

LOW FREQUENCY ADAPTER

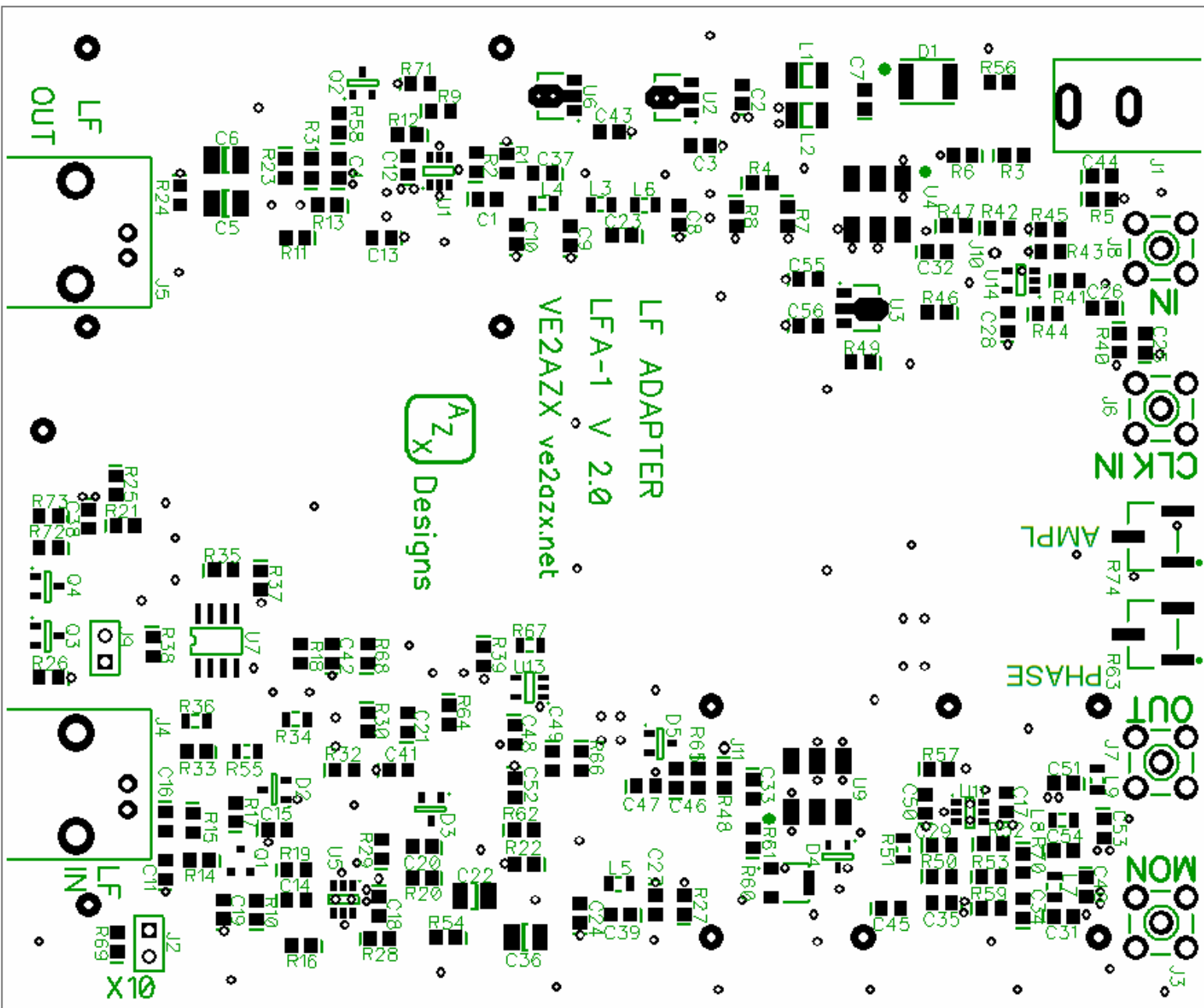
SMT Assembly, Mechanical Assembly and Test

