



# *OptoWave*

## **Wireless Optical Probe**

### **Installation and Use Manual (For Use with OptoBlue Adapter)**

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Ver 2.4.0



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*Linksys is a registered trademark of Cisco Systems.*

## I. Getting Started

Unpack and inspect the shipment. Be sure all items are included. The following is a list of components for each type of kit. Check the packing list for the kit type ordered.

### Optowave

Includes:

- 1 Optowave Optical Probe,
- Optowave Instructions

### Optowave Quick Kit

Includes:

- 1 Optowave Optical Probe,
- 4 AA Batteries,
- 1 Battery Case,
- 1 Kit Carrying Case,
- Optowave Instructions

### Optowave Deluxe Kit

Includes:

- 1 Optowave Optical Probe, **A**
- 4 AA Batteries, **B**
- 2 Battery Cases (1 four cell and 1 two cell), **C**
- 1 Optowave Belt Holster, **D**
- 1 USB Cable,\* **E**
- 1 Linksys/OptoBlue USB Bluetooth Adapter,\* **F**
- 1 Linksys/OptoBlue CD and Installation Instructions,\* **G**
- 1 Kit Carrying Case, **H**
- Optowave Instructions **I**

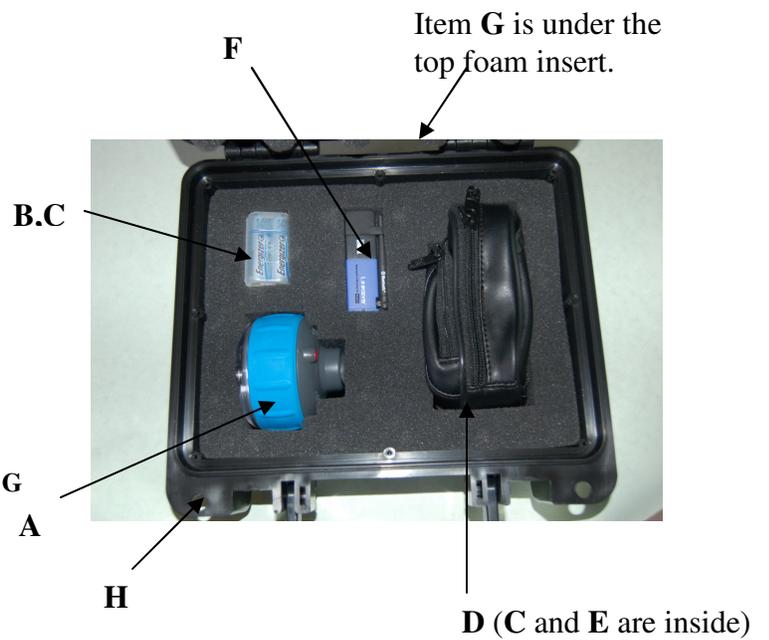
### Optowave Premium Kit

Includes:

- 1 Optowave Optical Probe,
- 4 AA Batteries,
- 2 Battery Cases (1 four cell and 1 two cell),
- 1 Optowave Optical Probe Belt Holster,
- 1 Universal AA Battery Charge w/ 12V adapter,
- 1 USB Cable with 2 Cable Ties and Velcro Tape,\*
- 1 Linksys/OptoBlue USB Bluetooth Adapter,\*
- 1 Linksys/OptoBlue CD and Installation Instructions,\*
- 1 Kit Carrying Case,
- Optowave Instructions

*\*Note Kits sold “w/ Linksys” contain these additional items. The basic kits do not.*

If any items are missing or appear damaged please notify a Probe-Tec representative right away or email [t.houck@probe-tec.com](mailto:t.houck@probe-tec.com), or call 765-252-0257.



**OptoWave Deluxe Kit  
w/ Linksys Adapter**

## II. About Bluetooth Devices

Probe-Tec engineers have evaluated numerous Bluetooth adapters. While almost all adapters work with the Optowave Wireless Optical Probe some work better than others. The major differences between adapters are the power class, the version, and the software and drivers used.

There are 2 power classes – Class 1 and Class 2. Class 1 devices have more power output and thus can result in better range. Probe-Tec recommends the use of a Class 1 device. Preferably a device with an external antenna – for the best possible range. However, there is a tradeoff to consider when selecting a Bluetooth device. External devices and antennas improve the range but these devices are more likely to be damaged due to their increased exposure. The user should consider their circumstances before deciding which device to use.



Bluetooth devices come in Version 1.2 and Version 2.0. The version refers to the core specification of the device compliance. Version 1.2 is older and has lower overall data rates. Version 2.0 is newer and has a broader feature set. With the Enhanced Data Rate (EDR) Version 2.0, devices can reach data speeds of 3Mbps. Probe-Tec does not support Version 1.2.

