

Overview

Why Bluetooth?

There were good reasons to use Bluetooth for this application. First, we've had customer requests for a way to locate the computer farther from the firearm, on the other side of laboratory safety walls or doors. Second, we wanted to encourage people to not locate their computer on wobbly bench surfaces that vibrate violently from recoil. Bluetooth is neat technology and does a whole lot more than just connect headsets to a cell phone.

About Bluetooth

Bluetooth technology has evolved much like USB. The first version of USB, called USB 1.0 did not last long and was replaced by USB 1.1 and USB 2.0. The same is true of Bluetooth with Bluetooth 2.1, the current standard.

You may already have Bluetooth on your computer. Most laptops come with a Bluetooth radio as standard equipment and Windows XP SP 2, Vista and Windows 7 have Bluetooth drivers already installed.



If your computer does not have Bluetooth all you need is an inexpensive USB dongle (\$5 - \$35).

Bluetooth is more than just two radio transceivers. It is actually a collection of communication protocols (called Bluetooth services) that are pre-defined for the purpose of communicating with various kinds of devices. There are pre-defined services for headsets, audio devices, modems, networks, printers, file transfer and serial communication. Drivers for all the Bluetooth services are always installed. The service we need for PressureTrace II is serial communication, sometimes abbreviated as "SPP" for Serial Port Profile.

How Bluetooth Drivers Work

All Bluetooth drivers do essentially the same thing but with a different user interface and levels of automation when setting up new devices. Drivers for the newest Bluetooth (2.0+) support more devices, have a faster transmission rate and are more "transparent" to the user. Often the biggest difference in drivers (and difficulty getting them to work) relates directly to the generation of Bluetooth hardware you have.

Once drivers are installed, Bluetooth devices must be manually linked to the computer. This is usually called "pairing" or "paring" but we will use the more descriptive term "link."



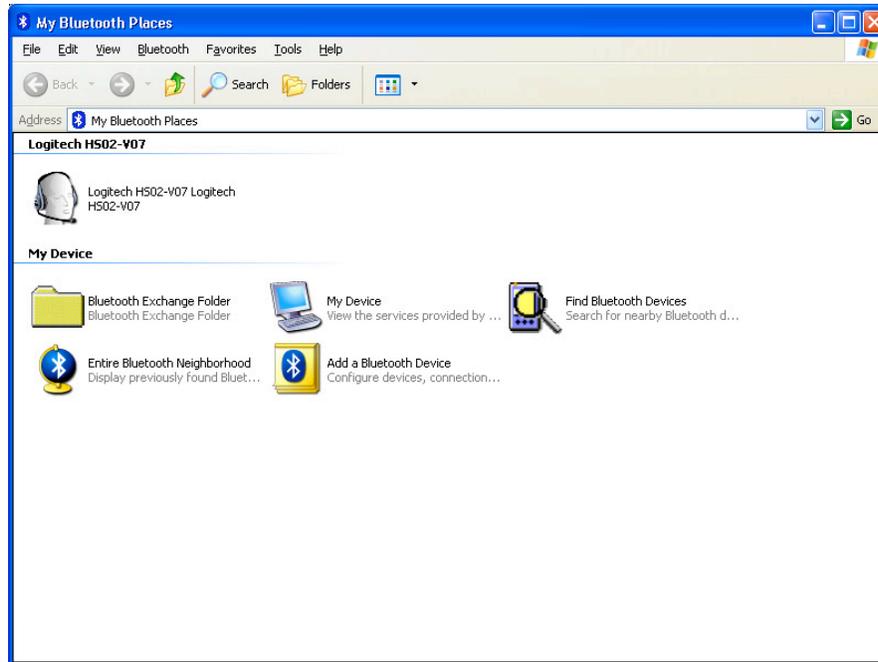
Bluetooth drivers will install a desktop icon, taskbar icon and/or control panel. One or more of the icons can be used to add devices or change settings. The device must always be powered on before your PC can create a link or connection. Once powered, the device will broadcast its ID and the kind of service it needs to operate.

