# Wireless USB Adapter User's Guide

Model WUSB 110

Version 1.0

**Copyright and Trademarks**

This document contains materials protected by copyright.  All rights are reserved. No part of this manual may be reproduced or transmitted in any form, by any means or for any purpose without expressed written consent of its authors. Product names appearing in this document are mentioned for identification purchases only. I-O Wireless™ is a trademark of I-O Corporation. Windows® is a registered trademark of Microsoft Corporation. All other products referenced are trademarks or registered trademarks of their respective companies.

# TABLE OF CONTENTS

# 1  Introduction

The I-O Wireless USB Adapter allows a desktop or laptop computer to be easily connected to a wireless LAN.  In the case of desktop computers, there is no need to open the case and insert a PCI card.  Connection is as simple as plugging in the USB cable.  As an added benefit, the external design of the Wireless USB Adapter allows the adapter to be easily positioned for the best transmission and reception of the wireless signals.

**Features:**

- Complies with the IEEE 802.11b Direct Sequence Spread specification
- Complies with USB Specification 1.0
- Supports 11, 5.5, 2 and 1 Mbps Data Rates on the wireless interface
- WEP 64-bit data encryption for security
- Firmware upgrade via USB interface
- Power is supplied via the USB cable
- Equipped with a Dipole antenna
- FCC Certified under Part 15 to Operate in 2.4GHz ISM Band
- Driver Support Microsoft Windows ® 98, Me and 2000

## 1.1  Installation Overview

The process of installing an I-O Wireless USB Adapter on your desktop or laptop PC is as follows:

1. Make certain that TCP/IP (and any other network protocols used you your network) as well as Microsoft's File and Print Sharing are installed and active on your computer:
2. Connect the Wireless USB Adapter to your computer
3. Install the USB driver.
4. Install the Monitor Utility
5. Set up the Wireless USB Adapter
6. Install I-O Management Central
7. Set up an IP address for the Wireless USB Adapter
8. Share and map drives, folders and printers across the network
9. Install the optional Internet sharing software or configure the browser to share an Internet connection

# 2 Before you Begin

Make certain that the following Microsoft Windows networking components are installed on your computer before proceeding:

- TCP/IP (and any other network protocols used in your network)
- File and Print sharing is active

See your Microsoft Windows user's guide for detailed instructions on the installation and activation of these components.

An abbreviated set of instructions is also included below.

## 2.1 Windows 98

1. Click *Start | Settings | Control Panel | Network.*

2. Under the Configuration tab, click *File and Print Sharing…*

3. Make sure that both boxes have been checked, click *OK.*

4. In the network components dialog box, scroll through it to see if there is a TCP/IP …. Entry.  If there is, skip to step 7.

5. Click *Add | Protocol | Add | Microsoft.*

6. Select TCP/IP from the dialog box, Click *OK.*

7. Restart Windows when prompted.

## 2.2 Windows Me

1. Click *Start | Settings | Control Panel | Network.*

2. Under the Configuration tab, click *File and Print Sharing…*

3. Make sure that both boxes have been checked, click *OK.*

4. In the network components dialog box, scroll through it to see if there is a TCP/IP …. Entry.  If there is, skip to step 7.

5.  Click *Add | Protocol | Add | Microsoft.*

6.  Select TCP/IP from the dialog box, Click *OK.*

7.  Restart Windows when prompted.


# 2.3  Windows 2000

1.  Click *Start | Settings | Network & Dial-up Connections.*

2.  Right click on any network connection, then click *Properties*.

3.  In the components used by this connection dialog box, scroll through it to see if there is a File and Print Sharing… entry.

    a.  If it is listed, make sure it has a check mark by it.   Then skip to step 4.
    b.  If it is not listed, click *Install | Service | Add | Microsoft.*
    c.  Select File and Print Sharing… from the Network Service dialog box.
    d.  Click *OK.*

4.  In the components used by this connection dialog box, scroll through it to see if there is a …TCP/IP Entry.  If there is, skip to step ???.

    a.  If it is listed, make sure it has a check mark by it.   Then skip to step ?.
    b.  If it is not listed, click *Install | Protocol | Add | Microsoft.*
    c.  Select TCP/IP from the Network Protocol dialog box.
    d.  Click *OK.*

5.  Close the Properties window.

# 3  Connect the Wireless USB Adapter

The Wireless USB Adapter is connected to your desktop or laptop computer using the computer's USB port, or through a USB hub.  Windows will then recognize that a new device has been added so the driver can be installed.

1.  Power on your computer and start Windows.

2.  Plug the USB cable into the Wireless USB Adapter the USB port of the PC.

3.  Proceed to the one of the three following sections depending upon the version of Windows on your PC.

# 3.1  Install the Driver under Windows 98

**Note**: During this process, Windows may pause and do some work in the background before it continues to the next step.  Please be patient, this may take a minute.

4.  Windows 98 automatically recognizes a new USB device. Click the *Next* button to proceed.

5.  Insert the Wireless USB Adapter Utility CD into the CD-ROM drive (wait a few seconds for the drive to spin up).

6.  Select **Search for the best driver for your device**.  Click *Next*.

7.  Select **Specify a location**.  Enter the driver location as "d:\" (d: is your CD-ROM drive). Click *Next*.

8.  Windows is now ready to install the driver. Click *Next*.

9.  After Windows copies the files from your CD, you will be notified that installation has been completed. Click *Finish* to complete the installation.

10. When the Wizard is finished, you will be prompted to restart Windows.  Click *Yes*.

11. To verify that the Wireless USB Adapter driver has been installed, right click the mouse on the **My Computer** icon and select **Properties**. Click **Device Manager**.  The **I-O Wireless 802.11 USB Adapter** will be listed under **Network** devices if the driver installation was successful.  If it is not listed, exit Windows, power down your computer, and remove the USB cable.  Then restart this process again.

12. Proceed to the section titled **Install the Monitor Utility**.

# 3.2 Install the Driver under Windows Me

**Note**: During this process, Windows may pause and do some work in the background before it continues to the next step. Please be patient, this may take a minute.

4. Windows ME automatically recognizes a new USB device has been added.

5. Insert the Wireless USB Adapter Utility CD into the CD-ROM drive (wait a few seconds for the drive to spin up).

6. Select **Specify the location of the driver.** Click the *Next* button to proceed.

7. At this point, Windows will ask you for new drivers. Make sure that **Search for the best driver for your device** and **Specify a location** options are selected. Enter the driver location as "d:\" (d: is your CD-ROM drive). Click *Next*.

8. Windows is now ready to install the driver. Click *Next*.

9. Windows will indicate that installation is complete. Click *Finish* to complete the installation.

10. When the Wizard is finished, you will be prompted to restart Windows. Click *Yes*.

11. To verify that the Wireless USB Adapter driver has been installed, right click the mouse on the **My Computer** icon and select **Properties**. Click **Device Manage**r. The **I-O Wireless 802.11 USB Adapter** will be listed under **Network** devices if the driver installation was successful. If it is not listed, exit Windows, power down your computer, and remove the USB cable. Then restart this process again.

12. Proceed to the section titled **Install the Monitor Utility**.

# 3.3  Install the Driver under Windows 2000

**Note**: During this process, Windows may pause and do some work in the background before it continues to the next step.  Please be patient, this may take a minute.

