

Remote Rig Control

By Chris Bigelow, VA3ECO

Whether you are away from home for work or pleasure, it's hard to lug your radio and antenna with you. I faced this problem recently and found setting up a remote control for my radio not as difficult as I thought it would be.

My "QTH" is on an island in Echo Bay, Lake of the Woods. I have a station similar to many of you: a Kenwood TS-2000, 45 foot tower, Ham 4 rotor, dipole for the low bands, and a Mosley TA-33 tri-bander beam. I am fortunate to have Ontario Hydro, a moderately good DSL internet connection, and no antenna restrictions!



I'm going to discuss how to first control the radio from a local computer, including audio, frequency and mode data, and transmit (PTT) control.

Then we will look at accessing this computer from another one over the internet (using free software).

And lastly I will finish up with remote rotor control and emergency shutdown considerations.

Computer to Radio Audio:

There are several ways to get the audio from the computer to the radio. If you are using any of the digital modes, you already have this part done. In my case I use a Signalink USB interface that converts the analog audio from the radio to a digital USB signal to the computer. (Sending the audio signal into the computer's sound card also works well.)

Here's the Signalink:

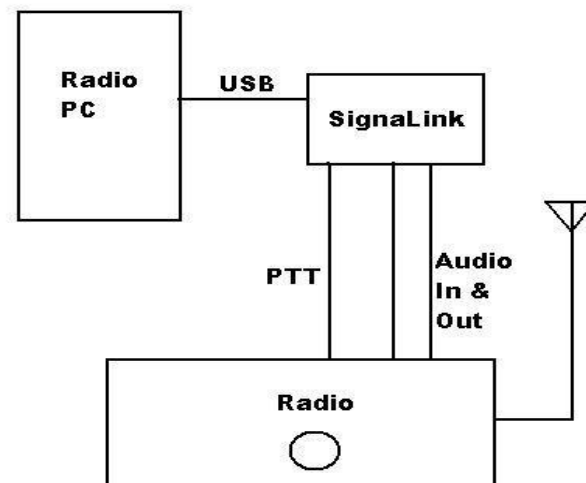


And a rear view:



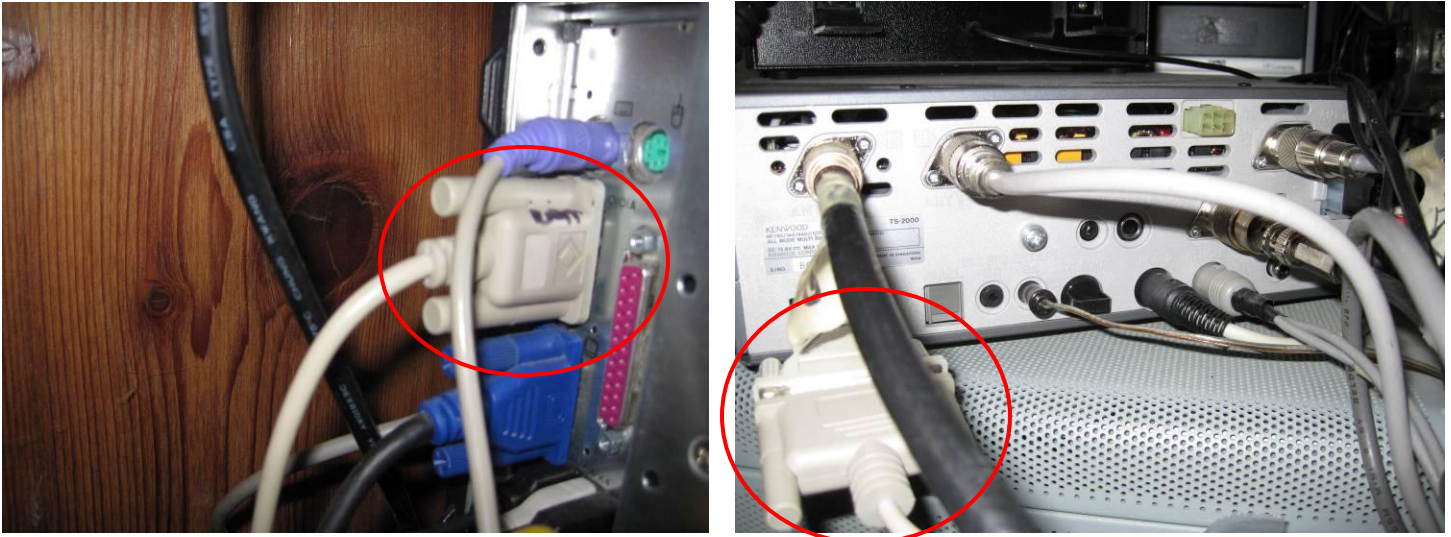
The Signalink has a built in VOX option that sends a PTT signal to the radio. This and the audio signals are in the cable connected to the "Radio" jack of the Signalink going to the radio's Accessory 2 jack on the back of the radio. (The large green LED on the front, and the grey cable on the back are modifications I'll talk about later.)

