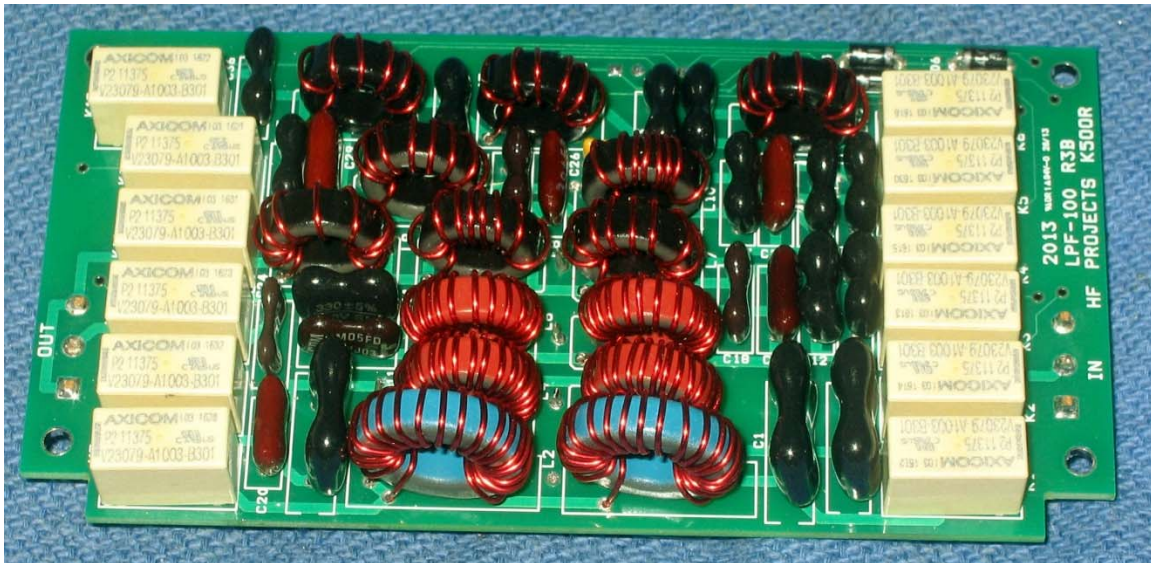
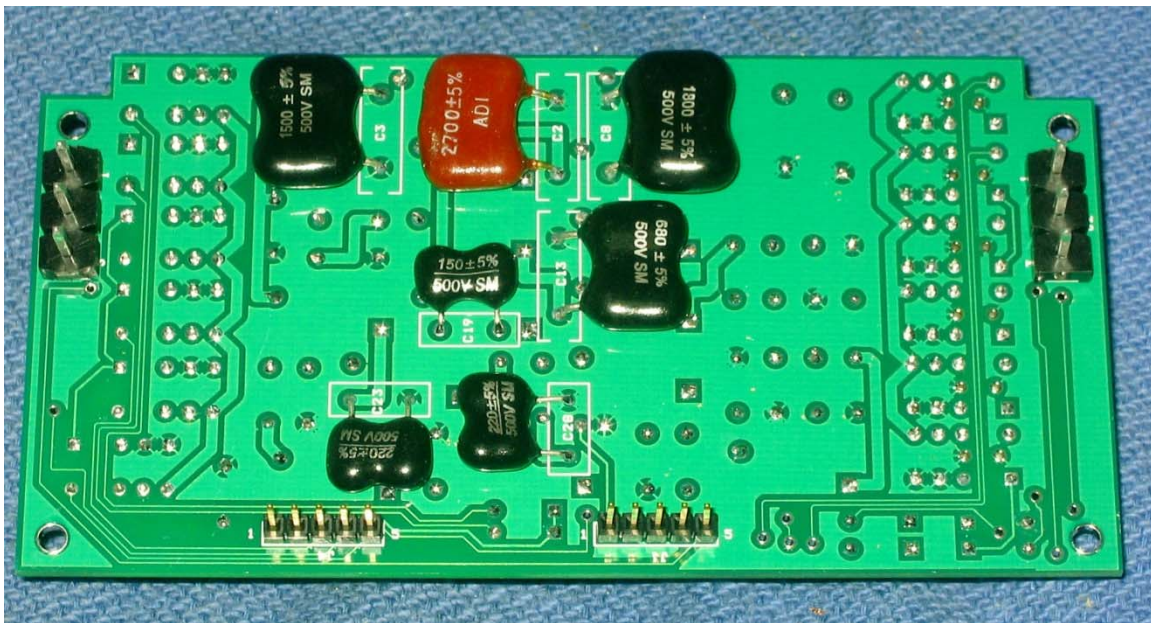


Construction Manual for Model LPF-100 R3B June 22, 2013



LPF100 R3B TOP



LPF100 R3B BOTTOM

The LPF-100 R3B design is electrically the same as R3A but has been changed for improved component spacing due to current availability of capacitor sizes.

