Intel® PRO/Wireless 2011B LAN

Adapter Product Reference Guide

Product Model

Intel® PRO/Wireless 2011B LAN Adapter product model: WPC2011BWW

Copyright

Patents

This product is covered by one or more of the following U.S. and foreign patents:

U.S. Patent No.

4,360,798;	4,369,361;	4,387,297;	4,460,120;	4,496,831;	4,593,186;	4,603,262;	4,607,156;	4,652,750;	4,673,805;	4,736,095;	4,758,717;	4,816,660;
4,845,350,	4,896,026;	4,897,532;	4,923,281;	4,933,538;	4,992,717;	5,015,833;	5,017,765;	5,021,641;	5,029,183;	5,047,617;	5,103,461;	5,113,445;
5,130,520;	5,140,144;	5,142,550;	5,149,950;	5,157,687;	5,168,148;	5,168,149;	5,180,904;	5,216,232;	5,229,591;	5,230,088;	5,235,167;	5,243,655;
5,247,162;	5,250,791;	5,250,792;	5,260,553;	5,262,627;	5,262,628;	5,266,787;	5,278,398;	5,280,162;	5,280,163;	5,280,164;	5,280,498;	5,304,786;
5,304,788;	5,306,900;	5,321,246;	5,324,924;	5,337,361;	5,367,151;	5,373,148;	5,378,882;	5,396,053;	5,396,055;	5,399,846;	5,408,081;	5,410,139;
5,410,140;	5,412,198;	5,418,812;	5,420,411;	5,436,440;	5,444,231;	5,449,891;	5,449,893;	5,468,949;	5,471,042;	5,478,998;	5,479,000;	5,479,002;
5,479,441;	5,504,322;	5,519,577;	5,528,621;	5,532,469;	5,543,610;	5,545,889;	5,552,592;	5,557,093;	5,578,810;	5,581,070;	5,589,679;	5,589,680;
5,608,202;	5,612,531;	5,619,028;	5,627,359;	5,637,852;	5,664,229;	5,668,803;	5,675,139;	5,693,929;	5,698,835;	5,705,800;	5,714,746;	5,723,851;
5,734,152;	5,734,153;	5,742,043;	5,745,794;	5,754,587;	5,762,516;	5,763,863;	5,767,500;	5,789,728;	5,789,731;	5,808,287;	5,811,785;	5,811,787;
5,815,811;	5,821,519;	5,821,520;	5,823,812;	5,828,050;	5,850,078;	5,861,615;	5,874,720;	5,875,415;	5,900,617;	5,902,989;	5,907,146;	5,912,450;
5,914,478;	5,917,173;	5,920,059;	5,923,025;	5,929,420;	5,945,658;	5,945,659;	5,946,194;	5,959,285;	D305,885;	D341,584;	D344,501;	D359,483;
D362,453;	D363,700;	D363,918;	D370,478;	D383,124;	D391,250;	D405,077;	D406,581;	D414,171;	D414,172			

Invention No. 55,358; 62,539; 69,060; 69,187 (Taiwan); No. 1,601,796; 1,907,875; 1,955,269 (Japan);
European Patent 367,298; 367,299; 367,300; 414,281; UK 2,072,832; France 81/03938; Italy 1,138,713

A61428-001

About This Document

Reference Documents

This reference guide refers to the following documents:

Part Number	Document Title
A61406-001	*Late Breaking News*
A61411-001	Intel® PRO/Wireless 2011B LAN *Access Point Quick Installation Guide*
A61426-001	Intel® PRO/Wireless 2011B LAN *Site Survey Administrators Guide*
A61429-001	Intel® PRO/Wireless 2011B LAN *Access Point Product Reference Guide*
A61437-001	Intel® PRO/Wireless 2011B LAN *Power Injector Quick Reference Guide*
A63056-001	Intel® PRO/Wireless 2011B LAN *Adapter Quick Installation Guide*

Conventions

Keystrokes are indicated as follows:

ENTER	identifies a key.
FUNC, **CTRL**, **C**	identifies a key sequence. Press and release each key in turn.
Press **A+B**	press the indicated keys simultaneously.
Hold **A+B**	press and hold the indicated keys while performing or waiting for another function. Used in combination with another keystroke.

Typeface conventions used include.

<angles>	indicates mandatory parameters in syntax.
[brackets]	for command line, indicates available parameters; in configuration files, brackets act as separators for options.
GUI Screen text	indicates the name of a control in a GUI-based application.
Italics	indicates the first use of a term, book title, variable or menu title.
Bold	indicates important user information, license provisions or warranty conditions.
`Screen dialog`	indicates screen dialog and user input options, and the exact syntax of items.
`Screen text`	indicates text and data displayed in an application screen on a computer monitor.
`Terminal text`	indicates text shown in a radio terminal LCD screen.
URL	indicates a Uniform Resource Locator, such as a Web page address.

This document uses the following for certain conditions or information:

indicates tips or special requirements.

indicates conditions that can cause equipment damage or data loss.

indicates a potentially dangerous condition or procedure that only Intel® PRO/Wireless 2011B LAN-trained personnel should attempt to correct or perform.

Contents

Chapter 1. Introduction to wireless networking

The Intel® PRO/Wireless 2011B LAN Adapter is an Intel® PRO/Wireless 2011B LAN network product. Intel® PRO/Wireless 2011B LAN network products are based on the IEEE 802.11b standard and connect computers together to form a wireless network.

A Local Area Network (LAN) is a network in a central location. Users at that location share files, printers, and other services. In a LAN, a networked computers that request services are called clients, while servers in a LAN provide services. In a wireless LAN (WLAN), wireless adapters are installed in clients. A wireless client communicates with the WLAN without cables. Instead, wireless clients send and receive information through the air.

All Intel 802.11b compliant devices interoperate with other 802.11b compliant wireless devices from other vendors. The WiFi certification logo indicates that the wireless device has been tested by an independent organization and is 802.11b compliant.

A wireless client operates in either infrastructure mode or peer-to-peer mode.

1.1   Infrastructure Mode: A WLAN with Access Points

In infrastructure mode, wireless clients send and receive information through access points. When a wireless client communicates with another, it transmits to the access point. The access point receives the information and rebroadcasts it. Then the other device receives the information.
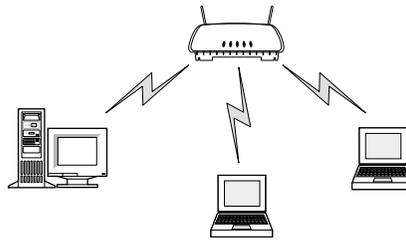
Access points are strategically located within an area to provide optimal coverage for wireless clients. A large WLAN uses multiple access points to provide coverage over a wide area. Access points can connect to a LAN through a wired Ethernet connection. Access points send and receive information from the LAN through this wired connection.

1.2   Peer-to-Peer Mode: A WLAN without Access Points

In peer-to-peer mode, also called Ad Hoc Mode, wireless clients send and receive information to other wireless clients without using an access point. In contrast to infrastructure mode, this type of WLAN only contains wireless clients.
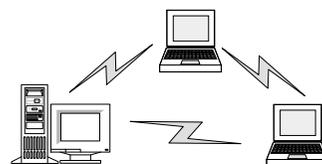
You can use peer-to-peer mode to network computers in a home or small office, or to set up a temporary wireless network for a meeting.

