Intel(R) PRO/Wireless LAN Mini PCI Adapter User's Guide

This document provides information for the following wireless devices:

- Intel(R) PRO/Wireless LAN 2100A 3B Mini PCI Adapter
- Intel(R) PRO/Wireless LAN 2100 3B Mini PCI Adapter

These wireless adapters operate with high-capacity networks using multiple access points within large or small environments. Using the Intel(R) PROSet Windows utility you can configure, manage wireless local area network (WLAN) management tasks, adapter switching functions, and connections.

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A wireless network connects computers without using network cables. Computers use radio communications to send data between each other. You can communicate directly with other wireless computers, or connect to an existing network through a wireless access point. When you set up your wireless adapter, you select the operating mode for the kind of wireless network you want. You can use your Intel(R) PRO/Wireless adapter to connect to other similar wireless devices that comply with the 802.11 standard for wireless networking.

Choosing a Wireless LAN Mode

Wireless LANs can operate with or without access points, depending on the number of users in the network. Infrastructure mode uses access points to allow wireless computers to send and receive information. Wireless computers transmit to the access point, the access point receives the information and rebroadcasts it to other computers. The access point can also connect to a wired network or to the Internet. Multiple access points can work together to provide coverage over a wide area.

Peer-to-Peer mode, also called Ad Hoc mode, works without access points and allows wireless computers to send information directly to other wireless computers. 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.

Configuring a Wireless LAN

There are three basic components that must be configured for a wireless LAN to operate properly:

- **Network Name**—Each wireless network uses a unique Network Name to identify the network. This name is called the Service Set Identifier (SSID). When you set up your wireless adapter, you specify the SSID. If you want to connect to an existing network, you must use the name for that network. If you are setting up your own network you can make up your own name and use it on each computer. The name can be up to 32 characters long and contain letters and numbers.
- **Profiles**—When you set up your computer to access a wireless network, Intel(R) PROSet creates a profile for the wireless settings that you specify. If you want to connect to another network, you can scan for existing networks and make a temporary connection, or create a new profile for that network. After you create profiles, your computer will automatically connect when you change locations.
- **Security**—The 802.11 wireless networks use encryption to help protect your data. Wired equivalent privacy (WEP) uses a 64-bit or 128-bit shared encryption key to scramble data. Before a computer transmits data, it scrambles the data using the secret encryption key. The receiving computer uses this same key to unscramble the data. If you are connecting to an existing network, use the encryption key provided by the administrator of the wireless network. If you are setting up your own network you can make up your own key and use it on each computer.

Identifying a Wireless Network

Depending on the size and components of a wireless LAN, there are many ways to identify a wireless LAN:

- **The Network Name or Service Set Identifier (SSID)**—Identifies a wireless network. All wireless devices on the network must use the same SSID.
- **Extended Service Set Identifier (ESSID)**—A special case of SSID used to identify a wireless network that includes access points.
- **Independent Basic Service Set Identifier (IBSSID)**—A special case of SSID used to identify a network of wireless computers configured to communicate directly with one another without using an access point.
- **Basic Service Set Identifier (BSSID)**—A unique identifier for each wireless device. The BSSID is the Ethernet MAC address of the device.
- **Broadcast SSID**—An access point can respond to computers sending probe packets with the broadcast SSID. If this feature is enabled on the access point, any wireless user can associate with the access point by using a blank (null) SSID.

Surveying the Site of Your Wireless LAN

Conducting a [site survey](#) for your wireless LAN is the most crucial step in the process of setting up a wireless network. It greatly reduces the amount of troubleshooting you will have to do once you have the wireless LAN set up and ready for connection testing. To conduct a site survey, you will need the following tools:

- An access point (or laptop computer) that is set up to be the transmitter. It should be mounted near and at the same height as the designated location of your wireless LAN.
- A laptop that will act as the mobile receiver. It must contain your site survey software.
- An area or building map, which will be used to plot the strength of your signals.

Once you have the tools you need, you are ready to survey the inside of the building. Launch the site survey software on the mobile receiver laptop and carry it around in the intended wireless LAN area to test the signal strength. Be sure to also check the signal strength of each intended access point location. If you encounter problems while surveying the site, make sure your transmitter laptop is not located on a wall containing metal, such as an air-conditioning duct, which will interfere with the range of your signal. Simply move the transmitter and test the signal strength again. For users to have seamless coverage when moving from access point to access point, the signal levels at each point must overlap. There is software available that will seamlessly hand off changing signal levels from one access point to another.

Your building's infrastructure can sometimes interfere with the microwave signal, but finding the location and cause of the interference will allow you to figure out the best place to mount your access points for optimal area coverage. Microwave signals travel in all directions, which means there is one access point for a multi-floor building. However, the range is highly dependent on the material used to construct the flooring, especially metal materials. Once your signal strength is strong inside the building, you are ready to check the strength outside the building. To do so, simply carry the mobile receiver laptop as far down the street or around the building as you can go without losing significant signal strength.

If possible, you should be aware of the types of networks being used by the companies on the floors above and below you, so that you can work together in harmony. With wireless networks, security is very important and if you communicate with those around you, you are better prepared to select the right channels, as well as the best location for access points.

Factors Affecting Range

Although access points can transmit signals up to 60 feet away in an area with many walled barriers or as much as 500 feet away in a large open area, the range is affected by the following factors:

- Building materials, such as steel and drywall, can shorten the range of the radio signals.
- Physical layout of the area can interfere with the signals and cause them to be dropped.
- Electronic noise from cell phones, microwave ovens, or other devices on the same frequency can interfere with the transmission of the signals.
- Range is inversely proportional to data rate, so the faster that the signals are sent, the less distance they will travel.

Taking these factors into consideration when you survey the site for your WLAN is key to providing all of your users with undisturbed mobile connectivity. Using multiple access points will, of course, reduce the impact of these factors if your area has dividing walls throughout.

Stronger Security

Although wireless networks are easy to use, the main issue lies with security. Even if you enable the security settings defined in the 802.11b standard, as well as the security settings of your hardware, your network is still vulnerable. There are a few things you can do to make it more difficult for outsiders to access your network:

- Change the default network name of your WLAN. Every manufacturer's default settings are public knowledge.
- Do not allow the name of your network to be broadcasted by your access points. This makes it more difficult for hackers to identify your network.
- Enable Wired Equivalent Privacy (WEP) encryption, which is the same security feature used by online shopping websites.
- Change your encryption keys as often as possible. Temporal Key Integrity Protocol (TKIP), which is being developed by a IEEE task group, will change the keys automatically.
- Enable MAC address filtering so that each access point can generate a list of approved MAC addresses for your WLAN.
- If you have a small network, use virtual private network encryption for additional security. If you have a large network, you may want to install a gateway between your access points and network clients.

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What is a Site Survey?

A site survey is an in-depth examination and analysis of a proposed wireless LAN site. The purpose of a site survey is to determine the number of access points needed, the types of antennas needed, and the best placement for those access points and antennas.

Although the goal of a site survey is simple, the means of arriving at that goal are not. Some of the steps involve taking measurements, but most involve experience, trial and error, and a little guesswork rather than numbers and figures.

When to Perform a Site Survey

Intel® recommends that you perform a site survey prior to installing a wireless LAN. Site surveys are especially important when:

- **You are installing a new site** — Evaluate the placement of the access points and antennas throughout the proposed site.
- **You are changing an existing site** — When modifying or extending an existing network structure, re-evaluate the placement of the access points and antennas. If you need a different level of coverage in some areas, you may need to move, replace, or supplement access points and antennas.
- **You are physically changing the site** — Remodeling may introduce new sources of interference, such as motors and metal structures within the coverage area of the access point, even if it does not directly effect the sites where the access points are located.

Elements of an Effective Site Survey

An effective site survey requires four elements. Failure to commit the appropriate time, money, and energy to accomplish a proper site survey in advance may result in greater expenditures of money and time later, when problems arise that require repeated adjustments to the wireless configuration. The four elements of an effective site survey are:

1. **Examine the network usage problems solved by the wireless LAN.**
   How many clients need a wireless LAN connection? What areas of the site require wireless LAN connectivity? How many hours each day is wireless LAN connectivity required? Which locations are likely to generate the largest amount of data traffic? Where is future network expansion most likely?
2. **Study blueprints of the proposed wireless LAN site.**
   A site blueprint provides a map of the site as well as the location of objects, such as walls, partitions, and anything else that could affect the performance of a wireless LAN. Examining the site blueprint prior to conducting the physical walk-through helps you identify areas in which wireless equipment is likely to perform well and areas where it is not. Many obstructions are not readily visible and, in some cases, a room originally built for a specific purpose, such as a radiology lab, might have been converted into something completely different, such as a conference room. The blueprint may also show areas proposed for future building expansion. To prepare for the next step of the site survey, mark possible wireless device locations on the blueprint and refer to the marked blueprint during the physical walk-through and inventory.
3. **Conduct a physical walk-through and inventory.**
   The primary purpose of the physical walk-through is to document any items or materials near a

proposed device location that may interfere with reception or transmission and affect network performance. Document stock and inventory levels, current environmental conditions and any materials that may interfere with the wireless LAN.

4. **Measure the radio frequency transmissions.**
   The Intel® PRO/Wireless LAN Site Survey Utility allows you to measure the signal strength, transmission rate and the number of successfully transmitted packets. This step in the site survey involves mounting access points and antennas in the proposed locations and measuring the RF signal strength, transmission rate and packet throughput.

Software Installation

Installing Drivers and Intel(R)

PROSet Software

See the instructions for your operating system:

- [Windows XP](#)
- [Windows 2000](#)
- [Windows NT 4.0](#)
- [Windows Me](#)
- [Windows 98/98SE](#)

Installation under Windows XP

Preliminary Notes

The installation instructions in this section are based on the following assumptions:

- The wireless adapter hardware has already been installed in the computer in accordance with the computer manufacturer's instructions.
- The computer has not been powered on since the hardware installation was completed.
- No other wireless LAN card is installed in this computer.

To install the driver before installing hardware, use **Start > Run** and browse to the file **SetupWLD.exe** in the path **PROW2100A\WINXP** on the Intel CD. After running SetupWLD.exe, shut down the computer and install the hardware. When the computer restarts, the driver will be automatically installed.

Before proceeding, make sure that you are operating Windows XP with administrative rights. If you log in to Windows XP without administrative rights, you may run into problems during the installation.

The Intel(R) PROSet utility or the Windows XP wireless configuration feature can be used to configure wireless network settings. The instructions below include steps for installing the Intel(R) PROSet utility and for turning off the Windows XP configuration feature. If you do not turn off the Windows XP feature, you will not be able to use Intel(R) PROSet to configure wireless network settings. For information on how to use the Windows XP feature, see your Windows XP documentation.

Driver Installation

To install drivers under Windows* XP, follow these steps:

1. Power up the computer in which the wireless adapter hardware has just been installed.
2. Log in with administrative rights if prompted by Windows XP.
3. Wait for Windows to detect the newly installed hardware and display the **Found New Hardware Wizard** dialog. Verify that **Install the software automatically (Recommended)** is selected. If Windows does not detect the new hardware, see Troubleshooting.
4. Insert the Intel CD into your CD drive. The **New Hardware Found Wizard** searches for the correct driver files and copies them to your hard drive.
5. On the **Network Name** screen, click **Next** to accept the default Network Name (SSID), or enter a specific SSID for your network, then click **Next**.
6. On the **Data Encryption** screen, click **Next** to accept the default encryption setting **None**, or enter specific encryption settings for your network, then click **Next**.
7. On the **Found New Hardware Wizard** screen, click **Finish**. Proceed to disable the Windows XP wireless configuration feature.

