP Parameters, the following Window appears.

```
┌──────── DDP Parameters -ARLAN.CFG ────────┐
│  Maximum Retries              00H    <0>   │
│  Max. Datagram Size           0000H <0>    │
│  Maximum Frame Size           0000H <0>    │
│  Receive Mode                 NORMAL       │
│  Scrambling                   ENABLED      │
│  Save Flag                    ENABLED      │
└────────────────────────────────────────────┘
```

Menu Descriptions

Maximum Retries - Only used in ARLAN and PSP registration modes. Sets the maximum number of times that the Aironet Client Card will retransmit a packet without getting an acknowledgment from the destination Router. If an acknowledgment is not received before the maximum retry count is reached, then the packet transmission fails. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes 16 retries to be used. The minimum recommended setting is 4.

Max. Datagram Size - Sets the maximum number of bytes allowed in received and transmitted datagrams. Since received datagrams are placed in fixed size internal buffers, reducing the maximum size increases the number of received datagrams that can be buffered. Values can be entered in Decimal Mode or Hexadecimal Mode. The value 0 causes the maximum of 2048 to be used. The minimum recommended setting is 1600.

Maximum Frame Size - Sets the maximum number of bytes in a frame. Values can be entered in Decimal Mode or Hexadecimal Mode.

Receive Mode - Used to set the receive mode of the Aironet device. Used for test purposes only.

Scrambling - Used to provide transmission security for 900 MHz radios only. Default is set to on.

Save Flag - When left at the default "On", the Client Card will save and use the current configuration when the PC is rebooted.

Setting the MAC Parameters

Use the MAC parameters to configure the MAC (Media Access Control). These parameters affect maximum retries and maximum datagram size. These parameters apply to all registration modes and are for test purposes only and should not be modified. When you select MAC Parameters, the following Window appears.

```
┌────────────MAC Parameters -ARLAN.CFG────────────┐
│   Header Size                   0000H <0>        │
│   Wait Time                     0000H <0>        │
│   L Parameter                   0000H <0>        │
│   Spreading Code                  00H <0>        │
└──────────────────────────────────────────────────┘
```

Menu Descriptions

Header Size - Specifies the length of the radio header preceding each packet. The header allows the receiving radio to synchronize with the sending radio. The units of this parameter are 0.000001 seconds (1us). The value 0 causes the standard time to be used. This parameter should be left as 0 in order for this device to communicate properly with other Aironet units.

Wait Time - Sets the wait time used for the radio Acknowledgment turnaround. The units of this parameter are 0.000001 seconds (1us). The value 0 causes the standard time to be used. This parameter should be left at 0 in order for this device to communicate properly with other Aironet devices.

L Parameter - Sets the L-parameter in the MAC (Media Access Control) random wait equation. The units of this parameter are 0.000001 seconds (1us). The value 0 causes the standard time to be used. This parameter should be left as 0 in order for this device to communicate properly with other Aironet devices.

Spreading Code - Used for test purposes only. Must be left at 0.

Resetting to Factory Settings

Use the Reset to Factory Settings parameter to restore all the configuration parameters currently loaded into memory to the factory settings. The Aironet Client Card is not affected until it is reconfigured. The configuration file on disk is not affected until it is saved.

Editing the ARLANDGS Color Scheme

Use the Edit ARLANDGS Color Scheme parameter to change the colors of the ARLANDGS screen elements. These settings can be made permanent by saving the color scheme to disk.

Using the File Menu to Load and Save Files

The File Menu allows you to load and save the configuration files in the system. When you select File Menu the following Window appears.

```
┌──── File Menu ────┐
│     Save File      │
│     Save As        │
│     Load File      │
└────────────────────┘
```
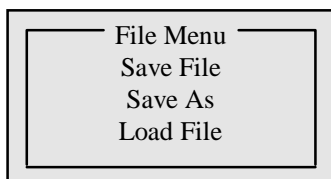
Menu Descriptions

Save File - Saves current configuration parameter settings to disk. If you are configuring multiple Aironet Client Cards to the same parameters, you should choose the Save Option when setting the parameters for the first time.

