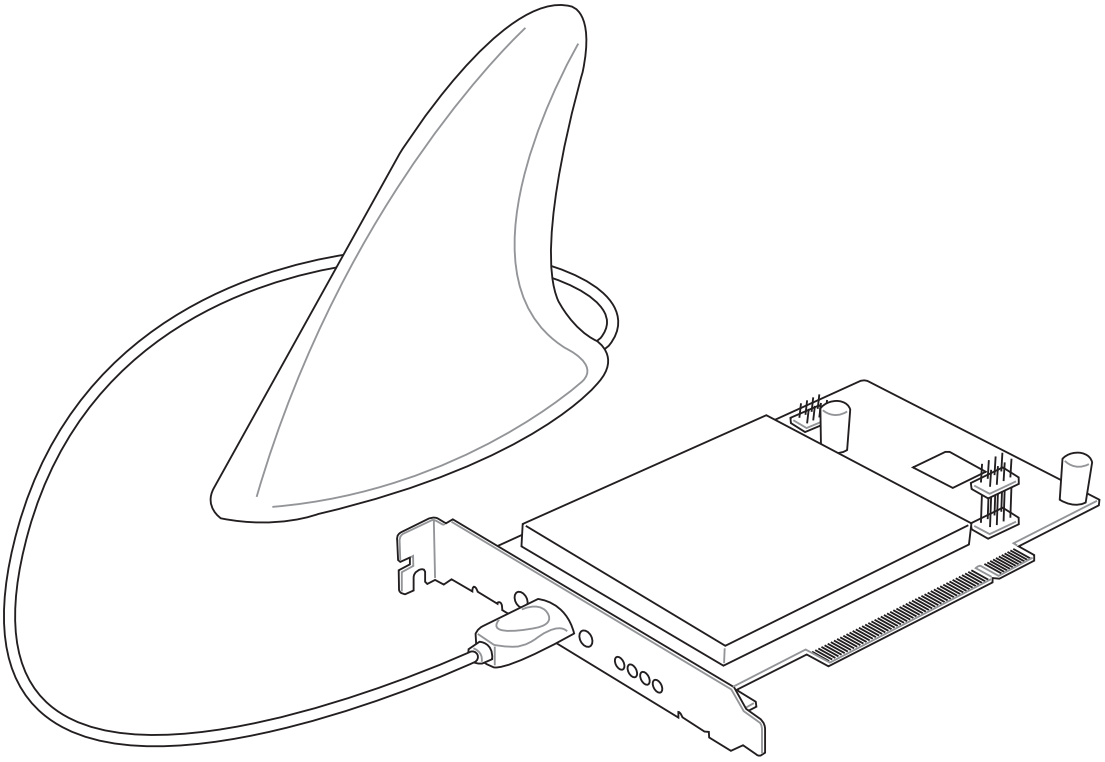
SpaceLink™ B&W PCI Card

WL230

User's Manual



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ASUSTeK COMPUTER INC. (Asia-Pacific)

Address: 150 Li-Te Road, Peitou, Taipei, Taiwan 112
General Tel: +886-2-2894-3447
General Fax: +886-2-2894-3449
General Email: info@asus.com.tw

Technical Support

MB/Others (Tel): +886-2-2890-7121 (English)
Notebook (Tel): +886-2-2890-7122 (English)
Desktop/Server: +886-2-2890-7123 (English)
Support Fax: +886-2-2890-7698
Support Email: tsd@asus.com.tw
Web Site: www.asus.com.tw
Newsgroup: cscnews.asus.com.tw

ASUS COMPUTER INTERNATIONAL (America)

Address: 6737 Mowry Avenue, Mowry Business Center,
Building 2, Newark, CA 94560, USA
General Fax: +1-510-608-4555
General Email: tmd1@asus.com

Technical Support

Support Fax: +1-510-608-4555
General Support: +1-502-933-8713
Web Site: www.asus.com
Support Email: tsd@asus.com

ASUS COMPUTER GmbH (Germany & Austria)

Address: Harkortstr. 25, 40880 Ratingen, BRD, Germany
General Fax: +49-2102-442066
General Email: sales@asuscom.de (for marketing requests only)

Technical Support

Support Hotline: MB/Others: +49-2102-9599-0
Notebook (Tel): +49-2102-9599-10
Support Fax: +49-2102-9599-11
Support (Email): www.asuscom.de/de/support (for online support)
Web Site: www.asuscom.de

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1. Introduction

Overview

Thank you for purchasing the ASUS SpaceLink B&W PCI Card. The ASUS SpaceLink B&W PCI Card is a PCI compliant "wireless" network interface card (NIC) for any computer equipped with a PCI slot. For Bluetooth support, you must also have an ASUS motherboard equipped with a Blue Magic PCI slot or any motherboard with a USB 2.0 header. The Blue Magic PCI slot has USB 2.0 built into the slot.

ASUS SpaceLink B&W PCI Card is designed to be fully compliant with both the IEEE 802.11b and IEE802.11a wireless local area network (Wireless LAN) standards as well as Bluetooth for interconnecting personal devices. As a result of the completion of the standard, the interoperability of Wireless LAN products among multiple manufacturers will be guaranteed. The ASUS SpaceLink B&W PCI Card product provides high-speed, standards-based Wireless LAN solutions. The ASUS SpaceLink B&W PCI Card can auto-switch between 802.11b and 802.11a networks, while maintaining Bluetooth connectivity.

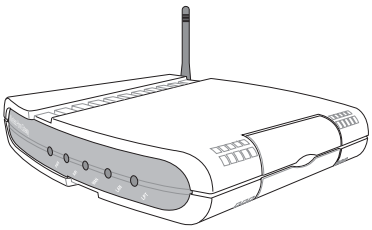
The ASUS SpaceLink B&W PCI Card supports data rates up to 11 Mbps, with automatic fallback to 5.5, 2, and 1 Mbps in 802.11b networks. It operates in the unlicensed 2.4 GHz frequencies called the Instrumentation, Science, and Medical (ISM) band. Unlicensed means free of charge to users.

The ASUS SpaceLink B&W PCI Card also supports data rates up to 54 Mbps in 802.11a networks using 5 GHz frequencies and Orthogonal Frequency Division Multiplexing (OFDM) technology.

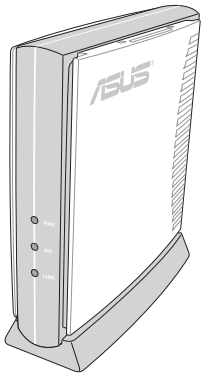
The ASUS SpaceLink B&W PCI Card configuration utility is a user-friendly application that helps you quickly setup multiple roaming nodes using the ASUS SpaceLink B&W PCI Card. You can even export the configuration settings to a file and import them to other computers for fast multiple installations. Wireless LANs are complementary extensions to existing wired LANs, offering complete mobility while maintaining continuous network connectivity to both corporate and home Intranets. They add a new level of convenience for LAN users. PC users stay connected to the network anywhere throughout a building without being bound by a LAN wires. This is accomplished through the use of SpaceLink Access Points. SpaceLink Access Points with built-in Internet gateway capability, allows your family to share a broadband Modem and one ISP account simultaneously from different rooms without wires! ASUS SpaceLink products can keep you connected anywhere, any time.

The SpaceLink™ Family

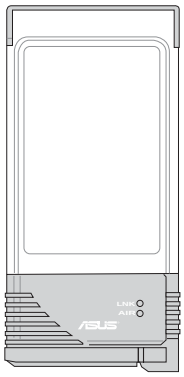
The SpaceLink™ Wireless PCI Card is a member of a product family that provides a complete wireless networking solution.



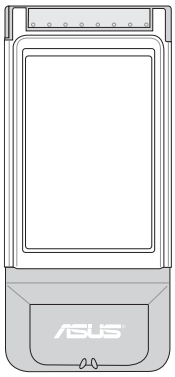
The **SpaceLink™ Gateway (WL-500)** creates a wireless network using the IEEE 802.11b wireless standard and allows sharing a single Internet connection.



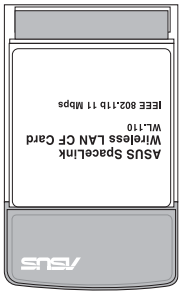
The **SpaceLink™ Access Point (WL-300)** creates a wireless network using the IEEE 802.11b wireless standard.



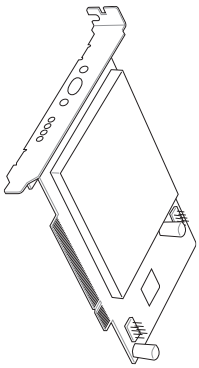
The **SpaceLink™ PC Card (WL-100)** is a wireless LAN adapter that fits into a PCMCIA Type II slot in a Notebook PC.



The **SpaceLink™ Cardbus Card (WL-200)** is a dual band (IEEE 802.11a/b) wireless LAN adapter that fits into a Notebook PC's PCMCIA Type II slot with Cardbus support.



The **SpaceLink™ CF Card (WL-110)** is a wireless LAN adapter that fits into a Compact Flash Type II slot in a Portable Digital Assistant (PDA).



The **SpaceLink™ PCI Card (WL230)** is a dual band/dual mode wireless PCI card that supports IEEE 802.11a, 802.11b, and Bluetooth.

The above illustrations are not to scale.

System Requirements

To begin using the SpaceLink™ Wireless PCI Card, you must have the following minimum requirements:

- An ASUS motherboard with the Blue Magic PCI slot
- Windows XP/2000/ME/98SE
- 32MB system memory or larger
- 300MHz processor or higher

As of the writing of this manual, the following motherboards have the Blue Magic PCI slot: A7V8X, P4PE, P4G8X, P4GE-V. Please visit the ASUS Web Site for updated information.

The Product Package

When you receive the Wireless LAN package, it should contain the following items:

- One SpaceLink™ Wireless PCI Card (WL230) with Antenna
- One SpaceLink™ Wireless PCI Card (WL230) User's Manual
- One Support CD (tools and documentation)

  ASUS WLAN Control Center

  Mobile Manager

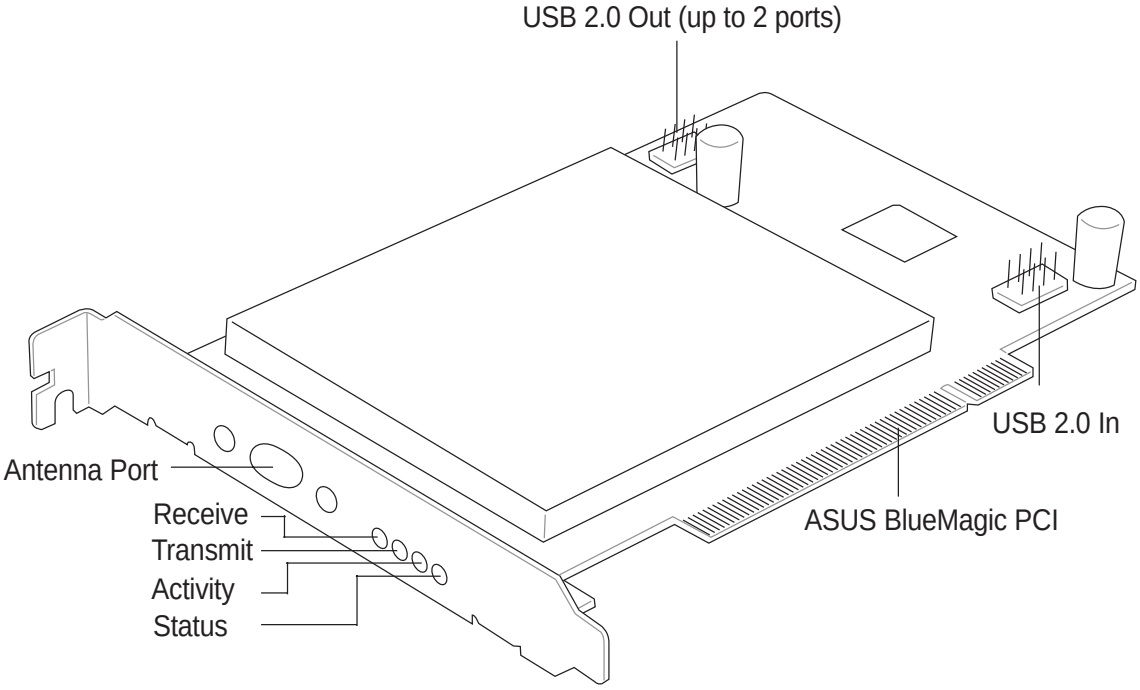
  Site Monitor

  TroubleShooting

  ASUS Bluetooth Software

If any of the above items are not included or damaged, contact your local dealer for instructions.

ASUS SpaceLink B&W PCI Card Layout



LED Definitions

Receive LED:
Blink - Receiving data packets
OFF - No data packets received

Transmit LED:
Blink - Transmitting data packets
OFF - No data packets transmitted

Activity LED	Status LED	Meaning
Fast Blink	Fast Blink	Associated or joined with network
Slow Blink	Slow Blink	Associated or joined with network, no activity
Alternating	Alternating	Searching for network connection
OFF	Slow Blink	Power save mode (Power-Up or Reset)
OFF	OFF	No power received

ASUS SpaceLink B&W Specifications

Industry Standards:	Bluetooth, IEEE802.11a, IEEE802.11b
Host Interface:	ASUS BlueMagic PCI
Antenna:	Integrated Bluetooth and dual-band wireless LAN

Bluetooth

Operating Freq:	2.4GHz to 2.5GHz
Data Rate:	1 Mbps
Range:	Up to 10 meters
Architecture:	Piconet, scatter net

IEEE802.11a

Operating Freq:	5.15GHz to 5.35GHz, 5.725GHz to 5.85GHz
Data Rate:	54, 48, 36, 24, 12, 9, 6Mbps, turbo mode up to 108Mbps
Range:	Indoor: 12 meters @ 11Mbps, 50 meters @ 6Mbps Outdoor: 30 meters @ 54Mbps, 150 meters @ 6Mbps
Architecture:	Infrastructure and Ad-Hoc

IEEE802.11b

Operating Freq:	2.4GHz to 2.5GHz
Data Rate:	11, 5.5, 2, 1Mbps
Range:	Indoor: 30 meters @ 11Mbps, 90 meters @ 2Mbps Outdoor: 150 meters @ 11Mbps, 300 meters @ 2Mbps
Architecture:	Infrastructure and Ad-Hoc

2. Installation

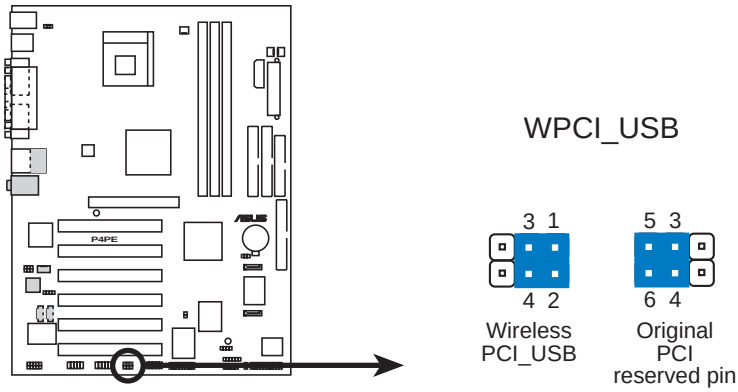
This chapter explains how to install the ASUS SpaceLink B&W PCI Card hardware, drivers, and utilities. This product is designed to operate in Windows Me, 2000, and XP. Examples in this manual will be that of Windows XP.

Complete the following steps to install the ASUS SpaceLink B&W PCI Card.

1. Install the ASUS SpaceLink B&W PCI Card.
2. Install the ASUS SpaceLink B&W PCI Card Driver
3. Install the ASUS SpaceLink B&W PCI Card Utilities

2.1 Installing the ASUS SpaceLink B&W PCI Card

1. Turn OFF your computer and open your computer chassis.
2. Locate the WPCI_USB* jumpers and move them to “Wireless PCI_USB”



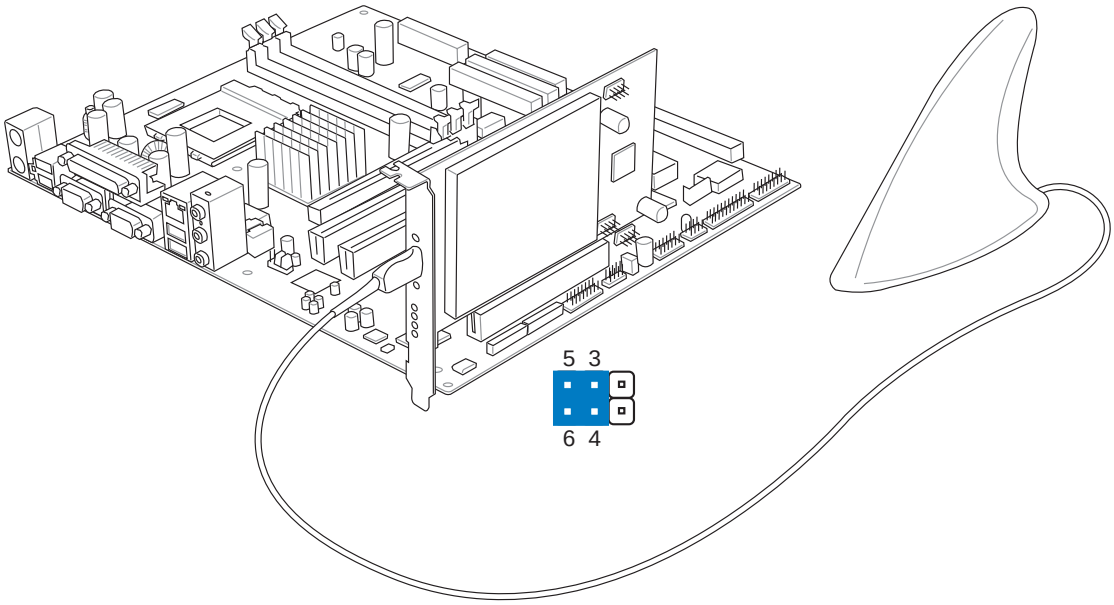
P4PE WPCI_USB Setting

***This is one motherboard example only and may not correctly reflect your motherboard. See your User’s Manual for correct information regarding the name, location, and use of these jumpers on your motherboard.**

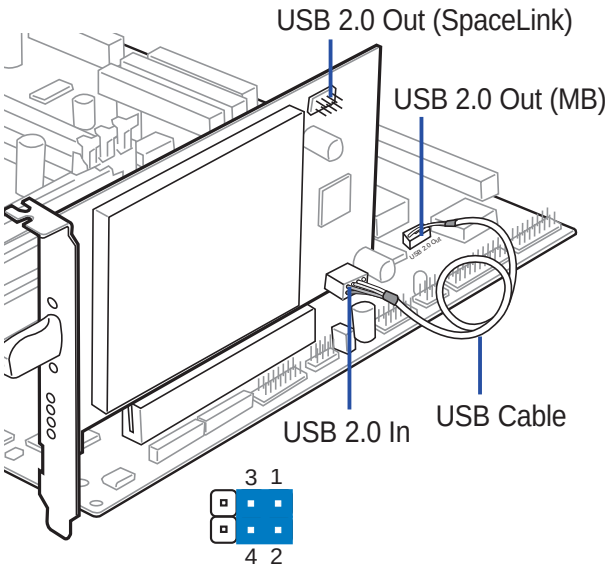
2.1 Installing the ASUS SpaceLink B&W PCI Card (Cont.)

3. Insert the ASUS SpaceLink B&W PCI Card into a Blue Magic PCI slot.
4. Attach the antenna to the ASUS SpaceLink B&W PCI Card as shown.

Blue Magic PCI Slot



Non-Blue Magic PCI Slot

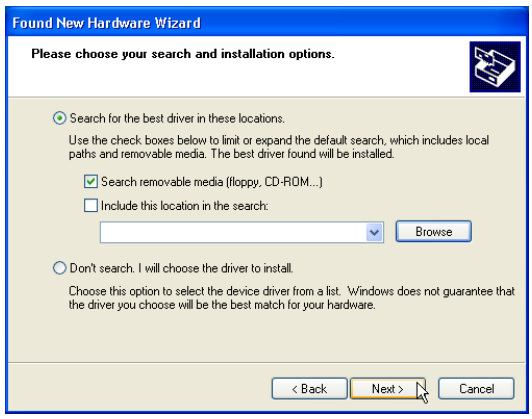


If inserting the ASUS SpaceLink B&W PCI Card into a non-Blue Magic PCI slot, a USB 2.0 header on the motherboard or USB 2.0 PCI card is required. Connect the provided USB cable from the ASUS SpaceLink B&W PCI Card (USB 2.0 IN) to the USB 2.0 OUT header on the motherboard or PCI card. You can still use the USB 2.0 port by connecting your USB bracket to the USB 2.0 OUT on the ASUS SpaceLink B&W PCI Card.

2.2 Installing the SpaceLink PCI Driver

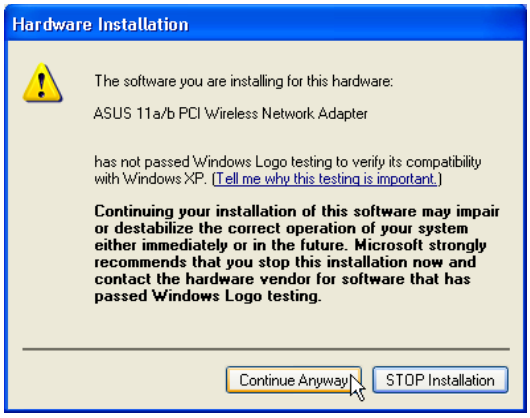
With the SpaceLink B&W PCI Card installed, turn ON your computer and enter Windows.

1. Windows will automatically detect the ASUS SpaceLink B&W PCI Card once it is inserted into the PCMCIA slot, then the “Add New Hardware Wizard” dialog will appear. Click **Next**.

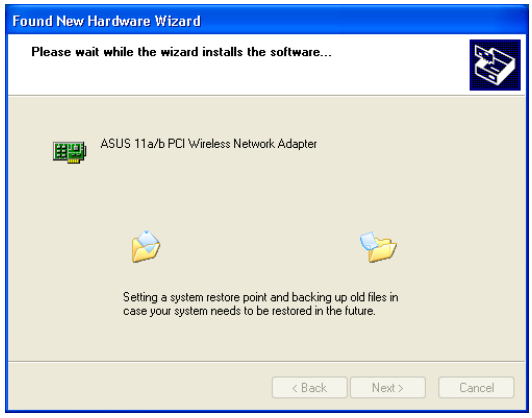


2. Insert the support CD that came with your ASUS SpaceLink B&W PCI Card .

3. Select “Search for the best driver in”... “Search removable media...” Click **Next**.

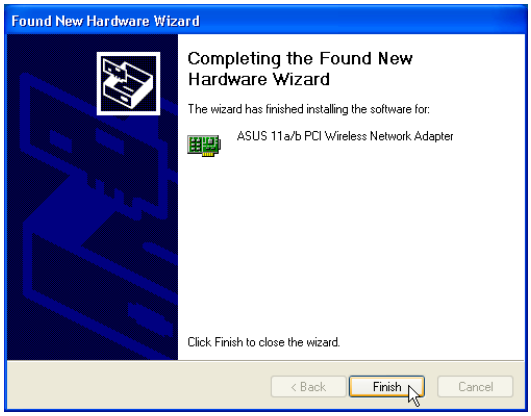


4. When asked about driver compatibility with Windows XP. Click **Continue Anyway** since ASUS has always tests its drivers before product shipment.

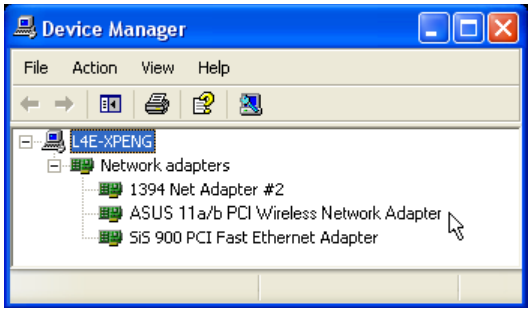


5. Wait while Windows XP creates a restore point for you system files in case you need to restore your current system.

2.2 Installing the SpaceLink PCI Driver (Cont.)



6. Click **Finish** when installation has complete. Restart your computer if prompted.



7. You can verify the "ASUS 11a/b PCI Wireless Network Adapter" driver in Device Manager.

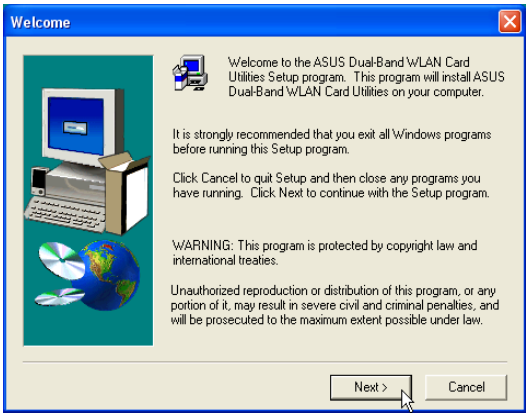
2.3 Verifying Drivers

You can verify the driver in Device Manager. (Access Device Manager from Start | Control Panel | System | Hardware). A question mark means that no driver has been installed. An exclamation mark over a card means that the driver is incorrect. Verify that you are using the correct product and driver CD. Try repeating the installation and contact customer support if necessary.