4.  Windows 2000 automatically recognizes the Wireless USB Adapter when it is connected to the PC.

5.  Insert the Wireless USB Adapter Utility CD into the CD-ROM drive (wait a few seconds for the drive to spin up).

6.  Click the *Next* button to proceed.

7.  Select **Search for a suitable driver for my device**.  Click Next.

8.  Select **Specify a location.**  Click *Next*.

9.  Enter the driver location as **"d:\"** (d: is your CD-ROM drive). Click *OK*.

10. Windows is now ready to install the driver. Click *Next*.

11. If a "Digital Signature Not Found" message is displayed, ignore it by clicking Yes.

12. Windows will indicate that installation is complete. Click *Finish* to complete the installation.

13. To verify that the USB driver has been installed, right click the mouse on the **My Computer** icon and select **Properties**. Select **Hardware** and click **Device Manager**. The **I-O Wireless 802.11 USB Adapter** will be listed under **Network** devices if the driver installation was successful. If it is not listed, exit Windows, power down your computer, and remove the USB cable.  Then restart this process again.

14. Proceed to the **Install the Monitor Utility** section.

# 4 Install the Monitor Utility

The Monitor Utility must be installed before the Wireless USB Adapter can be configured.

1. With the Wireless USB Adapter Utility CD inserted in the CD-ROM drive, click *Start | Run*, enter "d:\Setup.exe" (d:\ is the location of the CD-ROM drive) and click *OK.*
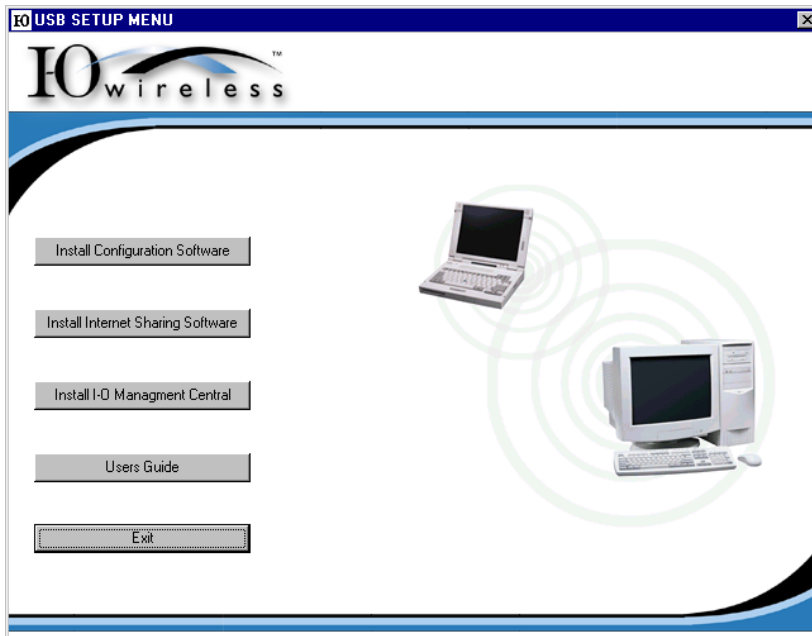


2. From the USB Setup Menu, click the *Install Monitor Utility* button.

3. Windows will bring you to the InstallShield Wizard screen. Click *Next*.

4. At this point, Windows will ask for the destination folder. Either accept the default or enter a folder of your choice.  Click *Next*.

5. Windows will ask for the program folder. Either accept the default or enter a folder of your choice. Click *Next*.

6. Windows will indicate that installation has been completed. Click *Finish* to complete the installation.

7. Proceed to the section titled **Using the Monitor Utility**.

# 5  Using the Monitor Utility

The Monitor Utility is used to set up the Wireless USB Adapter.  The utility will also give you information about the current activity of the Wireless USB Adapter.

The utility is divided in to six areas: Status, Statistics, Site Survey, Encryption, Advanced and Version.  Using the operations available within each of these areas, you can customize how your Wireless USB Adapter functions on the network.

The Monitor Utility icon will appear in the system tray every time the I-O Wireless USB Adapter is running.  The color of the icon indicates the wireless connection status – blue means a good connection, yellow is a poor connection and red indicates that there is no connection.

If the Monitor Utility icon is red, make sure that there is another wireless device available for connection.  Also, check the configuration to make sure that the IP address and sub-net mask coincide with the other wireless devices, that the SSID is the same, that the operational mode are the same, and that WEP keys are the same.

# 5.1 Running the Monitor Utility

1. In the system tray, double click the **Monitor Utility icon**.

   If the icon is not present in the system tray, click *Start | Programs | Wireless 802.11 USB Utility | Configuration & Monitor Utility*.  The icon will then appear in the system tray.

2. Windows will bring you to the **Wireless LAN Monitor Utility** screen.

   From this screen, you will select the type of wireless network, enter the name of the wireless network, setup WEP encryption, as well as modify other advanced settings.
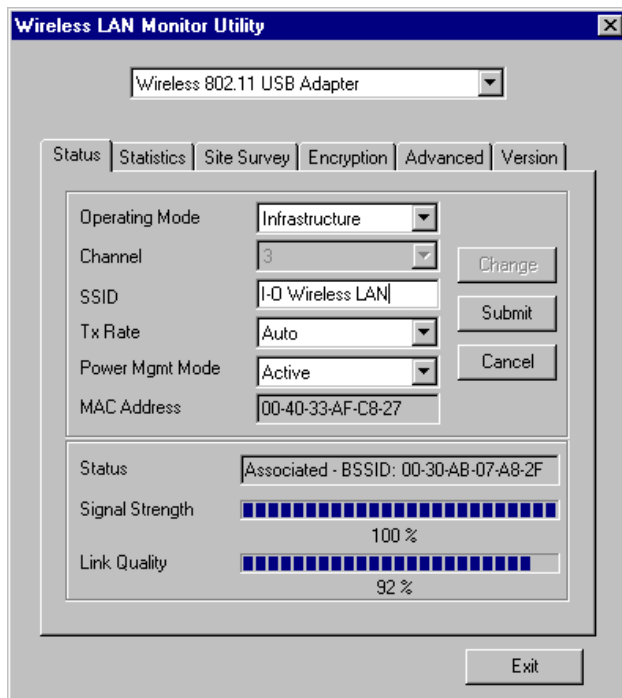
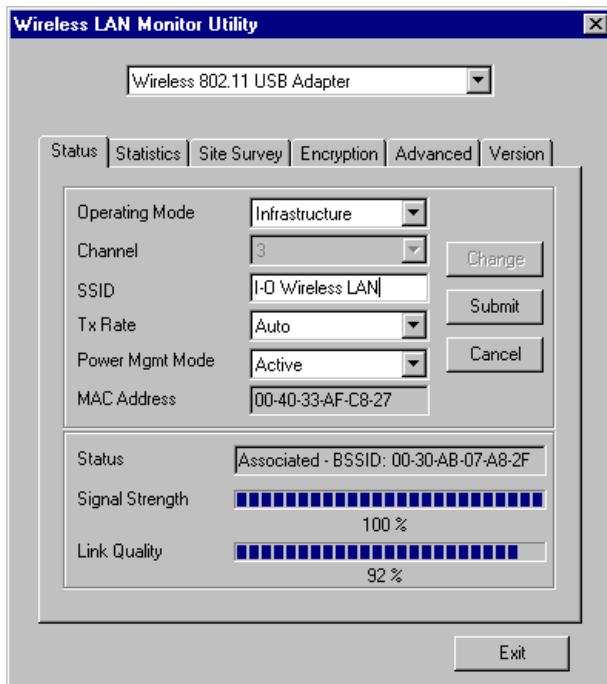# 5.2 Initial Setup of Wireless USB Adapter

If this is the first time you are setting up the Wireless USB Adapter, only the operating mode, the SSID network name and WEP encryption need to be set up. An IP address also needs to be assigned to the Wireless USB Adapter.