While class and packaging affect the range and version affects the speed, software and drivers affect usability. For most users an easy to use interface and full feature set will have the biggest impact on overall satisfaction. Poorly designed software results in a clumsy user interface. Poorly designed drivers result in a limited feature set. Select your Bluetooth device accordingly. Probe-Tec recommends devices that utilize the Widcomm drives and the Linksys software.

Cellphones, wireless computer keyboards and mice, digital cameras, printers, and other devices utilize Bluetooth technology. As you use the Optowave Wireless Optical Probe you may become aware of other Bluetooth devices. Before allowing your computer to interact with any Bluetooth device be sure to understand what the device does, who controls the device, and how the device may impact your overall system. When in doubt seek the advice of an IT professional.

Bluetooth is a radio technology that has been designed to a robust standard and is used in millions of devices. It operates in the 2.4 to 2.485GHz frequency range under relatively low power. As such, it is subject to interference from any radio frequency noise source. If the Optowave device works intermittently or does not work in specific locations the problem could be radio interference. Radio interference can also result in reduced operating range or slower operating speeds. If these conditions occur, reposition the laptop/handheld computer or situate it closer to the Optowave probe.

To learn more about Bluetooth technology visit: <http://www.bluetooth.com/Bluetooth/Learn/Basics/>

### III. Installing the OptoBlue USB Bluetooth Adapter

Follow the instructions for the Bluetooth Adapter selected. If you are using the Probe-TEC OptoBlue USB adapter supplied by Probe-Tec follow the instructions below. If you are installing the Linksys USB Bluetooth adapter refer to the alternate instruction set available at [www.probe-tec.com/FAQ.html](http://www.probe-tec.com/FAQ.html).



Figure 1

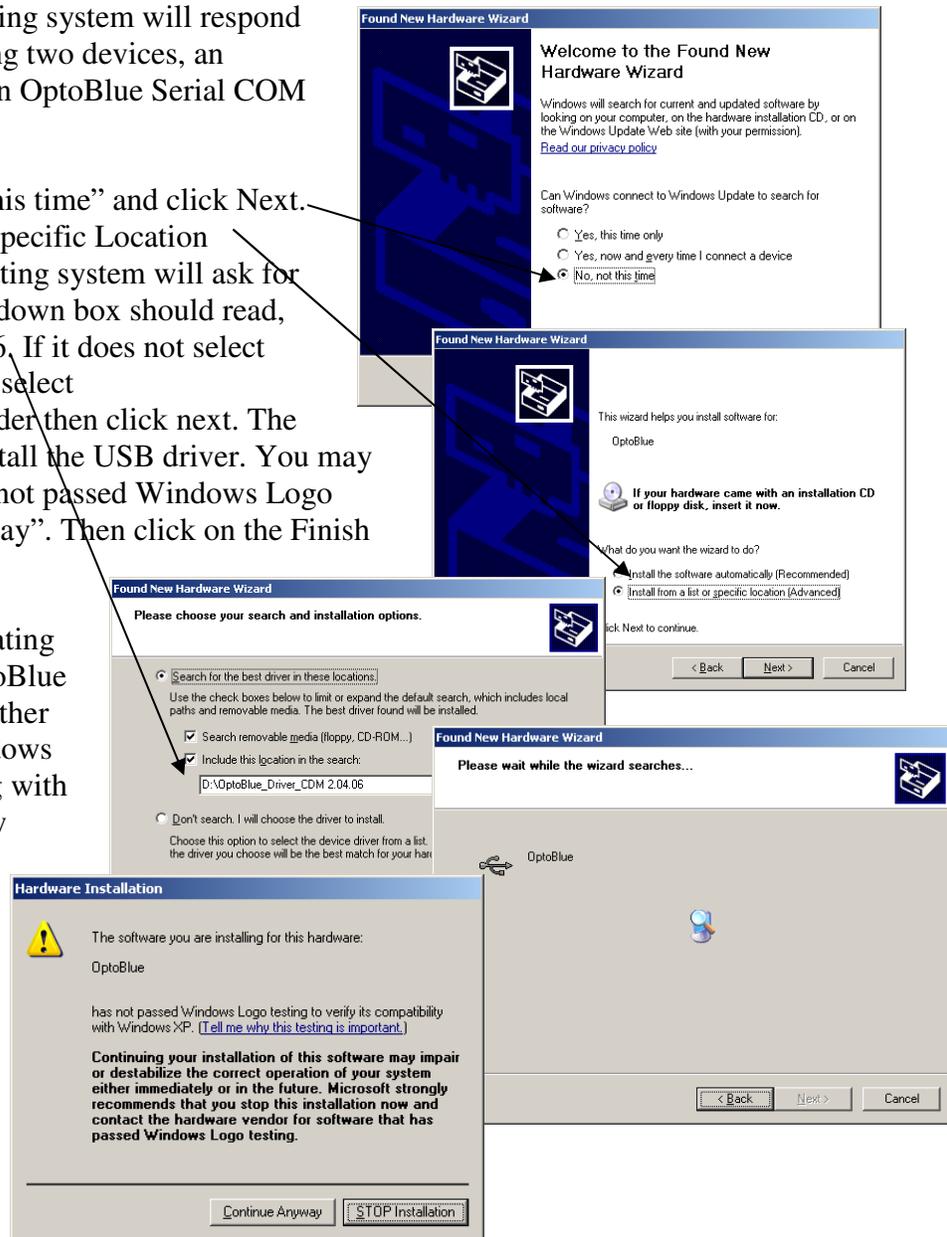
The OptoBlue USB Bluetooth adapter is as shown in Figure 1. If the adapter you are installing looks like this proceed by installing the Driver CD and plugging the adapter into the USB port you intended to use.