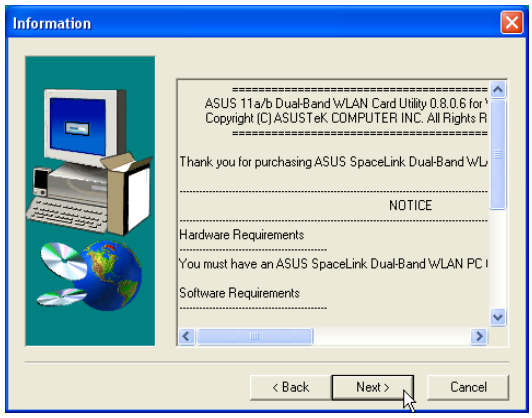
2.4 Installing the SpaceLink Utilities

After you have installed the ASUS SpaceLink B&W PCI Card driver, you can install the wireless utilities.

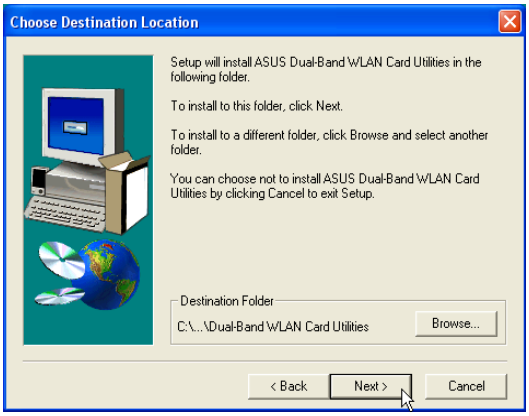
1. Insert the ASUS SpaceLink B&W PCI Card support CD and an autorun menu will appear. If your autorun is disabled, double click **SETUP.EXE** in the root directory of the support CD.
2. From the autorun menu, click Install **ASUS Dual-Band WLAN Card Utilities**.



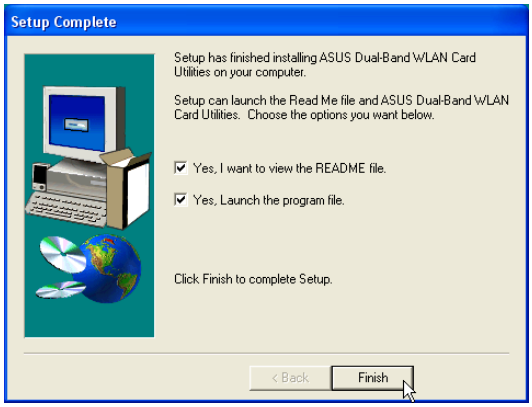
1. Click **Next** on the Welcome screen.



2. Click **Next** after reading the Information.



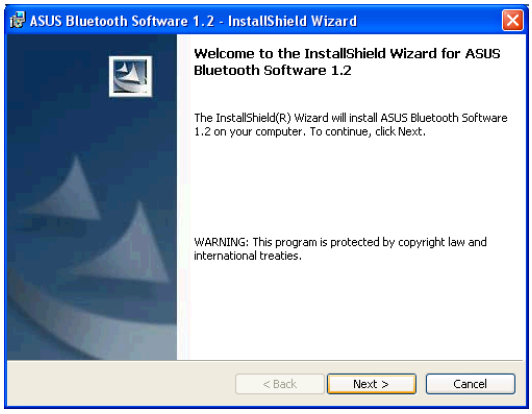
3. Click **Next** to use the default Destination Folder or click Browse to select another folder.



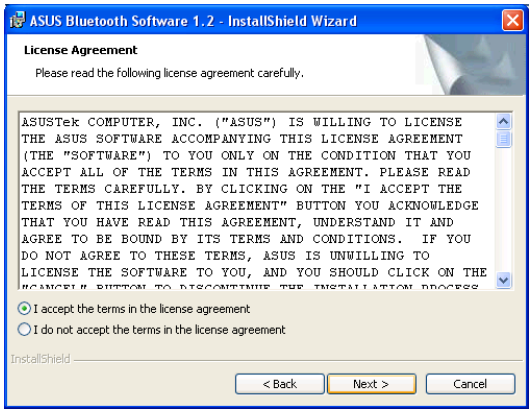
4. Click **Finish** after setup is complete.

2.5 Installing the SpaceLink Bluetooth

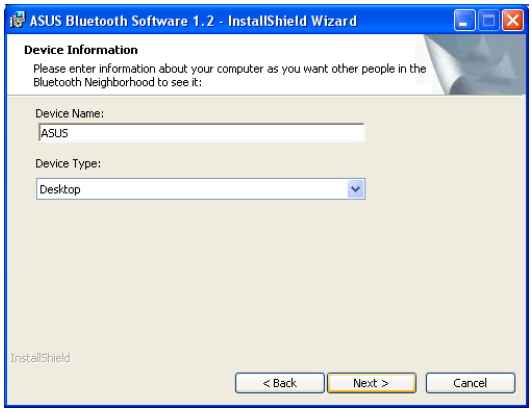
The SpaceLink Bluetooth requires the installation of the Samsung Bluetooth Software. After installation, you will find the PDF User Manual in "XTNDConnect Blue Manager" folder.



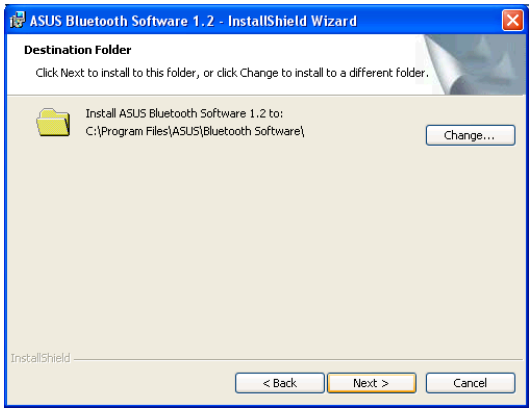
1. Click **Next** to begin.



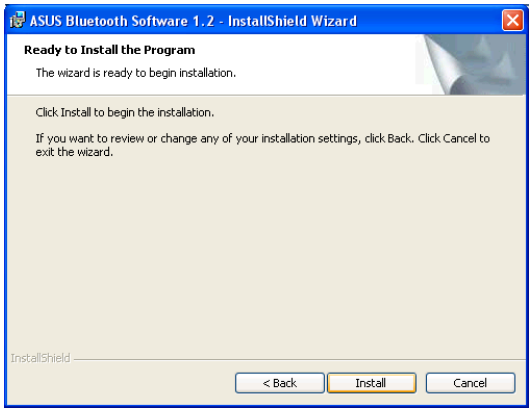
2. Click **Next** after reading the License Agreement and selecting "I accept...".



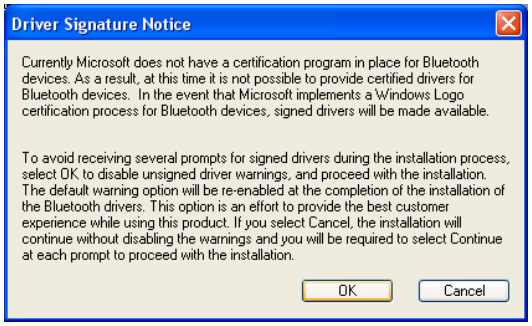
3. Select your computer type: **Desktop**



4. Click **Next** to accept the destination folder or click "Change" to specify another folder.

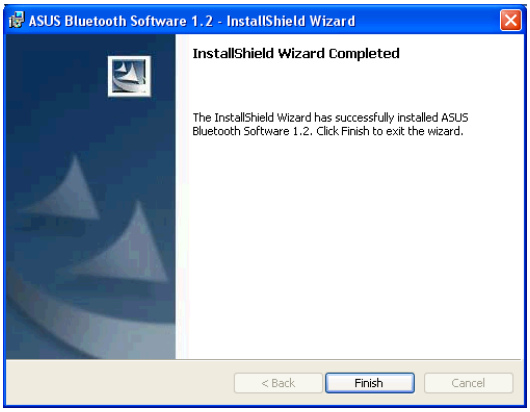


5. Click **Install** when ready to install the software.

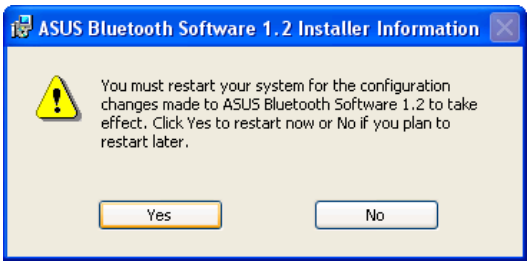


6. Click **OK** after reading the driver notice.

2.5 Installing the SpaceLink Bluetooth (Cont.)



7. Click **Finish** when installation is complete.



8. Click **Yes** to restart your computer.

3. Wireless LAN Reference

3.1 Overview

The ASUS SpaceLink B&W PCI Card software includes five groups of utilities.

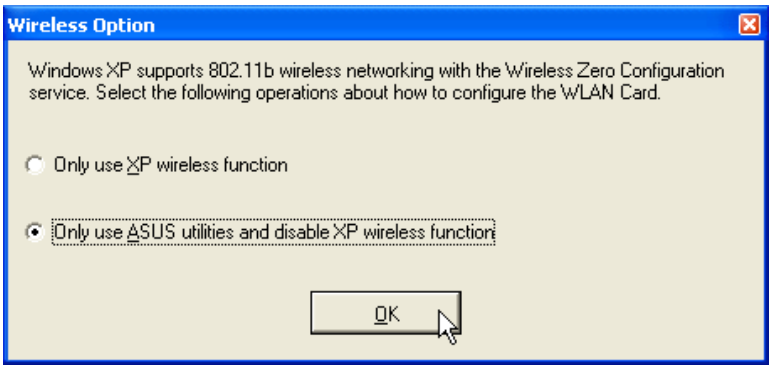
- **Control Center** – Makes it easy to launch applications and activate network location settings.
- **Mobile Manager** – A convenient tool to setup and manage network location settings.
- **Site Monitor** – Measures the received signal strength indicator (RSSI) values of all wireless networks. This tool is used for determining the best placement of Access Points to provide the most efficient coverage in a wireless network.
- **Troubleshooting -** Troubleshooting will test your settings and connection to try to pinpoint your problem and give you a solution.
- **Wireless Settings** – Allows users to control the ASUS SpaceLink B&W PCI Card.

3.2 Windows XP Wireless Options

The wireless options shown below is only available for Windows XP. The first time you run the Control Center utility, it will automatically show. Select one of the radio buttons to decide which interface to use with your SpaceLink B&W PCI Card.

Only use XP wireless function – Only use "Windows XP" wireless network settings to configure the ASUS SpaceLink B&W PCI Card.

Only use ASUS utilities and disable XP wireless function – Only use "ASUS SpaceLink B&W PCI Card utilities" to configure the ASUS SpaceLink B&W PCI Card.



You can return to the Wireless Option setting at any time by left clicking the control center icon and choosing "Wireless Option".

Taskbar Left-Click Menu

3.3 Control Center

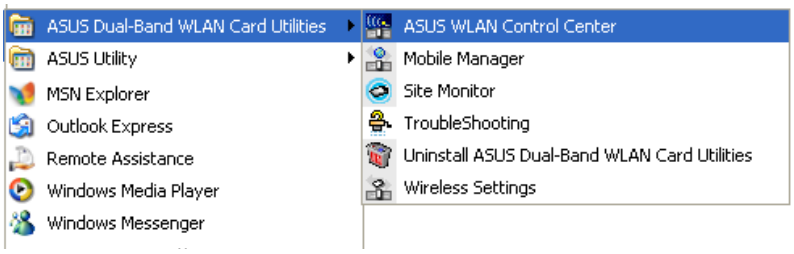
Control Center is an application that makes it easy to launch applications and activate network location settings. Control Center starts automatically when the system boots. Whenever Control Center is running, you will see a Control Center icon displayed on the Windows taskbar.

Starting the Control Center manually

- Click the Windows **Start** button, select **Programs**, select **ASUS Dual-Band WLAN Card Utilities**, and then click **ASUS WLAN Control Center**.

or

- Double click the **Control Center icon** on the desktop.

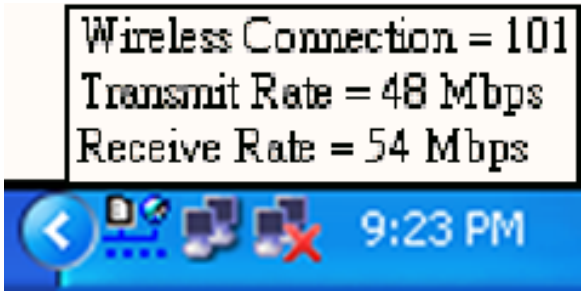


Windows Start Menu - Programs

Using the Control Center Taskbar

The Control Center Taskbar menu display the following information:

- The link quality of the ASUS SpaceLink B&W PCI Card (Excellent, Good, Fair, Poor, Not Linked)
- Whether the ASUS SpaceLink B&W PCI Card is connected to the Internet (Blue: Connected, Gray: Not Connected)



Taskbar Icon and Status

Wireless Status Icons (on the taskbar)

Excellent link quality and **connected to Internet** (Infrastructure)

Good link quality and **connected to Internet** (Infrastructure)

Fair link quality and **connected to Internet** (Infrastructure)

Poor link quality and **connected to Internet** (Infrastructure)

Not linked but **connected to Internet** (Infrastructure)

Excellent link quality but **not connected to Internet** (Infrastructure)

Good link quality but **not connected to Internet** (Infrastructure)

Fair link quality but **not connected to Internet** (Infrastructure)

Poor link quality but **not connected to Internet** (Infrastructure)

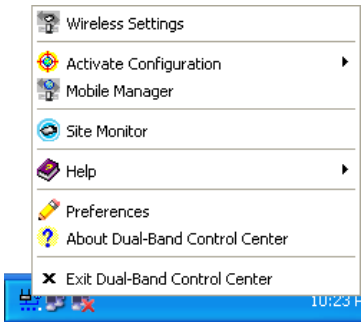
Not linked and **not connected to Internet** (Infrastructure)

Linked (Ad Hoc)

Not Linked (Ad Hoc)

Connected to Internet

Right-clicking the taskbar icon shows the following menu items:



Right-Click Menu

- **Wireless Settings** – Launches Wireless Settings application.
- **Activate Configuration** – Allows you to set which profile to use.
- **Mobile Manager** – Launches Mobile Manager application.
- **Preferences** – Customizes the way the Control Center program behaves. You can create a Control Center shortcut on the desktop. You can also set whether Control Center starts up with Windows.
- **Exit** – Closes the Control Center program.

Left-clicking the taskbar icon shows the following menu:

Taskbar Left-Click Menu

- **Wireless Radio On** – Turns the wireless radio ON.
- **Wireless Radio Off** – Turns the wireless radio OFF.
- **Search & Connect** – View the properties of available Access Points within range.
- **Wireless Option** (Windows XP only) – Sets your Windows XP wireless networking environment.

Double-clicking the taskbar icon:

- Launches the Wireless Settings application.

3.4 Wireless Settings

Wireless Settings is an application that allows you to control your ASUS SpaceLink B&W PCI Card. Use Wireless Settings to View or Modify the configuration settings and monitor the operational status of your PC Card. Once Wireless Settings is launched, you can see the tabbed property sheet. This property sheet is composed of tabbed “pages”, each with its own group of feature-specific settings.

Starting Wireless Settings

- Open the Windows **Control Panel**, and then double-click the icon **ASUS DualBand WLAN Card Setting** icon.

or

- Click the Windows **Start** button, select **Programs**, select **ASUS DualBand WLAN Card Utilities**, and then click **Wireless Settings**.

or

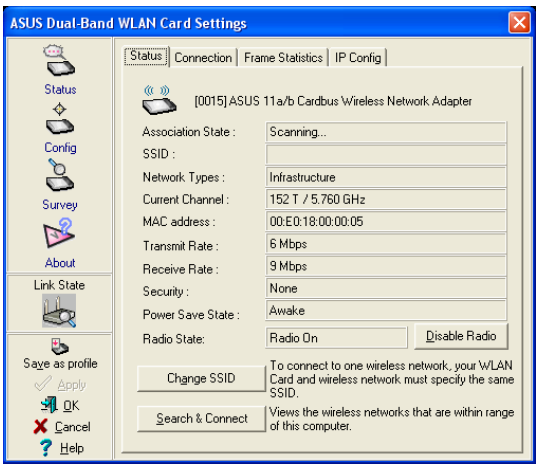
- Click the **Control Center icon** on the Windows taskbar, a popup menu appears, and then click **Wireless Settings**.

More than one ASUS SpaceLink Card

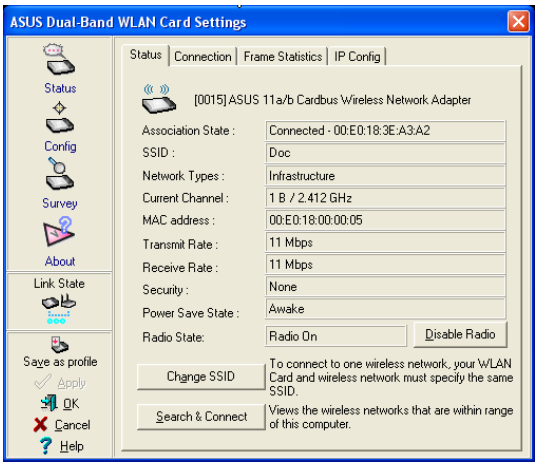
If you have more than one ASUS SpaceLink Card. You will be given a device selection window when you launch the “Wireless Settings” utility.

3.5 Status - Status Tab

You can view the information about the ASUS SpaceLink B&W PCI Card from the general menu. These fields are blank if the ASUS SpaceLink B&W PCI Card does not exist.



Scanning



Connected

Association State

Displays the connection status as follows:

Connected - The station is now associated with one wireless LAN device. When operating in Infrastructure mode, this field shows the MAC address of the Access Point with which you are communicating. When operating in Ad Hoc mode, this field shows the virtual MAC address used by computers participating in the Ad Hoc network.

Scanning... - The station is now attempting to authenticate and associate with the desired Access Point or Ad Hoc node.

Disconnected - The link is connected, but no beacon received.

SSID

Displays the Service Set Identifier (SSID) that the card is either associated or intending to join.

Network Type

Displays the type of the network that the card is in use. The value is either "Infrastructure" or "Ad Hoc".

Current Channel

Displays the radio channel that the card is currently tuned. This number changes as the radio scans the available channels.

MAC address

Indicates the hardware address of the card. MAC address is a unique identifier for networking devices (typically written as twelve hexadecimal digits 0 through 9 and A through F, six hexadecimal numbers separated by colons, i.e. 00:E0:18:F0:05:C0).

Transmit Rate

Displays the current transmit data rate in megabits per second (Mbps).

Receive Rate

Displays the current receive data rate in megabits per second (Mbps).

Security

Indicates whether or not Wired Equivalent Privacy (WEP) is enabled for the station.

Power Save State

Shows the following indicating the power saving state of the station "Awake", "Sleep Pending", "Sleep", "Fake Sleep Pending", "Faking Sleep", and "Unknown".

Radio State

Shows the wireless radio on or off.

Radio On - When the wireless radio is turned off, the following icon appears in the upper left of the Settings property page.

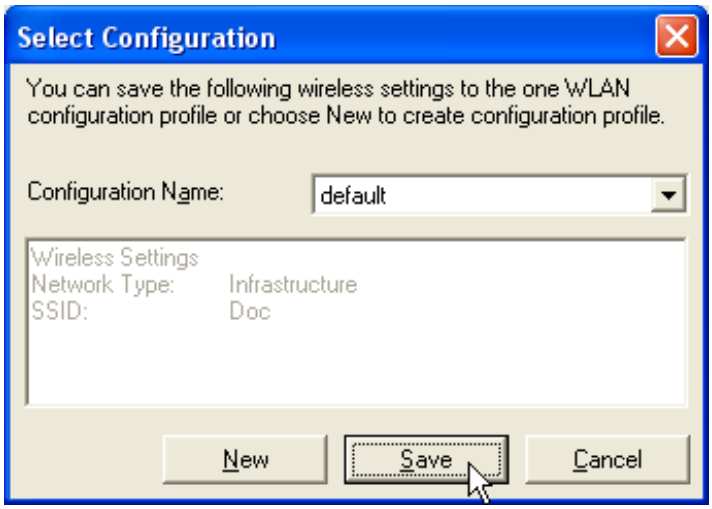
Radio Off - When the wireless radio is turned on, the following icon appears in the upper left of the Settings property page.

Change SSID – Click on this to set the SSID.

Search & Connect – Click on this to connect to an available network.

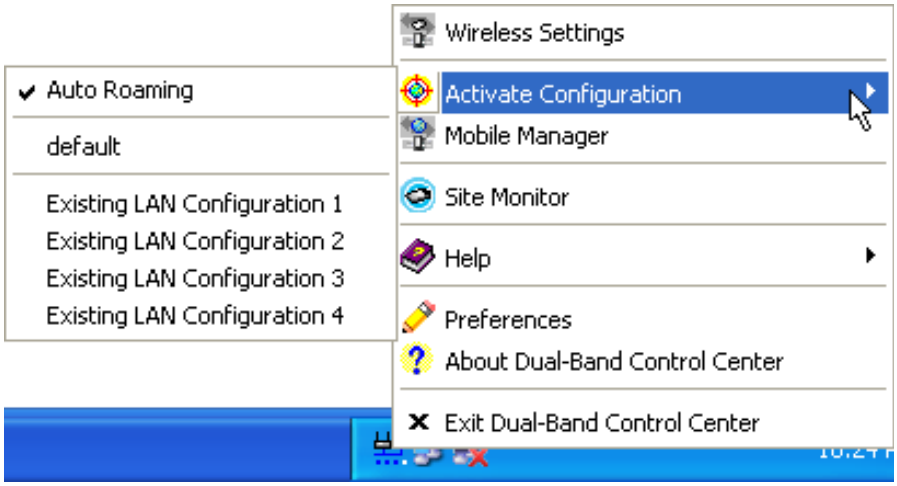
3.6 Save as Profile

Later, when you make individual settings, you may want to use profiles to save your settings. Profiles will help you combine all your settings for work, home, roaming, and other locations so that you do not have to repeat individual settings.



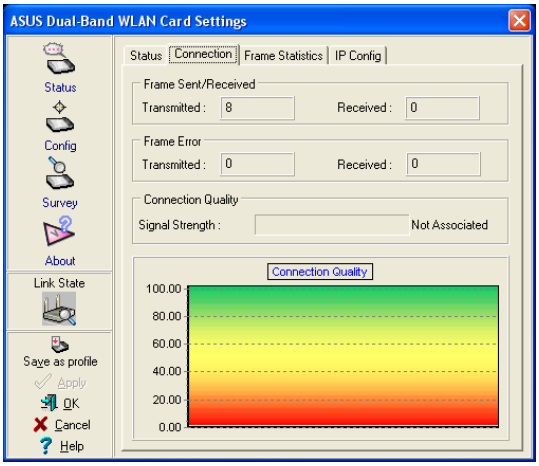
3.7 Activate Configuration

Auto roaming is enabled by default and will automatically switch to stronger access points. You can uncheck it if you have many access points and do not want to constantly switch to different networks. If you want to use a particular profile. You can also check it here.

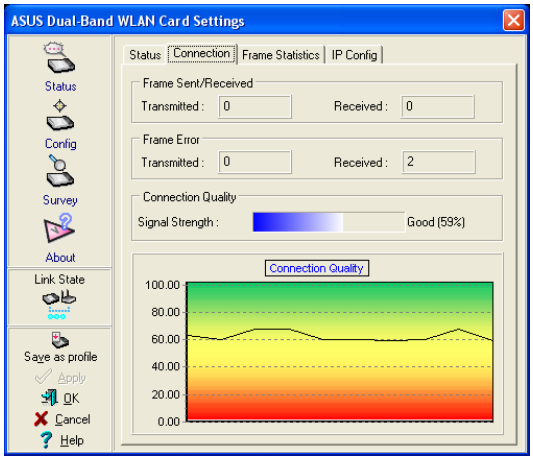


3.8 Status - Connection Tab

You can view the current link statistics about the ASUS SpaceLink B&W PCI Card. These statistics are updated once per second and are valid only if the ASUS SpaceLink B&W PCI Card exists.



Scanning



Connected

Frame Sent/Received

Transmitted - The number of frames that were transmitted.

Received - The number of frames that were received.

Frame Error

Transmitted - The number of frames that were not successfully transmitted.

Received - The number of frames that were not successfully received.

Connection Quality

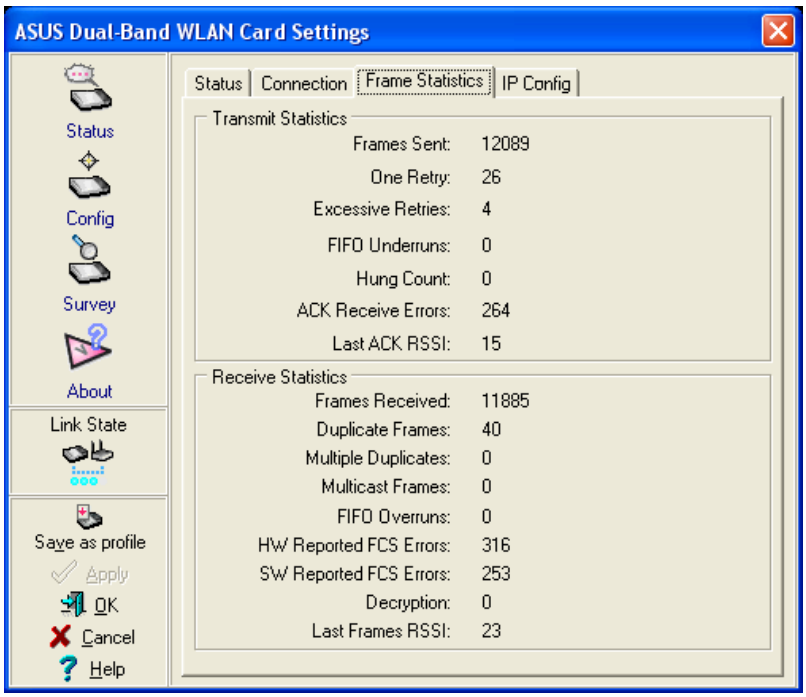
Signal Strength - Reflects the signal level related to the Access Point or Ad Hoc node the station is currently connected to. Ratings are: Excellent, Good, Fair, and Poor.