This will allow you to automatically configure the other Client Cards with the same parameters.

Keep in mind, though, you do not have to save the parameters specifically to the ARLAN.CFG file to configure the Client Card with the parameters you have set. To save to a different file, use the Save As Command. (See also *Configuring the Client Card*.)

Save As - Used to save the configuration parameters to a different file.

Load File - Loads the configuration parameters settings from the file specified.

Performing Diagnostics (Perform Diagnostics)

Use the Perform Diagnostics function to perform diagnostic tests on your Aironet Client Card. When you select the Perform Diagnostics function, the diagnostic test begins immediately, and as each item is tested, the results are shown on screen as follows:
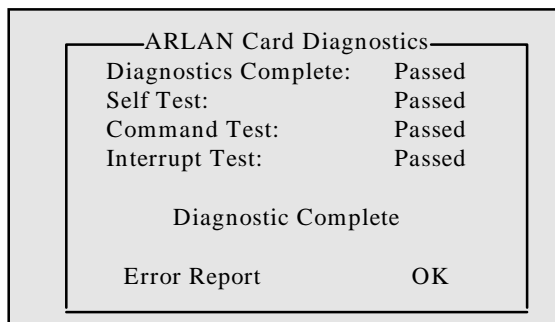
```
┌──────────ARLAN Card Diagnostics──────────┐
│  Diagnostics Complete:      Passed        │
│  Self Test:                 Passed        │
│  Command Test:              Passed        │
│  Interrupt Test:            Passed        │
│                                           │
│           Diagnostic Complete             │
│                                           │
│  Error Report              OK             │
│                                           │
└───────────────────────────────────────────┘
```

Interrupt Test: Sends a packet out and receives the interrupt level settings through the port.

Cable Test: Sends packets out to check the cable connection by seeing how many packets are lost.

If the Client Card does not pass the diagnostic tests, press the up arrow key to view the on-line troubleshooting tips. See *Chapter 4 - Troubleshooting and Performance.*

Once completed, press any key to return to the Main Menu.

Configuring the Client Card

Use the Configure Device option, to configure the Aironet Client Card with the system parameters you have set. Once the Client Card is configured, all settings will remain in non-volatile memory and will not change until re-configured. When you select the Configure Device option, the diagnostic tests described in the previous section are automatically performed. The results are displayed on screen as shown in the sample below.
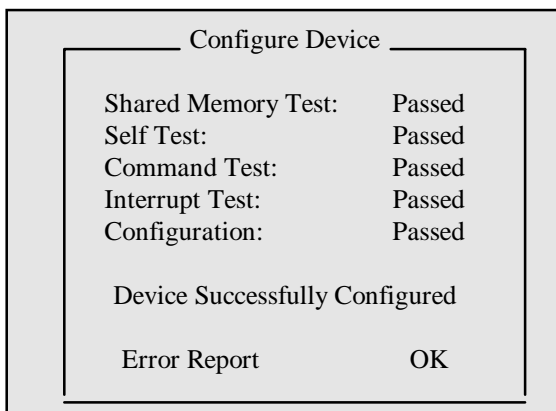
```
┌──────── Configure Device ────────┐
│                                  │
│   Shared Memory Test:    Passed  │
│   Self Test:             Passed  │
│   Command Test:          Passed  │
│   Interrupt Test:        Passed  │
│   Configuration:         Passed  │
│                                  │
│    Device Successfully Configured│
│                                  │
│    Error Report          OK      │
│                                  │
└──────────────────────────────────┘
```

Interrupt Test: Sends a packet out and receives the interrupt level settings through the port.

Cable Test: Sends packets out to check the cable connection by seeing how many packets are lost.

Configuration: Sends the configuration to the Client Card.

The Client Card will only be configured if all diagnostics test results are "Passed." If the result is "Configuration Failed," press the up arrow key to view the on-line troubleshooting tips. See *Chapter 4 - Troubleshooting and Performance*.

Once the Client Card is configured, press any key to return to the Main Menu.

Performing a LinkTest (Linktest)

Use the Linktest function to test the link quality between the Aironet Client Card and other nodes on the Radio Network.