Bluetooth Installation

Most drivers will enable the PC Bluetooth radio as soon as the computer finishes booting, and the logo graphic will be displayed in white. If the graphic in the Bluetooth icon is red, the PC radio may be disabled or not working.

This is the normal procedure for linking Bluetooth Devices:

- 1) Open the window that shows your Bluetooth places. It should look similar to the sample below. There will always be a menu or button somewhere to “Add a Bluetooth Device.” Select the menu or click the button. Your PC will then try to communicate with all the Bluetooth devices in your vicinity and identify what they are.



- 2) A window will show everything found as generic device icon(s), then will show the actual name(s) of the device(s). The PressureTrace II module will be clearly identified with its serial number. (In this example PTII 00002.)
- 3) Select the icon for your PressureTrace II module and click next or continue. At this point the drivers or version of Bluetooth hardware you have may work a little differently then this example.



Bluetooth Installation

- 4) Most drivers will request a security key to access the module. For PressureTrace II the key is always “1234”. If there are options to encrypt data that is transferred, disable the encryption option.



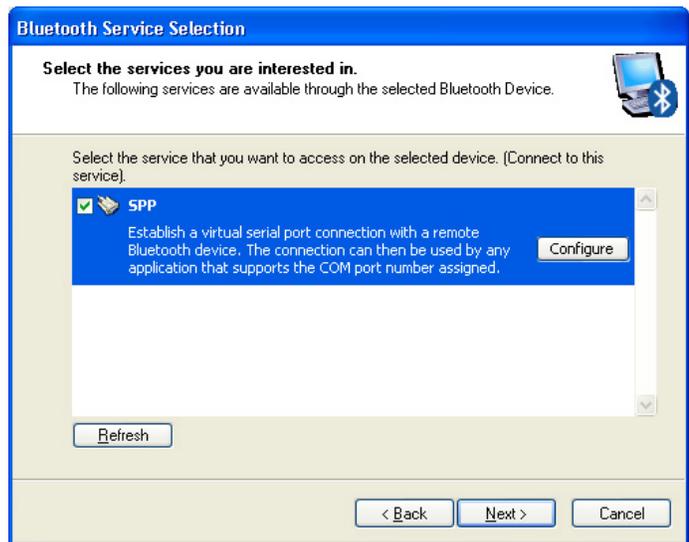
- 5) For Bluetooth 2.0+ on Vista or Windows 7 with the built-in Microsoft drivers, everything may be entirely automated from here on. For other drivers or Windows XP, you may need to confirm the Bluetooth service to use. The service to use with PressureTrace II is always “SPP” or “Serial Point Profile.”

For old drivers and Bluetooth you may have to manually identify the Bluetooth service from a long list. For newer drivers, you should only need to confirm the service by checking a box.

A [Configure] button during this step is used to change the com port assignment. You should not need to change the com port unless it is higher than com 16. (See section “Changing Default Com Port.”)

If your driver shows “SPP” services for both an incoming and outgoing com port, select the outgoing port as the one to use.