Overall Connection Quality

It is derived from the current "Signal Strength". A graph displays a connection quality range between 0 and 100 percent.

Frame Statistics

Frame statistics give information on data transferred though the wireless LAN. You can monitor performance or trouble shoot signal quality within different location of your wireless network.

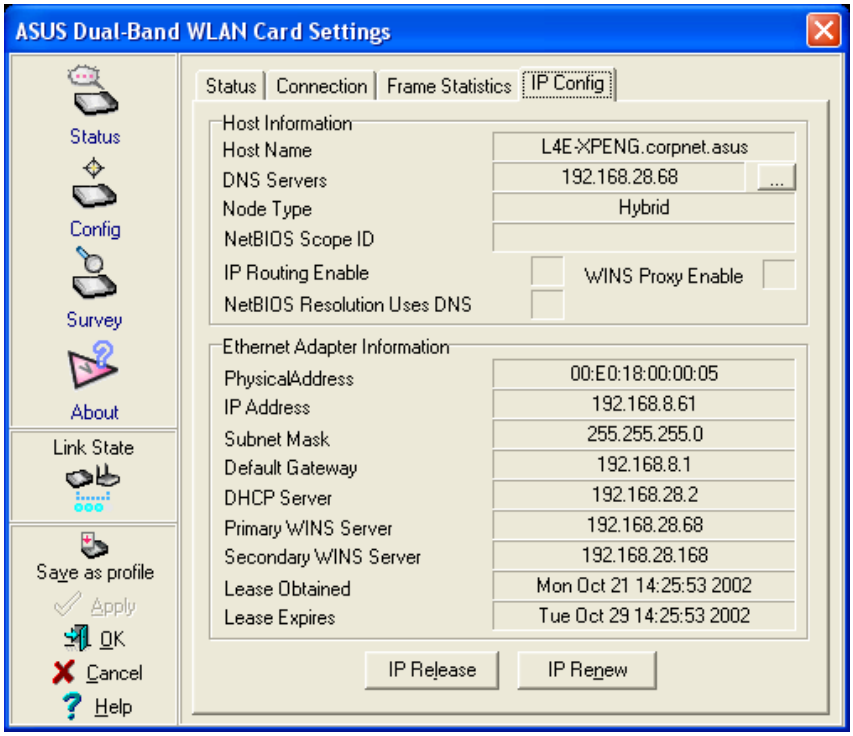


Connected

3.9 Status - IP Config Tab

IP Config tab shows all the current network configuration information for the ASUS SpaceLink B&W PCI Card. Use it to verify your network settings.

IP CONFIG will display all the current TCP/IP configuration values including the IP address, subnet mask, default gateway and Windows Internet Naming Service (WINS) and DNS configuration.



Connected

Button

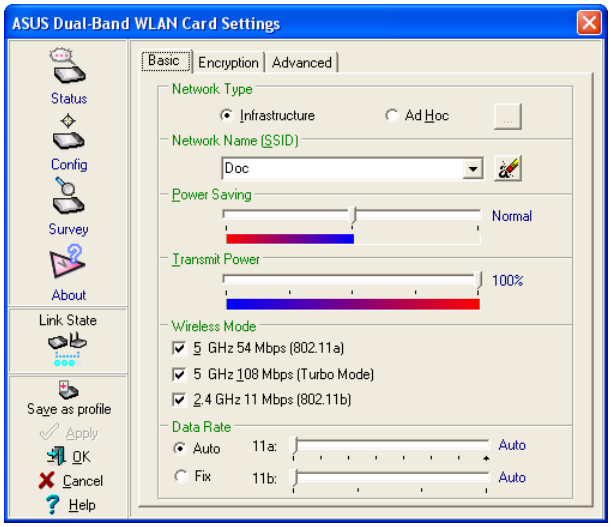
IP Release - Releases the DHCP IP address for the ASUS SpaceLink B&W PCI Card.

IP Renew - Renews the DHCP IP address for the ASUS SpaceLink B&W PCI Card.

NOTE: The IP Release and IP Renew buttons can only be used on the ASUS SpaceLink B&W PCI Card that is configured with DHCP.

3.10 Config - Basic Tab

Lets you can change the ASUS SpaceLink B&W PCI Card configurations without rebooting your computer.



SSID Set to "Doc"

Network Type

Infrastructure – Select the Infrastructure mode to establish a connection with an Access Point. Your computer is able to access wireless LAN and wired LAN (Ethernet), via an associated access point. The Channel field turns to "Auto" when "Infrastructure" is selected.

Ad Hoc – Select the "Ad Hoc" mode to communicate directly with each other without using an Access Point. An "Ad Hoc" network is typically formed quickly and easily without pre-planning. For example, share meeting notes between networked computers in a meeting room.

SSID

Use the SSID filed to configure the SSID for the ASUS SpaceLink B&W PCI Card. You can enter a new SSID or select one from the drop-down list box. SSID stands for "Service Set Identifier", which is a string used to identify a wireless LAN. You will only be able to connect Access Points which has the same SSID as the one you set. Use different SSIDs to segment the wireless LAN and increase security. SSIDs must all be printable characters and having a maximum of 32 case sensitive characters, such as " Wireless LAN".

Set the SSID to a null string, if you wish to allow your station to connect to any Access Point it can find. But you cannot use null string in Ad Hoc mode.

Power Saving

This field allows the configuration of power management options to conserve battery life. These options are "Off", "Normal, and "Maximum". Power Management is disabled when "Ad Hoc" mode is selected in the Network Type field.

When the Power Saving setting is Off, it allows a full powered state that yields the best performance. This mode is recommended for devices running on AC power.

Power Saving setting is Normal or Maximum will enable power savings function, the adapter will wake up periodically to see if there is any data being sent. This mode is recommended for devices running on battery power. The difference is when the Power Saving setting is Normal, the driver turns off power to the adapter for brief periods over briefly-spaced time intervals; when the Power Saving setting is Maximum, the driver turns off power to the adapter for long periods over widely-spaced time intervals.

Transmit Power

This field allows the configuration of transmit power options. The options are "100%", "50%", "25%", "12.5", and "Lowest".

Wireless Mode

Choose which wireless mode the wireless card will use. You can enable more than one wireless mode to allow system auto switch among them.

802.11a (5 GHz): Use this checkbox to allow the wireless card to use the 5 GHz and 54 Mbps wireless mode.

5 GHz 108 Mbps (Turbo Mode): Use this checkbox to allow the wireless card to use the 5 GHz and 108 Mbps wireless mode. A high speed operating mode for 802.11a radio space. Support data transfer speeds up to 108 Mbps, twice the speed of standard 802.11a devices.

802.11b (2.4 GHz): Use this checkbox to allow the wireless card to use the 2.4 GHz and 11 Mbps wireless mode.

Click Apply to save and activate the new configurations.

Data Rate

Select the transmit data rate (fix or auto). The data rates supported for the ASUS SpaceLink WLAN Cards are:

Auto - The adapter will adjust to the most suitable transmission rate.

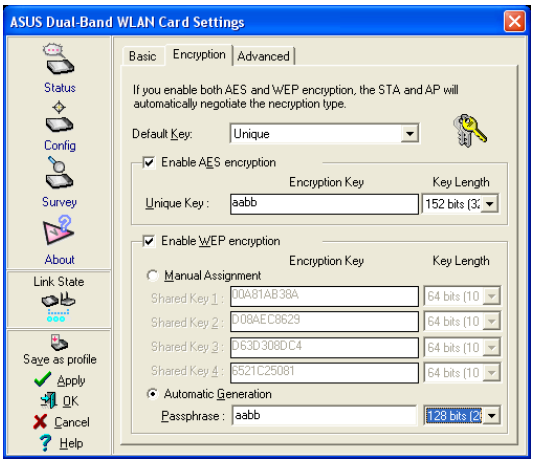
Fix - 11a: Fix data rate to 6, 9, 12, 18, 24, 36, 48, or 54 megabits per second.

11b: Fix data rate to 1, 2, 5, or 11 megabits per second.

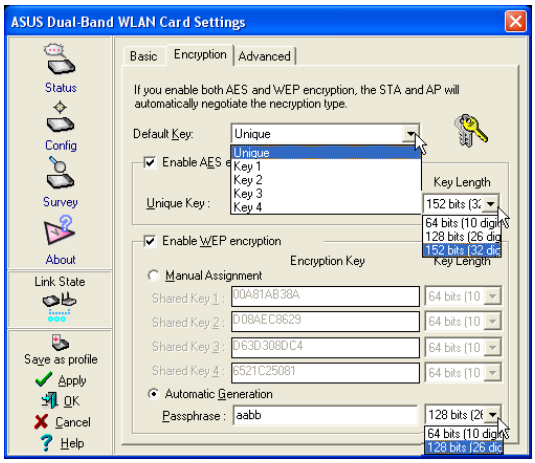
Click Apply to save and activate the new configurations.

3.11 Encryption

Lets you configure the ASUS SpaceLink WLAN Card encryption settings. We support two encryption types: Wired Equivalent Privacy (WEP) and Advanced Encryption Security (AES). While WEP is universally supported and commonly used, AES provides a much higher level of security. Frames encrypted with AES are more difficult to decipher without known the key. Please note that you will only be able to communicate with wireless devices that have use the same encryption settings.



WEP Enabled



Pull Down Menus

Selecting Encryption Types (Enable AES or WEP)

Specify the encryption type AES or WEP. If you enable both, the STA and AP will automatically negotiate the encryption type. By specifying auto, the STA and AP will negotiate and attempt to use AES before exchanging data packets. If the STA or AP does not support AES, WEP is used.

If one of the check boxes is selected, an encryption Key is used to encrypt your data before it is transmitted over the air. If you enable encryption, you will only be able to communicate with wireless devices that have use the same encryption keys.

NOTE: AES is not supported in Ad Hoc mode, since Ad Hoc mode does not support unique key.

Default Key

The Default Key field lets you specify which of the encryption key (Unique, First, Second, Third, or Fourth) you use to transmit data on your wireless LAN. You can change the default key by clicking on the down arrow at the right of

this field, selecting the number of the key you want to use and then clicking the Apply button. As long as the Access Point or station with which you are communicating has the same key in the same position, you can use any of the keys as the default.

Key Length

Defines the length for each encryption key. As the Key Length is changed, the number of available characters in the filed is changed automatically. For 64 bits encryption, each Key contains exactly 10 hexadecimal digits. For 128 bits encryption, each Key contains exactly 26 hexadecimal digits. For 152 bits encryption, each Key contains exactly 32 hexadecimal digits.

Unique Key

This option is enable only if you enable AES Encryption. Defines the unique encryption key for security for the current network configuration. In Ad Hoc mode, this encryption key type is not used.

Shared Key

This option is enable only if you enable WEP Encryption. The WEP Key is a 64 bits (5 byte), 128 bits (13 byte) or 152 bits (16 byte) Hexadecimal digits that is used to encrypt transmit data packets and decrypt received data packets.

Two ways to assign Shared Keys

Manual Assignment - When you click this button, the cursor appears in the field for Key 1. To enable WEP encryption, you are required to enter at least one shared key. For 64-bit encryption, each Key contains exactly 10 hex digits (0~9, a~f, and A~F). For 128-bit encryption, each Key contains exactly 26 hex digits (0~9, a~f, and A~F). For 152-bit encryption, each Key contains exactly 32 hex digits (0~9, a~f, and A~F).

Automatic Generation - Type a combination of up to 64 letters, numbers, or symbols in the Passphrase column, then the Wireless Settings Utility uses an algorithm to generate four shared Keys for encryption.

NOTE: This function ease users from having to remember their passwords and is compatible to some existing WLAN utilities, but it is not very secure. "Manual Assignment" is more secure.

NOTE: Click the Apply or OK button to save the encryption settings. The keys you entered will be masked by asterisks.

64/128bits versus 40/104bits

You may be confused about configuring WEP encryption, especially when using multiple wireless LAN products from different vendors. There are two levels of WEP Encryption: 64 bits and 128 bits.

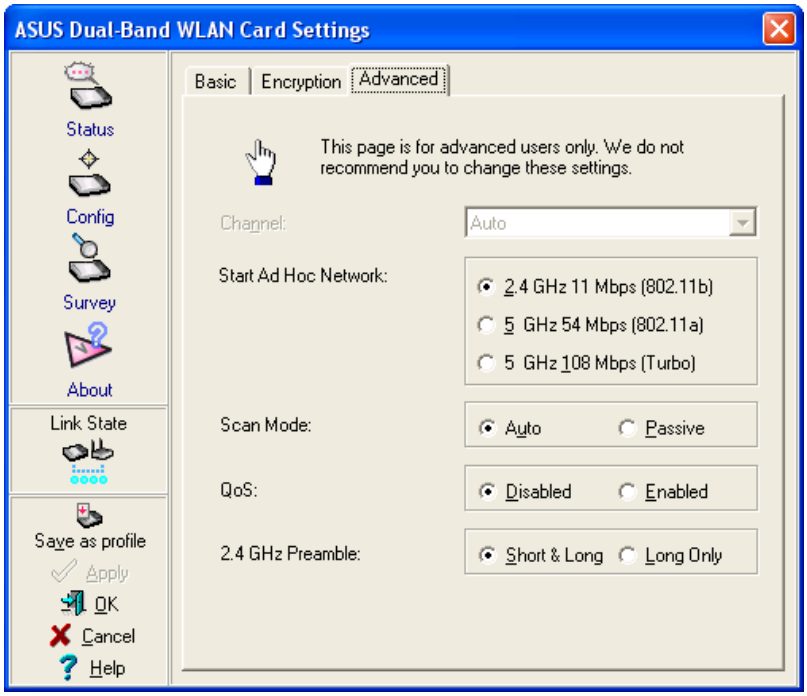
First, 64 bit WEP and 40 bit WEP are the same encryption method and can interoperate in the wireless network. This lower level of WEP encryption uses a 40 bit (10 Hex character) as a “secret key” (set by user), and a 24 bit “Initialization Vector” (not under user control). This together makes 64 bits (40 + 24). Some vendors refer to this level of WEP as 40 bits and others refer to this as 64 bits. ASUS SpaceLink products use the term 64 bits when referring to this *lower* level of encryption.

Second, 104 bit WEP and 128 bit WEP are the same encryption method and can interoperate in the wireless network. This higher level of WEP encryption uses a 104 bit (26 Hex character) as a “secret key” (set by user), and a 24 bit “Initialization Vector” (not under user control). This together makes 128 bits (104 + 24). Some vendors refer to this level of WEP as 104 bits and others refer to this as 128 bits. ASUS SpaceLink products use the term 128 bits when referring to this *higher* level of encryption.

Click Apply to save and activate the new configurations.

3.12 Config - Advanced Tab

Advanced tab provides some additional settings for the ASUS SpaceLink B&W PCI Card.



Channel

Using the Channel field to select the radio channel for card. In an "infrastructure" network, the card will automatically select the correct frequency channel required to communicate with an Access Point, this parameter will be fixed in "Auto" and cannot be changed. In an "Ad Hoc" network, you can decide channel number for the card. The radio channels you may use depend on the regulations in your country.

Start Ad Hoc Network

Choose which wireless mode will start an Ad Hoc network if no matching SSID is found after scanning all available modes. The default value is 5 GHz 54 Mbps (802.11a).

Scan Mode

Allows selection of the wireless card scanning method used to locate access

points or ad hoc networks. The default value is Auto.

Passive: Click on this radio button to specify passive scanning. Passive scanning indicates that the wireless card is in listen-only mode.

Auto: Click on this radio button to specify automatic scanning. The driver uses the country code to determine which type of scanning to use, either active or passive.

QoS

Specifies disable or enable the station to cooperate in a network using Quality of Service (QoS).

2.4 GHz Preamble

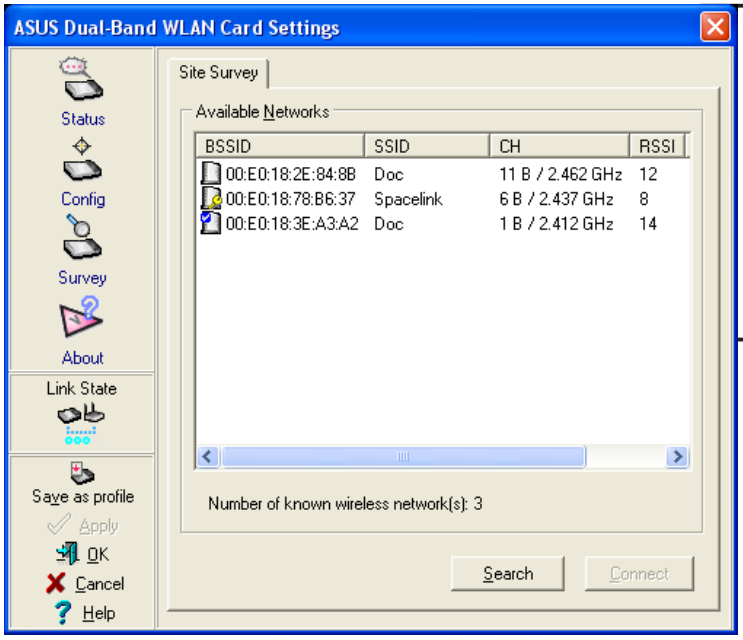
Specifies Short & Long or Long-Only preamble mode for a 2.4 GHz/11 Mb network. Long-Only is used for backward-compatibility with older 2.4 GHz devices. The default value is Short & Long.

Click Apply to save and activate the new configurations.

3.13 Survey - Site Survey Tab

Use the Site Survey tab to view statistics on the wireless networks available to the ASUS SpaceLink B&W PCI Card. The Site Survey tab is read-only with no user configurable data fields. Use the Site Survey tab to view the following network parameters.

- **BSSID** – View the IEEE MAC addresses of the available networks.
- **SSID** – View the SSID (service set identification) within available networks.
- **CH** – View the direct-sequence channel used by each network.
- **RSSI** – Views the Received Signal Strength Indication (RSSI) in dB.
- **Type** – View wireless network status information, the value is either AP (infrastructure) or STA (Ad Hoc).
- **WEP** – View wireless network WEP encryption information, the value is either OFF (disable encryption) or ON (enable encryption).



Some Access Points can disable broadcasting SSID to hide themselves from "Site Survey" or "Site Monitor" for added security but still allow you to join if you know their SSID.

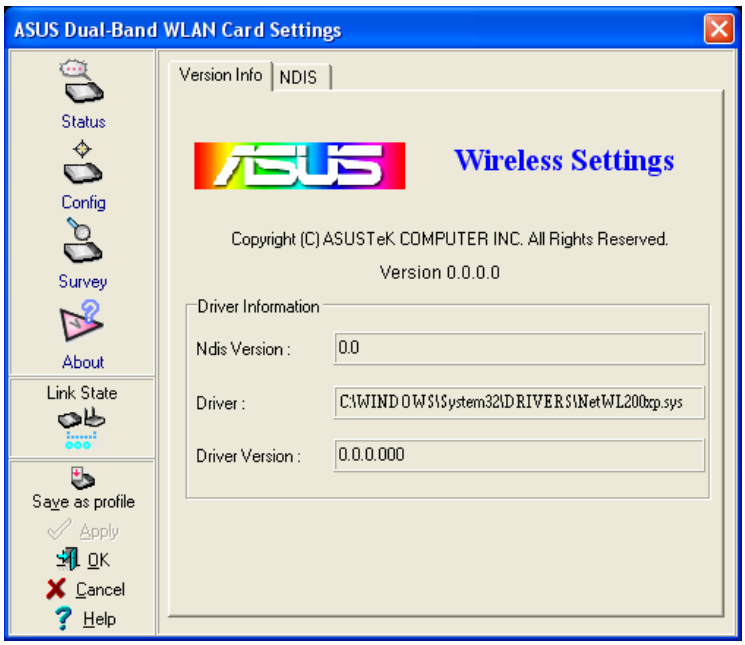
Buttons

Search – Scan all available wireless networks and show the scan result in the "Available Network List".

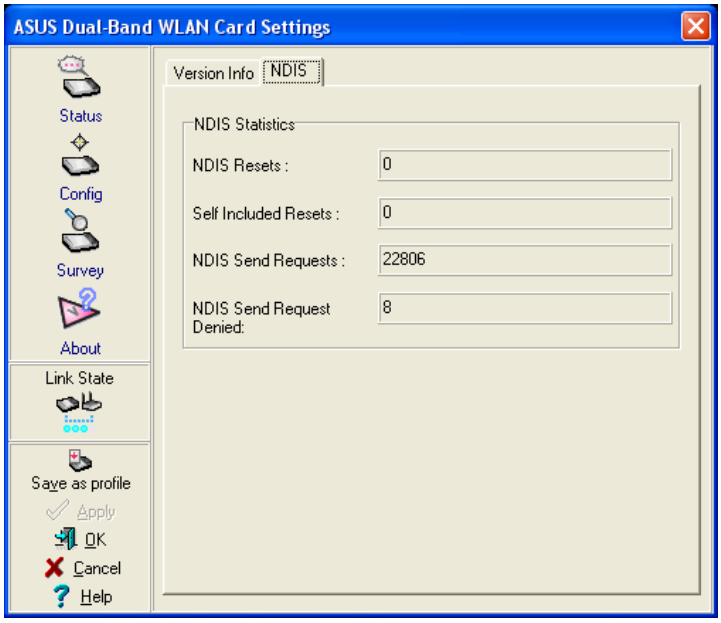
Connect – To associate a network, select it from the "Available Network List" and click this button.

3.14 About - Version Info Tab

Uses the Version Info tab to view program and ASUS SpaceLink WLAN Card version information. The program version information field includes the Copyright and utility version. The version information includes the ndis version, driver name, and driver version.



This screen is an example only. Normally, you will see non-zero version numbers.



Network Driver Interface Specification

3.15 Link Status

ASUS SpaceLink B&W PCI Card connection quality icon appears on the left of the ASUS WLAN Card Settings. Use the icon to view the current signal quality of the adapter.

Excellent Link Quality (Infrastructure)

Good Link Quality (Infrastructure)

Fair Link Quality (Infrastructure)

Poor Link Quality (Infrastructure)

Not linked (Infrastructure)

Linked (Ad Hoc)

Not Linked (Ad Hoc)

To Exit Wireless Settings

To exit Wireless Settings, you can click **OK** or **Cancel**. This utility may be closed at any time and from any tab. If you did not save the configuration settings, you will be prompted to do so.

3.16 Mobile Manager

Mobile Manager is a convenient tool to setup and manage network location settings. Mobile Manager lets users configure multiple alternative configurations for different locations. You only need to set this once, and then easily switch configurations when you change your location.

Starting Mobile Manager

- Click the Windows **Start** button, select **Programs**, select **ASUS Dual-Band WLAN Card Utilities**, and then click **Mobile Manager**.

or

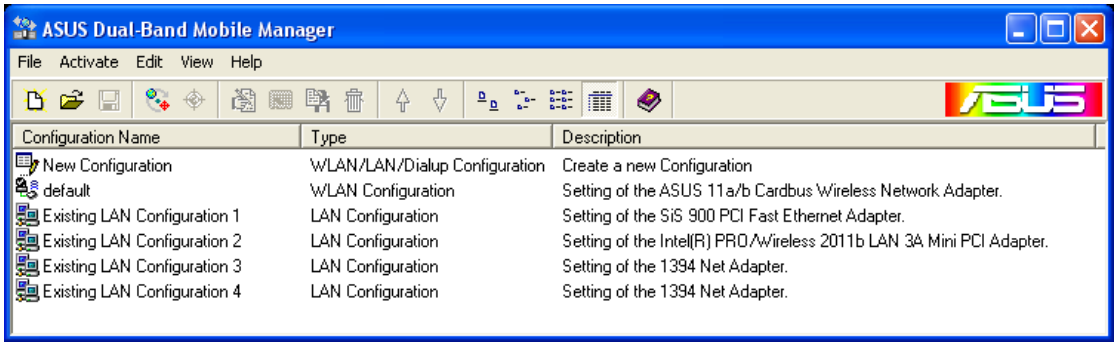
- Right-click the **Control Center** icon on the Windows taskbar and then click **Mobile Manager**.

Using Mobile Manager - Quick Guide

1. The first time you launch the Mobile Manager utility, it will automatically generate configurations that stores the current settings of all installed network devices in your system.
2. Change the name of the configuration to a descriptive name like “Work-Meeting Room” or “Home-ADSL”.
3. On the **File** menu, click **New Configuration**, the New Configuration Wizard dialog appears. Follow the on-screen instructions to create your own location configurations.
4. After you have created your configurations, you can see them in the main window.
5. Select the configuration you want to use and then click **Activate Configuration** from the **Activate** pull-down menu. Your system will then switch to the network settings configured to your chosen selection.