Version 2

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Dec. 2014 Rev1 Jan 2015

SMD ASSEMBLY LFA-1 V2.0

1



C25,26, 29, 44 0.01 uF

C12,16, 17, 28, 32, 33, 35, 41, 42, 46-50, 52 0.1 uF

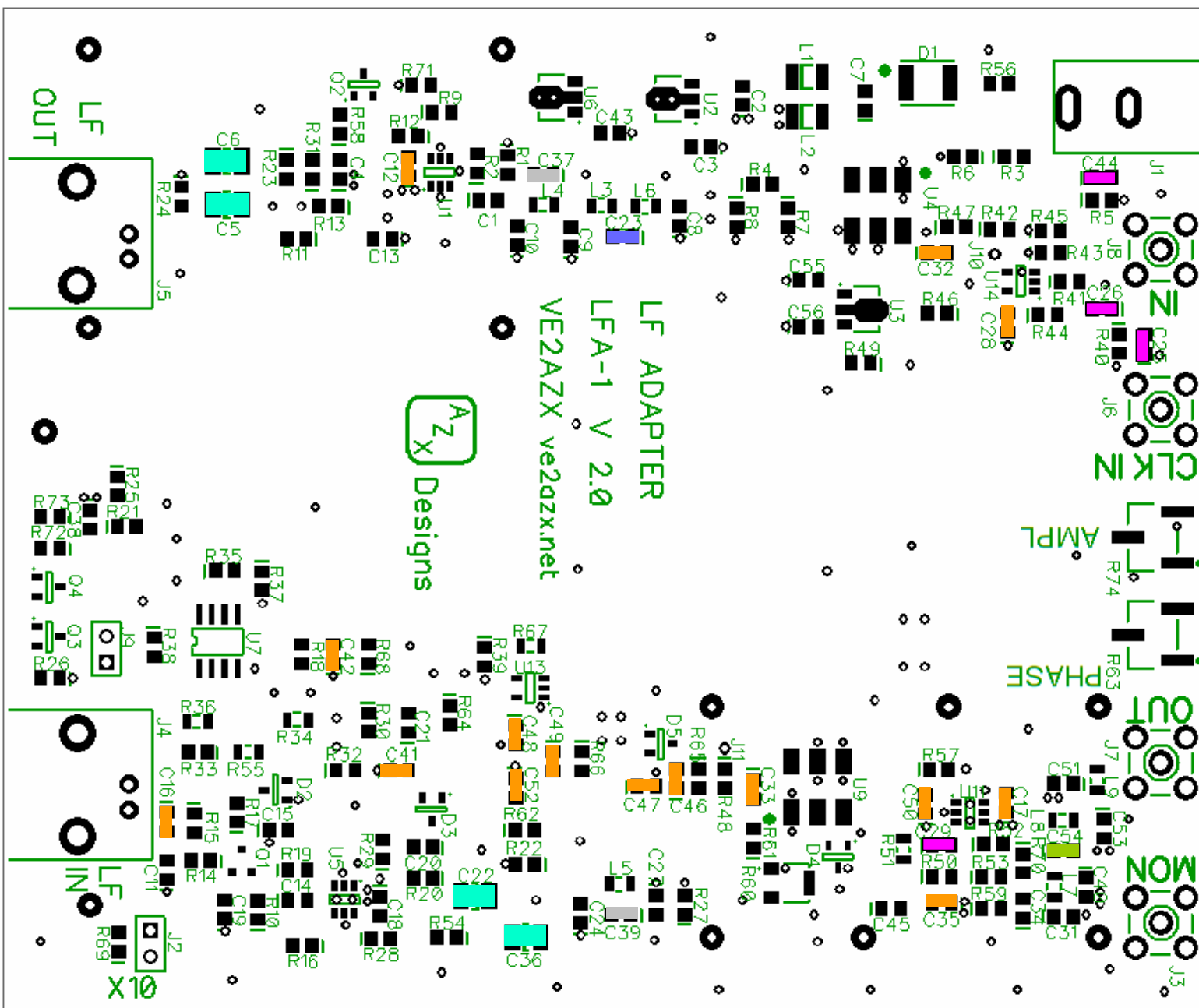
C5, 6, 22,36 100 uF

C23 130 pF

C37,39 16 pF

C54 240 pF

2



C8, 10, 24, 31, 34, 53 300 pF

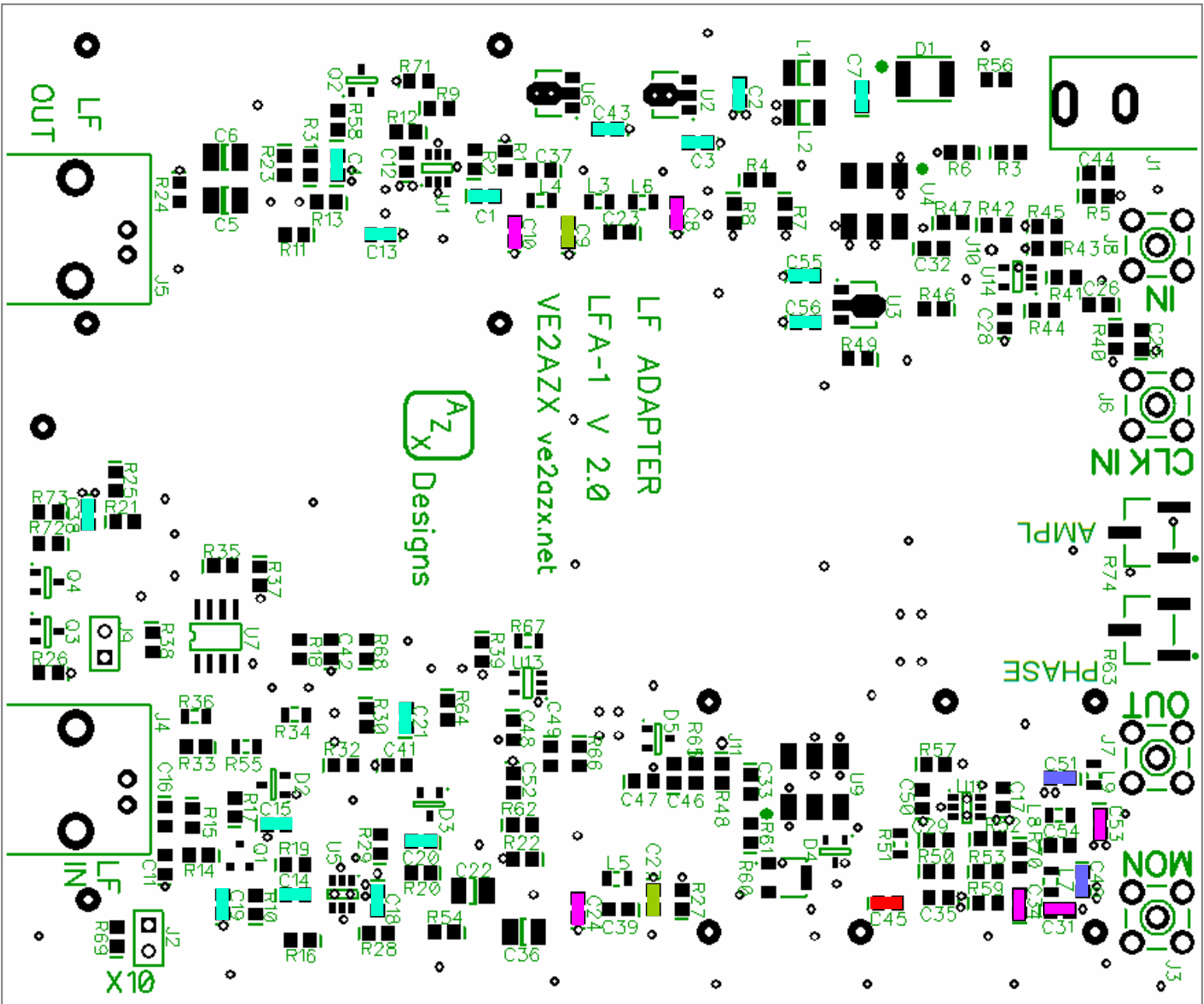
C1-4, 7, 13-15, 18-21, 38, 43, 55, 56 4.7 uF