Disable Windows XP Wireless Configuration (Required)

To disable the Windows XP wireless configuration feature so that you can use Intel(R) PROSet for wireless configuration, continue as follows:

Instructions are written for use with the Windows XP Start Menu and Control Panel Category View, not with "Classic" Start Menu or Control Panel views.

8. Click **Start** and **Control Panel**.
9. On the **Pick a category** screen, click **Network and Internet Connections**, then under the heading **or pick a Control Panel icon** click **Network Connections**.
10. In the **Network Connections** window, right-click your **Wireless Network Connection** and select **Properties**.
11. Select the **Wireless Networks** tab.
12. Click to clear ("deselect") the check box **Use Windows to configure my wireless network settings**, then click **OK** on the **Wireless Network** tab. Do not click any other tabs. Continue with the installation of Intel(R) PROSet.

Intel(R) PROSet Installation (Required)

Continue with the following steps to install the Intel(R) PROSet wireless configuration utility (required):

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of utility software. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Intel(R) PROSet installer manually using **Start > Run** and browsing to the file **PROSet.msi** in the path **APPS/PROSet/2K-NET32** on the Intel CD supplied with the product. Skip Steps 13 and 14 below and continue with **Step 15**.

13. Display the **Intel(R) PRO Network Connections** screen by removing and re-inserting the Intel CD, or by running autorun.exe from the CD. Click **Wireless LAN Adapters**.
14. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install Software**.
15. On the **Welcome to the InstallShield Wizard for Intel(R) PROSet** screen, click **Next**.
16. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
17. On the **Setup Type** screen, select **Typical** and then click **Next**. This is the recommended setting for a first-time installation.
18. On the **Ready to Install the Program** screen click **Install**.
19. After the software is installed on your computer, click **Finish**. Click **Exit** to close the **Intel(R) PRO Network Connections** screen or leave it open if you wish to install Wireless Administration Tools.
20. To launch Intel(R) PROSet, double-click the Intel(R) PROSet icon in the system tray or follow the path **Start > Programs > Intel Network Adapters > Intel(R) PROSet**. For additional information on the program, press **F1** or click **Help** while the program is running.

Administration Tools Installation (Optional)

Continue with the following steps to install the Intel(R) Wireless Administration Tools Site Survey and AP

Discovery (optional):

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of the Administration Tools. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Administration Tools installer manually using **Start > Run** and browsing to the file **APAdmin.msi** in the path **APPS/PROSet/2K-NET32** on the Intel CD supplied with the product. Skip Steps 21 and 22 below and continue with **Step 23**.

21. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.

    You can display this screen by removing and re-inserting the Intel CD, or by running autorun.exe from the CD.

22. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install AP Admin Tools**.

23. On the **Welcome to the InstallShield Wizard for Intel(R) Wireless Administration Tools** screen, click **Next**.

24. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.

25. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**.

26. On the **Ready to Install the Program** screen click **Install**.

27. After the software is installed on your computer, click **Finish**. Click Exit to close the **Intel(R) PRO Network Connections** screen.

28. To launch the Wireless Administration Tools, follow the path **Start > Programs > Intel(R) PRO Wireless > Access Point Administration Tools** and select **AP Discovery** or **Site Survey**. For additional information on either program, press **F1** or click **Help** while the program is running.

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Troubleshooting

Using a Profile with an incorrect WEP Encryption Key

When connected to an access point using a profile with an incorrect WEP key encryption, the task tray icon and the General page will both indicate good signal strength and that you are associated with the AP. However, when you attempt to send data to the AP using this profile, because of the incorrect WEP key encryption, authentication cannot be established to acquire an IP address from the AP to allow data transfer.

Refer to the following WEP encryption and authentication settings.

Open Authentication with an incorrect WEP 64 or 128-bit encryption key:

- A profile with an incorrect WEP encryption key will allow the wireless adapter to associate with the access point.
- No data transfer

Open Authentication with no WEP encryption:

- Allows association to an access point
- Data transfer is allowed

Shared Authentication:

- Associated to an AP always allows data transfer.

Problems with installation

Windows does not detect the wireless adapter:

1. Remove and re-install the adapter.
2. Uninstall and reinstall the adapter's drivers.

Before calling Customer Support

Make a note of the following answers before calling customer support:

- How many remote units do you have talking to each access point?
- What channels are you using, and how are they dispersed?
- How much coverage overlap is there between access points?
- How high above the floor are the access points mounted?
- What revision of Intel(R) PROSet software or other LAN software are you running?
- What other electronic equipment is operating in the same band?
- What construction materials are used in wall and floors?

Users are dropped from the wireless network

Suggested causes and solutions:

- Find out if a person or workgroup moved or if the building has been rearranged.
- If two or more users are seated too close to each other, performance can suffer. Instruct your users to space themselves a small distance apart to keep receivers from being overloaded.
- Delivery trucks with very large metal sides can affect performance by reflecting destructive signals back into a building. If you have an installation that includes a shipping dock, check to see if the problem coincides with the arrival of large trucks.
- Personal "systems" can also interfere with your network. Wireless speakers, cordless earphones, some Bluetooth devices, and similar systems can be the source of an infrequent but hard to find the problem. Some systems do not conform to wireless regulations. Shut off suspect devices or remove them from the area.
- If possible, remove and reinstall your new software. Conflicts with other resident software packages are always a possibility, and they are not always the fault of the newest addition. Sometimes just starting over fixes the problem.
- Swap units around. Does your problem follow the changed units, or is it unique to a specific location? If it follows the product, the swapped unit could be damaged, or improperly configured. If the problem stays with the location, try to find out what is different about that particular room or area.

Range decreases as data rate increases

This is a normal condition. Range is inversely proportional to data rate: the faster the data, the shorter the range. This has to do with the modulation technology used. Very fast data rates require extremely complex signal waveforms, where even minor distortions can result in data errors. Slower data rates are much more tolerant, and consequently will get through even in the presence of some amount of noise, interference, distortion and echo.

Signal doesn't pass through a short or thin wall

Range is highly dependent on the physical environment. In a line-of-sight location, with elevated and

calibrated antennas, range predictions are quite accurate. This is not true in a "typical" office building, where the walls may be simple drywall (which is almost transparent to microwaves), or could be plaster with metal underneath. Most sites are somewhere between these two extremes, and consist of a mixture of surfaces. You can't tell what is inside a wall by just looking at it, and we can't tell you exactly what distance you will achieve. Consider published range information to be typical, average, common or usual. Do not expect it to be exact.

Signal strength drops when a cell phone is used in the area

Range also depends on the electronic environment. If other equipment that could cause interference is nearby, the range of your transceiver could vary widely, and could change suddenly when the other equipment activates. This is particularly true for 802.11b installations, which share their frequencies with microwave ovens, cordless phones, wireless hi-fi speakers, electronics toys and similar devices. Try to keep your system away from other transmitters, and from other sources of electrical noise, such as large motors, spot welders, and similar "electronically noisy" devices.

Range is shorter than it should be

Repeat some tests late in the evening, or on a weekend, when there may be less interference. However, some users leave their networks turned all the time so this test is not foolproof. By all means, try more than one channel. Your range problem may just be a nearby user whose system uses your present test channel.

Interference from fluorescent lights

If you mount an access point close to fluorescent light fixtures, the lamp glow appears constant, but inside the lamp tube, ionization appears and disappears 120 times a second. This can modulate or "chop" an incoming signal and interfere with reception.

When too much range is undesirable

Too much range is not necessarily a good thing. At first it would appear that you would want as much range as possible, but with the increase in range comes an increase in interference potential, as your unit hears not only your other units but also manages to hear the systems of other companies up and down the street. If you have a large installation, you will also wind up with more than one access point using the same channel. If a remote unit hears two or more access points, this will slow the network

Prevent access to wireless networks from outside the building

Excess *transmit* range presents a special reverse problem. For example, putting an access point adjacent to a second floor bay window invites anyone with the right software on the street below to pick up and enjoy all network transmissions. We discuss some possible solutions to this problem further on.

Problems with Network Connectivity

If you cannot connect to the wireless network, try the following:

Check Network Settings

1. Select the wireless adapter in the Intel(R) PROSet left side pane.
2. From the General page, check that the Network Name (SSID) and operating mode are correct. If the laptop is configured for ad hoc networking, make sure that the channel is correct.
3. To correct these settings, click the **Networks** tab.
4. Select the profile being used.
5. Click the **Edit** button and make the changes.

Check Security Settings

1. Select the wireless adapter in the Intel(R) PROSet left side pane.
2. From the General page, check that the security settings are correct.
3. To correct the security settings, click the **Networks** tab.
4. Select the profile being used.
5. Click the **Edit** button.
6. Click the **Security** tab. Make sure that the settings for WEP encryption are correct.

Check Adapter Switching

1. Select the wireless adapter in the Intel(R) PROSet left side pane.
2. Select the **Adapter Switching** icon.
3. Check that the adapter is "Linked" to the network.

Checking Adapter Statistics

Adapter Statistics

If the adapter is communicating with an access point (infrastructure mode) or other computers in peer-to-peer mode, click the **Statistics** button in the Troubleshooting tab to display the current information about how well the adapter is transmitting and receiving information.

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Installation under Windows 2000

Preliminary Notes

The installation instructions in this section are based on the following assumptions:

- The wireless adapter hardware has already been installed in the computer in accordance with the computer manufacturer's instructions.
- The computer has not been powered on since the hardware installation was completed.
- No other wireless LAN card is installed in this computer.

To install the driver before installing hardware, use **Start > Run** and browse to the file **SetupWLD.exe** in the path **PROW2100A\WIN2K** on the Intel CD. After running SetupWLD.exe, shut down the computer and install the hardware. When the computer restarts, the driver will be automatically installed.

After loading the Windows 2000 operating system, be sure to log in with administrative rights. If you log in to Windows 2000 without administrative rights, you may run into problems during the installation.

During initial adapter installation and configuration, it may take up to two minutes for adapter settings to be confirmed.

Driver Installation

To install driver software in Windows* 2000, follow these steps:

1. Power up the computer in which the wireless adapter hardware has just been installed.
2. Log in with administrative rights when prompted by Windows 2000.
3. Wait for Windows to detect the newly installed hardware and display the **Found New Hardware Wizard** dialog. If Windows does not detect the new hardware, see Troubleshooting.
4. Insert the Intel CD-ROM into your CD-ROM drive. If the **Intel(R) PRO Network Connections** menu screen appears, leave it open and click the **Found New Hardware Wizard** dialog to make that the active window.
5. On the **Install Hardware Device Drivers** screen verify that **Search for a suitable driver for my device (recommended)** is selected, then click **Next**.
6. When the **Locate Driver Files** dialog appears, verify that the item **CD-ROM drives** is checked and click **Next**.
7. When the **Driver Files Search Results** dialog appears, indicating that a driver was found, click **Next**.
8. On the **Network Name** screen, click **Next** to accept the default Network Name (SSID), or enter a specific SSID for your network, then click **Next**.
9. On the **Data Encryption** screen, click **Next** to accept the default encryption setting **None**, or enter

specific encryption settings for your network, then click **Next**.