When you run a Linktest, the Client Card sends a sequence of packets to a target destination node—either an Aironet Client Card (if running in Non-ARLAN mode) or to an Aironet Access Point (if running in ARLAN mode). If the radio quality is good, the target destination will receive the packet then send the same packet back.

Before you run the Linktest, make sure the target destination node is powered up with the antenna attached, is within radio range, and is set to the same SID, bit rate and frequency, or channel.

The Aironet PCMCIA unit displays the number of packets sent, number received, and percentage lost, which is a reflection of the link quality. Keep in mind that packets will be lost, however, the upper layer drivers and software combined with radio retries ensure a constant connection.

When you select the Linktest parameter, the Linktest menu appears. To pause the Linktest at anytime, press the P key.

```
┌─────────── Perform Link Test ───────────┐
│  Destination Address         Not Specified │
│  Packet Length                  512 bytes  │
│  Number of Packets           100 Packets   │
│  Time Between Tests            3 seconds    │
│  Packets/Stats Update         5 seconds    │
│  Perform Link Test                         │
│  Continuous Link Test                      │
│                                            │
└────────────────────────────────────────────┘
```

Menu Descriptions

The Linktest menu contains the following options which can be left at default or edited. Keep in mind that when you first run ARLANDGS the default values are used for the linktest. If you edit these values, exit the Linktest menu, and then re-enter, the values shown will be those that were last set, not the defaults. The only exception is the default Destination Address, which is updated on restart into the Linktest.

Packet Length (default 512 bytes)

The default packet length of 512 data bytes is the recommended setting. The length of the packet can be set between 1 to 1500 bytes.

Number of packets to send (default 100)

The range of packets that can be sent is 0 to 9999. You can increase the accuracy of the Linktest by increasing the number of packets. It is not recommended that you send less than 100 packets.

Destination

The default destination address is a broadcast address and must be used when in ARLAN mode. In Non-ARLAN mode, you can specify the address of a specific target node (another Aironet Client Card only).

Pause time between each repetition (default 3 seconds)

If running the Linktest repeatedly, the pause time between tests can be set from 1 to 9999 seconds. (see *Perform Linktest/Continuous Linktest)*.

Number of packets per each statistics update (default 5)

While the Linktest is running, the screen displays updated statistical information regarding the link performance. You can adjust how often this display is updated, within a range of 1 to 9999 seconds.

Perform Linktest/Continuous Linktest

If the Linktest is run once, it will stop after the specified number of packets are sent. In continuous mode, the Linktest runs continuously until it is aborted by pressing Control-C. A Continuous Linktest also shows the regular linktest statistics, plus cumulative statistics. It is a good idea to run the Linktest several times to ensure that the link quality is consistent and repeatable.

