

# IC-781 Roofing Filter Relocation Results

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In October 2007 I bought and installed INRAD's just announced roofing filter for the IC-781. The filter works fine as a roofing filter but I did not like how it modified the radio's spectrum scope display. The filter significantly attenuated the amplitude of the displayed signals appearing beyond +/-5kHz each side of the center frequency. With the filter located *after* the scope pick-off point I would not expect this kind of response but there it was. After some investigation and testing I found a way to correct what I considered an unacceptable condition.

A clue to the solution was noticing when in Dual-Watch and the Balance control was turned to VFO-B the signals were restored to their appropriate amplitude on the display. (Remember the IC-781's Spectrum Scope only displays signal from VFO-A, not VFO-B.) By turning the Balance control from VFO-A to VFO-B the PIN diodes between the scope pick-off point and the filter were turning off essentially opening the circuit isolating the new roofing filter from the scope pick-off point. (Remember the roofing filter is installed in the out put of VFO-A only, has no effect on VFO-B signals.)

My conclusion was the filter needs to be buffered to isolate it from the scope's pick-off point. I moved the filter from the input of the buffer amplifier Q8 to its output. Signals were restored to their appropriate levels on the spectrum scope.

## **Testing – Proof:**

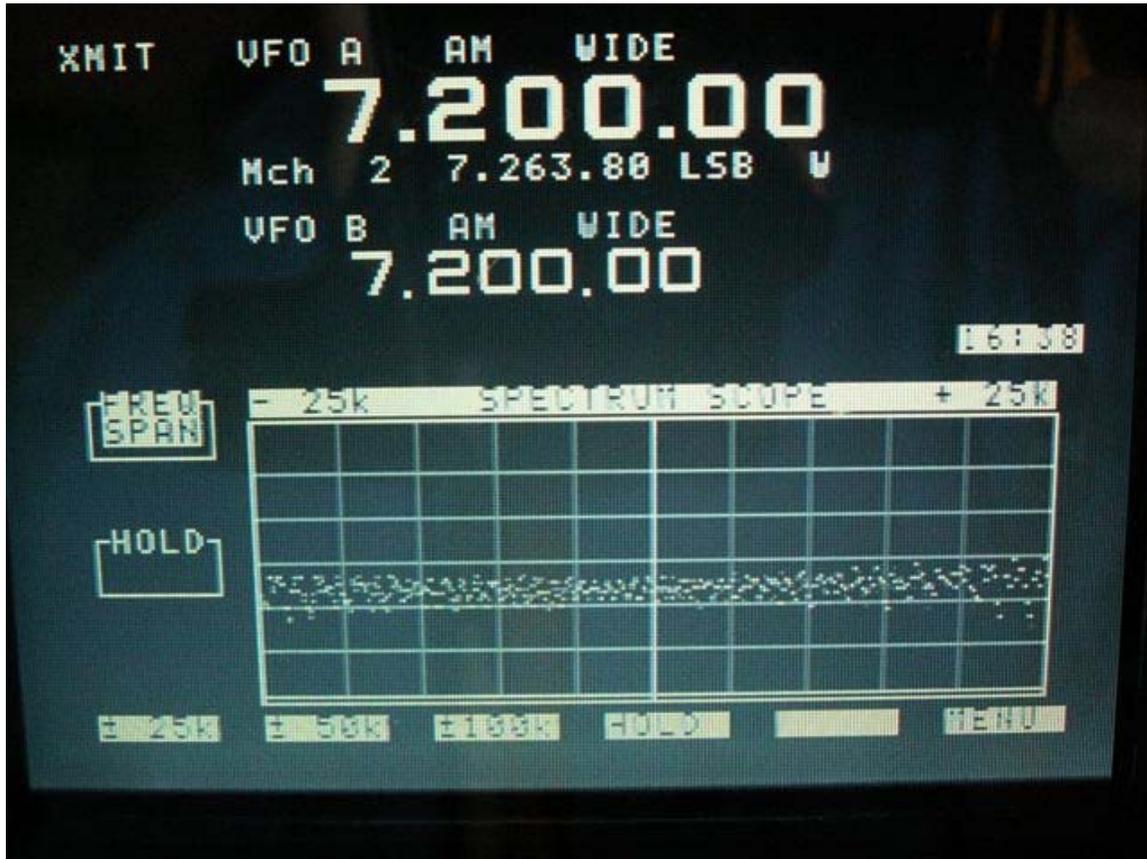
Using an HP8640B signal generator I injected a signal into the antenna connector. The signal was modulated with a 1kHz tone in FM mode I was able to produce a wide enough signal to illustrate the spectrum scope response across the span in this case 50kHz, 25kHz each side of center frequency.