10. On the **Found New Hardware Wizard** screen, click **Finish**. Proceed to install Intel(R) PROSet.

Intel(R) PROSet Installation (Required)

Continue with the following steps to install the Intel(R) PROSet wireless configuration utility (required):

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of utility software. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Intel(R) PROSet installer manually using **Start > Run** and browsing to the file **PROSet.msi** in the path **APPS/PROSet/2K-NET32** on the Intel CD supplied with the product. Skip Steps 11 and 12 below and continue with **Step 13**.

11. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.

This screen may have been launched in step 4 above. If the screen is not visible when you close the **Found New Hardware Wizard** dialog, display it by removing and re-inserting the Intel CD, or by running autorun.exe from the CD.

12. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install Software**.
13. On the **Welcome to the InstallShield Wizard for Intel(R) PROSet** screen, click **Next**.
14. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
15. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**. This is the recommended setting for a first-time installation.
16. On the **Ready to Install the Program** screen click **Install**.
17. After the software is installed on your computer, click **Finish**. Click Exit to close the **Intel(R) PRO Network Connections** screen or leave it open if you wish to install Wireless Administration Tools.
18. To launch Intel(R) Intel(R) PROSet, double-click the Intel(R) PROSet icon in the system tray or follow the path **Start > Programs > Intel Network Adapters > Intel(R) PROSet**. For additional information on the program, press **F1** or click **Help** while the program is running.

During initial adapter installation and configuration, it may take up to two minutes for adapter settings to be confirmed.

Administration Tools Installation (Optional)

Continue with the following steps to install the Intel(R) Wireless Administration Tools Site Survey and AP Discovery (optional):

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of the Administration Tools. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Administration Tools installer manually using **Start > Run** and browsing to the file **APAdmin.msi** in the path **APPS/PROSet/2K-NET32** on the Intel CD supplied with the product. Skip Steps 19 and 20 below and continue with **Step 21**.

19. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.

This screen may have been launched in step 4 above. If the screen is not visible when you close the **Found New Hardware Wizard** dialog, display it by removing and re-inserting the Intel CD, or by running autorun.exe from the CD.

20. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install AP Admin Tools**.
21. On the **Welcome to the InstallShield Wizard for Intel(R) Wireless Administration Tools** screen, click **Next**.
22. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
23. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**.
24. On the **Ready to Install the Program** screen click **Install**.
25. After the software is installed on your computer, click **Finish**. Click Exit to close the **Intel(R) PRO Network Connections** screen.
26. To launch the Wireless Administration Tools, follow the path **Start > Programs > Intel(R) PRO Wireless > Access Point Administration Tools** and select **AP Discovery** or **Site Survey**. For additional information on either program, press **F1** or click **Help** while the program is running.

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Installation under Windows NT 4.0

Preliminary Notes

The installation instructions in this section are based on the following assumptions:

- The wireless adapter hardware has already been installed in the computer in accordance with the computer manufacturer's instructions.
- The computer has not been powered on since the hardware installation was completed.
- No other wireless LAN card is installed in the computer in which the Mini PCI Adapter hardware has been installed.

Install Network Drivers for Windows* NT* 4.0

NOTE: *Before installing drivers, install Service Pack* 6 *or later. Advanced features for Intel adapters require Service Pack 6a or later.*

NOTE: *Use the following information if NT Networking has already been installed on the PC. If NT Networking is not installed, please refer to your Windows NT documentation or consult your network administrator for instructions. Also refer to your Windows NT documentation for information about installing the TCP/IP protocol.*

1. Power up the computer in which the wireless adapter hardware has just been installed.
2. Wait for Windows NT to start, then log in as administrator.
3. Insert the Intel CD into your CD-ROM drive. If the **Intel(R) PRO Network Connections** screen displays, you may disregard it or close it (you will redisplay it later to install Intel(R) PROSet II).
4. Click **Start**, **Settings**, **Control Panel**, then double-click the **Network icon**.
5. When the Networking dialog appears, select the **Adapters** tab and click the **Add** button.
6. Click the **Have Disk** button after the available network adapters display.
7. Enter the path **D:\PROW2100\WINNT4** (where D: is your CD-ROM drive) and click **OK**.
8. Select "Intel(R) PRO/Wireless 2100 Mini PCI Adapter" from the list of supported adapters and click **OK**.
9. If prompted for additional Windows NT files, re-enter the path to your CD drive (for example, D:\).
10. The Adapter Properties dialog displays. Click the **Configure** button.
11. On the **Wireless Network** tab, click **Next** to accept the default Network Name (SSID), or enter a specific SSID for your network, then click **OK** to continue. (Default setting under the Advanced button is no security; consult your network administrator if security is required.)

12. Click **Close**.
13. Enter TCP/IP settings for your network and click **OK**.
14. When prompted to restart the computer, remove the CD-ROM and click **Yes**.
15. After the computer has restarted, double-click the **Network Neighborhood** icon on your desktop. Make sure that you have access to the network. If you can log on your adapter has been properly installed.
16. Proceed to **Install Intel(R) PROSet II**.

Install

Intel(R) PROSet II (Required)

Intel Intel(R) PROSet II enables you to test and configure Intel network adapters on computers running Windows* NT with Service Pack 5 or later. For details about installing Intel Intel(R) PROSet II, see the instructions below.

When you run the Intel(R) PROSet Installer, it checks to see if a previously installed version of Intel(R) PROSet exists on your computer. If another installation is detected, you will be asked to remove it before proceeding with the installation of Intel(R) PROSet II. Use Add/Remove Programs in the Control Panel to find and remove any previous versions of Intel(R) PROSet software.

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of Intel(R) PROSet II. If the Intel(R) PRO Network Connections menu screen does not appear when you insert the Intel CD, or if it appears but does not have a menu item for Wireless LAN Adapters, you can start the Intel(R) PROSet II installer manually using **Start > Run** and browsing to the file **WSetup.exe** in the path **APPS\PROSet\WINNT4** on the Intel CD. Then skip to **Step 4** below and continue with the installation.

1. Insert the Intel CD into your CD-ROM drive. The **Intel(R) PRO Network Connections** screen displays. (If it doesn't display, use Start, Run and launch the file **autorun.exe** from the Intel CD.)
2. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.
3. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install Software**.
4. On the **Welcome to the InstallShield Wizard for Intel(R) PROSet** screen, click **Next**.
5. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
6. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**. This is the recommended setting for a first-time installation. Click **Custom** if you wish to install Intel(R) PROSet in a nondefault location.
7. On the **Ready to Install the Program** screen click **Install**.
8. After the software is installed on your computer, click **Finish**. Click Exit to close the **Intel(R) PRO Network Connections** screen, if displayed.
9. To launch Intel(R) PROSet II, double-click the Intel(R) PROSet II icon in the system tray or in the Control Panel. For additional information, press **F1** or click **Help** while the program is running.
10. Restart the computer if prompted.

Install Administration Tools (Optional)

Continue with the following steps to install the Intel(R) Wireless Administration Tools Site Survey and AP Discovery (optional):

1. Insert the Intel CD into your CD-ROM drive. The **Intel(R) PRO Network Connections** screen displays. (If it doesn't display, use Start, Run and launch the file **autorun.exe** from the Intel CD.)
2. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.
3. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install AP Admin Tools**.
4. On the **Welcome to the InstallShield Wizard for Intel(R) Wireless Administration Tools** screen, click **Next**.
5. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
6. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**.
7. On the **Ready to Install the Program** screen click **Install**.
8. After the software is installed on your computer, click **Finish**. Click Exit to close the **Intel(R) PRO Network Connections** screen.
9. To launch the Wireless Administration Tools, follow the path **Start > Programs > Intel(R) PRO Wireless > Access Point Administration Tools** and select **AP Discovery** or **Site Survey**. For additional information on either program, press **F1** or click **Help** while the program is running.

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Installation under Windows Me

Preliminary Notes

The installation instructions in this section are based on the following assumptions:

- The wireless adapter hardware has already been installed in the computer in accordance with the computer manufacturer's instructions.
- The computer has not been powered on since the hardware installation was completed.
- No other wireless LAN card is installed in this computer.

To install the driver before installing hardware, use **Start > Run** and browse to the file **SetupWLD.exe** in the path **PROW2100A\WINSE-ME** on the Intel CD. After running SetupWLD.exe, shut down the computer and install the hardware. When the computer restarts, the driver will be automatically installed.

Driver Installation

To install the software in Windows* Me (Millennium Edition), follow these steps:

1. Power up the computer in which the wireless adapter hardware has just been installed.
2. Wait for Windows to detect the newly installed hardware and display the **Add New Hardware Wizard** dialog. DO NOT click **Next**. Verify that **Automatic search for a better driver (Recommended)** is selected. If Windows does not detect the new hardware, see <u>Troubleshooting</u>.
3. Insert the Intel CD into your CD drive. Windows installs the driver from the CD. If the installation does not start automatically, click **Next** on the **Add New Hardware Wizard** screen.
4. On the **Network Name** screen, click **Next** to accept the default Network Name (SSID) **101**, or enter a specific SSID for your network, then click **Next**.
5. On the **Data Encryption** screen, click **Next** to accept the default encryption setting **None**, or enter specific encryption settings for your network, then click **Next**.
6. Click **Finish** on the **Add New Hardware Wizard** screen when the driver installation is complete.
7. When prompted to restart the computer, click **No**. You will restart it manually later. Proceed to install Intel(R) PROSet.

Intel(R) PROSet Installation (Required)

To install the Intel(R) PROSet utility, continue with the following steps:

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of utility software. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Intel(R) PROSet installer manually using **Start > Run** and browsing to the file **PROSet.msi** in the path **APPS/PROSet/WN98SEME** on the Intel

CD supplied with the product. Skip Steps 8 and 9 below and continue with **Step 10**.

8. Display the **Intel(R) PRO Network Connections** screen by removing and re-inserting the Intel CD, or by running autorun.exe from the CD. Click **Wireless Adapters**.
9. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install Software**.
10. On the **Welcome to the InstallShield Wizard for Intel(R) PROSet II** screen, click **Next**.
11. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
12. On the **Setup Type** screen, select **Typical** and then click **Next**. This is the recommended setting for a first-time installation.
13. On the **Ready to Install the Program** screen click **Install**.
14. After the software is installed on your computer, click **Finish**.
15. When prompted to restart the computer, click **Yes**.
16. To launch Intel(R) PROSet, double-click the Intel(R) PROSet icon in the system tray or follow the path **Start > Programs > Intel Network Adapters > Intel(R) PROSet**. For additional information on the program, press **F1** or click **Help** while the program is running.

Administration Tools Installation (Optional)

After restarting the computer, continue with the following steps to install the Intel(R) Wireless Administration Tools Site Survey and AP Discovery (optional):

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of the Administration Tools. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Administration Tools installer manually using **Start > Run** and browsing to the file **APAdmin.msi** in the path **APPS/PROSet/WN98SEME** on the Intel CD supplied with the product. Skip Steps 17 and 18 below and continue with **Step 19**.

17. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.

You can display this screen by removing and re-inserting the Intel CD, or by running autorun.exe from the CD.

18. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install AP Admin Tools**.
19. On the **Welcome to the InstallShield Wizard for Intel(R) Wireless Administration Tools** screen, click **Next**.
20. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
21. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**.
22. On the **Ready to Install the Program** screen click **Install**.
23. After the software is installed on your computer, click **Finish**.
24. To launch the Wireless Administration Tools, follow the path **Start > Programs > Intel(R) PRO Wireless > Access Point Administration Tools** and select **AP Discovery** or **Site Survey**. For additional information on either program, press **F1** or click **Help** while the program is running.