1. From within the Wireless LAN Monitor Utility screen, click the **Status tab**.



2. Click the **Change** button. Complete the following fields with information about your wireless LAN setup (accept the defaults for the other fields):

   - **Operating Mode** – select **Infrastructure** for use with an Access Point, **Ad-Hoc** for peer-to-peer.
   - SSID – enter the name of your wireless network (must be same name as used in all other wireless devices).

   Click *Submit* when finished.

   If Infrastructure Operating Mode was selected, the Status field will show the MAC address of the Access Point it is communicating with while the Signal Strength and Link Quality fields will show a bar scale representing the connection.

   If Ad-Hoc mode is selected, the Status filed will show "Ok" and the Link Quality field will show a bar scale representing the connection.

3. From the **Encryption** tab, in the "Encryption" field, select whether to activate 64-bit WEP encryption, 128-bit encryption, or to disable WEP encryption.
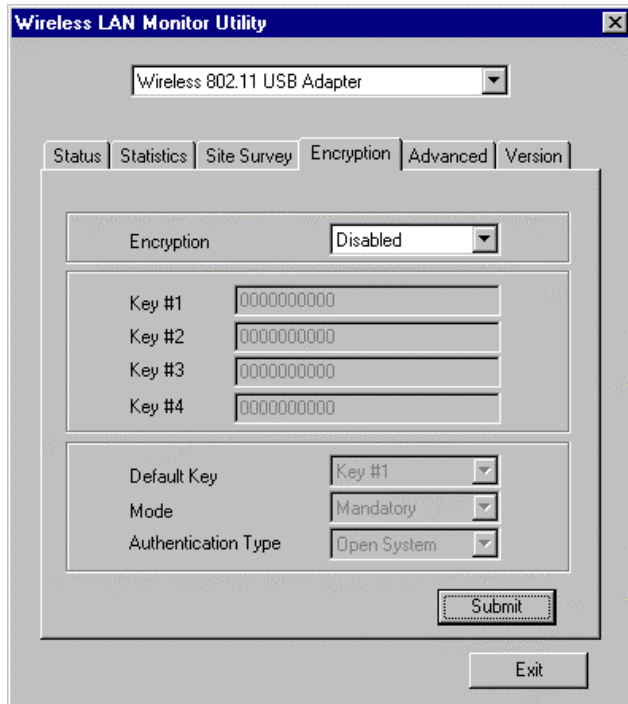


If you choose to activate WEP encryption, complete the following fields (refer to your system administrator for the values to be used here):

- In the **Key #1 … #4** fields, enter a unique combination of characters.
- In the **Default Key** field, select which of the four keys is to be used.
- In the **Mode** field, select whether WEP is optional or mandatory.
- In the **Authentication Type** field, select Open or Shared system authentication.

**Note:** The WEP entries entered here must match exactly those settings as used by all other wireless devices in the network.

**Cautions on the use of WEP**: The following are suggestions for increasing the security of your network.

- ✓ Do not use the default SSID!
- ✓ Use WEP encryption!
- ✓ Do not use the default key.
- ✓ Change the keys regularly.
- ✓ Don't tell anyone the key.
- ✓ Connect all wireless devices outside the firewall.
- ✓ Use IPsec, VPNs or other secure end-to-end protocols.

✓ Conduct audits of wireless devices regularly to insure that wireless connections are not inadvertently established within the firewall.

4. Click *Submit,* then Exit.

5. The IP address will automatically be assigned if there is a DHCP server on the network.  If there is not a DHCP server, then the IP address will need to be entered manually using I-O Management Central (refer the I-O Management Central chapter later in this user's guide).

# 5.3  Status

The Monitor screen provides information on the current link between the Wireless USB Adapter and the wireless access point.

- The **MAC Address** field shows the MAC address of the Wireless USB adapter.
- The **Status** field shows the status between the Wireless USB Adapter and other wireless devices.   When connected to an access point, the MAC address of the access point will be displayed.  When connected in an Ad-Hoc mode, this field will show an "Ok" indicator when wireless connections are active.
- The **Signal Strength** and **Link Quality** fields will be displayed by the strength of the block when applicable.   The Signal Strength field is only operable when connected to an access point.
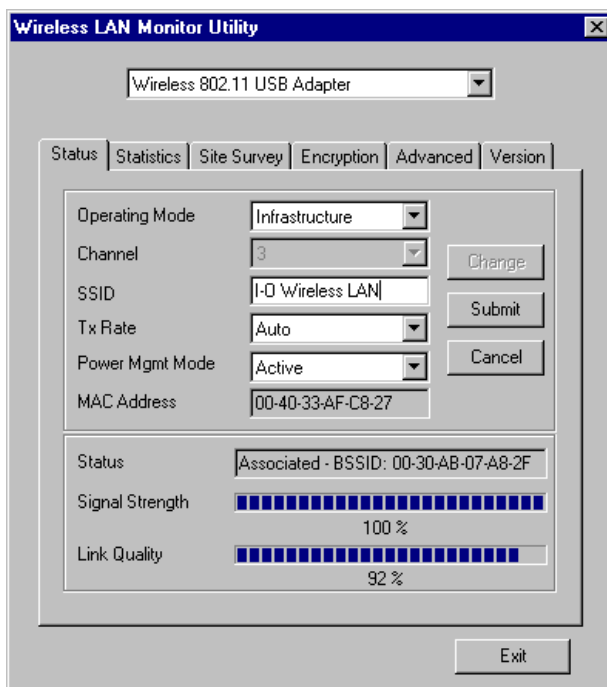


The Monitor screen also allows you to customize the settings for the Wireless USB Adapter and your wireless network.

- The **Operation Mode** setting determines the architecture of your wireless network.  Select Ad-Hoc or Infrastructure mode depending on your network type.

- The **Ad-Hoc** mode is used for a simple peer-to-peer network, which allows the sharing of local resources only between Wireless USB Adapters without a wireless access point.
- The **Infrastructure** mode allows a wireless network to be integrated into an existing wired network through an access point. Infrastructure networks permit roaming between access points while maintaining connection to all network resources and providing additional features, such as WEP security, power save mode, and extended range.
- The **Channel** setting specifies the channel used in wireless communication and should be set to the same channel as the other points in the wireless network.
- **SSID** is an acronym for Service Set Identifier, which is a unique name shared among all points in a wireless network. The SSID must be identical for all points in the network. It is case sensitive and must not exceed 32 characters.
- The **Tx Rate** field shows the current transfer rate for the Wireless USB Adapter. There are four fixed rates: 1 Mbps, 2 Mbps, 5.5 Mbps, and 11 Mbps. To optimize performance and range, the Tx Rate should be set to Auto rate, which will automatically adjust the transfer speed for best performance and longest range.
- The **Power Mgmt Mode** field shows the power management mode for adapter. Power Save mode enables the power saving features of your Wireless USB Adapter. The Power Save mode can only be set in Infrastructure mode.