The operating system will respond by installing two devices, an OptoBlue USB Device Driver and an OptoBlue Serial COM Port Driver.

When prompted select “No, not at this time” and click Next. Then select “Install from a list or a specific Location (Advanced)”. Click Next. The operating system will ask for you to select the location. The drop down box should read, “D:\OptoBlue\_Driver\_CDM 2.04.06. If it does not select Browse and browse to your CD and select OptoBlue\_Driver\_CDM 2.04.06 folder then click next. The operating system will proceed to install the USB driver. You may see a message that the software has not passed Windows Logo Testing. If so click “Continue Anyway”. Then click on the Finish button.

When this step is complete the operating system will begin installing the OptoBlue Serial Port Driver. You may see another new hardware found message. Windows will repeat the previous steps ending with a message that your hardware is now installed and ready to use.

If instructed to do so reboot the system before proceeding.

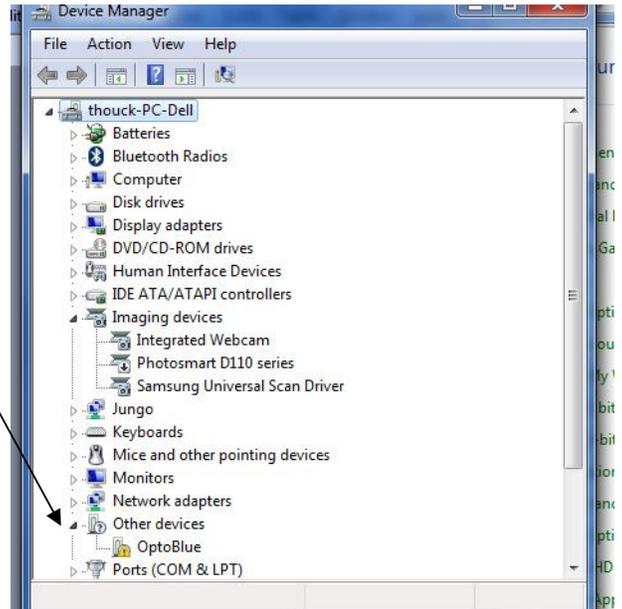


### Special Instruction for Windows 7 with Security Set to Protect From Unsigned Drivers

Insert OptoBlue CD in to CD Drive then plug OptoBlue Adapter in to USB port. The operating system will indicate that it is unable to install the device OptoBlue. Go to the Windows Start Menu And open Device Manager (Control Panel/Hardware and Sound/Devices and Printers/Device Manager). Find the OptoBlue Device listed under Universal Serial Bus Controllers or under Other Devices and right click and select Update Driver Software.

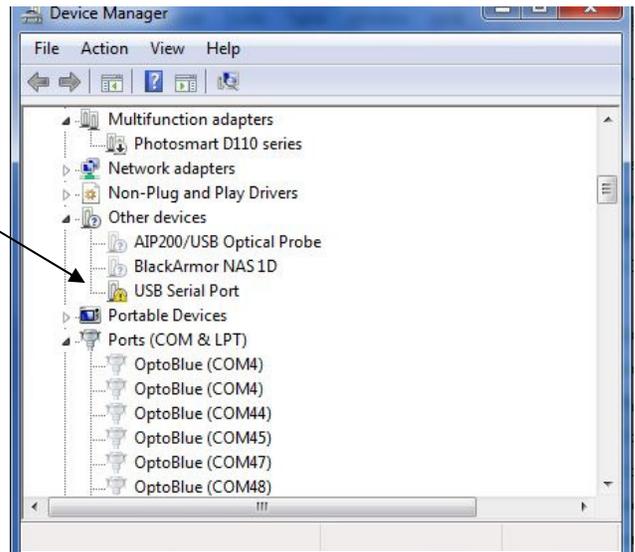
Select the Browse My Computer and navigate to the OptoBlue Driver CD. Be sure the Search Subfolders check box is checked. Select Next then select Install Driver Anyway.

The operating system should install the driver and the OptoBlue icon should look normal (Wait a few moments - the operating system may indicate again that new hardware was found but it could not be installed. This is normal and indicates that the system is attempting to install the COM port driver.)