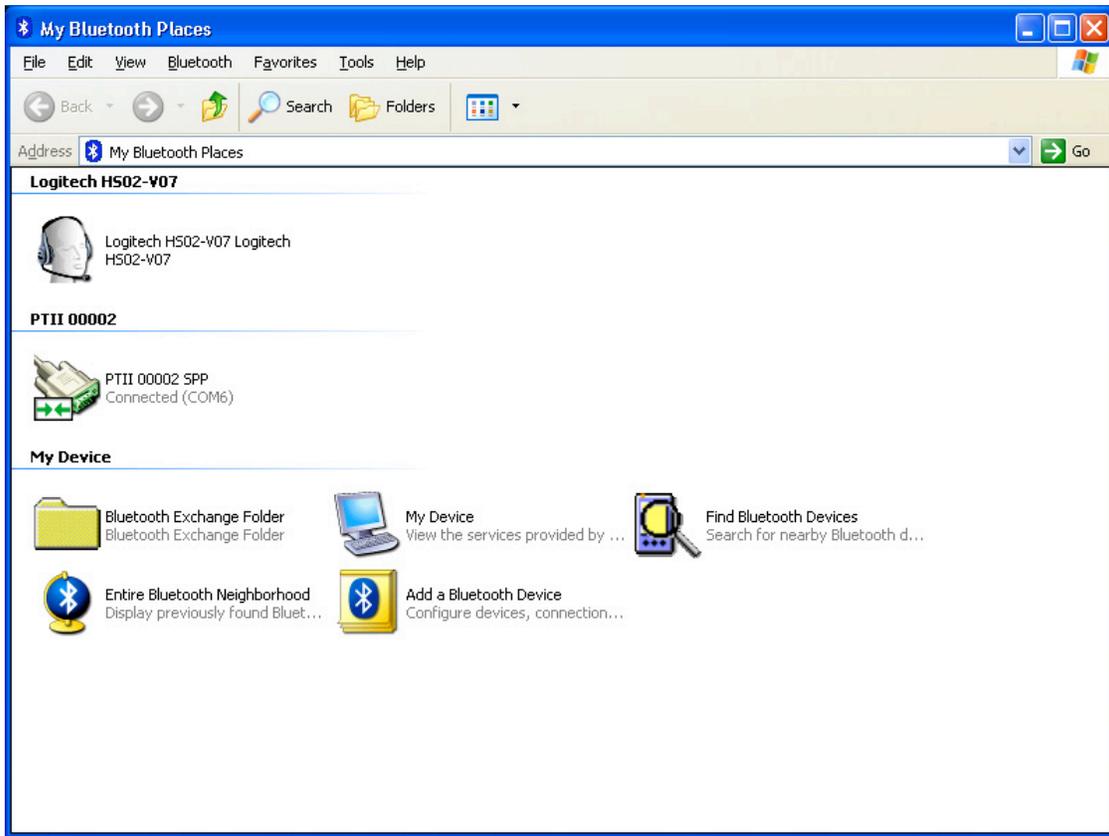
Make the appropriate “SPP” selection and continue.



- 6) Bluetooth will then complete the com port assignment and finish the link. There is usually a window allowing you to edit the name of the link and create desktop shortcuts. Neither is necessary for the PressureTrace II software to work, so you can just click through to the completion.

PressureTrace II will then be listed in the Bluetooth window as a linked (pared) device. The assigned com port may be displayed with the link name or identified in a properties menu. Make a note of the com port for use when configuring the PressureTrace II program.

Bluetooth Installation



- 7) Just one more thing to confirm before you move on. Your Bluetooth should be configured to allow devices to automatically discover the computer. Unless this feature is enabled you will have to manually connect to the device (launch the link) each time you start the PressureTrace II software. The preference should be located under a Bluetooth menu, a Bluetooth Settings control panel, or listed in the properties for the link. Once devices are allowed to discover your PC, turning on your module will activate the link so it is available when you launch the PressureTrace II software.

Bluetooth Installation

Bluetooth Drivers

If your laptop came with an internal Bluetooth radio, you should already have drivers installed, but they may be out of date. Bluetooth has advanced quickly, so if you have not used Bluetooth, check the computer manufacturer's web site for the latest recommended drivers.

Many Bluetooth USB dongles no longer ship with a driver CD because they are directly supported by Windows XP Service Pack 2 or newer.

If the dongle packaging is labeled "No Drivers Required," you can use the Windows drivers. Even if the dongle came with a CD, drivers may only be needed for old versions of Windows.

If you are not sure if your Windows XP computer has been updated with the latest service packs, run "Update Windows."

There is an easy way to determine if a dongle is supported directly by Windows. First, open the Add/Remove programs control panel and scan the list to make sure no old third party Bluetooth driver sets are installed. Third party drivers may not be compatible with the Windows drivers and should be uninstalled.

