



# ***Emerald USB Antenna***

## ***USB Client Station Adapter***



### ***User's Manual***

Version 1.1

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### **IMPORTANT OPERATING NOTE**

This unit complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept interference received including interference that may cause undesired operation.

### **LIMITED WARRANTY**

YDI provides warranty that your device is free of defects in material and workmanship for a period of one year after initial purchase. YDI will, in this period of time, repair or replace any YDI product returned to the factory (freight prepaid).

The YDI warranty covers repairs or replacement (at YDI's option) of the product only. YDI is not responsible for the cost of removal, reinstallation, or shipping to the place of repair. YDI does not extend or modify its warranty period as a result of repair or replacement.

YDI reserves the right to void a warranty and/or make reasonable charges for repair of a unit if the warranty seal is broken or the unit displays evidence of misuse, abuse, tampering or water damage.

YDI is not responsible for damage to any other equipment or property, or any other consequential or incidental damages of any kind, whether based on contract, negligence, or strict liability. Maximum liability shall not in any case exceed the purchase price of the unit.

Warranties give you (the buyer) specific legal rights. You may also have other rights which vary from state to state. This warranty is only extended to purchases made in the United States of America or its possessions.

### **IMPORTANT INSTALLATION NOTE**

**The antenna(s) used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 2 meters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.**

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# Section 1 OVERVIEW

## 1.1 Description

The Emerald USB Antenna is a 2.4 GHz flat panel 18dBi gain directional antenna with a built-in USB adapter using an 11Mbps 802.11b WiFi™ compliant WLAN Card. It provides long-range high-speed wireless connectivity for the USB-enabled desktop PC or laptop computers.

A 25-foot USB cable is included, but can be extended using active repeating extension cables. The antenna is intended for outdoor or long range use, and can be pole or wall-mounted for fixed wireless connectivity.

The Emerald USB Antenna offers the simplest, most efficient 2.4 GHz Wireless Internet Access solution for a desktop PC. The Emerald USB Antenna will communicate with any other wireless device that is WiFi compatible. When used with ORiNOCO Access Points, it has full-featured Link Test capabilities. This shows the connection's data rate and radio link margins in both directions.

There's no need to open a customer's PC to install an interface card, and no worries about IRQ device conflicts, finding vacant ISA or PCI slots, or dealing with external power supplies and cables. Just attach the included 25-foot USB cable (plus optional extension cables) to the Emerald USB Antenna, plug into an available USB jack on your computer, and your hardware installation is complete!

With the USB adapter built right in to the antenna, there's no complicated hardware configuration or RF cables to deal with. And because the Emerald USB Antenna has the radio built in, professional antenna installation is not required. All you have to do is make sure the flat panel antenna is optimally aimed and has clear line of sight to the base station. With the Windows-based Client Manager software provided, the signal strength and signal-to-noise ratio (SNR) displays make aiming the antenna a snap.

## 1.2 Features

- **18 dBi Gain Antenna**

FCC part 15 certified for license-free operation, this high-gain directional antenna provides long-range wireless connectivity. Professional Installation is not required.

- **802.11b compliant**

The Emerald USB Antenna is Wi-Fi compatible and will work with any certified 802.11b compatible Access Point. This includes the YDI AP2 and AP11 Access Points as well as the Lucent AP500 and AP1000.

- **USB interface**

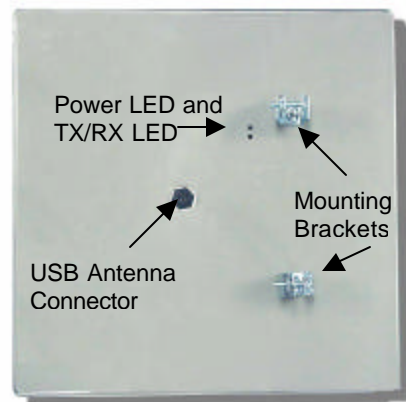
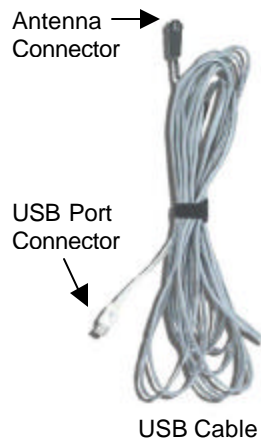
Universal Serial Bus (USB) allows you to easily install devices, like the Emerald USB Antenna, to your computer. You can attach the USB plug while the computer is on and Windows automatically detects the new device. Power is supplied to the Emerald USB Antenna through the USB interface, so there's no need to have an extra power supply nearby.

- **Operating System**

The Emerald USB Antenna is supported by the Windows 98, ME, and Windows 2000 operating systems.

The Emerald USB Antenna kit includes:

- Flat Panel 18 dBi gain directional antenna
- High performance 11Mbps 802.11b WLAN Card (built-in)
- USB adapter cable, 25 feet long
- CD-ROM or Floppy disks with drivers and Client Manager software
- User's Manual



### 1.3 Uses

**Long-range.** The Emerald USB Antenna works best in an open environment with no obstructions such as trees or buildings. Under ideal conditions, it can communicate with an 802.11b Access Point several miles away.