Installation under Windows 98SE

Preliminary Notes

The installation instructions in this section are based on the following assumptions:

● The wireless adapter hardware has already been installed in the computer in accordance with the computer manufacturer's instructions.
● The computer has not been powered on since the hardware installation was completed.
● No other wireless LAN card is installed in the computer.

To install the driver before installing hardware, use **Start > Run** and browse to the file **SetupWLD.exe** in the path **PROW2100A\WINSE-ME** on the Intel CD. After running SetupWLD.exe, shut down the computer and install the hardware. When the computer restarts, the driver will be automatically installed.

Driver Installation

To install the software in Windows* 98SE, follow these steps:

1. Power up the computer in which the wireless adapter hardware has just been installed.
2. Wait for Windows to detect the newly installed hardware and display the **Add New Hardware Wizard** dialog. Click **Next**. If Windows does not detect the new hardware, see Troubleshooting.
3. Insert the Intel CD into your CD drive.
4. On the **New Hardware Wizard** screen, select **Search for the best driver for you device (Recommended)**, and click **Next**, then select **CD drive** and click **Next**.
5. On the **Network Name** screen, click **Next** to accept the default Network Name (SSID), or enter a specific SSID for your network, then click **Next**.
6. On the **Data Encryption** screen, click **Next** to accept the default encryption setting **None**, or enter specific encryption settings for your network, then click **Next**.
7. On the **Add New Hardware Wizard** screen, click **Finish**.
8. When prompted to restart the computer, click **No**. You will restart it manually later. Proceed to the installation of Intel(R) PROSet.

Intel(R) PROSet Installation (Required)

To install the Intel(R) PROSet utility, continue with the following steps:

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of utility software. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Intel(R) PROSet installer manually using **Start > Run** and browsing to the file **PROSet.msi** in the path **APPS/PROSet/WN98SEME** on the Intel CD supplied with the product. Skip Steps 9 and 10 below and continue with **Step 11**.

9. Display the **Intel(R) PRO Network Connections** screen by removing and re-inserting the Intel CD, or by running autorun.exe from the CD. Click **Wireless Adapters**.
10. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install Software**.
11. On the **Welcome to the InstallShield Wizard for Intel(R) PROSet II** screen, click **Next**.
12. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
13. On the **Setup Type** screen, select **Typical** and then click **Next**. This is the recommended setting for a first-time installation.
14. On the **Ready to Install the Program** screen click **Install**.
15. After the software is installed on your computer, click **Finish**.
16. When prompted to restart the computer, click **Yes**.
17. To launch Intel(R) PROSet, double-click the Intel(R) PROSet icon in the system tray or follow the path **Start > Programs > Intel Network Adapters > Intel(R) PROSet**. For additional information on the program, press **F1** or click **Help** while the program is running.

Administration Tools Installation (Optional)

After restarting the computer, continue with the following steps to install the Intel(R) Wireless Administration Tools Site Survey and AP Discovery (optional):

Some versions of this product do not support the **Intel(R) PRO Network Connections** menu screen for installation of the Administration Tools. If the Intel(R) PRO Network Connections menu screen does not appear, or if it does not have a menu item for Wireless LAN Adapters, you can start the Administration Tools installer manually using **Start > Run** and browsing to the file **APAdmin.msi** in the path **APPS/PROSet/WN98SEME** on the Intel CD supplied with the product. Skip Steps 18 and 19 below and continue with **Step 20**.

18. On the **Intel(R) PRO Network Connections** screen, click **Wireless LAN Adapters**.

You can display this screen by removing and re-inserting the Intel CD, or by running autorun.exe from the CD.

19. On the **Intel PRO/Wireless LAN Adapters** menu screen, click **Install AP Admin Tools**.
20. On the **Welcome to the InstallShield Wizard for Intel(R) Wireless Administration Tools** screen, click **Next**.
21. On the **License Agreement** screen, after reading the license agreement, select **I accept the terms in the license agreement** and click **Next**.
22. On the **Setup Type** screen, verify that **Typical** is selected, then click **Next**.
23. On the **Ready to Install the Program** screen click **Install**.
24. After the software is installed on your computer, click **Finish**.
25. To launch the Wireless Administration Tools, follow the path **Start > Programs > Intel(R) PRO Wireless > Access Point Administration Tools** and select **AP Discovery** or **Site Survey**. For additional information on either program, press **F1** or click **Help** while the program is running.

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Using Wireless Profiles in Intel(R)

PROSet

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A profile is a saved group of network settings. Profiles are displayed in the Profile List in the Intel(R) PROSet General page. Profiles can be arranged in order of network connection priority. You can connect to one network using the first profile in the Profile List, then automatically connect to another network using the next profile. This allows you to stay connected while roaming freely from one wireless network to another. Although you can assign multiple profiles to a single network, you can only use one profile per connection.

Profile general settings include, the network name (SSID), channel, security settings, and TCP/IP settings. The Networks tab allows you to add, edit and delete profiles.

Creating a New Profile

To add a new profile, use the Profile Wizard sequence of dialogs to configure the profile contents. The following example uses all of the Profile Wizard dialogs. Some settings may not be required for all profiles.

To create a new profile and connect to a network:

1. Select the wireless adapter in the left-side pane.
2. From the General page, click the **Networks** tab.
3. Click the **Add** button. The General Settings dialog displays.

NOTE: *If this is the first time you have created a profile, click the profile named **Default** in the Profile List, click the **Edit** button and rename the default profile in the Profile Name field on the General page.*

Step 1 of 4: General Settings

4. Enter a profile name in the Profile Name field.

5. Enter the network SSID, in the **Network Name (SSID)** field.
6. Click the operating mode to use, **Infrastructure** or **Ad hoc**.
7. The Mandatory AP option is only used if Infrastructure mode is selected. Use this option to connect to a specific access point. Click the **Mandatory AP** button, enter the Ethernet address for the access point. Click **OK** to save the setting and return to the General Settings page.
8. Click the **Configure TCP/IP and VPN settings** checkbox to access the TCP/IP and VPN settings. If these settings are not required, leave the box unchecked, proceed to step 9.
9. Check the **Enable Auto-Import** check box to allow this profile to be imported. Refer to Automatic Profile Distribution for more information.
10. Click **Next**.

Step 2 of 4: TCP/IP and VPN Client Settings

11. Use these options to configure TCP/IP and VPN settings for a VPN profile. Click **Next** when finished.

Step 3 of 4: Security Settings

12. Select **Open** or **Shared** in the Network Authentication drop-down menu. Open, does not use any authentication method. Shared uses the WEP key as the authentication method.
13. Click the **Enable data encryption (WEP)** checkbox to configure WEP encryption settings.
14. Click the **Password protect this profile** checkbox to assign a password to the profile.
15. Click **Next**.

Step 4 of 4: Password Protection Settings

16. Click the **Password protect this profile** checkbox.
17. Enter a password in the Password field.
18. Reenter the same password in the Confirm New Password field.
19. Click the **Back** button to change or verify the settings or click **Finish** when you have completed the profile settings and return to the Networks page.
20. Click the new profile name shown in the Profile List. Use the up and down arrows to position the priority of the new profile in the priority list.
21. Click the **Advanced** button to set the network connection preferences.
22. Click the **Connect** button to connect to the network.
23. Click **OK** to close the Intel(R) PROSet dialog.

Creating a VPN Profile

To create a VPN profile:

1. Select the wireless adapter in the left-side pane.
2. From the General page, click the **Networks** tab.
3. Select the profile to add VPN settings to from the Profile List.
4. Click the **Edit** button and the General page appears.
5. Click the **Network** tab.
6. Click the **Configure** button for the TCP/IP Settings. Make sure that **Obtain an IP address automatically** and **Obtain DNS address automatically** is selected.
7. Click the **Close** button to close the dialog.
8. Click the **Configure** button for the VPN Client Settings.

9. Click **Enable VPN for this profile** checkbox.
10. Select the VPN client software from the **Available VPN Clients** drop-down menu.
11. Select the VPN profile if your VPN client software displays the VPN tunnel name.
12. Click the **Close** button to close the dialog.
13. Click **OK** on any of the pages to save all the settings and return to the Networks page.
14. Click the VPN profile name shown in the Profile List. Use the up and down arrows to position the priority of new profile in the priority list.
15. Click the **Connect** button to connect to the network. The VPN profile name displays a connect icon.
    Note: There must be an IP address assigned before the VPN client software can be launched. Click the **Details** button to verify that an IP address has been assigned.
16. Follow the on-screen instructions and enter your credentials before connecting.
17. Click **OK** to close the Intel(R) PROSet dialog.

Importing and Exporting Profiles

Note: A password protected profile can be imported and exported, however, before editing the profile, the password must be entered.

To import profiles:

1. From the General page, click the **Networks** tab.
2. Click the **Advanced** button.
3. Click the **Import/Export** button.
4. Click the **Import** button.
5. Locate the profile to import on your hard disk or enter the profile name in the File name field. The profile extension is .profile.
6. Click the **Import** to import the profile into the Profile List.
7. Click **OK** twice to return to the General page.
8. Click **OK** to close the Intel(R) PROSet dialog.

To export profiles:

1. From the General page, click the **Networks** tab.
2. Click the **Advanced** button.
3. Click the profiles to export from the export profile list.
4. Click the **Browse** button and select a directory to save the profiles in. Click **OK** to return to the previous dialog.
5. Click the **Export** button to start exporting the profiles.
6. Click **OK** twice to return to the General dialog.
7. Click **OK** to close the Intel(R) PROSet dialog.

Automatic Profile Distribution

The Enable Auto-Import feature allows a network administrator to distribute a profile automatically to computers connected to a network. The Enable Auto-Import box is located on the Profile Wizard dialogs. When the checkbox is checked the profile must be copied to a specific directory on the host computer, from there it can be distributed to multiple computers. Once the profile is received by the remote computer it will automatically be available for use from the Scan profile list. If an attempt is made to edit a distributed profile that is password protected, a password prompt will appear.

Automatically importing WLAN profiles is accomplished by monitoring the *import* folder on your hard disk for new profile files. Only profiles that have the **Enable Auto-Import** checked on the Profile Wizard dialog can be automatically imported. If a profile of the same name already exists in the Profile List, a dialog is displayed from which you can either reject the import, or accept in which case the existing profile will be replaced. All imported profiles will be placed at the bottom of the Profile List, and the profile file will be immediately deleted after the import whether the import was successful or not.

To distribute a profile to other computers on a network:

1. Select a profile to be edited from the Profile List in the Networks page, and click the **Edit** button or click the **Add** button to create a new profile using the Profile Wizard.
2. Check the **Enable Auto-Import** checkbox on the General page.
3. Click **OK** (Edit a profile) or **Finish** (Add a profile) to save the setting.
4. Copy the profile to the Programs Files/Intel/PROSet/Import directory. The profile is now ready to distribute to other computers.

Editing an Existing Profile

To edit an existing profile:

1. Select the wireless adapter in the left-side pane.
2. From the General page, click the **Networks** tab.
3. Click the **Edit** button. The General page displays.
4. Click on the **General**, **Security**, **Network** and **Password** tabs to make the necessary changes for the network profile settings:
5. Click **OK** on any of the pages to save all the settings and return to the Networks page.
6. Click the new profile name shown in the Profile List. Use the up and down arrows to position the priority of new profile in the priority list.
7. Click the **Advanced** button to set the network connection preferences.
8. Click the **Connect** button to connect to the network.
9. Click **OK** to close the Intel(R) PROSet dialog.

