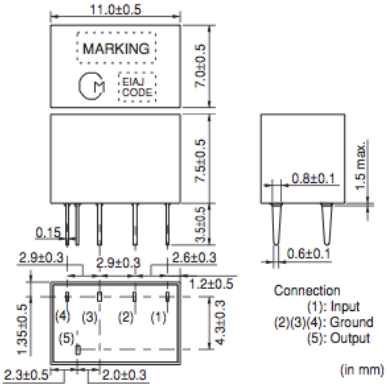
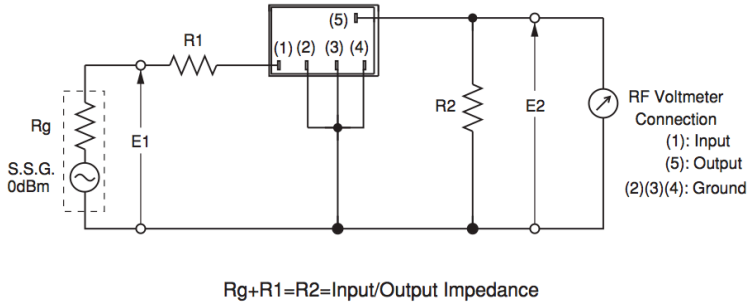
Murata CFWLA455KHFA-B0:

Part Number	Nominal Center Frequency (fn) (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Insertion Loss (dB)	Ripple (dB)	Input/Output Impedance (ohm)
CFWLA455KHFA-B0	455.0	fn±3.0 min.	fn±9.0 max. [within 50dB]	60 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	2.0 max. [within fn±2kHz]	2000