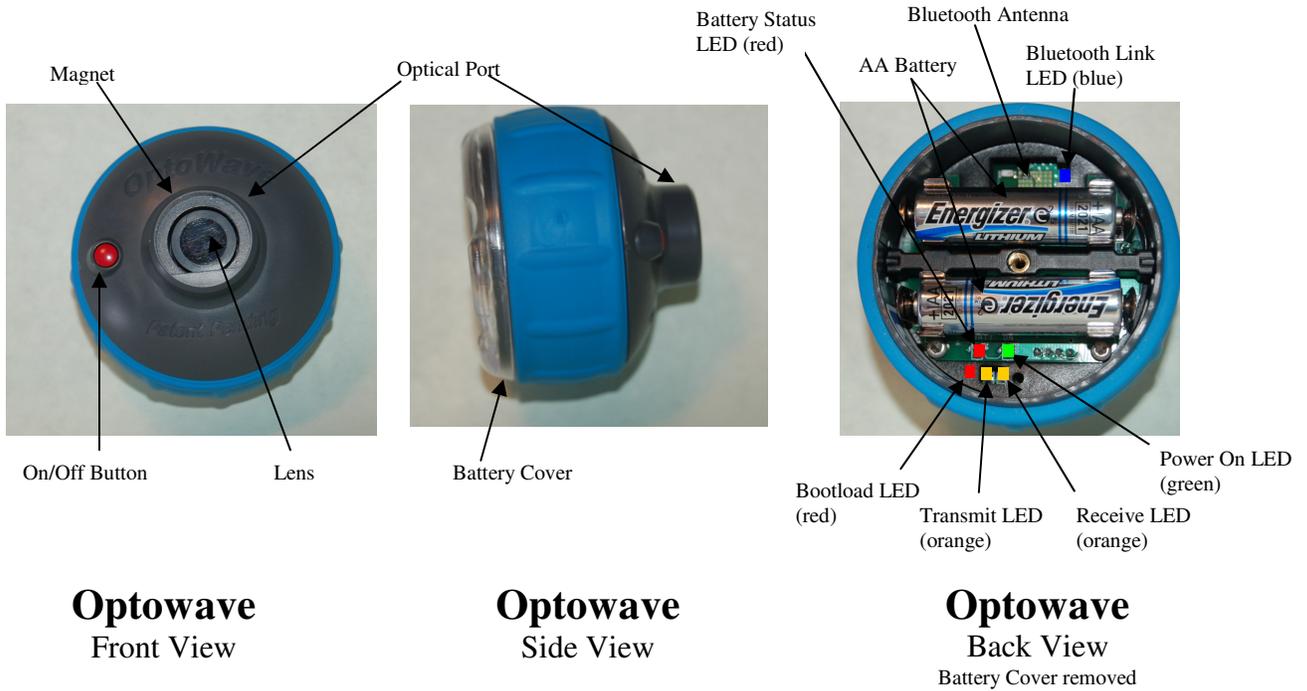


Next find the USB COM device listed under Other Devices or Ports; right click and select Update Driver Software. Select the Browse My Computer and navigate to the OptoBlue Driver CD. Be sure the Search Subfolders check box is checked. Select Next, then select Install Driver Anyway.

The operating system should install the driver and the OptoBlue icon should look normal. Note the COM port number assigned. This can be changed by double clicking and selecting Port Setting/Advanced. See Section VII.



## IV. Understanding the Optowave Wireless Optical Probe Features



**Optowave**  
Front View

**Optowave**  
Side View

**Optowave**  
Back View  
Battery Cover removed

**On/Off button** – press and hold for more than 2 sec to latch the Optowave into the Power On mode. The green Power On LED will light. When the power is on press and hold again until the blue LED lights to power off the Optowave probe.

**Optical Port** – the part of the probe that contains the optical interface.

**Magnet** – holds the probe to the meter’s optical port. Be careful to keep this powerful magnet away from magnetic media such as hard drives, floppy drives and magnetic strip cards such as credit cards and ID badges.

**Lens** – this is an optical filter lens that prevents natural ultraviolet light from interfering with the photodiodes. Keep the lens free from dirt and scratches.

**Battery Cover** –twisting this cover off accesses the battery compartment.

**Power On LED** – this LED glows green when the probe is powered on.

**Battery Status LED** – this LED glows red when the battery voltage has dropped to 20% of the required value. When the battery voltage drops to 10% of the required value the intensity of this LED increases.

**Bluetooth Link LED** – this LED glows blue when the Optowave probe is paired with a PC.

**Transmit/Receive LED’s** – these LED’s glow orange when there is activity over the optical link.

**Bootload LED** – this LED blinks briefly during power up and glows continuously when new firmware is ready to be bootloaded. See Section VX.