# 5.4  Statistics

The Statistics screen provides the number of transmitted and received packets of that are successful or unsuccessful. The packets are divided into Data, Management, and Rejected packets.
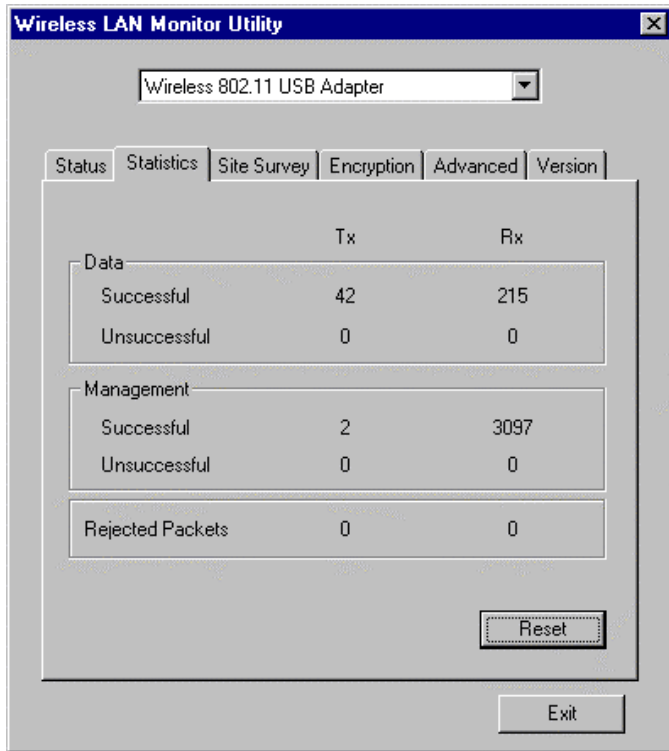


Clicking the Reset button will set all values back to zero.

# 5.5 Site Survey

The Site Survey screen shows all the points in the network.
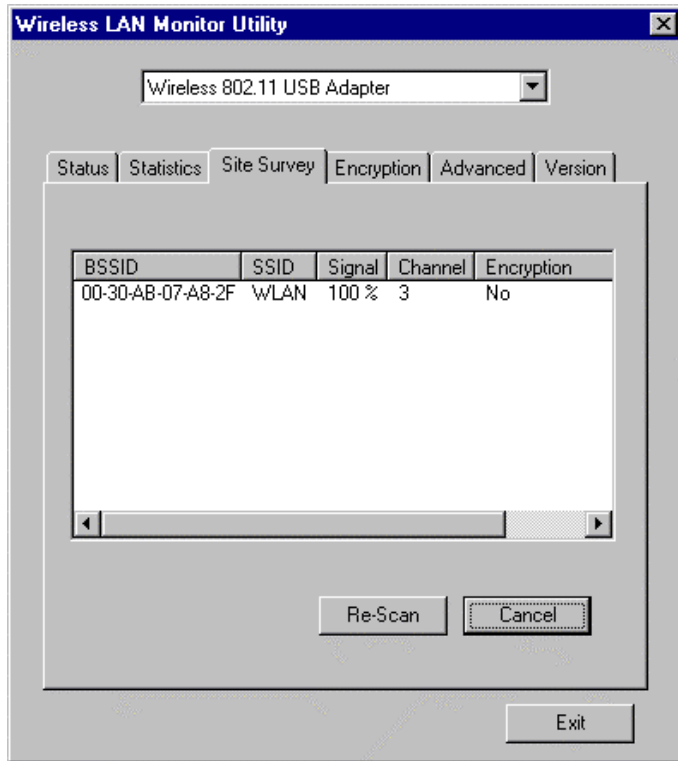


- **BSSID** is an acronym for Basic Service Set Identification, which is a 48-bit field of the same format as an IEEE 802 MAC address. This field is uniquely identified among all points in a wireless network.
- The **Signal** field shows the signal strength of the point.
- The **Channel** field shows to what channel the point is set.
- The **Encryption** field shows whether the encryption of the point is enabled or disabled.

# 5.6  Encryption

This screen is used to select whether to activate 64-bit encryption, 128-bit encryption, or to disable WEP encryption.

**Note:**  The WEP settings here must <u>match exactly</u> those settings as used by all other wireless devices in the network.
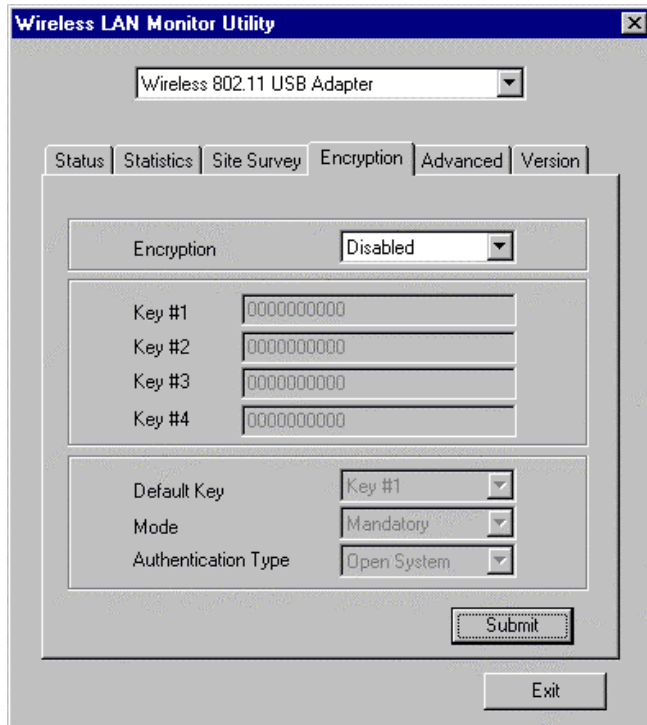


- The **Encryption** field allows the selection of whether to activate 64-bit encryption, 128-bit encryption, or to disable WEP encryption.  128-Bit WEP only uses one key while 64-bit allows you to choose which key to use.
- The **Key1**, **Key2, Key3** and **Key4** values are the keys used for establishing secured communication between the Access Point and the wireless clients. The keys are to be set to the same keys as all other points in the wireless network.  Each key is a combination of five sets of two digits.  Each key should be unique.
- The **Default Key** field specifies the WEP key to be used for secured communication between the wireless clients and the access point.  It should be set to the same key number as all other points in the wireless network.
- The **Mode** field determines whether WEP is optional or mandatory.
- The **Authentication Type** field sets the type of authentication service.  The **Open System** mode is for any wireless device. The **Shared Key** mode is for a wireless device with a shared secret key.

**Cautions on the use of WEP**:  The following are suggestions for increasing the security of your network.

- ✓ Do not use the default SSID!
- ✓ Use WEP encryption!
- ✓ Do not use the default key.
- ✓ Change the keys regularly.
- ✓ Don't tell anyone the key.
- ✓ Connect all wireless devices outside the firewall.
- ✓ Use IPsec, VPNs or other secure end-to-end protocols.
- ✓ Conduct audits of wireless devices regularly to insure that wireless connections are not inadvertently established within the firewall.

