

# USB Converters and the Windows OS

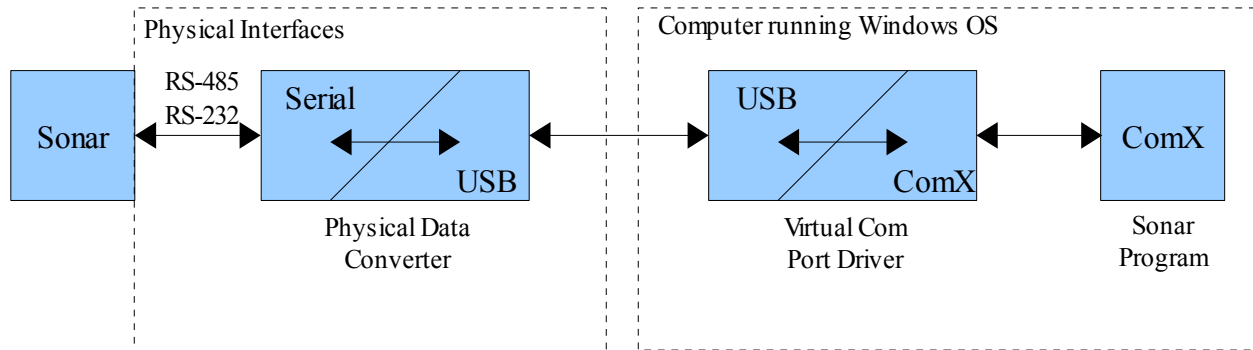
With the proliferation of the “*Universal Serial Bus*” (USB) compatible devices available for notebook and desktop computers, manufacturers are rapidly omitting physical serial ports on these products in order to cut production costs. The USB bus is extremely versatile as there are no Com Port conflicts, no IRQ's to deal with, and has support for up to 256 devices on one bus (while there are usually multiple USB ports on a computer, there are usually only two physical USB buses).

With all that is going for it, one would wonder why use serial devices at all. Good question. Major factors in retaining a true physical serial device are:

- Cable length – USB has a maximum cable length support of 5m (~16')
- Latency – USB is a packet driven technology and as such delays occur due to USB driver packaging schemes.

## Virtual Communication Ports

To get a serial device (RS-232 or RS-485) connected to a computer that only has USB ports, a converter needs to be installed in-line between the USB port and the serial device. These converters install a special driver in Windows called a “Virtual Com Port”. This software will emulate a serial port so that serial enabled software can simply “see” the USB port as a serial port. See the figure below for an overview.



*Illustration 1: Overview of USB Data Converter Logic Flow*

One caveat is that Windows can get confused if a device is plugged into a USB port while there is data being transmitted through it. Windows thinks that the device is a "pen mouse" and the mouse cursor will behave erratically. If this happens, the computer will need to be restarted. To circumvent this phenomena, **DO NOT** connect GPS, or other devices to the USB adapter until the adapter is fully functional (i.e. plug the converter into the computer and wait until Windows sets it up and assigns it a Com Port number **BEFORE** plugging a serial device into the converter).

Generally, once a converter is correctly installed, Windows will assign a Com Port number to **A PARTICULAR** device on **A PARTICULAR** USB port. Once this is done, things run pretty smoothly....until the operator changes something....

## Common Windows® Issues related to all USB <--> Serial Converters

Windows XP will assign a Com Port number to a USB device when it is first installed in the system. However, it will assign a **DIFFERENT Com Port** number to the same device when it is plugged into a **DIFFERENT USB port** on the same computer. To further complicate matters, Windows XP will assign a **DIFFERENT Com Port** number to a **DIFFERENT** device when it is plugged into the **SAME USB port** on the same computer.

Converter	USB Port	Assigned Com Port
A	A	4
A	B	5
A	A	4
B	A	5

*Table 1: Windows Com Port Assignment Scheme*

The table above indicates a possible scenario where various converters are plugged into various USB ports. The assigned Com Port numbers above are only for illustration purposes. Windows will actually assign the device the next available Com number.

For example, If you first plug the device into the BACK USB port of the laptop, Windows will assign it a Com Port number of (for arguments sake) '4'. When you start the SportScan software, you set the Com Port to '4', and it runs fine. The next time you use the device, you plug the same device into the SIDE USB port on the laptop. Windows will then assign the device a Com Port number of (again, for arguments sake) '5'. Now when you start the SportScan software, it cannot open, or find, Com Port '4' as the device is now set to Com Port '5'. You set the Com Port in SportScan to '5' and it again runs fine.

