

INSTRUCTION MANUAL ULTRA-SHARP RECEIVING FILTERS FOR HF OPERATIONS

Introduction

The purpose of the ultra-sharp receiving filters is to **block out the strong signal from a station operating on a different part of the same band on which you are making contacts.** For example, they can help a CW operator at the bottom end of the 20meter band and a Phone operator at the higher end of the 20 meter band coexist so that neither station's receiver experiences desensing from the other transmitter.

CAUTION: These filters WILL NOT ALLOW TWO STATIONS TO OPERATE ON THE SAME ANTENNA ON THE SAME BAND. **That would be disastrous.** You cannot connect two stations to the same "port" of the antenna multiplexer! The two stations *must be operating on different antennas*, hopefully separated by 300+ feet and of differing polarity (horizontal versus vertical).

The isolation provided by these filter is NOT SUFFICIENT by itself to provide separation. An additional large amount of isolation must be provided by the distance between the two antennas used by the two stations.

However, in the case of two stations with widely separated antennas still needing additional isolation, these filters may make the situation quite successful, if the two stations are sufficiently far apart in frequency.

Conditions for Successful Usage
Stations on SEPARATE ANTENNAS
Significant Separation of Antennas (e.g. 50+ dB)
Stations using different modes (e.g. CW versus Voice, CW versus Digital)
Stations using receiver protection techniques such as "IP+" and NOT using preamplifier at least at first.

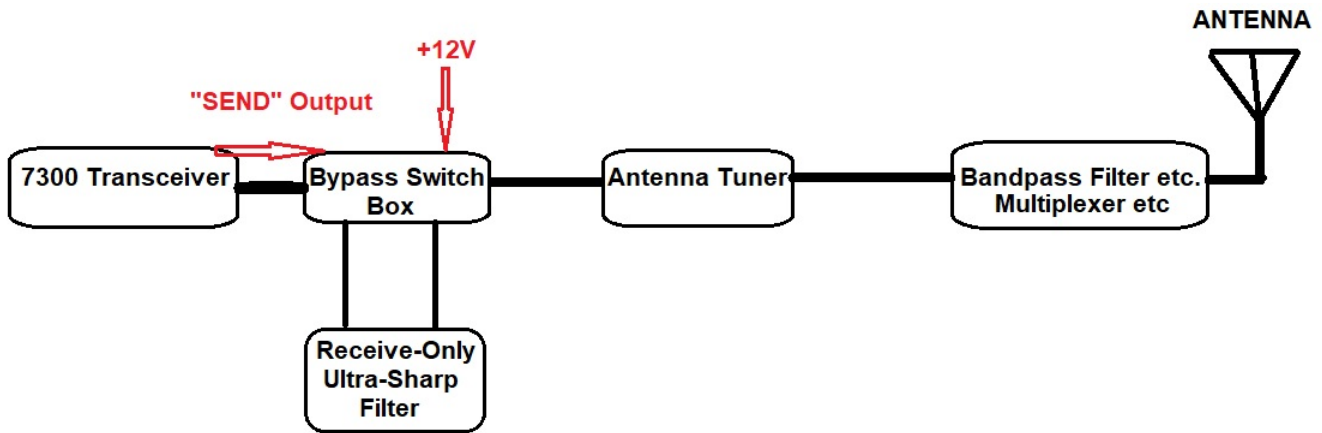
These filter ideas come from KA2C: <https://www.ka2c.com/wp-content/uploads/2021/01/Field-Day-Ultra-Sharp-RX-Filters.pdf>

RECEIVING filters (NOT for transmitting)

These filters are made with low-power components optimized for high Q (quality factor) to obtain very narrow frequency effects, and cannot handle transmitter output power. They are ONLY in the transmission line during RECEIVE. A separate "bypass switch box" is used to bypass the filter during TRANSMIT. This is done using the "SEND" output of the transceiver, which is more typically used to actuate a linear amplifier, but can be used to key the bypass switch box to bypass the receive-only filter.

The SEND output is typically a relay output that connects to ground during transmit. Typically it can switch currents in the range of 500mA at up to 15VDC or so. The bypass switch box imposes minimal load on this SEND output.

SIGNAL PATH



The receive-only ultra-sharp filters are optimized for 50-ohm systems. They can best be connected between the transceiver antenna output, and the antenna tuner (if used) input.

The bypass switch box provides this connection and will bypass the receive-only ultra-sharp filter during TRANSMIT and will route the incoming received signals through the filter during RECEIVE.

PHYSICAL APPEARANCE



In the photo above, the bypass switch box and VOICE receive only filter are to right of the 7300 station. You can see the two connections of the filter to the connections of the bypass switch box, which are plainly marked.

A second set, including another bypass switch box and CW receive-only filter, are displayed to the LEFT of the 7300 station, but are not connected to any transceiver. Notice that there are two different filters. BOTH are "notch" filters, but one cuts out lower frequencies while the other cuts out higher frequencies in the 20meter amateur radio band.

Filter Designation	Impact
VOICE filter	<ul style="list-style-type: none"> • PASSES VOICE • ATTENUATES FT8/FT4 • FURTHER ATTENUATES CW <p>This filter provides little loss to incoming 20 meter signals in the voice portion of the band. However, it significantly attenuates signals at the FT8/FT4 frequencies, and it even more attenuated signals in the lower CW portion of the band. It is possible to use this filter for either VOICE or FT8/FT4 operations. The extreme sensitivity of FT8/FT4 will tolerate the attenuation of the filter, and the filter may provide high single digit additional attenuation of CW signals.</p> <p>This filter is not designed to be user adjusted.</p>



CW filter

- Somewhat attenuates CW (13-17 dB) Preamp 1 adds about 4db gain and preamp 2 adds another 4dB if you need this back and can do so without OVF (overflow)
- Further attenuates FT8/FT4 (23dB)
- Really attenuates VOICE (30dB)

Although this filter does attenuate signals in the CW portion of the 20 meter band, it far more strongly attenuates FT8/FT4 and VOICE signals in those respective portions of the band. It is intended only to be used for the CW operator. It is tunable so that its characteristics can be modified as needed.