When the Linktest is run, the results are displayed as follows:

```
┌──────────────────── Link Test ────────────────────┐
│ ┌──────────────────────────────────────────────┐  │
│ │ Link Test Parameters                          │  │
│ │    Packet Length          :512      Signal Strength:  10   │  │
│ │    Packets/test           :100    ████████████▒▒  │  │
│ │    Packets/update         :5        Signal Quality:   12   │  │
│ │    Pause Time             :3      █████████████▒  │  │
│ │    Destination Address    :02:40:96:00:35:DF  │  │
│ │                                               │  │
│ │ Current Test Statistics                       │  │
│ │    Transmitted/ Received  :100/99    Link Quality: Excellent  │  │
│ │    Lost Out/Lost In       :1/0       Percent Lost: 1%  │  │
│ │    Data Throughput:       :964 kbp/s  ███████████  │  │
│ └──────────────────────────────────────────────┘  │
│ ──────────────── Press Any Key ─────────────────  │
└────────────────────────────────────────────────────┘
```
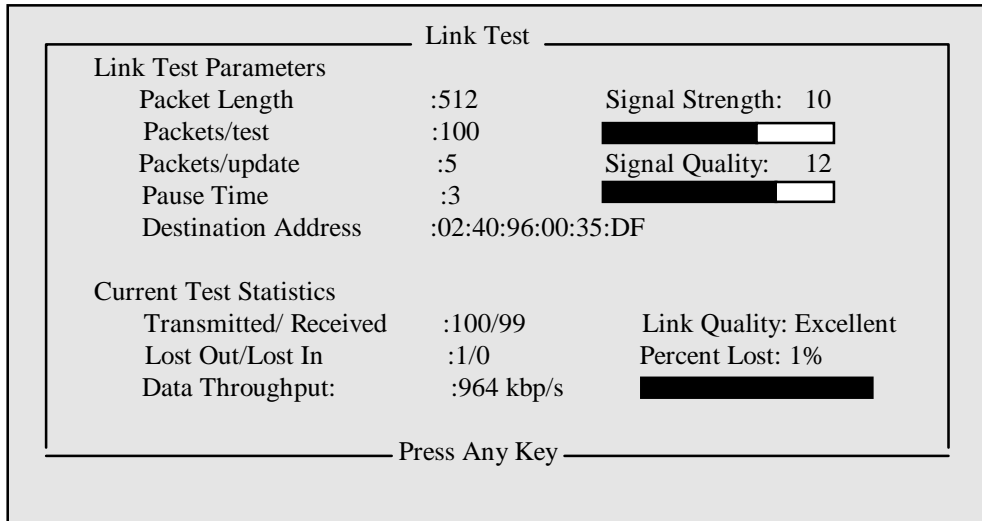
If the link quality is fair or poor, see *Chapter 4 - Troubleshooting and Performance* for steps on how to improve your transmission link quality.

NOTE: Signal strength and signal quality are only available on the Aironet PC2200 Series product.

Upgrading Firmware

You can upgrade new versions of firmware received from Aironet by selecting the Upgrade Firmware option from the Main Menu. When you select Upgrade Firmware, the following screen appears.

```
┌────────────────────────────────────────────────┐
│     ┌───────Upgrade Firmware────────────────┐   │
│     │                                       │   │
│     │ File Name:    ┌──Choose File──┐        │   │
│     │ Product:      │      A        │        │   │
│     │ Version:      │      B        │        │   │
│     │ Size:         │      C        │        │   │
│     │ Checksum:     │      D        │        │   │
│     │ Present:      │      E        │        │   │
│     │               │     [..]      │        │   │
│     │               └───────────────┘        │   │
│     │ Status:                                │   │
│     │                                        │   │
│     │  Start                    Cancel       │   │
│     │                                        │   │
│     └────────────────────────────────────────┘   │
└────────────────────────────────────────────────┘
```
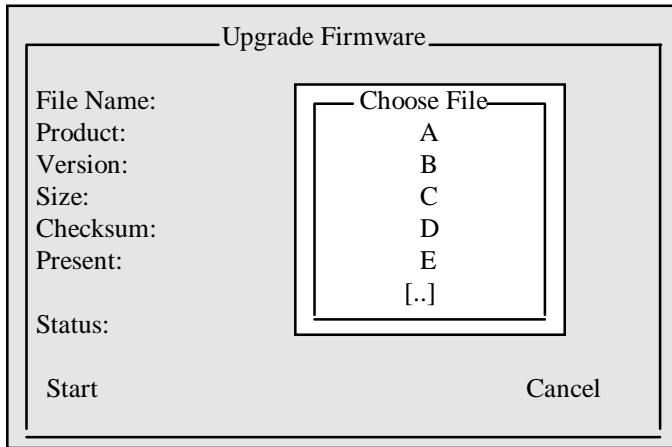
To Upgrade Firmware:

1. From the Choose File window, highlight the drive containing the upgraded firmware files.

2. Click once on the start button to commence downloading the firmware.

During the downloading process the system will display the following information regarding the firmware:

Filename: Displays the name of the firmware file assigned by Aironet.

Product: The name of the product the firmware is designed for use with.

Version: The version number of the firmware.

Size: The size of the file.

Checksum: The number of bits contained in the firmware data.

Present: Whether or not the firmware is present.

Status: Indicates whether or not the download was successful.

Exit ARLANDGS

Once the Client Card system configuration has been completed, choose Exit ARLANDGS to return to DOS by pressing the ESC Key.

