VSC-X
The Virtual Serial Cable

Configuration and Operating Instructions

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VSC-X provides a virtual serial link that allows you to connect your computer programmable radio to your computer without actually running a serial cable between the two. In fact, it can be used to provide a wireless connection anywhere you would have previously used a serial cable. People are using it in a variety of other applications including remote weather stations, remotely mounted GPS receivers, remote antenna tuners and remote control of radios. The serial link is provided by a pair of XBee Pro transceivers that operate in the 2.4 GHz license free band. It utilizes the USB port on your computer (no serial port required) and the serial port on your radio. Transmission of both RS232 level and TTL level signals are supported.

Quickstart Guide

To do a basic installation of VSC-X, you must load the appropriate USB driver on your computer, plug the USB VSC-X module into your computer, and interface the serial VSC-X module to your radio or other device.

Obtaining the Driver

The VSC-X USB module utilizes a FTDI USB interface chip. Drivers are available for both Windows and various Mac operating systems. In addition, the Linux driver is now built into the Linux kernel, so no driver is required. VSC-X only provides a replacement for the serial connection between your computer and radio. You still need to have radio-specific programming software to use VSC-X to remotely program your radio.

You can obtain the necessary driver from the FTDI driver download page. See http://www.ftdichip.com/Drivers/VCP.htm If you are using a Windows based computer the easiest way to load the driver is by utilizing the "setup executable" that is available on this page. After you install the driver the USB driver, the next time you plug in the USB module it will appear as a serial port on your computer. If you prefer that it is a different serial port (for example, if the number is too high to be recognized by your radio programming software), you can change this from the Windows device manager.

Interfacing to the Radio

If your radio has a standard 9 pin serial port (for example, the Kenwood D700), the installation is trivial. Simply plug the VSC-X serial module into the radio's 9 pin serial port. Then plug in a 9 volt battery. **I do not recommend using the same power supply that is powering the radio.** You may do this at your own risk, but if the ground connection to VSC-X fails for some reason, the ground return path will be through the data connection to the radio. If this path does not support a current of a few hundred ma, damage to your radio could result.

The Kenwood D710 is a special case. It uses RS-232 level signals, but does not have a 9 pin serial port. The Kenwood PG-5G programming cable can be used to connect the radio directly to the VSC-X module. These cables are available from Kenwood, you can make your own or you can buy a cable that will do this from Coastal ChipWorks.
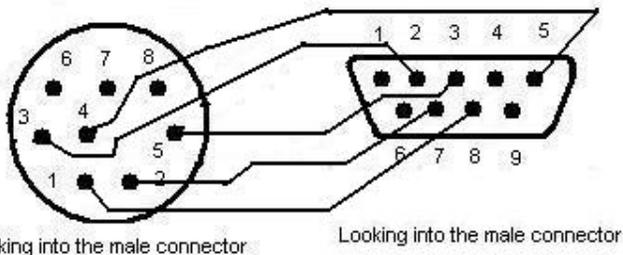

Figure 1: Connection Diagram for the Kenwood D710 radio.

Note: If you are using a radio that requires RS-232 level signals, leave the two jumpers on VSC-X off. Failure to do so could damage VSC-X.

If your radio has a TTL level port, the connections will be different. Examples of these radios include the Yaesu FT817, FT857 and FT897 and all of the ICOM radios with a CI-V type interface (such as the ICOM 706). Because these radios have TTL level signals, you should **remove the ICL 3232 chip from the VSC-X serial module. Then use the enclosed jumpers to connect pins 1 and 3 and connect pins 2 and 4 on the header block on this module to the left of the ICL 3232 chip.**

You will then need to build a cable that connects the ground, TXData and RXData lines. On the 800 series Yaesu radios, the connection to the computer is made through an 8 pin mini-din connector, wired as shown in Figure 2.

In order to connect VSC-X to an ICOM radio with a CI-V interface (706, 756, 703, etc.), you will need an adapter using a 1/8 inch phone plug using the wiring diagram shown in Figure 3.
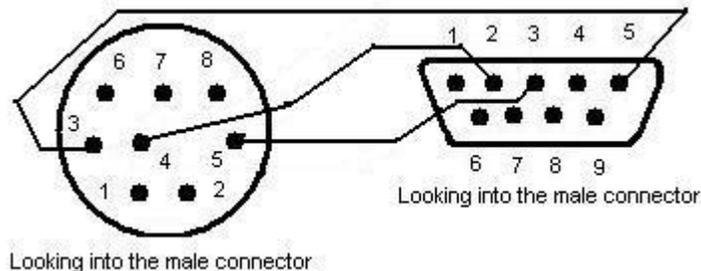

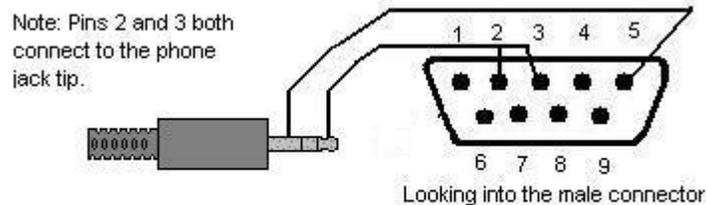Figure 2: Connection Diagram for Yaesu 800 Series Radios (FT817, FT857, FT897, etc)

Figure 3: Connection Diagram for ICOM radios that use a CI-V style interface.

