Guide to programming cables

This page is a collection of user submitted information on radio programming cables. If you have corrections or additions to this page, please submit them to me, or ask for edit privileges. I much prefer this information to be user-maintained and contributed! Note: as this is user-submitted content, the recommendations and opinions here are not necessarily shared by Dan and other primary CHiRP contributors.

Cable Buying Advice

In some cases, the manufacturer of your radio produces the highest quality cable for programming. However, these are usually the most expensive and are not always the most convenient (because of a lack of USB, etc). The exception to this are the very low cost USB cables that come with many Chinese radios that use a counterfeit Prolific USB to serial chip that has a number of driver problems with recent versions of Microsoft Windows. These cables generally work ok with Linux.

Third party cables are available for most radios with a range of costs and quality. The low cost cables use counterfeit Prolific USB chips. If you use Microsoft Windows, finding the right driver and keeping it working can be quite a chore. Saving $10-15 on a cable might cost you a good bit of time and frustration trying to get it all to work.

Cables that use only a 9-pin serial connection take a lot of guesswork out of the equation. With such a cable, you can choose your own (or try many) USB adapters to get a working setup. In reality, this is a much safer option as you only have to find a solid USB adapter once, and you can use it with many cables. The KeySpan USA-19HS is a very solid USB adapter that has many benefits and is not sold under another name, nor does it use a variety of chips as do many other cables. Anything with a **REAL** Prolific or FTDI chip should be fine as well.

How to figure out which cable to buy

Recommendations for purchasing a USB radio programming cable:

- **Avoid USB programming cables that appear to be based on the Prolific PL-2303 USB chip**. This is the chip that has been cloned/counterfeited in the Chinese cables. The early clones were fairly unreliable. Because of the counterfeiting, Prolific has taken the step of making their newest drivers attempt to detect the counterfeit chips and refuse to work with them. Recent versions of Microsoft Windows (7 and later) will automatically update to the latest Prolific driver. This can make a cable stop working at some point after it is installed.
 Look at the driver instructions for references to PL-2303. Also another clue is that there will be many different drivers listed to try if one doesn't work.
- **Cables based on the FTDI USB chip are recommended**. FTDI makes a high quality USB to serial chip that has a good, working driver built in to many operating systems. The FTDI chip can add $10-15 to the cost of a USB programming cable, but will save time and frustration with driver issues. Look for cables that specifically mention **FTDI**. Another clue is that the cables are advertised to work with Windows 7 64-bit. Some of the 3rd party cable manufacturers, such as Valley Enterprises, have switched to using only the FTDI chip after having too many problems with the Prolific clones.
- **RT Systems cables are not recommended for use with CHiRP**. While RT Systems sells high quality USB programming cables that are based on the FTDI chip, these cables may or may not work with CHiRP and any other software that except the cable to show up as a generic serial (COM) port. The RT Systems cables use a custom ID. With some work it is possible to get the RT Systems cable to show up as a generic serial devices, see FTDI OEM Cables.
- Note: For some radios such as Yaesu, the RT Systems cable and software are sold alongside the radio as if they were made by the manufacturer rather than a 3rd party. A number of ham radio dealers don't make it easy to distinguish that the software and cable are actually from a 3rd party.
- If you can't tell what chip the cable uses, look for a different cable.

Making your own cables

It is possible to build your own radio programming cable. Most radios use a serial interface for programming, however the voltage levels used varies. RS-232 Serial ports used voltage variations of up to -15Vdc to +15Vdc which was good for older equipment and long cable runs. Modern low voltage electronics tends to use signalling levels of 0-5Vdc, or 0-3.3Vdc. Be sure you know what voltage levels your radio expects before connecting anything. **RS-232 voltage levels can damage your radio if it is expecting to see a max of 3.3Vdc or 5Vdc**. Older radios with built-in TNCs or those otherwise designed to connect directly to a computer use RS-232 voltages. However these radios are becoming more and more rare. Most modern radios have a low voltage port connected directly to the radio's microcontroller for cloning and memory programming. Research "voltage level converters" for how to convert between the different types of signalling.

USB Serial cables that provide RS-232 ports usually include both a USB to low-voltage serial chip and a level converter. However, bare USB to serial adapters are available that provide 0-5Vdc or 0-3.3Vdc signalling from a number of companies targeted at microcontroller programmming and other do-it-yourself hobby/electronics activities. Building a USB programming cable for your radio can be as easy as selecting the appropriate USB adapter with the right voltage for your radio and soldering on the proper cable.

There is quite a bit of information available on building cables for most radios on the internet. Instructions with schematics can often be found in the mailing lists, Yahoo, Google (or other) Group, forums that are specifically for the users of each radio. Some of the plans have been linked below in the radio specific section.

Radio Specific Information

Alinco Radios

All (to my knowledge) Alinco radios use a three-pin 1/8" plug with a TTL converter in the 9-pin housing. This is identical to the Icom OPC-478 cable.

Baofeng

UV-3R

The UV-3R uses a Prolific USB-to-serial chip, but users report that in Windows, you must use drivers from http://409shop.com. It works out of the box on Linux.

The PLUS model of the UV-3R uses a Kenwood/Wouxun cable (same as the UV-5R) instead of the original single plug cable used by the UV-3R and UV-3R Mark II. All models (thus far) of the UV-3R use the same software.

Build your own cable:

- Miklor Site's Baofeng DIY

UV-4X

The UV-4X is a rebadged UV-3R Mark II and uses the single connector cable. The radios themselves are made by Vero Telecom

UV-5R

The UV-5R is made by TYT, uses a Kenwood/Wouxun cable, and does not use the same protocol as the UV-3R models.