Checking the LED Display

After the Client Card is fully configured, check the LED display. The Status LED should be solid green indicating that the Client Card is either registered to an Access Point (if ARLAN mode), or ready to trans-mit/receive (Non-ARLAN mode).

4

Troubleshooting and Performance

This chapter introduces some basic troubleshooting and performance techniques to help you if you experience difficulty with your Aironet Client Card.

Here's what you'll find in this chapter:

- When to call Technical Support

- Troubleshooting Tips

- Error Messages

- Performance Tips

When to Call Technical Support

Call Technical Support when you are having difficulties that cannot be resolved using the information supplied in this chapter. Before calling, please have available the following information:

■ Model and part number of the Aironet Client Card

■ Model number of the personal computer

■ Vendor and compliance level of the card and socket service used on the personal computer.

■ Aironet driver in use

■ Error codes or messages that may display

■ Error Messages

■ The contents (line by line) of the system configuration file (CON-FIG.SYS) and the autoexecute batch file (AUTOEXEC.BAT) of the personal computer

■ Firmware version of the Aironet Client Card

■ Serial number of unit

■ Name and address of reseller

■ Refer to Appendix E for the Technical Support phone number.

Troubleshooting Tips

If you are having trouble with your Client Card, here's a list of things to try before you call Technical Support for assistance. These procedures take only a few minutes, and 90 percent of the time you can solve the problem yourself.

If the Workstation does not boot after installing the Client Card Driver

A base memory address or IRQ conflict likely exists. To resolve this problem change the Client Card's base memory addresses and IRQ settings until you find a combination that works. If you change these settings, make sure you change the Client Card parameters as well using the ARLANDGS utility. (See *Chapter 3 - System Configuration*.)

If you're unable to communicate with some or all nodes on the Radio Network

■   Check to be certain that the Device Driver is loaded properly. (see *Chapter 1 - Client Card Installation* and *Chapter 2 - Client Card Driver Installation*).

■   Check that the Workstation is not out of radio range with other nodes on the Radio Network (see *Performance Tips*).

■   Make sure the Client Card's antenna is attached and is not shielded by surrounding metal, or otherwise poorly positioned. (see *Performance Tips*.)

■   Make sure the SID and Data Rate/Frequency/Channels settings are the same for all nodes on the Radio Network. Check the driver configuration files (PROTOCOL.INI and NET.CFG) for proper settings.

■   Run the ARLANDGS.EXE or WinDGS.EXE diagnostics to confirm the hardware con-nections.

If the System operation is slow or you are receiving numerous network time-out errors

Run the ARLANDGS.EXE or WinDGS.EXE utility and perform a Link-test to check the link quality between nodes on the Radio Network.

If results are marginal, then either the antenna placement is poor or the path loss is too high. If the Linktest results are good, check to make sure the network traffic load is not too high. (see *Performance Tips*.)

Error Messages

Error messages inform you when there is a problem with the software or the Client Card.

If you get an error message, write down the message and any instructions the message might offer to remedy the situation. This information will be helpful to the Technical Support personnel should you need to call for assistance. Shown below are some of the more common error messages you may receive.

"Time-out waiting for interrupt" Error initializing ARLAN PCMCIA

The Client Card may not be properly seated in the PCMCIA slot.

"LANcard RAM region test failed" Error initializing ARLAN PCMCIA

An extended memory manager may be using the requested region of memory. Ensure that the memory region selected for the Aironet PCM-CIA is excluded from use. (e.g. EMM386 x=D000-D1FF)

Performance Tips

If you are experiencing performance problems, here's a list of things to try before you call Technical Support for assistance.

Improving your Radio Range

- Access Point antennas should be located in the center of the area to be covered.

- Avoid placing any antenna where it may be shielded by surrounding metal surfaces.

- Antennas should be placed at the highest elevation possible, with a minimal number of obstacles between it and the direct path to other nodes. Common obstacles often encountered are furniture, walls and partitions.

- Orient the antenna in a vertical direction.

Reducing Network Load

- Reserve the network for accessing shared data files, common communications utilities and printer facilities.

- Install and run programs from a workstation's local drive.