There is no solution for this behaviour. It is a Windows function, and we have no control how the Com Ports are assigned to a device.

Our suggestion is to only use the same USB port for each device. For example, only use the BACK USB port for the device to run the sonar, and to only use the SIDE USB port for the device used for GPS input.

Also, if a different serial device is plugged into the same USB port, Windows will assign it a different Com Port again. For example, if Com Ports '4' and '5' are already taken, Windows will assign it Com Port '6'.

To make a long story short. Windows assigns a single Com Port to a specific serial device plugged into a specific USB port. If either changes, Windows will assign it a different Com Port.

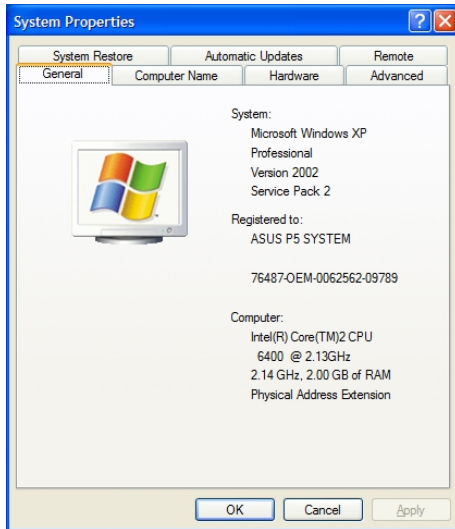
## Determining the Assigned Com Port For All USB <--> Serial Converters

This section describes various procedures for determining the assigned Com Port of a converter. This document assumes the Windows XP Pro operating system and other computers may appear differently. However, the procedures will be similar regardless of the Windows version.

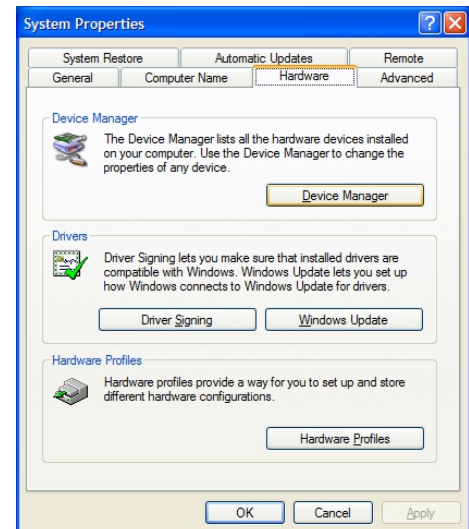
To access the Device Manager from the Desktop:

- Right click on “My Computer”
- Left click “Properties”

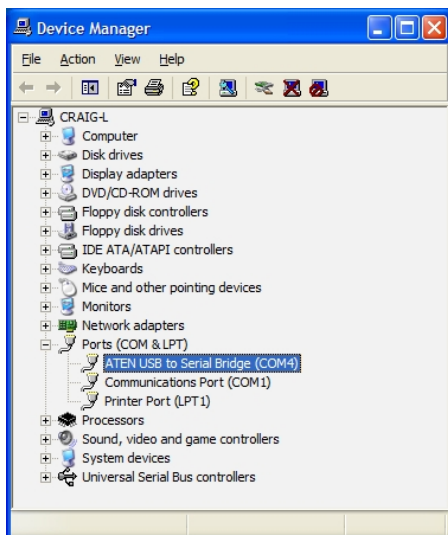
Follow the following Illustrations to Set the Com Port Number of the Device. Note these Illustrations are for the ATEN UC-232A Device. The procedure for the Sealevel 2104 is the same. Also, Ignore the baud rate settings. Imagenex software automatically opens the port at the correct parameters.