So what we have so far is:



Rig Control Hardware:

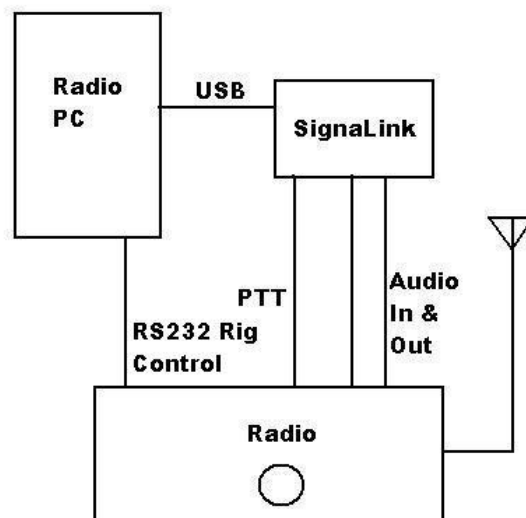
Controlling the radio's frequency, mode, and other functions from the computer is fairly simple on most modern radios. My Kenwood TS-2000 simply requires a 9 pin D-connector serial cable connected from an RS232 com port on the computer to a jack on the back of the radio.



Newer computers may not have this older style of serial port in favor of the newer USB connection, but adapters are available.

Rig Control Software:

Again, there are several to choose from. I am using ARCSII (<http://arcsii.wordpress.com/>). It is a free program designed for Kenwood radios. For the digital modes I use MIXW. The digital modes have the advantage of not needing a Skype connection. In the digital modes, what you type onto the Radio PC through the Log Me In program goes directly out through the Signalink or sound card. Other popular rig control programs are FTBCAT (<http://www.g4hfq.co.uk/download.html>) for Yaesu, and for all radios, the famous Ham Radio Deluxe. So now what we have is:



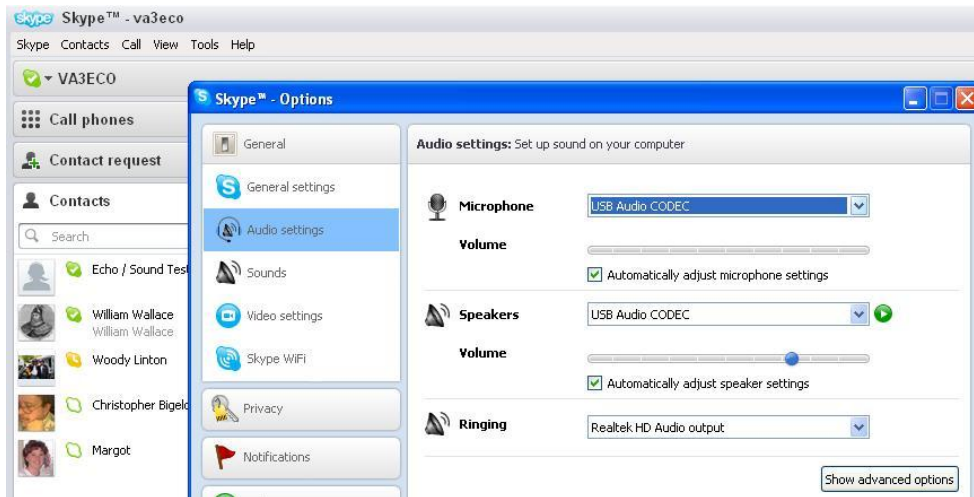
Skype Setup:

We now have the radio connected to the PC with audio and control. I will call this the “Radio PC”. I will then call the other PC located miles, or hundreds of miles away from the radio the “Non-Radio PC”. (I find using the terms remote and local can be confusing.)