Plug the Bluetooth dongle into a USB port and wait for a "Found new hardware" message. If you're not told to load drivers, then Windows has the drivers built in and you do not need to install anything. If the Windows Hardware Wizard launches, let it connect to the Internet and download drivers from the Microsoft web site.

If the Hardware Wizard indicates it cannot locate a correct driver, unplug the Bluetooth adapter and install the latest software for the dongle.

Note: If your computer has an old internal Bluetooth radio (Bluetooth 1.0 or 1.1), the data transmission rate and range will be low, the radio may not be supported by Windows, and you may be stuck with old funky drivers. An inexpensive dongle supported directly by Windows will increase the range speed and ease of setup.

To update your computer with new Bluetooth, you should remove the old Bluetooth radio or uninstall its drivers and disable the device in the device manager.

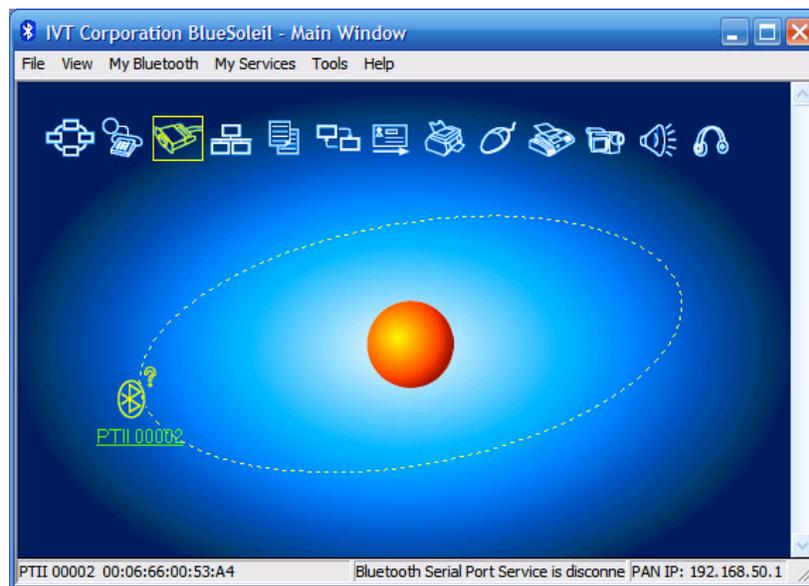
Specific Installation Instructions

This section of the document describes drivers that require specific settings or have an odd user interface. Drivers are constantly revised and may no longer appear exactly like these examples.

BlueSoleil

BlueSoleil drivers have an odd user interface and can often be replaced with generic Microsoft drivers (see Bluetooth Drivers above). We have also noticed updates for BlueSoleil drivers may disable SPP services without notice unless you pay for the upgrade. If the Bluetooth radio runs with Microsoft Windows drivers, you can avoid the fee and your drivers will be updated with Windows updates.

After installation of BlueSoleil drivers, you will see a screen similar to the following but without the PTII “planet” (a Solar System analogy).



A small popup window should ask you to plug in a Bluetooth device. Plug in your Bluetooth dongle and wait while BlueSoleil automatically loads the correct drivers.

Turn on the PressureTrace II module and select “Bluetooth Device Discovery” from the “My Bluetooth” menu. In a few seconds a “planet” will appear on the dotted line but it will not immediately display PTII. It should first show a MAC address, then PTII with the unit serial number.

Once your PTII module is fully detected, right click on the icon with your mouse. Select the menu labeled “Connect” and the secondary menu labeled “Bluetooth Serial Port Service.” Don’t select the menu labeled “Pair Device.” It will connect but you will not get a COM port assignment.

In a few seconds the graphic on the BlueSoleil screen will show a connection between the planet and the sun in the center.

A window will then ask if you want to make this connection automatically in the future. Say yes.