**Infrastructure Mode.** Infrastructure mode requires use of an Access Point. The Access Point (or AP) acts as a base point for wireless stations, regulating the transfer of information between them. It can be used to create a Wireless LAN (WLAN) or for wireless Internet applications.

**Ad Hoc Mode.** Ad Hoc is peer-to-peer networking. Two wireless clients communicate directly, without the use of an AP. It can be used for very small or temporary networks.

## Section 2 INSTALLATION AND CONFIGURATION


Before you install any USB device, you should be sure that the computer has USB support enabled. Most computers today with USB ports also have support enabled, but if you encounter problems, you may need to check this setting in the computer's BIOS. The manual that came with your computer or motherboard should include instructions on how to check the setting.

You can attach a USB device while your computer is on or off; either way, Windows will detect the device and enable its drivers, or start the "Add New Hardware" Wizard.

For the most reliable operation of the Emerald USB Antenna, you should install the drivers first, and then the Client Manager.

### 2.1 Hardware Setup

The most important aspect of setting up the Emerald USB Antenna hardware is optimal positioning of the flat panel antenna. The ORiNOCO Client Manager that comes with the Emerald USB Antenna has a signal strength indicator. You can use this Windows software to display the received Signal Strength, and use the readings to aim the antenna. Before you can do this, you have to install the Emerald USB Antenna drivers and Client Manager software. If you use this method, it is easier to have one person monitoring the Client Manager and one person aiming the antenna, until you find the ideal position for it.

 **Warning:** The antenna(s) used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 2 meters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

If you are using an ORiNOCO Access Point, then the Link Test will show not only the signal from the Access Point, but also your signal as received by the Access Point.


You might choose to determine the signal strength at a client site before you install the Emerald USB Antenna. Use a YDI Diamond WLAN Card (or equivalent\*) in a laptop computer, connected to a YDI FP18 Flat Panel Antenna. This will give you a signal strength reading and facilitate aiming the antenna. Place the FP18 Antenna where you intend to place the Emerald USB Antenna. Use the WLAN Card's signal strength indicator to measure Signal Strength, and use the measurements to aim the FP18 Antenna. When you have found the best position for the antenna, make a note of *exactly* how the FP18 is aimed and then replace it with the Emerald USB Antenna.

After you've found the best location for the antenna:

- Connect the 25-ft. USB adapter cable to the flat panel antenna. Also connect any optional (not included) active repeating extension cables.
- Use the brackets and screws to mount the flat panel antenna.
- Plug the USB connector in to a USB port on your computer.
- See Section 2.2 "Driver Installation" below.

## 2.2 Driver Installation for Windows 98/ME and 2000

If any drivers for ORiNOCO powered WLAN Cards have been previously installed on your computer, these drivers and software must be removed *completely* before installing the Emerald USB Antenna. See Appendix A "Troubleshooting" for how to do this.

 **Warning:** You cannot swap Emerald USB Antennas (or the Diamond or Emerald USB Adapters) on a computer once the drivers are installed for a specific device. The computer always expects to see the MAC address of the device. If a different unit is plugged into the USB port, the computer will report "New Hardware Found" and ask you to load the drivers for it. For the most reliable operation, any old drivers should be removed before installing the new device.

After you plug the USB cable into your computer, the Windows "Add New Hardware" Wizard automatically detects the new USB device. Follow these steps to install the drivers needed:

**NOTE:** If the "Add New Hardware Wizard" does not show up, the odds are that the USB port on your computer is not enabled.

1. When Windows starts the "Add New Hardware" wizard follow the instructions to install the drivers.
2. When you are prompted to locate the driver installation files:
  - Insert the CD or floppy disk that was included with your Emerald USB Antenna.
  - Specify the directory where the files are located (usually **d:\** for the CD-ROM drive and **a:\** for the floppy drive). Use the **Browse...** button if the Wizard doesn't find the files.
    - In Windows 98 or ME: **a:\Win\_98ME** or **d:\Drivers\Win\_98ME**
    - In Windows 2000: **a:\Win\_2000** or **d:\Drivers\Win\_2000**

When Windows finishes installing the drivers, it automatically opens the **Add/Edit Configuration Profile** window. See Section 2.3 "Set Basic Parameters".

**NOTE:** If you want to find out the MAC Address of the Emerald USB Antenna's WLAN Card before the Client Manager is installed, just use the **winipcfg** (in Win 98,

**Start** menu -> **Run...**) or `ipconfig /all` (in Win 2000, from the **Command Prompt**) command.

3. Continue with setting the basic parameters as described in Section 2.5 “Installing the Client Manager”.

### **Windows Network Properties**

If this is the very first time that Networking support is installed in Windows, you will be prompted to enter a computer and workgroup name. These names will be used to identify your computer on the network.

In Windows 98:

1. The Network Properties window pops up automatically.
2. In the **Computer Name** field, enter a unique name for your computer.
3. In the **Workgroup** field, enter the name of your workgroup.
4. (Optional) Provide a description of the computer in the **Computer Description** field.

You should contact your Network Administrator if you are not sure of the correct information for your network, or if you are not familiar with installing networking support in Windows 98, ME, or 2000.

## **2.3 Set Basic Parameters**

The Add/Edit Configuration Profile window enables you to specify one or more network connection profiles.