Build your own cable:

- Miklor Site's Baofeng DIY

Icom Radios

Instructions for building your own OPC-478 / OPC-552 / CI-V cables can be found here: http://highfields-arc.co.uk/constructors/other/opc478.htm Circuits are shown for both an RS-232 version with a level-converter as well as a USB version using an inexpensive USB module.

VHF/UHF Mobiles

Nearly all of these radios use an OPC-478 (or similar) cable, which plugs into the speaker jack of the radio. The housing of the 9-pin connector has TTL conversion logic, which can be home-built but it is typically easier to buy one pre-made. Note that some of the mobile D-STAR radios can also use their data connection for programming, which uses RS-232 signalling and requires no conversion hardware. Models that can do this include the IC-2820H, ID-880H, and ID-80.

IC-91AD, IC-92AD, ID-1

These radios operate in "live" mode and require a full-duplex RS-232 serial cable connection. For the IC-91AD, the OPC-1529 cable is used (and can be easily built).

The 92AD uses a moisture-proof custom bayonet connection at the top of the radio, which is only available from Icom (OPC-1799) and only with their RS-92 programming software. Note that the OPC-1797 adapter cable will not allow you to use an OPC-478 programming cable with this radio.

The ID-1 is programmed via its integrated USB connection.

IC-Q7A

For some reason, this radio doesn't use the standard three-conductor plug on the OPC-478. The cable for the Yaesu VX-7 actually works perfectly though.

Kenwood Radios

TH-F6A, TH-K2A

These radios use a two-pronged cable that plugs into the microphone and speaker jacks simultaneously. Note: many Chinese radios such as the Wouxun, and Baofeng UV-5R use the same two prong cable as these Kenwoods.

3rd party USB cables:

- Valley Enterprises FTDI-based Cable

Build your own cables:

- Miklor Site's Baofeng DIY (The UV-5R cable will work for these Kenwood)

TH-D7, TH-D7A, TH-D7Ag

These radios use a three-pin 3/32" plug directly wired to an RS-232 port (easily home-built).

TM-D700

This radio uses a regular serial cable (Female-Female) to the 9-pin connector on the front of the radio.

TM-D710, TM-V71A

This radio uses a RS-232 cable (officially, PG-5G) directly cabled to a eight-pin Mini-DIN connector marked "PC" on the back of the radio. No level converter is required, so this can be easily home-made with the right connectors.

Yaesu Radios

Check the following recommended vendors for cables:

- Valley Enterprises
- KAWA Mall - (note that recent reports from users show some cables from here might have counterfeit prolific chip. You will want to ensure you are using a compatible driver in this case.)

Note: A number of ham radio dealers sell the RT System's software and alongside the radios. This gives the false impression that the software and cable are from Yaesu rather than a 3rd party which is a bit misleading. Some RT System's cables such **will NOT work with CHiRP under**

Windows or Mac OS without some additional driver or chip configuration. See FTDI OEM Cables. Therefore, RT System's cables aren't recommend for use with CHiRP.

VX-2R, VX-3R, VX-5R, VX-6R, VX-7R, FT-60R

These handhelds use the same type of cable, which is a four-pin TRRS connector and a TTL voltage converter in the 9-pin housing.

3rd party cables:

- Valley Enterprises FTDI Based Cable
- KAWA Mall : Works for VX-2,3,5,6,7R, ICOM IC-Q7A
- 409shop : 2-in-1 cable for these handhelds and FT-7/8xxx mobiles

VX-8R, VX-8DR

The VX-8R and VX-8DR both use a moisture-proof multi-pin screw-on connector at the top of the housing. It is recommended that you find a third-party programming cable for this radio. This radio expects 3.3Vdc signalling. Using a 5Vdc adapter could possibly damage the radio. Note the VX-8G radio with the built-in GPS, uses an entirely different serial connection, see below

3rd party cables:

- VX-8R/DR from Valley Enterprises
- NOTE: RT System's cable **will NOT work with CHiRP under Windows or Mac OS** without some additional driver or chip configuration. See FTDI OEM Cables.

Build your own:

- VK4GOL's instructions. Uses FTDI modules to build a serial cable.
- VX-8 Connectors: RT Systems sells a DIY cable with the correct proprietary end for the VX-8 without the USB serial adapter for a very reasonable price. Note: it is not waterproof or moisture resistant, like

VX-8GR

The VX-8GR uses a three-conductor 3/32" plug directly to an RS-232 port. This is the same cable that Kenwood APRS radios use for the GPS connection, and almost the same as the Icom OPC-1529 type data cable, except that a null modem adapter must be used to switch the TX and RX pins.

3rd party cables:

- VX-8GR from Valley Enterprises

FT-7800, FT-7900, FT-8800, FT-8900

These radios use a 6-pin mini-DIN plug and a TTL converter in the 9-pin housing.

3rd party cables:

- Valley Enterprises

Wouxun Radios

The KG-UVD1P and KG-UV2D, KG-UV3D, KG-UV6D radios use the same cable as the Kenwood TH-F6A and TH-K2A listed above. The connection consists of a 3.5 mm and a 2.5 mm 3-conductor phone plug (TRS). It is a 5 Volt (TTL) serial interface, with Ground and TXD (fKrom Radio) on the sleeve and ring of the 2.5mm connector. RXD (to radio)is on the sleeve of the 3.5 mm plug.

3rd party USB cables:

- Valley Enterprises FTDI-based Cable

Build your own:

- Miklor Site's Baofeng DIY (The Wouxun uses the same cable as the Baofeng UV-5R)