475 kHz Bandpass Filter

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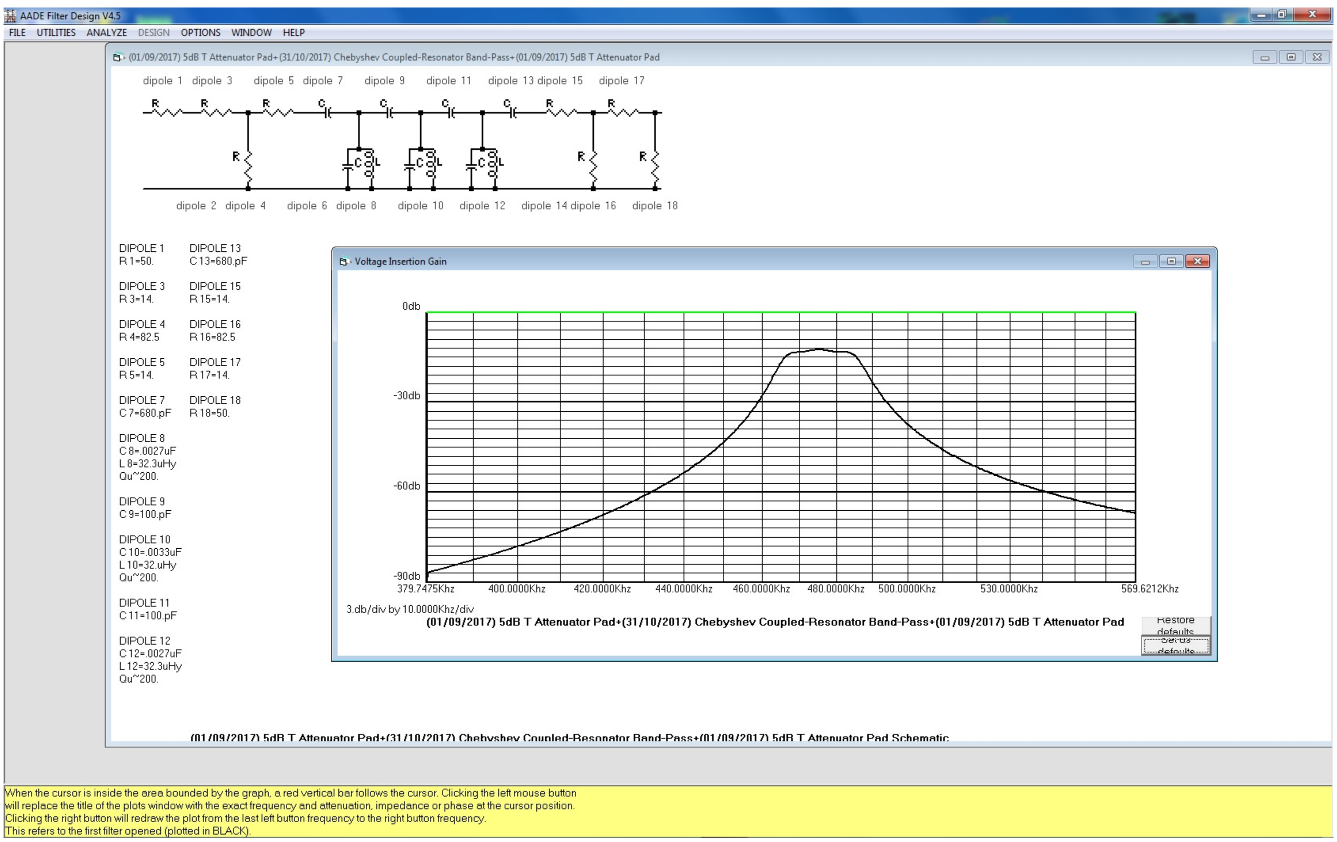
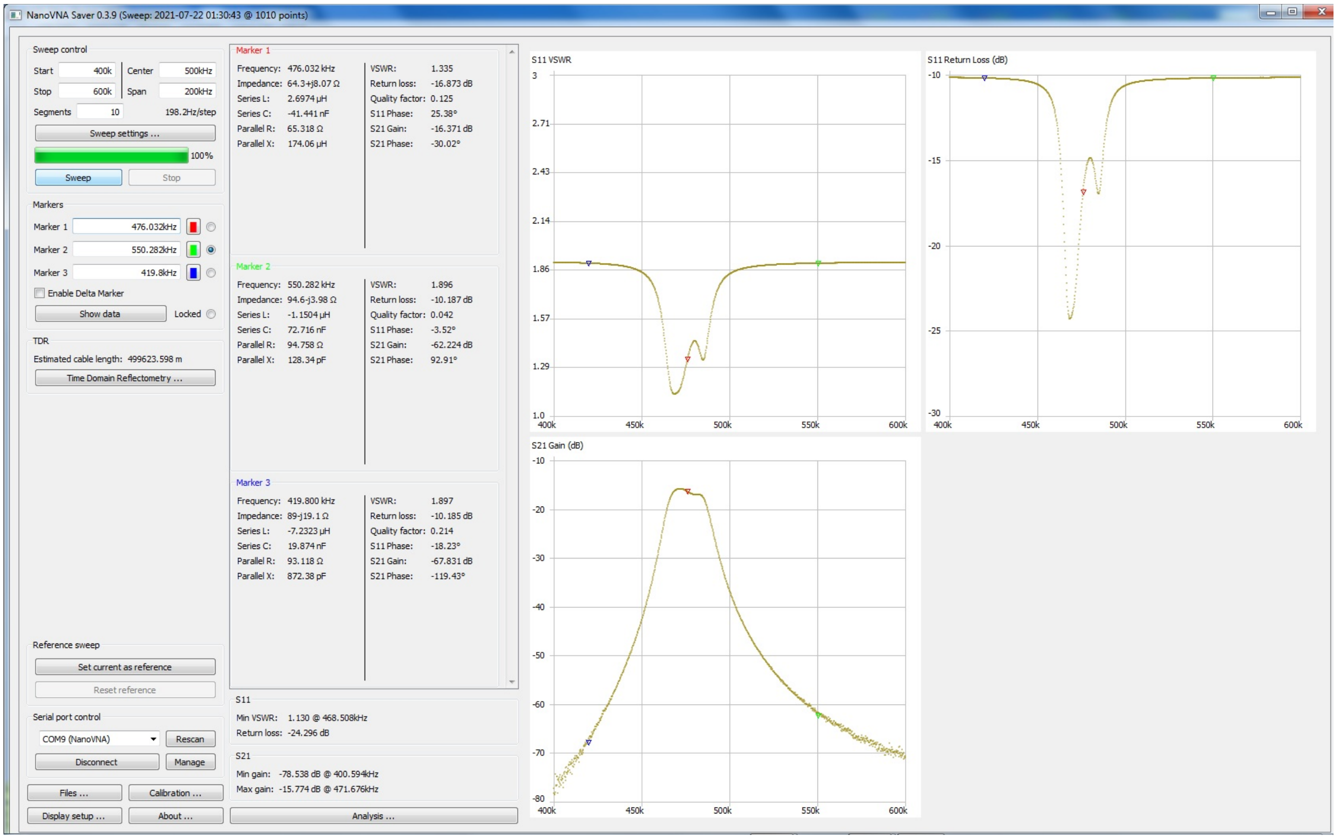
This filter was designed, using the AADE software, to provide 20 kHz bandwidth centered on 475 kHz. The filter is placed in the receive pathway of my 630m Softrock RXTX transceiver.
http://qsl.net/ve7vv/Files/2200-160 Meter RXTX Modification.pdf

Since both the input to the filter from an antenna/LPF 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.



The actual performance of this filter as measured with a NanoVNA is shown below.
The realized passband gain is 3 dB lower than predicted and the attenuation at 550kHz is 45 dB below the passband gain, which is 5 dB less attenuation than predicted. I believe that there is stray coupling between the three resonant circuits and that a better circuit board layout would improve the skirt roll-off. Nevertheless, the performance is reasonably good and the filter is effective in eliminating spurs from strong local AM broadcast stations.



The photo below shows the physical construction.