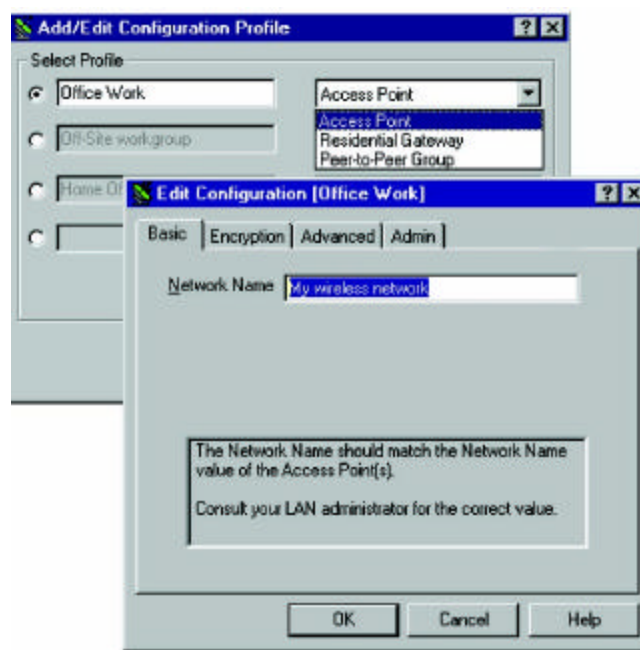


Figure 1. Add/Edit Configuration Profile window



To connect your computer to a wireless network you will need to:

1. Assign a name to the network connection profile
2. Use the pull-down menu on the right to select how you wish to connect to the wireless network.
3. Click the **Edit Profile** button to view/modify the parameters for the selected profile.

For first-time installations, you are advised to setup the single profile using only the Basic Settings.

**NOTE:** The number and type of parameters you need to specify may differ according to the selected connection type.

The Edit Configuration window also provides you the possibility to change other parameters (Encryption, Advanced, and Admin parameters). You are advised to leave these parameters to their default settings, unless there are special situations. See Section 3.2 “View/Modify Configuration” later in this manual.

### ***Basic Settings for Infrastructure Networks***

If you wish to connect to an Infrastructure Network, use the Add/Edit Configuration Profile window to:

- Select to connect to an **Access Point**.
- Set the correct **Network Name**.

In the field **Network Name** define the name of the wireless network to which you want to connect. You can use either:

- The value “ANY” to connect to any wireless network in the vicinity of your computer.
- An “exact” value to connect to a specific wireless network. Consult your LAN Administrator for the value that applies to your network.

**NOTE:** The Network Name can be any alphanumeric string in the range of “a” to “z”, “A” to “Z” and “0” to “9” with a maximum of 32 characters (case-sensitive).

Click **OK** to confirm and return to the Add/Edit Configuration Profile window. Click **OK** again to finish with the installation as described in Section 2.5 “Finish the Installation”.

### ***Basic Settings for Peer-to-Peer Workgroups***

If you wish to connect to a Peer-to-Peer workgroup, use the Add/Edit Configuration Profile window to:

- Select to connect to a **Peer-to-Peer** Workgroup.
- Set the correct **Network Name**.

In the field **Network Name** define the name of the wireless network to which you want to connect. The Network Name can be any alphanumeric string in the range of “a” to “z”, “A” to “Z” and “0” to “9” with a maximum of 32 characters (case-sensitive).

If there is already a Peer-to-Peer group with this name available your computer will automatically connect to this workgroup. If there is not yet such a group available, your computer will automatically start one with this name.

Click **OK** to confirm and return to the Add/Edit Configuration Profile window. Click **OK** again to proceed with the installation. Continue with Section 2.4 to complete the installation procedure.

## **2.4 Finish the Installation**

When you have finished “Set Basic Parameters”, click the **OK** button to close the Add/Edit Configuration window and to proceed with the installation process. Windows will finish building the driver configuration database and copy some files to your computer’s hard disk.

- If the Windows operating system prompts you to identify the location of the Windows files, specify the drive and directory of the Windows Installation CD.

If you do not have the Windows CD available, you can try replacing the proposed path in the Copy Files From dialog box with “c:\windows\system”, or “c:\windows”.

- If the Windows operating system prompts you to identify the location of the USB adapter driver files, specify the drive and directory on the Emerald USB Antenna driver floppy or CD.

When Windows finishes copying files, it will prompt you to restart your computer. Click the **OK** button to restart your computer.

After you have restarted your computer, the Windows operating system will detect the Emerald USB Antenna.


You may be prompted to enter a Windows user name and password. The password you enter here will be the one used to login to the Windows Network.

Consult your LAN Administrator if you need assistance with this aspect of Windows Networking.

## **2.5 Installing the Client Manager Software**

The Client Manager program is a software tool that you can use to check the quality of your network connection. It is not mandatory to install the Client Manager program in order to establish a network connection, but it enables you to view and/or modify your Emerald USB Antenna Configuration, to test your radio link, and to monitor your network connection. See Section 3 “Using the Client Manager”, for more information.

It is recommended that you install the Client Manager after the drivers are installed.

 **Warning:** If you have previously installed any ORiNOCO Client Manager, or ORiNOCO powered WLAN Cards, then the old Client Manager software and drivers must be *completely* uninstalled for proper operation of the Emerald USB Antenna. See Appendix A “Troubleshooting” for how to do this.