# 5.7  Advanced

The Advanced screen allows you to set the Preamble Type, Fragmentation Threshold and RTS/CTS Threshold.
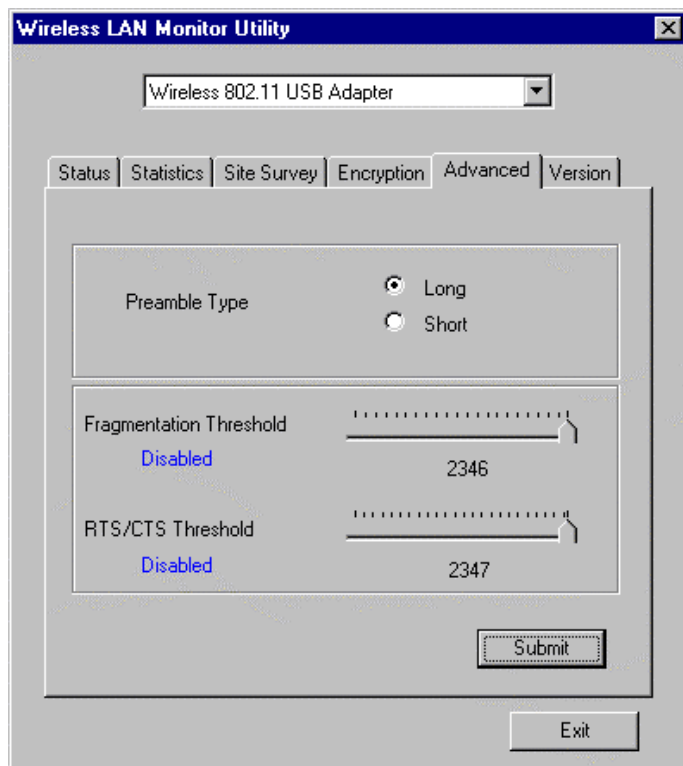


- The **Preamble Type** field sets the length of preamble. The **Long** mode is set to 144 bits. The **Short** mode is set to 72 bits.

- The **Fragmentation Threshold** field sets the length of the fragment. Each fragment should be no larger than the Fragmentation Threshold.
- The **RTS/CTS Threshold** field sets the length threshold. A Wireless USB Adapter uses a RTS/CTS exchange for directed frames only when the length of the MPDU is greater than the length threshold.

# 5.8 Version

The Version screen shows the release information for the Monitor Utility.
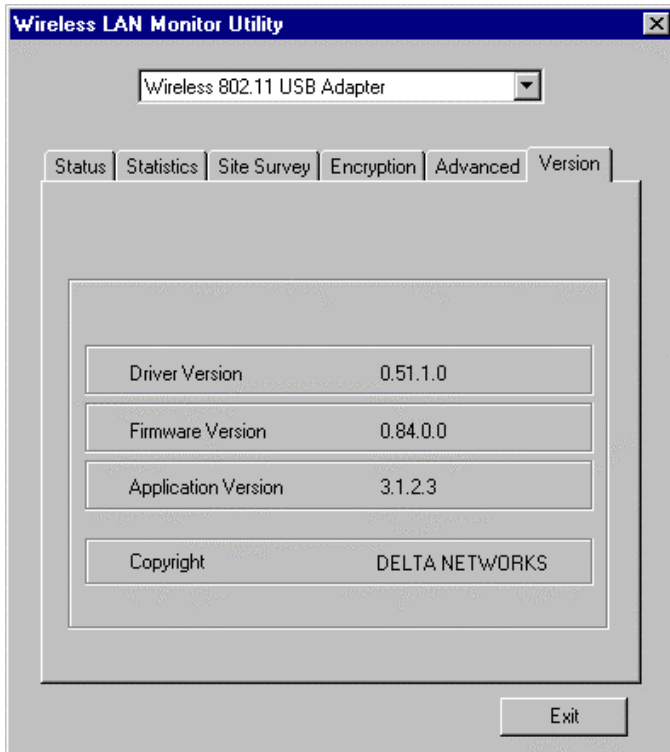
# 6 Firmware Upgrade Utility

The Firmware Upgrade Utility is used to upgrade the Wireless USB Adapter's firmware.

1. Click *Start | Programs | Wireless 802.11 USB Utility | Firmware Upgrade Utility.*

2. Click the *Upgrade* button.

3. From the dialog box's listing, select the appropriate *.rom file.
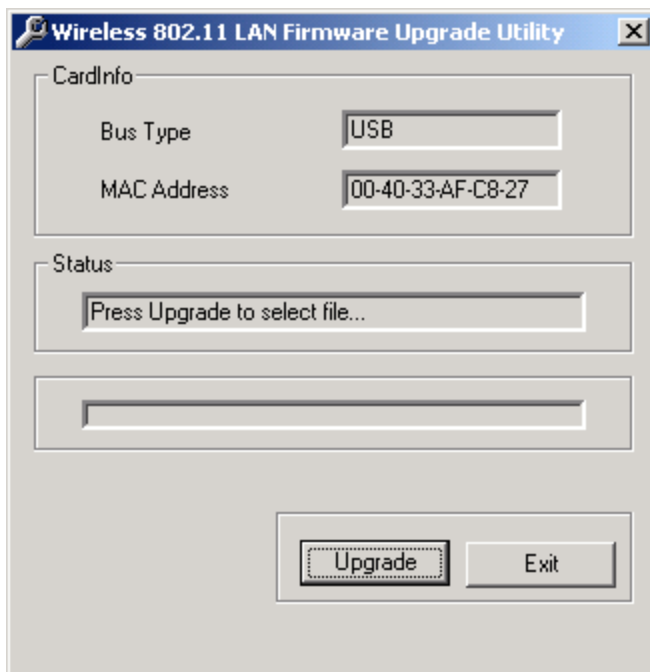
# 7  I-O Management Central

I-O Management Central is an easy to use utility that allows you to easily perform a number of more complex Windows functions without the hassle of drilling down into various screens to find a particular configuration setting.

With Management Central, you can do the following:

- Designate which drives and folders are to be shared with other computers on the network.
- Create shortcuts (mapping) to easily access other computer's drives
- Designate which printers attached to your computer you will allow others to share.
- Map other computer's printers on the network for your use.
- Change the IP address of your I-O Wireless device.
- Change your computer's sharing name that others know your computer as.
- Change the IP address of the proxy server in your Internet Explorer or Netscape browser to a different address.
- Install the BrowseGate[LITE] Internet proxy server software.

A brief description of each of these functions is given here.  Refer to the Help function within Management Central for specific information.

To use Management Central, either click the shortcut on the desktop or navigate to the programs folder, and select Management Central.  When you see the main menu, click on the button for the desired function.  Each screen will present you with instructions to perform that function.  A *Help* button will also be available to give you more information.

## 7.1  Drive Sharing

Drive Sharing allows you to share a drive with other computers on the network.  You may allow other users to just "read" the files, or give them "full" access (change, delete or create new files).

To help other users easily identify your shared drives, a "share name" is assigned to each drive.  You may customize this name or accept the default.

To make your drives available to other computers, click on the drive.  Then select the sharing level you want others to have to that drive by clicking on the desired access level radio button.  If you desire a different share name, enter the new name in the Share Name field.  Click the *SHARE* button to save the settings.

# 7.2  Drive Mapping

Drive Mapping lets you use another computer's shared drive as if it were directly attached to your computer.

Mapping sets up a drive letter on your computer that points to the shared drive of another computer.  This new drive letter becomes a shortcut so you can quickly access the other computer's shared drive.

For example, on a desktop computer located in the study, drive C has been shared.  The share name for the drive has been assigned as "Study\C".  On your computer (a laptop located in the front room), you have mapped Study\C as "S".  From your computer, you want to open a Word document on the computer located in the study.  In Word, you change to drive S, navigate to the appropriate folder, and select the desired document from the list the documents.