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Bill Of Materials

Item	Qty	Ref	Part Description
1	1		Circuit Board LPF-100 R3B blank
2	6	D1,D2,D3,D4,D5,D6	Diode 1N4007
3	12	K1,K2,K3,K4,K5,K6,K7,K8,K9,K10,K11,K12	Relay DPDT
4	2	L1,L2	Inductor T68-1 (BLUE)
5	4	L3,L4,L5,L6	Inductor T50-2 (RED)
6	8	L7,L8,L9,L10,L11,L12,L13,L14	Inductor T50-10 (BLACK)
7	2	J1,J4	CON5
8	2	J3,J2	CON3
9	1	C25	Cap 12p
10	1	C30	Cap 18p
11	1	C18	Cap 27p
12	1	C35	Cap 33p
13	2	C10,C26	Cap 39p
14	2	C31,C24	Cap 47p
15	1	C32	Cap 68p
16	1	C36	Cap 82p
17	2	C21,C29	Cap 100p
18	1	C11	Cap 110p
19	1	C20	Cap 120p
20	4	C19,C27,C33,C34	Cap 150p
21	3	C22,C23,C28	Cap 220p
22	1	C14	Cap 330p
23	1	C12	Cap 390p
24	1	C13	Cap 680p
25	2	C7,C9	Cap 1000p
26	2	C1,C3	Cap 1500p
27	1	C8	Cap 1800p
28	1	C2	Cap 2700p
29	1	C4	Cap 0.01uF
30	14ft		Wire, 22AWG

Coil Winding Data: All coils wound in the direction shown in Figure 1



Figure 1

Item	Ref	Part Description	Band	uH	Inch	Turns	Note
1	L1,L2	T68-1 BLUE	160	5.08	19	20	7-5 Clock
2	L3,L4	T50-2 RED	80	2.65	17	22	Tight
3	L5	T50-2 RED	60/40	1.37	13	15	Tight
4	L6	T50-2 RED	60/40	1.17	12	13	Tight
5	L7	T50-10 BLACK	30/20	.58	11	10	10-2 Clock
6	L8	T50-10 BLACK	30/20	.40	10	9	9-3 Clock
7	L9	T50-10 BLACK	30/20	.43	11	10	9-3 Clock
8	L10,L11	T50-10 BLACK	17/15	.47	10	9	9-3 Clock
9	L12	T50-10 BLACK	12/10	.38	9	8	11-2 Clock
10	L13,L14	T50-10 BLACK	12/10	.33	8	7	11-2 Clock

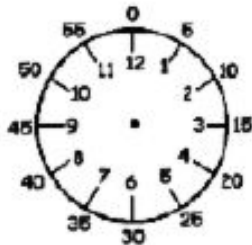


Figure 2

The clock face in figure 2 indicates where the windings begin and end. Tight means that the windings are tight with the center at 12 O'clock. The note 9-3 means that the windings are distributed evenly between 9 and 3 on the clock. Refer to Note in the last column above.

Wind all inductors. Strip and tin leads 3/8 inch. Each pass of wire through center counts as one turn. Adjust wire spacing according to the Note Column. I use a hobby knife to remove most of the insulation on the wire lead to be soldered. To insure a good solder connection, I dip the lead in rosin and tin the lead. I use an old soldering iron where I drilled down the center of the tip to make a miniature solder pot. Measure the inductance and adjust the wire spacing to achieve the uH given in the table above for each inductor. Set aside each inductor for later assembly.

Relay Assembly

Insert Relays K1 – K12. Place a book or other object over the top of the relays and turn the assembly over to the solder side of the circuit board. Solder one pin of each relay to

hold it in place. Reheat the solder joint while pressing the relay closer to the board. The idea is to make sure the relays are flat against the circuit board. Solder all pins of the relays.