## V. Install 2 AA batteries into the Optowave Wireless Optical Probe

Grip Optowave Wireless Optical Probe with the optical port in the palm of your weaker hand. With your other hand grip around the rim of the battery cover, much the same as opening a jar. Twist the cover counterclockwise. If the cover is tightly installed you will notice a number of bumps as you first begin loosening the cover. This bumping is



normal. As the cover loosens the bumping will stop and the cover will turn freely. Spin the cover free. *(The screw in the center of the cover will remain with the cover as it is removed. Do not remove the cover by unthreading the screw unless the battery cover is seized and you cannot loosen it by hand. If the screw should come loose or if you unscrewed it,*

*rethread it into the cover until the rubber gasket is tight against the cover. Then screw the cover on to the Optowave device.)*



If there are batteries already in the probe, remove them by forcing your thumb under the mid-section of the battery while pushing up.

Install fresh batteries in the probe according to the polarity markings on the circuit board below each battery position. Improperly installing batteries will prevent the Optowave Wireless probe from powering-up. Be sure each end of each battery snaps into place in the respective battery clip. If the batteries are not seated properly they may interfere with the complete installation of the battery cover. While the battery cover is not in place be careful that no dust, dirt, liquid or other foreign matter is allowed to enter into the device cavity.

Once the batteries are installed screw on the battery cover until the rim begins to make contact with the rubber grip section. Notice that after the cover begins to make contact with the rubber grip slight bumps will be felt as the cover is further tightened. Continue to tighten the cover until between 3 and 5 bumps have been noticed. The final stop should be between the high point of the bumps. Tightening the cover in this manner helps to maintain a water resistant seal.

**Note:** *If the device is to be stored for a long period of time the batteries should be removed and the cover should not be fully tighten.*

**Note:** *Operating the Optowave without the Battery Cover in place can void the device warranty.*

## VI. Powering-Up the Optowave Wireless Optical Probe

Once the batteries and the cover are correctly installed, hold the probe so that the battery cover is facing you and the optical port is facing away. With your other hand find the power button on the other side of the probe. Depress the button while looking at the battery cover. You should notice the **green** Power LED lights after a slight delay. You will also notice the **orange** transmit LED flashes briefly. Hold the power button for five seconds to latch the probe into the Power On mode – the blue LED will flash twice. Now release the power button. After you release the power button, the green LED should remain lit. If the OptoBlue USB adapter is plugged in and powered on, after 5 seconds the Blue LED on both devices should turn on. This indicates the wireless probe is now ready for use. If the **green** LED does not remain lit press the power button again and hold it for slightly longer.

Press the power button and hold (about 5 sec.) until the **blue** LED lights, then release the power button to Power Off the Optowave. The **green** LED and the **blue** LED should turn off. The Optowave is now off.

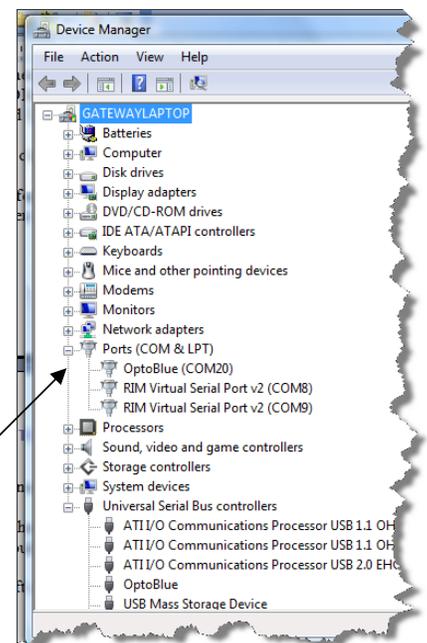
For probes with **firmware version 2.3** and newer there are special power up modes available. By holding the power button down for 10 seconds (the blue LED flashes 4 times) the probe will power into the 4800 bps mode. This mode works with the Landis Focus AL meters and other meters that communicate at 4800 bps. A third operating mode is accessible by continuing to hold the power button for an additional 10 seconds (the blue LED flashes 4 times again). In the third mode the probe is operating at 2400 bps. This mode works with the GE i210 and other meters that communicate at 2400 bps. To return to the ANSI standard 9600 bps mode power cycle the probe, holding the power button only until the first two flashes of the blue LED (about 5 sec.)

## VII. Configuring the Serial Connection

If you are using the Optowave with Probe-TEC's OptoBlue USB Serial adapter please follow these simple configuration steps. If you are using the Optowave with the Linksys Bluetooth adapter or some other adapter refer to the alternate configuration steps in the instructions manual for that device or go to [www.probe-tec.com/faqs.htm](http://www.probe-tec.com/faqs.htm) for complete instructions.

The OptoBlue Serial adapter is a self contained Bluetooth to USB serial conversion device. The Bluetooth radio and the higher level Bluetooth stack are contained in the adapter. It is not necessary to install any Bluetooth software on the PC or handheld. Because of this using the Optowave with the OptoBlue adapter is as simple as using a standard USB probe. After completing the steps in Section III the only additional step is to configure the COM port you wish to use.