## **Below are pictures of the result on the Spectrum Scope:**

The first picture is without a filter showing essentially uniform amplitude of the HP8640B's FM signal. The second image is with the filter installed per INRAD's recommendation. Here you can see the attenuation of signals beginning 5kHz either side of the center frequency. The third image is the result when it was moved to the output of Q8 the buffer amplifier.

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Original IC-781 Spectrum Scope display with no roofing filter:



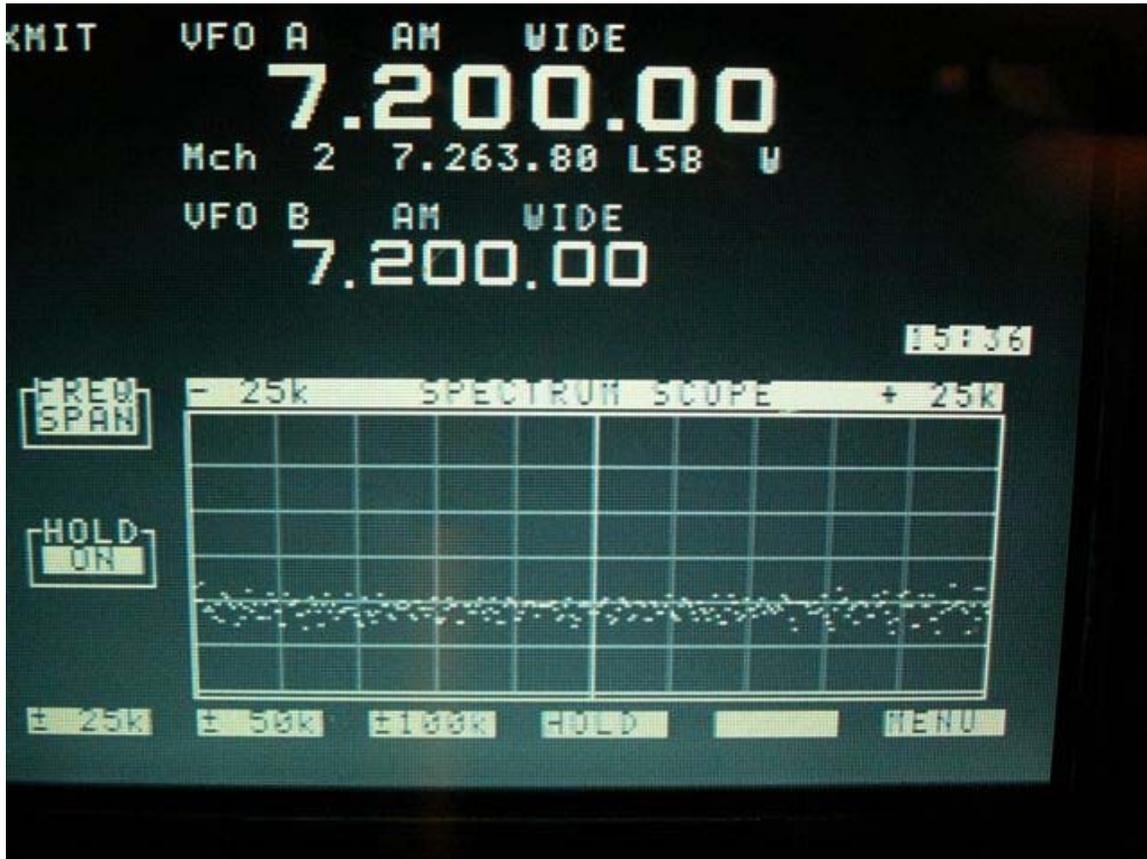
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Spectrum Scope response with roofing filter in Inrad's position:



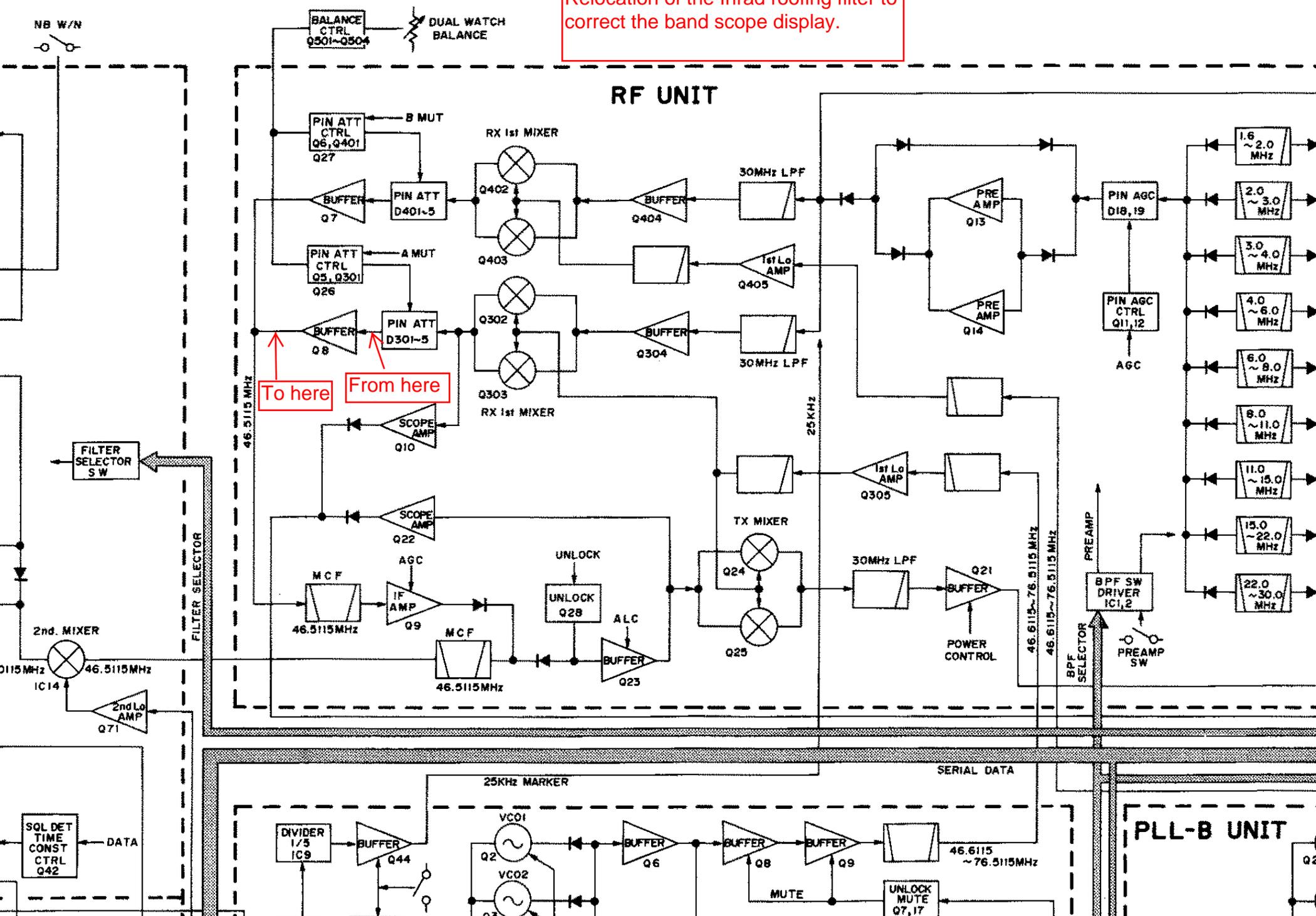
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Spectrum Scope with roofing filter in the new location:



END

Relocation of the Inrad roofing filter to correct the band scope display.