Main Window

You can use the Mobile Manager utility main window to create a new configuration, edit a configuration or activate a configuration. The main window includes a menu bar, tool bar, and a list view for showing existing configurations.



Using the pull-down menu and toolbar

The following topics show the commands available from the Mobile Manager pull-down menu and toolbar. If no configuration is selected, some commands will be grayed out and inaccessible. The toolbar contains buttons for many of the most commonly used commands in Mobile Manager. It allows quick access to some of the most useful features of Mobile Manager. The commands provided by the toolbar buttons are also available from the pull-down menu.

File Menu

New Configuration - Select New Configuration in the File menu to open a New Configuration Wizard dialog. Use the New Configuration Wizard dialog to create a new configuration. See Using New Configuration Wizard for details on this command.

Import Configuration - Load a configuration from an INI File.

Export Configuration - Save the selected configuration (containing Wireless Settings, TCP/IP Settings, Network Settings, ...) to an INI File. The INI file can be placed on a floppy diskette and then imported by other computers using Mobile Manager. This can also be used as a backup feature for yourself.

Exit - Close the Mobile Manager utility.

Mobilize Menu

Auto Roaming – If an association changes, it will automatically switch into a network configuration that you have made. If no associations have been made, it will automatically connect to a wireless network based on configurations that you specify.

Activate Configuration – Applies the configuration that you have selected from the list. You may be prompted to restart Windows depending on the required changes. Follow the instructions on the screen. Windows 2000 and XP usually do not require restarting your computer, but Windows 98 and ME usually will require a restart.

Edit Menu

All these commands are also available from the context menu that appears when you right-click with a configuration in the Mobile Manager window.

Edit Configuration - Select Edit Configuration in the Edit menu to open an Edit Configuration dialog to edit selected configuration items. See “Using Edit Configuration” for details on this command.

Rename - Change the name of the selected configuration.

Copy - Duplicate the selected configuration.

Delete - Discard the selected configuration.

View Menu

Large Icons - Displays large icons for each configuration.

Small Icons - Displays small icons for each configuration.

List - Shows the configuration names in a list.

Details - The Detailed view expands this list to include information about the configurations. The information includes configuration name, type, and description.

Help Menu

Contents - Displays the WinHelp contents window (the one you are reading now) for online Help.

About Mobile Manager - Displays the version number and copyright information for Mobile Manager. Click on the logo to connect to ASUS' website.

Using New Configuration Wizard

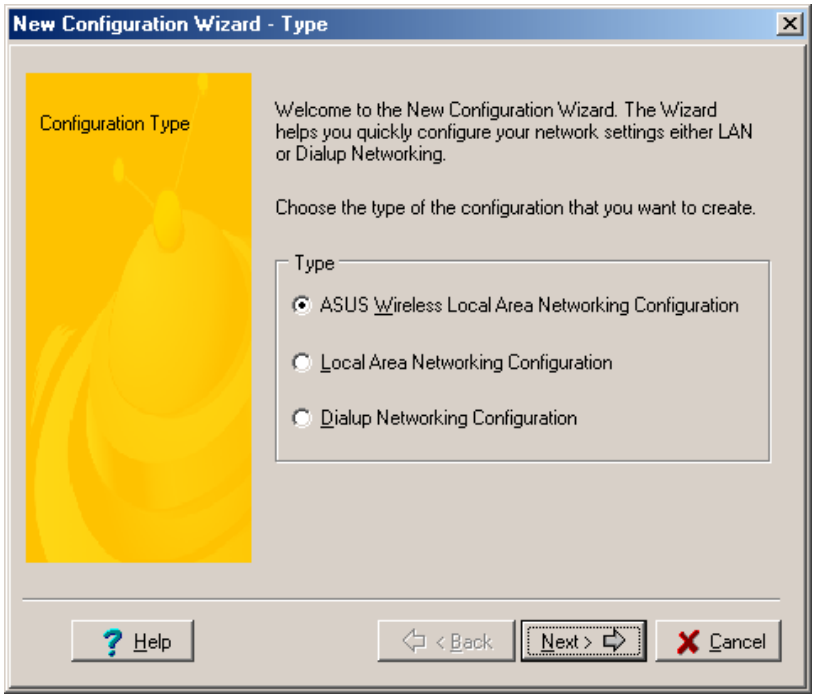
Create a new configuration

Create a new configuration if you are in a specific location that does not have an existing configuration defined. Use the New Configuration Wizard to create a configuration in a few easy steps.

1. Do one of the following:
   - On the **File menu**, click **New Configuration**.

   or
   - Double-click **New Configuration** on the Main window.

   Then the New Configuration Wizard dialog starts.
2. Choose the type of configuration that you want to create and click **Next**.
   - **Wireless Local Area Network Configuration:** You must have an ASUS SpaceLink B&W PCI Card installed in your PC.
   - **Wired Local Area Network Configuration:** You must have a NIC (LAN card) (other than ASUS SpaceLink B&W PCI Card) installed in your PC.
   - **Dialup Networking Configuration:** You must have a modem installed in your PC.



3. Enter the name and description you want to use for this configuration in the Name and description field. And Click **Next**.
4. Follow the on-screen instructions, it will guide you through the process of specifying the settings in your configuration. The Wizard reads the current system settings (TCP/IP, NT Domain, Proxy, File, and Printer Sharing) and displays it. Depending on the configuration that you have created, you can set the following groups of settings:
   - Wireless settings (for Wireless Configuration)
   - Network settings (for Wireless/Wired Configuration)
   - TCP/IP settings (for Wireless/Wired Configuration)
   - Dialing settings (for Dialup Configuration)
   - Dialup Networking settings (for Dialup Configuration)
   - Internet settings (for Wireless/Wired/Dialup Configuration)
   - Sharing settings (for Wireless/Wired/Dialup Configuration)

   See “Using Edit Configuration” for detailed information on each.
5. Enter the appropriate information in the wizard. After specifying the appropriate information on each page, click **Next** to continue.
6. On the final window of the New Configuration Wizard, you will see a **Finish** button.
   - If you do not want to use this new configuration now, click **Finish** to save the new configuration. It will be shown in the Mobile Manager main window.

   or
   - If you want to use this new configuration now, click **Mobilize**.

Using Edit Configuration

Edit an existing configuration

Edit a configuration if you want to view or change dialup or LAN settings.

- On the **Edit menu**, click **Edit Configuration**.

or

- Double-click one existing configuration on the Main window.

Then the Edit Configuration dialog starts.

The Edit Configuration dialog contains various settings, which you select by clicking the buttons at the left of the window. Each setting is described below.

General settings

Name – This field is mandatory, and used for indicating the location from which you are dialing or connecting to the network. For example, if this is used for a meeting room at work, you can use a name like "Work-Meeting Room". If it is used for home on your ADSL, you can name like "Home-ADSL".

Description – This field is optional, you can use it to provide more details about this configuration.

Network settings

Network settings include: "Identification" and "Microsoft Networking".

Identification

Computer name – Give your computer a unique name of up to 15 characters. Thecomputer name is the name that others on your network will see your computer as. For complete compatibility, do not use spaces or symbols. It's generally the same as the DNS hostname, for example, "JohnDoe".

Workgroup – Type an existing workgroup name or create a new workgroup by typing a new name that contains up to 15 characters. Use it to identify your computer group that you belong to.

Computer Description – This information is displayed as a comment next to the computer name when the computer is seen in "Details" view (select from the Windows pull-down menu). Use it to describe your computer, for example, your name, or location.

Microsoft Networking

Logon validation – Specify how Windows 9x clients connect to a Windows NT Server Domain at this location.Check *Log on to Windows NT domain* box if you are using a Windows NT Server in domain controller mode. And then enter the Window NT server domain name in *Window NT domain* field.

Network logon options – Specify how Windows 9x clients try to logon. Select *Quick logon* to wait until the shared network drives is actually used to attempt the login. Select *Logon and restore network connections* to logon to all shared network drives when the user logs into Windows.

Wireless settings

Network Type

Infrastructure – Select the Infrastructure mode to establish a connection with an Access Point.

Ad Hoc – Select the Ad Hoc mode to communicate directly with each other without using an Access Point.

SSID

Using the SSID filed to configure the SSID setting for the ASUS SpaceLink B&W PCI Card. SSID stands for Service Set Identifier, which is a string used to identify a wireless LAN. You will only be able to connect with an Access Point, which has the same SSID. Use different SSIDs to segment the wireless LAN and add security.

Note that the SSID must be all printable character string (case sensitivity) and up to 32 characters long, such as " WIRELESS LAN". Set the SSID to a null string, if you wish to allow your station to connect to any Access Point it can find. But you cannot use null string in Ad Hoc mode.

Encryption

Select disable or enable AES or WEP encryption. If you enable both, the STA and AP will automatically negotiate the encryption type. By specifying auto, the STA and AP will negotiate and attempt to use AES before exchanging data packets. If the STA or AP does not support AES, WEP is used.

If one of the check boxes is selected, an encryption Key is used to encrypt your data before it is transmitted over the air. If you enable encryption, you will only be able to communicate with wireless devices that have use the same encryption keys.

NOTE: AES is not supported in Ad Hoc mode, since Ad Hoc mode does not support unique key.

TCP/IP settings

TCP/IP settings include five tabs: Device, IP Address, Gateway, DNS, and WINS.

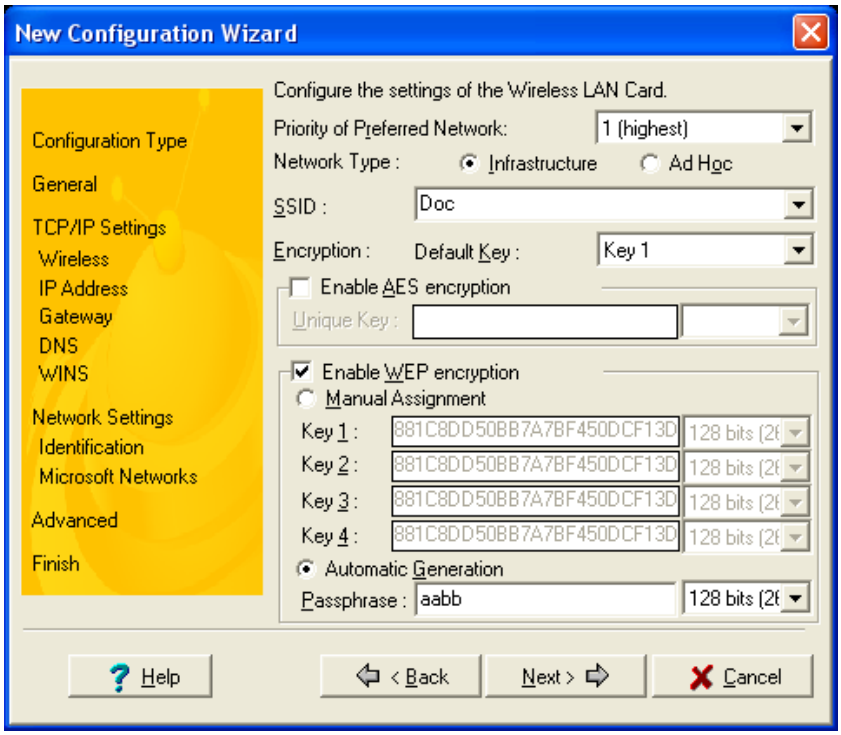
Device

Choose the network adapter that you want to use for this configuration.

IP Address

Obtain an IP address from a DHCP server – Dynamic host configuration protocol (DHCP) server assigns IP addresses automatically within a specified range to devices.

Specify an IP address – Ask your network administrator for the IP address and subnet mask that you should use. Type in the IP Address and Subnet Mask fields manually.



Gateway

Specify the gateways. There can be more than one specified.Set up the primary gateway first.

Add a gateway - Type the IP address of the gateway in the **New Gateway** field and then click **Add**. The gateway you specified appears in the **Installed Gateways** list. Repeat to specify another gateways. The value in each field must be a number between 0 and 255. You can have up to eight IP addresses for gateways.

Remove a gateway - Select the gateway from the **Installed Gateways** list and click **Remove**.

DNS

Select Enable or Disable DNS. If you enable DNS, fill the following parameters.

Host – Enter the name of your computer. That is used to identifier the computer on the Internet. The hostname is generally the same as the Microsoft networking computer name, for example, “S82000W”.

Domain – Enter the TCP/IP domain name for your network.The full domain name consists of one or more names that are separated by dots, for example, “asus.com”.

DNS Server Search Order – Specify the DNS Servers in the desired order to search for DNS information.

Domain Suffix Search Order – Add any domain suffixes that may be valid attached to the end of Internet domain name.

WINS

Specify the WINS server. There can be more than one specified.Set up the primary WINS server first.

Disable WINS Resolution – Do not use WINS resolution.

Enable WINS Resolution – Use WINS resolution. Specify the IP addresses of the WINS servers in the desired search order. *Scope ID* is used when NetBIOS over TCP/IP is enabling on the workstations. If this protocol has been enabled, then every workstation group must have the same Scope ID for those computers to communicate within the group. The Scope ID is usually left blank.

Use DHCP for WINS Resolution – If a DHCP server is available that is configured to provide information on available WINS servers.

Dialing settings

Specify how the call will be dialed. This is useful if you want to change the call to a calling card, use your computer from different locations, or add a dial prefix, country code, or area code automatically.

Dialup Networking settings

Dialup Networking settings include four tabs: Device, Phone Number, Server Type, and TCP/IP.

Device

Choose the modem you want to use by Dial-Up Networking to connect to another computer for this connection.

Phone Number

Specify area code, telephone number, and country code for this connection. Clear the **Use area code and Dialing Properties** checkbox, if you want to ignore area code and dialing settings.

Server Type

Type of Dial-Up Server – Select the server type for this connection.

Advanced options

Select **Log on to network** checkbox to specify that Dial-Up Networking will attempt to log on to the network you are connecting to, using the user name and password you typed when you logged on to Windows.

Select **Enable software compression** checkbox to specify whether incoming or outgoing information is compressed before it is sent. This is useful to speed up the transfer of information. Compression occurs only if both computers are using compatible compression.

Select **Require encrypted password** checkbox to specify that only encrypted passwords can be sent to or accepted by your computer. This is useful if you need additional security for this connection. When type your password while dialing out, this setting will encrypt your password but the target computer must support encrypted passwords for your password to be understood.

Allowed network protocols – Specifies the network protocols that your computer can use.

Select **NetBEUI** protocol to connect to Windows NT, Windows for Workgroups, or LAN Manager servers.

Select **IPX/SPX Compatible** protocol to connect to Netware and Windows NT servers and Windows 98 computers.

Select **TCP/IP** protocol to connect to Internet and wide-area networks.

TCP/IP

Server assigned IP address – Specifies whether Dialup Networking accepts an IP address from a ppp server. If the ppp server does not offer an IP address, the IP address specified for TCP/IP Dial-Up Adapter in the Network dialog box is used.

Specify an IP address – Provides a space for you to type the preferred IP address for this connection. Dial-Up Networking tries to use this address first.

Server assigned name server addresses – Specifies whether Dial-Up Networking accepts a DNS and WINS server addresses from a ppp server. If the ppp server does not offer DNS and WINS addresses, DNS and WINS server addresses specified for TCP/IP Dial-Up Adapter in the Network dialog box are used.

Specify name server addresses – Provides a space for you to type one or two DNS and WINS server addresses for this connection only. Dial-Up Networking tries to use these addresses first.

Use IP header compression – Specifies whether Dial-Up Networking uses IP header compression for this connection. IP header compression optimizes data transfer between computers.

Use default gateway on remote network – Specifies whether IP traffic is routed to the WAN connection by default.

Internet settings

A proxy server acts as a security barrier between your internal network (Intranet) and the Internet, keeping other people on the Internet from gaining access to confidential information on your internal network or your computer.

Disable Proxy Server – Do not use proxy server.

Enable Proxy Server – Use the Proxy server to gain access to the Internet.

Use the same proxy server for all protocols – Specifies whether you want to use the same proxy server to gain access to the Internet using all protocols.

Servers – Provides spaces for you to type the address and port number of the proxy server you want to use to gain access to the Internet over HTTP, Secure, FTP, Gopher, and Socks protocol.

Exceptions

Do not use proxy server for address beginning with – Provides a space for you to type the Web addresses that do not need to be accessed through the proxy server. If you want to connect to a computer on your Intranet, make sure you type its address in this box. You can use wild cards to match domain and host names or addresses, for example, "*.company.com", "192.72.111.*".

Bypass proxy server for local addresses – Specifies whether you want to use the proxy server for all local (Intranet) addresses. You might be able to gain access to local addresses easier and faster if you do not use the proxy server.

Sharing settings

I want to be able to give others access to my files – Turn file sharing ON or OFF. File sharing enables people using other computers to read or modify files you share on your computer.

I want to be able to allow others to print to my printer(s) – Turn printer sharing ON or OFF. Printer sharing enables people using other computers to printer their files on your printers.

Click **Save** button to save all the changes you have made without closing the Edit Configuration dialog box.

Click **Cancel** button to close the Edit Configuration dialog box without saving any changes you have made.

Click **Close** button to close the Edit Configuration dialog box and save any changes that you have made.

Site Monitor

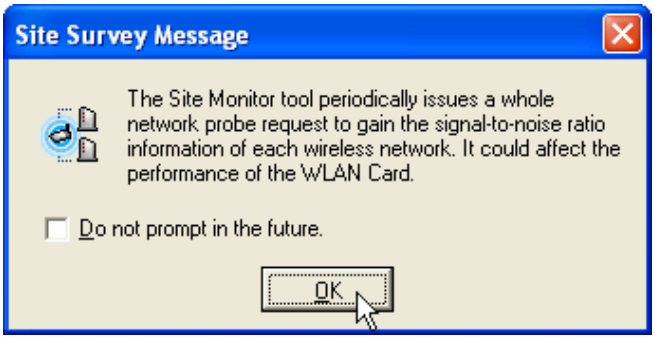
Site Monitor measures the received signal strength indicator (RSSI) values of all available wireless networks. This tool is used for determining the best placement of Access Points to provide the best coverage for a wireless network.

Starting Site Monitor

- Click the Windows **Start** button, select **Programs**, select **ASUS Dual-Band WLAN Card Utilities**, and then click **Site Monitor**.

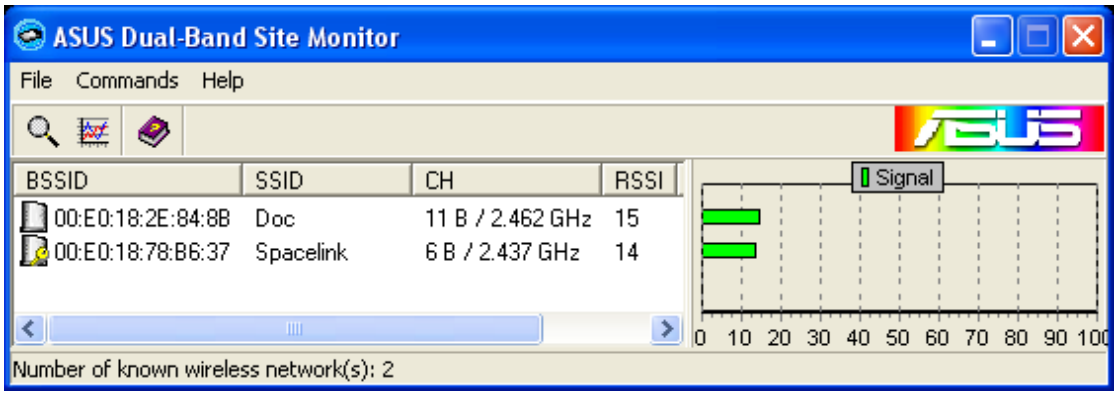
or

- Right-click the **Control Center** icon on the Windows taskbar and then click **Site Monitor**.



Main Screen

Measures the signal-to-noise (SNR) values of all available wireless networks.



Some Access Points can disable broadcasting SSID to hide themselves from "Site Survey" or "Site Monitor" for added security but still allow you to join if you know their SSID.

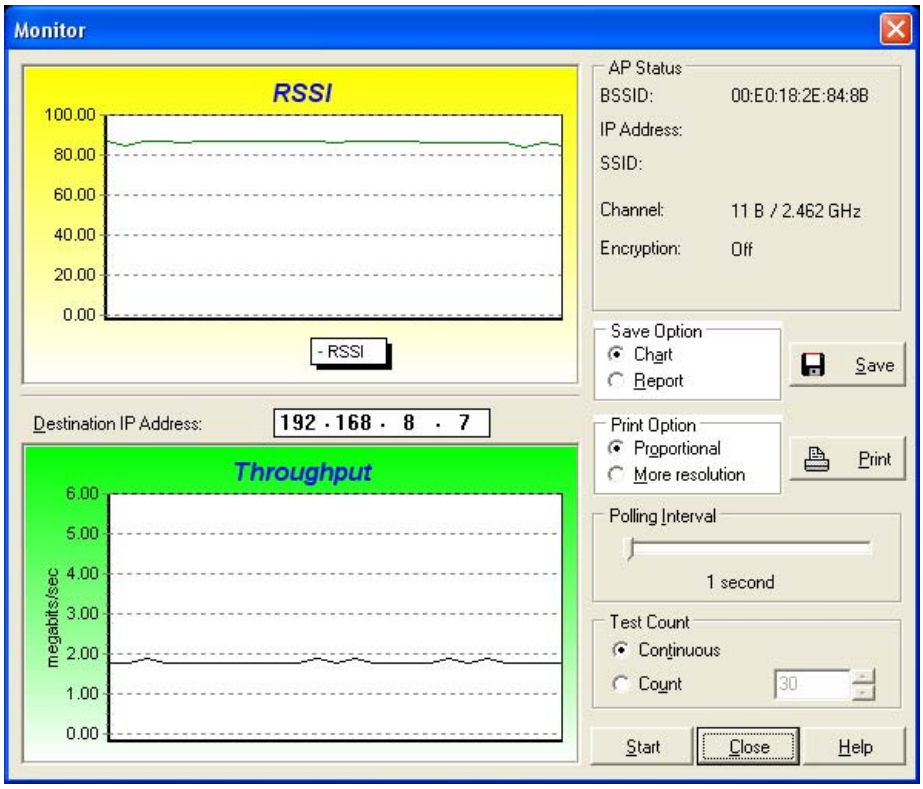
Monitor

Directed link state test with one particular wireless network, including:

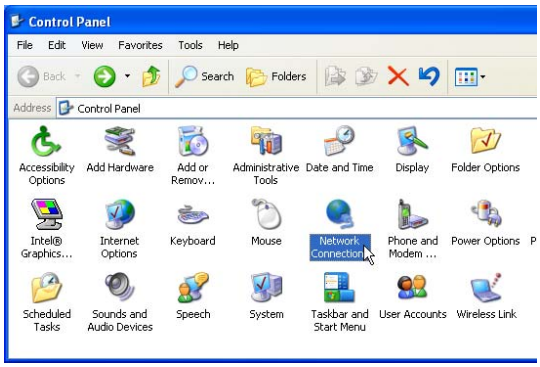
RSSI: This indicates the value of received signal strength of the last received frame. In principle, the higher the RSSI, the better your communications quality.

Throughput: This sends a specified number of data packets to the remote host and calculates the average megabytes per second.

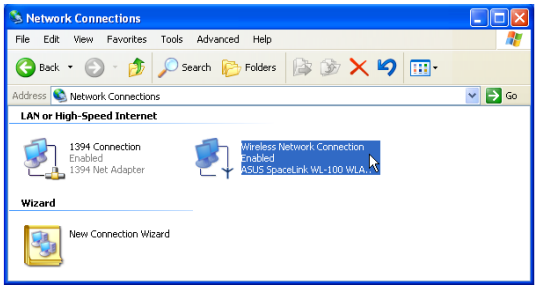
During the test, the Start button toggles to Stop. You can click Start button to begin the link test and click Stop button at any time to terminate the test.



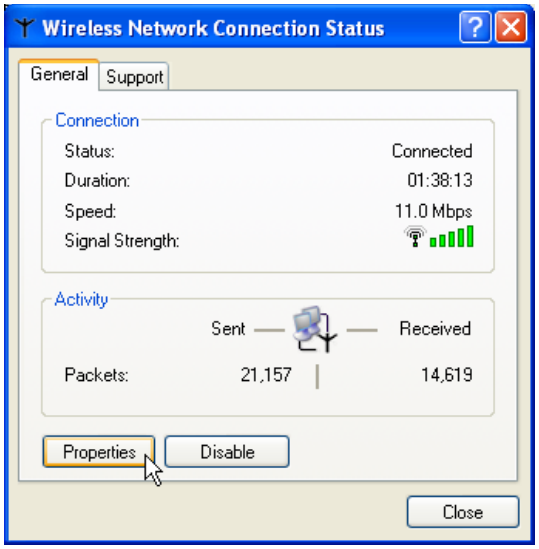
3.17 Windows XP Wireless Properties



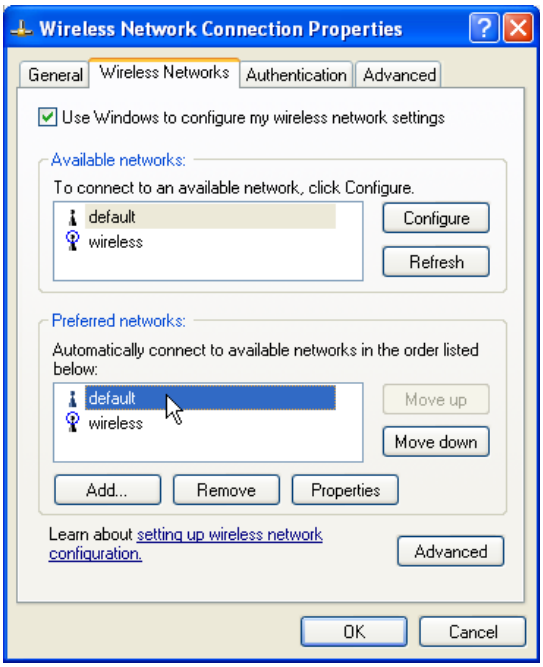
1. Double-click **System** icon in the Control Panel.