Diode Assembly

Insert Diodes D1 – D6. Observe polarity mark on the diode matches the circuit board symbol. You will need to bend the leads at right angle close to the ends of the diode. You will need to pull the leads through and snug the diodes to the board. Solder all diode.

Capacitor Assembly, Top of Circuit Board

Install capacitors in the following sequence and solder a group at a time. Insert capacitors and bend leads 45 degrees to hold them in place. Solder and clip leads flush with the board. Reflow each solder joint after clipping.

GROUP	REF	PF
1	C36	82
	C20	120
	C24	47
	C35	33
2	C9	1000
	C11	110
	C14	330
	C29	100
3	C34	150
	C31	47
	C26	39
	C4	0.01uF
4	C33	150
	C30	18
	C1	1500
	C18	27
5	C27	150
	C10	39
	C21	100
	C12	390
6	C25	12
	C7	1000
	C22	220
	C32	68

Inductor Assembly

Pre-form the leads at any location on the circuit board to ease assembly in tight locations. Install Inductors per instructions below. Confirm you have the correct number of turns on the correct color core. Pull the leads tight and align the inductor in-line with the component outline. Solder and clip leads flush with the board. Reflow the solder joints after clipping the inductor leads.

Install L1 and L14. Align straight with coils not touching.

Capacitor Assembly, Bottom of Circuit Board

Install capacitors on the bottom side of the board with the component lying flat and flush to the surface. Allow enough lead length so that the capacitors are not under tension. Solder on the bottom side and clip leads on the top side. Solder on the top side. Reflow each solder joint after clipping.

7	C3	1500
	C2	2700
	C8	1800
	C13	680
8	C19	150
	C23	220
	C28	220

Alternate Assembly Inductors and Bottom Caps

Paul, AF5BV, found it easier to install a row of inductors and corresponding bottom mounted capacitors at the same time. Trimming the capacitor leads was then relatively easy with side cutters. For example - assemble in the following order - C3, L2, L4, L6, L9, L8, C19, L11, C23, L14, L13, C28, L10, C13, L7, L5, C2, L3, L1, C8. The final capacitor, C8, was a bit hard to get to, but doable.

Connector Assembly

If the LPF-100 is not used in the HF SuperPacker Pro 100W Amp, connector assembly may be bypassed. It is up to the user to supply the necessary connections.

Install J2 and J3

Insert from the back side of the circuit board with the tips of the blunt ends of the connector just flush with the top of the circuit board.

Hint: Hold the connector in place from the backside. Pressing down on the blunt ends will slide the pins in the holder until the top of the blunt ends are flush with the top of the circuit board. The purpose is to provide maximum mating connector penetration depth of the pointed pins.

These connectors have a blunt end and shaped end. The blunt ends will be soldered to the circuit board. Solder one pin on each connector. Inspect that the connector is perpendicular to the circuit board. Solder all 3 pins of each connector.

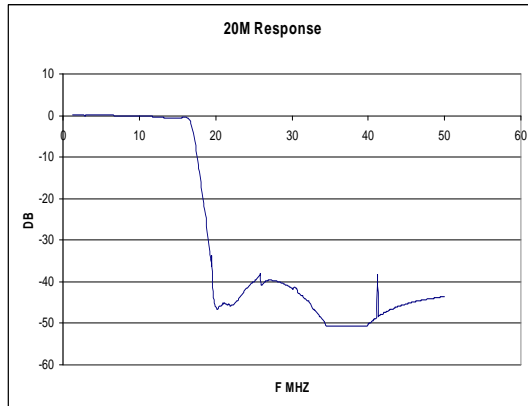
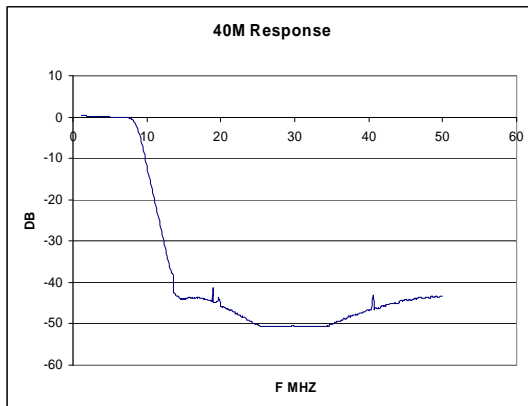
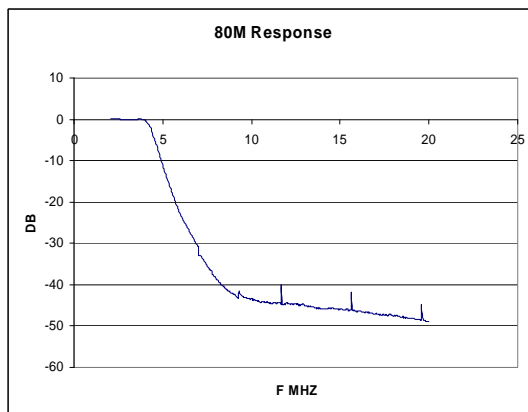
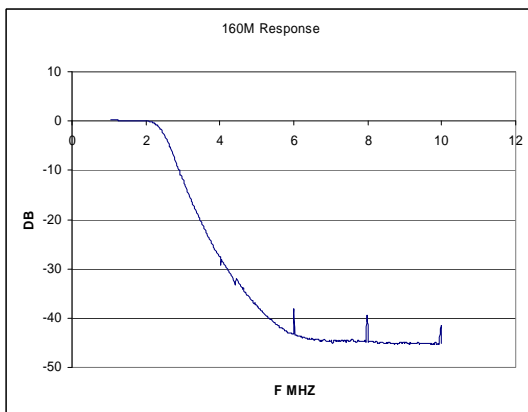
Install J1 and J4