1.3   Identifying a WLAN

All the devices on a WLAN use a Network Name, or Service Set Identifier (SSID) to identify the WLAN. There are several kinds of SSIDs, each having a slightly different meaning. In peer-to-peer mode, an Independent Basic Service Set Identifier (IBSSID) identifies a WLAN. In infrastructure mode, an Extended Service Set Identifier (ESSID) identifies a WLAN. For simplicity, this guide uses the term Network Name (SSID) in place of ESSID and IBSSID. Regardless of whether you are dealing with a infrastructure of peer-to-peer WLAN, the SSID indicates what WLAN you are communicating with. All the devices on a WLAN must use the same SSID to communicate with other wireless devices. When installing an access point or wireless adapter in a wireless client, the software asks you to specify an SSID.

1.4   Identifying Devices on a WLAN

A Basic Service Set Identifier (BSSID) uniquely defines each wireless device. The BSSID is the Ethernet Media Access Control (MAC) address of the wireless adapter installed in the wireless client. The MAC address is permanently set when the adapter is manufactured. MAC addresses determine the device sending or receiving data. A MAC address is a 48-bit number written as six hexadecimal bytes separated by colons. For example:

    00:A0:F8:24:9A:C8

To view the MAC address of an Intel® PRO/Wireless 2011B LAN device, see the bottom of the device.

1.5   Wireless Security

Wireless networking devices transmit information through the air. Without implementing security, it is easy for an unauthorized person to intercept the information.

A common way of implementing security and protecting information is encryption. Before sending information, the wireless client or access point encrypts or scrambles information using an encryption key. The device receiving the information uses the same key to decrypt or unscramble the information. The information is only readable to wireless devices that have the correct encryption key.

The IEEE 802.11 wireless LAN standard specifies the Wired Equivalent Privacy (WEP) encryption and decryption algorithm. The standard includes two levels of security, using a 40-bit key or a 128-bit key. To implement WEP, use either one of these methods. For better security, use a 128-bit key. A 128-bit key has several trillion times as many possible combinations as a 40-bit key. For added security, change your keys often. Some vendors refer to 40-bit encryption as 64-bit. These are identical. A wireless device that claims to have 40-bit encryption interoperates with a device that claims to have 64-bit encryption.

The same device, host computer or front-end processor usually performs both encryption and decryption. The algorithm, like the pattern of a lock, is standardized and may be used by anyone, but the encrypted data is unreadable without the appropriate key, which is known only by the sender and receiver of the transmitted data. You should change your keys often for added security.

1.6   Radio Basics

IEEE 802.11 networking devices transmit and receive radio signals. Users communicate with the network by establishing radio links between mobile devices and access points, or between each other.

IEEE 802.11 devices use frequency modulation (FM) to transmit digital data from one device to another. The radio signal propagates into the air as electromagnetic waves. The receiving device demodulates the signal, which results in the original digital data. The radio devices transmit in the 2.4 to 2.5 gigahertz frequency range, a license-free range throughout most of the world. The actual range is country-dependent.

Chapter 2. About the Intel® PRO/Wireless 2011B LAN Adapter

The Intel® PRO/Wireless 2011B LAN Adapter is an Intel® PRO/Wireless 2011B LAN network product. Intel® PRO/Wireless 2011B LAN network products operate between 2.4 and 2.5 gigahertz (GHz) using direct-sequence spread spectrum (DSSS) technology.

Adapter features include:

- IEEE 802.11b specification compatibility. This open architecture allows Intel® PRO/Wireless 2011B LAN devices to communicate with wireless devices from other vendors.

- 11 Mbps data rate for high-capacity, fast operation

- Standard *Network Driver Interface Specification (NDIS).*

- Microsoft Windows† 95, Windows 98, Windows 2000 and Windows CE† driver support.

- Card and Socket Services support.

- WEP data security

- Plug and Play support.

- operating range of about 45 meters (150 feet).

- Low-power operation for battery-powered devices with PC Card slots. Power management includes *Continuously Aware Mode* (*CAM*) and *Power Save Polling* (*PSP*).

- peer-to-peer mode for connecting directly to other computers

- station mode for use with single or multiple access points

- roaming support for mobile LAN connections throughout large facilities

The adapter can only be installed in a PC Card slot in a suitably equipped computer. The adapter contains a built-in radio antenna that protrudes when inserted into the slot.

The Intel® PRO/Wireless 2011B LAN Adapter allows Personal Computer Memory Card International Association (PCMCIA) 3.3-volt Type II PC Card slot-equipped computers to configure, connect to and establish an Intel® PRO/Wireless 2011B LAN network.

Unlike the Intel® PRO/Wireless 2011 LAN Adapter, which is a 5-volt Type II PC Card with a PCI carrier for use with a non-mobile computers, the Intel® PRO/Wireless 2011B LAN Adapter is a 3.3-volt Type II PC Card that you can use only mobile computers. You cannot use this PC Card with a PCI carrier.

The exposed end of the adapter is vulnerable to damage from scratching, snagging or striking other objects. Such contact may bend or break the adapter or the PC Card slot in which it resides.

2.1   Intel® PRO/Wireless 2011B LAN Adapter Operating Modes

The Intel® PRO/Wireless 2011B LAN Adapter supports the following operational modes:

- ESS (802.11 Station) infrastructure mode: The adapter connects to an access point. In ESS mode, the adapter can roam freely between access point cells in the network or transmit and receive across subnets.

- IBSS (802.11 Ad Hoc) peer-to-peer mode: Use this mode to form peer-to-peer networks

without access points. The wireless computer starting the IBSS network (the first adapter transmitting a beacon) determines the channel used for the computers in the IBSS network.

• Pseudo IBSS (Proprietary Ad Hoc) mode: Use this mode when the highest throughput is required in an IBSS network to test performance. In Pseudo IBSS mode, each adapter is required to be on the same channel. Pseudo IBSS is not recommended for devices operating on battery power.

2.2   11 Mbps Operation

The Intel® PRO/Wireless 2011B LAN Adapter supports a maximum 11 Mbps data rate. The adapter automatically changes to a 5.5, 2, or 1 Mbps data rate when unable to maintain a high quality connection at 11 Mbps.

The following factors can dynamically alter the data rate:

• signal strength between the access point and the computer.

• the ratio of good transmitted packets to attempted transmitted packets falls below a threshold.

• the computer encounters an unspecified data rate or finds a higher transmit rate with another access point.

2.3   Mobile IP

The Intel® PRO/Wireless 2011B LAN Adapter supports Mobile IP. The Mobile IP feature allows Intel® PRO/Wireless 2011B LAN devices to roam across routers.

The computer retains its IP address when configured for Mobile IP and can:

• move from one IP subnet to another.

• move from an Ethernet segment to a wireless LAN.

• move from one Ethernet segment to another.
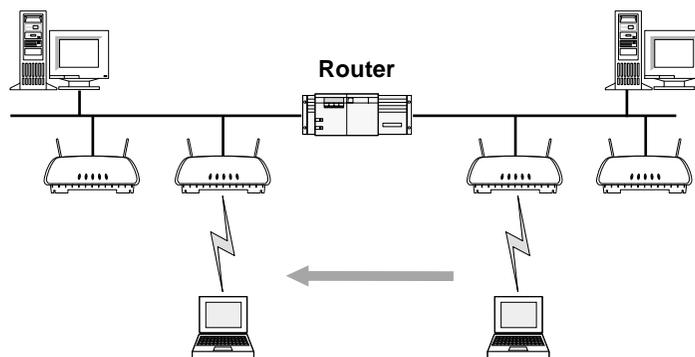
When the client moves to an access point on another subnet, mobile IP allows it to continue to communicate as if it were on it's original subnet. Mobile IP uses a packet tunneling technique to deliver data to the proper subnet. This additional overhead may result in slightly lower data throughput than that seen on the "home" subnet.