2. Double-click **ASUS SpaceLink WL230...**

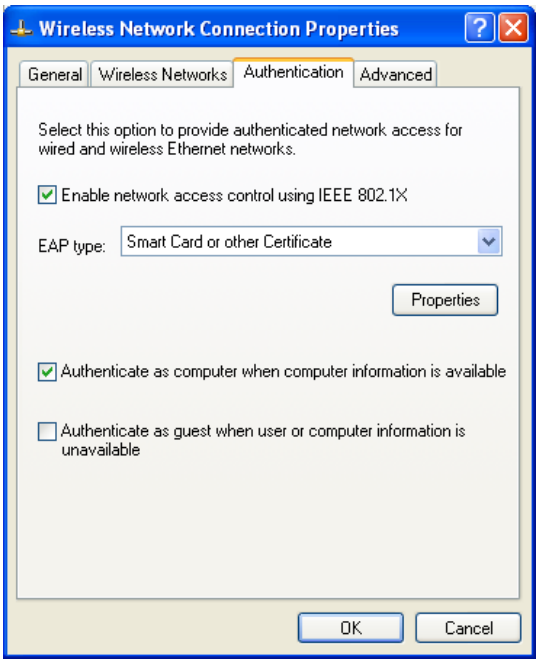


3. The "General" page will show status, duration, speed, and signal strength. Signal strength is represented by green bars with 5 bars meaning excellent signal and 1 bar meaning poor signal.

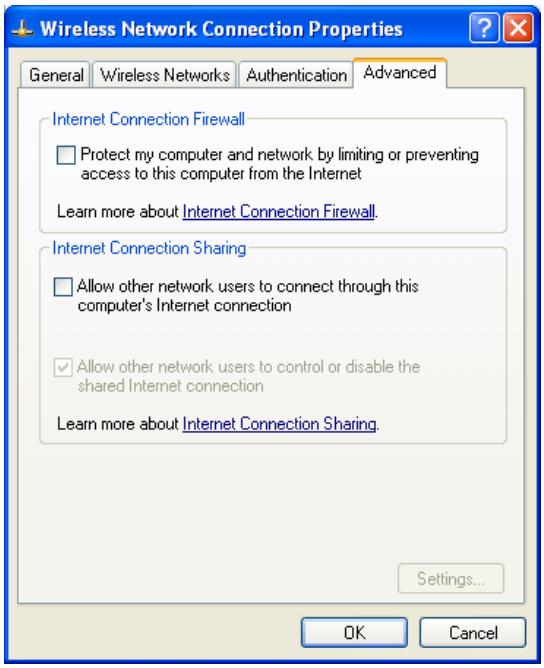


4. The "Wireless Networks" page will show Available networks and Preferred networks. Use the **Add** button to add the "SSID" of available networks and set the connection preference order with the **Move up** and **Move down** buttons. The radio tower with a signal icon identifies the currently connected access point.

3.7 Windows XP Wireless Properties (Cont.)



5. The "Authentication" page allows you to add security settings. Read Windows help for more information.



6. The "Advanced" page allows you to set firewall and sharing. Read Windows help for more information.

Bluetooth Reference

Introduction to Bluetooth

The term "Bluetooth" refers to a worldwide standard for the wireless exchange of data between two devices.

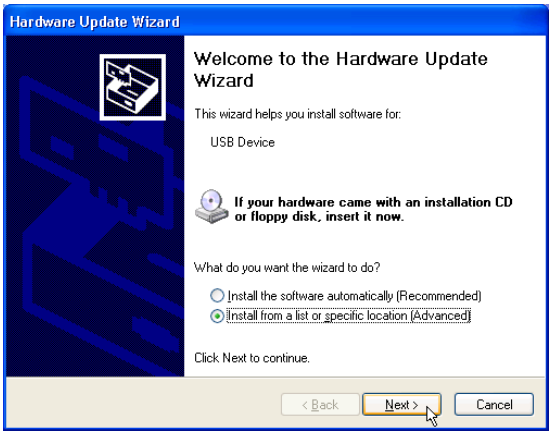
In order to exchange data, two Bluetooth devices must establish a connection. Before a connection is established, one device must request a connection with another. The second device accepts (or rejects) the connection. The originator of the request is known as the client. The device that accepts (or rejects) the request is known as the server. Many Bluetooth devices can act as both client and server.

A client Bluetooth device runs a software program that requests a connection to another device as part of its normal operation. For example, the program may request a connection to a remote computer, a printer, PDA, or a Cellular Phone. Becoming a Bluetooth client normally requires an action by the device operator, such as an attempt to browse a remote computer, print a file, or dial out on a Cellular Phone.

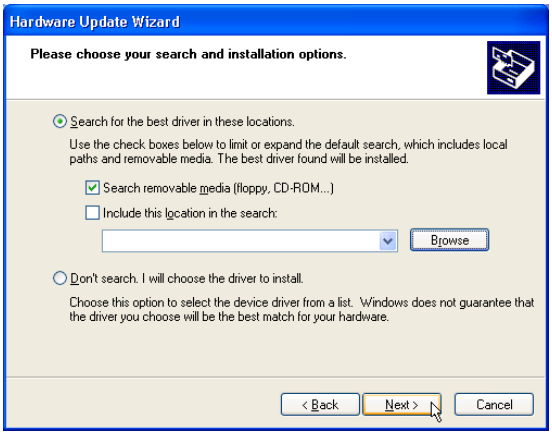
Every Bluetooth device that provides a service must be prepared to respond to a connection request. Bluetooth software is always running in the background on the server, ready to respond to connection requests.

Bluetooth Dongle

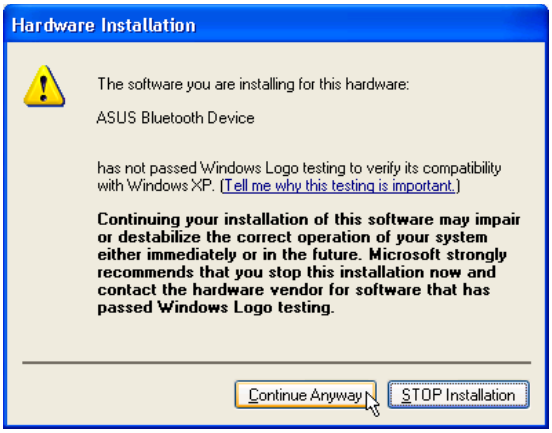
The Bluetooth dongle is an optional device. The following gives instructions on using a Bluetooth dongle with the ASUS SpaceLink B&W PCI Card.



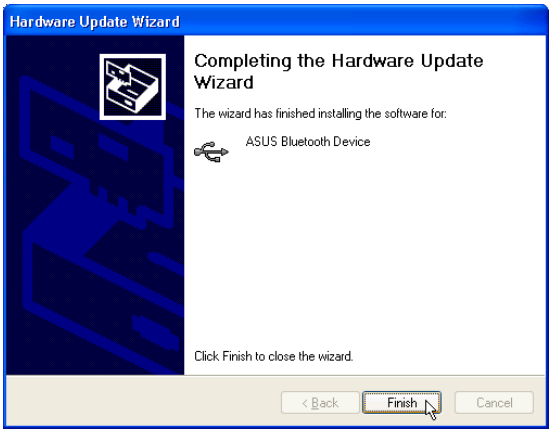
1. When you insert a USB Bluetooth dongle, "Hardware Update Wizard" will appear. Select "Install from a list..." and click **Next** to continue.



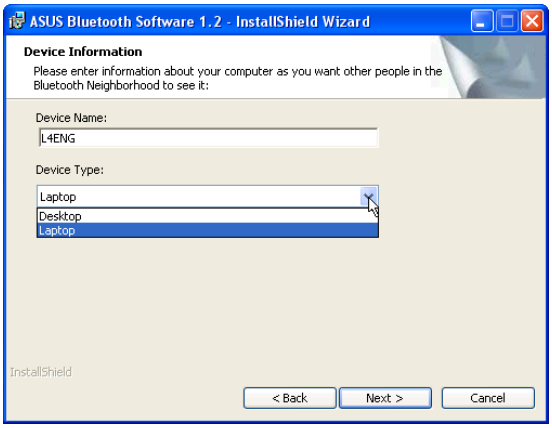
2. Select "Search removable..." and click **Next** to continue.



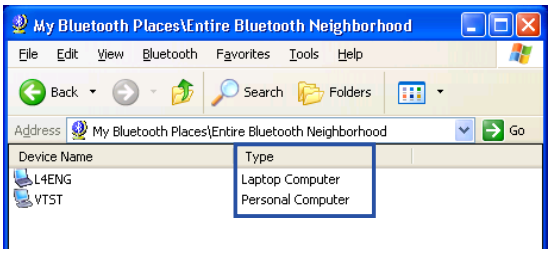
3. Click **Continue Anyway** on driver warnings when installing devices using bundled drivers.



4. Click **Finish** when the hardware update is complete.



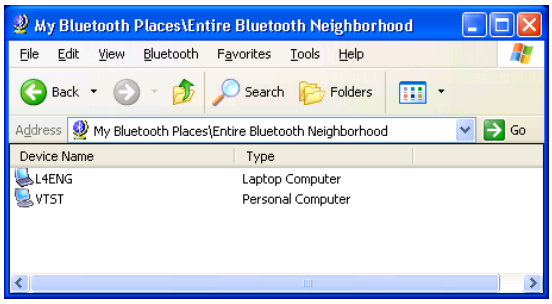
When installing software for your Bluetooth device, you may be asked about your device type in order to add type information to the "Entire Bluetooth Neighborhood".



Using the Bluetooth Software

This icon will appear on your desktop. Double-click to launch the Bluetooth utility.

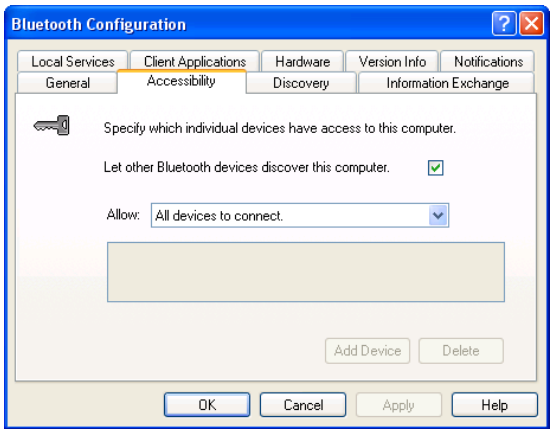
Click **Entire Bluetooth Neighborhood** to search for Bluetooth devices in range.



Devices within range will be shown in “Entire Bluetooth Neighborhood”

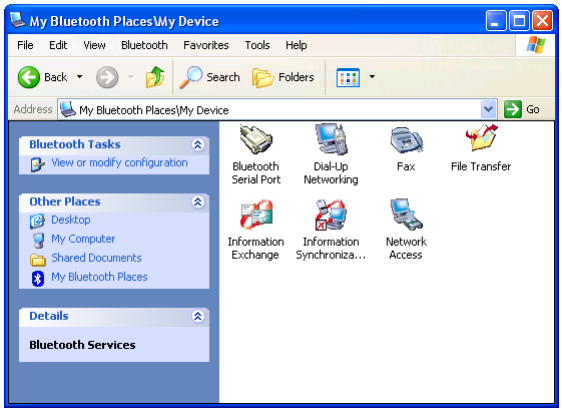
If you cannot see any devices within “Entire Bluetooth Neighborhood”, make sure that your devices are properly working and set to allow discovering.

Enable Discovering



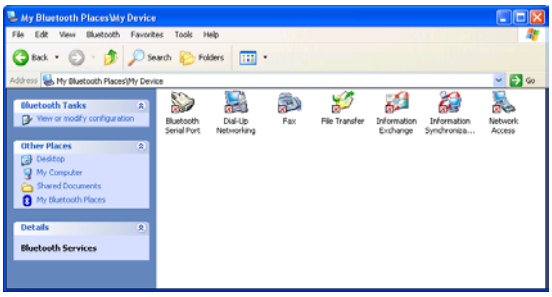
By default, Bluetooth devices will have their discovery option enabled. If you want to know where this is set, right-click the Bluetooth icon on the taskbar and choose **Setup | Configuration** in order to bring up the configuration window. Use the “Accessibility” page to “Let other Bluetooth devices discover this computer”.

Different Views



Depending on your Windows folder options, you will may see different sized icons. The above has “Show common tasks in folders” enabled and view “Tiles”.

Bluetooth Not Available

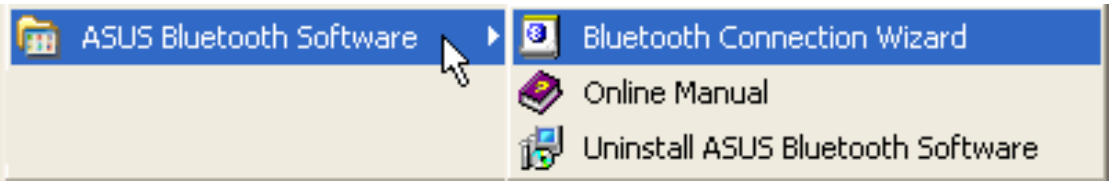


If your local Bluetooth device is not present or working, you will get red x’s on each Bluetooth service icon.

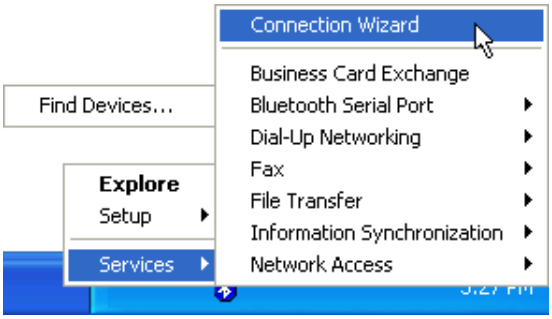
Chapter 4

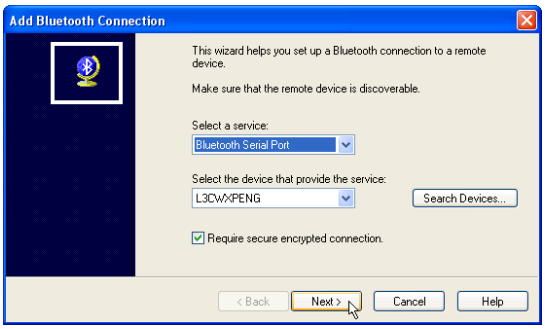
Bluetooth Connection Wizard

Using “My Bluetooth Places” and browsing to the individual service within a target device is actually easier to use than using the “Bluetooth Connection Wizard”. See “Services” a few pages later.

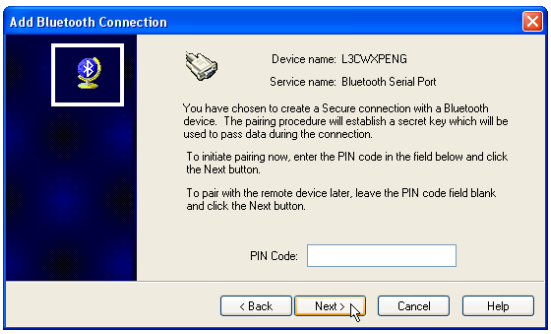


Launch the “Bluetooth Connection Wizard” from the Start menu or right click the Bluetooth icon on the taskbar. You can read about “Bluetooth Connection” in the Online Manual.

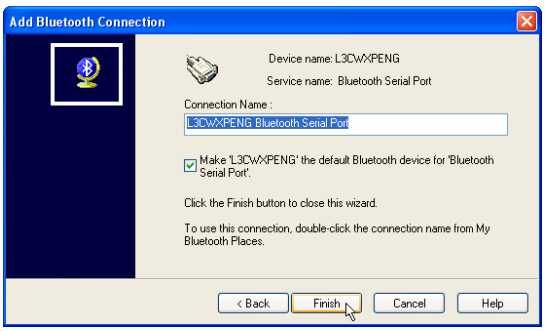




Select a service and target device.



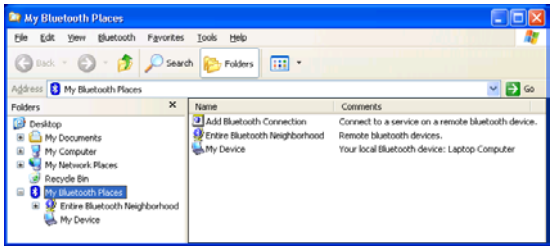
Enter a password if necessary.



Click Finish when completed.

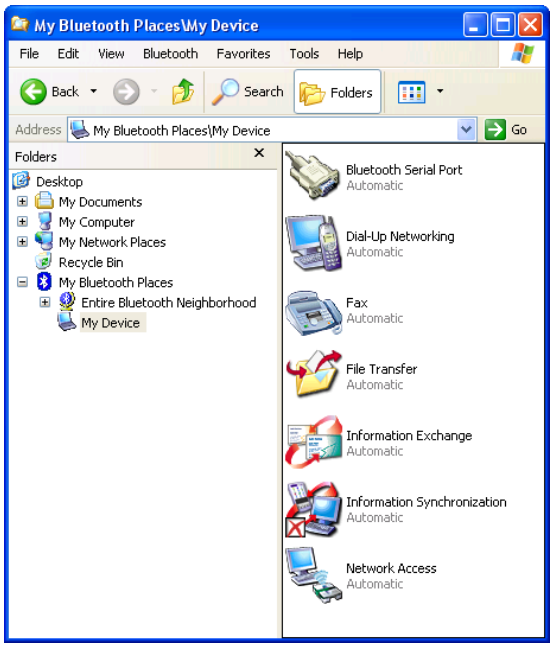
Explore

Besides double-clicking the Bluetooth icon on your desktop, you can right click and select **Explore** to view Bluetooth devices along with your entire computer in one window.



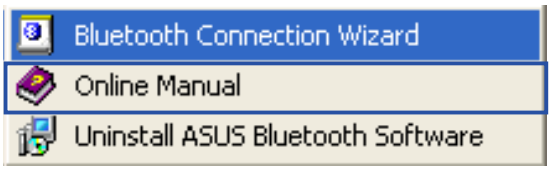
This is Windows "Explorer" utility with "My Bluetooth Places" selected.

This is Windows "Explorer" utility with "Entire Bluetooth Neighborhood" selected.



This is Windows "Explorer" utility with "My Device" selected.

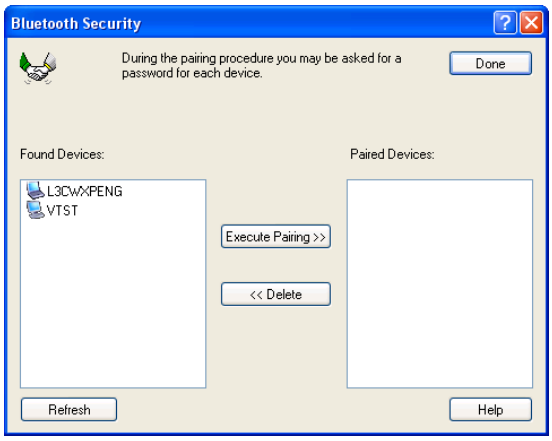
Setup



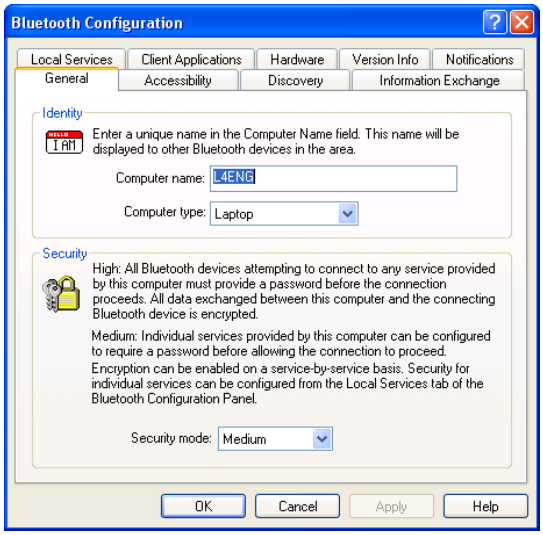
Right click and select **Setup** to view Bluetooth configuration options.

You can read about the Security and Configuration settings in the Online Manual.

Security

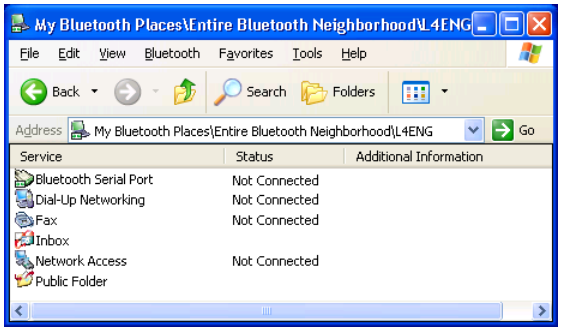


Configuration

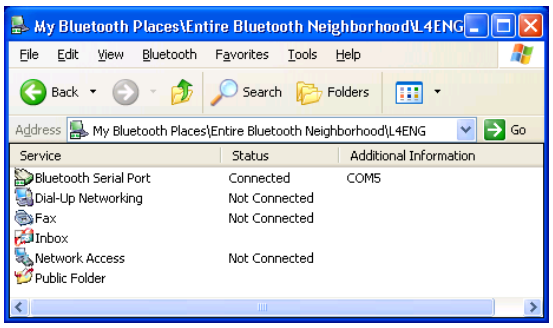


Services

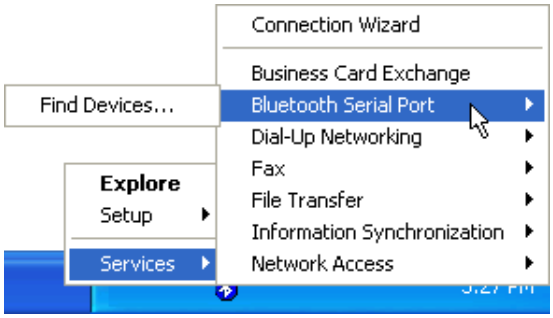
Using services on a target device are just as they would be on your own computer but you will be borrowing the target device's resources. For more information on those services, refer to your source or target's user's manual.



There are several other services available when you open the target device.



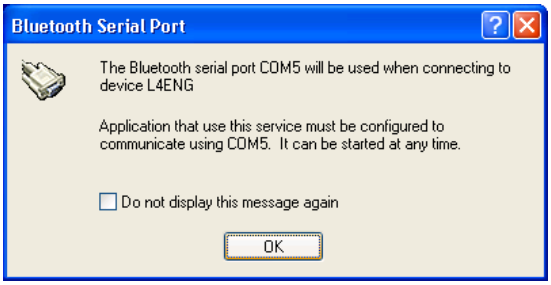
When you double-click a service, the "Status" will show "Connected". Because resources are limited, when you start a service, other services may be disconnected.



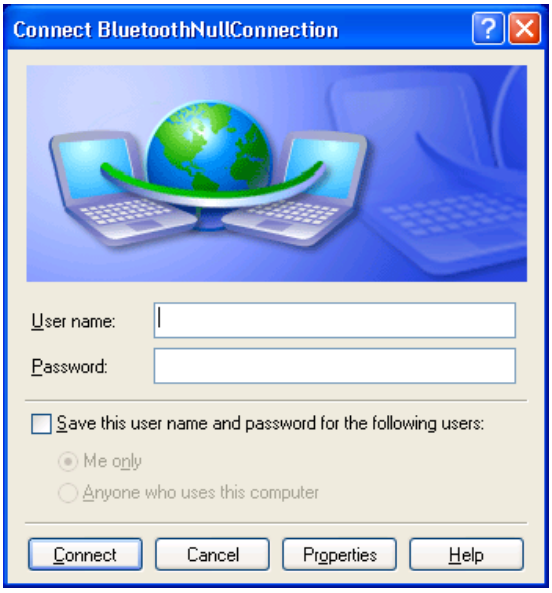
You can also use services from the Bluetooth taskbar icon. Right-click the icon to bring up the "Services" menu.

See next page for examples of each service.

