Field Day Bandpass Filters

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Our ARES® group / NFARC club is planning a COVID-19-compliant Field Day effort at our EOC, as per the ARRL decisions. We wondered if we could create some homebrew bandpass filters that would better allow two transmitters on different bands to simultaneously communicate. The ARRL has a great design for Butterworth filters: https://www.arrl.org/files/file/Technology/tis/info/pdf/8809017.pdf Then **John Trites NO5X** designed Chebyshev filters that provide some isolation between the top and bottom ends of the 3.5-4.0 MHz band.

Physically assembling these filters and providing proper shielding requires some effort. To make that task easier, I created double-sided printed circuit board design, with a ground plane, designed to connect to two SO-239 connectors and mounted on the underside of an empty paint-can lid. Sanding the protective coating of the paint can lid rim should allow good contact with the inexpensive can and provide a good shielding system. Boards have been manufactured in China and delivery is expected soon. The Gerber files needed to have your own boards made by the fabricator of your choice are freely available at: http://qsl.net/nf4rc/Tech/BandpassFilterPCB.zip

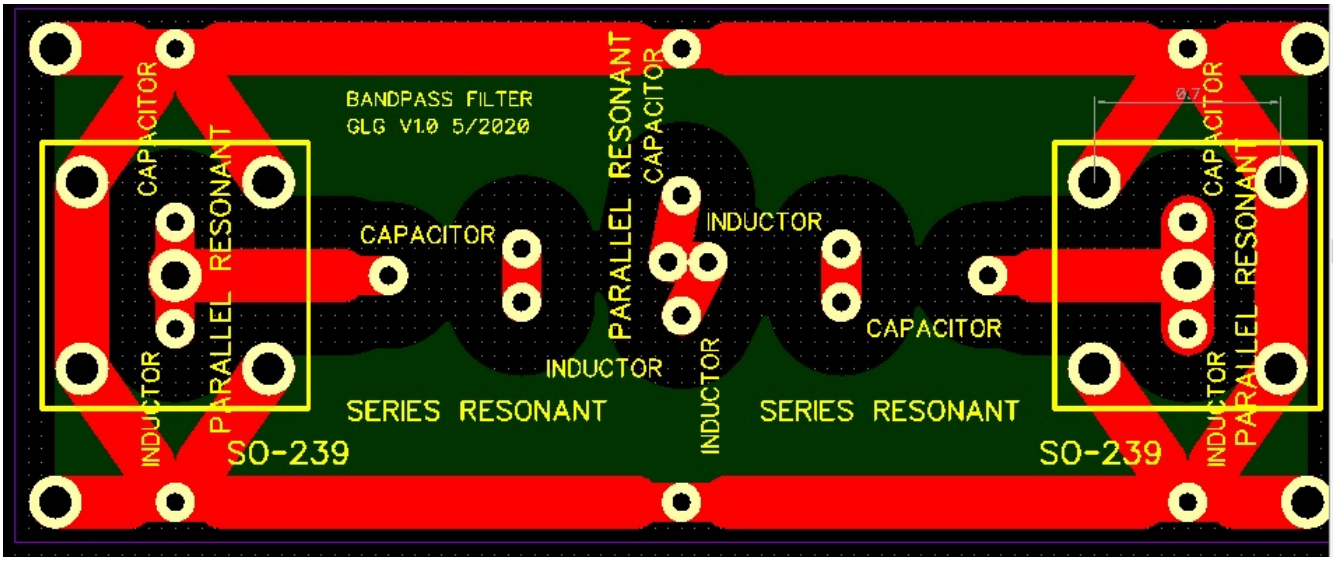

Figure. Top (red) and Bottom (dark green) connections on filter board.

	Butterworth/Chebyshev Filters									
	Parallel @input & @output (same)				Series Section				Parallel Middle	
	Capacitance	Inductance	F(resonant)		Capacitance	Inductance	F(resonant		Capacitance	Inductance	F(resonant)
	C	L	MHz		C	L	MHz		C	L	MHz
80M Butt	2.00E-09	1.10E-06	3.395		2.00E-10	1.10E-05	3.395		4.00E-09	5.50E-07	3.395
40M Butt	1.00E-09	5.50E-07	6.790		1.00E-10	5.50E-06	6.790		2.00E-09	2.75E-07	6.790
20M Butt	5.00E-10	2.80E-07	13.458		5.00E-11	2.80E-06	13.458		1.00E-09	1.40E-07	13.458
80 CW Cheby	5.07E-09	4.48E-07	3.341		1.50E-10	1.52E-05	3.335		8.73E-09	2.60E-07	3.342
75 Ph Cheby	4.10E-09	3.60E-07	4.145		1.20E-10	1.23E-05	4.145		7.06E-09	2.09E-07	4.145

Construction Note: Elements of the parallel resonant circuits can be arranged in series and evaluated for series resonance by an antenna analyzer. Series section is easy to tune (out of circuit) using antenna analyzer. Entire circuit can be tweaked with spectrum analyzer.