

475 kHz Bandpass Filter

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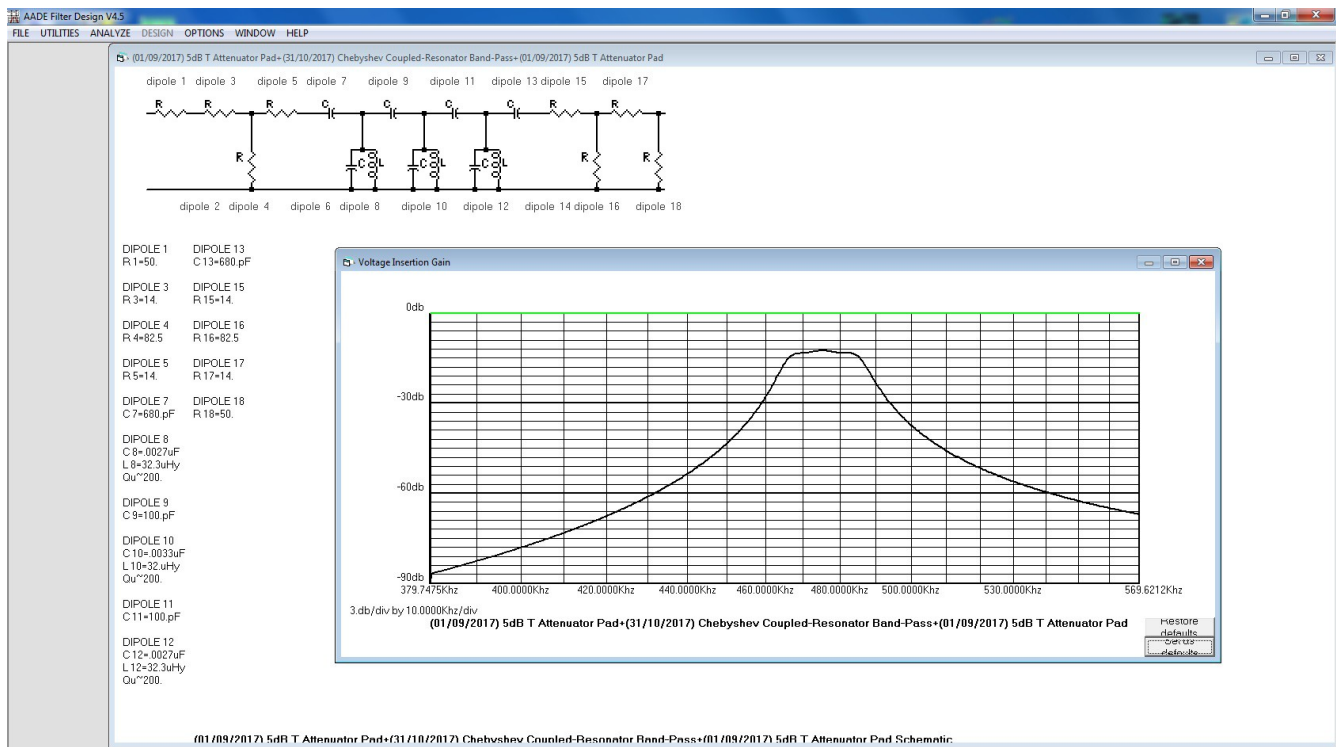
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This filter was designed, using the AADE software, to provide 20 kHz bandwidth centered on 475 kHz. The filter is placed in the receive pathway of my 630m Softrock RXTX transceiver.

