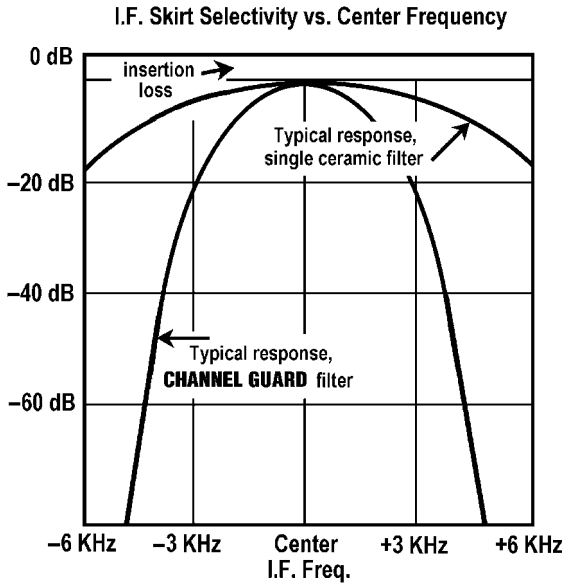
INSTALLATION INSTRUCTIONS
455 KHz *CHANNEL GUARD* IF INTERFERENCE FILTER

The ***CHANNEL GUARD*** filter is a very effective device to knock out one of CB's biggest problems: splash, splatter, or "bleedover" from other channels. It's a unique replacement filter designed to be soldered into the same three mounting holes as the radio's original 455 KHz ceramic filter, and then connected to a 12 volt DC power source.

By placing three high-Q ceramic filter elements in series on a small PC board, the selectivity "skirt" of the IF response curve is greatly narrowed, as illustrated in Figure 1. The graph shows a typical single filter element (top line) vs. our triple-element narrow filter. A 10,000 µV test signal (modulated 30% @1000 Hz) is swept around the 455 KHz center IF frequency and the signal attenuation is measured.

The area between the two curves represents the increased rejection of unwanted signals that fall outside the IF passband. (The ones you *won't* hear!) The result: beyond about ±5 KHz from the 455 KHz center, the signal is barely detectable. And a tone-modulated test signal is much more powerful than one modulated with a human voice.

FIGURE 1

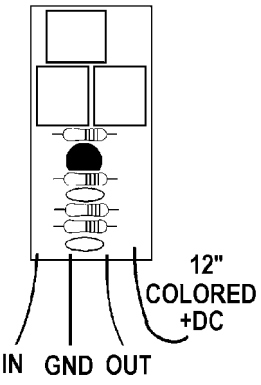


The use of three such filters can attenuate the RF signal substantially, as much as 6 dB per filter element. Therefore a single transistor amplifier stage is included to compensate for this signal reduction. The result is a filter with zero gain and zero loss, but vastly improved selectivity. There's no loss in RX sensitivity. In addition, we use an even sharper ceramic element of ±2 KHz, rather than the standard ±3 KHz element used in most CBs. This has no noticeable effect on the received audio quality of typical AM CB transmissions.

NOTE: The ***CHANNEL GUARD*** filter may be too sharp for FM reception, if the FM deviation exceeds ±2.5 KHz. If received signals appear to be breaking up, the other station may be overdeviating.

INSTALLATION

FIGURE 2



1. Remove the existing 455 KHz filter. This is easily recognized as a small black or gray plastic block, about 5/16" square on the radio's main PC board. It often says "Murata" on it. It usually has three leads: INPUT, GROUND, and OUTPUT. Unsolder the three leads using a solder sucker or solder wick.
2. Install the ***CHANNEL GUARD*** filter's three wires to match the same INPUT and OUTPUT holes from the removed filter. Ground the middle bare filter wire by soldering it to the nearest metal tuning can. See Figure 2.

NOTE: A few 455 KHz radio filters have four or five leads, not three. You'll generally find that more than one of them is a ground. There will always be only one INPUT and one OUTPUT hole on the radio's PC board.