- Install copies of overlay files on the workstation's local drive.

- When editing files, copy to a local directory prior to opening the file.

- Configure application programs to create temporary files on local disks where possible.

Testing the Radio Link

- The LED Display on the Aironet Client Card can be used to assess the condition of the Client Card radio link. (See *Chapter 3 - System Configuration* for an explanation of the LED displays.)

- Run the ARLANDGS.EXE or WinDGS.EXE utility and perform a Linktest to test the link quality between nodes on the Radio Network. When running the Linktest, look for consistent results. It is a good idea to establish "benchmark" tests on those nodes with a quality link, and then set other nodes with the same data rate and frequency settings (see *Chapter 3 - System Configuration* for instructions on running a Linktest).

Appendix A - PCMCIA Specifications

PC Bus Interface

Item	Description
Data Transfer	8-bit
Base Address	Programmable in 8 KB blocks from C000h to DE00h
Interrupts	Selectable from IRQ2-IRQ15

Radio Specifications

Item	Aironet PC1200	Aironet PC2200
Frequency	902 to 928 MHz	2.400 to 2.485 GHz
Modulation	Direct sequence spread spectrum	
Antenna	Omni-directional dipole	
Power Output	620 mW maximum	100 mW E.I.R.P. maximum

Physical Specifications

Item	Description
Size	Standard Type II PCMCIA
Status Indicators	Radio Traffic Activity and Status LEDs
Power Supply	+5v, 600mA peak, 400 mA average
Operating environment	-20°C to +50°C

Appendix B - International Channel Sets

Appendix B contains international channel set tables, for both 900 MHz and 2.4 GHz data rates.

Table B-1 provides an alphabetical listing of countries and their corresponding 900 MHz channel sets and frequencies. **Tables B-2 and B-3** provides the data rates and frequencies for each 900 MHz channel set.

Table B-4 provides an alphabetical listing of countries and their corresponding 2.4 GHz channel sets and frequencies. **Tables B-5 through B-11** provides the data rates and frequencies for each 2.4 GHz channel set.

Table B-1 - International Channel Sets and Frequencies - 900 MHz

Country	Channel Set	Frequencies MHz
Canada U.S.A. Mexico	1	908.50, 910.06, 912.52, 915.00, 917.83, 919.22, 922.26, 911.45, 915.00, 918.55, 915.00
Australia	6	920.31, 920.93, 921.55, 922.17, 922.79, 921.46, 921.55

Table B-2 - Channel Set 1 - 900 MHz

Channel #	Data Rate kb/s	Frequency MHz
0	215	908.50
1	215	910.06
2	215	912.52
3	215	915.00
4	215	917.83
5	215	919.22
6	215	922.26
7	344	911.45
8	344	915.00
9	344	918.55
10	630	915.00
11	860	915.00

Table B-3 - Channel Set 6 - 900 MHz

Channel #	Data Rate kb/s	Frequency MHz
0	172	920.31
1	172	920.93
2	172	921.55
3	172	922.17
4	172	922.79
5	215	921.46
6	215	921.55

Table B-4 - International Channel Sets and Frequencies - 2.4 GHz

Country	Channel Set	Frequencies MHz
North America (U.S.A., Canada, Mexico, New Zealand)	9	2412, 2427, 2442, 2457, 2465
E.T.S.I	10	2412, 2427, 2442, 2457, 2472
Japan	11	2484
France	12	2457, 2465, 2472
Australia	13	2411, 2425, 2439
Germany	14	2427, 2442, 2457
U.K. (MPT1349), Spain	15	2460
Israel	18	2430, 2445

Table B-5 - Channel Set 9 - 2.4 GHz

Rate #	Data Rate kb/s
1	354.84
2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2412
2	2427
3	2442
4	2457
5	2465

Table B-6 - Channel Set 10 - 2.4 GHz

Rate #	Data Rate kb/s
1	354.84
2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2412
2	2427
3	2442
4	2457
5	2472

Table B-7 - Channel Set 11 - 2.4 GHz

Rate #	Data Rate kb/s
1	354.84
2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2484