2.4   Power Management

The WLAN adapter supports the Continuously Aware Mode (CAM) and Power Save Polling (PSP) power-management modes. CAM requires the radio to remain on. Intel does not recommend CAM for battery powered devices.

PSP mode allows the computer to conserve power by suspending communication for short periods of time while still associated with an access point. The access point saves data for transmission to the computer when it wakes at given intervals.

The PSP performance index, which varies from 1 to 5, allows you to specify how often the computer wakes up to check for data. PSP performance index 1 provides the quickest response time (shortest sleep interval), while PSP performance index 5 provides efficient power consumption (longest sleep interval).

2.5   Card and Socket Services

The Intel® PRO/Wireless 2011B LAN Adapter supports Card and Socket services. Card and Socket Service software packages work with the host computer operating system enabling the WLAN adapter to interface with host computer configuration and power management functions. Card and Socket Service software packages include SystemSoft and Phoenix.

2.6   Plug and Play

The Intel® PRO/Wireless 2011B LAN Adapter supports Plug and Play systems. This allows a computer to recognize the adapter, and to configure the hardware interrupt, memory and device recognition addresses. This feature simplifies installation and minimizes hardware conflicts.

2.6.1 Data Encryption

The Intel® PRO/Wireless 2011B LAN Adapter uses the Wired Equivalent Privacy (WEP) encryption and decryption algorithm specified in Section 8 of the IEEE 802.11 wireless LAN standard. WEP uses the same key for both encryption and decryption, and provides security equivalent to that of a wired network, hence the "Wired Equivalent" portion of the name.

The IEEE 802.11 standard defines two types of authentication:

- **Open system authentication** is the default authentication service, in which all clients that request access to the network are accepted, with no actual verification. You should only use this system if it's not necessary to positively validate the identity of the sender.

- **Shared key authentication** requires the exchange of an authentication key shared among all of the authentic access points and clients in the network. When a client requests access to the network, the access point sends a long random number encrypted with the shared key to the client. The client decrypts the number using the same key and sends it back to the access point, which only grants access to clients that return the correct number. The Intel® PRO/Wireless 2011B LAN Access Point supports both 40-bit and 128-bit shared key encryption.

If you implement the shared key authentication mode, you must configure all access points and clients to use the same key.

To implement WEP on each access point, use either a 40-bit key or a 128-bit key. A 40-bit key consists of 10 hexadecimal numbers in two 5-digit groups, arrayed as follows.

```
10111 21314
```

A 128-bit key consists of 26 hexadecimal numbers in two 5-digit groups and four 4-digit groups, arrayed as follows.

```
10111 21314 1516 1718 191A 1B1C
```

2.7 Intel® PRO/Wireless 2011B LAN Adapter LED Descriptions

The LED on the Intel® PRO/Wireless 2011B LAN Adapter indicates the status of the adapter.

Status	Function
Off	The adapter radio is disabled or incapable of transmission.
Slow Flash	The adapter is associated with an access point.
Rapid Flash	The adapter is sending or receiving data. The faster the flash, the more data traffic on the network.

Chapter 3. Managing the Adapter with Intel® PROSet II

The drivers and management software for the Intel® PRO/Wireless 2011B LAN Adapter are included on the installation CD included with the adapter. Before you can use Intel® PROSet II, you must install the Intel® PRO/Wireless 2011B LAN Software from the CD included with your adapter. For installation instructions, see the Intel® PRO/Wireless 2011B LAN *Adapter Quick Installation Guide*.

On Windows 2000, Windows ME, and Windows 98, the installation program installs Intel® PROSet II. If you are running Windows 95, the installation program installs the Intel WLAN Utilities. For information on managing the adapter on Windows 95, see the Help for the WLAN Utilities, or see the information on the adapter properties in the next chapter.

3.1　Viewing and Changing network settings

Intel® PROSet II allows you to change two groups of network settings:

*   Mobile unit settings are settings for your laptop. You configure a laptop to communicate with either an access point or other computers in a peer-to-peer network.

*   Security settings allow you to protect data. Data in a wireless network is broadcast through the air. If the data is unprotected, anyone can intercept it.

To view or change the network settings:

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar. If the icon is not present, click **Start**, select **Settings**, and **Control Panel,** and then double-click the **Intel® PROSet II** icon. To display the **PROSet II** icon on the taskbar, make sure **Show the tray icon** is checked in the PROSet II main window.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.
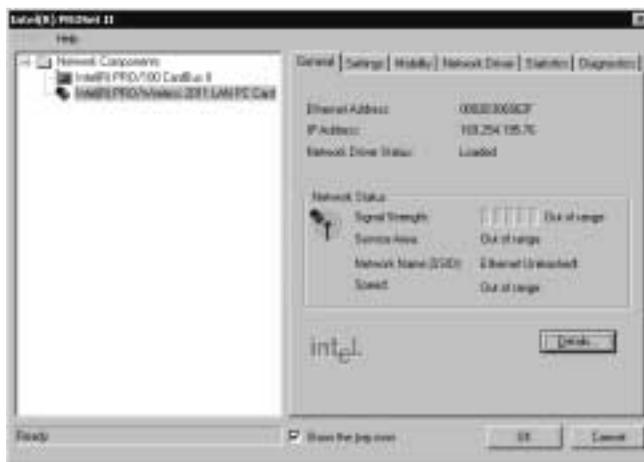
3. To view or change basic settings, click the **Settings** tab.

For more information about configuring wireless network settings, click **Help** on the PROSet II **Help** menu.

3.2   Connecting to the network using an access point

An infrastructure network is comprised of one or more access points and one or more laptops with wireless adapters installed. Each access point can have a wired connection to the Local Area Network (LAN). Laptops with an installed wireless adapter communicate with an access point.

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Settings** tab.

4. Click **Network Settings**.

5. For the operating mode, select **Communicate with access point (802.11 Station)**.

6. Enter a **Network Name (SSID)** or select one from the list.
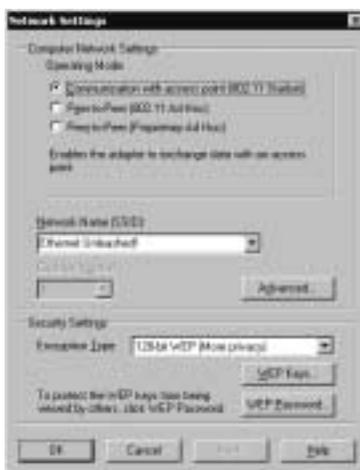
Use the Network Name (SSID) assigned to the access points in the wireless LAN (WLAN). The wireless adapter scans the access point and uses the channel selected by the access point. You cannot change the channel.

3.3   Connecting to a peer-to-peer network

A peer-to-peer wireless network is a simple network of wireless computers that communicate directly with each other without using an access point.

To connect to a peer-to-peer network:

1.   Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2.   Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3.   Click the **Settings** tab.