Deleting a Profile

To delete a profile:

1. Select the wireless adapter in the left-side pane.
2. From the General page, click the **Networks** tab.
3. Click the profile to be deleted from the Profile List.
4. Click the **Delete** button.
5. Click **Yes** to permanently delete the profile.

C

onnecting to a Network without a Profile

To connect to an available network without a profile:

1. Select the wireless adapter in the left-side pane.
2. From the General page, click the **Networks** tab.
3. Click the **Scan** button.
4. Select the network profile name with **<no profile>** shown, and click the **Connect** button.
5. Click the **No, connect me directly without creating a profile** option. Note, you can click **Yes, create a profile for this network now** to create a profile to be used later.
6. Click **OK** to connect.

Connecting to a Network if a Blank SSID displays

If the wireless adapter receives a blank network name (SSID) from a stealth access point, both the blank SSID and <no profile> display in the available networks list. To associate with a stealth access point, a new profile must first be created before connection. After connection both the blank SSID and the associated SSID can be viewed in the available networks list.

To connect to an access point that transmits a blank network name (SSID) in the Available Networks list:

1. From the General page, click the **Networks** tab.
2. Click the **Scan** button.
3. Select the network name with a blank SSID and <no profile> shown in the Available Networks list.
4. Click the **Connect** button.
5. Click the *Yes, create a profile for this network now* option.
6. The Profile Wizard dialog displays. Enter a profile name and Network Name (SSID) and security settings if required. Click **Finish** to save the profile settings and return to the Networks page.
7. Select the new profile from the profile list and click **Connect**.

Profile Connection Preferences

To access the profile connection preference option:

1. From the General page, click the **Networks** tab.
2. Click the **Advanced** button.
3. Under the **Auto-connection** heading, click the one of the following options:

- *Connect to available networks using profiles only (Default setting)*: Use the profiles in the Profile List to connect to any available network.
- *Connect to any available network if no matching profile is found*: Connect to any available network without using a profile from the Profile List.

4. Click **OK** to save the setting and return to the previous dialog.

Loading a Profile from the Task Tray

To load a profile from the Task Tray:

1. Right-click **Intel(R) PROSet** icon in the task tray.
2. Select the **Intel PRO/Wireless LAN 2100A 3B Mini PCI Adapter** or the **Intel PRO/Wireless LAN**

2100 3B Mini PCI Adapter.
3. Click **Select Profile** and select the profile to be launched.

Connecting to a Network using Intel(R)

PROSet

Connecting to a Network Automatically

The Configuration Service feature operates in background to automatically display available networks not listed in the Profile List. This method provides automatic connection in a 2.4 or 5GHz environment to available networks in the range of your wireless adapter. The Configuration Service constantly monitors your wireless adapter's connection status. If no matching profiles are found in the Profile List for a network, a dialog automatically displays the available network access points and computers (ad hoc mode) within range of the wireless adapter. The Configuration Service can also be used if there is more than one wireless adapter installed using 802.11a and 802.11b bands.

The Configuration Service features:

- The Configuration Service is launched when you log on to your computer.
- No *active* profile switching will be performed. Once the adapter is associated with the access point, if a higher priority profile becomes available, no switching will occur.
- The Configuration Service is only be available if the Intel(R) PROSet is installed.
- If a connection to an access point cannot be made using any of the profiles in the Profile List, a dialog will display the available networks.
- If there are multiple profiles listed for an available network, a dialog box will list the profiles for you to choose from.
- If an available network is detected with WEP encryption and authentication, a dialog for setting up WEP encryption displays before the connection is made.

The Configuration Service can be used in two ways:

1. Connect to available network using profiles only: In this mode the Configuration Service attempts to connect to a network access point using profiles from the Profile List only. If no matching profile is found, a dialog appears that lists the available networks. You can also close this dialog without connecting by clicking the Cancel button. The adapter will remain unassociated, and the list of available networks will NOT be displayed again unless another available network is detected. This mode is set in the Advanced Setting options.
2. Connect to any available network if no matching profile found: In this mode the Configuration Service attempts to connect to a network access point first using profiles from the Profile List. If no

matching profile is found, the Configuration Service automatically connects to any available network. This mode is set in the Advanced Setting options.

Enabling Automatic Connection

The Configuration Service also monitors for the "resume status" after a laptop computer suspend event. When this occurs, the Configuration Service will re-enable the automatic connection service.

These features can be enabled again after rebooting your computer or after a suspend and resume cycle.

Enable profile management features: Check this setting in the Advanced Settings options to manually re-enable the Configuration Service profile management features after being disabled from the notification dialog when another profile management application is detected. This option can only be used to re-enable the Configuration Service features, it cannot be used to manually disable the Configuration Service features. Refer to Profile Switching for more information.

Profile Management Options

The following Profile Management options can be found in Advanced Settings.

Display available networks when not associated: If no networks are available that match any profiles in the Profile List, the Configuration Service dialog is displayed, listing the available networks. By checking "Don't show this again" option, the dialog listing the available networks will not be displayed again, if the adapter becomes unassociated. The Configuration Service will continue to function and attempt to connect, using a profile from the Profile List, or to an available network depending on the selection mode. This mean that if Connect Using Preferred Profiles Only is selected and no matching profile is found, then the adapter will remain unassociated. You can still use the Connect button from the Networks tab to connect to an available network. The Configuration Service dialog can be re-enabled from the Advanced Settings options.

Notify when disabling profile management features: Check this box to display the service disabling notification dialog when another Profile Management service is detected such as Windows XP Zero Configuration or AAA clients. The notification dialog is displayed, indicating that another service has been detected and that some of the Intel(R) PROSet management features will be disabled. From this dialog, you can also choose "Don't show this again," in which case the Intel(R) PROSet features will automatically be disabled without notification. This dialog can be re-enabled from the Advanced Settings options.

Features affected when another profile management application is detected

For AAA Client:

Select OK, and the AAA Client application will manage the adapter. The current connection will continue with the affected Intel(R) PROSet features show below. To avoid conflicts, the Intel(R) PROSet profile management features have been temporarily disabled. To re-enable these features, first disable the other LAN utility and then either:

1. Re-enable from Intel(R) PROSet's Advanced Settings.
2. Resume after a computer suspend.
3. Reboot the computer.

For Windows XP Zero Configuration:

- Select Yes, to disable Windows XP Zero Configuration. Intel(R) PROSet will continue to manage the
  adapter.
- Select No, Windows XP will manage the adapter. The current connection will continue with the affected Intel(R) PROSet features show below. You can also prevent the dialog from being displayed again, in which case Windows XP Zero Configuration will automatically manage the wireless adapter. The notification dialog can be re-enabled from the Advanced Settings options.

Affected Intel(R) PROSet features:

- The Connect button on the Profile page is non-functioning.
- The Scan button can be used to scan for available networks, however, the Connect button is non-functioning when used to connect to an available network.
- Ad hoc mode is disabled. The Connect button in the ad hoc connect dialog is non-functioning.
- Task tray icon menu: Launching an ad hoc profile and applying a profile from the task tray menu is not available.

> **NOTE:** *If the buttons described above are used, the following message displays: "Another wireless LAN utility is communicating with the Intel(R) PRO/Wireless LAN adapter. To avoid conflicts, Intel(R) PROSet has temporarily disabled its Profile Management features."*

Scanning for Available Networks

A fast way to connect to a network is to use the **Scan** button to search for a network access point in range of your wireless adapter. When a network is found, you can instantly connect without a profile or create a new profile.

> **NOTE:** *Profiles with the Enable Auto-Import feature enabled will also be displayed in the profile list of available networks. Refer to Automatic Profile Distribution for more information.*

To scan for available networks:

1. From the General page, select the wireless adapter on the left side pane.
2. Select the **Networks** tab.
3. Click the **Scan** button.
4. The Available Networks dialog displays the names of the available networks.
5. Select the network from the list, and click the **Connect** button. Click the **Refresh** button to refresh the list of available networks.
6. To connect without creating a profile, click **No, connect me directly without creating a profile**.
7. To create a new profile using the Profile Wizard, click **Yes, create a profile for this network now**.
8. Click **OK** to connect to a network.

Connecting to a Network Using an Access Point

An infrastructure network consists of one or more access points and one or more computers with wireless adapters installed. Each access point must have a wired connection to the Local Area Network (LAN).

The following describes how to create a new profile using the Profile Wizard and connect to an access point using the Connect button. You can also connect to a network, by using the Scan button.

1. From the General page, select the wireless adapter on the left side pane.
2. Click the **Networks** tab.
3. Click the **Add** button.
4. Enter the *profile name* in the text box.
5. Enter a *network name (SSID)* in the text box.
6. Select **Infrastructure** for the operating mode.
7. Use this option to connect to a specific access point. Click the **Mandatory AP** button, enter the Ethernet address for the access point. Click **OK** to save the setting and return to the General Settings page.
8. Click the **Configure TCP/IP and VPN settings** check box and click the Next button to access the TCP/IP and VPN settings. If these settings are not required, leave the box unchecked and proceed to step 11.
9. Click the **Next** button to select the WEP security settings.
10. Click the **Password protect this profile** checkbox and click **Next** button to access the Password Protection settings. Click **Finish** after the password information has been entered. If this option is not required, leave the box unchecked and proceed to step 11.
11. Click **OK** to save the profile settings and return to the Networks page.
12. After creating the new profile, click the profile in the Profile List. Profiles using infrastructure mode are indicated by a computer icon next to the profile name.
13. Click the **Connect** button to connect to the ad hoc network.

Connecting to a Peer-to-Peer (Ad Hoc) Network

In peer-to-peer (ad hoc) mode, you can send and receive information to other computers without using an access point. Each computer in a peer-to-peer network is called a peer.

To create or join an ad hoc network, enter a personal password. Network related settings (SSID), operating mode, WEP 128-bit encryption, and IP addresses are automatically created. Once a network connection is established, after permission rights are given by other computers in the ad hoc network, you can freely share files. All wireless clients in the ad hoc network must use the same network name (SSID) and channel number. For a list of allowed 802.11b ad hoc channels, refer to the Adapter Settings for more information.

NOTE: *While scanning with an ad hoc profile set to a specific transmit channel, if an ad hoc network is found on another channel, you will be connected using the new channel. The new channel number is displayed in the Adapter Settings.*

Connect or Start an Ad Hoc Network

NOTE: *For information about connecting to an ad hoc using a profile, refer to Create an Ad Hoc Profile using the Profile Wizard.*

1. Connect using an ad hoc profile. Refer to [Creating a New Profile](#) for details. Select an ad hoc profile from the Profile List and click the **Connect** button. This method uses a pre-defined ad hoc profile created by the Profile Wizard. The ad hoc profile is displayed in the Profile List. When joining an ad hoc network, the transmit channel established by the first computer is used. This channel may be different than the one selected when the ad hoc profile was created by the Profile Wizard.

2. Join a one-time ad hoc session without a profile. Refer to *Starting an Ad Hoc (peer-to-peer) Connection* below for details. This method does not use a pre-defined profile. To connect to any ad hoc network, use the **Scan** button to scan for any ad hoc networks, enter the password (SSID), then click the **Connect** button to connect. To end the session, click the **Close** button to end the session.

Start an Ad Hoc Network

Refer to *Starting an Ad Hoc (peer-to-peer) Connection* below for details.

- This method uses your computer's SSID to establish the ad hoc network for other users to connect to.
- When you are the originator of an ad hoc network, all other users must use the channel and SSID.