To map the drives of other computers in the network, in the Not Mapped screen, click on the drive to be mapped.  The next available drive letter (starting from F) will appear in the small box between the Mapped and Available to be Mapped screens.  You may change this drive letter to any unused drive letter.  You cannot assign A, B, C, D or any other drive letter that is reserved by Windows or already assigned to another drive.  To complete the mapping, click on the *MAP* Button.  The new drive will be moved from the Available to be Mapped screen to the Mapped screen.

To remove the mapping of a drive, in the Mapped screen, click on the drive. Click on the *UNMAP* button.  The drive will be moved from the Mapped screen to the Available to be Mapped screen.

To change the mapping of a drive, you need to remove the mapping and then reassign it.

# 7.3  Printer Sharing

Printer Sharing allows you to share the printers attached to your computer with other computers on the network.

To help other users easily identify your shared printers, a "share name" is assigned to each printer.  You may customize this name or accept the default.

To make your printers available to other computers, click on the printer.  If you desire a different share name, enter the new name in the Share Name field. Click *SHARE* to save the settings.

To change a printer from being shared to not shared, click on the printer, then click on the *UNSHARE* button.  Other computers in the network will no longer have access to this printer.

# 7.4  Printer Mapping

Mapping a printer allows you to access a shared printer located on another computer.

All shared printers on other computers in the network will appear in the "Available to be Mapped" screen.  From this screen, you will select the printer(s) you want to access over the network.

In order for you to send print jobs to a mapped printer, your computer will need to have the drivers for that mapped printer installed on your computer.  When you select a printer and click on the *MAP* button, the Windows Add New Printer Wizard will guide you through the process of installing the appropriate drivers.  The wizard will check to see if the drivers are already installed on your computer.  If they are not installed, the wizard will instruct you to insert the Windows CD and then will install the appropriate drivers.  You may unmap a printer and later map the printer again.  The wizard will not reinstall the drivers as they are already there.

To map a printer that uses custom installation software, first manually install the printer software on each computer that will use the printer.

To change a printer from being mapped to unmapped, select the printer in the "Mapped" screen, and click on the *UNMAP* button.  The printer will disappear from the Mapped screen and reappear on the Available to be Mapped screen.

# 7.5  IP Addressing and Computer Name

Each computer in the network must have a unique IP address.  The address can be assigned automatically by a DHCP server that is located on the network, or it can be assigned manually.  During the installation process you may have been given the option of selecting automatic address assignment or manually enter the address.  You may change that address here.

IP addresses are structured in four sets of three numbers; each set separated by a period (such as 192.168.0.1).  Each set of numbers may be from one to three in length, ranging from 0 to 999.  Generally, the first, second and sometimes the

third set of numbers is the same for a network.  The last set is usually what is changed, as each computer in the network must have a unique IP address.

Associated with the IP address is a subnet mask.  The subnet mask is used to associate a group of computers together within a larger network.  This address is structured similar to the IP address.  See your system administrator for this number.

Each computer in a network needs a name that will be used by other computers to access your computer's resources (drives, printers, etc.).

When moving a laptop computer from one environment to another, you may need to change the IP address and subnet mask to match the new environment.

# 7.6  Internet Sharing

Sharing the Internet involves two processes:

- Installing the Internet sharing software on the computer which will be sharing its Internet connection with other computers, and
- Configuring the browser of all other computers to access the Internet through the computer with Internet connection.

**Note:**  The Internet sharing software is installed on one computer only while the browser is configured on all other computers.

**To install the Internet sharing software (method 1):**

1.  On the computer with the Internet connection, insert the Wireless USB Adapter Utility CD in the CD-ROM drive.

2.  Click *Start | Run*, enter "d:\setup_usb" and click *OK*.  (d:\ is the location of the CD-ROM drive.)

3.  From the USB Setup Menu, click the Install Internet Sharing Software button.

4.  Follow the prompts of the installation process.

**To Install the Internet sharing software (method 2):**

1.  On the computer with the Internet connection, insert the Wireless USB Adapter Utility CD in the CD-ROM drive.

2. Launch Management Central by clicking the icon located on the Windows Desktop.  If it does not appear on the Desktop, click *Start | Programs | Management Central.*

3. Click *Internet Sharing | Install BrowseGate*.  Refer to the Management Central self-documenting screens as you proceed through this process.

4. Follow the prompts of the BrowseGate installation process.

**To configure the browser to access the Internet via the shared Internet connection:**

1. On all other computers (except the computer with the Internet sharing software), launch Management Central by clicking the icon located on the Windows Desktop.  If it does not appear on the Desktop, click *Start | Programs | Management Central*.

2. Click *Internet Sharing | Browser Setup*.

3. Referring to the Management Central self-documenting screens, enter the *TCP/IP address* of the computer with the Internet connection.  Enter other appropriate information as needed.

# 8 Removing the Wireless USB Adapter

Removing the Wireless USB Adapter requires four processes:

1.	Remove the Monitor Utility by clicking on *Start | Programs | Wireless 802.11 USB Utility | Uninstall*.  Follow the prompts of uninstaller.  If prompted about removing shared files, it is suggested that they be removed at the next reboot of Windows.

2.	Remove I-O Management Central by clicking on *Start | Settings | Control* Panel | Add*/Remove Programs* and selecting I-O Management Central.  Click *Add/Remove*.  Follow the prompts of the uninstaller.  It is suggested that the shared files also be removed.

3.	Remove the Wireless USB Drivers by right clicking on *My Computer*, then clicking *Properties* and navigating to *Device Manager*.  Under the *Network adapters* section, select the Wireless USB Adapter.  In Windows 98/Me, click the *Remove* button.  In Windows 2000, right-click the Wireless USB Adapter entry, click *Uninstall,* and *OK*.  Restart Windows if prompted.

4.	After the other three steps have been completed, disconnect the Wireless USB Adapter prior to Windows restarting.

# 9 Troubleshooting

- **Cautions on the use of WEP**: The following are suggestions for increasing the security of your network.

  - ✓ Do not use the default SSID!
  - ✓ Use WEP encryption!
  - ✓ Do not use the default key.
  - ✓ Change the keys regularly.
  - ✓ Don't tell anyone the key.
  - ✓ Connect all wireless devices outside the firewall.
  - ✓ Use IPsec, VPNs or other secure end-to-end protocols.
  - ✓ Conduct audits of wireless devices regularly to insure that wireless connections are not inadvertently established within the firewall.

- The Wireless USB Adapter's SSID must be exactly the same as the SSID/ESSID assigned to the wireless computers in the wireless network.

- The Wireless USB Adapter's IP address must coincide with the IP addresses used in both the wired Ethernet and wireless networks.

- If DHCP is used to set IP addresses in the wired Ethernet network, the wireless computers in the wireless network should also have their IP addresses set using DHCP.

- The Wireless USB Adapter's sub-net mask must match the sub-net mask of wired Ethernet network.

- If WEP security is used, the keys and key used must be exactly the same for the Wireless USB Adapter and all wireless computers and access points in the wireless network.

- For best signal transmission and reception, locate the Wireless USB Adapter at the highest point available.

- Where possible situate both the Wireless USB Adapter, wireless cards and access points in a "line-of-sight" arrangement.

- Avoid placing the Wireless USB Adapter in or near areas painted with lead based paint.

- Use the Signal Strength and Signal Quality indicators to help locate the Wireless USB Adapter. The higher the signal strength and quality indicators,

the better the connection.  This is done by moving the Wireless USB Adapter around while watching the indicators.