*It is important to keep in mind that Windows assigns COM ports for devices even if that device is not longer plugged into your computer. Once assigned Windows will still reserve that COM port setting. If*



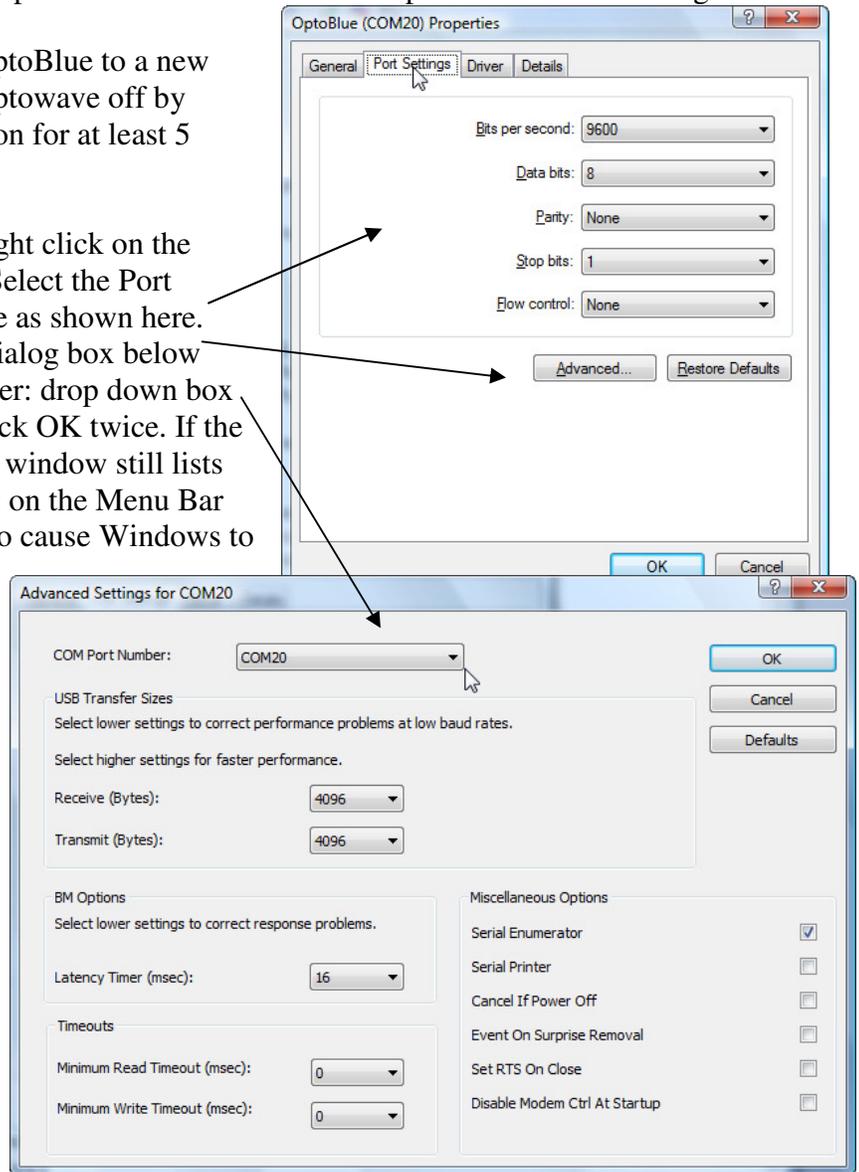
you wish to configure the Optowave/OptoBlue to work on a particular COM port be sure that COM port is available for use. If Windows lists a COM port as in use then you will have to uninstall the device that Windows has assigned to that COM port number. For more information see [www.probe-tec.com/faqs.htm](http://www.probe-tec.com/faqs.htm) or call Probe-TEC for more support.

When installed the OptoWave/OptoBlue was assigned a COM port by Windows. To determine what COM port number was assigned open the Device Manager and expand the listing for Ports (COM and LTP). Listed here you will see the OptoBlue device with the COM port Windows has assigned.

If you decide to assign the Optowave/OptoBlue to a new COM port number be sure to turn the Optowave off by pressing and holding the red power button for at least 5 seconds.

To change the COM port assignment, right click on the OptoBlue listing and select Properties. Select the Port Settings tab and be sure your settings are as shown here. Then select the Advanced button. The dialog box below will appear. Select the COM Port Number: drop down box and chose any open COM port. Then click OK twice. If the OptoBlue listing in the Device Manager window still lists the old COM Port number go to Actions on the Menu Bar and select Scan for Hardware Changes to cause Windows to re-enumerate the device. Once Windows show the correct COM port number on the Device Manager screen the Optowave is ready to be used with your metering software.