Solder one pin. Inspect and align pin so it is perpendicular to the board and flat against the board. Solder all 5 pins on each connector.

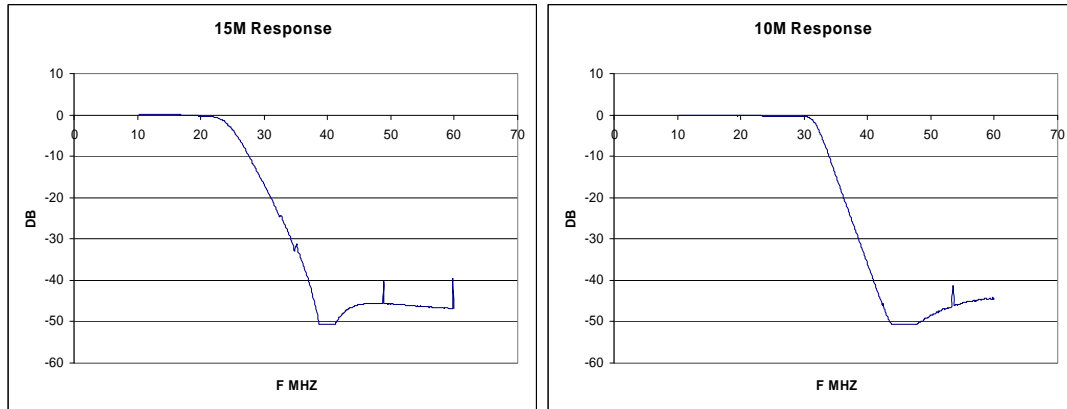
Board Cleaning

I recommend board cleaning to remove residue that might provide a conduction path at high frequencies and subvert the overall frequency response of the filters. I use TechSpray Blue Shower available from Mouser Electronics (1630-16S). Use in a well ventilated area (outside) to remove solder flux from the board. Follow directions on the can.

HF SuperPacker Pro 100W Amp Low Pass Filter Module LPF-100 R3B



HF SuperPacker Pro 100W Amp Low Pass Filter Module LPF-100 R3B



Response curves captured on a MINIVNA

Note: the random spikes was a pickup problem using the MINIVNA

A Quick tutorial on how to wind the inductors

example RED Core, T3 16 inch #22 wire, 21 Turns used on the HF SuperPacker Pro 100W Amp.

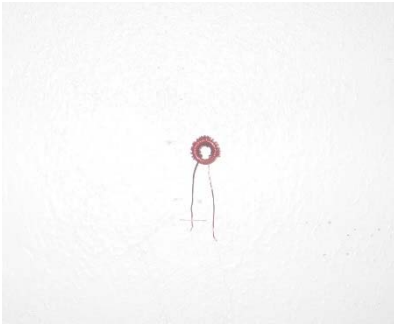


The starting position: Divide the wire in half letting the core hang down. The wire passing through the core counts as one turn.