A confirmation will display at the bottom of the screen. Note the COM port assigned in the pop up window for use with the PressureTrace II program.

Bluetooth Installation

If you forget the COM port number assigned to PressureTrace II, right click on the PTII planet and select the “Status” menu. The COM port number should be labeled “Connection.” [Example: COM8(SPP)]

If a COM port number higher than 16 is assigned to PressureTrace II you will need to delete device(s) using lower numbered ports and connect again until the COM port is between 1 and 16.

Toshiba

Toshiba Bluetooth drivers are used on many laptops and the generic Microsoft Windows drivers can usually be substituted (see Bluetooth Drivers above).

Turning on the Radio



When Toshiba drivers are installed, you will see a Bluetooth icon in the Windows taskbar notification area. If the icon is blue and red, the Bluetooth radio is not turned on. Most drivers automatically start Bluetooth when the computer boots, but Toshiba drivers may need to be manually started before you can connect to a device.

Right click the Bluetooth icon in the taskbar notification area and select the “Options” menu. The options window will show a large button used to turn on the radio. The button will change color and the Bluetooth icon in the notification area will change to blue and white. Close the Options screen and proceed to creating a Bluetooth link.

Making the Bluetooth Connection

To connect to a fully enabled com port with Toshiba drivers you must manually specify an open port rather than their default port.

Right click the Bluetooth icon in the taskbar notification area and select the “Bluetooth Settings” menu. A Bluetooth settings screen will open.



Turn on your PressureTrace II module and click the [New Connection] button.

Choose “Custom Mode” on the first screen. The software will then search for your PressureTrace II.

When the PressureTrace II module is found, click the [Next] button. A pop up window will ask you to enter the security code. Enter “1234”.

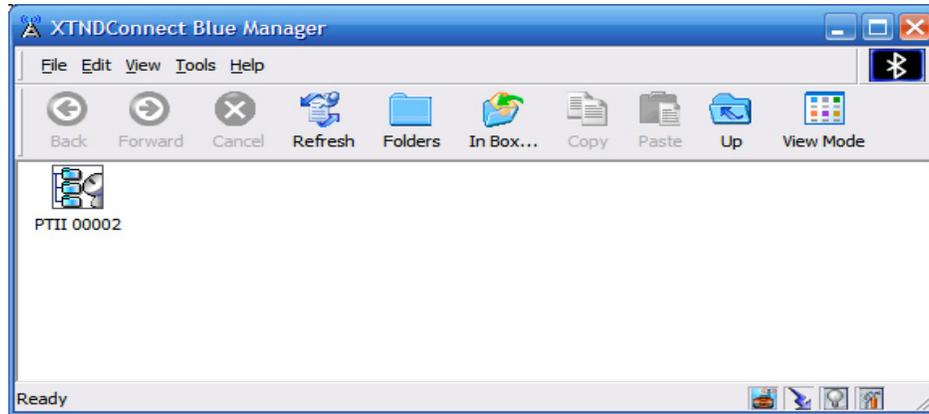
Another screen will appear asking you to select the service to use. “Serial Port SPP” should already be selected. Press the [Next] button.

A screen will then ask you to select a COM port to use. On that screen a COM port number is recommended. If the COM port is 16 or less, everything is fine and you can press the [Next] button. If the COM port assignment is higher than 16, see the procedure described in Troubleshooting – Change Default Com Port.

XTNDConnect Blue Manager

This driver set is perhaps the least desirable and should definitely be replaced with the generic Microsoft Windows drivers (see Installing Bluetooth Drivers).