Ending an Ad Hoc Session

To end an ad hoc session, click the **Close** button. After the session is ended, an attempt is made to re-connect to the last profile used from the Profile List.

Creating an Ad Hoc Profile Using the Profile Wizard

The following describes how to create a new ad hoc profile using the Profile Wizard and connect to an ad hoc network. You can also connect to a network, by using the Scan button.

1. From the General page, select the wireless adapter on the left side pane.
2. Click the Networks tab.
3. Click the **Add** button.
4. Enter the *profile name* in the text box.
5. Enter a *network name (SSID)* in the text box.
6. Select **Ad Hoc** for the operating mode.
7. Click the **Configure TCP/IP and VPN settings** check box and click the Next button to access the TCP/IP and VPN settings. If these settings are not required, leave the box unchecked and proceed to step 11.
8. Click the **Next** button to select the WEP security settings.
9. Click the **Password protect this profile** checkbox and click **Next** button to access the Password Protection settings. Click **Finish** after the password information has been entered. If this option is not required, leave the box unchecked and proceed to step 11.
10. Click **OK** to save the profile settings and return to the Networks page.
11. **Set the Transmit channel from the Adapter tab:** Channel 7 is the default transmit channel. Unless the other computers in the ad hoc network use a different channel, there is no need to

change the default channel. Click the **Adapter** tab, and click the **Configure** button under Ad Hoc Channel Selection. Choose the operating band select a channel. Click **OK** to save the setting.

12. Select the **Networks** tab
13. After creating the new profile, click the profile in the Profile List. Profiles using infrastructure mode are indicated by a computer icon next to the profile name.
14. Click the **Connect** button to connect to the ad hoc network.

Starting an Ad Hoc (peer-to-peer) Connection

To communicate properly, all computers/peers on an ad hoc network must have Intel wireless adapters installed. To connect to an ad hoc network for a one-time session:

1. From the General page, select the wireless adapter on the left side pane.
2. Click the **Networks** tab.
3. Click the **Start** button.
4. Enter the password (SSID) for your computer in the text box. If you establish the ad hoc network, then this SSID and assigned transmit channel must be used by other users to connect to the ad hoc network. The entered SSID can also be the same as the other users in the established ad hoc network, in this case your computer will join the ad hoc network.
5. To join the ad hoc network, select the peer name from the displayed list of computers in the ad hoc network and click the Connect button
6. To establish an ad hoc network, after your computer's SSID is entered, click the Connect button to scan for other users in the ad hoc network
7. Under **Send Files**, files can be sent to another computer in the ad hoc network. To send a file, click the **Send File** button. Locate the file you want to sent, and click **Send**.
8. Click the **Close** button to end the ad hoc session.

Disconnecting from a Network

To disconnect from a network, turn the radio to OFF from the General page in Intel(R) PROSet**.**

Switching the Adapter Off and On

The wireless adapter can be switched off and on from the optional hardware radio switch on your laptop computer, Intel(R) PROSet application, and the Windows operating system.

Note: When your laptop is switched on, the radio is constantly transmitting signals. In certain situations, such as in a plane, signals from the radio may cause interference. Use the following methods if you need to disable the radio and use your laptop without emitting radio signals.

Using the optional hardware radio on/off switch

If your laptop computer has an optional external hardware switch installed, it can be used to switch the radio on or off. Refer to the laptop manufacturer for more information about this switch. If you have Intel(R) PROSet installed, the current state of the radio is displayed on the General page.

Using Intel(R) PROSet to switch the radio on/off

From Intel(R) PROSet, the radio can be switched on or off from the General page. The current state of the radio is displayed, which also includes the state of the optional hardware radio switch.

Hardware radio switch On/Off

Depending on the current state of the external optional hardware switch, displays on or off on the General page.

Switching the radio On/Off

Note: When your laptop is switched on, the radio is constantly transmitting signals. In certain situations, such as in a plane, signals from the radio may cause interference.

To switch the radio OFF: From the General page, click the Off button. next to Switch Radio On/Off.

- The wireless adapter is not associated with the network when the radio is off.
- Intel(R) PROSet can be used to edit or add profile contents when the radio is off.

To switch the radio ON: From the General page, click the On button, next to Switch Radio On/Off.

When the radio is on, an attempt will be made to associate with the network access point using the last profile. If the adapter cannot connect to the access point, the Configuration Service will attempt to find an available network. Refer to Configuration Service for more information.

Switching the radio on or off from the Task Tray Icon

Right-click on the Intel(R) PROSet task tray icon and click Switch radio Off.

Using the Windows operating system to switch the radio on/off

The radio can be switched on or off via the Windows operating system from the Device Properties dialog.

Switching Between Wired and Wireless Adapters

Adapter switching enables your computer to automatically switch between wired and the wireless adapter, so your laptop computer can maintain the best possible connection to the network while moving from one location to another. When Adapter Switching is enabled, DHCP is disabled on all other wired adapters except for the adapter currently being used. However, connection is possible using another wired adapter using an auto IP address setting.

Adapter switching switches between wired and wireless adapters for the following Intel PRO adapters:

- Wired LAN adapters. This type of adapter connects to a network through an Ethernet network cable. Adapter Switching supports adapters in the PRO/100 family, including the PRO/100 Mobile Adapters.
- Intel PRO/Wireless LAN 2100A 3B Mini PCI adapter and the Intel PRO/Wireless LAN 2100 3B Mini PCI adapter. These adapter send data to and from the network through the adapter's antenna.

By default, adapter switching uses the wired Ethernet adapter when both wired and wireless adapters are present and working. If you detach the wired adapter, adapter switching automatically switches to the wireless adapter. When you attach an Ethernet cable again, adapter switching automatically switches back to the wired

Ethernet connection.

You can change your wireless preferences from the Advanced Settings dialog and prioritize your wireless and wired adapters from the Adapter Switching dialog.

You can also install multiple wired adapters, or install two wireless adapters if the network supports both 802.11a and 802.11b wireless standards. Then when you detach the wired adapter, your computer uses the wireless adapter that gives the best data rate.

Wireless Preferences

One or more wired adapter and one or two wireless adapter can be installed in the same computer. Using the adapter switching feature, you can select your priority for a specific type of adapter, wired or wireless.

If adapter switching is enabled, the installed adapters are selected from a preference list. To access the network preferences:

1. From the General page, select the wireless adapter on the left side pane.
2. Click the Networks tab.
3. Click the **Advanced** button.
4. Select your preferences from the options shown.
5. Click **OK** to save the settings and return to the Profiles dialog.

Adapter Switching Considerations

Consider the following issues when switching adapters:

● Adapter switching requires the use of DHCP. It cannot be used with fixed IP addressing.
● Only Intel wired and wireless adapters are supported when using the Start button to connect to an ad hoc network.
● Adapter switching cannot be used on a Virtual Private Network (VPN).
● Adapter switching should not be applied while an active data transfer is in progress.
● Intel(R) PROSet determines how many wireless adapters are present in the computer.
● Intel(R) PROSet supports simultaneous wireless adapter operation for the following:
   ❍ 2.4 GHz and 5 GHz installed adapters: Supports simultaneous operation in either ad hoc or infrastructure mode.
   ❍ 2.4 GHz and 2.4 GHz installed adapters: Supports simultaneous operation where one adapter is in ad hoc mode and the other adapter is in infrastructure mode. Simultaneous operation with both adapters in infrastructure or ad hoc mode is not be supported.
   ❍ The second adapter added is not supported.
   ❍ 5 GHz and 5 GHz installed adapters: Supports simultaneous operation where one adapter is in ad hoc mode and the other adapter is in infrastructure mode. Simultaneous operation with both adapters in infrastructure mode or ad hoc is not supported.
   ❍ The second adapter added is not supported.
   ❍ Maximum of four adapters is supported.

Switching Between 2.4 and 5 GHz Bands

Intel(R) PROSet supports switching between 802.11a (5 GHz) and 802.11b (2.4 GHz) bands. Using the

Advanced Settings options, you can define band priorities.

Changing the Settings for Adapter Switching

If you have two adapters installed, you can define the adapter to be used first. Adapter priorities can be set in the Adapter Switching dialog.

To change the adapter switching settings:

1. From the General page, select the wireless adapter on the left side pane.
2. Click the **Adapter Switching** icon on the left side pane.
3. Click the Adapter Switching checkbox under the Settings heading.
4. Prioritize adapters in the lower adapter display list.
   Select an adapter in the Adapter Type list and use the up/down arrows on the left side of the dialog to arrange the adapters in priority. The adapter in the highest position is used first.
5. Click the adapter name that you want to use in the upper display list. The current adapter link status displays next to the adapter name.

NOTE: *One wireless adapter can be used for each band operating at a time.*

6. After you have switched to the desired adapter, click **OK** to close the Adapter Switching dialog and return to the General tab.

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Security Overview

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Wireless Security

Since wireless networking devices transmit information through radio waves, it is imperative that you protect your information by configuring your security settings. There are three main components that, when used together, can protect your wireless network:

- Service Set Identifier (SSID) — The name of a device on a network, the SSID is the first level of security, but it is not fool-proof because the access points broadcast the SSIDs across a wireless network. This level of security is okay if you are on a peer-to-peer network without any access points, but for larger networks, more complex security measures should be put in place.
- Wired Equivalent Privacy (WEP) — Supported by the IEEE 802.11 standard, WEP uses 64- or 128-bit encryption keys to encrypt data as it is sent or received by each client on a wireless network. The way these keys are authenticated determines the level of security on your wireless network. Using the default keys, however, makes your wireless network vulnerable and you should not use them.
- Authentication Server — An authentication server works with each client to authenticate access with a session-specific WEP key. This type of server protects sensitive user and password information from intruders.

Security Guidelines

The following can help to achieve maximum security for your wireless network:

1. Enable WEP on your wireless network and change the WEP key daily or weekly.
2. Protect your drives and folders with passwords.
3. Change the default SSID.
4. Change the WEP key with each session, if possible.
5. Enable MAC address filtering, if possible.
6. Implement a Virtual Private Network (VPN) system to increase security. A VPN client is included in most operating systems.

Protecting Your Network

-

● [Virtual Private Networks](#)

Authentication Types

The IEEE 802.1x standard provides a general authentication framework for 802 LANs and specifies an extensible authentication protocol (EAP) to enable LAN transport for many different types of authentication protocols.

Encryption Keys

To protect client traffic, the 802.11 standard defines Wireless Encryption Privacy (WEP) with fixed encryption keys (and three optional key lengths). The use of fixed keys has made it easy to mount several types of attack against WEP.

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 64-bit key (sometimes referred to as 40-bit) 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.

Refer to [Setting up WEP Encryption](#) for more information.

802.1x

A WAN client initiates an authorization request to the access point, which authenticates the client to an Extensible Authentication Protocol (EAP) compliant RADIUS server. This RADIUS server may authenticate either the user (via passwords) or the machine (by MAC address).

IPSEC

Software based IPSEC transport security.

TKIP (Temporal key Integrity Protocol)

Uses an encryption method called fast-packet rekeying, that changes the encryption keys frequency.

Virtual Private Networks (VPN)

The following VPN client software is supported by PROSet. Refer to [Virtual Private Network (VPN)](#) for more information.

● Netstructure VPN (SST)
● Netstructure VPN (IPsec-IKE)
● Cisco 3000 VPN

- Checkpoint VPN (Non office transparent mode, connect office mode and connect non-office mode)
- Microsoftt VPN (L2TP over IPsec transport, L2TP for configuration with ESP-in-UDP)

802.11a and 802.11b can be augmented with VPN security to protect TCP/IP based services.