We will need separate Skype accounts for both PC’s. (I will not go into the details of setting up the accounts.) Once you have the accounts setup, here are some options needed on the “Radio PC”:

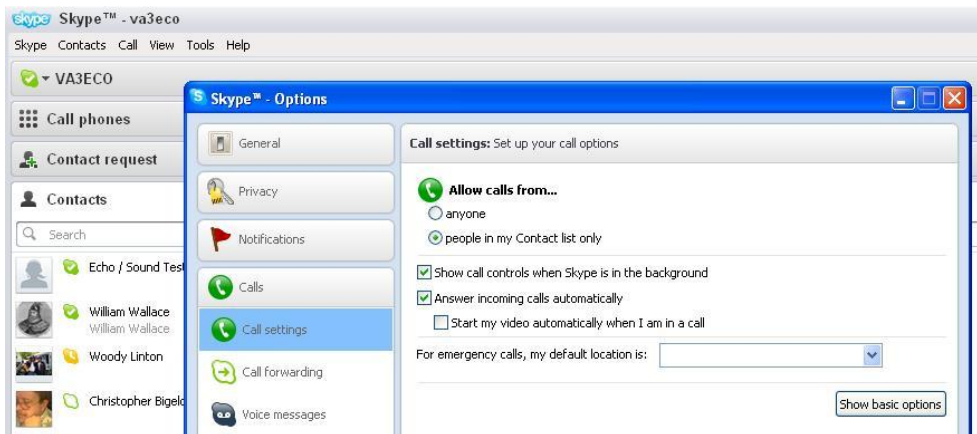


Click on Tools, Options,



Then Audio Settings, now click the pull down arrow for Microphone and Speakers, and select whatever sound device your Radio to PC audio is using. The Signalink is listed as “USB Audio Codec”. If you are using your sound card, pick that. Be aware that if you are choosing VOX for your PTT and a sound card for your audio, Windows bings

and bongs will get transmitted; more on that later. I leave microphone and speaker level settings to automatic on both Skype accounts.



Now go to Calls, Call Settings.

Select “people in my Contact list only”, and “Answer incoming calls automatically”.

You will need to get your Non-Radio Skype account into your contact list.

The Non-Radio Skype settings can be left as default.

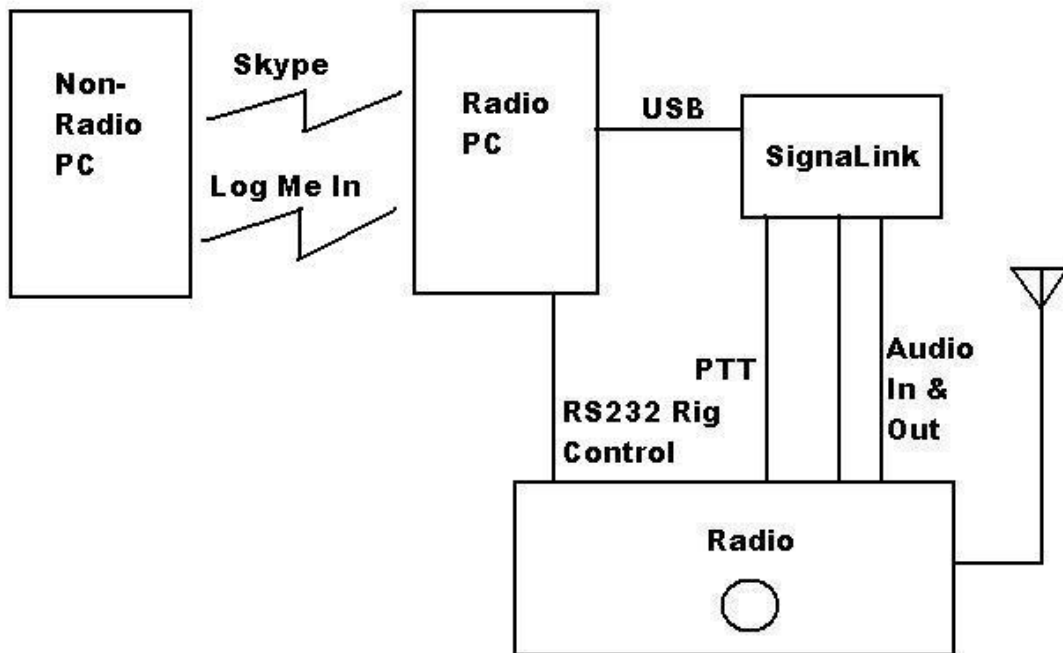
Remote PC Control Software:

To access the Radio PC from the Non-Radio PC there are several programs to choose from; I previously used a free one called “Log Me In”, however now it’s no longer free. So I have switched to a program called “Team Viewer”: <http://www.teamviewer.com/en/index.aspx>

It is free for non-commercial use, it has a little nag screen to confirm that when you close it. It is restricted to how much time you use it, but I’ve heard that an hour a day is OK. You will need to install a small program on both the Radio and Non-Radio PC for Team Viewer to work; I leave them running all the time with little effect on system performance. Team Viewer also includes two way audio, but I personally prefer the sound quality through Skype.

Note: Throughout this document you will see references to Log Me In. Please substitute Team Viewer, or whatever remote access program you choose to use.

We now have:



Ham Radio Deluxe:

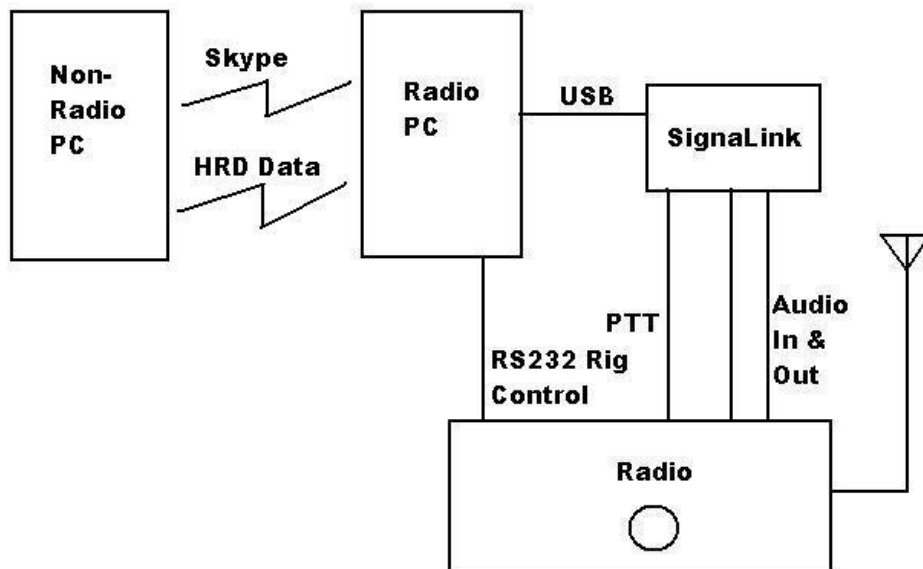
This software deserves special mention because besides controlling your radio with it using Log Me In, it can be configured in a “Server” mode. This sounds kind of techno-nerdy, but basically you dispense with the Log Me In and control the radio directly from a copy of HRD running in the Non-Radio PC. This talks digitally over the internet to the Radio PC running “Server” software, which then sends all commands to and from the radio. Skype is still needed for sending the audio signals back and forth, so it should be set to start automatically on the Radio PC.

The advantage of this setup is that the delay time is considerably reduced because the video information from the Radio PC to the Non-Radio PC is not needed. And video is the big bandwidth hog.

The disadvantage is with the computers finding each other over the internet. Most of the people here have what is called a “dynamic IP address”. This means your IP address changes every few days. When running Log Me In, it watches for this and adjusts itself. However there are free and low cost services available that solve this problem for HRD, such as <http://www.no-ip.com/>.