To install the Client Manager software, proceed as follows:

1. If you received floppy disks with your Emerald USB Antenna, put the Client Manager disk into the floppy drive and from the Windows **Start** menu, select **Run**, and type **a:\c1\_mgr.exe**.
2. If you received a CD with your Emerald USB Antenna, put it into the CD-ROM drive and go to **Start -> Run** and type **d:\Client Manager\c1\_mgr.exe**. Or use the Windows Explorer to locate the file on the CD, and double click to run it.
3. **c1\_mgr** is a self-extracting zip file. It will use the c:\windows\temp directory to uncompress the setup files. It will then automatically launch the setup wizard to install the Client Manager. Use all the default directories under most circumstances.

## Section 3 USING THE CLIENT MANAGER

The Client Manager will start automatically every time you power up your computer.

The Client Manager icon is displayed in the System Tray of your Windows taskbar at the right side on the bottom of your screen, indicating that the Client Manager program is running.

Click the icon once with your left mouse button to retrieve a more detailed status overview.







Click the icon once with your right mouse button to display a menu with more options.

### 3.1 View Wireless Link Quality

You can use the Client Manager icon on the Windows task bar to verify the link quality of your network connection.

An overview of all possible icons is given in Table 3-1. When the Client Manager icon is not indicating excellent or good radio connection, act as described below.

**Table 1. Client Manager Icon**

Icon	Color	Description
	Green	Excellent radio connection
	Green	Good radio connection
	Yellow	Marginal radio connection: The radio signal is weak.  Move closer to the AP or Base Station
	Red	Poor radio connection:  The radio signal is very weak. Save your files and move closer to the AP or Base Station
	Red	No radio connection because:  Looking for initial connection, you have moved out of range of the network.
	Blank	No Connection because there is no PC Card inserted

**NOTE:** This only shows the received signal from the Access Point (or remote unit). It does not show your signal into the Access Point. Since most base station systems or WIPOPs (Wireless Internet Points of Presence) have amplifiers and this device does not, your signal into the base unit will be 12 to 20 dB lower than the signal from the amplified base unit. If ORiNOCO AP's are used at the base, then you can get an immediate reading of your signal into the base Access Point using the Link Test feature in the Client Manager software. This remote indication is not available if the AP is not an ORiNOCO Access Point.

### 3.2 View/Modify Configuration

If you would like to view or modify Emerald USB Antenna wireless parameters (*i.e.* to connect to another network or type of network) proceed as follows:

1. Right-click on the Client Manager icon on the Windows taskbar.
2. From the menu, select **Configuration Profile** and select:
  - **Add/Edit Profile** to add a new profile or to modify an existing profile.
  - **One of the existing profiles** (if present) to select a profile without viewing or modifying the settings.

After selecting and another profile, the Emerald USB Antenna will use the selected profile to connect to the wireless network.

### 3.3 Advanced Configurations

Although your Emerald USB Antenna will work fine in most network environments with the basic settings described earlier in this manual, you may wish to explore the advanced parameters options as displayed on the Client Manager's **Add/Edit Configuration** window.

Advanced parameters can only be specified if the Emerald USB Antenna is connected to an existing network. Consult your LAN Administrator for information about whether these parameters apply to your situation.

#### ***Encryption Tab***

The Encryption tab enables you to define the encryption keys that your Emerald USB Antenna client station should use to encrypt and decrypt data that will be transmitted via the wireless interface. You can identify up to 4 different key values, but you can only activate one at a time.

The length of the key you can use depends on whether devices in your wireless network you support WEP 64 or WEP 128. YDI Diamond products use WEP 64, and YDI Emerald products support WEP 128.

Devices that support WEP 128 (like the Emerald USB Antenna) can also support WEP 64. However, WEP 64 devices will *not* support WEP 128. Therefore, if you use encryption in a network with both types of devices, you must use WEP 64.

**Note:** Check the documentation that came with any other devices in your network to find out which kind of encryption, if any, they support.

Keys can be entered in Hexadecimal or Alphanumerical format. Whichever format you choose, the key that you enter is used in an encryption algorithm to encode the data that you send. Only another wireless card using the same key can decode and receive the data.

WEP 64 requires a 5-character Alphanumeric Text key or a 10-character Hexadecimal key. WEP 128 requires a 13-character Text key or a 26-character Hex key. Hex keys

must begin with “0x” and are composed of the numbers 0-9 and letters A-F. Text keys cannot start with “0x”.



**CAUTION:** Encryption keys must be the same for all communicating wireless stations. If you don't use the right key, you can establish a radio connection with another station on your network but you will not be able to transfer data.

### ***Advanced Tab***

On the Advanced tab of the Edit Configuration window the following parameters can be specified:

- **Card Power Management** – to extend the battery life of (mobile) wireless devices.
- **Interference Robustness** – when troubleshooting slow performance of the WLAN network that could be related to in-band interference from e.g. microwave ovens.
- **RTS/CTS Medium Reservation** – if density of WLAN stations and access points is very low, OR as a result of poor network performance due to excessive frame collisions at the access points.