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Setting Up WEP Encryption and Authentication

Wired Equivalent Privacy (WEP) encryption and shared authentication provides protect for your data on the network. WEP uses an encryption key to encrypt data before transmitting it. Only computers using the same encryption key can access the network or decrypt the encrypted data transmitted by other computers.

Authentication provides an additional validation process from the adapter to the access point.

Supported authentication schemes are Open and Shared-Key authentication:

- Shared-Key authentication is supported using 64-bit and 128-bit WEP encryption keys.
- Open mode does not use an encryption authentication method to associate to a specific access point.

Encryption Overview

Security in the WLAN can be achieved by enabling data encryption using WEP (Wireless Encryption Protocol). You can choose a 64 or 128 bit level encryption. Also, the data can then be encrypted with a key. Another parameter called the key index is provides the option to create multiple keys for that profile. However, only one key can be used at a time. You can also choose to password protect the profile to ensure privacy.

The pass phrase is used to generate a WEP key automatically. You have the option of either using a pass phrase or entering a WEP key manually. Using 64-bit encryption, the pass phrase is 5 characters long and you can choose to enter any arbitrary and easy to remember phrase like Acme1 or enter 10 Hexadecimal numbers for the WEP key corresponding to the network the user wants to connect to. For 128-bit encryption, the pass phrase is 13 characters long or you can enter a 26 hexadecimal numbers for the WEP key to get connected to the appropriate network.

Note: You must use the same encryption type, key index number, and WEP key as other devices on your wireless network. Also, if 802.1x authentication is being used, WEP encryption must be disabled.

To enable 64-bit (40-bit) or 128-bit encryption with authentication:

1. Select the wireless adapter in the left-side pane.
2. From the General page, click the **Networks** tab.
3. Select the profile from the Profile List and click the **Edit** button or click the **Add** button if you are using the Profile Wizard.
4. Click the **Security** tab. Select **Security Settings**, the third dialog if using the Profile Wizard.
5. Select **Shared** from the *Network Authentication* drop-down box.
6. Select **64-bit** or **128-bit** from the *Encryption Level* drop-down box.
7. Select a key index number **1, 2, 3, or 4** from the Encrypt data with key index drop-down box to use for encryption. Key selection corresponds to the WEP encryption pass phrase or WEP key.
8. Select either of the following:

   - **Pass phrase**: Click **Use Pass Phrase** to enable it. Enter a text phrase, up to **five (using 64-bit)** or **13 (using 128-bit)** alphanumeric characters (0-9, a-z or A-Z), in the pass phrase field.
   - **WEP key:** Click **Use WEP Keys** to enable it. Enter up to **ten (using 64-bit)** alphanumeric characters, 0-9, A-F, or **twenty-six (using 128-bit)** alphanumeric characters, 0-9, A-F in the WEP key field.

9. Click **OK** if editing a profile or **Finish** if in the Profile Wizard to save the settings.

NOTE: *You must use the same encryption type, index number, and WEP key as other devices on your wireless network.*

Virtual Private Networks and Encryption

A Virtual Private Network (VPN) allows remote users who belong to a private network (Intel network) to communicate freely and securely through a public network, such as the Internet. Many companies, including Intel, now use hardware and software VPN solutions that employees with high-speed Internet connections use to establish a secure tunnel between home and the corporate network.

A VPN client application connects a remote user to the WLAN providing a secure access to the private network as if you were an on-site user. As a remote user, a connection (low speed or high speed) to the Internet is first established. Then the VPN client application is used to establish a secure connection called a tunnel between the remote computer and the private network.

A VPN client support the following technologies to connect to the internet:

- POTS (Plain Old Telephone Service) – Uses a dial-up modem to connect.
- ISDN (Integrated Services Digital Network) – Uses a dial-up modem to connect.
- Cable – Uses a cable modem and is always connected.
- DSL – Uses DSL Modem and is always connected.
- LAN connection – Uses a direct LAN connection to the Internet.
- Wireless LAN connection – Uses a wireless LAN connection that is connected to the internet via an access point.

There are two ways to create a VPN connection: By dialing an ISP, or by connecting directly to the Internet.

Dialing an ISP: The VPN connection first makes a call to an ISP. After the connection is established, the connection then makes another call to the remote access server that establishes the PPTP or L2TP tunnel. After authentication, access to corporate network is granted.

Connect directly to the Internet: Connecting directly to the Internet means direct IP access without going through an ISP. A user who is already connected to the Internet uses a VPN connection to dial the number for the remote access server. After authentication, the user can access the corporate network, achieving the same functionality as the preceding example.

If you have an active Winsock Proxy client, you cannot create a VPN. A Winsock Proxy client immediately redirects data to a configured proxy server before the data can be processed in the fashion required by a VPN. To establish a VPN, disable the Winsock Proxy client.

VPN Network Protocol Support

Because virtual private networks (VPNs) support the most common network protocols, it is easy for clients on Ethernet, TCP/IP, and IPX networks to use VPNs. The IPX/SPX protocol is not available on Windows XP 64-Bit Edition.

VPN Administration

To tighten security measures a system administrator can configure remote access dial-in settings to define a group profile such that all users who are assigned to that profile are required to authenticate by using the Extensible Authentication Protocol (EAP) and encrypt their data by using strong (128-bit) data encryption. By assigning a user to the group profile, these security measures are automatically required when anyone in that group profile connects to the remote access server. You should configure your VPN connection to match the policies set by your network administrator.

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Specifications

- **Intel(R) PRO/Wireless LAN 2100A 3B Mini PCI Adapter Model WM3B2100A**
- **Intel(R) PRO/Wireless LAN 2100 3B Mini PCI Adapter Model WM3B2100**

Physical Characteristics

Form Factor	Mini PCI Type 3B (model WM3B2100A and WM3B2100)
Dimensions (HxWxD)	Type 3B card: 2.34 in x 1.75 in x 0.20 in (59.45 mm x 44.45 mm x 5 mm)
Weight	0.6 oz (17 g)
Antenna Interface Connector	Hirose U.FL-R-SMT mates with cable connector U.FL-LP-066
Dual Diversity Antenna	On-board dual diversity switching
Connector Interface	124-pin SO-DIMM edge connector
Operating Temperature	0 to +70 degrees Celsius
Humidity	50 to 85% non-condensing

Frequency Modulation	**5 GHz (802.11a)**	**2.4 GHz (802.11b)**
Frequency band	5.15 GHz to 5.85 GHz	2.4 GHz to 2.497 GHz
Modulation	BPSK, QPSK, 16 QAM, 64 QAM	CCK, DQPSK, DBPSK
Wireless Medium	5 GHz UNII: Orthogonal Frequency Division Multiplexing (OFDM)	2.4 GHz ISM: Direct Sequence Spread Spectrum (DSSS)
Channels	4 to 12 non-overlapping, dependent on country	Full 14 channel support

Data Rates	54, 48, 36, 24, 18, 12, 9, 6 Mbps	11, 5.5, 2, 1 Mbps
Indoor Range	40 ft (12m) @ 54 Mbps / 300 ft (91 m) @ 6 Mbps	100 ft (30 m) @ 11 Mbps / 300 ft (90 m) @ 1 Mbps
Outdoor Range	100 ft (30 m) @ 54 Mbps / 1000 ft (305 m) @ 6 Mbps	400 ft (120 m) @ 11 Mbps / 1500 ft (460 m) @ 1 Mbps

Power

Transmit Output Power	14 dBm (typical)	16 dBm (typical)
Adapter Power Consumption		
Transmit	1.7 W	1.6 W
Receive	1.3 W	1.0 W
Standby	135 mW	135 mW
Sleep	45 mW	45 mW
Voltage	3.3 V	3.3 V

Operating Systems	Windows* XP, 2000, 98, 98SE, Me, NT 4.0	Windows* XP, 2000, 98, 98SE, Me, NT 4.0
WECA	WiFi certification for 802.11a and 802.11b	WiFi certification for 802.11b
WHQL	Yes	Yes

WLAN Standard	IEEE 802.11a and IEEE 802.11b
Architecture	Infrastructure or ad hoc (peer-to-peer)
Roaming	802.11a and 802.11b compliant for seamless roaming between respective access points (802.11a, 802.11b, dual-band 802.11a/11b)
Security	LEAP, TKIP, 802.1x, EAP-TLS, 128-bit and 64-bit WEP

Product Safety	UL, C-UL, CB (IEC 60590)

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Glossary

Numerical

802.11 x: A series of IEEE specifications for LANs: currently 802.11b, 802.11a, and 802.11g. Using any one of these extensions to the 802.11 standard permits wireless communication between a client and an access point or between two clients. The various specifications govern transmission speeds and radio frequencies as well as fall-back rates and other characteristics. The upcoming standard 802.11i will provide additional security specific to WLANs, and 802.11e will address quality of service.

A

Access Point: A device that serves as a communications hub for wireless clients and provides a connection to a wired LAN.

Advanced Encryption Standard (AES): A federal information-processing standard, supporting 128-, 192-, and 256-bit keys.

B

Basic Service Set Identifier (BSSID): A unique identifier for each wireless client on a wireless network. The BSSID is the Ethernet MAC address of each adapter on the network.

Bit Rate: The total number of bits (ones and zeros) per second that a network connection can support. Note that this bit rate will vary, under software control, with different signal path conditions.

Bluetooth: An incompatible, very short-range lower speed communications system (PAN), developed first in Europe as a "cable replacement" for printers and similar peripheral connections. Its usage has expanded to include cordless earphones and similar devices. It uses the 2.4 GHz ISM band, and "co-exists" with 802.11b. Here the term, "co-exist" means that not all researchers agree on the amount of mutual interference generated when both systems operate in the same location.

Broadcast SSID: Used to allow an access point to respond to clients on a wireless network by sending probes.

D

Data Rate (Information Rate): Not all bits carry user information. Each group (packet) of bits contains headers, trailers, echo control, destination information, and other data required by the transmission protocol. It is important to understand the difference between bit rate and data rate, since the overhead information may consume more than 40% of the total transmission. This difference is common to many such data systems,

including Ethernet.

Direct-Sequence Spread Spectrum (DSSS) and Frequency-Hop Spread Spectrum (FHSS): Two incompatible technologies used in radio transmission.

E

Extensible Authentication Protocol (EAP): An authentication protocol that supports multiple authentication methods, such as Kerberos, passwords, or smart cards. Cisco's authentication protocol, LEAP, is based on EAP, an extension to PPP (Point-to-Point Protocol).

Encryption: Scrambling data so that only the authorized recipient can read it. Usually a key is needed to decrypt the data.

Extended Service Set IDentifier (ESSID): A type of unique identifier applied to both the AP and the wireless PC Card that is attached to each packet. This allows the AP to recognize each wireless client and its traffic.

F

Frequencies: Strike a piano key and you generate a tone. Pick up the tone with a microphone and your tone turns in to a "vibrating" or "cycling" electronic signal. The rate of vibration depends on the key struck. In electronics we refer to this rate of vibration as the number of "cycles per second." The formal term for this value is Hertz. As we move up in rate, such as in the Broadcast Band, we can use Kilohertz (KHz) to represent 1,000 Hz, or Megahertz (MHz) to represent 1,000,000 Hz. Continuing much further upward, we finally reach 1,000,000,000 Hz, which we can fortunately shorten to a Gigahertz (GHz). These frequencies are the home of both 802.11a (5 GHz) and 802.11b (2.4 GHz).