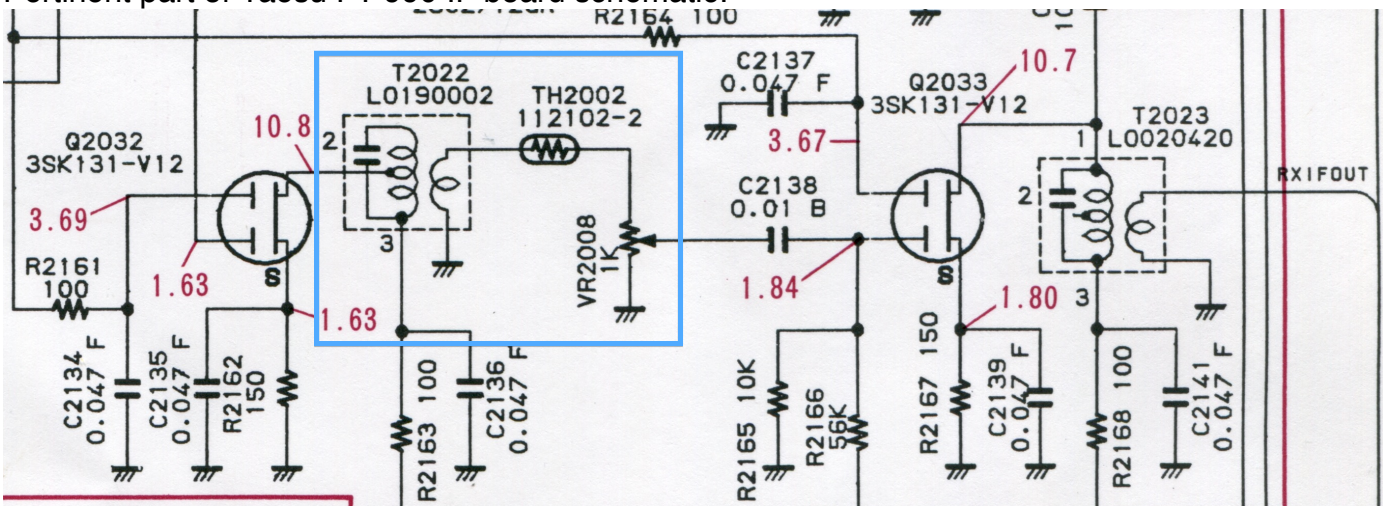




The FT-990 “hiss mod” basically removes thermistor TH2002 and inserts a 455 KHz, 6 KHz BW filter, such as the one above, in its place. The output of the filter is to have a 1k resistor in series, so that in combination with the existing pot, VR2008, it will be looking at a 2k ohm load. The input to the filter is said to need a 2k resistor to ground in order that it see a 2k impedance source... HOWEVER, I contend that this resistor would be in parallel with the output impedance of T2022. T2022 output link is likely a fairly low impedance as it was to drive the load of TH2002 (~500 ohms*) in series with VR2008 (1k ohm). * measured at room temp

If the output link of T2022 represents a impedance that is 2k or less then the input of the 455 KHz filter is going to see 1k ohm or less driving it. My worry is that this differs significantly from the required 2k impedance that the filter expects; enough to cause it to behave measurably less than ideal.

Pertinent part of Yaesu FT-990 IF board schematic:



I apologize in advance if everyone thinks that the "hiss mod" has been talked to death. I'm finally ready to do the mod and have some thoughts that I'd like vetted out. My opinion is that there is one slight flaw that might compromise performance.

After acquiring some well spec'ed Murata 6KHz BW, 6 Pole, 455 KHz filters from Mouser, I started reviewing the "hiss mod" instructions. The mod basically entails inserting the filter between the output of a IF transformer (T2002) and one of the inputs to a dual-gate FET (Q2033).

Before modification, the **factory** setup is such that the IF transformer's output is carried through a thermistor (TH2002; ~500 ohms) and then through a 1k trimpot (VR2008) to ground. The wiper of the pot is capacitor coupled to drive the dual-gate FET of the next stage with the pot allowing adjustment of the drive level of that transistor.

To facilitate the hiss mod, thermistor TH2002 is removed and the new 455 KHz filter is basically inserted in it's place. The Murata filter specs are that it should have a impedance driving it of 2k ohms and the output should be looking into a load of 2k ohms.

After modification of the circuit, the new filter will see a 2k load by adding a 1k resistor in series with the 1k trimpot. That is what the "hiss mod" describes and I am in agreement that 1k ohm in series with 1k ohm is 2k ohms of load termination (ignoring some very negligible loading from the next stage). The part that I have a problem with has to do with the impedance shown to the input of the new filter:

The mod has us putting a 2k ohm resistor from the input of the 455 KHz filter to ground. I believe that it is explained that this will provide the proper input impedance to this filter (2k ohms). However, it seems to me that one is really putting a 2k resistor in parallel with the output coupling link of the IF transformer that is providing the drive to it

(T2002). And since that transformer was previously driving approximately 1.5 kohms of load, it was probably designed to have a impedance comparable or lower than this. If so, in essence, then we are presenting an impedance of less than 1k ohm to the input of the new filter (2k ohm in parallel with <2k ohm).

I am not suggesting that the modification doesn't work. I know that it does from what others who have done it reported back (thanks to those folks). My thought is just that the filter response is compromised when you start deviating from what the filter is supposed to see driving it. If it was acceptable to the filter makers then they would have given a impedance range but we know that this isn't the case.

Sanity check anyone? My thought is that we may need a bit of series resistance from the IF transformer output to the new 455 KHz filter input, perhaps as low as zero ohms but possibly as much or more than 1.5 kohm.

My hope is to do the mod and report back. The Mouser part number for the filter that I spent time selecting is 81-CFWLA455KHFA-B0 ($3.59/ea.). That and a couple resistors, a little time, and a hot soldering iron, and gumption may be all that is required. Well, that and a consensus on the right way to treat the filter's input impedance. Thoughts?

Thanks in advance and apologies to those who have heard too much ;-) I'll try to post a PDF** with some diagrams, etc. so that it isn't just my descriptions and hand gestures being considered.

73, Paul NT7U

** this is that PDF