### ***Admin Tab***

On the Admin tab of the Edit Configuration window the following parameters can be specified:

- **Distance between Access Points** – depending on the number of access points in a WLAN network this parameter controls the network performance.
- **MAC Address** – when troubleshooting slow performance of the WLAN network that could be related to in-band interference from e.g. microwave ovens

## **3.4 Performance Testing**

Open the main window of the Client Manager by left clicking once on the icon in the taskbar. This screen displays general information about the operational status and performance of your Emerald USB Antenna.

You can diagnose the performance of your Emerald USB Antenna by using one of the options under the **Advanced** menu:

- Perform a PC Card hardware test running the **Card Diagnostics**.
- Perform a radio **Link Test** with a single Access Point or computer.
- Perform a Site Survey running the **Site Monitor** option.

## **3.5 Card Diagnostics**

The Card Diagnostics option verifies your hardware and can help determine the cause of a malfunctioning card. You can use the Card Test information to investigate the operation of your Emerald USB Antenna and the installed driver.

From the Client Manager main window, pull down the **Advanced** menu and select the item **Card Diagnostics**. You will see the Station Name (name of the local computer), and the MAC Address of the WLAN Card in the Emerald USB Antenna.

Click the **Test Card Now** button to test the status of the following components:

- Driver
- Driver/Utility Match
- Driver/Firmware Match
- Utility/Firmware Match
- Hardware Integrity
- Firmware Integrity
- Error details



**CAUTION:** Running the Card Test will disrupt normal operation of your Emerald USB Antenna. This may result in a loss of your current connection to your network. When you click the **Test Card Now** button, the Client Manager program will display a warning that allows you to either abort or proceed with the Card Test.

### 3.6 Link Test

You can use the link test mode to get detailed diagnostic information about the quality of the radio link between your Client Manager station and one specific test partner. Subject to the type of wireless network you are connected to, the test partner may be either an Access Point or another WLAN client station.

**NOTE:** The Link Test only works with other YDI Diamond or Emerald products or ORiNOCO Access Point or products. If the Link Test option is unavailable but you are connected to an infrastructure (Access Point) network, try using the Site Monitor (described below).

To start the Link Test, from the Client Manager main window, pull down the **Advanced** menu and select **Link Test**. The Link Test will analyze the messages as received on both ends of the link to determine:

- **Radio Quality**, by comparing the Signal Level to the Noise Level and calculating the Signal to Noise Ratio (**SNR**).

**SNR** is a dynamic indicator that indicates the relative strength of the radio signal (Signal Level) versus the radio interference (Noise Level) in the radio signal path.

The color-coding of the SNR-bar indicates the link quality:

- Green – Communication quality is Excellent or Good; no action required.
- Yellow – Communication quality is Marginal; no action required.
- Red – Communication quality is Poor; see Appendix A “Troubleshooting”.

In most environments, SNR is the best indicator for the quality of the radio link between transmitter and receiver. A higher SNR value means a better quality

radio link. If the level of SNR is lower than expected the signal level and noise level indicators may help you investigate the cause:

- A low signal level indicates that the strength of the radio signal is fairly low: *i.e.* your Client Manager station is almost out-of-range of its link test partner.
- A high noise level indicates a source of radio interference in the radio path between the two link test partners.

Comparing the values for your station and the link test partner will help you to identify the location where the interference occurs, and investigate whether any actions to eliminate or remedy the source interference resulted in a better performance.

**NOTE:** If your Link Test partner station has an amplifier, then your signal into it will be much lower than its signal into your unit.

- **Throughput Efficiency**, by comparing:
  - Total number of Sent Messages to Received Messages, and calculating the number of messages that were lost.
  - Number of messages transmitted at the supported data rates.

The results are displayed for both Link Test Partners, which can be identified by their Station Names and/or MAC Addresses.

To analyze a specific situation in more detail, you can:

- Click the **Freeze** button to temporarily stop the dynamic update of the diagnostic counters.
- Click the **Reset** button to reset the diagnostic counters to zero.
- Click the **Advice** button to assess possible impact on your network performance, or explore suggestions to improve communications quality.

### ***Test History Tab***

You can use Test History to display link test results as a line-chart. You can change the display to include the diagnostic parameters of your choice, and a user-defined time window. You can set the time window to display the information of the last minute, last hour or last 24 hours. Test History allows you to analyze what was causing the performance problem without having to watch the dynamic indicators continuously.

### ***Log Settings Tab***

You can record the link test measurements to a log file, and use this log file to more fully analyze the link quality. The measurement data can be logged automatically at regular intervals or manually upon user-command.



### 3.7 Site Monitor

The Site Monitor option enables you to display the communications quality between your Client Manager station and all Access Points within its range. The site monitor helps you determine the overall wireless coverage of your network and verify or optimize the placement of your Access Points, in order to provide seamless roaming connectivity to WLAN stations.

**NOTE:** The Site Monitor option only works in Infrastructure mode. The Site Monitor will allow you to determine the presence of neighboring Ad-Hoc (Peer-to-Peer) workgroups, but you cannot select this type of network for Site Monitor statistics.

To start the site monitor, select **Site Monitor** from the **Advanced** menu in the main Client Manager window.