I

Independent Basic Service Set Identifier (IBSSID): Used to identify a wireless network configured to allow each wireless client to communicate directly with each other without an access point.

Independent Network: A network that provides (usually temporarily) peer-to-peer connectivity without relying on a complete network infrastructure.

Infrastructure Mode: A wireless network centered around an access point. In this environment, the access point not only provides communication with the wired network but also mediates wireless network traffic in the immediate neighborhood.

Institute of Electrical and Electronics Engineers (IEEE): An organization involved in setting computing and communications standards.

ISM Bands: A series of frequency bands, set aside by the FCC for Industrial, Scientific and Medical applications. Users of these bands operate equipment on a shared basis, meaning that they must expect, and accept interference from other legal users. Products manufactured for ISM Band use must be approved by the FCC, but the user does not have to be licensed. In addition to WLAN, ISM bands support cordless phones, microwave ovens, baby monitors, toys, ham radio transceivers, and other wireless services.

K

Kerberos: An authentication system enabling protected communication over an open network using a unique key called a ticket.

M

Media Access Control (MAC) Address: A hardwired address applied at the factory. It uniquely identifies network hardware, such as a wireless PC Card, on a LAN or WAN.

Microcell: A bounded physical space in which a number of wireless devices can communicate. Because it is possible to have overlapping cells as well as isolated cells, the boundaries of the cell are established by some rule or convention.

Microwave: Technically, the term describes any frequency above 1.0 GHz. Unfortunately the advertising industry has contorted this meaning considerably. In our discussion we will stick to the technical definition.

Multipath: The signal variation caused when radio signals take multiple paths from transmitter to receiver.

O

Orthogonal Frequency Division Multiplexing (OFDM): A modulation technique for transmitting large amounts of digital data over radio waves. 802.11a uses OFDM, as will 802.11g.

P

Peer-to-Peer Mode: A wireless network structure that allows wireless clients to communicate with each other without using an access point.

Personal Area Network (PAN): A personal area network, or PAN, is a networking scheme that enables computing devices such as PCs, laptop computers, handheld personal computers, printers and personal digital assistants (PDAs) to communicate with each other over short distances either with or without wires.

Preamble: A preliminary signal transmitted over a WLAN to control signal detection and clock synchronization.

R

Radio Frequency (RF) Terms (GHz, MHz, Hz): The international unit for measuring frequency is Hertz (Hz), which is equivalent to the older unit of cycles per second. One Mega-Hertz (MHz) is one million Hertz. One Giga-Hertz (GHz) is one billion Hertz. For reference: the standard US electrical power frequency is 60 Hz, the AM broadcast radio frequency band is 0.55 -1.6 MHz, the FM broadcast radio frequency band is 88-108 MHz, and microwave ovens typically operate at 2.45 GHz.

Range: The distance over which a given system can communicate. This subject is discussed in detail below.

RC4: An encryption algorithm designed at RSA Laboratories; specifically, a stream cipher of pseudo-random bytes that is used in WEP encryption.

Remote Authentication Dial-In User Service (RAID): An authentication and accounting system that verifies users' credentials and grants access to requested resources.

Roaming: Movement of a wireless node between two microcells. Roaming usually occurs in infrastructure networks built around multiple access points.

S

Service Set Identifier (SSID): Used to identify clients on a wireless network.

Shared key An encryption key known only to the receiver and sender of data.

Site Survey: A process where you set up one transceiver in a fixed location, and then use another unit to plot the field strength of the first unit's transmitted signal. By moving the transmitter around, and repeating the plots, you can develop a plan as to the best locations for access points. You will also identify dead zones and other areas in need of special attention. This can be a long, slow process, but it beats ripping up an unsatisfactory installation and starting over. These tests require special software commands. Refer to your manual for specific instructions. If you have a very large, or unusually complex installation situation, you might want to consider calling in professionals to do your survey. We are not permitted to suggest installer names, but you can check your yellow pages or similar sources for likely candidates.

T

Transceiver: A commonly used term that describes a combination transmitter and receiver. Both 802.11a and 802.11b devices would be properly described as data transceivers.

U

UNII Bands: Unlicensed National Information Infrastructure. In contrast to the ISM bands, these are a group of frequency bands set aside by the FCC for WLAN type communications only. Users must accept interference from other legal WLAN users, but the other sources of interference problems are, or legally should be, missing.

W

WECA: The Wireless Ethernet Compatibility Alliance...

WEP64 and WEP128: Wired Equivalent Privacy, 64 bit and 128 bit (64 bit is sometimes referred to as 40 bit). This is a low-level encryption technique designed to give the user about the same amount of privacy that he would expect from a LAN. It is extremely important to understand that WEP is not some CIA-proof supercode! It performs as intended, giving the user a simple level of data security and protection from casual electronic eavesdropping. Use of the 128 bit option at all possible times is recommended. Remember that 802.11 devices transmit (broadcast) in all directions, and that it is possible, with very complex software, to copy and

decode WEP transmissions. The task is not trivial, but it is possible. If your data is extremely sensitive, you should consider some form of secondary protection, such as strong passwords and an additional level of encryption. Suitable software packages are available from reputable suppliers. Although not intended by the original architects, WEP also prevents unauthorized access to your system by an outsider. Hackers have been known to access systems from outside a building, and to then to access the Web for a leisurely session, all at the system owner's expense.

Wide Area Network (WAN): A wide area network (WAN) is a voice, data, or video network that provides connections from one or more computers or networks within a business to one or more computers or networks that are external to such business.

Wireless: A microwave transceiver system.

Wireless LAN (WLAN): Wireless LAN is a type of local-area network that uses high-frequency radio waves rather than wires to communicate between nodes. WLAN is a flexible data communication system used as an alternative to, or an extension of a wired LAN.

Wireless Node: A user computer with a wireless network interface card (adapter).

Customer Support

Intel support is available online or by telephone. Available services include the most up-to-date product information, installation instructions about specific products, and troubleshooting tips.

Online Support

Technical Support: http://support.intel.com

Network Product Support: http://www.intel.com/network

Corporate Web Site: http://www.intel.com

Intel

(R) PRO/Wireless LAN Products
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Intel(R) PRO/Wireless LAN 2100 Products
Safety and Regulatory Notices

This document contains general safety and regulatory notices applicable to the following product. Detailed regulatory information is supplied as part of the user information for each product.

- Intel(R) PRO/Wireless LAN 2100A 3B Mini PCI Adapter (model WM3B2100A)
- Intel(R) PRO/Wireless LAN 2100 3B Mini PCI Adapter (model WM3B2100)

  - Safety Notices
  - Local Restrictions on 802.11a and 802.11b Radio Usage

This device is intended for OEM integrators only.
This device cannot be co-located with any other transmitter.

Information for the OEM Integrators:
Please refer to the full Grant of equipment document for other restrictions.

FCC Radio Frequency Interference Requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for the frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems. High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and /or damage this device.

Safety Notices

The FCC with its action in ET Docket 93-62 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. The Intel PRO/Wireless LAN 2100 products meet the Human Exposure limits found in OET Bulletin 65, 2001, and ANSI/IEEE C95.1, 1992. Proper operation of this radio according to the instructions found in this manual will result in exposure substantially below the FCC's recommended limits.

The following safety precautions should be observed:

- Do not touch or move antenna while the 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 the radio or attempt to transmit data unless the antenna is connected; if not, the radio may be damaged.
● Use in specific environments:
  ❍ The use of wireless devices in hazardous locations is limited by the constraints posed by the safety directors of such environments.
  ❍ The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA).
  ❍ The use of wireless devices in hospitals is restricted to the limits set forth by each hospital.
● Antenna use:
  ❍ In order to comply with FCC RF exposure limits, low gain integrated antennas should be located at a minimum distance of 20 cm (8 inches) or more from the body of all persons.
  ❍ High-gain, wall-mount, or mast-mount antennas are designed to be professionally installed and should be located at a minimum distance of 30 cm (12 inches) or more from the body of all persons. Please contact your professional installer, VAR, or antenna manufacturer for proper installation requirements.
● Explosive Device Proximity Warning (see below)
● Antenna Warning (see below)
● Use on Aircraft Caution (see below)
● Other Wireless Devices (see below)
● Power Supply (Access Point) (see below)

Explosive Device Proximity Warning

 Warning: Do not operate a portable transmitter (such as a wireless network device) near unshielded blasting caps or in an explosive environment unless the device has been modified to be qualified for such use.

Antenna Warnings

 Warning: To comply with the FCC and ANSI C95.1 RF exposure limits, it is recommended for the Intel(R) PRO/Wireless LAN 2100A 3B Mini PCI Adapter installed in a desktop or portable computer, that the antenna for this device be installed so as to provide a separation distance of al least 20 cm (8 inches) from all persons and that the antenna must not be co-located or operating in conjunction with any other antenna or radio transmitter. It is recommended that the user limit exposure time if the antenna is positioned closer than 20 cm (8 inches).

 Warning: Intel(R) PRO/Wireless 2100 Network Connection products are not designed for use with high-gain directional antennas. Use of such antennas with these products is illegal.

Use On Aircraft Caution

 Caution: Regulations of the FCC and FAA prohibit airborne operation of radio-frequency wireless devices because their signals could interfere with critical aircraft instruments.

Other Wireless Devices

Safety Notices for Other Devices in the Wireless Network: Refer to the documentation supplied with wireless Ethernet adapters or other devices in the wireless network.

Safety Notice, Underwriters Laboratories: For use with UL-Listed Personal Computers or UL-Listed similar equipment.

Local Restrictions on 802.11a and 802.11b Radio Usage

Caution: Due to the fact that the frequencies used by 802.11a and 802.11b wireless LAN devices may not yet be harmonized in all countries, 802.11a and 802.11b products are designed for use only in specific countries, and are not allowed to be operated in countries other than those of designated use. As a user of these products, you are responsible for ensuring that the products are used only in the countries for which they were intended and for verifying that they are configured with the correct selection of frequency and channel for the country of use. Any deviation from the permissible settings for the country of use is an infringement of national law and may be punished as such.

For country-specific information, see the additional compliance information supplied with the product.

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Limited Lifetime Hardware Warranty

Intel warrants to the original owner that the adapter product delivered in this package will be free from defects in material and workmanship. This warranty does not cover the adapter product if it is damaged in the process of being installed or improperly used.

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

This warranty does not cover replacement of adapter products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation, or improper testing. If the adapter product is found to be defective, Intel, at its option, will replace or repair the hardware product at no charge except as set forth below, or refund your purchase price provided that you deliver the adapter product along with a Return Material Authorization (RMA) number (see below), along with proof of purchase (if not registered), either to the dealer from whom you purchased it or to Intel with an explanation of any deficiency. If you ship the adapter 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 adapter product with either new or reconditioned parts, and any adapter product, or part thereof replaced by Intel becomes Intel's property. Repaired or replaced adapter products will be returned to you at the same revision level as received or higher, at Intel's option. Intel reserves the right to replace discontinued adapter products with an equivalent current generation adapter product.

Returning a Defective Product

From North America:

Before returning any adapter product, contact Intel Customer Support and obtain a Return Material Authorization (RMA) number by calling +1 916-377-7000.

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

All other locations:

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

Intel Adapter Money-back Guarantee (North America Only)

Intel wants you to be completely satisfied with the Intel adapter product that you have purchased. Any time within ninety (90) days of purchase, you may return your Intel adapter to the original place of purchase for a full refund of the purchase price from your dealer. Resellers and distributors, respectively, accepting returns

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