

QCX+ 15m

After receiving QRP Lab's QCX+ 5w for the 40m band, I decided that I want to operate on the 15m band instead. This is for two main reasons.

1. Antenna Length: Assuming 40m wavelength, a dipole antenna would have to be huge! 20m long or $\lambda/2$. On 15m, the typical length for each wire with 13cm tail is: 3.58m. In total it would be around 7.16m, much shorter. QE1OPW reports that at 6m height the dipole antenna performed quite well.
2. 15m band is suitable for DX no matter what time of the day, however is most useful for intercontinental communication during daylight hours, especially in years close to the solar maxima. It seems that 15m in my grid has been operating quite well in night hours. 15m band frequencies are propagated by the F2 layers of the Ionosphere.

Band Conditions

Global ☒ Personalized

SFI: 166 A: 22 K: 4
SN: 121

CM95QG (35.27°, -120.62°) • Day •
Geo-Lat: 42.21°

Band	Day	Night
80m-40m	Fair	Poor
30m-20m	Good	Good
17m-15m	Good	Good
12m-10m	Good	Poor

Noise Level: S3-S4

(Atmospheric: +0.5, Time: +0.5, Season:
-0.2 S-units)



Peter ▾

Hallo,

during Corona I build a QCX+ for 15m. I ordered a QCX+ with a 15m LPF.

T1 = 21T+3T+3T+3T

Yesterday after covid recovery I installed a simple 15m Dipol (6 meter high).

In the HB Contest I worked in 2 hours 30 stations.

And I was very happy > 3 Stations from USA (K0ZR, N4AF and K3UL). All on first calling.

The QCX+ makes 4.5W on 13 Volt.

Receiver sensitivity is very good (heard Japan and lot of other DX).

So 15m with good conditions is very good for qrp. Even with a simple Dipol. Looking forward end of May for WPX Contest

73

Peter OE1OPW Vienna

👍 2 People liked this



Peter ▾

Hallo Murat,

my 15m Dipol consist simple of a Balun (1:1) and 2 wires each 3,3m long. At the beginning the wire was 3.5m but after some VSWR adjustments I could reach with 3.3m a VSWR of almost 1:1. But don't cut the wire during adjustment - it's ok of you just bend back the wire.

Coax is 20m long (Aircell 7 type)

Regards

Peter OE1OPW Vienna

Modifications Table

Section	Part	Qty	Value / Winding	Notes
LPF (plug-in board)	L1, L3 (T37-6, yellow)	2	12T	even spacing; scrape & tin enamel well
	L2	1	14T	
	C27, C28	2	82 pF (820)	
	C25, C26	2	220 pF (221)	
PA Transformer	T1 (red core per kit)	1	3T + 3T + 3T + 21T	primary = 21T; three 3-turn secondaries (per proven 15 m builds)
L4 (PA)	L4 (T37-2)	1	8T (256pF)	

40m

Qty	Value	Description	Component numbers
2	1.4uH	21 turns on T37-6 core (yellow)	L1, L3
1	1.7uH	24 turns on T37-6 core (yellow)	L2
1	1.0uH	16 turns on T37-2 core (red)	L4
1		5+5+5+38 turns, T50-2 core (red)	T1

Qty	Value	Description	Component numbers
1	39pF	Label "390"	C5
1	56pF	Label "560"	C30
2	270pF	Label "271"	C27, 28
2	680pF	Label "681"	C25, 26

Inductance Calculation for 15m LPF

QCX LPF follows a standard 7th-order Chebyshev pi-section. Each band rescales inductance and capacitance so that the cutoff frequency stays a little bit above the band's highest signal frequency:

First Let's try with 1-pole/element:

$$f_c \propto \frac{1}{\sqrt{LC}}$$

Where,

L: Inductance

C: Capacitance

Theoretical 1-pole Calculations

$$f_c \propto \frac{1}{\sqrt{LC}}$$

$$f_{c15} = 8 \text{ MHz}$$

$$f_{c40} = 22 \text{ MHz}$$

$$\frac{f_{c15}}{f_{c40}} \propto \frac{\frac{1}{L_{15} \cdot C_{15}}}{\frac{1}{L_{40} \cdot C_{40}}}$$

$$\text{Let } \frac{f_{c15}}{f_{c40}} = k,$$

$$\frac{1}{k^2} = \frac{L_{15}}{L_{40}} \cdot \frac{C_{15}}{C_{40}} \quad k$$

$$\frac{1}{k^2} \cdot \frac{C_{40}}{C_{15}} = \frac{L_{15}}{L_{40}}$$

$$\frac{1}{k^2} \cdot k = \frac{L_{15}}{L_{40}}$$

$$\frac{1}{k} = \frac{L_{15}}{L_{40}}$$

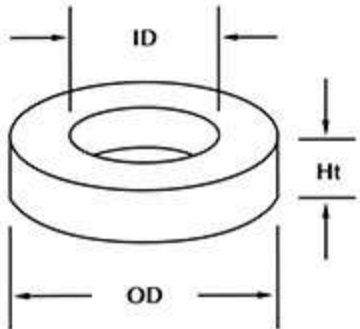
$$\frac{1}{k} \cdot L_{40} = L_{15}$$

$$L_{15} = \frac{1}{2.75} \cdot 1.4 \text{E-6} = 0.509 \mu\text{H} \quad (1 \text{ pole})$$

$$C_{15} = \frac{1}{2.75} \cdot 220 = 80 \mu\text{F} \quad (C \text{ series}) \quad 1 \text{ pole}$$

$$C_{15} = \frac{1}{2.75} \cdot 680 = 247 \mu\text{F} \quad (C \text{ shunt}) \quad 1 \text{ pole}$$

Note: Capacitance was mislabeled (unit-wise) in henry. Should be micro-Farad

Physical Dimensions		
COLOR CODE - 1 Blue/Clear - 2 Red/Clear - 3 Gray/Clear - 6 Yellow/Clear - 7 White/Clear - 10 Black/Clear - 12 Green/White - 15 Red/White - 17 Blue/Yellow - 0 Tan		TYPICAL PART NO. T 25 - 10 OD in 100th Inches Micrometals Mix No. Letter Indicates Alternate Height
OD = .375 in / 9.53 mm +/- 0.015 in ID = .205 in / 5.21 mm +/- 0.015 in Ht = .128 in / 3.25 mm +/- 0.02 in		
$A_L = 3 \pm 5\%$ $uH = (A_L * \text{Turns}^2) / 1000$		
Temperature Stability (ppm /°C) = 35		
Color Code = Yellow / Clear		
Optimum Resonant Circuit Range for highest Q and lowest core loss 3 MHz - 40 MHz		
Orders and Pricing www.kitsandparts.com		

W3NQN LPF Design and Values

<https://grp-labs.com/images/lpokit/instructions2.pdf>

3. Parts List

Please refer to the parts list below, for your band. Capacitor values are in picofarads (pf) except where indicated (600m and 2200m LF band values are in nanofarads) and the inductors L1-3 specify the number of turns to wind on the toroid.

Band	C1	C2	C3	C4	L1	L2	L3	Toroid
2200m	2.2n//10n	4.7n//22n	4.7n//22n	2.2n//10n	105	105	105	T50-2 (red)
600m	2.2n//2.2n	10n	10n	2.2n//2.2n	64	70	64	T50-2 (red)
160m	820	2200	2200	820	30	34	30	T50-2 (red)
80m	470	1200	1200	470	25	27	25	T37-2 (red)
60m	680	1200	1200	680	23	24	23	T37-2 (red)
40m	270	680	680	270	21	24	21	T37-6 (yellow)
30m	270	560	560	270	19	20	19	T37-6 (yellow)
20m	180	390	390	180	16	17	16	T37-6 (yellow)
17m	100	270	270	100	13	15	13	T37-6 (yellow)
15m	82	220	220	82	12	14	12	T37-6 (yellow)
12m	100	220	220	100	12	13	12	T37-6 (yellow)
10m	56	150	150	56	10	11	10	T37-6 (yellow)