C40, 51 470 pF

C45 3.3 pF

C9, 27 820 pF

3



D3,D5 BAT54S

D1 Si SMA

D2, D4 BAV99

L1,2 68 uH

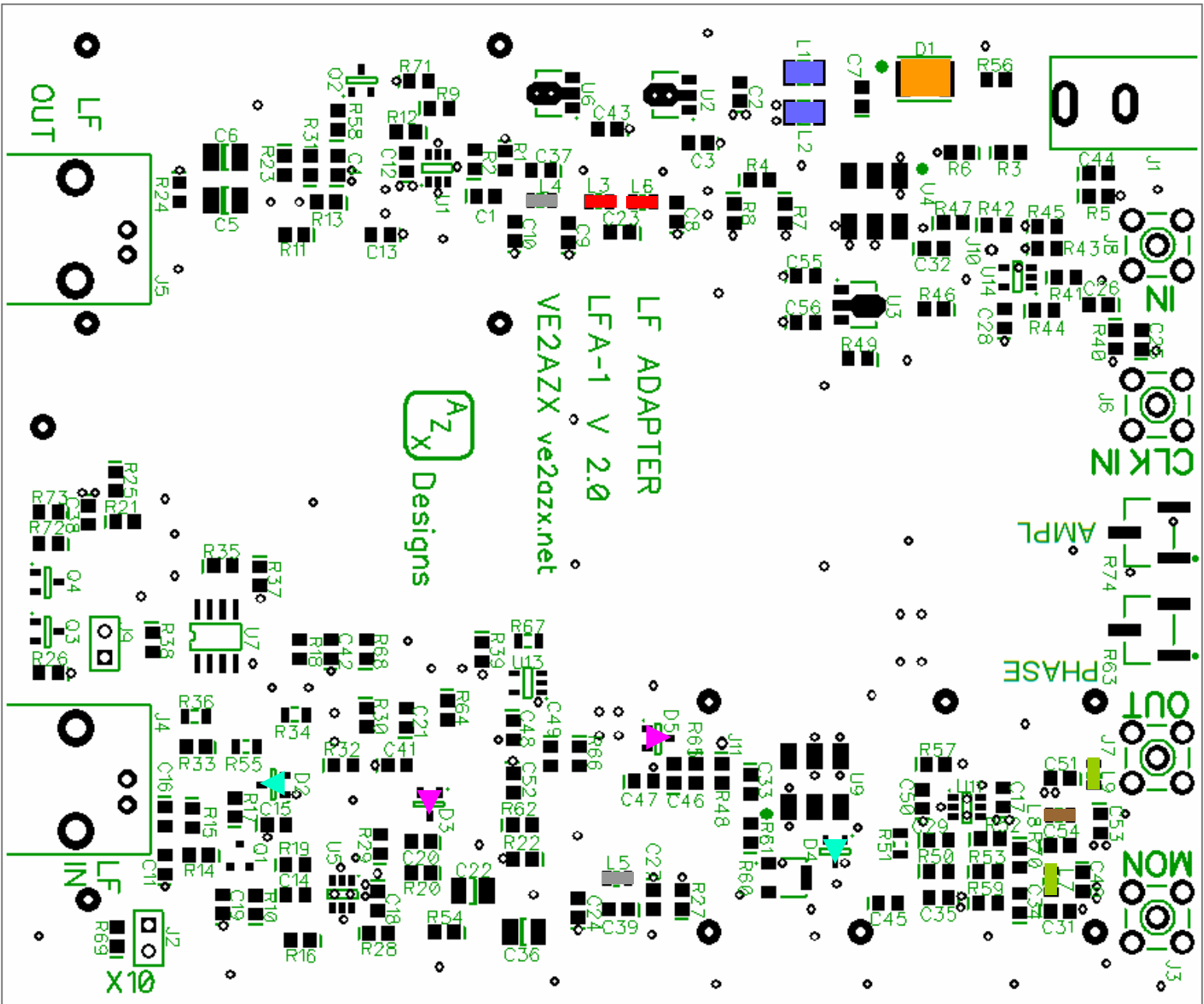
L3, 6 1 uH

L4, 5 3.3 uH

L7, 9 0.56 uH

L8 0.27 uH

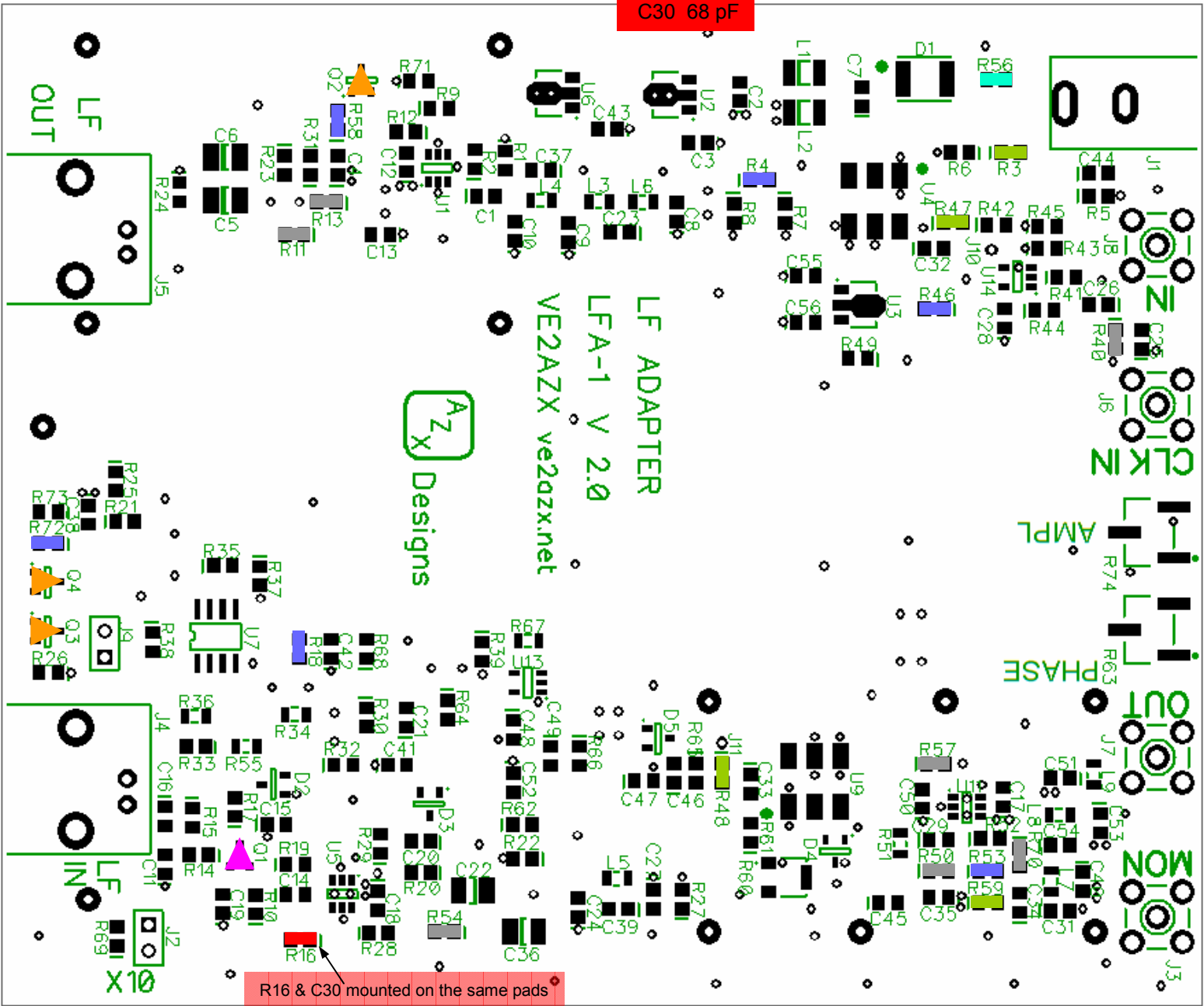
4



Q1 BFR30 Q2 - 4 2N3904 R56 3.3Ω R4, 18, 46, 53, 58, 72 18Ω R16 37.4Ω R11,13, 40, 50, 54, 57, 70 49.9Ω R3, 47, 48 ,59 68.1Ω

