

K9HZ 100W LPF – FILTER BOARD
BUILD INSTRUCTIONS for PCB V1.10
JULY 1, 2025

The K9HZ LPF board set is intended to be a very compact yet effective 11 band low-pass filter network to meet FCC regulations. While this board was intended to be use in a set of three, it can be used stand-alone for just using the filters.

Operating Data

Power Requirements: 12-15 VDC at 100ma max (provided by the Control Board).
Frequency Range: 1.8MHz – 54MHz/ 160M – 6M in 11 bands inclusive.
RF Input: 150W Maximum. Input and Output with bypass.
Control: BCD band data from the Control Board via two connectors.
Performance: N-th order harmonic reduction more than than 43 db.

Inventory and Prework

Spend time to determine if you want all 11 bands for 1.8MHz-54MHz/ 160M-6M (all amateur bands included in that frequency range). If you wish to delete a particular band or build that filter later, just remove those parts from the BOM before ordering. The 100W BOM is:

Qty	Part Value	Part Reference	Comments
1	14pF 200V	C70	
5	27pF 200V	C63, C69, C39A, C67A, C100A	
4	33pF 200V	C65, C39B, C67B, C100B	
1	39 pF 200V	C71	
3	47pF 200V	C60, C62, C64	
2	56pF 200V	C57, C75	
	60pF 200V	C39, C67, C100 (made from above A and B parts stacked)	33pf+27pf above stacked
2	68pF 200V	C66, C68	
8	82pF 200V	C24, C35, C41, C53, C72, C85, C90, C105	
2	91pF 200V	C51, C82	
9	100pF 200V	C32, C38, C52, C56, C58, C74, C76, C94, C99	
2	120pF 200V	C37, C98	
11	150pF 200V	C27, C28, C33, C36, C42, C61, C83, C95, C97, C102, C104	
2	180pF 200V	C50, C81	
4	220pF 200V	C34, C49, C80, C96	
13	330pF 200V	C25, C43, C44, C48, C54, C55, C59, C73, C77, C79, C87, C88, C103	
2	390pF 200V	C26, C101	
6	470pF 200V	C30, C40, C47, C78, C89, C92	
2	560pF 200V	C31, C93	
2	1200pF 200V	C46, C86	
2	1500pF 200V	C29, C91	
2	2200pF 200V	C45, C84	
24	0.1uF 50V	C106, C107, C108, C109, C110, C111, C112, C113, C114, C115, C116, C117, C118, C119, C120, C121, C122, C123, C124, C125, C126, C127, C157, C158	

2	RF interconnect	J17, J22	
1	IDX2x5 Male Box Connector	J26, J27	
24	HF41F-12-ZS	K8, K9, K10, K11, K12, K13, K14, K15, K16, K17, K18, K19, K20, K21, K22, K23, K24, K25, K26, K27, K28, K29, K32, K33	Surplus from eBay
1	0.170uH	L24	8 Turns of #20 Wire on a T68-17 Core.
2	0.188uH	L13, L35	8 Turns of #20 Wire on a T68-17 Core.
1	0.305uH	L23	7 Turns of #20 Wire on a T68-6 Core.
2	0.335uH	L12, L34	7 Turns of #20 Wire on a T68-6 Core.
2	0.337uH	L11, L33	7 Turns of #20 Wire on a T68-6 Core.
1	0.342uH	L22	7 Turns of #20 Wire on a T68-6 Core.
1	0.406uH	L21	7 Turns of #20 Wire on a T68-6 Core.
2	0.447uH	L10, L32	9 Turns of #20 Wire on a T68-6 Core.
1	0.471uH	L20	9 Turns of #20 Wire on a T68-6 Core.
2	0.519uH	L9, L31	10 Turns of #20 Wire on a T68-6 Core.
1	0.608uH	L19	10 Turns of #20 Wire on a T68-6 Core.
2	0.670uH	L8, L30	11 Turns of #20 Wire on a T68-6 Core.
1	0.843uH	L18	12 Turns of #20 Wire on a T68-6 Core.
2	0.928uH	L7, L29	13 Turns of #20 Wire on a T68-6 Core.
1	1.22uH	L17	15 Turns of #20 Wire on a T68-6 Core.
2	1.34uH	L6, L28	16 Turns of #20 Wire on a T68-6 Core.
1	1.60uH	L16	16 Turns of #20 Wire on a T68-2 Core.
2	1.76uH	L5, L27	17 Turns of #20 Wire on a T68-2 Core.
1	2.43uH	L15	20 Turns of #20 Wire on a T68-2 Core.
2	2.68uH	L4, L26	21 Turns of #20 Wire on a T68-2 Core.
1	4.73uH	L14	28 Turns of #20 Wire on a T68-2 Core.
2	5.21uH	L3, L25	30 Turns of #20 Wire on a T68-2 Core.
3	T68-17 Cores	For L3-L35	KitsAndParts.com T41 V012.6 LPF Kit
21	T68-6 Cores	For L3-L35	KitsAndParts.com T41 V012.6 LPF Kit
9	T68-2 Cores	For L3-L35	KitsAndParts.com T41 V012.6 LPF Kit
38	Feet #20 Transformer Wire	For L3-L35	KitsAndParts.com T41 V012.6 LPF Kit

The filter board can also be built as a 20W maximum board for QRP operations. The BOM for that combination is listed in the BOM directory.

Keep the capacitors in their envelopes until you need them as they are hard to discern if you mix them up. A good 45W soldering pencil, solder, flux, and a good set of forceps are all that is needed to complete this board.

Building the LPF board

At this point, it really makes sense to spend time winding the torroids before building the board. If you have an LCR meter or a VNA, wind each inductor... measure it, and label it. The turns numbers given in the BOM are a very good starting point and should work sufficiently. If you don't have a way to measure the inductance of the wound inductor, stay with the number of turns suggested in the BOM.

Wind the cores to spread the turns over the entire body of the core. If you can

1. Start by wiping the board, front and back, with Isopropyl alcohol. This will make soldering parts on the board easier/

Please see the “Modifications By Others” directory for some tweaks to the LPF filter coils to maximize Return loss.