Affordable Protection for your RSP – MFJ-1708

One of the issues commonly faced by hams is how to protect sensitive receivers in the vicinity of radio transmitters. One popular solution for those who wish to build a pan adapter or just want to protect their RSP which is operated nearby a rig is the MFJ-1708. The MFJ-1708 is a T/R (Transmit/Receive) switch which can isolate the RSP while the transmitter is being keyed.

Out of the box the MFJ-1708 is configured with the rig connected to the TX jack and the RSP connected to the RX jack, with a shared antenna connected to the Antenna port. In receive mode the antenna is connected the RX port for listening on the RSP. When the transmitter is keyed a PTT signal or a built-in RF sense circuit switches over a relay to connect the TX port to the antenna and ground the input to the RSP*.

** For this reason the Bias-T circuit should be turned off (RSP1a, RSP2 Ant B)*

Unfortunately, as configured above there is one drawback for many users. The receive channel is now only via the RSP and SDR software, which is delayed in real time due to the signal processing. It also means that without the receive channel of the rig being available your headsets will need to be rewired to hear audio from the PC. To overcome this limitation some users have modified their MFJ-1708 to create a permanent connection from the TX jack to the Antenna jack. In this fashion the rig's received audio can still be heard. However users should be aware of two factors when using this modification:

1. In receive mode the rig and the RSP are now effectively connected together in a T configuration. Assuming 50 Ohms input impedance for each, the antenna is now being loaded by two parallel inputs, i.e. 25 Ohms. (Inevitably this also means the received power will be 3dB down since it is now shared between two receivers)

2. By connecting the RSP input and the rig input together it is crucial that the relay switches quickly to prevent transmitted RF from the rig overloading the input of the RSP. For this reason we strongly recommend using the PTT Control input and not relying on the RF sense circuitry which has a small but finite response time.

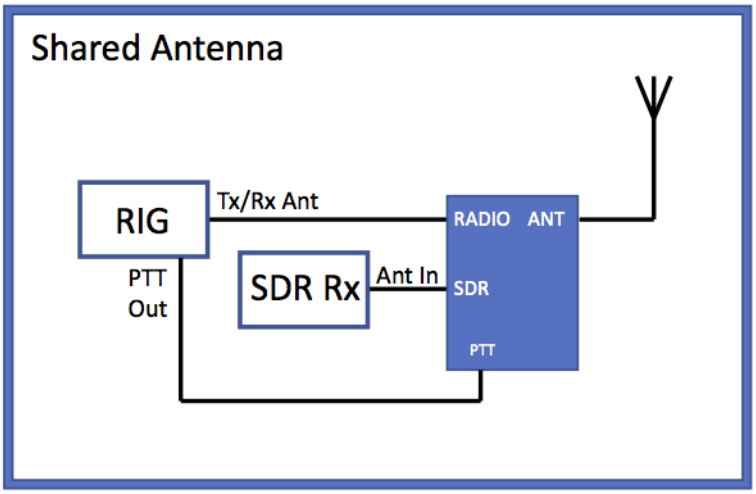
For users not wishing to perform this modification themselves the MFJ-1708SDR is now available which is already modified in this fashion:

Applications

Depending on the user's needs the MFJ-1708SDR can be used in different configurations:

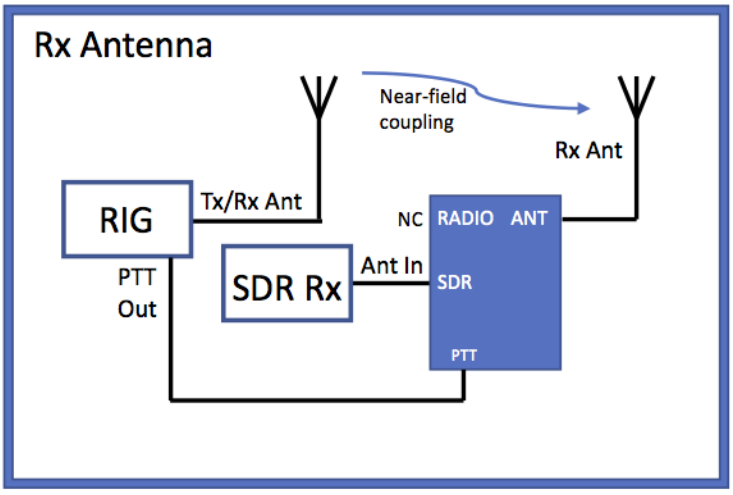
Shared Antenna

When the same antenna is shared between the rig and the RSP the device is connected as follows:



Separate Rx Antenna

If the RSP has a separate antenna from the rig but near-field coupling is a concern, the PTT signal can still be used to isolate the RSP when the rig is transmitting:



PTT connections

It should be clear that reliably isolating the RSP from transmitted signals is of great importance. For this reason the user should be sure that the PTT cable is connected at all times. Take care to ensure the cable has continuity and that it is connected to the correct jack on the rig, and that the rig is configured to enable this function.

Note: What we need to use is an output signal, not to be confused with a PTT input jack, which would normally be used with something like a footswitch to key the rig!

Examples:

Yaesu FTDX500
The “TX GND” jack, and its functionality must be enabled in Menu Item 173.

Kenwood TS-590
The “Remote” 7-pin DIN connector, between pins 2 and 4.

Icom 7300
The “SEND” jack.

Elecraft K3
The “KEY OUT” jack.

Be sure to check the Users Manual for your rig to identify the appropriate jack and any applicable configuration settings.