

Controlling PTT Using an RS-232 Port

Newer model radios will allow software to connect via USB port. These radios provide an RS-232 port for control commands and a sound card interface for two-way audio. There are a few radios that either don't provide RS-232 for control or the RS-232 interface does not allow the computer to switch the radio between transmit and receive.

The accessory jack of most radios provides a PTT pin which, when grounded, will put the radio in transmit mode. If such a pin is not provided at the accessory jack then it surely is provided at the microphone jack.

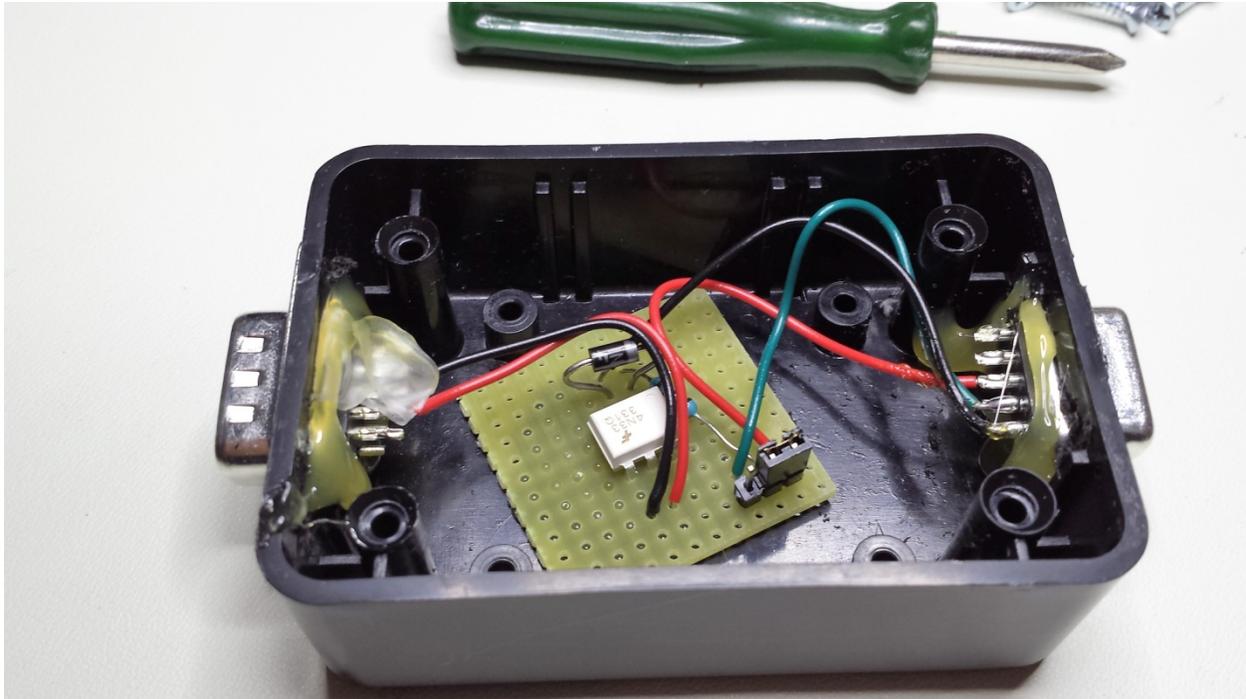
This article will show you how to connect an RS-232 port on your computer to the PTT pins on your radio without possibility of ground loops or other interference. Directly connecting the computer to the radio, even if you use a transistor, is not the best way to do it. The connection should be electrically isolated so that any difference in the ground potentials of the radio and computer will not cause malfunction or harm. If your computer does not have an RS-232 port you can purchase a USB to RS-232 port device almost anywhere computer accessories are sold.

Parts Needed:

1. A female 9 pin D connector. This will connect to the computer's RS-232 port.
2. A connector that is compatible with your radio's accessory (or microphone) port. The type varies with the make and model of your radio so I can't specify this part. You will need to know the pin assignments on this port for ground (GND) and push to talk (PTT).
3. A 1.2K (1,200 ohm) resistor.
4. A 4N33 opto-coupler. This is available from most electronics suppliers such as Jameco.com or SparkFun.com. It electrically isolates the radio from the computer.
5. A three pin jumper or SPDT switch to select between the RS232 port's RTS and DTR signals.

Connections:

1. Connect pin 5 of the RS-232 port to pin 2 of the 4N33 chip. This is the computer ground.
2. Connect the common terminal of the switch or jumper through the 1.2K resistor to pin 1 of the 4N33 chip. This will either be the RTS (request to send) or the DTR (data terminal ready) output of the RS-232 port.
3. Connect pin 7 of the RS-232 port to either position (not the common) of the switch or jumper. If your software uses the RTS signal then the switch or jumper must be in this position.
4. Connect pin 4 of the RS-232 port to the other position (not the common) of the switch or jumper. If your software uses the DTR signal then the switch or jumper must be in this position.
5. Connect pin 4 of the 4N33 chip to the ground pin of your radio.
6. Connect pin 5 of the 4N33 chip to the PTT pin of your radio.



Above is the finished product which I constructed for an Icom F8101 transceiver. As you can see my aim with the hot glue gun is not very good. I added, as overkill, An IN4001 diode across pins 1 and 2 of the 4N33 chip to protect against reverse biases. The cathode (indicated by a grey stripe) is on pin 1.

Inside the 4N33 where the RS-232 port connects there is nothing more than a simple LED. When the RTS or DTR signal goes active the LED shines light.

Also inside the 4N33, on the radio connected side, is a phototransistor. In this chip the transistor is Darlington style which supports higher currents. When light from the LED shines it connects the PTT circuit to ground causing the radio to transmit. The only connection between the radio and the computer is light.

I chose a jumper instead of a switch because so long as I use the same software there will be no need to change anything. You could opt to eliminate the switch and wire the DTR or RTS pin directly through the resistor to the 4N33. But watch out for Murphy!