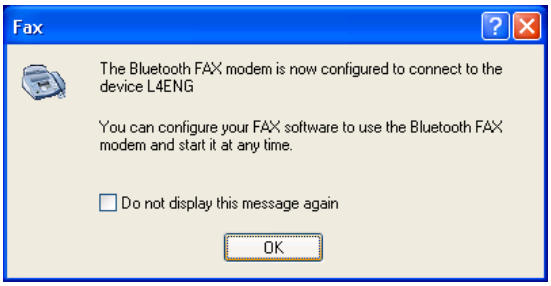
Serial Port



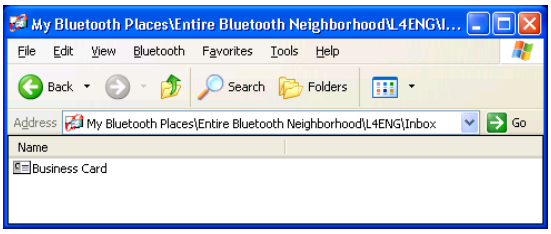
Dial-Up Networking



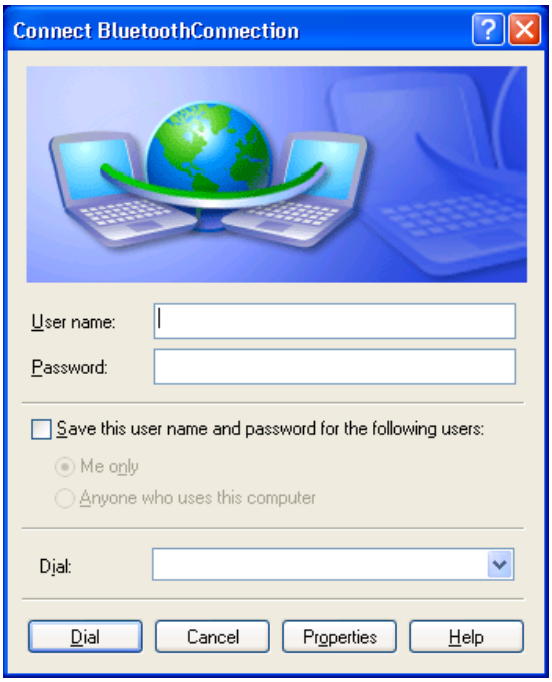
Fax



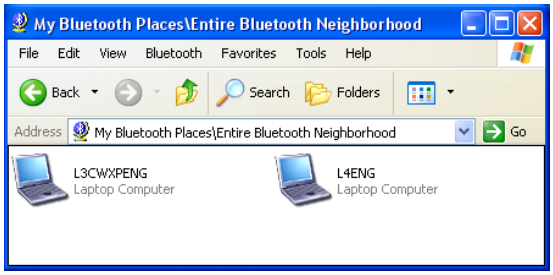
Inbox



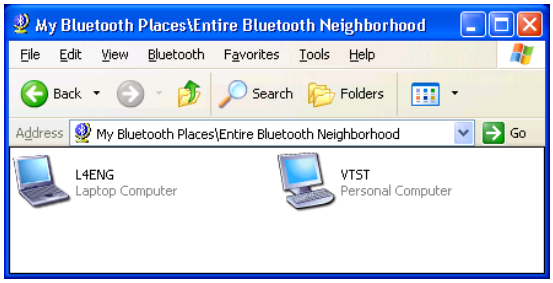
Network Access



File Transfer (to Public Folder)

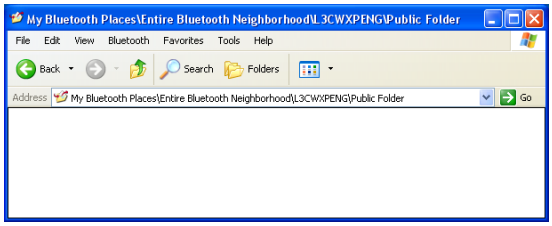


[Source] Selecting "Entire Bluetooth Neighborhood" will show available Bluetooth devices. You will not see yourself. The above example is a Personal Computer (Desktop PC) and only Laptop Computers (Notebook PC) are shown.

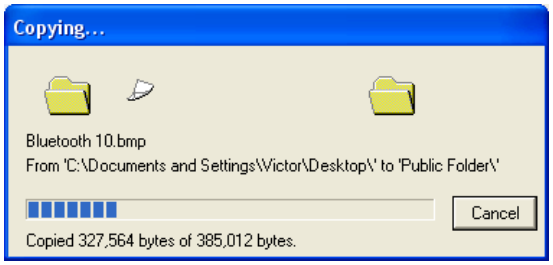


[Target] In this setup, there are two Laptop Computers and one Personal Computer. From one of the target Laptop Computers, you can see the Personal Computer that was not shown in the previous screen capture.

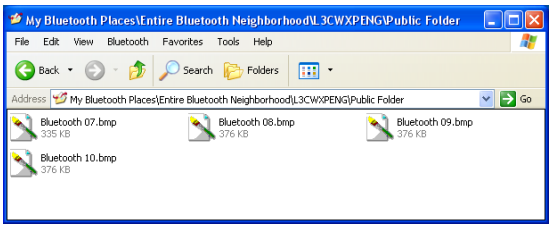
[Source] When you open the target device, the available services will be shown. Notice the device name in the "Address".



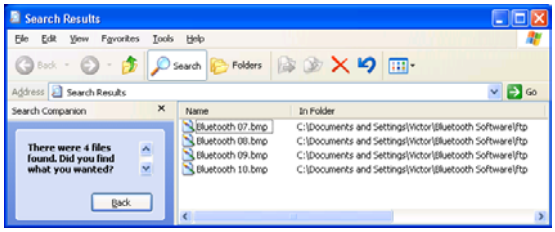
[Source] When you open the target device's "Public Folder" for the first time, it should be empty. Notice the device name in the "Address".



[Source] Drag and drop some files into the window to begin transferring files.

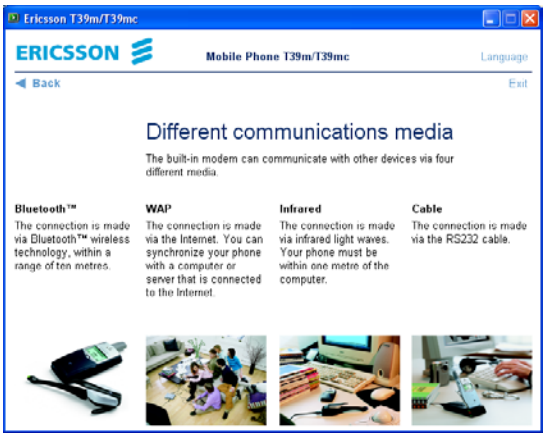


[Source] After copying, you will see the files in the other device. Notice the device name in the "Address".



[Target] You will find the files in the path similar to the one shown here. If the target device has a search option, you can use it to locate the files.

Bluetooth Cellular Phone



Modern cellular (also called mobile) phones have several connection options to make its features accessible to a wide range of devices and computers in several environments.

When using a Bluetooth Cellular phone such as the Ericsson T39, you can see target Bluetooth devices similar to using a computer. Under (5) Extras menu, there is (5) Bluetooth options.

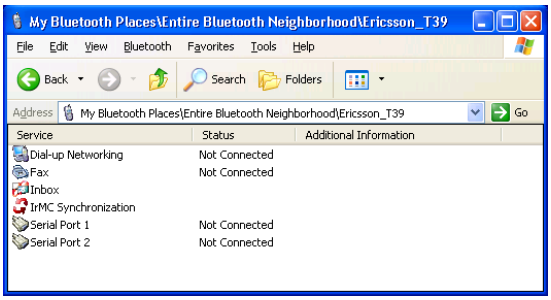
(1) Discoverable - use this to allow other to be able to see your Cellular phone. The Ericsson T39 will only enable this function for 3 mins at a time for security reasons.

(2) Paired devices - add Bluetooth devices to connect to

(3) Discover - use this to search for available Bluetooth devices.

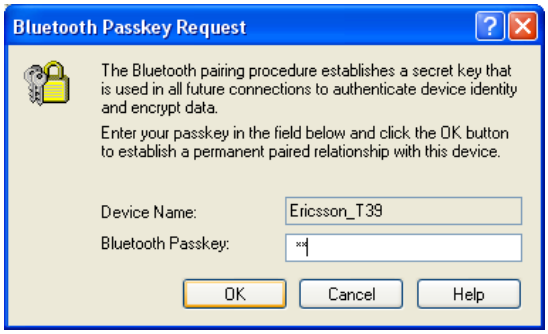
(4) Operation mode - set the operation mode for the Ericsson T39

Here we can see the Ericsson T39 when using a computer equipped Bluetooth.



Here are the available services using the Ericsson T39.

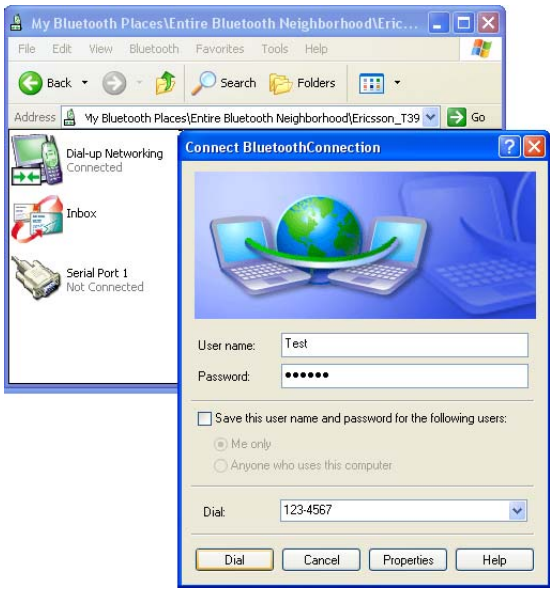
Pairing



Pairing is necessary in order to utilize another device's resources. You will be asked to enter a password on both devices. The first device (a computer in this case) sets the password and the second device (the Ericsson T39 in this case) must enter the same password. Since the Ericsson T39 can only enter numbers as the password, make sure you also use numbers as the password on the computer.

Dial-Up Networking with Bluetooth Cellular Phone

This is the same as one computer using another computer's resources to access the Internet. While on the road, you can borrow your Bluetooth cellular phone's modem without connecting a cable. This is like using a computer and a modem at home to access the Internet through an Internet Service Provider (ISP).



To access the Internet, you need to dial-up to your Internet Service Provider (ISP), double click "Dial-up Networking" in the Ericsson_T39 window. Enter your ISP account "User name", "Password", and Phone Number.

5. Troubleshooting

The below troubleshooting guides provide answers to some of the more common problems, which you may encounter while installing or using ASUS SpaceLink B&W PCI Card products. If you encounter difficulties that are not mentioned in this section, please contact ASUS Wireless LAN Technical Support.

Verify if the PCI Card is installed correctly.

When the ASUS SpaceLink B&W PCI Card setup task is complete, you can verify if the driver has been setup properly. Right click **My Computer**, select **Properties**, and click the **Device Manager** tab. Then double-click the **Network adapters** icon; you should see "ASUS 11a/b PCI Wireless Network Adapter" with an icon of expansion card. There should not be a "!" or "?" (problem) or "x" (disabled) symbol over this icon.

There is a yellow exclamation mark or a yellow question mark in Device Manager in front of my ASUS SpaceLink B&W PCI Card.

To resolve the problem, you should update/reinstall the ASUS SpaceLink B&W PCI Card driver. In "Device Manager", right click **ASUS 11a/b PCI Wireless Network Adapter**, select **Properties**, and select **Driver** tab. Click on **Update Driver** button, then follow the "Update Device Driver Wizard" to complete the driver installation.

In addition, you may be able to resolve this issue by reinstalling the driver. Choose **ASUS 11a/b PCI Wireless Network Adapter**, click **Remove** button in "Device Manager", and then run the **Add New Hardware Wizard** from the **Control Panel**.

Cannot connect to any Access Points

Follow the procedure below to configure your ASUS SpaceLink B&W PCI Card.

a. Verify that the "Network Type" is in "Infrastructure" mode.

b. Verify that the "SSID" of your ASUS SpaceLink B&W PCI Card is set to the same "SSID" of an Access Point.

c. Verify that the "Encryption" type is the same as that of an Access Point. If you enabled "WEP" encryption, you must also set the same WEP Keys on both sides.

Cannot connect to a Station (ASUS SpaceLink B&W PCI Card)

Follow the procedure below to configure your ASUS SpaceLink B&W PCI Card.

a. Verify that the “Network Type” is in “Ad Hoc” mode.

b. Verify that the “SSID” of your ASUS SpaceLink B&W PCI Card is set to the same “SSID” of the other station (or another ASUS SpaceLink B&W PCI Card).

c. Verify that the “channel” of the ASUS SpaceLink B&W PCI Card is “Auto” or set to the same “channel” of the other station (or another ASUS SpaceLink B&W PCI Card).

d. Verify that the “Encryption” type is the same as the other station (or another ASUS SpaceLink B&W PCI Card). If “WEP” encryption is enabled, you must set the same “WEP” Keys on both stations.

Bad link quality or bad signal strength

There are two possible reasons. First is radio interference, keep the environment around the ASUS SpaceLink B&W PCI Card away from microwave ovens and large metal objects. Then try to reorient the ASUS SpaceLink B&W PCI Card antenna. Second is the distance, decrease the distance between your ASUS SpaceLink B&W PCI Card and the Access Point or station (or another ASUS SpaceLink B&W PCI Card).

The TCP/IP protocol did not bind to the SpaceLink PC Card.

This will occur when the computer already has six TCP/IP bindings in Windows 98 or ten bindings in Windows Me. These limits are imposed by the Microsoft operating system.

Solution: If your computer already has the maximum number of TCP/IP bindings, remove one of the network adapters from the Network configuration before installing the ASUS SpaceLink B&W PCI Card driver.

6. Glossary

Access Point (AP)
An networking device that seamlessly connects wired and wireless networks. Access Points combined with a distributed system support the creation of multiple radio cells that enable roaming throughout a facility.

Ad Hoc
A wireless network composed solely of stations within mutual communication range of each other (no Access Point).

Basic Service Area (BSS)
A set of stations controlled by a single coordination function.

Channel
An instance of medium use for the purpose of passing protocol data units that may be used simultaneously, in the same volume of space, with other instances of medium use (on other channels) by other instances of the same physical layer, with an acceptably low frame error ratio due to mutual interference.

COFDM
See next few pages for detailed explanation.

Direct-Sequence Spread Spectrum
See next few pages for detailed explanation.

Extended Service Set (ESS)
A set of one or more interconnected basic service set (BSSs) and integrated local area networks (LANs) can be configured as an Extended Service Set.

Ethernet
The most widely used LAN access method, which is defined by the IEEE 802.3 standard. Ethernet is normally a shared media LAN meaning all devices on the network segment share total bandwidth. Ethernet networks operate at 10Mbps using CSMA/CD to run over 10-BaseT cables.

Gateway
A network component that acts as an entrance to another network.

IEEE 802.11
IEEE 802.xx is a set of specifications for LANs from the Institute of Electrical and Electronic Engineers (IEEE). Most wired networks conform to 802.3, the specification for CSMA/CD based Ethernet networks or 802.5, the specification for token ring networks. 802.11 defines the standard for wireless LANs encompassing three incompatible (non-interoperable) technologies: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), and Infrared. 802.11 specifies a carrier sense media access control and physical layer specifications for 1 and 2 Mbps wireless LANs.

IEEE 802.11a / IEEE 802.11b
See next few pages for detailed explanations.

Infrastructure
A wireless network centered about 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.

IP (Internet Protocol)
The TCP/IP standard protocol that defines the IP datagram as the unit of information passed across an Internet and provides the basis for connectionless packet delivery service. IP includes the ICMP control and error message protocol as an integral part. It provides the functional equivalent of ISO OSI Network Services.

IP Address
An IP address is a 32-bit number that identifies each sender or receiver of information that is sent across the Internet. An IP address has two parts: the identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network.

ISM Bands (Industrial, Scientific, and Medicine Bands)
Radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 902 MHz, 2.400 GHz, and 5.7 GHz.

ISP (Internet Service Provider)
An organization that provides access to the Internet. Small ISPs provide service via modem and ISDN while the larger ones also offer private line hookups (T1, fractional T1, etc.).

LAN (Local Area Network)
A communications network that serves users within a defined geographical area. The benefits include the sharing of Internet access, files and equipment like printers and storage devices. Special network cabling (10 Base-T) is often used to connect the PCs together.

NIC (Network Interface Card)
A network adapter inserted into a computer so that the computer can be connected to a network. It is responsible for converting data from stored in the computer to the form transmitted or received.

Packet
A basic message unit for communication across a network. A packet usually includes routing information, data, and sometimes error detection information.

PCMCIA (Personal Computer Memory Card International Association)
The Personal Computer Memory Card International Association (PCMCIA), develops standards for PC cards, formerly known as PCMCIA cards. These cards are available in three types, and are have about the same length and width as credit cards. However, the different width of the cards ranges in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for various functions, including memory storage, landline modems and wireless modems.

Radio Frequency (RF) Terms: GHz, MHz, Hz
The international unit for measuring frequency is Hertz (Hz), equivalent to the older unit of cycles per second. One megahertz (MHz) is one million Hertz. One gigahertz (GHz) is one billion Hertz. 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 wireless 802.11 LANs operate at 2.4 GHz.

SSID (Service Set ID)
SSID is a group name shared by every member of a wireless network. Only client PCs with the same SSID are allowed to establish a connection.

Station
Any device containing IEEE 802.11 wireless medium access conformity.

TCP (Transmission Control Protocol)
The standard transport level protocol that provides the full duplex, stream service on which many application protocols depend. TCP allows a process or one machine to send a stream of data to a process on another. Software implementing TCP usually resides in the operating system and uses the IP to transmit information across the network.

IEEE 802.11b (11Mbits/sec)

In 1997, the Institute of Electrical and Electronics Engineers (IEEE) adopted the 802.11 standard for wireless devices operating in the 2.4 GHz frequency band. This standard includes provisions for three radio technologies: direct sequence spread spectrum, frequency hopping spread spectrum, and infrared. Devices that comply with the 802.11 standard operate at a data rate of either 1 or 2 Mbps.

In 1999, the IEEE created the 802.11b standard. 802.11b is essentially identical to the 802.11 standard except 802.11b provides for data rates of up to 11 Mbps for direct sequence spread spectrum devices. Under 802.11b, direct sequence devices can operate at 11 Mbps, 5.5 Mbps, 2 Mbps, or 1 Mbps. This provides interoperability with existing 802.11 direct sequence devices that operate only at 2 Mbps.

Direct sequence spread spectrum devices spread a radio signal over a range of frequencies. The IEEE 802.11b specification allocates the 2.4 GHz frequency band into 14 overlapping operating Channels. Each Channel corresponds to a different set of frequencies. See the Appendix to determine the center frequency used by each Channel.

If operating multiple 802.11b Wireless PCI Cards in the same vicinity, the distance between the center frequencies must be at least 25 MHz to avoid interference. Note that the Channels available to an 802.11b Wireless PCI Card will vary from country to country. In the United States, the 802.11b standard allocates 11 operating Channels for direct sequence devices. Channels 1, 6, and 11 are independent and do not overlap with each other. To avoid interference between 802.11b Wireless PCI Cards, It is recommended that you configure the Wireless PCI Cards using only Channels 1, 6, and 11.

Direct-Sequence Spread Spectrum (for 802.11b)

Spread spectrum (broadband) uses a narrowband signal to spread the transmission over a segment of the radio frequency band or spectrum. Direct-sequence is a spread spectrum technique where the transmitted signal is spread over a particular frequency range. The Space Link Wireless PCI Card uses Direct-Sequence Spread Spectrum (DSSS) for radio communication.

Direct-sequence systems communicate by continuously transmitting a redundant pattern of bits called a chipping sequence. Each bit of transmitted data is mapped into chips by the Wireless PCI Card and rearranged into a pseudorandom spreading code to form the chipping sequence. The chipping sequence is combined with a transmitted data stream to produce the Wireless PCI Card output signal.

Wireless mobile clients receiving a direct-sequence transmission use the spreading code to map the chips within the chipping sequence back into bits to recreate the original data transmitted by the Wireless PCI Card. Intercepting and decoding a direct-sequence transmission requires a predefined algorithm to associate the spreading code used by the transmitting Wireless PCI Card to the receiving wireless mobile client.

This algorithm is established by IEEE 802.11b specifications. The bit redundancy within the chipping sequence enables the receiving wireless mobile client to recreate the original data pattern, even if bits in the chipping sequence are corrupted by interference. The ratio of chips per bit is called the spreading ratio. A high spreading ratio increases the resistance of the signal to interference. A low spreading ratio increases the bandwidth available to the user. The Wireless PCI Card uses a constant chip rate of 11Mchips/s for all data rates, but uses different modulation schemes to encode more bits per chip at the higher data rates. The Wireless PCI Card is capable of an 11 Mbps data transmission rate, but the coverage area is less than a 1 or 2 Mbps Wireless PCI Card since coverage area decreases as bandwidth increases.

IEEE 802.11a (54Mbits/sec)

The 802.11b standard was designed to operate in the 2.4-GHz ISM (Industrial, Scientific and Medical) band using direct-sequence spread-spectrum technology. The 802.11a standard, on the other hand, was designed to operate in the more recently allocated 5-GHz UNII (Unlicensed National Information Infrastructure) band. And unlike 802.11b, the 802.11a standard departs from the traditional spread-spectrum technology, instead using a frequency division multiplexing scheme that's intended to be friendlier to office environments.

The 802.11a standard, which supports data rates of up to 54 Mbps, is the Fast Ethernet analog to 802.11b, which supports data rates of up to 11 Mbps. Like Ethernet and Fast Ethernet, 802.11b and 802.11a use an identical MAC (Media Access Control). However, while Fast Ethernet uses the same physical-layer encoding scheme as Ethernet (only faster), 802.11a uses an entirely different encoding scheme, called OFDM (orthogonal frequency division multiplexing).

The 802.11b spectrum is plagued by saturation from wireless phones, microwave ovens and other emerging wireless technologies, such as Bluetooth. In contrast, 802.11a spectrum is relatively free of interference.

The 802.11a standard gains some of its performance from the higher frequencies at which it operates. The laws of information theory tie frequency, radiated power and distance together in an inverse relationship. Thus, moving up to the 5-GHz spectrum from 2.4 GHz will lead to shorter distances, given the same radiated power and encoding scheme.

COFDM (for 802.11a)

Power alone is not enough to maintain 802.11b-like distances in an 802.11a environment. To compensate, vendors specified and designed a new physical-layer encoding technology that departs from the traditional direct-sequence technology being deployed today. This technology is called COFDM (coded OFDM). COFDM was developed specifically for indoor wireless use and offers performance much superior to that of spread-spectrum solutions. COFDM works by breaking one high-speed data carrier into several lower-speed subcarriers, which are then transmitted in parallel. Each high-speed carrier is 20 MHz wide and is broken up into 52 subchannels, each approximately 300 KHz wide. COFDM uses 48 of these subchannels for data, while the remaining four are used for error correction. COFDM delivers higher data rates and a high degree of multipath reflection recovery, thanks to its encoding scheme and error correction.

Each subchannel in the COFDM implementation is about 300 KHz wide. At the low end of the speed gradient, BPSK (binary phase shift keying) is used to encode 125 Kbps of data per channel, resulting in a 6,000-Kbps, or 6 Mbps, data rate. Using quadrature phase shift keying, you can double the amount of data encoded to 250 Kbps per channel, yielding a 12-Mbps data rate. And by using 16-level quadrature amplitude modulation encoding 4 bits per hertz, you can achieve a data rate of 24 Mbps. The 802.11a standard specifies that all 802.11a-compliant products must support these basic data rates. The standard also lets the vendor extend the modulation scheme beyond 24 Mbps. Remember, the more bits per cycle (hertz) that are encoded, the more susceptible the signal will be to interference and fading, and ultimately, the shorter the range, unless power output is increased.

7. Safety Information

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

WARNING! The use of a shielded-type power cord is required in order to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used. Use only shielded cables to connect I/O devices to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Reprinted from the Code of Federal Regulations #47, part 15.193, 1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office.

Canadian Department of Communications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Regulatory information / Disclaimers

Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution of the connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

CAUTION: To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with minimum distance [20cm] between the radiator and your body. Use on the supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations.

MPE Statement (Safety Information)

Your device contains a low power transmitter. When device is transmitted it sends out Radio Frequency (RF) signal.

Safety Information

In order to maintain compliance with the FCC RF exposure guidelines, this equipment should be installed and operated with minimum distance **[20cm]** between the radiator and your body. Use only with supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations.

Caution Statement of the FCC Radio Frequency Exposure

This Wireless LAN radio device has been evaluated under FCC Bulletin OET 65C and found compliant to the requirements as set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247(b)(4) addressing RF Exposure from radio frequency devices. The radiation output power of this Wireless LAN device is far below the FCC radio frequency exposure limits. Nevertheless, this device shall be used in such a manner that the potential for human contact during normal operation – as a mobile or portable device but use in a body-worn way is strictly prohibit. When using this device, a certain separation distance between antenna and nearby persons has to be kept to ensure RF exposure compliance. In order to comply with the RF exposure limits established in the ANSI C95.1 standards, the distance between the antennas and the user should not be less than **[20cm]**.

SAR Exposure

This device has been tested for compliance with FCC RF Exposure (SAR) limits in typical laptop configurations.

In order to comply with SAR limits established in the ANSI C95.1 standards, it is recommended when using a PC card adapter that the integrated antenna is positioned more than **[20cm]** from your body or nearby persons during extended periods of operation. If the antenna is positioned less than **[20cm]** from the user, it is recommended that the user limit the exposure time.

Radio Frequency Interference Requirements

This device is restricted to INDOOR USE due to its operation in the 5.15 to 5.25GHz frequency range. FCC requires this product to be used indoors for the frequency range 5.15 to 5.25GHz to reduce the potential for harmful interference to co-channel of the Mobile Satellite Systems.

High power radars are allocated as primary user of the 5.25 to 5.35GHz and 5.65 to 5.85GHz bands. These radar stations can cause interference with and / or damage this device

BTW Configuration & User's Guide

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Confidential and Proprietary Information

Wireless Internet and Data Communication
9645 Scranton Road, Suite 205
San Diego, CA 92121
Phone: 858.453.8400
Fax: 858.453.5735
Email
Technical Support: support@widcomm.com
Information: info@widcomm.com

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1 Introduction

1.1 INTRODUCTION TO BLUETOOTH

The term "Bluetooth" refers to a worldwide standard for the wireless exchange of data between two devices.