Table B-8 - Channel Set 12 - 2.4 GHz

Rate #	Data Rate kb/s
1 & 2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2457
2	2465
3	2472

Table B-9 - Channel Set 13 - 2.4 GHz

Rate #	Data Rate kb/s
1 & 2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2411
2	2425
3	2439

Table B-10 - Channel Set 14 - 2.4 GHz

Rate #	Data Rate kb/s
1 & 2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2427
2	2442
3	2457

Table B-11 - Channel Set 15 - 2.4 GHz

Rate #	Data Rate kb/s
1 & 2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2460

Table B-12 - Channel Set 18 - 2.4 GHz

Rate #	Data Rate kb/s
1 & 2	354.84
3	1000
4	2000

Freq #	Frequency MHz
1	2430
2	2445

Appendix C - Command Line Switches

ARLANDGS contains a variety of command line switches which are shown in the Table below. The command line usage for ARLANDGS is: *arlandgs [switches]*

Switch	Description
-b \<addr\>	Download to Client Card at base address \<addr\>
-cfg \<file\>	Specify the configuration file with cfg. extension. Default is ARLAN.CFG
-dfile \<file\>	Specify the production download file with .img extension.
-donce	Download once and exit. Use with -dfile
-h, -?	Display command line help
-lcd	Change color setting to liquid crystal display (lcd) defaults.
+s	Enable parallel and serial scans
+spar	Enable the parallel port scan
+spcm	Disable PCMCIA card scan
-ss \<time\>	Change screen saver time-out to \<time\> seconds. 0=disable. Default = 5 min.
+sser	Enable the serial port scan

Appendix D - Current Device Parameters

The Current Device Parameters are contained on the ARLANDGS Main Screen described in *Chapter 3-Client Card System Configuration.*

Parameter	Description
Status	**Not Configured** - Client Card is not configured **Configured** - Client Card is configured **Not_Registered** - Client Card is configured in ARLAN Mode and not registered **Registered** - Client Card is configured in ARLAN Mode and is registered **Comm Error** - ARLANDGS is having trouble communicating with Client Card
Hardware Type	The product number of the Aironet Client Card selected
Firmware	The version number of the software installed in the Aironet Client Card
Base Address	The Base Address of the Aironet Client Card
IRQ	The IRQ Level used by the Aironet Client Card
Radio Type	The product number of the radio installed on the Aironet Client Card
Default Channel Set	The radio channel set being used by the Aironet Client Card
Mode	The Mode for which the Aironet Client Card is configured (ARLAN, PSP, NON-ARLAN)
System ID	The System ID currently being used by the Aironet Client Card.
Address	The 6-byte address of the Aironet Client Card.
Router	The 6-byte address of the Access Point to which the Aironet Client Card is registered. (ARLAN Only)
Name	The name assigned to the Aironet Client Card.
Channel	The radio channel number currently being used by the Aironet Client Card (900 MHz)
Bitrate	The radio bitrate currently being used by the Aironet Client Card (2.4 GHz)
Frequency	The radio frequency currently being used by the Aironet Client Card (2.4 GHz)
Port	The parallel/serial port to which the Aironet Client Card is connected
Socket	The socket number in which the Aironet PCMCIA LAN Adapter is inserted
LocalTalk ID	The LocalTalk address of the Aironet Server Card.

Appendix E - Aironet Technical Support

Should you need assistance beyond the scope of this manual, please contact your Aironet supplier. If they cannot help resolve your problem, contact the Aironet Technical Support Department. The support representatives can assist you in solving any problems.

When requesting support, please have the following items available:

1. Configuration of the system including model numbers of the Aironet equipment used.

2. Antenna information and cable lengths.

3. Site information (possible radio path problems, trees, machines, or buildings).

4. Distance between devices.

5. Description of problems encountered.

6. Serial number of unit.

7. Name and address of reseller.

The Aironet Customer Support Department can be reached via the following:

Voice Phone	800-705-5555 (8am to 8pm EST)
FAX	330-664-7990
WWW	www.aironet.com
Email	techsupp@aironet.com

For marketing and sales information on other Aironet products:

Phone	1-800-3-WIRELESS
internet	sales@aironet.com

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