C30 68 pF

5



R16 & C30 mounted on the same pads

R5, 6, 9, 32, 41, 64 100Ω

R1 121Ω

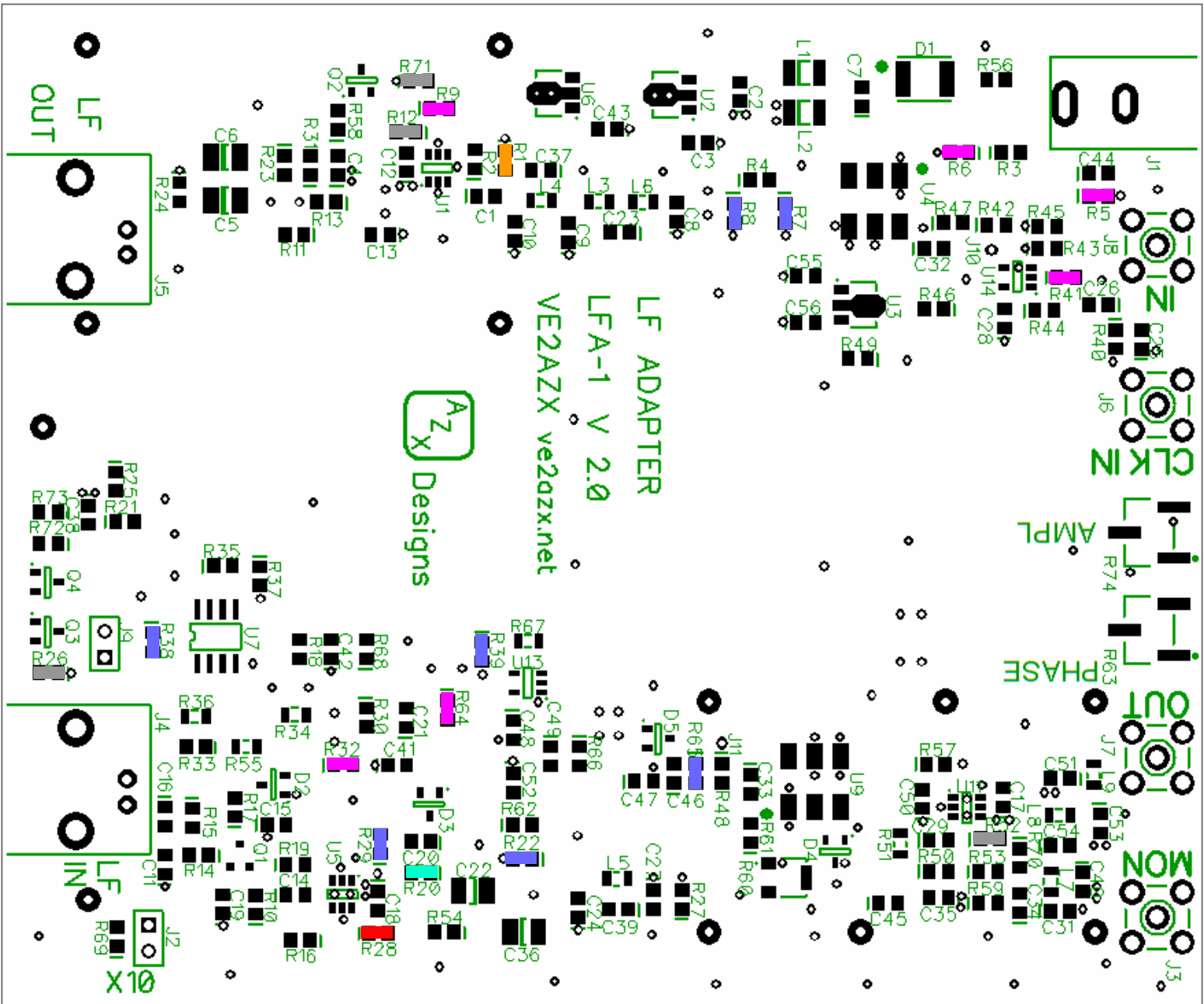
R20 178Ω

R7,8, 17, 22, 29, 38, 39, 65 301Ω

R28 453Ω

R12, 15, 26, 52, 71 604Ω

6



R33, 49, 51, 55 1K

R10 2K

R69 2.55K