*Note: Some meter software packages do not support the higher numbered virtual serial ports that Windows may offer as a selection. Before setting the COM port be sure which COM ports are supported by the software packages to be used.*



## VIII. Pairing The Optowave with the PC

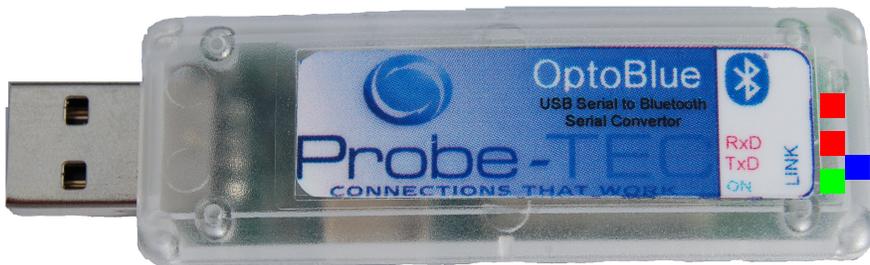
The Optowave and OptoBlue devices are normally shipped from the factory as a pair, so there is normally no need to perform the pairing operation. To confirm your devices are properly paired simply plug the OptoBlue in to the appropriate USB port on your computer. Watch for the green LED to light. Once the green LED is on turn on the Optowave and after about 5 seconds the blue LED on both devices should turn on. If they do your devices are properly paired. If the blue LED's don't both turn on call Probe-TEC for further assistance.

If your devices were not shipped from the factory as a matched pair please see the separate instructions shipped with your device or contact Probe-TEC.

## IX. Using the OptoBlue Serial Adapter

The OptoBlue Serial Adapter is a sophisticated special purpose USB serial to Bluetooth convertor. Embedded in the OptoBlue are several state-of-the-art features that help to assure your wireless optical probe performs as much as possible like the wired version you are familiar with.

**The OptoBlue is not a general purpose Bluetooth device. For performance and security reasons it is designed to work only with the Optowave Wireless Optical Probe.**



Red Transmit LED  
 Red Receive LED  
 Blue Link LED  
 Green Power LED

The OptoBlue has four LED's to aid in its use. The green LED will turn on whenever the PC is delivering power to the OptoBlue through the USB port. If the green LED does not turn on after plugging the OptoBlue in the port is not powered (check the PC power management or that the PC is on), the OptoBlue drivers are not installed (check Device Manager), or the OptoBlue is not plugged in correctly. When the Optowave wireless probe that is paired to the the OptoBlue adapter is turned on the blue Link LED should be lit. This indicates there is a logical connection from the PC to the Optowave probe. The blue LED on the probe should also be lit. The two red LED's will turn on and off as data is sent and received over the port. Watching these LED's can aid in determining if the meter and software are communicating appropriately.

The use of the OptoBlue is simple. Plug it in to the appropriate USB port and watch for the green LED to turn on. Once on, turn on the Optowave probe and watch for both blue LED's to turn on. You are now ready to read and program meters.

## X. Configuring the Meter Software

Remember to configure the meter software package to use the COM port selected in Section VII. In some cases timeout or packet size settings may also need adjusted. If you experience any problems with a particular configuration, contact Probe-Tec for more details or visit [www.probe-tec.com/faqs.htm](http://www.probe-tec.com/faqs.htm) .

## XI. Using the Optowave Probe

The Optowave probe is used just like any wired probe. Simply plug in the OptoBlue and turn on the Optowave.

Place the probe on the meter's optical port. Open the meter reading software package. Connect the meter in the normal manner (be sure the COM port is set correctly). When a connection is established the **blue** LED should be lit. Read or program the meter in the normal manner. While the meter is communicating with the software package you will notice the **orange** and **red** LEDs flashing rapidly.

When the session is complete disconnect the meter reading software and shut it down. Remove the probe and turn it off. Return the Optowave Wireless probe to the holster or carrying case until its next use.

## XII. Automatic Power Off Feature

The Optowave Wireless Optical Probe was designed with an automatic power off feature. After power has been turned on, the probe will monitor its status and communications over the air. If there is no activity for a period of 15 minutes, the Optowave probe will automatically shutdown. 20 seconds before shut down the **blue** LED will begin flashing as a warning of the pending shutdown. To avoid the automatic shutdown begin communications with a meter or briefly press the power button. Note that if the OptoBlue adapter is plugged into the PC the probe will remain on.

## XIII. Batteries

The Optowave Wireless Optical Probe requires 2 AA batteries. The battery type can be either disposable or rechargeable. The battery composition will not affect the Optowave Wireless Optical Probe as long as the voltage battery voltage is 1.5V.

The batteries supplied with the Optowave Wireless Optical Probe are high-energy Lithium disposable batteries. With daily periodic use, such as occasional meter programming, a fresh set of

these batteries should last over a month. If the probe is used daily for continuous meter reading the batteries will need changed or recharged more frequently.

Never attempt to recharge batteries while they are installed in the Optowave device. Always follow the battery manufacturers' specific instructions regarding the use, recharging, and disposal of their batteries and the battery charger.

