

# Electronics Workshop – January 25, 2018

## Time & Location:

7:00 PM

Fire District 6 Training Room, 2123 Jackson Highway, Chehalis, WA

## Topics:

1. Basic: Power Supplies
2. Stretch: Fourier Transform
3. New: HF Propagation Beacons  
Portland Stonehenge Tower
4. Project: Triplexer/Band Pass Filters

## Notes:

## Reference:

### Power Supplies:

1. <https://heilsound.com/amateur-radio-post/the-pine-board-project/>
2. “The ARRL Handbook for Radio Communications – 2018”

### Fourier Transform:

3. [http://www.stem2.org/je/Excel\\_FFT\\_Instructions.pdf](http://www.stem2.org/je/Excel_FFT_Instructions.pdf)
4. [http://dougkerr.net/Pumpkin/articles/Excel\\_Fourier.pdf](http://dougkerr.net/Pumpkin/articles/Excel_Fourier.pdf)

### HF Propagation Beacons:

5. <http://www.ncdxf.org/beacon/intro.html>

### Portland Stonehenge Tower:

6. <https://people.well.com/user/dmsml/stonehenge/>

### Triplexer/Band Pass Filters:

7. “HF Yagi Triplexer Especially for ARRL Field Day,” Gary Gordon, K6KV, QST June 2010, pp. 37-40
8. “The NVARC ‘Ugly’ Filter Project,” <https://www.n1nc.org/Filters/>
9. “Clean Up Your Signals with Band Pass Filters,” E. Wetherhold, W3NQN, QST May 1998, pp. 44-51 and June 1998 pp. 39-42
10. K7MEM Air-Core Inductor Design, [http://www.k7mem.com/Ind\\_Coil\\_Design.html](http://www.k7mem.com/Ind_Coil_Design.html)

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## Bandpass Filter Cases

3-3/8" x 5-1/2" x 5-7/8", 0.03" sheet metal thickness

**10-Meter Bandpass Filter**, <http://www.n1nc.org/Filters/10meter/>,  
<http://www.n1nc.org/Filters/10meter/Schematic>  
<http://www.n1nc.org/Filters/10meter/Chassis>

Coil #	Coil Form			Coil			
	Pipe	OD	Length	Wire	Turns	Coil Length	Inductance
L1, L5	1/2" Sched 40 PVC	0.840"	2"	36", #14 solid, insulated	9-3/4	1.00"	1.64 $\mu$ H
L3	1/2" Sched 40 PVC	0.840"	2"	36", #14 solid, insulated	9	1.00"	1.41 $\mu$ H
L2, L4	Thin wall PVC	0.620"	1-1/4"	12", #14 solid, insulated	3-1/2	0.40"	0.23 $\mu$ H

C1, C2, C3, C4, C5, C6 – 33 pf, 3 KV, Panasonic P/N ECC-A3F330JGE

3 – 1-1/4", 4-40 brass machine screws

10 – 1/4", 4-40 brass machine screws

19 – 4-40 brass nuts

5 – 4-40 brass washers

2 – ground lugs

2 – SO-239 UHF jacks & mounting machine screws/nuts

**15-Meter Bandpass Filter**, <http://www.n1nc.org/Filters/15meter/>  
<http://www.n1nc.org/Filters/15meter/Schematic>  
<http://www.n1nc.org/Filters/15meter/Chassis>  
<http://www.n1nc.org/Filters/Shield>

Coil #	Coil Form			Coil			
	Pipe	OD	Length	Wire	Turns	Coil Length	Inductance
L1, L2, L3	3/4" Sched 40 PVC		2"	54", #14 solid, insulated	11-1/2	1.10"	2.65 $\mu$ H

C1, C5 – 2 x 12 pf, 3 KV, Panasonic P/N ECC-A3F120JGE in parallel (24 pf each)

C2, C4 – 2 x 100 pf, 1 KV, Panasonic P/N ECC-A3A101JGE and

1 x 12 pf, 1 KV, Panasonic P/N ECC-A3A120JGE in parallel (212 pf each)

C3 – 1 x 12 pf, 3 KV, Panasonic P/N ECC-A3F120JGE and

1 x 15 pf, 3 KV, Panasonic P/N ECC-A3F150JGE in parallel (27 pf total)

3 – 1-1/4", 4-40 brass machine screws

16 – 1/4", 4-40 brass machine screws

22 – 4-40 brass nuts

5 – 4-40 brass washers

2 – ground lugs

2 – SO-239 UHF jacks & mounting machine screws/nuts

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**20-Meter Bandpass Filter**, <http://www.n1nc.org/Filters/20meter/>  
<http://www.n1nc.org/Filters/20meter/Schematic>  
<http://www.n1nc.org/Filters/20meter/Chassis>  
<http://www.n1nc.org/Filters/Shield>

Coil #	Coil Form			Coil			
	Pipe	OD	Length	Wire	Turns	Coil Length	Inductance
L1, L2, L3	3/4" Sched 40 PVC		2-1/4"	60", #14 solid, insulated	14	1.40"	3.17 $\mu$ H

- C1, C5 – 1 x 47 pf, 3 KV, Panasonic P/N ECC-A3F470JGE
- C2, C4 – 2 x 150 pf, 1 KV, Panasonic P/N ECC-A3A151JGE and  
 1 x 18 pf, 1 KV, Panasonic P/N ECC-A3A180JGE in parallel (318 pf each)
- C3 – 1 x 22 pf, 3 KV, Panasonic P/N ECC-A3F220JGE and  
 1 x 33 pf, 3 KV, Panasonic P/N ECC-A3F330JGE in parallel (55 pf total)
- 3 – 1-1/2", 4-40 brass machine screws
- 19 – 1/4", 4-40 brass machine screws
- 23 – 4-40 brass nuts
- 5 – 4-40 brass washers
- 2 – ground lugs
- 2 – SO-239 UHF jacks & mounting machine screws/nuts

**Triplexer**, QST, June 2010, pg 37-40

Case: Hammond 1590E, Digi-Key P/N HM155, 7.402" x 4.724" x 3.296"

Coil #	Coil Form			Coil			
	OD	ID	Length	Wire	Turns	Pitch	Inductance
L1 (20M)	1"	3/4"	2"	#20 solid, insulated	19-1/2	17-1/2 TPI	8.0 $\mu$ H
L2 (15M)	1"	3/4"	2"	#18 solid, insulated	13-1/2	13 TPI	5.3 $\mu$ H
L3 (10M)	1"	3/4"	2"	#16 solid, insulated	12	11 TPI	4.0 $\mu$ H

Pipe: 1" polycarbonate (LEXAN),

[https://www.tapplastics.com/product/plastics/plastic\\_rods\\_tubes\\_shapes/polycarbonate\\_tubes/276](https://www.tapplastics.com/product/plastics/plastic_rods_tubes_shapes/polycarbonate_tubes/276)

- C1 – 16 pF, 2 KV+, variable capacitor (20M)
- C2 – 11 pF, 2 KV+, variable Capacitor (15M)
- C3 – 8 pF, 2 KV+, variable capacitor (10M)
- Example capacitor: RF Parts 41  $\mu$ F P/N 48APL30, 5 to 30 pF, 2 KV
- 4 – SO-239 UHF jacks & mounting machine screws/nuts