4.   Click **Network Settings**.

5.   For the operating mode, select **Peer to Peer (802.11 Ad Hoc)**.

6.   Enter a **Network Name (SSID)** or select one from the list.

7.   Select a **Channel Number** from the pull-down list.

The **Network Name (SSID)** and **Channel Number** must be the same for all the computers in a peer-to-peer network. For the channel, follow the regulatory requirements below

Country	ID	Channels	
		First	Last
Argentina	AR	1	13
Australia	AU	1	13
Austria	AT	1	13
Bahrain	BH	1	13
Belarus	BY	1	13
Belgium - Indoor	BE	1	13
Belgium - Outdoor	BE	1	2
Brazil	BR	1	13
Bulgaria	BG	1	13
Canada	CA	1	13
Chile	CL	1	13
China	CN	1	13
Columbia	CO	1	13
Costa Rica	CR	1	13
Croatia	HR	1	13
Czech Republic	CZ	1	13
Denmark	DK	1	13
Finland	FL	1	13
France	FR	11	13
Germany	DE	1	13

Country	ID	Channels	
		First	Last
Greece	GR	1	13
Guatemala	GT	1	13
Hong Kong	HK	1	13
Hungary	HU	1	13
Iceland	IS	1	13
India	IN	1	13
Indonesia	ID	1	13
Ireland	IE	1	13
Israel	IL	5	8
Italy	IT	1	13
Japan	JP	1	14
Jordan	JO	1	13
Kuwait	KW	1	13
Liechtenstein	LN	1	13
Lithuania	LT	1	13
Luxembourg	LU	1	13
Malaysia	MY	1	13
Mexico	MX	11	13
Morocco	MA	1	13
Netherlands	NL	1	13
New Zealand	NZ	1	13
Norway	NO	1	13
Peru	PE	1	13
Panama	PA	1	13
Philippines	PH	1	13
Poland	PL	1	13
Portugal	PT	1	13
Qatar	QA	1	13
Romania	RO	1	13
Russian Federation	RU	1	13
Saudi Arabia	SA	1	13
Singapore	SG	10	13
Slovak Republic	SO	1	13
Slovenia	SI	1	13
South Africa	ZA	1	13
South Korea	KR	1	13
Spain	ES	1	13
Sri Lanka	LK	1	2
Taiwan	TW	1	13
Thailand	TH	1	13
Turkey	TR	1	13
UAE	UE	1	13
Ukraine	UA	1	13
UK	UK	1	13
USA	US	1	11
Venezuela	VE	1	13

3.4 Protecting your network with WEP encryption

You can prevent unauthorized reception of your wireless data using the IEEE 802.11 *Wired Equivalent Privacy* (*WEP*). The standard includes two levels of security, using a 40-bit key or a 128-bit key. For better security, use a 128-bit key. If you use encryption, all wireless devices on your WLAN must use the same encryption settings.

To set up 40-bit encryption:

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Settings** tab.

4. Click **Network Settings**.

5. Click **WEP Keys**.

6. If required, enter your WEP password.

7. Click **OK**. The **WEP Key Configuration** dialog box is displayed.

8. Enter Keys 1 through 4. Use numbers 0 through 9 and letters A through F. Only the first two columns are available for 40-bit encryption.

9. Select the key you want to use for encryption. The keys and selected key must be the same for the access point or for all other computers in a peer-to-peer network.

To set up 128-bit encryption:

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Settings** tab.

4. Click **Network Settings**.

5. Click **WEP Keys**.

6. If required, enter your WEP password.

7. Click **OK**. The **WEP Key Configuration** dialog box is displayed.

8. Enter Keys 1 through 4. Use numbers 0 through 9 and letters A through F.

9. Select the key you want to use for encryption. The keys and selected key must be the same for the access point or for all other computers in an Ad Hoc (peer-to-peer) network.

3.5 Using Wireless Profiles

A profile is a saved group of network settings. If you are moving from one wireless network to another, it is convenient to save the network settings for each wireless network as a profile. Then you can easily select the profile for the appropriate network.

Settings include but are not limited to the network name (SSID), channel, security settings, and TCP/IP settings. Intel® My WLAN Places allows you to edit profiles and create new profiles.

To set up a profile:

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Settings** tab.

4. Click **My WLAN Places**.

To edit a profile:

1. Click the **Settings** tab.

2. Click **My WLAN Places**.

To start using a profile:

1. Click the **Settings** tab.

2. From the pull-down menu, select the appropriate wireless LAN profile for your networking situation.

3. Click **Activate Profile**.

For more information about My WLAN Places, select **Contents** from the pull-down **Help** menu in the **My WLAN Places** window.

3.6   Switching between wired and wireless adapters

Adapter Switching allows your computer to seamlessly switch between wired and wireless adapters. You also indicate what type of adapter you prefer to use. If this type of adapter is unavailable, your computer uses the type of adapter available.

To change the Adapter Switching settings:

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Mobility** tab.

4. Click **Adapter Switching**.

3.7   Setting the adapter's power consumption

If your notebook computer is operating on battery power, you can adjust the power settings to extend battery life.

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Settings** tab.

4. Click **Power Settings**.

5. Make sure that the **Switch power mode based on power source** check box is not checked.

6. Make sure that **Let adapter manage power** is checked.

For more information about the power settings, click the **Help** button.

Chapter 4. Managing the Adapter from the Control Panel

After you install the driver for the Intel® PRO/Wireless 2011B LAN Adapter, you can access the Intel® PRO/Wireless 2011B LAN Adapter property pages from the Networking icon in the Windows Control Panel and configure the wireless settings for the adapter. For driver installation instructions, see the Intel® PRO/Wireless 2011B LAN *Adapter Quick Installation Guide*.

To display the adapter properties on Windows ME, 98, and 95:

1. Double-click **My Computer**, and then double-click **Control Panel**.

2. Double-click **Network**.

3. Select the Intel® PRO/Wireless 2011B LAN Adapter and click **Properties**.

To display the adapter properties on Windows 2000:

1. Double-click **My Computer**, and then double-click **Control Panel**.

2. Double-click **Network**.

3. Right-click the **Local Area Connection** for the wireless adapter and click **Properties**.

The Control Panel Properties window for the adapter displays an **Easy Setup** window, allowing you to set the Network Name (SSID). The Network Name is a string of characters identifying the wireless LAN.

Click the **Advanced** button to view or edit WLAN adapter settings using the **Mobile Unit**, **Power**, **Mobile IP**, **Encryption** and **WLAN Adapter** property pages.

The **Easy Setup** window and the **Advanced** property pages can differ in appearance between the Windows 95, 98, 2000 and CE operating systems.

You can limit access to the **Advanced** property pages by setting a password on the **WLAN Adapter** property page. When enabled, no one can access the **Advanced** property pages without entering the correct password.

4.1   Mobile Unit Property Page

Use the **Mobile Unit** property page to configure the adapter operating mode and Network Name (SSID).

Use the **Operating Mode** pull-down menu to select one of the following operating modes for the adapter:

ESS (802.11 Station) – Select **ESS (802.11 Station)** to enable the computer to transmit and receive data with an access point. Infrastructure (ESS) is the computer default mode.

IBSS (802.11 Ad Hoc) – Select **IBSS (802.11 Ad Hoc)** to enable computers to form their own local network where computers communicate peer-to-peer without access points. Use Ad Hoc (IBSS) to create networks where needed within established cells. In Ad Hoc, computers take turns generating beacons and handling probe responses. The computer starting the Ad Hoc network (the first station transmitting a beacon) determines the channel and data rate used for the Ad Hoc network.

Pseudo IBSS (Proprietary Ad Hoc) – Select **Pseudo IBSS** when the highest throughput is required in an Ad Hoc network for computer testing. Proprietary Ad Hoc (Pseudo IBSS) does not support PSP computers and does not use beacons or authentication. In Proprietary Ad Hoc mode, each computer is required to be on the same channel. Proprietary Ad Hoc is not recommended as a normal operational mode or for computers operating on battery power.

Enter a Network Name (SSID) in the **802.11 ESSID** field using a maximum of 32 characters. You can also enter the Network Name in the **Easy Setup** window. To communicate with an access point, the Network Name must match the Network Name of the access point.

Use the **Mandatory AP addres**s field to enter the IEEE Media Access Control (MAC) address of the access point with which the adapter is required to associate. The adapter associates to only this access point when communicating on the network. Enter an access point MAC address to associate to an access point that has a compatible Network Name.