Probe-Tec also offers NiMH rechargeable batteries as an option. This option includes a battery charger that can be powered by the 12V lighter plug of any 12V vehicle.

*When installing new batteries be sure both batteries are fresh or fully recharged.*

*Do not attempt to recharge the Lithium batteries supplied with the probe.*

*Damaged cause by defective or improper use of batteries is not covered under Probe-Tec's standard warranty.*

## **XIV. Carrying Case**

The Optowave Wireless Optical Probe is a sophisticated computerized radio communications device. The Optowave design is robust and it can be used just as wired probes are used. Probe-Tec ships the Optowave with a rugged carrying case that should be used to store the Optowave when not in use. The carrying case not only protects the Optowave from accidental damage it also protects it from dirt, and provides a handy place to keep the various meter reading items.

## XV. Bootloading

The Optowave Wireless Optical Probe is capable of remote firmware updates. This process is referred to as Bootloading. The process is as follows.

- A. Determine if your probe is bootloadable. If the probe has a red LED to the right of the two orange LED's then it is a bootloadable probe. See Optowave Back View on page 4. The bootload LED will flash briefly when the power on button is first pressed. If there is no red LED call Probe-TEC for further assistance.
- B. Check to be sure Microsoft.NET Framework 3.5 is installed on the PC which is used with the probe. (*Check %systemroot%\microsoft.net\framework for a folder named v3.5.*). If it is not installed install it @ <http://msdn.microsoft.com/en-us/netframework/cc378097.aspx>. Follow Microsoft's instructions.
- C. On the same PC create a folder named Optowave under Programs Files.
- D. Unzip the bootload program (Optowave Flash Tool.zip) and the new firmware file (Optowave\_X\_X.opw) and Optowave\_0x00\_i2c.opw into the Optowave directory.
- E. Run the program and select File from the menu. Then select Open. Browse to C:/Program Files/Optowave and select the file Optowave\_0x00\_i2c.opw.
- F. Using the drop down box set the Com Port to the port number for your probe.
- G. Using the drop down box set the Bit Rate to 115200.
- H. Turn on the probe to be flashed (*be sure the batteries are not low*). Orient the optical interface towards a distant non-reflective surface.
- I. Select the Connect Button. The button should turn green and the blue LED should light.
- J. Select the Flash Button. It should turn green, the program should indicate "Flashing", and the red Bootload LED should flash rapidly for about 30 seconds. When the LED stops flashing the program should indicate "Flash Complete" and the blue LED should turn off.
- K. Power cycle the probe.
- L. Repeat the process by selecting File from the menu. Then select Open. Browse to C:/Program Files/Optowave and select the file Optowave\_X\_X.opw. (*Note X\_X should correspond to the firmware version you are attempting to install. For example 2.1 would be Optowave\_2\_1.opw*)
- M. The version number should now appear just above and to the right of the file name.
- N. Check to be sure the probe is still on (*be sure the batteries are not low*). Orient the optical interface towards a distant non-reflective surface.
- O. Select the Connect Button. It should turn green and the blue LED should light.
- P. Select the Flash Button. It should turn green, the program should indicate "Flashing", and the red Bootload LED should flash rapidly for about 30 seconds. When the LED stops flashing the program should indicate "Flash Complete" and the blue LED should turn off.
- Q. Power cycle the probe – Turn it off. Then turn it on BUT DO NOT RELEASE THE POWER BUTTON UNTIL RED BOOTLOAD LED TURNS OFF (about 40 seconds). Release the power button and then power the probe on again. This time the red Bootload LED should flash briefly. The green LED should latch after 5 seconds - the probe is now running the new firmware.

If the probe or program does not behave as describe above call probe-tec @ 765-252-0257 for further assistance.

## Appendix

<b>System Requirements</b>	
Operating System	Windows 2000, Windows XP, VISTA
Bluetooth Version	Version 2.0 +EDR
Adapter Configurations	USB, PCMCIA, Serial DB9, or internal
Bluetooth Class	Class 1 or Class 2

<b>Meter Software Supported</b>	
Landis + Gyr/Siemens	1132Com, DG1100, Maxcom
GE	Metermate
ABB/Elster	Alpha Power Plus, MeterCat
Schlumberger/Itron	MVLT Win, PC Pro+
Ametek	JemWare & JemRead
Schneider Electric	ION
SEL	Acseleator

<b>Meters Supported</b>	
All	ANSI Optical Probe Compliant
Elster/ABB	A1, A1+, A3
GE	KV, KV2, I210+C
Landis + Gyr/Siemens	S2, S3, S4, Altimus, DE, DD, DX, Focus AX, Maxsys, Elite
Schlumberger/Itron	Vectron, Centron, Sentinel
Ametek	JemStar
Schneider/PML	Ion-7550
Transdate	MarkV
Schweitzer	SEL-734