If you would prefer to purchase these cables rather than make them yourself, they are available from Coastal ChipWorks. With the VSC-X USB module plugged into your computer and the VSC-X serial module plugged into your radio, you are now ready to use the radio programming software to program your radio. The VSC-X modules are set up for a 9600 baud serial data transmission rate. Configure both your radio and your radio programming software to utilize this rate.

Advanced Operations

Troubleshooting and Range Test

If you are having trouble getting your radio programming software to recognize your radio, or you want to test the range of the VSC-X modules, software is available that will allow you to do this.

The program is called "X-CTU" and is available from the Digi corporate site:

http://www.digi.com/support/kbase/kbaseresultdetl.jsp?kb=125

You can use this software on two different computers and connect the USB module to one computer and the serial module to the other. Alternatively, you can connect both modules to the same computer and run two copies of the X-CTU software, one for each module. If you connect the serial module to a computer rather than to your radio, **it is necessary to use a null modem cable** to make the connection between the module and the computer. When the X-CTU software comes up you will see the screen in Figure 4.
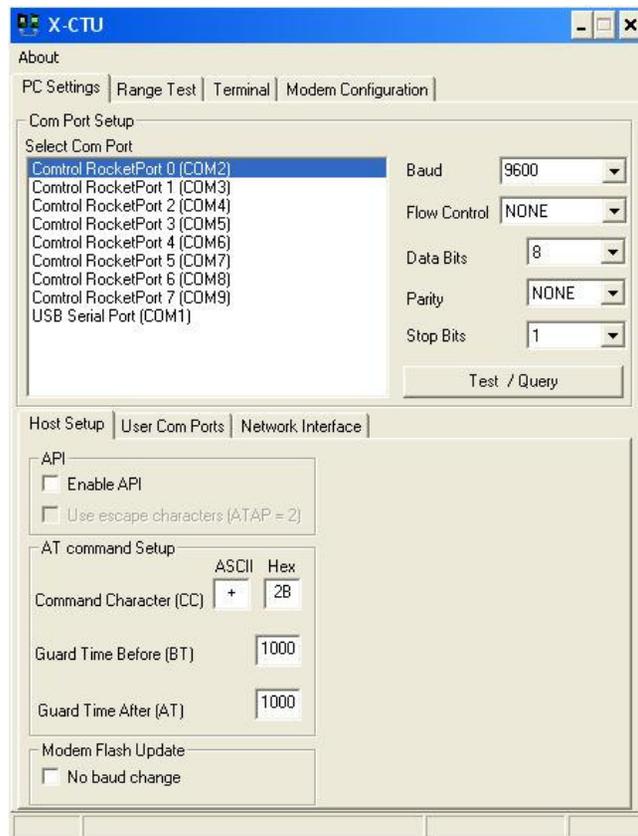

Figure 4: X-CTU PC Settings screen

All of the serial ports on your computer should be visible including the one that has the USB module connected to it (COM1 in Figure 4). Select the port that you have connected your module to and press the Test/Query button. You should see a confirmation that the module has been found. Note the default data communication rate is 9600 baud. You can alter that, but I have not found data rates higher than 9600 baud to provide reliable communications with hardware handshaking disabled.

If you want to test the range of your modules, it is probably a good idea to connect the USB module to a laptop computer so
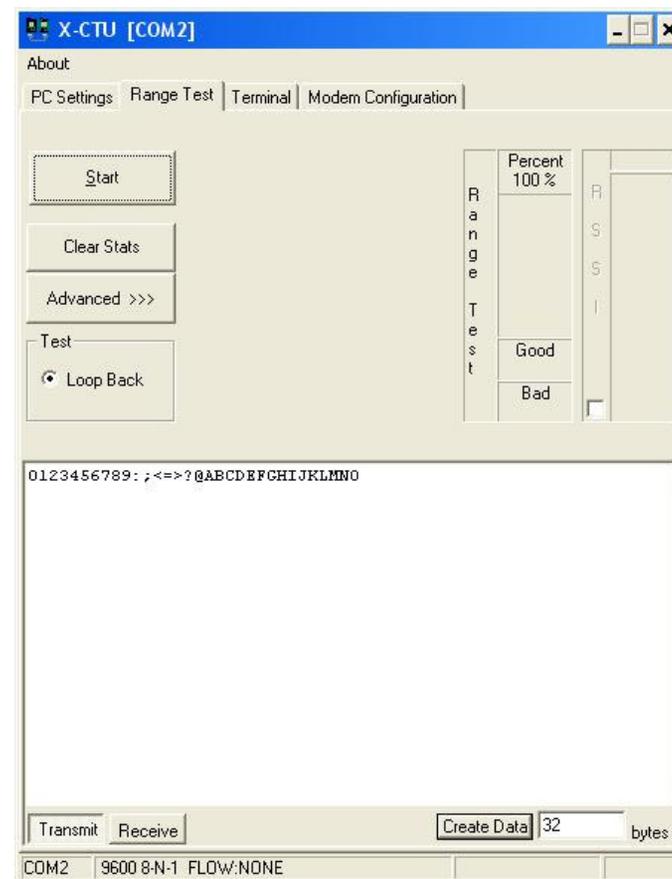