Select **Send Long Preamble Headers** if the associated access point is using a long preamble when transmitting. The preamble is approximately 8 bytes of packet header data generated by the access point and attached to the packet prior to transmission. The access point and adapter are required to use the same preamble length to interoperate. Ask your system administrator if you don't know the preamble length used by the access point.

Check the **International Roaming** check book to enable the adapter to roam and associate to access points with different country codes.

4.2   Battery Usage Property Page

Use the Battery Usage property page to control adapter power consumption. The adapter has two power consumption modes, Continuous Access Mode (CAM) and Power Save Poll (PSP) mode. CAM yields the best performance but uses the most power. CAM is the preferred mode for systems running on AC power. PSP saves significant amounts of power over CAM. PSP is the preferred mode for systems running on battery power.

Set the slider to the far right to keep the adapter in CAM or set the slider to a PSP performance index (1 to 5). Each mode is described underneath the sliding scale.

If you are running Windows 95, disable Power Management capabilities in WLAN Monitor to use the settings on this property page.

4.3   Transmission Power Property Page

Use the **Transmission Power** property page to set the adapter power level for data transmitted. Set the operating mode for the adapter on the **Mobile Unit** property page.

Adjusting the adapter transmit level enables you to expand or confine a transmission area in respect to interference or other wireless devices that could be operating nearby.

Use the **802.11 Tx Power Options** to set the transmission power level for adapters operating in infrastructure (ESS) mode.

*   Select **Auto** to use the current access point transmit power level for the adapter. Auto mode is the default mode for adapters operating in infrastructure (ESS) mode.

*   Select **PowerPlus** to set the transmit power one level higher than the level set for the access point. If the access point is set to the highest power level, then that is the level used by the adapter.

Use the **IBSS Tx Power Options** to set the transmit power level for computers operating in IBSS mode. Select a transmit power level from the **AdHoc Tx Power** list.

*   Select **Maximum Power** to set the adapter to the highest transmission power level. Select **Maximum Power** when operating in highly reflective environments and areas where other devices could be operating nearby, or when attempting to communicate with adapters at the outer edge of a coverage area.

*   Select **Minimal Power** to use the lowest transmit power level. Use **Minimal Power** when transmitting with wireless computers in close proximity and when little interference is anticipated. Select the **10%**, **25%**, or **50%** settings as needed if you encounter problems communicating with other devices.

4.4   Mobile IP Property Page

Use the **Mobile IP** property page to configure the adapter to support roaming across routers. Mobile IP enables a computer to communicate with other access points using its home IP address after changing its point-of-attachment to the Internet/intranet.

The Wireless LAN Utilities is needed on those devices supporting Mobile IP in order for the Mobile IP feature to function properly.

Select the **Enable Mobile IP** check box to enable Mobile IP support. For the changes to take effect, restart the system.

Use the **Home Agent AP Address** field to view the IP address of the access point last associated with the adapter in the home subnet. The adapter can use this access point IP address as a "home residence" when transmitting data with different access points. Therefore, the adapter always has the means to associate to an access point in its home subnet.

Enter a **Mobile Home MD5 Key** matching the MD5 key on the access point of the home subnet. The MD5 key is a password (13 characters maximum) used to protect data from being tampered with when using the Mobile IP feature to transmit and receive data across a foreign subnet. An adapter is required to use the MD5 key set for the access point in the access point **System Configuration** page. The default MD5 key is Intel. If unsure which MD5 key to use or where to configure it for an Intel® PRO/Wireless 2011B LAN access point, see your system administrator.

Use the **Registration Timeout** pull-down menu to select a timeout value. When the computer registers with a foreign subnet access point the registration is required to take place within the time specified. The default registration time is **60** seconds. If the computer does not register with the foreign subnet access point within the specified time, the foreign subnet access point removes the computer from its list of registered computers.

Use the **Delay Time** pull-down menu to select the time a computer waits for a response from a foreign subnet access point when trying to register with that access point. A computer attempts to register with an access point three times before stopping.

4.5   Encryption Property Page

Use the **Encryption** property page for configuring WLAN adapter Encryption settings. The absence of a physical connection makes wireless links vulnerable to information theft. Encryption is an efficient method of preventing data theft and improving data security. The firmware supports **Open System, 40-bit** and **128-bit** Encryption algorithms.

Use the **Encryption Algorithm** list to select the Open System, 40-bit or 128-bit Encryption algorithm to be used for the adapter. The default setting is Open System.

Select **Open System** to disable encryption for the WLAN adapter and allow for the transmission and receipt of data with no security. The Open System algorithm does not encrypt packets over the network.

To be able to associate and transmit data, an access point and clients must use the same encryption settings, as summarized below:

Access Point	Mobile Unit	Association
Open	Open	OK
40	40	OK
128	40	Association, No data transmission
Open	40	No Association
Open	128	No Association
40	128	Association, No data transmission
40	Open	No Association
128	Open	No Association
128	128	OK

If an access point is set to 40-bit encryption and the computer is set to 128-bit encryption, the devices can associate but no data transmission can occur between the two devices.

When 40-bit encryption is selected, enter the 10-digit hexadecimal encryption key into the two text windows.

Choose 128-bit Encryption from the Encryption Algorithm pull-down menu and enter a 26 Hex digit Encryption key by spreading the 26 Hex digits across the six text windows. The 128-bit Encryption option provides a higher level of security than 40-bit Encryption while maintaining an 11 Mbps data rate.

Click **Reset Keys** to clear the entries in the Shared Encryption Key fields.

128-bit strong encryption is subject to export restrictions and may not be available in all countries. An access code is required if 128-bit encryption is selected and an export restrictions dialog box displays. Contact the Intel Corporation Technologies Support Center (1-800-653-5350) for information on acquiring an access code for 128-bit Encryption.

If an access code is required, click the **Access Code** button to display the **Enable 128-bit Encryption** dialog box. Enter the access code in the three fields provided and click **OK**. After you enter an access code, the **Access Code** button is no longer displayed on the **Encryption** property page and the access code is stored.

Once 128-bit encryption is enabled, select **128-bit Encryption** from the **Encryption Algorithm** pull-down menu. Enter the 26-digit hexadecimal encryption key into the six fields provided. Click **OK** to save and implement the encryption key data.

4.6　WLAN Adapter Property Page

Use the **WLAN Adapter** property page to configure the adapter hardware and radio settings.

1. Use the **Card Type** pull-down menu to specify the type of adapter in the system.

   The **Interrupt Number**, **IO Port Address** and **Memory Base Address** fields are automatically updated.

2. Select the appropriate **Diversity** setting for your wireless network:

- Select **Diversity** if dual antenna support is available or required, such as in highly reflective environments.

- Select **Primary** only if a secondary antenna is not being used by the network access points.

> The **Diversity** setting must match the antenna configuration for the network access points with which your adapter associates to optimize network performance and maintain adapter association.

Diversity is the use of two access point antennas simultaneously. Diversity improves radio reception by receiving over one antenna while transmitting at the same time over the other antenna. In highly reflective environments, antenna diversity improves network speed and performance and increases the likelihood of maintaining adapter to access point association and a high data rate.

When a single Primary antenna is used, that one antenna is used for both transmitting and receiving. Outgoing access point transmissions must wait until all incoming data packets are received before they are transmitted over the single Primary antenna. If an adapter is set for **Primary** and an access point is set for **Diversity**, the adapter's ability to maintain the access point's throughput is compromised and numerous missed beacons could result in the access point dropping the adapter from its list of supported devices.

Using the **Diversity** setting when associated with a single-antenna access point can also cause poor wireless network performance.