#### **Site Monitor Tab**

You can customize the selection of site monitor parameters according to your monitoring needs and preferences. The recommended selection for standard site survey procedures is as follows:

- **AP name** to identify access points,
- **SNR** to indicate the communications quality with the various access points, and
- **Channel** to identify which radio channel is used by each of the access points.

Access Points can also be identified by MAC address, if AP names are not available. The SNR, signal level and noise level can be displayed as dynamic indicators and/or numerical values in dBm. The Site Monitor will display up to five parameter selections.

#### **Selection Tab**

The **Selection** tab enables you to select another WLAN network to monitor, or detect the presence of other wireless networks that could possibly interfere with your WLAN network.

The list of **Observed Networks** on this tab will show:

- All networks that are operational within the range of your Client Manager station
- The type of network that might either be an Infrastructure network or a Peer-to-Peer workgroup
- The number of access points in the observed infrastructure network(s).
- The different radio channels used by the access points.

Click the **Scan Now** button to refresh the list of observed networks. Click the network of your choice and return to the Site Monitor tab to display the diagnostics.

When the list of Observed Networks does not show other networks, this means that:

- Your Client Manager station has been configured with a specific Network Name. This setting will not allow you to scan for/monitor other network infrastructures.

To do so, you will need to reconfigure your station to use the Network Name "ANY".

- There are no other networks operational in the vicinity of your Client Manager station, or
- The neighboring networks have been "closed" to deny wireless devices with the network name "ANY" to establish a radio connection

### ***AP Names Tab***

The **AP names** tab enables you to create a user-defined list of access point names associated with the MAC address of the WLAN Card(s) of your access points.

The field **AP name** in the Site Monitor window will display the value that has been assigned to the access point upon configuration.

When you spot an access point identified as "unknown" you can assign a name to identify it in the Client Manager diagnostic windows:

1. Enter a MAC address or double-click on one of the MAC addresses in the list.
2. Enter a name that allows for easy identification of this access point in the access point **Name** field.
3. Next click the **Add to Table** button to associate the name with this MAC address.

The access point names you assign to a MAC address will be saved into an ASCII file (APlist.txt) that is stored in "c:\program files\orinoco\client manager". You can edit the names later on, using an ASCII text editor, such as the Windows Notepad.

### ***Log Settings Tab***

You can record the link test measurements to a log file, and use this log file to more fully analyze the link quality. The measurement data can be logged automatically at regular intervals or manually upon user-command.

## **Appendix A: TROUBLESHOOTING**

If, after you have followed the installation and configuration steps above, you encounter problems in connecting to your network, the following suggestions may help you to resolve them.

### **1. Is the Emerald USB Antenna plugged into the computer?**

Verify that the Adapter is securely attached to the computer. When the computer is powered on and the Emerald USB Antenna is secured, the green Power LED on the back of the antenna will be lit.

### **2. Is the line-of-sight view obstructed?**

Place the antenna in a location where the line-of-sight between it and the remote device will not be blocked by other objects, like trees or walls.

### **3. Are other wireless clients or Access Points functioning?**

You or your network administrator can verify whether or not an AP or any other wireless stations in the network are functioning properly. If they are, check the wireless configuration and IP settings of the malfunctioning station.

### **4. Is wireless configuration consistent with the rest of the network?**

If you are certain all hardware is securely installed, and operational, open the Utility program to check the status. If the “No Connection” message displays, check Network Configuration as discussed in Section 2.4 “Set Basic Parameters”. Refer to Section 3 for an explanation of advanced settings.

**NOTE:** If you do not know the name of the network to specify as the Network Name, ask your network administrator.

If you are using Peer-to-Peer mode, all wireless stations must have the same Network Name, and be set to the same channel.

Access Point mode also requires the correct Network Name, but an Access Point is able to detect Emerald USB Antennas with Network Name set to “ANY”. If your station is set to “ANY” try changing the Network Name to the same name the Access Point uses.

### **5. Is TCP/IP configuration consistent with the rest of the network?**

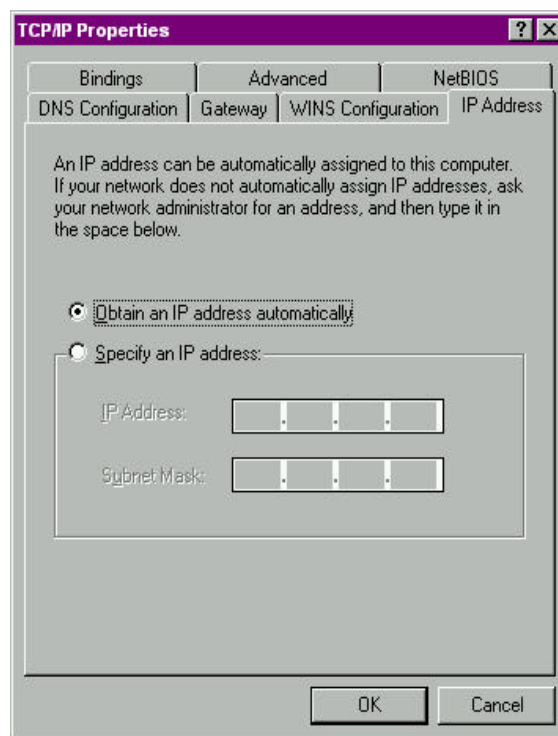
If the Wireless network configuration is correct but you still cannot connect to the network, verify that the Windows Network properties are consistent for your network. When installing the Emerald USB Antenna, the “Orinoco USB Card” network adapter

should automatically bind the correct network protocols, but sometimes it might not (usually in Windows 98).