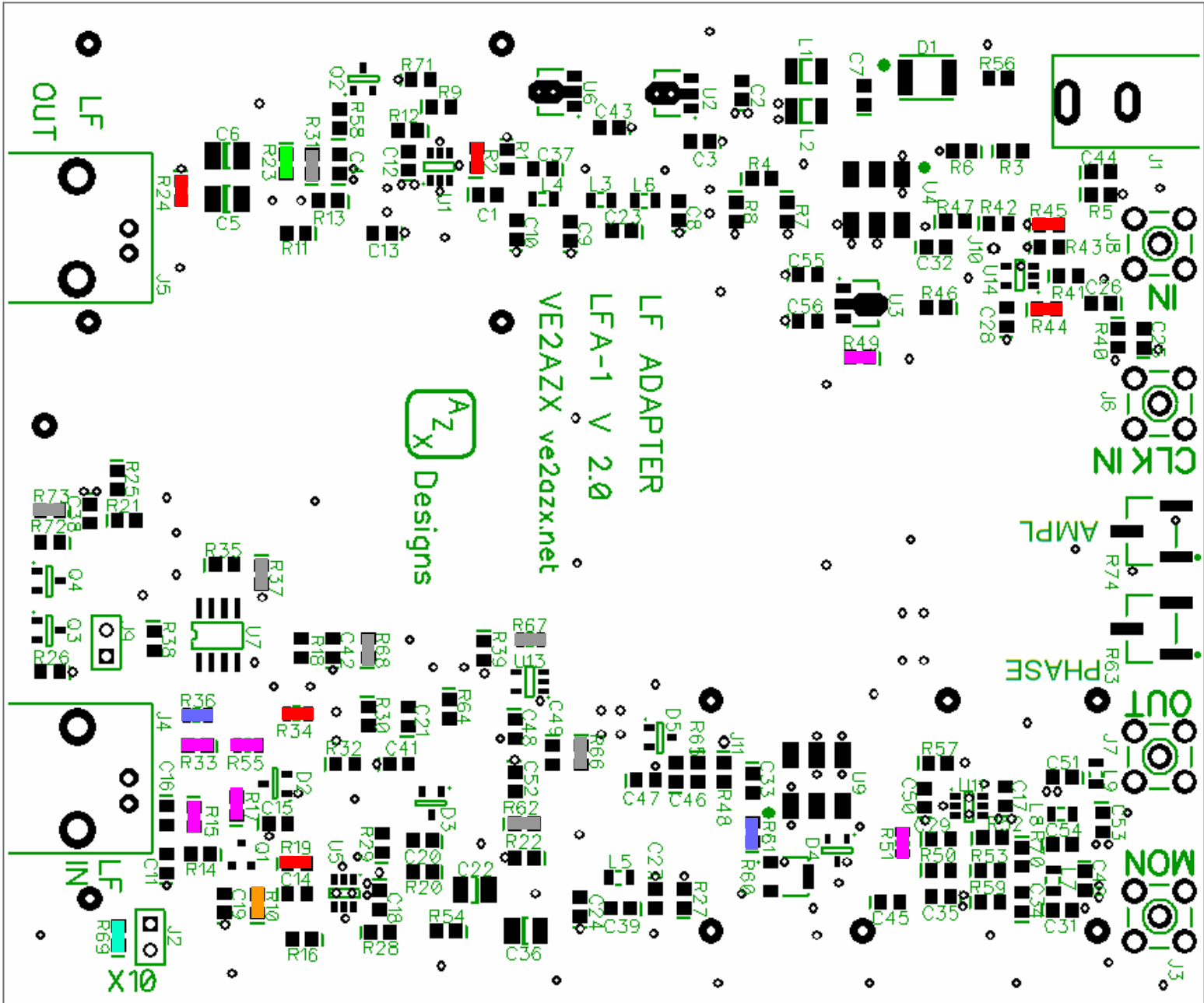
R36, 61 3.32K

R2,19, 24, 34, 44, 45 10K

R23 13K

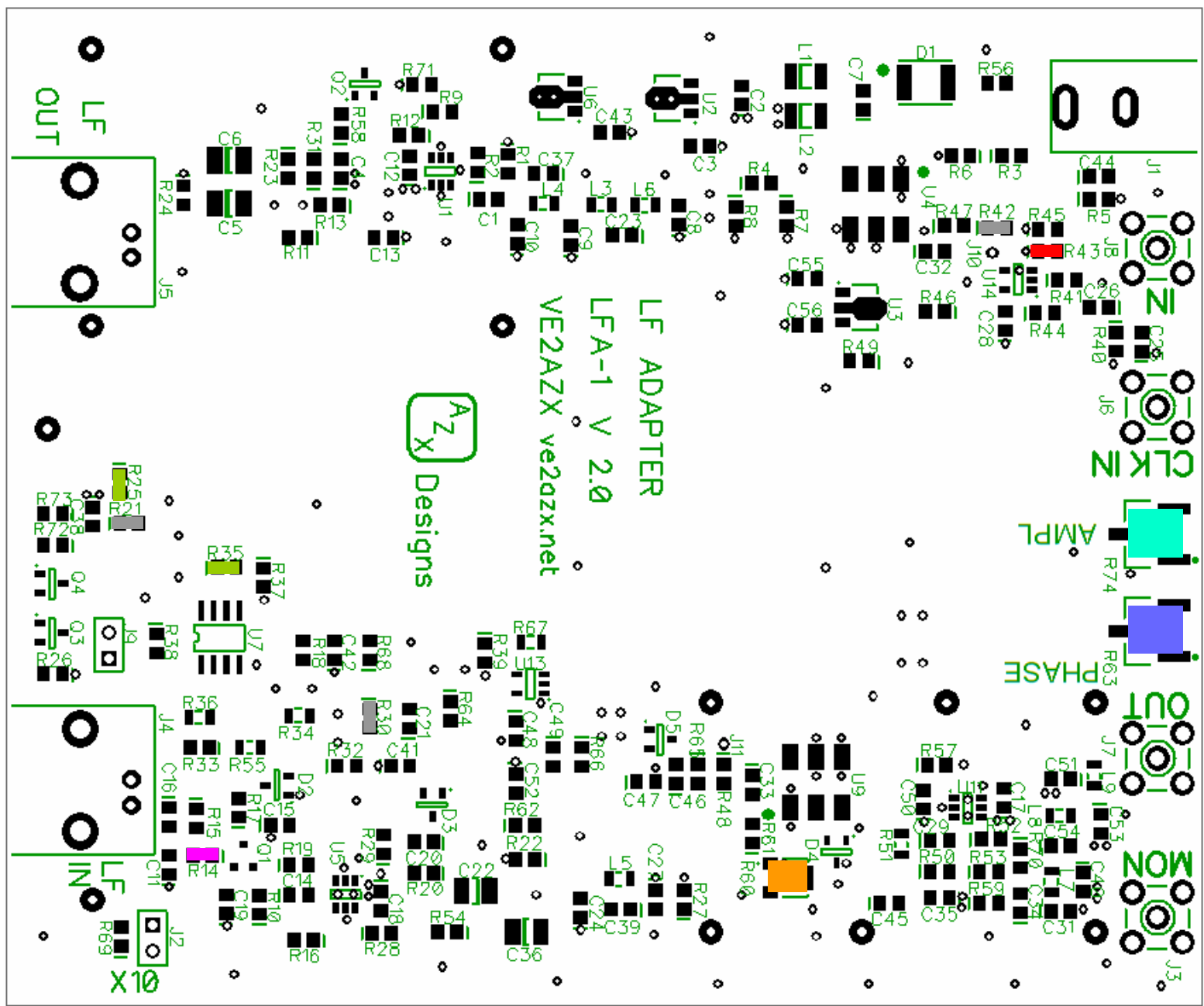
R31, 37, 62, 66, 67, 68, 73 20K

7



R43 43.2K
R21, 30 42 100K
R25, 35 200K
R14 1M
R60 POT 100
R74 POT 100
R63 POT 10K

8



U2,6 78L08

U3 78L33