- To fully remove all driver files after you have uninstalled the Wireless USB Adapter, in Windows 98/Me, in the ..\Windows\inf\other sub-directory, delete the file named "NETWORDnetvusba.inf".

- If when attempting to share a drive, folder or a printer in Management Central and there is no sharing action (the drive, folder or printer is not marked full or read only as you selected), check that the Microsoft Windows File and Print sharing options have been activated.  See Chapter 2.

# Glossary

**10/100BaseT:** An IEEE standard (802.3) for operating at either 10 Mbps or 100 Mbps Ethernet networks (LANs) with twisted pair cabling and a wiring hub.

**Access Point (AP)** - An internetworking device that seamlessly connects wired and wireless networks together.

**Ad-Hoc** - An Ad-Hoc wireless LAN is a group of computers each with wireless cards, connected as an independent wireless LAN.  You can immediately begin communicating between the various stations as soon as the hardware and drivers are installed.  An Ad-Hoc network is not attached to a wired network (which uses an access point in an infrastructure mode).  An alternative set-up is where computers communicate with each other through an access point where there is a connection with a wired network.  (See Access Point and Infrastructure.)

**Backbone** - The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

**Base Station** - In mobile telecommunication, a base station is the central radio transmitter/ receiver that maintains communication with the mobile radio telephone sets within range. In cellular and personal communications applications, each cell or microcell has its own base station; each base station in turn is interconnected with other cells' base.

**BSS** - Stands for "Basic Service Set." An Access Point associated with several wireless stations.

**Client** – Any computer connected to a network that requests services (files, print capability) from another member of the network.

**DSS** – Direct-Sequencing Spread-Spectrum.  DSSS uses a radio transmitter to spread data packets over a fixed range of frequency band.

**ESS** - Stands for "Extended Service Set." More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

**Ethernet** - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.

**Gateway** – A network point that acts as an entrance to another network.

**Hz (Frequency or Hertz)** – The international unit for measuring frequency, equivalent to the older unit of cycles per second.  One megahertz (MHz) is one milling hertz.  One gigahertz (GHz) is one billion hertz.  The standard US electrical power frequency is 60 Hz, the AM broadcast radio frequency band is 0.551.6 MHz, the FM broadcast radio frequency band is 88103 MHz, and wireless 802.11 LANs operate at 2.4 GHz.

**IEEE** - Institute of Electrical and Electronics Engineers, New York, www.ieee.org. A membership organization that includes engineers, scientists, and students in electronics and allied fields. It has more than 300,000 members and is involved with setting standards for computers and communications.

**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, specification for CSMA/CD based Ethernet 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.

**Infrastructure** - An integrated wireless and wired LAN is called an Infrastructure configuration. As compared to Ad-Hoc Mode where computers communicate directly with each other, clients set in Infrastructure Mode all pass data through a central access point. The AP not only mediates wireless network traffic in the immediate neighbourhood, but also provides communication with the wired network. (See AD-Hoc and Access Point.)

**IP** - The Internet Protocol (IP) is a method or protocol by which data is sent from one computer to another on a network, i.e. the Internet. Each computer on the Internet has at least one address that uniquely identifies it from all other computers on the Internet. When you send or receive data (for example, an e-mail note or a Web page), the message gets divided into little chunks called packets. Each of these packets contains both the sender's Internet address and the receiver's address. Any packet is sent first to a gateway computer that understands a small part of the Internet. The gateway computer reads the destination address and forwards the packet to an adjacent gateway that in turn reads the destination address and so forth across the Internet until one gateway recognises the packet as belonging to a computer within its immediate neighbourhood or domain. That gateway then forwards the packet directly to the computer whose address is specified. Because the data is divided into a number of packets, each packet can, if necessary, be sent by a different route across the Internet. A packet is treated as an independent unit of data so packets can arrive at their destination in a different order than they were sent in. Another protocol,

the Transmission Control Protocol, (TCP) then reassembles the packets in the right order.

**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.

**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 (10BaseT) is often used to connect the computers together. Wireless LANs use wireless communications, in a home or office, to network all computers together so there is no need to run an extra set of cables.

**PCI** -  A local bus standard for connecting peripherals to a personal computer. Within a computer, the bus is the transmission path on which signals and data transfers occur between the CPU, system memory, and attached devices such as a network card, sound card, or CD-ROM drive.

**PCMCIA** - Personal Computer Memory Card International Association, which develops standards for PC cards, formerly known as PCMCIA cards, are available in three "types" which are about the same length and width as credit cards, but range 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 many functions, including memory storage, as landline modems and as wireless LAN.

**Roaming** - A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connected to the infrastructure.  As a wireless computer moves from an area served by one AP to another AP, the connection is automatically switch from the first AP to the second AP.  When the change of connection occurs, there may appear to be a loss of connection at the wireless station.

**RTS Threshold** – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this " Hidden Node Problem".

**SSID –** An acronym for Service Set Identifier, SSID is the unique name shared among all clients and Access Points in a wireless network. The SSID must be identical for all clients or Access Points participating in the same network. The SSID is case sensitive and must not exceed 30 characters.

**TCP (Transmission Control Protocol) -**  A protocol used along with the Internet Protocol (IP) to send data in the form of individual units (called packets) between computers over the Internet. While IP takes care of handling the actual delivery

of the data, TCP takes care of keeping track of the packets that a message is divided into for efficient routing through the Internet. For example, when a web page is downloaded from a web server, the TCP program layer in that server divides the file into packets, numbers the packets, and then forwards them individually to the IP program layer. Although each packet has the same destination IP address, it may get routed differently through the network. At the other end, TCP reassembles the individual packets and waits until they have all arrived to forward them as a single file.

**WEP (Wired Equivalent Privacy)** - WEP data encryption is defined by the 802.11 standard to prevent (i) access to the network by "intruders" using similar wireless LAN equipment and (ii) capture of wireless LAN traffic through eavesdropping. WEP allows the administrator to define a set of respective "Keys" for each wireless network user based on a "Key String" passed through the WEP encryption algorithm. Access is denied by anyone who does not have an assigned key.  The key, either 40 or 104 bits in length, is added to a 24-bit initialization vector resulting in a 64-bit or 128-bit key size.  Each station and access point in the network must be set-up the same.

# FCC Compliance Notices

*Radio Frequency Notice*

This device complies with part 15 of the Federal Communications Commission (FCC) Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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: (1) Reorient or relocate the receiving antenna, (2) Increase the separation between the equipment and receiver, (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected, (4) Consult the dealer or an experienced radio/TV technician for help.

*Radiation Exposure Statement*

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm (8 inches) during normal operation.