This section covers TCP/IP settings but if you need to configure any other network property settings you should consult your network administrator. Change these settings only after you have consulted your network administrator and fully understand your network's topology.

**NOTE:** Check with your network administrator if you need to configure network properties other than the TCP/IP protocol.

### Windows Network and TCP/IP Properties



The client station must have the same subnet mask as the rest of the network, and a valid IP address for that network. If a DHCP server is used, be sure that option is selected in the Windows 98 TCP/IP properties.

If your wireless network has an Access Point acting as a DHCP server or is connected to a DHCP server, when the Emerald USB Antenna connects to that Access Point, it should automatically receive an IP address from the DHCP server.

Alternatively, if there is no DHCP server on the network, you must assign a static IP address. If this is the case, follow the steps below to check TCP/IP settings. You need to know what IP address to assign, the correct subnet mask of the network, and whether or not you need to specify any other IP addresses (i.e. of a default gateway or

DNS server). If you aren't sure of these or any other TCP/IP Properties settings, your network administrator should be able to help you.

To change TCP/IP settings (Win98):

1. On the Windows task bar click the **Start** button.
2. Select **Settings** and then select **Control Panel**.
3. On the Control Panel window, double click on the **Network** icon to view the **Network Properties**.
4. From the list of installed components, check if the **TCP/IP -> Orinoco USB Card** protocol is installed.
  - If this protocol is not yet installed, click the **Add** button and select the **TCP/IP** protocol from the list. Refer to the Windows Help for more information.
  - If this protocol is installed, select this protocol and click the **Properties** button. Check if the parameters resemble the settings provided by your LAN Administrator. Make changes if necessary, and click **OK** when you're done.
5. When prompted, restart your computer.

If you want to check the IP address after rebooting Windows 98 click the **Start** button, select **Run**, and type `windowsipcfg`. In Windows 2000, open a Command Prompt window and type `ipconfig` to check the IP address.

Consult your network administrator for further assistance before you make any changes, if necessary, as required for your network.

## 6. Are there security settings preventing access to an Access Point?

If security mode is enabled on an AP, a wireless client must have a key, or password. The client must be granted access to the AP (see your network administrator).

## 7. Is there interference from other radio sources?

If none of the above steps solves the connection problem, there may be another cause, such as interference on the airwaves, preventing communication. Malfunctioning microwave ovens can be a source of interference. Moving the wireless station away from objects that may produce interference can improve performance.

## 8. Is there a driver conflict? (How to remove ORiNOCO drivers and Client Manager software from your system)



**CAUTION:** You should be familiar with device driver removal in Windows systems before you attempt this procedure! You can *seriously* damage the operating system if you remove the wrong files or devices.

It is not possible to install different types of ORiNOCO powered network interfaces on the same computer.

Although you *can* swap ORiNOCO powered WLAN Cards (like the YDI Diamond and Emerald WLAN Cards) on the same computer, the ORiNOCO drivers *do not* support swapping from:

- ORiNOCO powered WLAN Card to USB device (such as the YDI Diamond USB or the YDI Emerald USB Antenna).
- ORiNOCO powered USB device to ORiNOCO powered WLAN Card.
- One ORiNOCO powered USB device to another.

If you want to use a different interface than one already installed on the computer, or if you need to update the drivers for any device, you will need to:

1. Uninstall the existing Client Manager software (if already installed).
2. Uninstall the currently installed driver and remove the files from the system.
3. Disconnect the old network interface.
4. Connect the other network interface and (re-)install the driver.
5. (Re-)install new Client Manager software.

You should follow all of these steps in order, to ensure a smooth device swap or driver upgrade.

**NOTE:** Do not use the Windows 2000 driver "Update" feature; it might not update all of the files correctly. You should first uninstall then re-install the drivers.

### ***Uninstall the Client Manager***

To remove the Client Manager from your system, proceed as follows:

1. Click the Windows **Start** button, point to **Settings** and select **Control Panel**.
2. In the Control Panel window, double-click the **Add/Remove** icon to display the "Add/Remove Program Properties" window.
3. Scroll down the list of applications in the lower (in Win98) or right-hand (in Win2000) section of the "Install/Uninstall" tab, and select the item Client Manager.

Next click the **Add/Remove** button, and follow the instructions on your screen.

### ***Remove Existing ORiNOCO Powered Devices from Windows 98***

1. Click on **Start -> Settings**, then click **Control Panel**.
2. In the Control Panel window, double-click the **Network** icon.
3. Select the **ORiNOCO Adapter** (either PC Card or USB) and click the **Remove** button.

The Windows operating system will disable the driver and update the driver configuration files. It will not delete the driver from your computer's hard disk.

This means that when you re-insert the ORiNOCO powered device, your Windows operating system will attempt to activate the same driver files again.

4. When prompted to **Restart your computer** choose **No**.
5. Remove the driver files listed below, using the procedure under **Remove Driver Files From The System** later this section. After you've done this, physically remove the device from the computer if it hasn't been already.

