

VHF Filters for Experimenters

Since 2004, we have been developing roofing filter mods for some of the more popular radios. The listing of what we have available is on our web site. Some radios are easy to modify because they have a coax cable between the output of the first mixer and the input to the second mixer. Other radios have this circuitry all on one pc board, and they require some PC board surgery to add the modification. Now we are providing filters for people who want to create their own modifications or who want to experiment.

The following table lists the first IF for many of the better radios.

Reference	Frequency MHz	Radio	Main Rx	Sub Rx
#912	69.4500	FT-2000	X	
#908	48.6400	FT-1000D		X
#916	73.6200	FT-1000D	X	
#907	47.2100	FT-1000MP Series		X
#914	70.4550	FT-1000MP Series	X	
#904	45.7050	FT-847	X	
#910	68.9850	FT-920	X	
#906	47.0550	FT-980	X	
#909	64.4550	IC-746, IC-756PRO I, II, III	X	
#911	69.0115	IC-756, 765, 775	X	
#913	70.4515	IC-761	X	
#905	46.5115	IC-781	X	
#902	45.0000	Orion, Orion II		X
#915	73.0500	TS-450, 690, 850, 870, 950SDX	X	
#901	44.9300	TS-930	X	
#903	45.0500	TS-940	X	
#900	40.0550	TS-950SDX		X

These filters are the same type of filters used in our roofing filter mods.

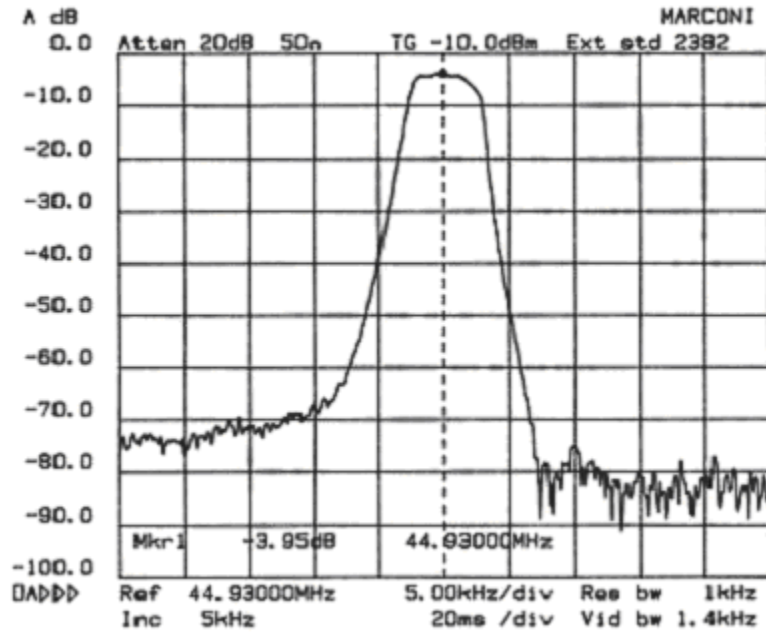
Wiring at VHF needs to be done with very short leads. In particular, the grounding of the filter case must have very low inductance to prevent "blowby", or poor isolation. At 73 MHz an inductance of 2 nano-Henries will insert 1 ohm in series with the filter. A wire less than ½ inch long has this much inductance. This can result in blowby which is only 34 dB down. Care should be taken that all of the signal and return current passes through the filter and its case. If a common ground is used between input and output, the filter isolation will be compromised when some of the signal return current flows through the ground plane. For example: a copper ground plane should be split to separate input and output signals. All of the Inrad roofing filter assemblies are designed this way.

If you are designing an experimental up conversion radio using one of these filters, it would be wise to select the second IF using the same frequency as the original radio. That is, select 9.0115 MHz for the second IF to go with 69.0115 MHz in the first IF, as in several of the Icom radios. This should minimize the spurious signals generated in the mixing process. Most up conversion radios use 455 kHz as the third IF.

Filter Specifications

Bandwidth:	4-5 kHz typical
Insertion loss:	5 dB typical
Case:	Shown below
Temperature range:	0 to 50 degrees C.
Input/Output match:	50 Ohms
Operating level:	0 dBm maximum
Isolation:	-60 dB typical

Typical Filter Characteristic



Filter Case Dimensions (mm)

