

TS590G interface to SDR

Adding a Pan Adaptor using your computer and a Software Defined Radio, can be dead easy on some radios, with others requiring modifications to the radio, something that can be easy to do or the opposite.

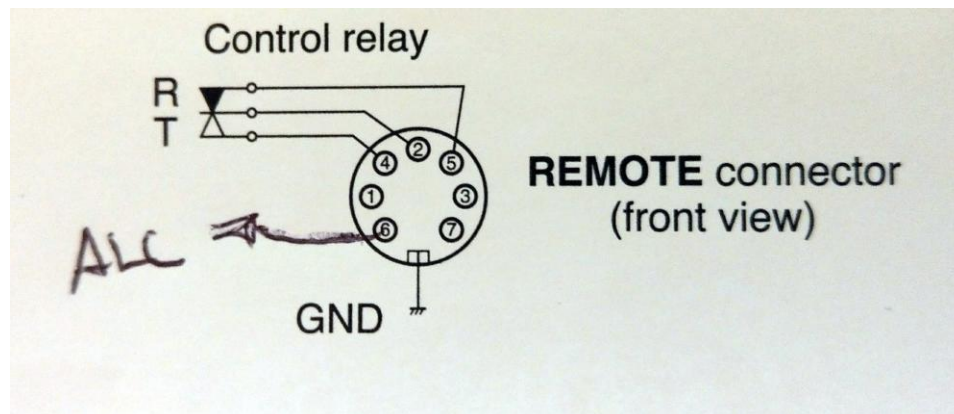
The Kenwood TS590S unlike the newer TS590SG does not easily lend itself to connecting a Software Defined Radio. There are modifications that involve fitting a cable to the internals of the radio, providing the RF signal to reach the Software Defined Radio. The idea in this case is that the RX/TX switching is taken care of by the radio.

If you are like me, you tend to not modify a radio for the many negatives in doing so. Searching the net revealed several solutions. The only one I liked was to use an external box that uses RF sensing to protect the Software Defined Radio device.

The purpose is to limit the amount of RF reaching the Software Defined Radio, when in TX mode, the problem with RF sensing is that it's a bit like closing the gate after the horse has bolted. This requires all sorts of techniques to limit the TX RF reaching the device when the RX to TX transition takes place, this is a real problem with digital modes or even CW, the required delay will vary.

The TS590G has a port that allows to connect a linear amp, with this the radio controls when the RF is generated, allowing for all electromechanical switching to take place. This delay is also defined for the kind of mode the TX will be in, (CW, FSK, AM, FM, SSB). So using the switching signal from this made sense, it took care of the many issues to do with delays.

The TS590S Remote Connector provides SPDT switch, this is controlled by the radios CPU and all the required timing.