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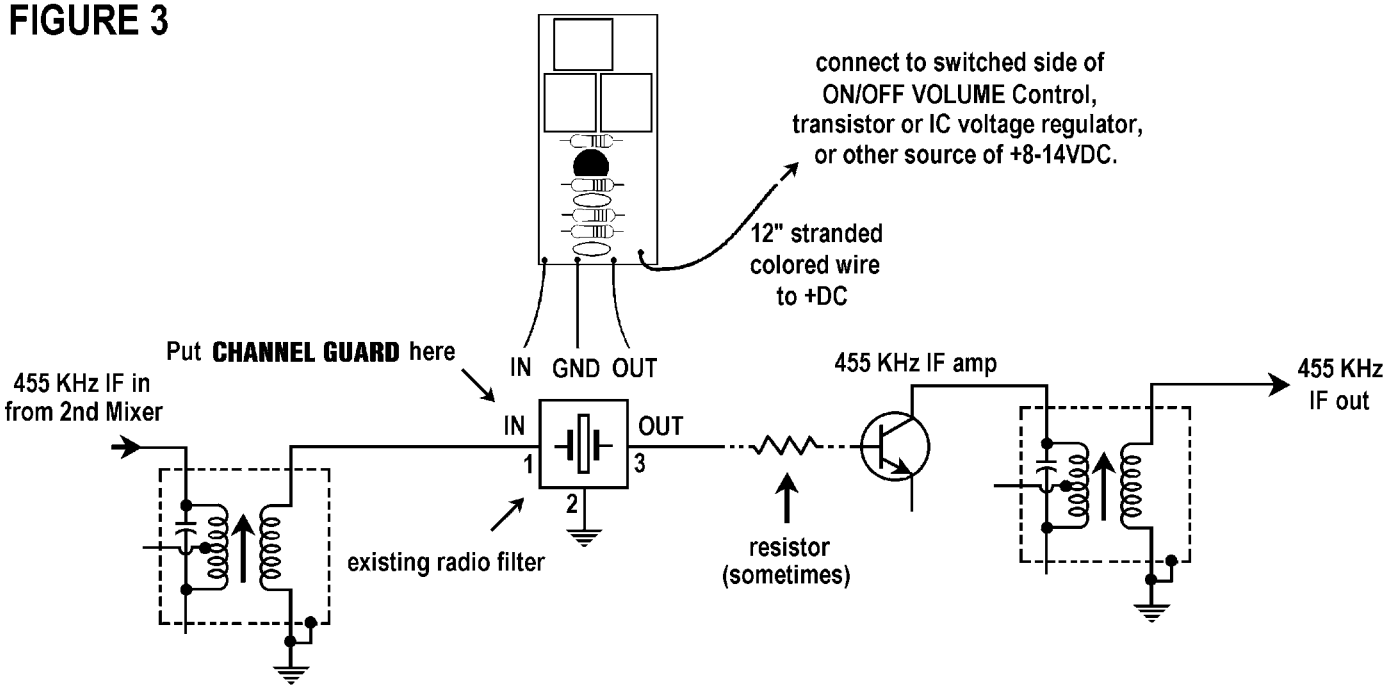
3. Often you can figure out the INPUT and OUTPUT holes without the radio's schematic. Figure 3 shows a typical 455 KHz IF amplifier stage. A metal IF transformer "can" connects to the base of the IF amplifier transistor, either directly or through a resistor. The existing ceramic filter is in series with this signal path. Follow the circuit foil traces to reveal which is INPUT and which is OUTPUT. The GROUND is easy to spot because it's the largest foil on the PC board, and will run all over the chassis.

   The INPUT will always be the hole leading to the transformer can, and the OUTPUT will always be the hole leading to the base of the transistor, either directly or through a resistor.

FIGURE 3



4. Connect the 12" stranded colored wire to +8-13.8VDC. The easiest connection is directly to the switch lugs at the ON/OFF/VOLUME control on mobile or base rigs. Use the lug on the *switched* side, so the filter is only powered when the radio itself is turned on.

   CAUTION: Some very old tube-type base radios switch 115 VAC. *Never connect to such a switch or the Warranty will be voided!*

5. Avoid shorts by using the black plastic sleeving provided. Cut it into three equal lengths, and slip some over each bare ***CHANNEL GUARD*** wire for insulation.

6. Reversing the IN and OUT signal wires is the most common mistake people make. This is usually obvious because the RX sensitivity as indicated by your S-Meter or speaker volume will drop way down. Make *sure* you correctly followed the radio's foil traces to their 455 KHz signal connections: the ***CHANNEL GUARD*** INPUT wire goes to the first amp's output coil secondary, and the OUTPUT wire to the base side of the transistor IF amp stage that follows.

