144-MHz Stop-Band TVI Filters†

Got TVI from your vhf transmitter? A high-pass filter won't help. Use a stop-band filter to notch out the beast!

The use of band-reject filters at the TV receiver is an attractive solution in the case of interference from 70-, 144- and 432-MHz transmissions, where TV reception may be on frequencies higher *or lower* than that of the amateur transmitter.

Even a simple series-tuned resonant circuit across the TV feed line can help and may sometimes attenuate strong local signals by 30 to 45 dB. A rather more elegant stop-band design for reducing strong signals is the "bridged-T" filter, which when correctly adjusted can provide a tunable, sharp, symmetrical null, even within the frequency band used for TV reception. Band-rejection filters of high Q can also be made using single or double stubs fashioned from coaxial cable.

Jan Martin Noedling, LA8AK, points out, however, that the technique of using stop-band filters to cure TVI caused by 144-MHz transmissions still receives relatively little coverage in most of the handbooks. Recently he encountered a problem of severe TVI when working "aurora" with 100 watts of output power on cw. For such transmissions his beam antenna needed to be directed virtually straight at a house some 33 feet (10 meters) distant, where his signals blanketed the TV receiver and blocked reception.

The Norwegian radio and TV interference investigation team found his equipment to be reasonably good; an article in the Dutch *Electron* (no. 11, 1978) encouraged him to try the use of stop-band filters tuned to 144 MHz and installed in the neighbor's TV feed line. See Fig. 1. The filter is capable of providing 50 to 60 dB of attenuation over all or part of the 144-MHz band. The parallel resonant circuit (L2-C2) is tuned to the center of the required rejection band by squeezing, pulling or bending turns. The series-resonant circuits (L1-C1 and L3-C3) are trimmed for maximum attenuation at the upper and lower frequency limits. The filter was aligned using a test circuit incorporating a 3-dB pad (see Fig. 2), tuning the resonant circuits to the frequencies shown in Table 1. A stable generator should be used for alignment. The pad is needed to prevent "short-circuiting" the signal generator output, as this can cause false indications. This simple arrangement cured LA8AK's TVI problems completely. ham

†Adapted from an item of the same title in the column by Pat Hawker, G3VA, "Technical Topics," *Radio Communication* (RSGB), March 1979, p. 232.

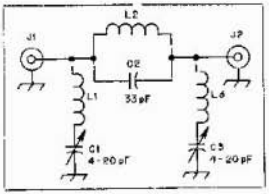

Fig. 1 — The 144-MHz stop-band filter. L1 and L3 are 10 turns of no. 16 AWG wire with a 3/16-inch inside diameter. L2 is two turns of no. 16 AWG wire with a 5/16-inch inside diameter. See text regarding length adjustment of inductors. C1 and C3 are trimmer capacitors. J1 and J2 are BNC jacks, soldered to the pc-board foil.

Table 1

Resonant Circuit Frequencies

These are frequencies to which the resonant circuits of the filter should be tuned, for maximum attenuation in different segments of the 2-meter band.

Circuit	144 to 144.5 MHz	144 to 146 MHz	146 to 148 MHz
L1-C1	144 MHz	144 MHz	146 MHz
L2-C2	144.25 MHz	145 MHz	147 MHz
L3-C3	144.5 MHz	146 MHz	148 MHz

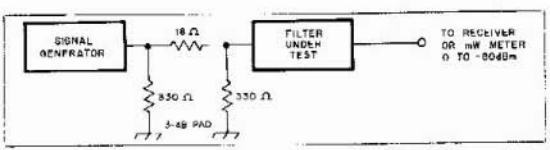

Fig. 2 — The recommended filter test circuit. See text.

Circuit-board etching pattern for the 144-MHz stop-band filter. Black represents copper. The pattern is shown at actual size from the foil side of the circuit board.

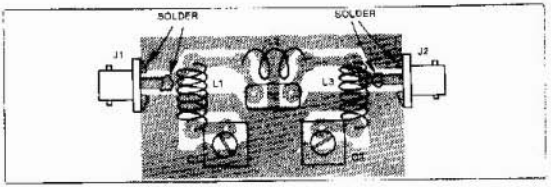

Fig. 3 — Parts-placement guide for the filter. The shaded area represents an X-ray view of the copper pattern. The two BNC connectors are each soldered to the board in three places as shown.