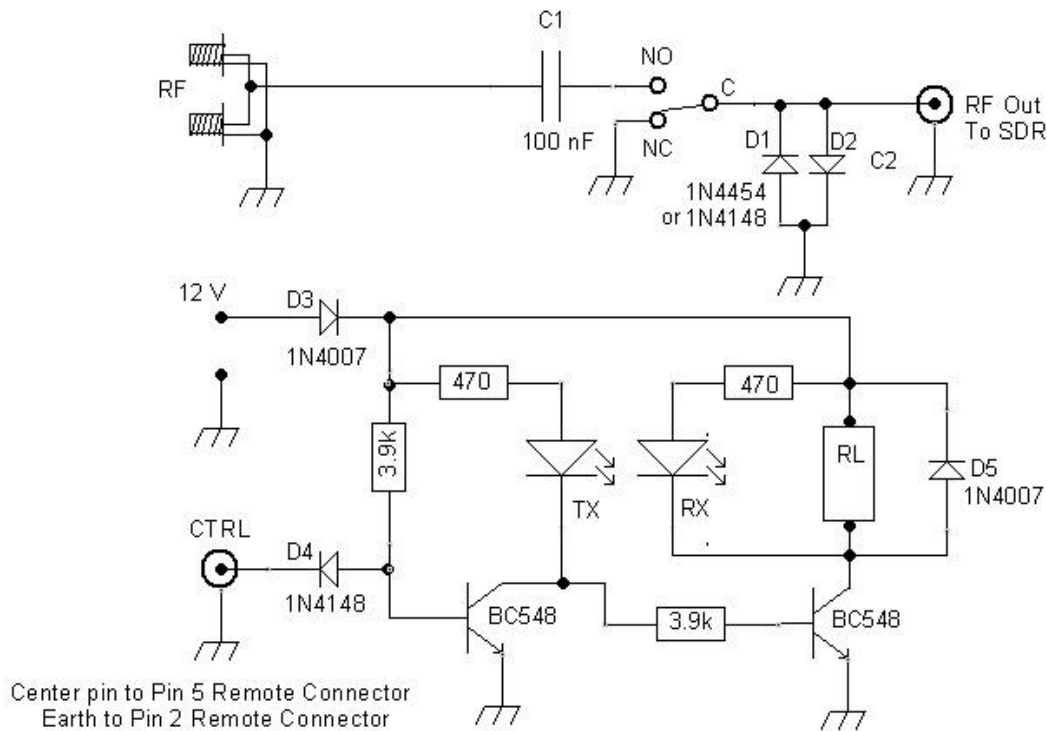


Pin 2 and 5 are closed during RX mode

Pin 2 and 4 are closed during TX mode

The above connector can be used for both the control of a linear amp and the Software Defined Radio antenna switching.

With the Software Defined Radio, the antenna input to the device must be switched in such a manner, to limit the RF to a safe level, when the TX is on. The best protection is to apply a short at the device antenna when the TX is on.



The use of a miniature relay serves this purpose, the same job could be done using other devices like FET and the like or even 1/4 Wave switches using PIN diodes. The idea was to keep this simple and use what features the radio provided as far as timing.

The above circuit does the job, with some built in safety features. If the Control signal or the supply 12 Volt is missing, the circuit will ground the Software Defined Radio antenna input.

C1 provides the coupling from the radio antenna system; the idea is to observe on the pan scope what the radio is listening to. C1 should be kept as small as possible, reducing any loading, providing just enough coupling to the Software Defined Radio; all will depend on the available gain of the Software Defined Radio you are using.

D1, D2 Act as an RF clamp, limiting the energy to the Software Defined Radio, should any stray coupled RF reach the Software Defined Radio during the RX to TX transition. PIN diodes should be used here but a general purpose diode can be substituted, I have given both types, the 1N4454 is the PIN diode.

Note that in some better quality Software Defined Radios, this kind of protection is included; in this case the protection diodes can be excluded.
The other consideration, is that under very strong signals these two diodes can create products due to their rectifier action, in practice this is unlikely, just be aware, should you observe some strange signals on the Pan Adaptor.

D3, is the reverse polarity protection.

D4, act as an isolation diode should the control port from the Kenwood is used to switch some other equipment, only when this is at ground potential.