Test as per Test Points

U1, 5, 11 4860

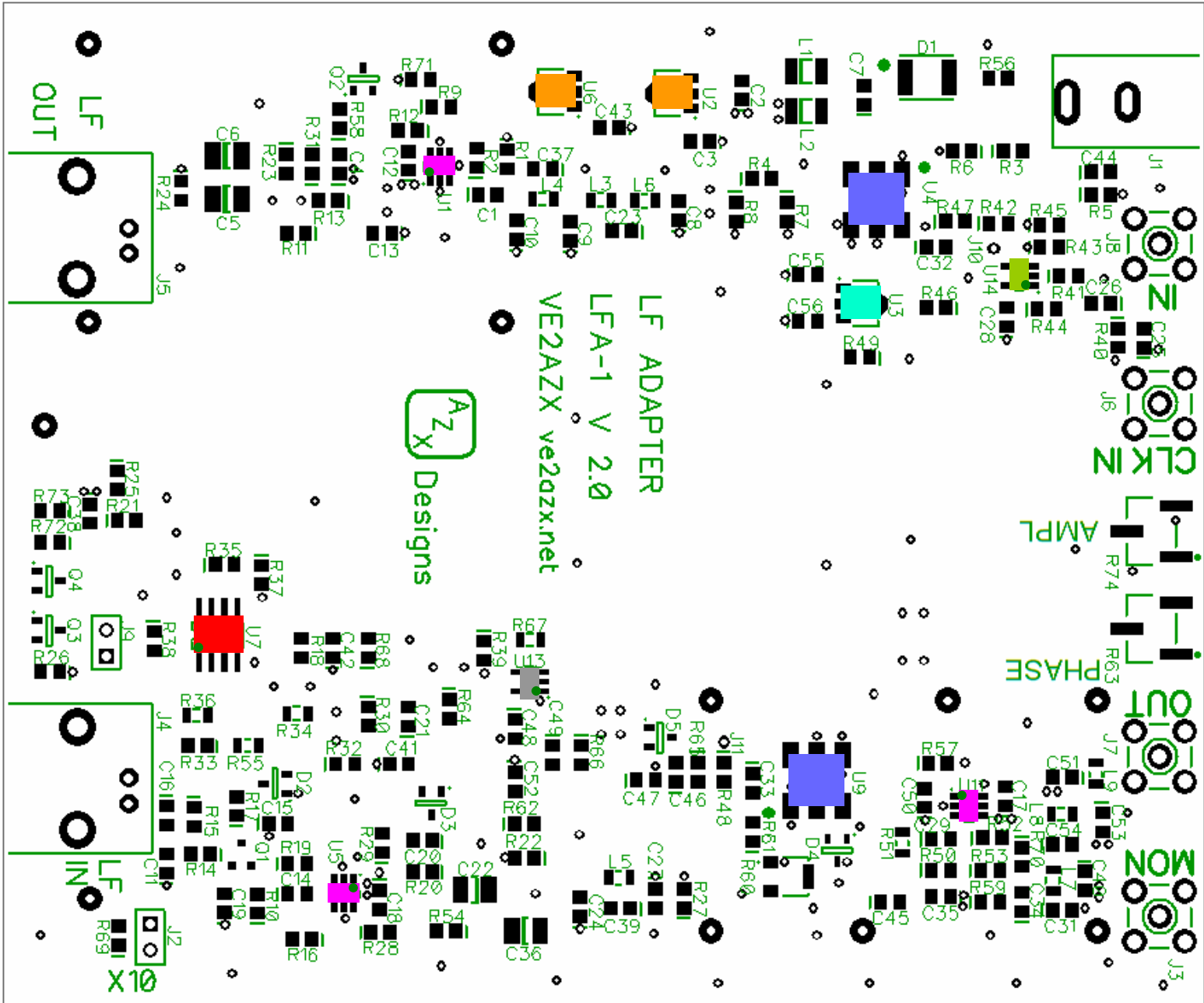
U4, 9 ADEX-10

U7 2904

U13 6231

U14 7SZ126

9



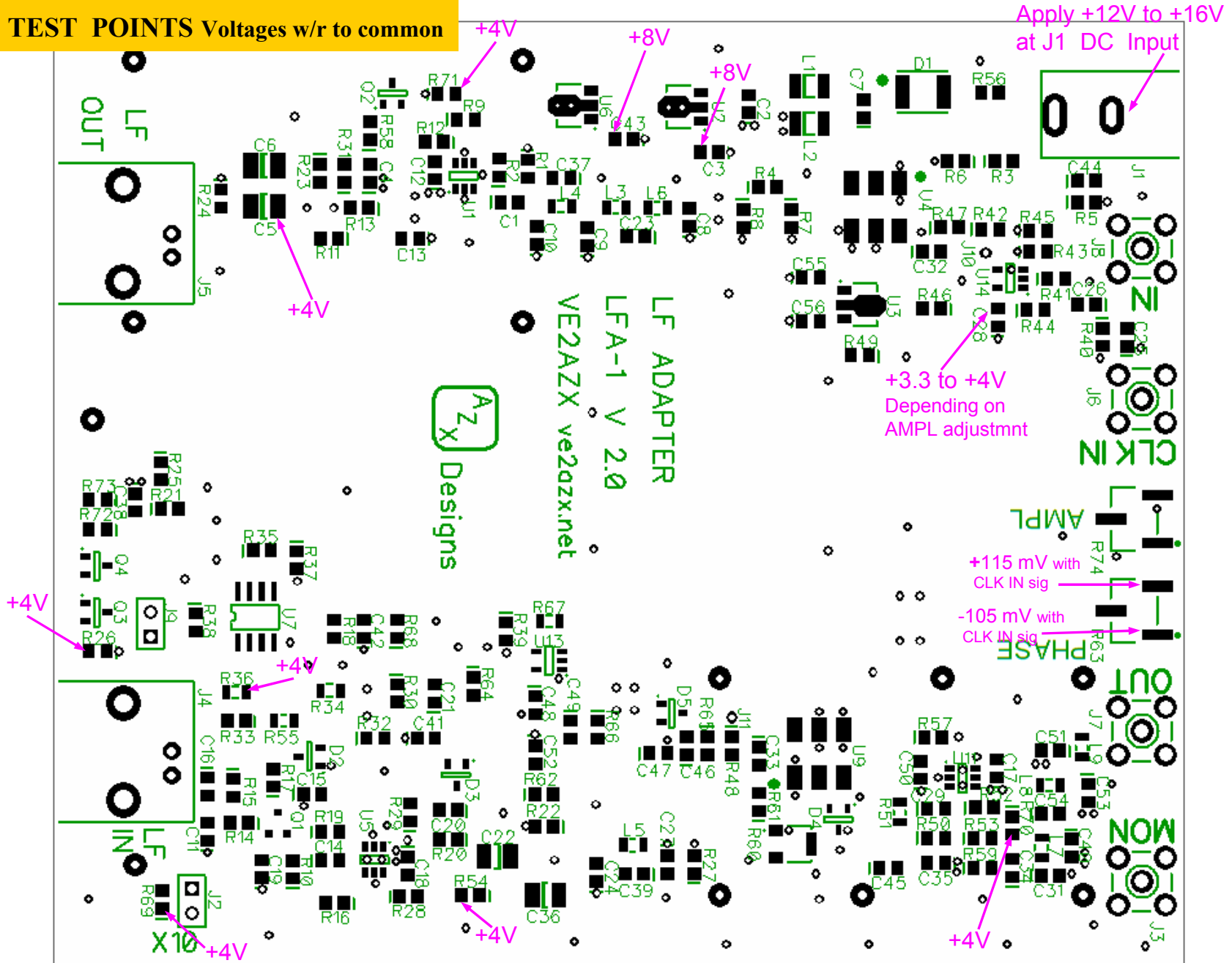
Solder the four SMA connectors, the two BNC connectors and the DC connector
On the ground plane side, connect a #30 insulated wire between J10 and J11

Proceed to test the assembled pcb before final assembly

TESTING

- DC Voltages. See next page.
- Back to Back Levels with VNA
- Check monitor output
- Adjust 10 MHz Carrier feedthru. See last page.