<http://qsl.net/ve7vv/Files/2200-160 Meter RXTX Modification.pdf>

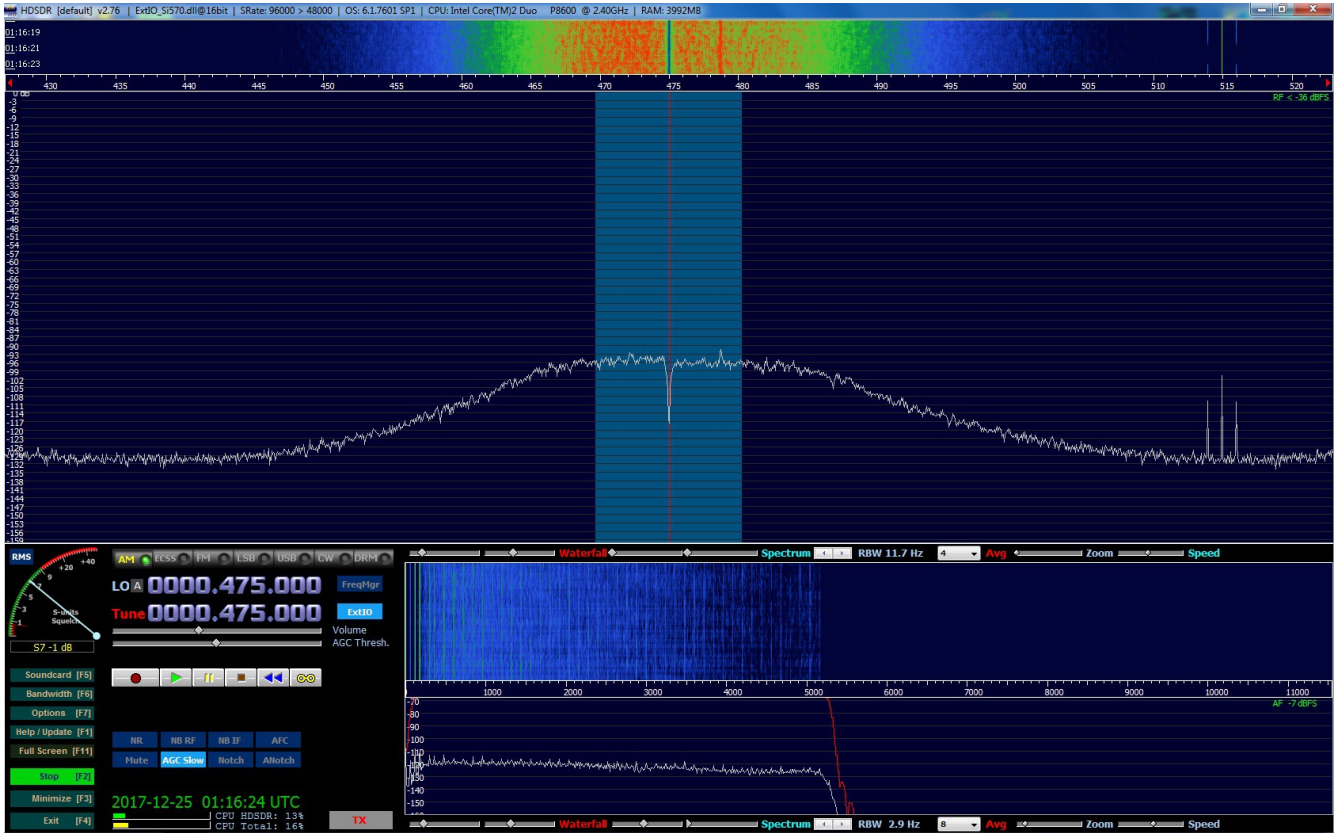
Since both the input to the filter from an antenna and the termination on the filter by the Tayloe switching mixer would be non-50 Ohms and highly reactive at frequencies distant from 475 kHz, 5 dB 50 Ohm attenuators were added to both the input and output of the filter to constrain the input and output impedances seen by the filter to be closer to 50 Ohm resistive at all frequencies.

The image below shows the filter design including component values and the predicted frequency response with ideal 50 Ohm source and termination. The passband attenuation is approximately 13 dB. The attenuation in the AM broadcast band is greater than 63 dB (> 50 dB below the passband level) at and above 550 kHz. Attenuating a strong local BC station carrier on 550 kHz by at least 50 dB below the passband was a design goal for this filter.



When the cursor is inside the area bounded by the graph, a red vertical bar follows the cursor. Clicking the left mouse button will replace the title of the plots window with the exact frequency and attenuation, impedances or phase at the cursor position. Clicking the right button will redraw the plot from the last left button frequency to the right button frequency. This refers to the first filter opened (plotted in BLACK).

The actual filter response is shown in the screenshot below that shows a 96 kHz wide spectrum view of the SDR receiver centered on 475 kHz. The response is flat within +/- 5 kHz (470-480 kHz), about 3 dB down at +/- 10 kHz and 30 dB down at +/- 40 kHz. The screenshot does not show the attenuation skirts beyond this range b/c the noise level beyond +/- 40 kHz is limited by the noise floor of the receiver. A NDB station is visible on 515 kHz.



The photo below shows the physical construction. Inductors are 43T on T50-3 cores, measured to be 32 μH .