Mixer B

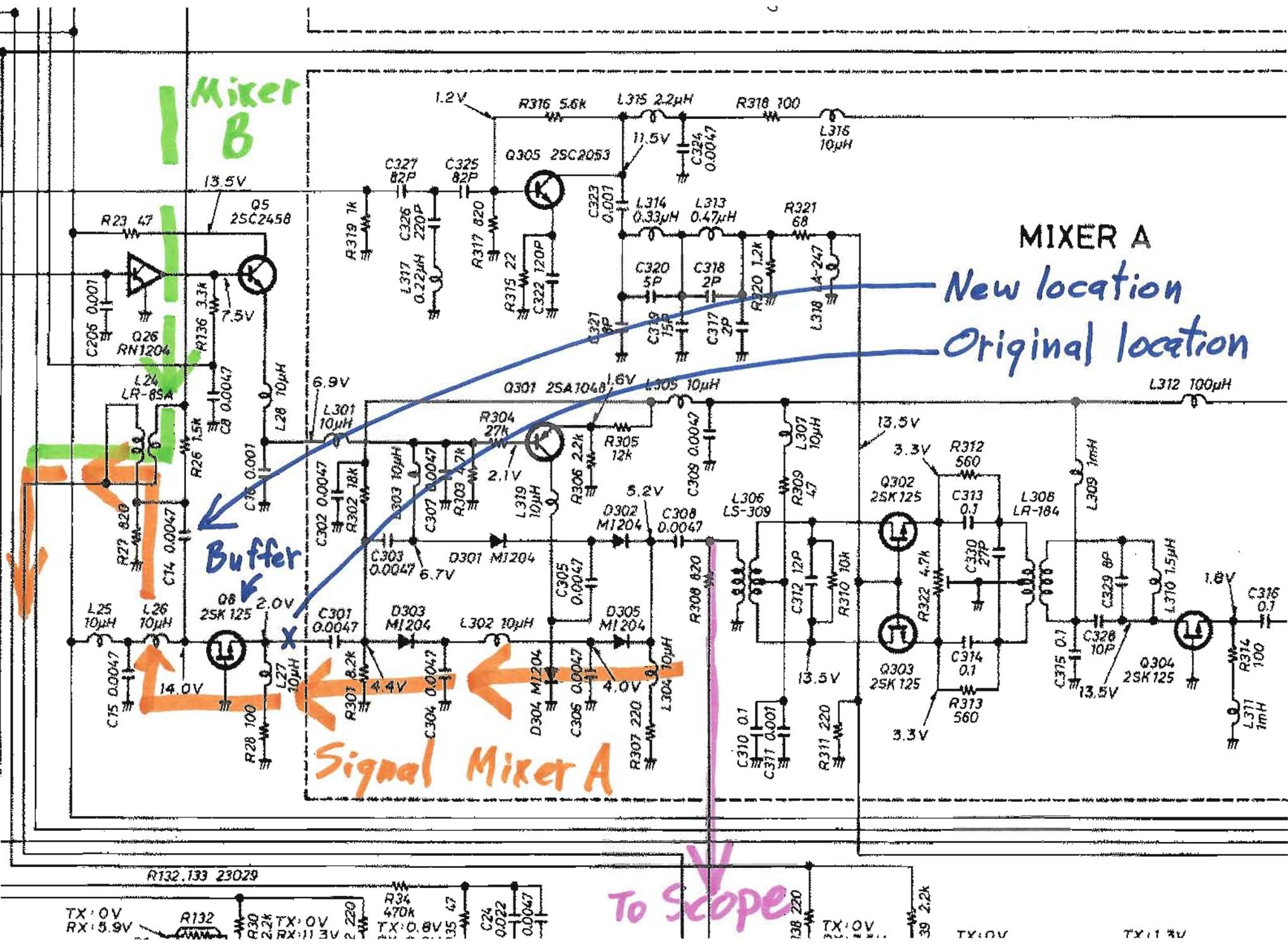
MIXER A

New location  
Original location

Buffer

Signal Mixer A

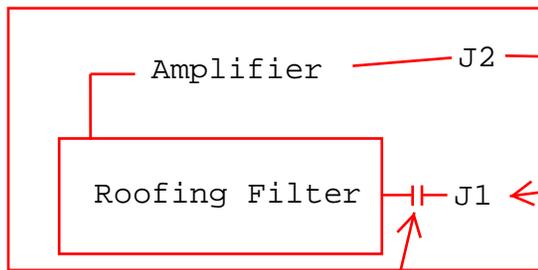
To Scope



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Installing the filter in this position eliminates the band scope signal amplitude distortion. Putting it after Q8 buffer amp provides isolation from the scope signal pickup.

INRAD Roofing Filter Board



Put C14 here

Remove C14 and install the coax in each hole. The hole nearest the front panel goes to J1 (input) and the hole near the rear of the radio goes to J2 (output).

NOTE: Install C14 between J1 and the filter. Requires PCB trace removal and soldering.