Password Protecting Access to the Property Pages

You can set a password to limit access to the WLAN adapter's advanced property pages. By default, the password is off.

To create a password for the **Advanced** property pages:

1. Click the **Password** button from the **WLAN Adapter** property page.

2. Enter the case-sensitive password in the **Current Password** field. The maxim length is 10 characters.

Access to the **Advanced** property pages is enabled and now appears when you click the **Advanced** button from the **Easy Setup** window.

To disable password, enter the current password and leave the **New Password** and **Confirm New Password** fields blank.

To change the password, enter the current password and enter a new password in the **New Password** and **Confirm New Password** fields.

Chapter 5. Udating the Driver and Firmware Version

Verify the Intel® PRO/Wireless 2011B LAN Adapter driver and firmware is the most recent version to ensure optimal functionality.

5.1   Verifying the Driver and Firmware Versions

In Windows 2000, ME, and 98, use PROSet II to view driver and firmware versions.

To view the driver and firmware version:

1. Double click the **Intel® PROSet II** icon on the right side of the Windows taskbar.

2. Select the wireless adapter on the left side of the **Intel® PROSet II** window.

3. Click the **Network Driver** tab.

4. If you have a newer firmware file from Intel, you can click the **Update** button and update the Firmware.

In Windows 95, use the WLAN Monitor utility to view driver and firmware versions. The WLAN Monitor **General** properties page allows you to verify driver firmware version data and view wireless LAN adapter signal and transmission quality information.

The WLAN Update utility upgrades the firmware for an adapter. Refer to the documentation shipped with the Wireless LAN Utilities for instructions on using WLAN Update. The driver and Wireless LAN Utilities installation is required to run the WLAN Update utility.

5.2   Upgrading Drivers and Utilities to Version 3.0

To update the driver in Windows 2000:

1. Right-click **My Computer** and click **Properties**.

2. Click the **Hardware** tab and click **Device Manager**.

3. Open **Network adapters** and double-click **Intel® PRO/Wireless 2011B LAN PC Card**.

4. Click the **Driver** tab and click **Update Driver**.

To update the driver in Windows 98 and 95:

1. Uninstall the Version 2.0 driver.

2. Install the Version 3.0 driver.

3. Restart the computer.

To install Install the Version 3.0 Utilities tools:

1. Insert the CD into your CD-ROM.

2. When the program starts, click **Install Software** and follow the instructions on the screen.

Chapter 6. Specifications

Product Model	WPC2011BWW
Adapter Physical	
Dimensions (less antenna)	85 mm × 54 mm × 5 mm (3.3 inches × 2.1 inches × 0.2 inches)
Weight	45.4 g (1.6 oz)
Operating temperature	0° to 55° C (32° to 130° F)
Humidity	95% maximum non-condensing
Cargo/Packaged	1.8 m (6 feet) drop 5Hz vibration Mil-Std 810E
Altitude	4,600 m (15,000 feet) – Storage 2,400 m (8,000 feet) – Operating
Vibration	2 G peak, sine; 0.02 G peak random (5Hz to 2000Hz)
Shock	40 G, 11mS, half sine
ESD	Conformite Europeene (CE) Marking
PC Card Compliance	3.3-volt Type II, Version 2.1 Card and Socket Services for Windows 4.0
Adapter Radio	
Frequency Range	Country dependent. Typically 2412 to 2462 MHz.
Radio Data Rate	11 Mbps – Optional
	5.5 Mbps – Optional
	2 Mbps – Required
	1 Mbps – Required
Range	Open environment: over 30 m (100 feet) at 11 Mbps. Typical office or retail environment: 9 to 15 m (30 to 50 feet) at 11 Mbps.
TX Max. Radiated EIRP	U.S.: FCC part 15.247
	Europe: ETS 300 320
	Japan: RCR STD-33
Modulation	Binary GFSK
TX Out-of-Band Emissions	U.S.: FCC part 15.247, 15.205, 15.209
	Europe: ETS 300 320
	Japan: RCR STD-33

Chapter 7. Troubleshooting

Except for the lack of a wired network connection, the Intel® PRO/Wireless 2011B LAN Adapter is just like any mobile network adapter. The troubleshooting techniques that apply to mobile network adapters in general also apply to the Intel® PRO/Wireless 2011B LAN Adapter.

For an adapter to communicate with an access point:

- The Network Name (SSID) of the adapter and access point must match.

- If the WEP encryption option is enabled on the access point, the adapter must support this option and the adapter and access point must use the same encryption keys.

> Short RF Preamble Setting must be configured correctly in a multi-vendor LAN. See "Managing an Access Point in a Multi-Vendor WLAN" section of the Intel® PRO/Wireless 2011B LAN *Access Point Product Reference Guide*.

7.1   Windows 95/98 Troubleshooting Tips

Use the tools provided by Windows 95/98 and LAN analyzers (FTP Software NETXRAY, Novell LAN analyzer) to diagnose problems. Some common problems exhibited when the Intel® PRO/Wireless 2011B LAN Adapter has not been properly installed include:

- Windows 95/98 does not recognize the Intel® PRO/Wireless 2011B LAN Adapter when installed.
    — Verify that Windows 95/98 PC Card support is installed.
    — Verify the computer has a Plug and Play BIOS.
- The driver fails to load.
    — A resource conflict could exist. Use the **Device Manager** to resolve resource conflicts. Select the **System** applet from the **Control Panel**. Select the **Device Manager** tab.
- The workstation cannot associate to the Intel® PRO/Wireless 2011B LAN Access Point.
    — Verify the adapter Network Name (SSID) matches the Network Name of the access point. Refer to the Intel® PRO/Wireless 2011B LAN *Adapter Quick Installation Guide* for details on how to configure the WLAN access point and adapter.
- Degraded performance from the Intel® PRO/Wireless 2011B LAN Adapter is detected.
    — Verify that the adapter is firmly seated in a PC Card slot.
    — Verify that the protruding end containing the adapter antenna is not damaged.
    — Verify that the **Diversity** setting on the **WLAN Adapter** property page matches the antenna configuration for the associated network access point. See your network administrator for more information.
    — Perform a self-test on the adapter using the **WLAN Info Adapter Diagnostics** page.
    — Associate the adapter with a different access point.
- Network drive mappings disappear when the laptop suspends or the adapter is removed then reinserted. Windows 95/98 does not restore Netware network drive mappings under these conditions.
    — Log out and log in again, or restart the machine to restore the connections.
- Non-functioning adapter LEDs.

— Verify that the adapter Network Name (SSID) matches the Network Name of the access point.

- An computer associates with an access point, but Wireless LAN Utilities fail to discover access point
  or work improperly.
  — The Wireless LAN Utilities are closely integrated with the wireless adapter driver software. Investigate for system resource conflicts and reload or reconfigure driver software as needed.

7.2   Windows 2000 Troubleshooting Tips

To diagnose problems, use the tools provided by Windows 2000.

- The workstation cannot associate to the Intel® PRO/Wireless 2011B LAN Access Point.
  — Verify the adapter Network Name (SSID) matches the Network Name of the access point. Refer to the Intel® PRO/Wireless 2011B LAN *Adapter Quick Installation Guide* for details on how to configure the WLAN access point and adapter.
- Degraded performance from the Intel® PRO/Wireless 2011B LAN Adapter is detected.
  — Verify that the adapter is firmly seated in a PC Card slot.
  — Verify that the protruding end containing the adapter antenna is not damaged.
  — Verify that the Diversity setting on the **WLAN Adapter** property page matches the antenna configuration for the associated network access point. See your network administrator for more information.
- Non-functioning adapter LED.
  — Verify that the adapter SSID matches the SSID of the access point.