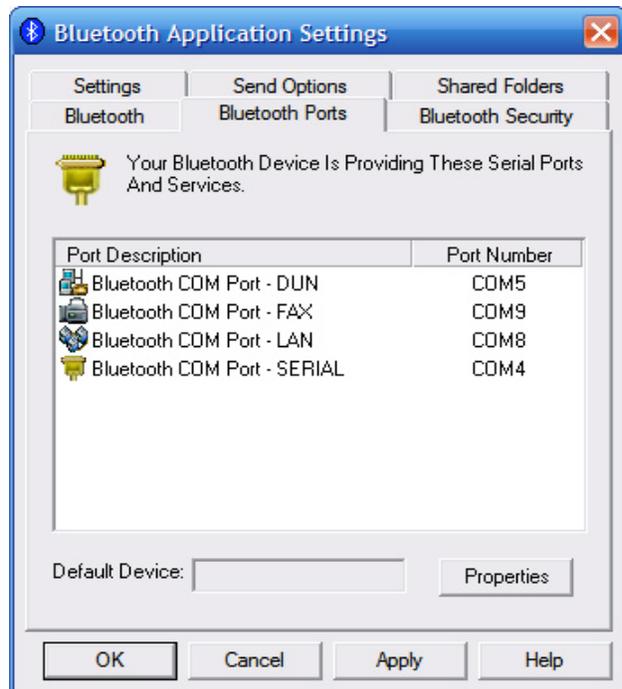
Once you have completed the driver installation, turn on your PressureTrace II and start the Blue Manager program. The program will search for new devices and will eventually show your PressureTrace II module. If the program doesn't start searching, press the [Refresh] button at the top of the program screen.



Right click on the PTII icon and select the Trust Device menu choice. A Passkey Required dialog box will open. Enter the passkey "1234" and click OK.

Make sure the PTII icon is selected and then select Options from the Tools menu. Select the Bluetooth Ports tab and note the Bluetooth COM port assigned to PressureTrace II. The port to use in this example will be COM4.

Press the [OK] button and close the Blue Manager programs.



Troubleshooting Bluetooth

The Bluetooth radio link between the PressureTrace II module and your computer must have working communication services provided by the Windows operating system. Bluetooth SPP services are just a link between the Bluetooth radio in your PC and the standard RS-232 com service provided by Windows. Without working Windows com services, no Bluetooth drivers can function. If you have downloaded or uploaded data directly through a USB port to other devices, your Windows com services should be OK.

Bluetooth drivers are not installed with the PressureTrace II program and are unique to the hardware you own. There are myriad Bluetooth devices with most using services OTHER than SPP. Because you have successfully created a link with other kinds of Bluetooth devices does not mean you have used SPP services or that it is working. A working Bluetooth SPP service should show a com port listing in your device manager under “Ports.”

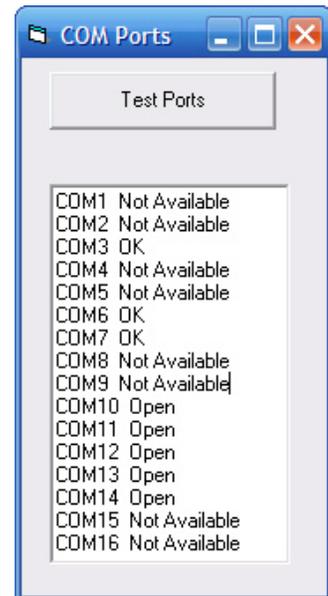
If you have problems, first check for updated Bluetooth drivers. You may need to uninstall your old Bluetooth drivers via the add/remove control panel then reinstall a current driver set.

Com Port Limit

The PressureTrace II software supports com port assignments from 1 to 16. Some Bluetooth drivers will use the same com port for all serial devices. Others will assign a new port to each com device and even new ports when the drivers are updated. As a result ports can sometimes exceed 16.

To view the available com ports on your computer, load the PressureTrace II CD into your drive. When the CD menu program launches, select the button [Run COMChecker] then click [Test Ports]. The status of the first 16 COM ports will be shown.

Go to your Bluetooth settings and reconfigure the PressureTrace II link to use an available port lower than 16. If none are available, you may need to remove links to other devices that are using the lower numbered com ports. Com ports may also be deleted using the Device Manager.