In order to exchange data, two Bluetooth devices must establish a connection.

Before a connection is established, one device must request a connection with another. The second device accepts (or rejects) the connection.

The originator of the request is known as the client.

The device that accepts (or rejects) the request is known as the server.

Many Bluetooth devices can act as both client and server.

A client Bluetooth device runs a software program that requests a connection to another device as part of its normal operation. For example, the program may request a connection to a remote computer, a printer, or a modem.

Becoming a Bluetooth client normally requires an action by the device operator, such as an attempt to browse a remote computer, print a file, or dial out on a modem.

Every Bluetooth device that provides a service must be prepared to respond to a connection request. Bluetooth software is always running in the background on the server, ready to respond to connection requests.

1.2 INTRODUCTION TO BTW

BTW is the solution for the seamless integration of Bluetooth technology into personal computers.

For an overview of the features added in this release, see What's New.

Most Bluetooth-enabled devices have the capability to act as:

- A Bluetooth server—these devices provide one or more services, such as access to the Internet, to other Bluetooth devices.
- A Bluetooth client—these devices use the service(s) provided by Bluetooth servers.

Bluetooth devices that can act as both server and client can often do both at the same time.

BTW provides:

- Clients with the means:
  - To locate other Bluetooth devices in the immediate vicinity (inquiry)
  - Discover the services that those devices offer (discovery)
  - Connect to, use, and disconnect from those services.
- Servers with the means to include/exclude individual services in the list of services they provide to clients.
- Extensive security, including:
  - Authorization
  - Authentication
  - Encryption.

BTW supports

- Windows 2000.
- Windows 98SE (Second Edition).
- Windows Me (Millennium Edition)
- Windows XP Professional
- Windows XP Home Edition.

BTW functions the same way, regardless of the supported version of Windows on which it is running.

The services supported by BTW are:

- **Bluetooth Serial Port**—establishes a Bluetooth wireless connection between two devices. The connection may be used by applications as though a physical serial cable connected the devices.
- **Dial-up Networking**—allows a Bluetooth client to use a modem that is physically attached to the Bluetooth server.
- **Fax**—allows a Bluetooth client to wirelessly send a fax using a device that is physically attached to the Bluetooth server.
- **File Transfer**—establishes a Bluetooth wireless connection that allows your computer to perform file system operations on another Bluetooth-enabled device—browse, drag/drop, open, print, cut/copy, paste, delete, rename, etc.
- **Information Exchang**e—establishes a Bluetooth wireless connection between two devices so that they can exchange personal information manager data such as business cards, calendar items, email messages, and notes.
- **Information Synchronization**—establishes a Bluetooth wireless connection between two devices and uses the connection to synchronize Personal Information Manager data between the two devices.
- **Network Access**—establishes a Bluetooth wireless connection between the client and a server that is physically connected to the Local Area Network. If the client has permission (user name and password for the LAN), the wireless connection can be used as if the client were hardwired to the LAN.

All Bluetooth servers do not necessarily provide all of these services. For example, a network gateway may only provide access to the Local Area Network (the Network Access service).

To determine the services provided by a Bluetooth device:

1. On the client, in the Folders pane of My Bluetooth Places, select Entire Bluetooth Neighborhood.
2. In the right pane of Entire Bluetooth Neighborhood, right-click anywhere *except on a device name* and select Refresh from the pop-up menu.

In the Folders pane of My Bluetooth Places, right-click a device and select Discover Available Services from the pop-up menu to update the available services list. The available services will be displayed in the right pane of My Bluetooth Places.

1.3 BLUETOOTH DEVICE IDENTITY

Every Bluetooth device has a unique 48-bit binary Bluetooth Device Address (BDA) burned into its Read-Only Memory (ROM). This address cannot be changed by the end-user.

A device's BDA is usually displayed in hexadecimal format; 00:D0:B7:03:2E:9F is a valid BDA.

Each Bluetooth device also has an operator-configurable, user-friendly name to help distinguish it from other Bluetooth devices. The user-friendly name may be up to 99 alphanumeric characters in length and may contain spaces. **My Personal Computer** is a valid user-friendly name.

1.4 ICONS USED FOR BLUETOOTH DEVICES AND SERVICES

Bluetooth icons provide at-a-glance feedback about a device or service's status by changing appearance.

Device icons are shown in Table 1 and Table 2.

Table 1: Device icons for all operating systems **Except** *Windows XP*

Device Icons (except Windows XP, see below)			
Device Type	**Normal**	**Connected**	**Paired**
Cellular Telephone			
Desktop Computer			
Laptop Computer			
Modem			
Network Access Point			
Personal Digital Assistant			
Printer			
Unknown Devices			

Table 2: Device icons for Windows XP

Windows XP Device Icons			
Device Type	**Normal**	**Connected**	**Paired**
Cellular Telephone			
Desktop Computer			
Laptop Computer			
Modem			
Network Access Point			
Personal Digital Assistant			
Printer			
Unknown Devices			

Service icons are shown in Table 3 and Table 4.

Table 3: Service icons for all operating systems **Except** *Windows XP*

Service Icons (except Windows XP, see below)		
Service Name	**Normal**	**Connected**
Bluetooth Serial Port		
Dial-up Networking		
Fax		
File Transfer		
Information Exchange		
Information Synchronization		
Network Access		
* Services may be unavailable because they are in use or because the necessary hardware is not installed.		

Table 4: Service icons for Windows XP

Windows XP Service Icons			
Service Type	**Normal**	**Connected**	**Unavailable***
Dial-up Networking			
Fax			
File Transfer			
Information Exchange			
Network Access			
Serial Port			
Information Synchronization			
Services may be unavailable because they are in use or because the necessary hardware is not installed.			

1.5 WHAT'S NEW

- A Connection Wizard now helps you set up new connections and places a shortcut to the new connection in My Bluetooth Places.
  - Extensive right-click context sensitive menu support throughout, including the ability to:
  - Access the Bluetooth Configuration Panel.
  - Create connection shortcuts.
  - Discover services.
  - Display connection status.
  - Display properties for connections, shortcuts to connections, local devices and services, remote devices and services.
  - Open and close connections.
  - Pair and un-pair devices.
  - Refresh lists of devices, services, and folder contents.
- Context sensitive What's This Help in the Bluetooth Configuration Panel.
- A Relative Signal Strength Indicator/Properties dialog box has been added for every connection. right-click the connection and select Status to display the dialog box.
- Enhanced Windows system tray functions that provide quick access to:
  - My Bluetooth Places; double-click the Bluetooth icon
  - Speedy connection establishment; Right-click the Bluetooth icon, select Services, and then the service you want. BTW shows you only the devices that offer that service.
  - The Connection Wizard.

2 Basic Operations

2.1 FIND BLUETOOTH DEVICES

"Search for Devices" looks for Bluetooth devices in the vicinity and displays the devices it finds in My Bluetooth Places.

To start the Search for Devices:

- In the Folders pane of My Bluetooth Devices, select (highlight) a device name
- Open the Bluetooth menu and select Search for Devices.

The Bluetooth menu is only visible when My Bluetooth Places is active.

BTW can be configured to automatically search for devices on a regular basis (Bluetooth Configuration Panel >Discovery tab).

One of the advantages of Bluetooth is the mobility the wireless connections allow. However, mobility means that devices may move in or out of connection range during the time between the automatic updates performed by BTW. To be certain that the displayed list of devices in the neighborhood is current, or if automatic periodic inquiry is not enabled, force an update of the device list using the technique above.

Some devices within connection range may not show up in the list of devices found because

- Your device is configured to report only specific types or classes of devices (Bluetooth Configuration Panel >Discovery tab, on your device).
- The unlisted device is configured to be non-discoverable (Bluetooth Configuration Panel > Accessibility tab, on the unlisted device).

2.2 FIND A SERVICE

The process of determining the services that a device provides is called Service Discovery.

To initiate a Service Discovery, in the Folders pane of My Bluetooth Places, right-click the device and select Discover Available Services from the pop-up menu.

The services supported by BTW are:

- **Bluetooth Serial Port**—establishes a Bluetooth wireless connection between two devices. The connection may be used by applications as though a physical serial cable connected the devices.
- **Dial-up Networking**—allows a Bluetooth client to use a modem that is physically attached to the Bluetooth server.
- **Fax**—allows a Bluetooth client to wirelessly send a fax using a device that is physically attached to the Bluetooth server.
- **File Transfer**—establishes a Bluetooth wireless connection that allows your computer to perform file system operations on another Bluetooth-enabled device—browse, drag/drop, open, print, cut/copy, paste, delete, rename, etc.
- **Information Exchange**—establishes a Bluetooth wireless connection between two devices so that they can exchange personal information manager data such as business cards, calendar items, email messages, and notes.
- **Information Synchronization**—establishes a Bluetooth wireless connection between two devices and uses the connection to synchronize Personal Information Manager data between the two devices.
- **Network Access**—establishes a Bluetooth wireless connection between the client and a server that is physically connected to the Local Area Network. If the client has permission (user name and password for the LAN), the wireless connection can be used as if the client were hardwired to the LAN.

All Bluetooth servers do not necessarily provide all of these services. For example, network gateways only provide access to the Local Area Network (the Network Access service).

2.3 DETERMINE A CONNECTION'S STATUS

The Bluetooth Connection Status dialog box displays information about the state of a connection and provides a means to disconnect an active connection.

To display the Connection Status dialog box

- In My Bluetooth Places, from the Folders pane, select (highlight) a device.
- In the right pane of My Bluetooth Places, right-click a service name and select Status from the pop-up menu.

The information provided is

- **Status**: Connected or Disconnected
- **Device Name**: the name of the device to which this computer is connected.
- **Duration**: the length of time this connection has been established, displayed in hours, minutes and seconds. Depending on the service, the connection may time out (automatically disconnect) after a specific period of inactivity.
- **Activity**: the number of bytes sent and received over the connection
- **Signal Strength**: a variable scale that ranges from Too Weak through Good to Too Strong.

To change the power transmission level of this computer: from the Bluetooth Configuration Panel, Hardware tab, click the Advanced button, and then change the setting in the Maximum Power Transmission drop-down list.

The controls in the Bluetooth Connection Status dialog box are

- **Properties** button: displays the Bluetooth Properties dialog box for this connection
- **Disconnect** button: closes this connection wherever applicable.
- **Stop** button: disables this service wherever applicable.
- **Close** button: closes the Bluetooth Connection Status dialog box.

2.4 USING THE CONNECTION WIZARD

The Connection Wizard walks you through the process of setting up a new Bluetooth connection with another device. The connection is not actually established; instead, a shortcut is placed in the right pane of My Bluetooth Places. To use the connection, double-click the shortcut.

2.4.1 Setup a new connection

1. Open the Connection Wizard: in the Windows system tray, right-click the Bluetooth icon, select Services from the pop-up menu, and then select Connection Wizard from the submenu.
2. On the first Connection Wizard screen:
   a) In the Select a Service drop-down menu, select the *type* of connection that will be established. (The specific service will be selected later, if necessary.)
   b) In the "Select a device that provides the service" drop-down menu, select the device that will provide the service. (To update the list of devices displayed, click the Search Devices… button.)
   c) Optional: select the "Require secure encrypted connection" option to enable Authentication and Encryption for this connection.
3. Click the Next button:
   - If more than one service of the type selected in the Select a Service drop-down menu (above) exists on the selected device, for example, multiple Bluetooth Serial Ports, then the Select Bluetooth Service dialog box appears. Select the specific service to be used, and then click the OK button to close the Select Bluetooth Service dialog box.
   - If only one service of the type selected in the Select a Service drop-down menu (above) exists on the selected device, the next Connection Wizard screen appears.
4. If "Require secure encrypted connection" was selected above, a security screen may appear:
   - To establish a paired relationship with the remote device while using this wizard, enter your Personal Identification Number in the PIN Code field of the security screen, and then click the Next button.
   - To establish the paired relationship with the remote device the first time this connection is used, leave the PIN Code field blank in the security screen, and click the Next button.
     *The Security screen **WILL NOT** appear if the devices have been paired.*
5. On the last Connection Wizard screen:
   - The top of the screen provides basic information about the new connection—the name of the device that will provide the service and the name of the service that will be provided. If this information is NOT correct, click the Back button to return to the previous screen, and from that screen select the correct service and device.
   - In the "Connection Name:" field, enter a descriptive name for the connection, for example, "BT Serial Connection to Joe's Desktop."

2.5 BLUETOOTH TRAY

The Bluetooth Tray resides in the Windows System Tray, which is normally located in the lower-right corner of the screen. Bluetooth Tray provides fast access to many routine Bluetooth operations.

From the Bluetooth Tray you can:

- **Access My Bluetooth Places**—double-click the Bluetooth icon.
- **Access the Bluetooth Configuration Panel**—right-click the Bluetooth icon, select Setup, and then select Configuration from the submenu.
- **Access the Bluetooth Security dialog box**—right-click the Bluetooth icon, select Setup, and then select Security from the submenu.
- **Access the Bluetooth Connection Wizard**—right-click the Bluetooth icon, select Services, and then select Connection Wizard from the submenu.
- **Exchange Business Cards with another Bluetooth Computer**—right-click the Bluetooth icon, select Services, and then select Business Card Exchange from the submenu.
- **Search for, and connect to, a specific service**—right-click the Bluetooth icon, select Services, and then select the desired service from the submenu. An additional submenu will appear that contains one or more options, including:
  - Find Devices…

  or
  - Other Devices… and one or more device names. The device name(s) will be present if this computer has used this service, and connected via this technique, at least once before. If a device name is present in the submenu, selecting that device will re-initialize the connection.

The services that can be searched for and connected to from the Bluetooth Tray are:

- Bluetooth Serial Port(s)
- Dial-up Networking
- Fax
- File Transfer
- Information Synchronization
- Network Access.

3 Client Applications

3.1 NETWORK ACCESS

The Network Access service permits a Bluetooth client to use a Local Area Network connection that is physically attached to another Bluetooth device (the server).

Possible Network Access servers include:

- Bluetooth-enabled computers that have an Ethernet connection.
- Stand-alone Bluetooth Network Access Points such as those in WIDCOMM's BlueGate series.

The Bluetooth server must be specifically configured to provide the Network Access service.

After a Bluetooth device is configured as a Network Access server it cannot act as a Network Access client without being re-configured.

3.1.1 Windows 2000, Server-side Setup

1. From the Windows Control Panel select Network and Dial-up Connections
2. Right-click the Local Area Connection icon and select Properties
3. In the Local Area Connection Properties dialog box on the Sharing tab, select Enable Internet Connection Sharing for this connection and click OK
4. Click the YES button in the confirmation dialog box to enable Internet connection sharing.

3.1.2 Windows XP, Server-side Setup

Have your Windows XP compact disc handy; you may need it during the setup process:

1. Click Start > Control Panel
2. Double-click Network Connections
3. Right-click Local Area Connection and select Properties from the popup menu
4. In the Local Area Connection Properties dialog box, click the Advanced tab
5. In the Internet Connection Sharing section of the dialog box, select "Allow other network users to connect through this computer's Internet connection" and then click OK.

3.1.3 Windows 98SE & Windows Me, Server-side Setup

Internet Protocol routing software is required on Windows 98SE and Windows Me servers; a downloadable trial version of WinRoute Lite is available on the Tiny Software, Inc. website—http://www.tinysoftware.com/.

3.1.3.1 Configure the server:

1. From the Windows Control Panel, double-click the Network icon.
2. On the Configuration tab, select TCP/IP-> Bluetooth LAN Access Server Driver (scroll down if necessary).
3. Click Properties and select the IP Address tab.
4. Select Specify an IP address
5. Enter an IP Address (suggested value—192.168.1.1) and a Subnet Mask (suggested value—255.255.255.0).
6. Click OK twice to close the dialog boxes.
7. Click YES to restart the computer.

3.1.3.2 Configure the routing software:

1. In the Windows system tray, right-click the WinRoute icon and select Administration.…
2. On the Settings tab, select "2nd network adapter".
3. From the Network adapter drop-down list choose any adapter other than the WIDCOMM adapter and click the Settings button.
4. On the DHCP tab, in the Adapter drop-down list, select the WIDCOMM Bluetooth Windows 9x Adapter.
5. Select Enable DHCP Server.
6. Fill in the client IP address range fields:
   a) From—210
   b) To—240
7. Click OK and then minimize (do not close) the WinRoute Administration configuration panel.

3.2 BLUETOOTH SERIAL PORT

The Bluetooth Serial Port service allows two Bluetooth devices to establish a wireless connection through virtual communications ports and then use that connection as if it were a hardwired serial cable between the devices.

To establish a Bluetooth serial port connection:

Connections are initiated from the client:

1. On the client, in the Folders pane of My Bluetooth Places, select Entire Bluetooth Neighborhood.
2. In the right pane of Entire Bluetooth Neighborhood, right-click anywhere *except on a device name* and select Refresh from the pop-up menu.
3. In the Folders pane of My Bluetooth Places, right-click the server you want to establish a connection with and select Discover Available Services from the pop-up menu to update the available services list. The available services will be displayed in the right pane of My Bluetooth Places.
4. In the right pane of My Bluetooth Places, double-click Bluetooth Serial Port. A dialog box appears that contains the communications port number assigned to this connection by the client. The application that will use this connection must be configured to send data to this port.

Depending on the security configuration, the dialog box that provides communications port information may not appear until after Authentication and Authorization have been accomplished.

The application on the server must be configured to use the correct communications port.

To determine the communications port being used by the service:

- On the server, in the Folders pane of My Bluetooth Places, right-click My Device and select Properties from the pop-up menu
- In the Bluetooth Configuration Panel, select the Local Services tab.
- Double-click the Bluetooth Serial Port service to display its Service Properties dialog box. The Service Properties dialog box shows the communications port the connection is using.

To close a Bluetooth serial port connection

Connections are normally closed from the client:

- On the client, in the Folders pane of My Bluetooth Places, select (highlight) the device that is providing the Bluetooth Serial Port service.
- In the right pane of My Bluetooth Places, right-click Bluetooth Serial Port and then select Disconnect Bluetooth Serial Port from the pop-up menu.

Though not recommended, connections can also be closed from the server:

- On the server, in the Folders pane of My Bluetooth Places, select (highlight) My Device
- In the right pane of My Bluetooth Places, right-click Bluetooth Serial Port and then select Stop to close the service. The service must be re-started before it will be available to remote devices (right-click Bluetooth Serial Port and select Start from the pop-up menu).

3.3 DIAL-UP NETWORKING

The Dial-up Networking service permits a Bluetooth client to use a modem that is physically connected to a different Bluetooth device (the server).

After the Bluetooth wireless connection is established the client can use the server's modem as if it were a local device on the client.

To establish a Dial-up Networking session

Connections are initiated from the client:

1. On the client, in the Folders pane of My Bluetooth Places, select Entire Bluetooth Neighborhood.
2. In the right pane of Entire Bluetooth Neighborhood, right-click anywhere *except on a device name* and select Refresh from the pop-up menu.
3. In the Folders pane of My Bluetooth Places, right-click the server that will provide the Dial-up Networking Service and select Discover Available Services from the pop-up menu to update the available services list. The available services will be displayed in the right pane of My Bluetooth Places.
4. In the right pane of My Bluetooth Places, double-click Dial-up Networking.
5. In the Connect To dialog box, fill in your user name, password, and the phone number to be dialed, and then click the Dial button. Select the Save password check box and the dialog box will not appear for subsequent connections to the same phone number.

You can now open a web browser and connect to the Internet.

To close a Dial-up Networking connection

1. On the client, in the Folders pane of My Bluetooth Places, select (highlight) the device that is providing the Dial-up Networking service.
2. In the right pane of My Bluetooth Places, right-click Dial-up Networking and then select Disconnect Dial-up Networking from the pop-up menu.

3.4 FAX

The Fax service allows a Bluetooth client to wirelessly send a fax using a device that is physically attached to a Bluetooth server.

To send a Fax

Connections are initiated from the client:

1. On the client, in the Folders pane of My Bluetooth Places, select Entire Bluetooth Neighborhood.
2. In the right pane of Entire Bluetooth Neighborhood, right-click anywhere *except on a device name* and select Refresh from the pop-up menu.
3. In the Folders pane of My Bluetooth Places, right-click the server that will provide the Fax service and select Discover Available Services from the pop-up menu to update the available services list. The available services will be displayed in the right pane of My Bluetooth Places.
4. In the right pane of My Bluetooth Places, double-click Fax.

After the Fax connection is established, open or create the document to be faxed and use the "Print" or "Send to Fax Recipient" option available in most applications.

The Fax connection closes automatically when the transmission is complete.

3.5 FILE TRANSFER

The File Transfer service allows one Bluetooth device to perform file operations on the default File Transfer directory (and the folders and files it contains) of another Bluetooth device.

To perform an operation on a folder or file

On the machine from which the File Transfer service will be used:

1. In the Folders pane of My Bluetooth Places, select Entire Bluetooth Neighborhood.
2. In the right pane of Entire Bluetooth Neighborhood, right-click anywhere *except on a device name* and select Refresh from the pop-up menu.
3. In the Folders pane of My Bluetooth Places, right-click the device you want to transfer files with and select Discover Available Services from the pop-up menu to update the available services list. The available services will be displayed in the right pane of My Bluetooth Places.
4. Still in the Folders pane of My Bluetooth Places, click the plus (+) sign in front of Public Folder to expand that folder. If there are additional folders inside the expanded folder then those additional folders may have to be expanded.

Folder contents are displayed in the right pane of My Bluetooth Places.

3.5.1 Types of File Transfer operations

In the right pane of My Bluetooth Places, right-click a folder item and select an option from the pop-up menu. A dialog box (the title varies, depending on the operation being carried out) appears and the status line (bottom of the dialog box) indicates the operational step that is being carried out.

The types of operations that can be accomplished are:

- Open:
  - Files—are opened in the application associated with them.
  - Folders—are expanded to show their contents.
- Print—sends the selected server file to the client's default printer.
- Send to:
  - 3.5" Floppy Drive—copies the selected item(s) from the server to the client's 3.5" floppy drive.
  - My Shared Folder—copies the selected item(s) from the server to the default File Transfer folder on the client.
- Cut—copies a folder and its contents, or individually selected files in a folder, to the Windows clipboard. When the clipboard contents are pasted to a new location, the originally selected file(s) on the server are deleted.
- Copy—copies a folder and its contents, or individually selected files in a folder, to the Windows clipboard.
- Delete—deletes selected file(s) and/or folder(s) on the server.
- Rename—allows you to change an empty folder's name.
- Properties—displays the file or folder's properties dialog box.

Other options may appear (depending on the context the menu appears in):

- Update—updates the contents of a folder
- New Folder—creates a new folder on the server
- Abort FTP Operation—aborts an in-process File Transfer operation.

3.6 INFORMATION EXCHANGE

The Information Exchange service provides a way to send and receive Microsoft Outlook items to and from another Bluetooth device, such as a Personal Digital Assistant or notebook computer.

The supported Outlook items are

- Business cards (*.vcf and *.vcd)
- Calendar entries (*.vcs)
- Notes (*.vnt)
- Messages (*.vmg)

There are three types of operations:

- Send—sends an object to another device.
- Receive—requests an object from another device.
- Exchange—sends a client object and receives a server object.

The default location of your business card and the location where received items are placed can be configured in the Bluetooth Configuration Panel.

To send, receive or exchange an object: on the client, in the Folders pane of My Bluetooth Places, right-click the Inbox icon of the remote device and select an option from the pop-up menu.

Business cards are sent, received or exchanged without further intervention.

To send Calendar Items, Notes, and Messages, navigate to the folder that contains the item you want to send, select the item, and then click Open.

3.7 INFORMATION SYNCHRONIZATION

The Information Synchronization service is used to synchronize information (e.g., a Personal Information Manager database) between a Bluetooth client and a Bluetooth server.

BTW supports synchronization with devices that support IrMC v1.1 and exchange the v2.1 vCard format.

The first time Information Synchronization is used with a new application it may take a few minutes to synchronize the database; the data from both devices must be merged, duplicate entries deleted, and then the updated database copied back to both devices.

Subsequent uses of Information Synchronization, for the same application, are much faster—only the changes that have been made since the databases were last synchronized must be exchanged.

Microsoft Outlook is the only Personal Information Manager supported in this release of BTW. Outlook permits duplicate entries, so all duplicates may not be exchanged in the synchronization process.

Only Outlook's default contacts folder is synchronized. Items in sub-folders are not synchronized. Items that are moved from the default folder to a sub-folder will appear to have been deleted the next synchronization takes place.

To use Information Synchronization

1. On the client, in the Folders pane of My Bluetooth Places, select Entire Bluetooth Neighborhood.
2. In the right pane of Entire Bluetooth Neighborhood, right-click anywhere *except on a device name* and select Refresh from the pop-up menu.
3. In the Folders pane of My Bluetooth Places, right-click the server you want to synchronize with and select Discover Available Services from the pop-up menu to update the available services list. The available services will be displayed in the right pane of My Bluetooth Places.
4. In the right pane of My Bluetooth Places, double-click Information Synchronization.

A dialog box displays synchronization progress and, when the process is complete, indicates that synchronization has successfully completed.

The connection closes automatically when synchronization is complete.

4 Local Services

4.1 LOCAL SERVICES

Local Services are those services that a Bluetooth server is capable of providing.

The services provided by BTW are:

- Bluetooth Serial Port
- Dial-Up Networking
- Fax
- File Transfer
- Information Exchange
- Information Synchronization
- Network Access.