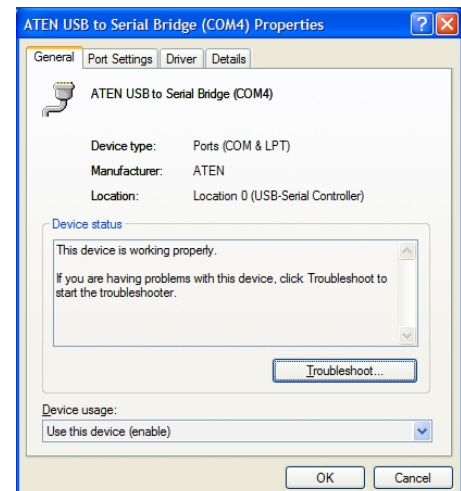
*Illustration 2: System Properties*



*Illustration 3: System Properties - Select Hardware Tab*



*Illustration 5: Device Manager – Select Ports and double click device*



*Illustration 4: Port Properties – Select “Port Settings”*

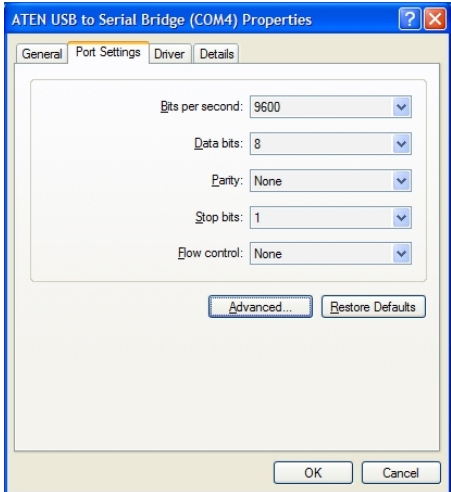


Illustration 7: Port Properties - Click "Advanced"

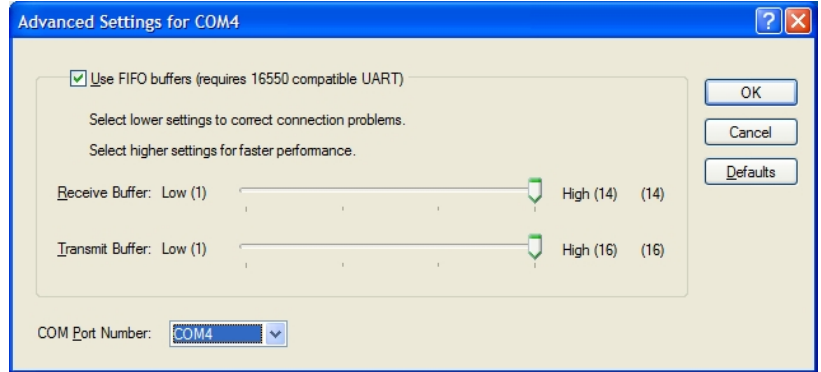


Illustration 6: Advanced Port Properties - Select Com Port Number

## Quick Tip

To make a shortcut to the Device Manager on the Windows desktop:

- Right click on the Windows desktop
- Select "New" --> Shortcut
- Enter "devmgmt.msc"
- Select "Next"
- Enter "Device Manager"
- Select Finish

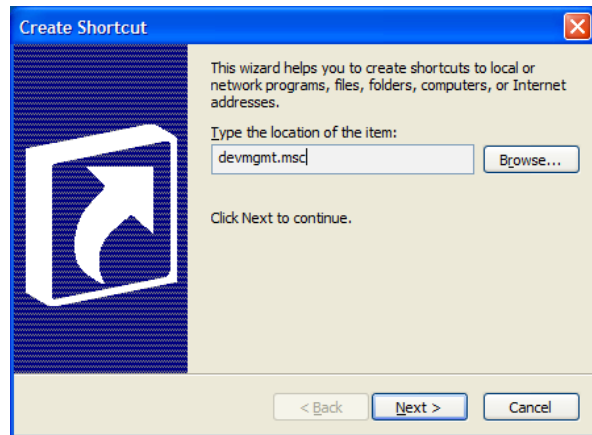
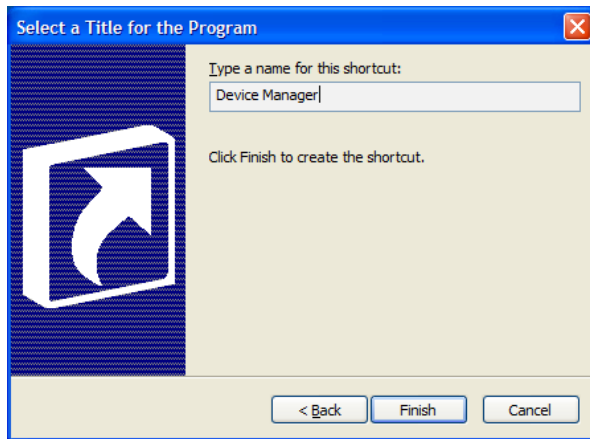


Illustration 8: Creating a Device Manager Shortcut