Figure 5: X-CTU Range Test Screen

you can walk around with it. To do a range test, select the range test tab from the X-CTU software on both computers. You should see the screen shown in Figure 5.

Push the "Transmit" button on one of the copies of X-CTU and the "Receive" button on the other. Then press the Start button on both computers. If the modules are communicating, you should see a rising count of "Good" packets on both screens.
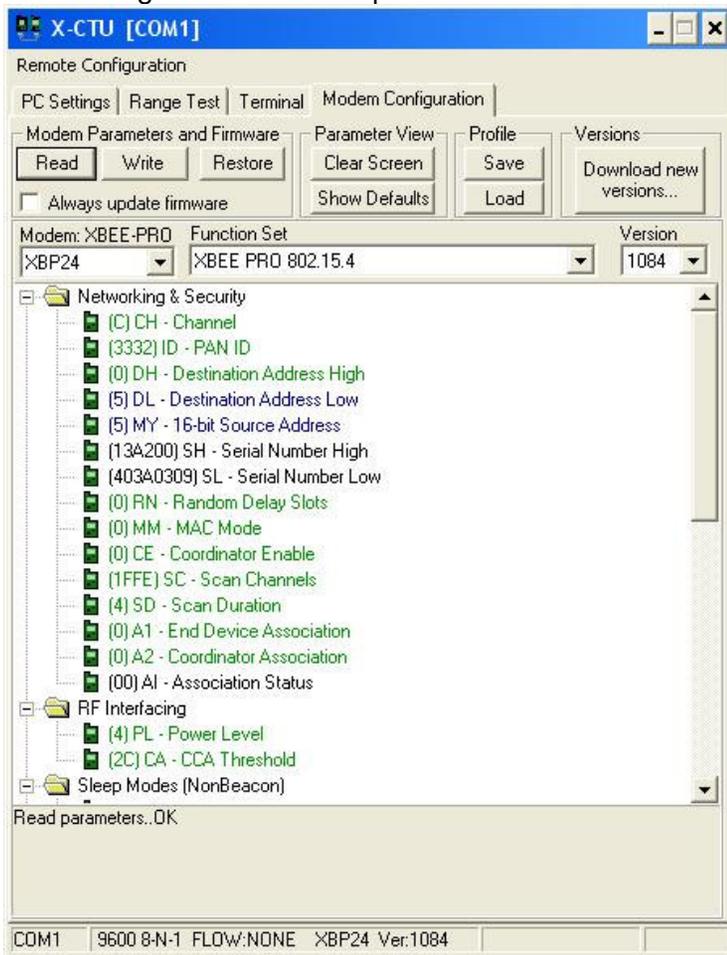

Figure 6: X-CTU Modem Configuration

You can then walk around with one of the computer/modules until you begin to see "Bad" packets. This will give you an idea of how far the modules can communicate.

Data Security

Given the relatively short range of these modules and the non-critical nature of the data being communicated, you may not be very concerned about the security of your data transmissions. However, if you are, or if you wish to use a single computer to communicate with more than one radio (and those radios are left on at the same time), you can alter the addresses of the modules to something other than the default value (which is 0). To do this press the "Modem Configuration" tab on the X-CTU software. Then press the "Read" button in the "Modem Parameters and Firmware" section. The screen in Figure 6 should appear.

Note the values that say "Destination Address High", "Destination Address Low" and "16 bit Source Address". The default setting for all of these is 0. The source address refers to the address of the module currently attached to your computer. The destination address is the address that this module expects to communicate with. If you click on these items you will be able to edit them. By altering these values you can specify your own "private" addresses for each of the modules connected to your radio(s). Pressing the "Write" button then causes the new values to be written into your XBee-Pro.

There is a newsgroup to support VSC-X. It can be found at:

http://tech.groups.yahoo.com/group/VSC-X/