The names of all the services are displayed even though the server may not be capable of supporting all services. For example, when a server provides a service that is hardware-dependant, that server must be capable of local action, i.e., a Dial-up Networking server must have a working modem, a Fax server must have a functional fax modem, and a Network Access server must be physically connected to the Local Area Network.

All services start automatically by default when BTW is initialized.

Automatic start-up can be turned off for individual services (Bluetooth Configuration Panel, Local Services tab, double-click the service name). If a service is not configured to start automatically it can still be started manually (right-click the service and select Start from the pop-up menu).

To stop a local service: right-click the service and select Stop from the pop-up menu. Stopped services are not available for use by clients.

With Local Device selected, the Details view of Explorer provides basic information about each local service:

- Service—the name of the service
- Startup—Automatic or Manual
- Status:
  - Started(COM#)—the service is running and ready to use COM#
  - Not Started—the service is not running (not available to clients)
  - Connected(COM#)—the service is in use, the local port is COM#
- Device name if connected:
  - Empty field—the service is not connected
  - A device name and/or Bluetooth Device Address—identifies the device that is using the service.

To interrupt a connection from the server side:

- Right-click the local service and select Stop from the pop-up menu.
- Right-click the local service and select Start from the pop-up menu to re-start the service.

5 Configuration Panel

The Bluetooth Configuration Panel provides access to settings for Bluetooth services, hardware and security and for event notification.

To access the Bluetooth Configuration Panel

- From the Windows Control Panel, select Bluetooth Configuration

  or

- In the Windows System Tray, right-click the Bluetooth icon, select Setup and then Configuration from the submenu.

5.1 ACCESSIBILITY TAB

The Accessibility tab of the Bluetooth Configuration Panel lets you specify which remote devices may access this computer.

Security settings configured in the General, Local Services, and Client Applications tabs may also affect which devices have access to this computer.

To allow other devices to discover this computer: select "Let other Bluetooth devices discover this computer" to permit remote Bluetooth devices to find and report this computer. If "Allow No devices to connect" (below) is selected, this option is not available.

To control the types of devices that are allowed to connect to this computer

From the Allow drop-down-menu, select:

- **All devices to connect**—all remote devices are permitted to connect to this computer.
- **No devices to connec**t—no remote devices are permitted to initiate a connection with this computer. However, this computer can still initiate connections (as a client) with remote Bluetooth devices.
- **Only paired devices to connect**—only devices that have been paired with this computer are allowed to connect to it.
- **Only devices listed below to connect**—only the listed devices are allowed to connect to this computer (see Accessibility, adding and deleting devices).

5.1.1 Adding and Deleting Devices

To limit access to your computer to specific remote devices: from the Bluetooth Configuration Panel, Accessibility tab, in the Allow drop-down list box, select "Only devices listed below".

To add a device to the list of devices allowed to connect:

- From the Bluetooth Configuration Panel, Accessibility tab, click the Add Device button.
- In the Devices with access... dialog box select the device(s) and click OK. Multiple devices can be selected at the same time using SHIFT + click and/or CTRL + click.

To delete a device from the list of devices allowed to connect

- From the Bluetooth Configuration Panel, Accessibility tab
- In the list of devices allowed to connect, click the name of the device to be removed and then click the Delete button.

5.2 DISCOVERY TAB

The settings on the Discovery tab of the Bluetooth Configuration Panel determine whether your computer looks for other Bluetooth devices automatically, how often it looks and what type of devices it looks for.

To perform a periodic Search for Devices: when "Look for other Bluetooth devices" is selected, BTW automatically searches for devices every "X" minutes. X is an integer from 1 to 60. To change the time between auto inquiries, highlight the existing time and enter the new time.

When My Bluetooth Places is first opened it performs an initial automatic search for devices even if "Look for other Bluetooth devices" is not enabled.

To determine the devices that will be reported

BTW can screen out devices that you do not need to access.

The options are:

- Report all Bluetooth devices
- Report only selected Bluetooth devices (see Discovery, Adding Specific Devices and Discovery, Deleting Specific Devices).

Select the desired option from the drop-down list.

To limit the type of remote devices reported:

BTW can report only specific devices, specific class(es) of device(s), or specific type(s) of device(s) within a class. Discovered devices can be mixed-and-matched; you can discover one or more specific devices, classes of devices and types of devices within a class at the same time.

When BTW is configured to report only specific devices, it reports ONLY those devices.

To report only specific devices

- From the Bluetooth Configuration Panel, on the Discovery tab, select "Report only selected Bluetooth devices" from the drop-down list and then click the Add Device button.
- In the Discoverable devices... dialog box, highlight the device to be discovered and click the OK button. Multiple devices can be selected at the same time using SHIFT + click and/or CTRL + Click.

To add a device to the list of devices to be discovered, that device must be within range of the Bluetooth radio; devices that are not within radio range will not appear in the list of devices in the Discoverable devices... dialog box.

To report only a specific class of device

1. From the Bluetooth Configuration Panel, on the Discovery tab, select "Report only selected Bluetooth devices" from the drop-down list and then click the Add Device button.
2. In the Discoverable devices... dialog box, select "Allow this computer to discover specific devices or types of devices within a class."
3. From the Class drop-down list, select a class of devices to be discovered.
4. Click the OK button.

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To report only a specific a type of device within a class

1. Configure BTW to report the class of device that the type of device belongs to (follow the steps in "Report only a specific class of device," above, but do **NOT** click the OK button).
2. In the Discoverable devices... dialog box, from the Type drop-down menu select the specific type of device to be reported.
3. Click the OK button.

To remove a device from the list of devices to be discovered: in the Bluetooth Configuration Panel, from the Discovery tab, select the device to be removed and click the Delete button.

If "Report only selected Bluetooth devices" is not selected the Delete button will not be available.

To temporarily override the discovery of specific devices: in the Bluetooth Configuration Panel, from the Discovery tab, select "Report all Bluetooth devices." The specifically selected devices will be discovered along with all other devices.

To re-enable specific device discovery re-select "Report only selected Bluetooth devices."

When all devices are deleted, an error message will appear if "Report all Bluetooth devices" is not selected.

5.3 General Configuration Settings

The settings on the General tab of the Bluetooth Configuration Panel determine device properties and basic system security settings.

Identity section:

- **Computer Name-**enter a unique name to identify this computer to other Bluetooth devices in the vicinity; this field cannot be left blank.
- **Computer type-**select either Desktop or Laptop from the drop-down menu to help identify this computer to other Bluetooth devices in the vicinity.

Bluetooth Security Section:

- **High-**requires Bluetooth devices to authenticate (enter a Personal Identification Number (PIN)) before allowing a connection to be established. Your computer and the connected Bluetooth device will exchange data using encrypted links.
- **Medium-**the default setting—security is configured at the service-level. Service level security means that each individual service must have its security settings (Authentication, Authorization and Encryption) set independently.

If the security mode is "Medium" and service-level security is not configured, any Bluetooth device will be able to discover your computer and use it's services.

5.4 HARDWARE CONFIGURATION

The Hardware tab of the Bluetooth Configuration Panel provides basic information about the Bluetooth hardware installed on this computer and access to the Advanced Settings dialog box, if required:

- Devices:
  - **Name**: the name of the device, e.g., *WIDCOMM Bluetooth Device*
  - **Type**: the type of device, e.g., *USB.*
- Device Properties:
  - **Manufacturer**: the name of the company that manufactured the device selected in the Devices section of this dialog box.
  - **Firmware Revision**: the manufacturer's firmware version number.
  - **Device status**: indicates that the device is operating properly or that there is a problem/conflict.
  - **Device Address**: the Bluetooth Device Address (BDA or BD_Addr) programmed into this device when it was manufactured.
  - **HCI Version**: the version number of the Bluetooth Specification that the Host Controller Interface complies with.
  - **HCI Revision**: the revision number of the Bluetooth Specification that the Host Controller Interface complies with.
  - **LMP Version**: the version number of the Bluetooth Specification that the Link Manager Protocol complies with.
  - **LMP Sub Version**: the sub-version number of the Bluetooth Specification that the Link Manager Protocol complies with.
- **The Advanced button**: displays the Advanced Settings dialog box, which allows you to select the country code and transmission power settings. *This option is not available on all systems.*

5.4.1 Hardware Advanced Settings Dialog Box

When available, this dialog box is reached from the Hardware tab of the Bluetooth Configuration Panel.

Depending on the country in which the hardware is sold and/or in which it will be used, the Advanced button may not be present.

From this dialog box you can set the:

- Country Code:
  - North America, Europe (except France), and Japan
  - France and China
- Maximum Transmission Power:
  - High
  - Medium
  - Low.

Click the Apply button to implement the changes. A dialog box appears with notification that the Bluetooth device attached to this computer must be reset before the change(s) will take effect.

Click the Yes button to reset the Bluetooth device now—*all open Bluetooth connections will be closed*.

Click the No button to save the changes—the changes will be applied the next time the Bluetooth device is reset or restarted.

5.5 INFORMATION EXCHANGE CONFIGURATION SETTINGS

The settings on the Information Exchange tab of the Bluetooth Configuration Panel configure:

- The highest-level directory on this computer that a remote device has permission to access (My Shared Directory)
- The path to your electronic business card (My Business Card)
- The path to the directory that will be used to save incoming (My Inbox Directory):
  - Business cards
  - Notes
  - Messages
  - Calendar items.

5.5.1 File Transfer

My Shared Directory: the directory configured in this section is the highest-level directory to which a remote Bluetooth computer has access. This directory and its sub directories are displayed in the remote device's My Bluetooth Places.

Click the Browse button and navigate to the directory that will be used as My Shared Directory.

5.5.2 Send Business Card

My Business Card: the path to the directory on this computer that contains your electronic business card.

Select the "Send Business Card on Request" option to allow remote devices to obtain your business card.

Click the Browse button and navigate to the directory that contains your business card.

5.5.3 Receive Business Card

My Inbox Directory: the path to the directory on this computer where inbound Personal Information Manager items such as Business cards, Notes, Calendar entries and Messages will be saved.

Select the types of items you wish to accept by placing a checkmark in the appropriate boxes, and then click the Browse button to navigate to the directory where they should be saved.

Select the "Save Object in Personal Information Manager" option to save incoming objects directly in the PIM. *When this option is selected, the path specified in "My Inbox Directory" is not used.*

5.6 LOCAL SERVICES TAB

The settings on the Local Services tab of the Bluetooth Configuration Panel determine the configuration of the services provided by your computer to remote devices. Each service can be configured individually for security, name, and other settings.

The Local Services tab also includes options to add and delete user-defined serial services.

BTW Local Service names are:

- Bluetooth Serial Port
- Dial-Up Networking
- Fax
- File Transfer
- Information Exchange
- Information Synchronization
- Network Access

5.6.1 Property settings which are common to all of the local services

Although each of these settings can be set individually for each service, all local services have settings for:

- Authentication
- Authorization
- Encryption
- Startup
- Service Name.

Some services have an additional setting that is specific to that service:

- Network Access—has an additional setting for the maximum number of connections allowed at any time.
- Dial-Up Networking—has an additional setting for selecting the modem that will be used by the service.
- Fax—has an additional setting for selecting the modem that will be used by the service.
- Bluetooth Serial Port—has an additional setting for selecting the communications that will be used by the service.

5.6.2 To add a user- defined Bluetooth Serial Port

Most applications that use a serial connection can also use the wireless Bluetooth Serial Port service to transfer data; the Bluetooth Serial Port is a replacement for the physical cable and is transparent to the application.

BTW has one pre-configured Bluetooth Serial Port, but additional Bluetooth Serial Ports can be added when needed.

To add an additional Bluetooth Serial Port

1. From the Bluetooth Configuration Panel, Local Services tab, click the Add Serial Service button.
2. In the Service Properties dialog box, modify the properties:
   a) Enter a unique name (less than 99 alphanumeric characters).
   b) Select the appropriate security settings.
   c) If you want the service to start automatically when BTW initializes, select Startup.
   d) From the COM Port drop-down menu select a communications port that is not assigned to any other service.
3. Click OK.

5.6.3 To remove a user-defined Bluetooth Serial Port

From the Bluetooth Configuration Panel, Local Services tab, select (highlight) the port to be removed, and then click the Delete button.

The Delete button is only available when the Bluetooth Serial Port service or a user-defined serial port service is selected.

To change a local service's properties: from the Bluetooth Configuration Panel, Local Services tab, double-click the service name.

Make the changes by selecting or clearing the appropriate boxes and click the OK button.

The service properties that may be changed are:

- **Startup**—when enabled, starts the service when BTW initializes. The default setting is enabled. If Startup is not enabled the service can still be started manually.
- **Authorization**—when enabled, requires confirmation by the server operator before a remote device is allowed to connect to this service. The default setting is disabled. Authentication (see below)—is automatically enabled when Authorization is enabled.
- **Encryption**—when enabled, encrypts data exchanged by the Bluetooth server and the Bluetooth client. The default setting is disabled. Encryption applies to the Bluetooth connection ONLY. Data transmitted to/from a modem, Local Area Network, etc., is NOT affected by this setting. Authentication is automatically enabled when Encryption is enabled.
- **Authentication**—when enabled, requires that the client and server exchange a passkey or Link Key before a connection is established. The default setting is disabled. Devices are paired automatically when authentication is complete.
- **Service Name**—Enter a service name (one to 99 alphanumeric characters) in this field. In most cases the default service name will serve. However, in environments where there is more than one device of the same type or one device provides more than one service of the same type (this is only possible for the Bluetooth Serial Port service), the service name can be customized.

5.7 NOTIFICATIONS TAB

The Notifications tab of the Bluetooth Configuration Panel lets you associate a sound (Windows *.wav file) with specific Bluetooth events.

Sounds can be associated on an individual basis, depending on security settings, with several events, including:

- When a PIN code is required (Authentication must be enabled)
- When a remote device attempts to access (Authorization for the related service must be enabled):
  - Files on this computer
  - A Bluetooth port
  - The Dial-up network service
  - The LAN Access service
  - The Fax service.
- When a remote device attempts to send (Authorization for the related service must be enabled):
  - Information items
  - Synchronization information.

To associate a sound with a Bluetooth event:

1. From the Bluetooth Configuration Panel, Notifications tab:
2. In the Notify column of the Events list, select the check box associated with the event.
3. In the Sound area of the Notifications tab, click the Browse button and navigate to the sound file (*.wav) to be used for notification. To preview the sound file, click the play ( ) button.
4. Click the OK button to close the Bluetooth Configuration Panel.

The sound will not play, even though it has been assigned, unless the Notify check box is selected.

5.8 VERSION INFO CONFIGURATION

The Version Info tab of the Bluetooth Configuration Panel displays the name and version number of the software components of BTW.

There are no options to configure on this tab.

6 Security

6.1 INTRODUCTION

Each service that the server provides can be configured to require:

- Authorization—the server operator must acknowledge all connection attempts before a connection is established.
- Authentication—the server requires a Personal Identification Number (PIN, also referred to as a "passkey") code or a Link Key before a connection is established.
- Encryption—all data sent between the Bluetooth client and Bluetooth server is encrypted. The encryption key is based on the Authentication Link Key; Encryption requires that Authentication be enabled.

The default security setting for Authorization, Authentication and Encryption is disabled.

Devices can also be paired, a process that eliminates the need to enter a PIN code every time access is attempted.

6.2 AUTHENTICATION

Authentication is used to verify identity; it requires a passkey or Link Key from the remote device. When a remote device attempts access, a visual and/or audio warning notifies the local operator.

The local operator can open a dialog box that provides:

- The user-friendly name of the device attempting access
- A place for the local operator to enter a Bluetooth passkey.

The operator of the remote system must enter the identical passkey or access is denied.

If the notification is ignored, access is denied after a preset timeout.

When devices are "paired," those devices automatically exchange a Link Key and Authentication is carried out without operator intervention.

6.3 AUTHORIZATION

Authorization is yes-or-no security.

A visual and/or audio warning alerts the server operator that a remote device is attempting to connect.

The server operator responds by clicking the Bluetooth icon in the Windows system tray to open a dialog box that displays:

- The user-friendly name of the device attempting to connect
- The local service to which the remote device is attempting to connect.

The server operator may grant or deny access to the service by clicking an on-screen button.

If the server operator ignores the Authorization notification access will be denied after a preset timeout.

6.4 ENCRYPTION

Encrypting translates data into an unreadable format using a secret key or password. Decrypting the data requires the same key or password that was used to encrypt it.

Encryption in BTW is based on the same passkey or Link Key that is used for Authentication. If Authentication is not enabled the key is not available and encryption will not take place.

To use Encryption, Authentication must be enabled.

To enable Encryption for a service:

1. Right-click a service name and select Properties from the pop-up menu to display the Bluetooth Properties dialog box.
2. Select the Encryption option. If Authentication is not enabled it will be automatically turned on when Encryption is selected.
3. Click the OK button to close the dialog box and apply the change.

6.5 LEVELS OF SECURITY

Security for local services may be configured on an individual basis.

The configuration options are:

- Startup-Automatic or Manual
- Authorization
- Authentication
- Encryption

To access the security settings for a local service, in the Bluetooth Configuration Panel, from the Local Services tab, double-click the service name.

Bluetooth-enabled devices from different vendors may handle security in a slightly different manner. Refer to the user's guide for your Bluetooth device for additional information.

6.6 LINK KEY

A Link Key is a unique, internally generated, access code. Link Keys are generated automatically when devices are Paired or when Authentication is enabled.

Link Keys are created by combining

- The Passkey
- The Bluetooth Device Address
- An internally generated random number.

6.7 PAIRING DEVICES

Pairing allows you to avoid entering access information each time a connection is attempted. Paired devices share a unique Link Key, which they exchange when connecting.

The mate of a pair will always appear in My Bluetooth Places, even if the mate is not turned on or is out of connection range.

Paired devices remain paired even when:

- One of the devices is not powered up
- A service connection is interrupted or the service stopped
- One or both devices are rebooted.

When Authentication is enabled, devices are paired the first time they attempt to connect, after a successful passkey exchange.

To pair devices *before* attempting a connection:

1. In the Windows System Tray, right-click the Bluetooth icon, then Setup and select Security from the submenu.
2. The Bluetooth Security dialog box appears and BTW performs a device inquiry to update the list of devices in the area. After the inquiry is complete:
3. In the Found Devices pane of the dialog box, click the name of the device to be paired
4. Click the Execute Pairing button.
5. In the Bluetooth Passkey Request dialog box:
6. Enter the Bluetooth passkey
7. Click the OK button.

The check box on the main screen, when selected, permits all services to connect without Authorization.

When devices are paired, the configuration information is saved on both devices. Devices remain paired until the relationship is broken on both devices.

To break a paired device relationship

- In the Windows System Tray, right-click the Bluetooth icon, then Setup and select Security from the submenu.
- From the Bluetooth Security dialog box, in the Paired Devices list, select a device, click the Delete button and then click the Done button.

Pairing must be broken on both devices.

6.8 PASSKEY

A Passkey is an alphanumeric string up to 16 characters in length. Passkeys are also called PIN codes, or Personal Identification Numbers.

In BTW, passkeys are used in the Authentication and Encryption process.

6.9 SECURITY REQUEST DIALOG BOX

A Bluetooth Authorization or Bluetooth Passkey Request dialog box may appear (depending on security settings) when a connection is attempted if either Authorization or Authentication is enabled. The method of notification depends on the version of Windows:

- Windows 2000, Windows Me, and Windows XP—a bubble message is displayed over the Bluetooth icon in the Windows System Tray
- Windows 98SE—The BTW icon in the Windows System Tray blinks.

Regardless of the version of Windows, click the Bluetooth icon in the Windows System Tray and then follow the on-screen instructions. The instructions vary, depending on the security configuration of the system.

If the security notification is ignored the connection request will fail after a preset timeout.

The dialog box provides

- Device Name: the user-friendly name of the device attempting to connect.
- Request to access: the service the remote device is attempting to access.
- Buttons for responding.
  - OK-allow the connection
  - Cancel-deny the connection
  - Advanced button (see below)
- A check box that, when enabled, grants (authorizes) the connecting device access to all of the services on this computer (click the See Also button, below, for more information).

6.10 SECURITY REQUEST DIALOG BOX, ADVANCED BUTTON

The check box on the main page of the Bluetooth Authorization and Bluetooth Passkey Request dialog boxes ("Check this box to ALWAYS allow this device to access ALL the services of your computer"), when enabled, grants permission (authorizes) the device attempting to connect to access all services on this computer when attempting to connect in the future.

To limit the services the connecting device may use:

- Click the Advanced button
- In the expanded dialog box, select the services that the connecting device is authorized to use. When a service is selected, that service will NOT require authorization in the future (no prompt will appear when a connection is attempted).
  Regardless of whether the main dialog box is for Authorization or Authentication, these options pertain to Authorization; they do not affect Authentication.
- Click the Authorize or Authenticate button.

7 Technical Support

WIDCOMM customers are issued a user name and password so that they may use on-line technical support. If you do not have a customer support user name and password contact mailto:customerservice@widcomm.com.

To contact WIDCOMM technical support

1. Go to the WIDCOMM home page on the World Wide Web and click Support.
2. On the Support page click the BTW entry that is appropriate for your version of BTW.
3. On the Technical Support page under BTW, click "Enter Password Protected Area."
4. Enter your technical support user name and password and click the Submit button.
5. Select from the options on the support page.

If you are filling out a bug report or requesting technical assistance, please provide as much information as possible on the form.

8 Troubleshooting

8.1 CANNOT CONNECT TO A PAIRED DEVICE:

Paired devices are always displayed in My Bluetooth Places, even if the remote device is out of range or not powered up.

Verify that the remote member of the pair is within radio range and powered up and then attempt the connection again.

8.2 CANNOT DISCOVER SERVICES ON AN UN-PAIRED REMOTE DEVICE:

The remote device may not be powered up or may be out of range.

- Verify that the remote device is powered up.
- Verify that the remote device is in Connectable mode (Bluetooth Configuration Panel > Accessibility tab).
- Perform a Search for Devices to verify that the device is within range.

8.3 DIAL-UP NETWORKING SERVICE DOES NOT START:

The Dial-up Networking service will not start unless a properly configured modem is attached to the server.

- Verify that the modem is usable as a local device from the server.
- In the Bluetooth Configuration Panel, Local Services tab, double-click the Dial-up Networking service:
  - Click the down arrow in the Modem field and select the modem that will be used to dial out
  - Click the OK button
  - Click the OK button to close the Bluetooth Configuration Panel.

8.4 HOW DO I DETERMINE THE BLUETOOTH DEVICE ADDRESS (BDA) OF MY HARDWARE DEVICE?

In the Bluetooth Configuration Panel, on the Hardware tab, in the Devices section, select the device you want to determine the address of. In the Device Properties section of the dialog box, the fourth entry, Device Address, is the BDA of the selected Bluetooth device.

8.5 HOW DO I DETERMINE THE VERSION NUMBER OF THE BLUETOOTH SPECIFICATION THAT THE HOST CONTROLLER INTERFACE (HCI) COMPLIES WITH?

In the Bluetooth Configuration Panel, on the Hardware tab, in the Device Properties section, the fifth entry provides Bluetooth Specification compliance information for the Host Controller Interface.

The sixth entry contains the Specification Revision information for the Host Controller Interface, if appropriate.

8.6 HOW DO I DETERMINE THE VERSION NUMBER OF THE LINK MANAGER PROTOCOL (LMP)?

In the Bluetooth Configuration Panel, on the Hardware tab, in the Device Properties section, the seventh entry provides Link Manager Protocol version number information.

The eighth entry contains the Link Manager Protocol sub-version number information, if appropriate.

8.7 How do I find information about the Bluetooth hardware attached to my computer?

In the Bluetooth Configuration Panel, select the Hardware tab.

8.8 How do I test a Network Access connection?

If the client is hardwired to the LAN, unplug the hardwired connection to ensure that the test checks the wireless connection rather than the hardwired connection.

If the server has access to the Internet, open a browser on the client and connect to the World Wide Web.

You may also Ping the server from the DOS prompt.

8.9 Why do I get an Unknown Port message when I attempt to use a Bluetooth Serial Port?

The "Unknown Port" error message usually means an attempt was made to connect a port that was in use.

Additional Bluetooth Serial Ports can be added if they are required.

9 Glossary

BD Addr ..... Bluetooth Device Address

BDA ..... Bluetooth Device Address

Device Inquiry ..... The process of searching for other Bluetooth devices.

DHCP ..... Dynamic Host Control Protocol-when enabled, connecting devices are assigned an Internet Protocol (IP) address by the server.

FTP ..... File Transfer Protocol

HCI ..... Host Controller Interface

IrDA..... Infrared Data Association

IrMC..... Infrared Mobile Communications

Link Key..... An internally-generated unique security key that is exchanged by paired devices as proof of identity before a connection is established.

LMP..... Link Manager Protocol--used by Bluetooth for internal communications.

Me ..... Millennium Edition

PAD ..... Personal Digital Assistant

Page Scan Mode ... A Bluetooth mode in which a server is actively listening (scanning) for a client to "page" it. The server then answers the page and attempts to set up a connection with the paging device (the client).

PIM..... Personal Information Manager--an application, such as Microsoft Outlook, that is used to manage contacts, keep track of phone numbers, etc.

PIN..... Personal Identification Number, also referred to as a "passkey" or "password."

SE..... Second Edition

Service Discovery . The process of determining the services that a Bluetooth server provides.

SysTray ..... The Windows system tray-usually located in the lower-right corner of the screen.