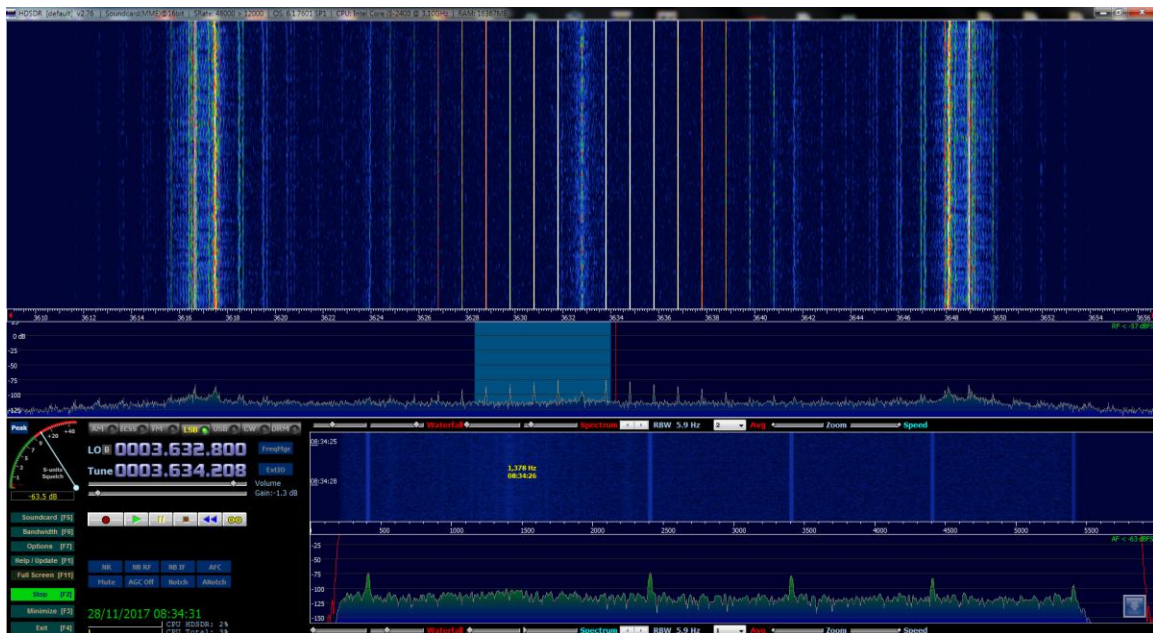
Q1 and Q2 follow the dc control and when CTRL is at ground potential, Q2 will be conducting, the relay will be energized, the system antenna will be connected to the Software Defined Radio.

Should the CTRL or 12 Volt be missing the unit will default to grounding the Software Defined Radio antenna input.

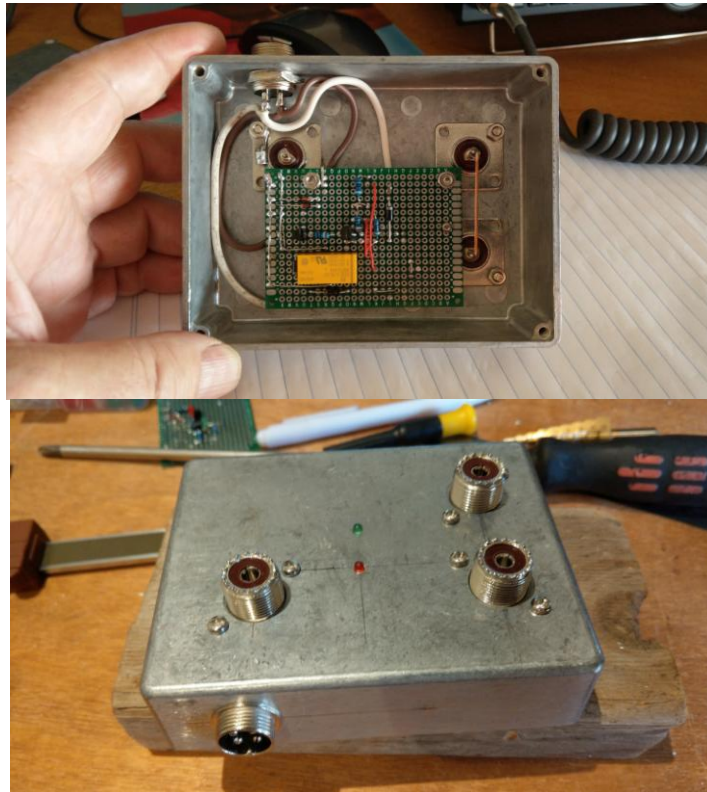
The RX LED and its associated 470 Ohm resistor can be replaced with a 5.6 K Ohm resistor, having only the TX led operational.

Both LED's can be omitted, only there to show that the interface is working.

There are many software packages that integrate the TS590S and a Software Defined Radio, further providing CAT control of the radio.
I have selected HSDR that in conjunction with a program called Omni Rig provides full control of the radio using CAT.



Concluding, what I have provided here is a cheap simple addition to the Kenwood TS 590S, this will also work on a TS590SG however the later with the proper selection in the menu system can be done by plugging the Software Defined Radio into the DRV socket.



73's de VK2YMU