Running HRD in Server mode can be a bit complicated, but there are many resources on the net on how to do this, including: http://www.k6br.net/HRD_remote.pdf.

So if you went with HRD in its Server mode, the diagram would now look like:



PTT, the problem child:

Push to talk, or making your radio transmit, can be one of the biggest obstacles when setting up remote control. Pressing the transmit button on Ham Radio Deluxe, or most rig control software programs, causes the radio to transmit, seems like no problem. The problem is that most radios will then want the audio to come in to the front microphone jack, not the rear accessory jack where your Signalink or sound card is connected.

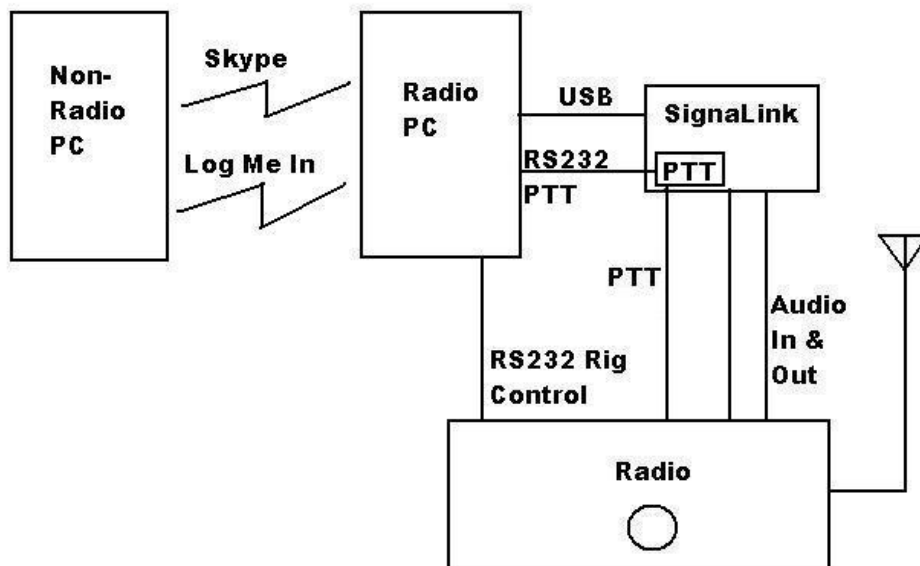
An obvious solution would be to bring the Signalink or soundcard connection into the front microphone jack. The drawback to this solution is reconnecting the microphone when working the radio locally. I believe there are devices like Rig Blaster that solve this problem.

A second option that I mentioned at the beginning is the VOX circuit on the Signalink. This triggers a PTT line going into the rear accessory jack. This will successfully transmit your audio. The problem I had with this setup is my dog barking, or me sneezing, goes out on the Manitoba Weather Net when it's not my turn.

I used a third option: I made a small opto-isolated circuit that is triggered by a second RS232 port on the Radio PC. I stuffed this little circuit inside the Signalink box. I drilled a hole in the back for the serial cable, and a hole in the front for an indicating LED to light while transmitting.

I disabled the VOX output wires inside the Signalink, and substituted the output of my small circuit.

So my system looks like this:



If you decide to go this route, refer to appendix A for more detailed information.

Remote Rotor Control:

Some of you are thinking, I can control my radio, but what good is that if I can't rotate my beam? Well, thanks to a couple of guys at idiom press this can be done if you are using a CDE three button rotor control box and have yet another RS232 port on your Radio PC. The kit is called Rotor-EZ (<http://www.idiompres.com/rotor-ez.html>), and the price:

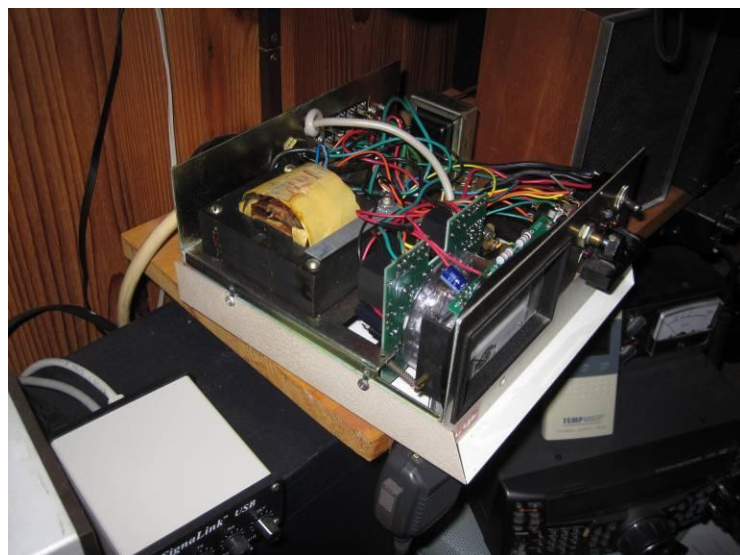
Pricing and Ordering

	Price	Description
<input type="checkbox"/>	\$ 99.95	Rotor-EZ Basic Kit, No RS232
<input type="checkbox"/>	\$ 129.95	Rotor-EZ Basic Kit, With RS232
<input type="checkbox"/>	\$ 129.95	Rotor-EZ Assembled & Tested, No RS232
<input type="checkbox"/>	\$ 164.95	Rotor-EZ Assembled & Tested, With RS232
<input type="checkbox"/>	\$ 10.95	Rotator Illuminator LED Light Kit more info

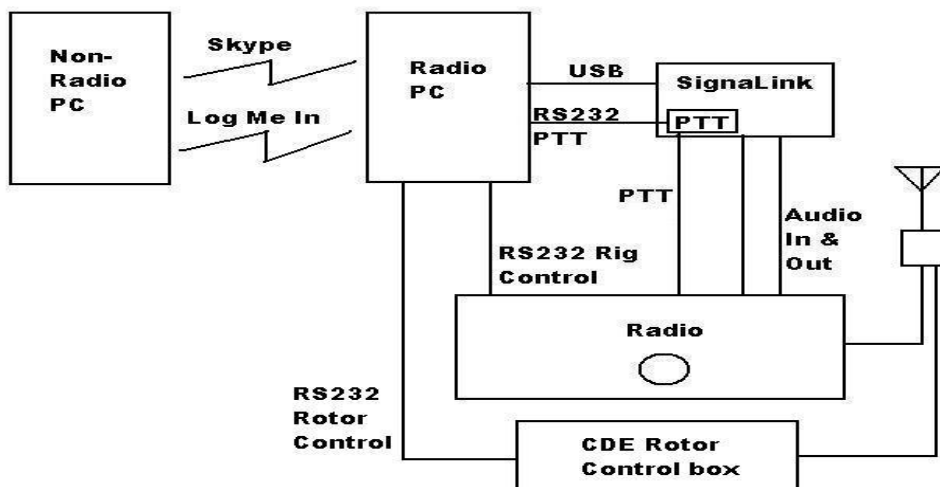
add to cart

- **Shipping and Handling:** \$5.00 USA, \$10.00 Outside USA

You will want the RS232 option, the kit is a good evening's work of soldering. Installing into the CDE control box takes another evening, you basically gut it first. When done it looks like this:



I went for the \$11 LED Light Kit as well. My system now looks like a road map to Albuquerque:



Remote Power Off:

Should your computer lock up, or your internet connection fail while transmitting you may want to consider a means of powering things down remotely. Most new radios have transmit time-out settings, but this may not get you back on the air. The cheapest solution would be to send your son-in-law over to cycle power on the radio and PC, but here are other options.



I use a telephone responder unit from X-10. It is no longer available, but there are other units (<https://www.remotepowerswitch.com/rps-home.html>) that will allow you to dial into your radio location and cycle the A.C. power. I have a power bar so that I can cycle power to the radio, the Radio PC and the DSL modem all at once. I have changed the CMOS setting on the PC to boot automatically on power up. Works like a charm. You will have to remember to set Log Me In to boot automatically as well.