7.3   Windows CE Troublshooting

The following problem scenarios could be encountered when using the Intel® PRO/Wireless 2011B LAN Adapter in a Windows CE environment:

The Handheld Computer Does Not Recognize the Adapter

The handheld computer could display an **Unidentified PC Card Adapter** window when the Intel® PRO/Wireless 2011B LAN Adapter is inserted into the handheld computer.

This probably means the Intel® PRO/Wireless 2011B LAN 32-bit Windows CE driver was not loaded or was loaded incorrectly. If this is the case the driver files require reinstallation. Refer to the Intel® PRO/Wireless 2011B LAN 32-bit Windows CE driver installation section of Chapter 8 for detailed installation instructions.

To verify that the handheld computer recognizes the Intel® PRO/Wireless 2011B LAN Adapter:

1. Tap **Start** and select **Settings** and **Control Panel**.

2. Double tap the **System** icon.

    The **Expansion Slot:** in the **System:** section of the **System Properties** window should list **Low_Power_Ethernet**.

    This window displays the type of processor the handheld computer uses.

3. If the handheld computer does not recognize the Intel® PRO/Wireless 2011B LAN Adapter and does not display an **Unidentified PC Card Adapter** window, remove and reinsert the adapter.

— If the handheld computer has an adapter locking mechanism, verify that it is engaged after the adapter has been re-inserted.

An IP Address is Not Recognized by the Handheld Computer

Remove and reinsert the adapter for changes to the IP address to take effect once the **Network** program has been run from the Windows CE **Control Panel**.

Chapter 8. Customer Support

8.1 Intel Automated Customer Support

You can reach Intel automated support services 24 hours a day, every day at no charge. The services contain the most up-to-date information about Intel products. You can access installation instructions, troubleshooting information, and product information.

8.1.1 User Guide on Your Product CD-ROM

For more information about installing drivers or troubleshooting other topics, see the online User Guide. To view the guide, insert the Intel CD in your drive and wait for the Autorun to display. Click the **User Guide** button to view the guide. Note that a web browser is required to view the guide.

8.1.2 Web and Internet Sites

- Support: http://support.intel.com
- Network Products: http://www.intel.com/network
- Corporate: http://www.intel.com
- Newsgroups: news://cs.intel.com
- FTP Host: ftp://download.intel.com
- FTP Directory: `/support/network/<device>/`

8.1.3 Customer Support Technicians

U.S. and Canada

If you are using this product in conjunction with Intel® PRO/Wireless 2011B LAN hardware in a business or office environment and want customer support, please call +1 916-377-7000 (7:00 – 17:00 M–F Pacific Time). You can also visit the Intel customer support web site (http://support.intel.com).

Worldwide Access

Intel has technical support centers worldwide. Many of the centers are staffed by technicians who speak the local languages. For a list of all Intel support centers, the telephone numbers, and the times they are open, refer to the Customer Support Phone Numbers web site (http://www.intel.com/support/9089.htm).

8.2 Intel Software License Agreement

IMPORTANT - READ CAREFULLY BEFORE COPYING, INSTALLING OR USING.

Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.

LICENSES

- If you are a network administrator, the "Site License" below shall apply to you.
- If you are an end user, the "Single User License" shall apply to you.

Site License

You may copy the Software onto your organiation's computers for your organization's use, and you may make a reasonable number of back-up copies of the Software, subject to these conditions:

1. **This Software is licensed for use only in conjunction with Intel component products. Use of the Software with non-Intel component products is not licensed hereunder.**
2. You may not copy, modify, rent, sell, distribute or transfer any part of the Software except as provided in this Agreement, and you agree to prevent unauthorized copying of the Software.
3. You may not reverse engineer, decompile, or disassemble the Software.
4. You may not sublicense or permit simultaneous use of the Software by more than one user.
5. The Software may include portions offered on terms in addition to those set out here, as set out in a license accompanying those portions.

Single User License

You may copy the Software onto a single computer for your personal, noncommercial use, and you may make one back-up copy of the Software, subject to these conditions:

1. **This Software is licensed for use only in conjunction with Intel component products. Use of the Software with non-Intel component products is not licensed hereunder.**
2. You may not copy, modify, rent, sell, distribute or transfer any part of the Software except as provided in this Agreement, and you agree to prevent unauthorized copying of the Software.
3. You may not reverse engineer, decompile, or disassemble the Software.
4. You may not sublicense or permit simultaneous use of the Software by more than one user.
5. The Software may include portions offered on terms in addition to those set out here, as set out in a license accompanying those portions.

OWNERSHIP OF SOFTWARE AND COPYRIGHTS

Title to all copies of the Software remains with Intel or its suppliers. The Software is copyrighted and protected by the laws of the United States and other countries, and international treaty provisions. You may not remove any copyright notices from the Software. Intel may make changes to the Software, or to items referenced therein, at any time without notice, but is not obligated to support or update the Software. Except as otherwise expressly provided, Intel grants no express or implied right under Intel patents, copyrights, trademarks, or other intellectual property rights. You may transfer the Software only if the recipient agrees to be fully bound by these terms and if you retain no copies of the Software.

LIMITED MEDIA WARRANTY

If the Software has been delivered by Intel on physical media, Intel warrants the media to be free from material physical defects for a period of ninety days after delivery by Intel. If such a defect is found, return the media to Intel for replacement or alternate delivery of the Software as Intel may select.

EXCLUSION OF OTHER WARRANTIES

EXCEPT AS PROVIDED ABOVE, THE SOFTWARE IS PROVIDED "AS IS" WITHOUT ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND INCLUDING WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT, OR FITNESS FOR A PARTICULAR PURPOSE. Intel does not warrant or assume responsibility for the accuracy or completeness of any information, text, graphics, links or other items contained within the Software.

LIMITATION OF LIABILITY

> **IN NO EVENT SHALL INTEL OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, LOST PROFITS, BUSINESS INTERRUPTION, OR LOST INFORMATION) ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE, EVEN IF INTEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME JURISDICTIONS PROHIBIT EXCLUSION OR LIMITATION OF LIABILITY FOR IMPLIED WARRANTIES OR CONSEQUENTIAL OR INCIDENTAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. YOU MAY ALSO HAVE OTHER LEGAL RIGHTS THAT VARY FROM JURISDICTION TO JURISDICTION.**

TERMINATION OF THIS AGREEMENT

> Intel may terminate this Agreement at any time if you violate its terms. Upon termination, you will immediately destroy the Software or return all copies of the Software to Intel.

APPLICABLE LAWS

> Claims arising under this Agreement shall be governed by the laws of California, excluding its principles of conflict of laws and the United Nations Convention on Contracts for the Sale of Goods. You may not export the Software in violation of applicable export laws and regulations. Intel is not obligated under any other agreements unless they are in writing and signed by an authorized representative of Intel.

GOVERNMENT RESTRICTED RIGHTS

> The Software is provided with "RESTRICTED RIGHTS." Use, duplication, or disclosure by the Government is subject to restrictions as set forth in FAR52.227-14 and DFAR252.227-7013 et seq. or its successor. Use of the Software by the Government constitutes acknowledgment of Intel's proprietary rights therein. Contractor or Manufacturer is Intel Corporation, 2200 Mission College Blvd., Santa Clara, CA 95052.

8.3   Limited Hardware Warranty

Intel warrants to the original owner that the hardware product delivered in this package will be free from defects in material and workmanship. This warranty does not cover the product if it is damaged in the process of being installed. Intel recommends that you have the company from whom you purchased this product install the product. Intel reserves the right to fill your order with a product containing new or remanufactured components.

THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF NON-INFRINGEMENT OF INTELLECTUAL PROPERTY, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF ANY PROPOSAL, SPECIFICATION OR SAMPLE.

This warranty does not cover replacement of hardware products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation or improper testing.

If the hardware product is found to be otherwise defective, Intel, at its option, will replace or repair the hardware product at no charge except as set forth below, provided that you deliver the hardware product along with a Return Material Authorization (RMA) number (see below) either to the company from whom you purchased it or to Intel (North America only). If you ship the hardware product, you must assume the risk of damage or loss in transit. You must use the original container (or the equivalent) and pay the shipping charge.

Intel may replace or repair the hardware product with either new or remanufactured product or parts, and the returned hardware product becomes Intel's property. Repaired or replaced products will be returned at the same revision level as received or higher, at Intel's option. Intel reserves the right to replace discontinued product with an equivalent current generation product.

This warranty gives you specific legal rights and you may have other rights which vary from state to state. All parts or components contained in this hardware product are covered by Intel's limited warranty for this product; the product may contain fully tested, recycled parts, warranted as if new. For warranty information call one of the numbers below.

Returning a Defective Product

From North America

Before returning any hardware product, contact Intel Customer Support to obtain an RMA number by calling +1 916-377-7000.

If the Customer Support Group verifies that the hardware product is defective, they will have the Return Material Authorization Department issue you an RMA number to place on the outer package of the hardware product. Intel cannot accept any product without an RMA number on the package.

All Other Locations

Return the hardware product to the place of purchase for a refund or replacement.

8.3.1 Limitation of Liability and Remedies

INTEL'S SOLE LIABILITY HEREUNDER SHALL BE LIMITED TO DIRECT, OBJECTIVELY MEASURABLE DAMAGES. IN NO EVENT SHALL INTEL HAVE ANY LIABILITY FOR ANY INDIRECT OR SPECULATIVE DAMAGES (INCLUDING, WITHOUT LIMITING THE FOREGOING, CONSEQUENTIAL, INCIDENTAL, AND SPECIAL DAMAGES) INCLUDING, BUT NOT LIMITED TO, INFRINGEMENT OF INTELLECTUAL PROPERTY, REPROCUREMENT COSTS, LOSS OF USE, BUSINESS INTERRUPTIONS, LOSS OF GOODWILL, AND LOSS OF PROFITS, WHETHER ANY SUCH DAMAGES ARISE OUT OF CONTRACT, NEGLIGENCE, TORT OR UNDER ANY WARRANTY, IRRESPECTIVE OF WHETHER INTEL HAS ADVANCE NOTICE OF THE POSSIBILITY OF ANY SUCH DAMAGES. NOTWITHSTANDING THE FOREGOING, INTEL'S TOTAL LIABILTIY FOR ALL CLAIMS UNDER THIS AGREEMENT SHALL NOT EXCEED THE PRICE PAID FOR THE PRODUCT. THESE LIMITATIONS ON POTENIAL LIABLTIES WERE AN ESSENTIAL ELEMENT IN SETTING THE PRODUCT PRICE. INTEL NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME FOR IT ANY OTHER LIABILITIES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

Critical Control Applications

Intel specifically disclaims liability for use of the hardware product in critical control applications (including, for example only, safety or health care control systems, nuclear energy control systems, or air or ground traffic control systems) by you or your customers, and such use is entirely at the user's risk. You agree to defend, indemnify, and hold Intel harmless from and against any and all claims arising out of use of the hardware product in such applications by you or your customers.

Software

Software provided with the hardware product is not covered under the hardware warranty described above. See the applicable software license agreement which shipped with the hardware product for details on any software warranty.

8.4 Product Registration

The Beginning of a Valuable Relationship…

Register Your Product Today!

As a registered customer, you stay connected and informed by receiving:

- Access to Intel's outstanding technical support for optimum performance.
- Advance notice of product upgrades and new products to give you a competitive edge.
- Information updates to keep you current.
- Special offers for savings on products and evaluation units.

There are three easy ways to register:

- Browse the Intel product registration web site (http://www.intel.com/product/register).
- Mail the attached postage prepaid registration card.
- Fax the attached registration card to +1 608-757-1727.

Chapter 9. Regulatory Compliance Information

For U.S. and international regulatory compliance information for the Intel® PRO/Wireless 2011B LAN, please see the Regulatory Specifications posted at the Intel customer support web site (http://support.intel.com).

Important Regulatory Compliance Instructions

If your country is listed on the regulatory labels included with the Intel® PRO/Wireless 2011B LAN hardware, remove the label for your country and attach it to the bottom of the device in the space provided. Failure to apply the label for the appropriate country constitutes a breach of law.

Index

Numerics

11 Mbps Operation, 4
    WLAN property page, 20, 24, 25

A

Access Point
    shared key authentication, 6
access point
    , 14
    11 Mbps operation, 4
    CAM, 5
    direct-sequence, 1
    Mobile IP, 5
    operating modes, 4
    power management, 5
    PSP, 5
    signal strength, 5
antenna
    WLAN property page, 20, 24, 25

C

CAM (Continuously Aware Mode)
    power management, 5
CSS (Card and Socket Services)
    wireless LAN, 6

D

data decryption, 2
    types of authentication, 6
    WEP algorithm, 2, 6, 12
data encryption
    types of authentication, 6
    WEP algorithm, 2, 6, 12
data rate, 5
    11 Mbps association., 5
    11 Mbps operation, 4
    CAM, 5
    WLAN property page, 20, 24, 25
direct-sequence
    data rate, 5

E

Encryption
    64-bit, 19
    open systems, 18
Encryption property page, 18
    configure, 18

ESSID, 14
    easy setup, 14
    Mobile Unit properties, 15
    NCPA, 15

F

firmware, 22
    update, 22
    verification, 22
    WLAN Monitor, 22
    WLAN Update, 22
frequency, 3
frequency modulation, 3
frequency range, 3

I

IEEE address
    MAC, 2
installation
    card and socket services, 6
    firmware, 22
    plug and play, 6
    power management, 5
Intel PRO/11 Wireless LAN
    radio basics, 2

M

Managing, 14
Mobile IP (Internet Protocol)
    Mobile IP property page, 16
    roaming, 5
Mobile IP property page, 16
    configure, 16
mobile unit property page, 15
MU
    authentication, 6
    data encryption, 6
MU (Mobile Unit)
    11 Mbps Operation, 4
    card and socket services, 6
    ESS mode, 4
    firmware, 22
    Mobile IP, 5
    operation, 4
    plug and play, 6
    power management, 5
MU Mode, 4

N

NCPA
    802.11 ESSID, 14
    Encryption property page, 18
    Mobile IP property page, 16
    Mobile Unit properties, 15
    password, 20
    Power property page, 15
    tools and utilities, 14
    using, 14
    WLAN property page, 20, 24, 25

P

PC Card
    11 Mbps data rate, 5
    about, 4, 24
    CAM, 5
    features, 4
    firmware, 22
    Mobile IP, 5
    power management, 5
    PSP, 6
power management
    CAM, 5
    PSP, 5
PSP (Power Save Polling)
    power management, 5

R

radio basics, 2
    digital data, 3
    electromagnetic waves, 2
    radio links, 2
regulatory compliance, 33
roaming
    Mobile IP, 5

S

security
    decryption, 2
    WEP algorithm, 2, 6, 12

T

tools and utilities
    NCPA, 14

U

utilities
    WLAN Monitor, 22
    WLAN Update, 22

W

WEP algorithm, 2, 6, 12
wireless LAN local area network)
    CSS, 6
WLAN adapter property page, 20, 24, 25