

Kenwood TM-V71 Connection to RigPi

Jay McClellan K8DC

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These instructions are based on my experience connecting a TM-V71 to the RigPi. I have successfully used it for voice communication with the RigPi web interface, and also for sending and receiving digital data. The connections and settings should be very similar for other Kenwood mobile radios such as the TM-D710, and indeed for other manufacturers' mobile radios also. The main difference with other rigs would be the radio menu settings, for which you'd have to check the documentation.

These instructions are based on version 1.05 of the RigPi Station Server software.

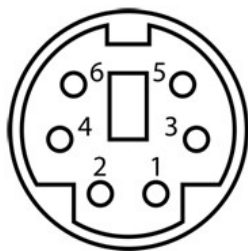
CAT Serial Connection

For rig control I used a USB dongle from RT Systems, which came bundled with their rig programming software. Any serial dongle compatible with the TM-V71 should work. It plugs into a USB port on the RigPi and into the 8-pin 'PC' connector on the back of the radio.

Audio Connections

The audio and PTT connections are through the 6-pin 'Data' connector on the back of the radio. The radio's instruction manual refers to this connector for packet communication and it works for that, but it also works fine for other digital modes and voice communication if you set it up according to these instructions.

Here is a diagram of this connector when looking at the back of the radio, and it will be a mirror image of this when looking at the cable connector:



1. TX Audio
2. GND
3. PTT (radio transmits when this is connected to GND)
4. RX Audio 9600 bps (full bandwidth)
5. RX Audio 1200 bps (reduced bandwidth)
6. Squelch output

Only pins 1-4 will be used. There is also a grounded shield conductor tied to the shield of the DIN connector, and this should be connected only at that end i.e. do not connect the shield to anything at the far end of the cable. You could try to extend the shield into the two plugs described below but I just kept the wires beyond the shield as short as practical (a few inches) and it seems to work fine.

I happened to have an unused Yaesu communication cable which uses the same DIN connector, so I used that. Most any 6-pin mini-DIN cable should work so long as it is shielded, as most are. On the free end of the cable you need to attach two 1/8" (3.5 mm) plugs, one for transmit audio and PTT and the other for receive audio. The transmit connector needs to be a stereo plug, and the receive needs only a mono plug but a stereo one will work if you just ignore the ring connector. These plug into the TX OUT and RX IN connectors on the RigPi and are connected to the cable as follows:

TX OUT

Sleeve: Pin 2, GND

Ring: Pin 3, PTT

Tip: Pin 1, TX Audio

RX IN

Sleeve: Pin 2, GND

Tip: Pin 4, RX Audio 9600 bps

TM-V71 Menu Settings

The menus on the radio are accessed by pressing 'F' followed by pressing the tuning knob in the lower left. Rotate the tuning knob to select the desired menu item, then press it to edit the item. Rotate the knob to change the value and then press it again to accept the value. Press 'F' when finished to return to normal radio mode.

517 DATBND: A

This selects which band is tied to the 'Data' connector on the back of the radio. The 'A' band is what appears on the left side of the radio in normal operation, and the 'B' band appears on the right. You will only hear what is received on the selected band when using the Data connector. Alternatively you could connect a speaker output to the RigPi RX IN and hear both bands but you will only be able to transmit on one of them that is selected with this menu. It's possible to have it receive on one band and transmit on the other, but the simplest option here is to just select band A.

518 DATSPD: 9600

This is VERY important, and doesn't do what it looks like. It sets the input level of the TX Audio connector to 2 V p-p, which is suitable for the audio output of the RigPi. If you set this to 1200 (which is the default setting) then the input level is only 40 mV p-p, so the RigPi will overdrive the input unless its output volume is turned almost all the way down and then the transmitted audio will be extremely noisy. This has nothing to do with the actual baud rate you can use for packet communication; it is only setting the audio input level.

519 PCSPD: 57600

This is the baud rate of the radio's serial port. The default is 9600 but I used 57600 which is the highest rate available. There is no reason to use a slower speed unless communication is error-prone, which is unlikely unless there is a cabling problem of some kind.

RigPi Software Settings

Configure the RigPi software using the web interface under Settings → Advanced Radio Settings. After setting these items as specified, press the “upload” button at the top to save them.

Select ‘Kenwood’ as the manufacturer, and ‘TM-D710 (G)’ as the radio type. This radio uses the same command set as the TM-V71.

Set the ‘R Port’ to the serial port assigned to the dongle such as `/dev/TTYUSB0`. Set the Baud to the same baud rate that you set in the radio (e.g. 57600). The remaining serial port settings can be left at ‘default’. Set ‘PTT’ to be ‘ON when transmitting’. As I discovered the hard way, this has no effect unless you also set ‘Keyer’ to ‘RigPi Keyer’.

At this point you should be able to switch to the Tuner page and press the Connect button to connect to the radio. If it doesn’t connect, try restarting the radio and failing that, restart the RigPi. If it still won’t connect, double check that you have the same baud rate set in the radio and the RigPi menus.

When I was having connection problems I used a serial terminal program called PuTTY (which you can install on the RigPi using the Preferences → Add / Remove Software menu) to connect directly to the serial port at the 57600 baud rate. If you type ID and press return, the radio should respond with its model number. That confirms that serial communication is working. Make sure to close PuTTY before trying to connect with the RigPi web interface.

Audio Operation

If you have connected a Mumble client to the RigPi as documented elsewhere, you should be able to hear received audio from the radio. The audio from the Data port is not affected by the volume and squelch controls on the front panel, so you will hear static when nothing else is being received. Alternatively if you connected the radio’s speaker output to the RigPi then it is affected by those controls and you may need to adjust the volume level to get an acceptable audio signal.

Audio should be transmitted from the Mumble client when you press the PTT button. I used a handheld transceiver to monitor what was being transmitted. If the sound quality is very bad, double-check that you have menu setting 518 DATSPD set to 9600.

VFO Tuning

You can put the radio into VFO mode by pressing the VFO button on the front of the radio. I found that if I press this while the RigPi web interface is connected, the CAT communication starts switching it back and forth repeatedly. The same happened when I tried to program macro buttons to switch between VFO and memory modes. Hopefully this problem will be solved, but until then you have to select either VFO or memory mode before connecting RigPi to the radio.

As of software version 1.05, the RigPi web interface is geared toward HF rigs and most of it is not usable with a VHF/UHF radio i.e. the all HF band selection buttons do nothing. Tuning the radio is a bit dicey because it tunes in steps of 5 kHz or 25 kHz (these can be changed via radio menus). If you try to tune it

up by 1 kHz for example, it jumps right back to the previous frequency because it's rounding to the nearest 5 or 25 kHz. So it's best to click on the 10 kHz or 100 kHz digit in the RigPi interface to tune approximately to the desired frequency, and then use macro buttons to tune it UP/DOWN by the step size.

To program macro buttons for UP/DOWN tuning, set them in the Settings → Macros menu as follows:

```
TUNE-      *G DOWN
TUNE+      *G UP
```

You can use whatever captions you like, and the *G commands tell the hamlib module to tune the radio down or up just like pressing the DWN / UP buttons on the microphone.

Memory Tuning

You can put the radio into memory recall mode by pressing the MR button on the front of the radio (as noted above, before connecting RigPi web interface). The up/down tuning macros shown above also work in memory mode to switch between memory channels. You won't see the memory channel name or number on the RigPi interface but it will display the frequency as the channel is changed. Perhaps this can also be improved in the future but as of software version 1.05 you can only see the frequency so it's helpful to have a printout of the channel frequencies when tuning in this mode.