# Technical Specifications

| | |
|---|---|
| **Standard** | IEEE 802.11b,<br>USB 1.0 Specification |
| **Data Rate** | 11 Mbps, 5.5 Mbps, 2 Mbps, 1 Mbps<br>(Auto-Fallback) |
| **Security** | 64-Bit WEP Data Encryption |
| **Frequency Band** | 2.4 GHz ISM Frequency Band<br>2400 - 2483.5 MHz (US, Canada)<br>2400 - 2497 MHz (Japan, ETSI) |
| **Wireless Medium** | Direct Sequence Spread Spectrum (DSSS) |
| **Modulation Type** | DBPSK @ 1 Mbps, DQPSK @ 2 Mbps,<br>CCK @ 5.5 Mbps and 11 Mbps |
| **Operating Channels** | 11 Channels (US, Canada)<br>13 Channels (ETSI)<br>14 Channels (Japan) |
| **Operating Range** | |
| Indoor | 120 feet at 11 Mbps<br>200 feet at 5.5 Mbps<br>240 feet at 2 Mbps<br>300 feet at 1 Mbps |
| Outdoor | 400 feet at 11 Mbps<br>600 feet at 5.5 Mbps<br>750 feet at 2 Mbps<br>1000 feet at 1 Mbps |
| **Antenna Type** | Built-in Dual Dipole Antenna |
| **Receive Sensitivity**<br>(Typical) | -84dBm for 11 Mbps (8% PER)<br>-87dBm for 5.5 Mbps (8% PER) |
| **Interface** | USB Interface (USB cable included) |
| **LED Indicator** | USB connection, RF link/activity |

| | |
|---|---|
| **Output Power** | 13 dBm |
| **Dimensions** | 107 mm x 87 mm x 24 mm |
| **Weight** | 24 g |
| **Emissions** | FCC Part 15, CE, Telec, Jate |
| **Operating Temperature** | 0 to 40° C |
| **Storage Temperature** | -20 to 70° C |
| **Operating Humidity** | 10% to 90% RH |

# Hardware Warranty

I-O Wireless (I-O) warrants the hardware product against defects in material and workmanship for a period of one (1) year commencing from date of purchase by the original customer, when operated and maintained in accordance with I-O's published specifications.  I-O's liability shall be limited, at its option and expense, to refund to buyer the actual amount paid by buyer or to repair or replace any defective or non-conforming product or part thereof, F.O.B. I-O's authorized repair depot.  Buyer will pay reasonable labor and handling charges for each product returned for repair which is found to have no defect.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES.  OTHERWISE, THE PRODUCTS ARE SOLD <u>AS IS</u> WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O.  I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.  EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER.  UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

I-O shall not be liable for non-performance or delays hereunder due to causes beyond its control.  These shall include, but not be limited to, acts of God, wars, strikes, fires, flood, storm, earthquake, shortages of labor or materials, labor disputes, transportation embargoes, acts of any government or agency thereof.

**Some jurisdictions do not allow implied warranties to be excluded or consequential damages in the case of injury to the person to be limited if the products are used or bought for use primarily for personal, family or household purposes.  Therefore if the products are used or bought for use primarily for personal, family or household purposes, all of the above limitations or exclusions may not apply to you.**

SOFTWARE: Software provided with this product is covered under the separate warranty.  See the applicable software license agreement for details on any software warranty.

# Software License Agreement

By installing this software on your computer system, you indicate your acceptance of the following terms and conditions.  If you do not agree with these terms and conditions, do not proceed further and delete any information obtained from this software and return the software to I-O Wireless (I-O).

GRANT OF LICENSE.  Subject to the terms and restrictions set forth herein, I-O grants to you the right to use one copy of the enclosed software program or subsequent upgrades (SOFTWARE) on a single personal computer system.

COPYRIGHT RESTRICTIONS.  The SOFTWARE is owned by I-O or its suppliers and is protected by the United States copyright laws and international treaty provisions.  You may either (i) make one copy of the SOFTWARE solely for backup and archival purposes provided that you reproduce all copyright and other proprietary notices that are on the original copy of the SOFTWARE provided to you, or (ii) transfer the SOFTWARE to a single hard disk provided that you keep the original solely for backup or archival purposes.  You may not copy the written materials accompanying the SOFTWARE.

OTHER RESTRICTIONS.  You may not rent or lease the SOFTWARE.  You may transfer your interest in this License on a permanent basis provided you retain no copies or versions thereof and the recipient agrees to the terms of this Agreement.  You may not reverse engineer, decompile, disassemble, or create derivative works from the SOFTWARE.

BREACH OF RESTRICTIONS.  Breach of the copyright or any other restriction herein shall revoke the license granted without further action or notice by I-O.

GENERAL PROVISIONS.  You acknowledge and agree that (i) you have independently determined that the SOFTWARE licensed hereunder meets your intended requirements, and (ii) you have sole responsibility for the installation, use and results obtained from the SOFTWARE.

You acknowledge and agree that the SOFTWARE is subject to restrictions and controls imposed by the United States Export Administration Act (ACT) and the regulations thereunder.  You agree and certify that neither the SOFTWARE nor any direct product thereof is being or will be acquired, shipped, transferred or re-exported, directly or indirectly, into any country prohibited by the ACT and the regulations thereunder or will be used for any purpose prohibited by the same.  This Agreement is governed by the laws of the State of Utah, USA.  The provisions of the Uniform Commercial Code as therein adopted shall apply to this transaction.

LIMITED WARRANTY.  I-O warrants this SOFTWARE for a period of ninety (90) days commencing from the date of purchase by the original end-user that:  (i) the SOFTWARE will substantially conform to the applicable user documentation and (ii) that the magnetic media and the user documentation (if any) are free from defects in material and workmanship.  I-O's liability shall be limited, at its option and expense, to refund to original end-user the actual amount paid by original end-user or to repair or replace any defective or non-conforming product or part thereof, F.O.B. I-O's authorized repair depot.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES.  OTHERWISE, THE PRODUCTS ARE SOLD AS IS WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O.  I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER.  UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

**Some jurisdictions do not allow implied warranties to be excluded or consequential damages in the case of injury to the person to be limited if the products are used or bought for use primarily for personal, family or household purposes.  Therefore if the products are used or bought for use primarily for personal, family or household purposes, all of the above limitations or exclusions may not apply to you.**

# Product Support and Warranty Administration Policy

## *Contact I-O Wireless™ if . . .*

- You have questions about the installation or operation of your I-O Wireless product, or
- You believe your I-O Wireless product may not be working properly.

## *How to contact I-O Wireless*

Web site address:    www.iowireless.com

- Frequently asked questions, installation guides, and technical information are available for reference and assisting with self-help.
- Questions or requests may be submitted via e-mail in the "Contact Us" section.

Telephone:    1.877.471.9933 (toll-free)

- Hours of support are 12:00 noon to 8:00pm MST, Monday - Friday.
- Voice mail messages may be left outside normal hours of operation

## *Support*

You must have your product serial number to qualify for I-O Wireless telephone support.

Telephone support is provided at no charge for 90 days from date of purchase.

Telephone support after 90 days is billed at $15 per call, up to one year from date of purchase.  Support charges after one year are $25 per call.  The following credit cards are accepted forms of payment:

- Visa
- MasterCard

No telephone support will be given without first verifying your I-O Wireless product serial number.  This number was activated when your product was shipped.   The product serial number is found on the label attached on the bottom side of the product.

Please have your product serial number noted before calling I-O Wireless.

Self-help assistance or e-mail inquiries via the I-O Wireless web site are always free.

### *Returning a product*

If the I-O Wireless Customer Service Representative determines that your product should be replaced under the manufacturers terms of warranty, you will be able to choose from two handling options:

- Normal Replacement: Return your product in it's original packaging, freight pre-paid, to I-O Wireless.  Upon receipt of your returned unit, I-O Wireless will send you a replacement product, freight pre-paid.
- Expedited Replacement: If you require expedited replacement service, you may pay for a replacement unit that would be shipped immediately (in advance of returning your defective unit).  When your original unit is returned (freight pre-paid) and received by I-O Wireless, a reversal of the replacement charge will be processed, off-setting the expedited replacement charge to zero.