HF SuperPacker Pro 100W Amp Low Pass Filter Module LPF-100 R3B



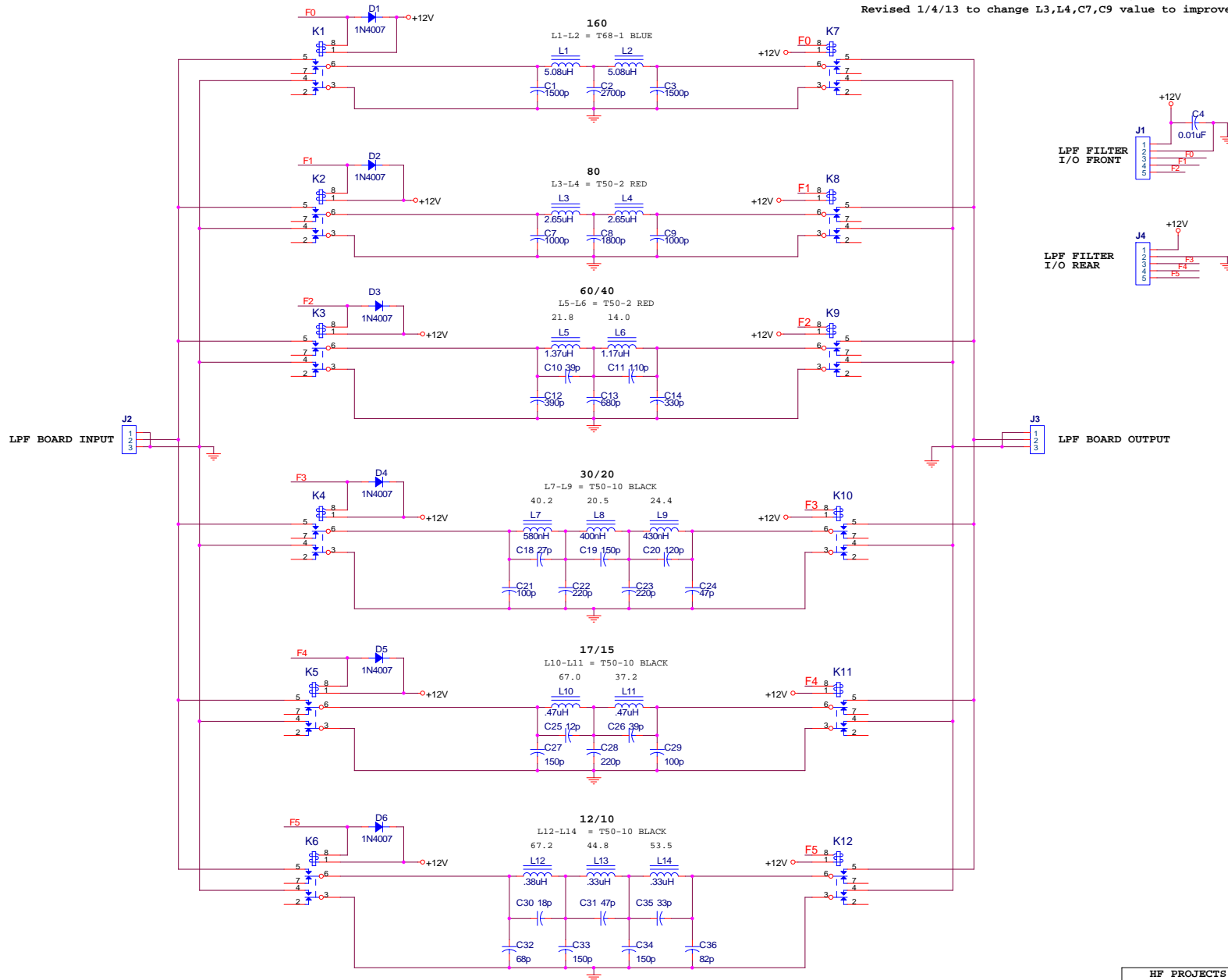
Wind one side. I start with the wire in the back and wrap 10 turns on the right side. I use a pair of needle nose pliers to aid in pulling the wire tight against the core as I wrap it around.



Wind the other side. Wrap 10 turns on the other side.

You now have 21 turns through the core. I squeeze up the wraps to be tight. Your inductors must be wound with the wires on the sides shown or the inductor footprint will not match the circuit board layout.

Revised 4/5/11 to change L1/L2 from T50-1 to T68-1
 Revised 1/4/13 to change L3,L4,C7,C9 value to improve in-band VSWR



HF PROJECTS - K500R			
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Size	Document Number		Rev
C	LPF-100 R3A1		0
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