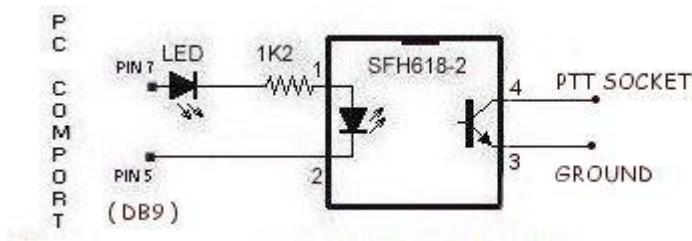
So that's about it, if you have any problems, email me at:

`cbigelow(at)kmts.ca`

Good luck and good DX!

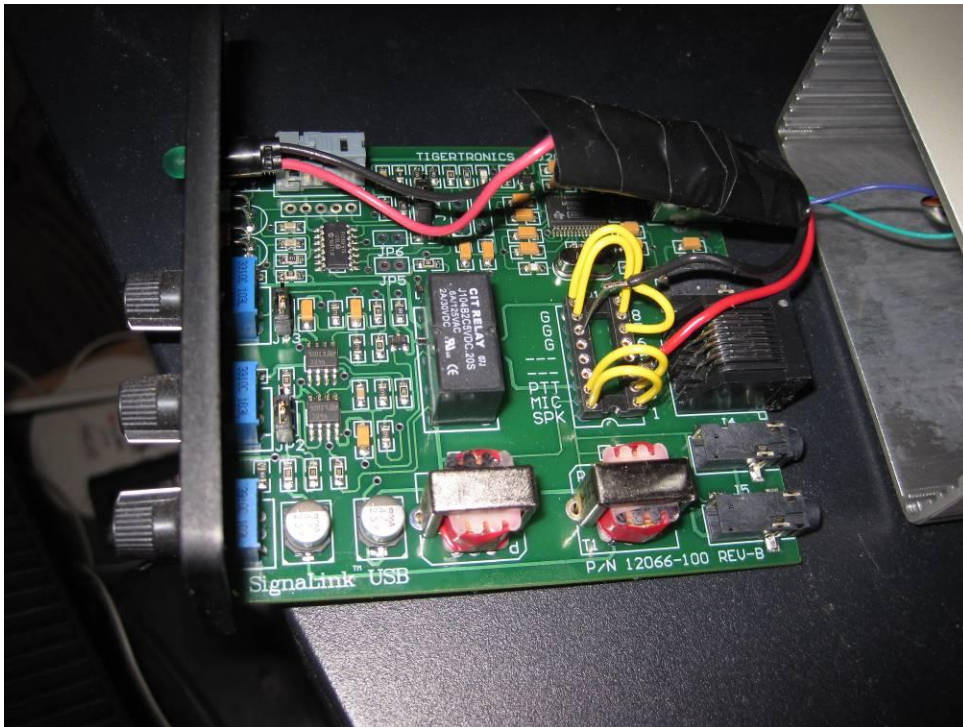
Appendix A, PTT Circuit

I mentioned a third option for push to talk, or transmit control, as being a small circuit that begins with the “RTS” line of an RS232 port, optically isolates it, then triggers the radio’s PTT input on rear accessory jack. An example of the circuit design can be seen here:



The RTS line is pin 7 and ground is pin 5 on the DB9 connector (pins 4 and 7 respectively on a DB25) .

I free soldered this circuit, wrapped it in electrical tape, and stuffed it into the SignalLink box:



I drilled a hole for the new transmit LED in the front of the SignalLink box, and another hole in the back for the RS232 RTS signal (green and blue wires).

The left pins of the “dip-shunt” connect to the SignalLink circuit. The numbered right pins go directly to the radio via the black jack to the right.

I disabled the original VOX PTT by removing its jumper between PTT and “3” on the SignalLink board.

I then tinned and inserted my new PTT lead into “3”, it’s from the collector of the opto-isolator circuit (red wire). I then soldered the emitter (black wire) to one of the “G” ground jumpers.

The original jumper configuration can be seen on the SignalLink web site. The jumpers will vary from radio to radio, but the diagrams are well documented.

Yes it’s a little technical, and probably voids the SignalLink warranty, but it was quicker and cheaper than ordering the SignalLink “8-pin Round Mic Connector” (option 1 mentioned earlier).

Most Radio control programs give you the choice for a separate PTT com port using the RTS line. For extra ports on my Radio PC, I ordered a dual comport board from eBay, \$8 delivered from Hong Kong!