### ***Remove Existing ORiNOCO Powered Devices from Windows 2000***

1. Right-click the **My Computer** icon on your desktop, and select the item **Manage** from the pop-up menu.
2. In the **Computer Management** window, select the item **Device Manager** in the left column.
3. Next select the item **View - Show hidden devices** from the menu bar of the **Computer Management** window.
4. In the right column of the **Computer Management** window, select the item **Network adapters** to expand a list of installed adapter types.


This will display all the installed network adapters, where the shaded icons indicate unavailable devices.

5. Now right-click the **ORiNOCO Adapter** (PC Card or USB) and select the item **Uninstall** from the pop-up menu.
6. Follow the instructions on your screen to complete the uninstall process.
7. Now follow the steps below to **Remove Driver Files From The System**. After you've done this, physically remove the device from the computer if it hasn't been already.

### ***Remove Driver Files From The System***

The procedure to physically remove the ORiNOCO driver files from the computer is similar for all Windows operating systems.

*Prior to deleting the files from your hard disk, it is important to follow the device removal procedure for your OS as described above. Failing to do so will lead to complications when you try to re-install the ORiNOCO driver in the future.*

 **CAUTION:** Do **not** delete *any* other files than the ones listed below! You can *seriously* damage the operating system if you remove the wrong files or devices. If you delete the wrong file, Windows might work properly, might not even boot, or you could end up losing important data!

1. Open the Windows Explorer.
2. In the Explorer menu, click on **View** (in Windows 2000, click **Tools**) and select **Folder Options**.

3. From the **View** tab, select **Show all files** and clear the check-box **Hide file extensions**.
4. Click the **Apply** button to return to the Explorer window.
5. Delete the **"inf"** file:
  - Delete the file: "Lucent TechnologiesWLLUC\*\*.inf" from the folder **c:\windows\inf\other** and/or "LWLLUC\*\*.INF" from the folder **c:\windows\inf**.
6. If you are in Windows 98, open the folder **c:\windows\system**. Delete the ORiNOCO driver files listed below (the \*\* will be either 48 or 51, depending on the device you're removing):
  - wcluc\*\* .exe
  - wiluc\*\* .dll
  - wlluc\*\* .sys
  - wnluc\*\* .cpl
  - wuluc\*\* .vxd
  - wnluc\*\* .hlp (or wnluc.hlp)
  - wnluc\*\* .cnt

If you're using Windows 2000, you will find these files in the folder **c:\WINNT\system32**. You may also find an additional file, `wdluc** .dll`, which should be deleted as well. The file `wlluc** .sys` will be in the folder **c:\WINNT\system32\drivers**.

After you uninstall the drivers and delete the appropriate files, be sure to physically remove the device you've just uninstalled (if it hasn't been already) **before** you reboot the computer to install the new device.



## **Appendix B: DEFINITION OF TERMS**

**2.4 GHz band** – radio operating band designated license-free by the FCC

**802.11b** – IEEE standard for high-speed wireless data network communications

**Access Point (AP)** – a wireless device that regulates and directs communications among several wireless clients

**Adapter** – an internal or external circuit board that attaches to a computer to allow support for various devices; a network adapter (like the USB Client Station Adapter) enables a computer to connect to a network

**Ad Hoc** – peer-to-peer computer network; wireless clients communicate directly to each other; usually for temporary networks

**Channel** – a specific frequency band used in wireless communication

**Client Station** – any computer on a network that requests information or services from another computer (a server) and acts according to the server's response

**Data Frame** – bits of data to be transmitted over the network

**DHCP Server** – [Dynamic Host Configuration Protocol Server] – automatically assigns IP addresses to client stations

**ESSID** – Extended Service Set Identifier – name of the network

**FCC** – Federal Communications Commission

**Fragmentation Threshold** – any data frame larger than this threshold will be divided into smaller pieces before transmission

**GHz** – Gigahertz

**IEEE** – Institute of Electrical and Electronics Engineers – a professional organization that sets standards for data communications

**Infrastructure** – server-based computer network; wireless clients communicate through an Access Point; used for long range or large networks or internetworks

**IP Address** – [Internet Protocol Address] – a unique number used to identify computers on a network; can be static (manually assigned) or dynamic (periodically assigned by DHCP server)

**MAC Address** – [Media Access Control Address] – a permanent, unique identifier assigned to all network adapter cards (at the time of manufacture)

**Mbps** – Megabits per second

**PC Card** – a credit card-sized device consistent with PCMCIA standards, used mainly in notebook computers; the Type II PCMCIA Card (PC Card) used with the USB Client Station Adapter can attach to any computer with a USB interface

**PCMCIA** – Personal Computer Memory Card International Association – sets standards for devices used with portable computers

**RTS/CTS** – Request To Send/Clear To Send – signals used by computers on a network to determine when to transmit data

**RTS Threshold** – any data frame larger than this threshold requires the sender to use the RTS/CTS signal

**Subnet Mask** – determines which part of an IP address should be used to identify the network and which part to identify a station on that network

**TCP/IP** – Transmission Control Protocol/Internet Protocol – a method of communicating to computers on different networks

**USB** – Universal Serial Bus – an interface standard for peripheral devices on a computer, such as a mouse, keyboard, network adapter, etc



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