You are done!

PUTTING NEW LIFE INTO OLD CBs

Many of the early old "antique" CBs had no 455 KHz IF filtering at all. These can benefit greatly by adding a ***CHANNEL GUARD***. You can often do it by cutting the PC foil trace that connects one of the 455 KHz IF transformer secondaries to the IF Amp transistor (or tube) stage that follows it. See Figure 4. *Make sure* this trace isn't used to power the transistor base (or tube grid) via the transformer secondary; otherwise you'll kill the amp stage! In the case of tube rigs, check the schematic to make sure there's no high voltage present at the installation point; otherwise you'll have to add a DC blocking capacitor in series with the IN or OUT (or both) filter leads as necessary. Install the ***CHANNEL GUARD*** in series, observing the correct IN/OUT path. There are usually two or three stages of 455 KHz amplification to choose from; put the filter between any of these stages.

Last, connect the 12" stranded wire to a +12VDC in the radio. For solid-state radios (including bases) use the switched ON/OFF VOLUME control lug again. On tube type rigs, there may be both low- and high-voltage DC sources, or high-voltage only. You can still connect our 12" stranded wire to a high-voltage +DC source if you use a series dropping resistor to get the required +12 volts DC. The ***CHANNEL GUARD*** draws about 3.5 mA. total current @12VDC. You can therefore use Ohm's Law to calculate the required series dropping resistor.

Example: Suppose the radio has (among others) a +250VDC power source. You need about +12V for the ***CHANNEL GUARD***, which means the voltage supply is [250 – 12] = 238V too much. To drop 238V, the series dropping resistor would be:

R = E ÷ I; R = [(250 — 12)] ÷ 0.0035 Amp = 68,000?

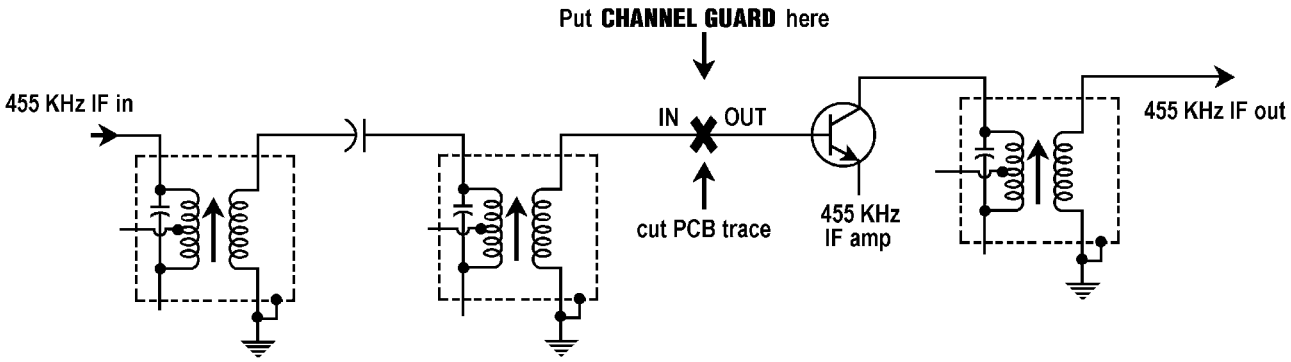
A standard 68K? could be used. The power consumption is:

P = E I; P = 238 x .0035 = 0.833 watts

A standard 1 Watt resistor can be used. If your calculation had resulted in some odd value instead of our nice round "68,000" you can always substitute the next standard value higher, in this case 75K? . Remember too if you don't have any 1W resistors, you can always parallel two or more ½W resistors of the right values together.

CAUTION—HIGH VOLTAGES ARE LETHAL! ***If you have the slightest doubts about installing the CHANNEL GUARD in a high-voltage, tube type transceiver, let a qualified technician do it.***

FIGURE 4



TECHNICAL SPECIFICATIONS (INDIVIDUAL FILTER ELEMENTS)
Selectivity: ?2 KHz @ –6dB; ?7.5 KHz @ –40dB ? Maximum insertion loss: 6dB
Input/Output impedance: 2K? ? Center Frequency: 455 KHz ?1 KHz

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