The Correct Module

Each PressureTrace II module is programmed with an identifying serial number that is displayed while establishing a Bluetooth link. This allows use of multiple modules within range of the PC without “cross-talk” from the other modules. The Bluetooth link must be made to the correct module.

Distance And Broadcast Quality

We highly recommend Bluetooth 2.0 or higher due its faster data transfer rate and improved drivers. There are three Bluetooth broadcast ranges, Class 3 - 1 meter, Class 2 - 10 meters and Class 1 - 100 meters. The Bluetooth radio in the PressureTrace II module is Class 1 with a 100 meter range. Internal Bluetooth equipped laptops are typically Class 2. Many dongles are now Class 1 and will allow transmission to 100 meters. Class 3 Bluetooth is insufficient for this application and should be avoided.

Internal Bluetooth and even Class 1 dongles may not broadcast reliably through computers. The area between the Bluetooth radio and the module should be clear of electronics and shielding. High power Class I dongles may actually work best if the module is several feet away from the dongle.

Bluetooth Installation

Auto Discovery

Normal operation of the PressureTrace system should not require you to manually connect the Bluetooth link every time you launch the software. The PressureTrace II software cannot communicate with the module until the Bluetooth link has been connected.

Bluetooth drivers have a preference to allow devices to “discover” or “auto-connect” the PC. Look for the setting to allow devices to discover your computer and turn it on. Then, as soon as the module is turned on, the link will be made. When the software is launched, your PC can immediately communicate with the module.

No SPP Service

The service option displayed for the Bluetooth link should always be “SPP” (serial port profile). This should not be confused with the local services “Bluetooth Serial Port” installed with some drivers. At some point while establishing a link to the module, there should be a dialog or property to confirm “SPP” is available and used for the link.

The earliest versions of Bluetooth may not offer “SPP” service and are simply too old to use with PressureTrace II. (see Old Bluetooth below.)

Security Services & Firewalls

Drivers may have various security settings to encrypt data transferred through the com port. This feature should be disabled.

Bluetooth can be used to network computers. Firewalls may block access to the com port or slow communication unless the PressureTrace II software is identified as authorized to use the port. To ensure your firewall is not preventing communication to the module, open your Firewall control panel and add the PressureTrace II software to the list of approved exceptions.

Old Bluetooth

The original Bluetooth 1.0 did not always provide “SPP” service and even if available, it was slow. If your laptop has an old internal Bluetooth 1.0 chip, first try updating drivers. If it still does not work or you cannot link to the module with “SPP” services, the Bluetooth may simply be too old or no longer supported by third party drivers or Windows.

Before adding new hardware, it is worth trying the generic Microsoft Windows drivers. Use the Add/Remove software control panel to remove the internal Bluetooth drivers then reboot. Open the device manager, and if a Bluetooth radio is listed, right click the radio, select properties, and delete the driver.

When you are certain the old Bluetooth drivers are no longer installed, run the Add Hardware control panel and let the Hardware Wizard attempt to locate drivers. If the Hardware Wizard indicates it cannot locate drivers for the internal Bluetooth hardware, or even after loading the drivers, you still can't link to the module, your only option is to update the internal Bluetooth card or add a USB Bluetooth dongle.

An inexpensive USB Bluetooth dongle can be added to any PC with USB ports. Not only will the dongle likely be Bluetooth 2.0 or newer with enhanced data transfer rate (EDR), but may also be Class 1 with a more powerful radio.

PTII.ini File

If you upgrade Bluetooth hardware or install new drivers, the com port may change. An earlier configuration of the PressureTrace II software would then attempt connection to the wrong com port.

Bluetooth Installation

The com port used to configure the PressureTrace II software is stored in a file called PTII.ini located in your Documents/PressureTrace files folder. It can be opened with any text editor and saved with the correct com port, or the “Configure The Program” window can be used to set a new port.

Additional help with Bluetooth driver related issues are available on the PressureTrace support page at www.shootingsoftware.com/ptsupport.htm.