TEST POINTS Voltages w/r to common



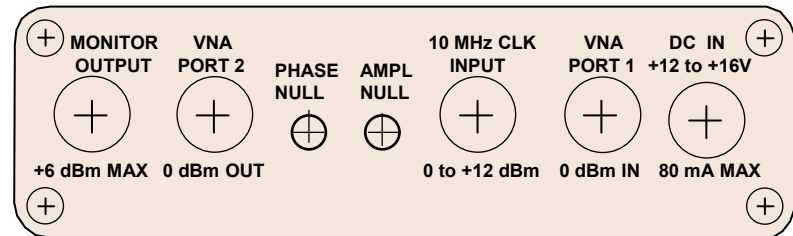
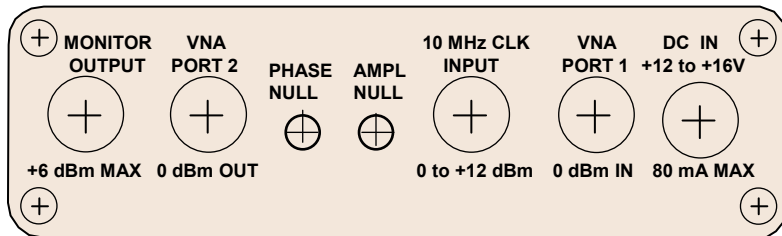
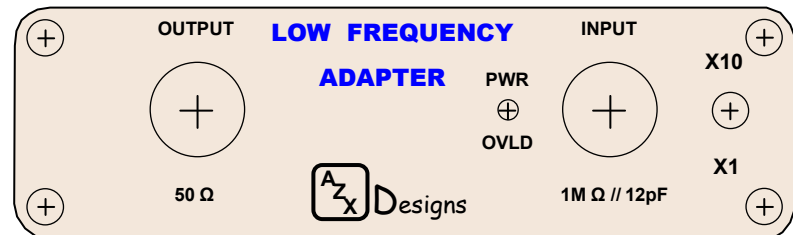
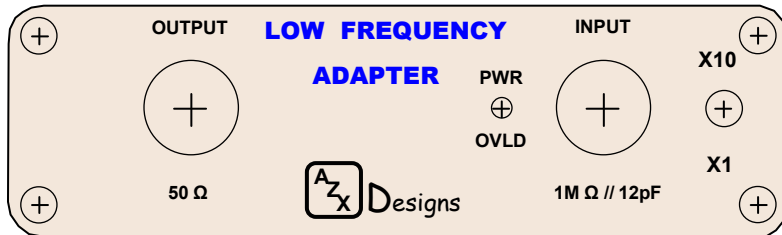
Cabinet Front and Rear Plates

- Front and rear drill templates, face plates and laminating sheets may be supplied by the author.
- Using scissors, cut the two supplied drill templates just inside the perimeter line.
- Place and hold the paper templates with transparent tape on the aluminium cabinet end plates.
- Using a sharp point, proceed to mark the hole location.
- Drill the holes as per size on the templates.

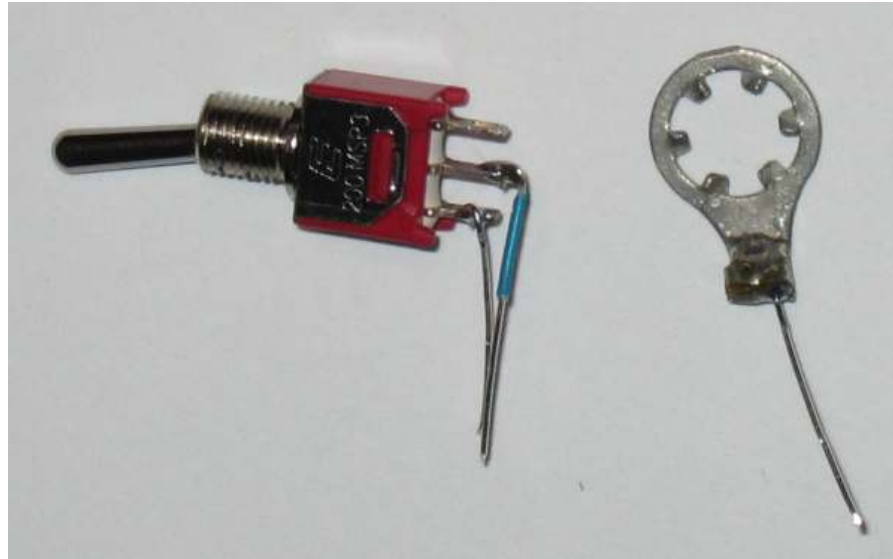
- Remove the paper template, clean the metal plates. Use sandpaper to roughen the plates before gluing.
- Cut the two faceplates papers just inside the perimeter line.
- Apply glue (such as carpenter's glue) to the metallic end plates. (A double side tape might work, but not tried)
Make sure to apply a bit of glue around the corners.
- Carefully apply pressure to one end of the faceplate, then to the remaining part.
Using a cloth, remove excess glue around the faceplate. Let dry under pressure.

- Cover the faceplates with self adhesive transparent laminating sheets that have been previously cut. (supplied)
- Using a sharp knife, (such as an Exacto) proceed to remove the laminating sheets and paper at the hole locations.
Be careful – do not remove excessive paper at the four corners.

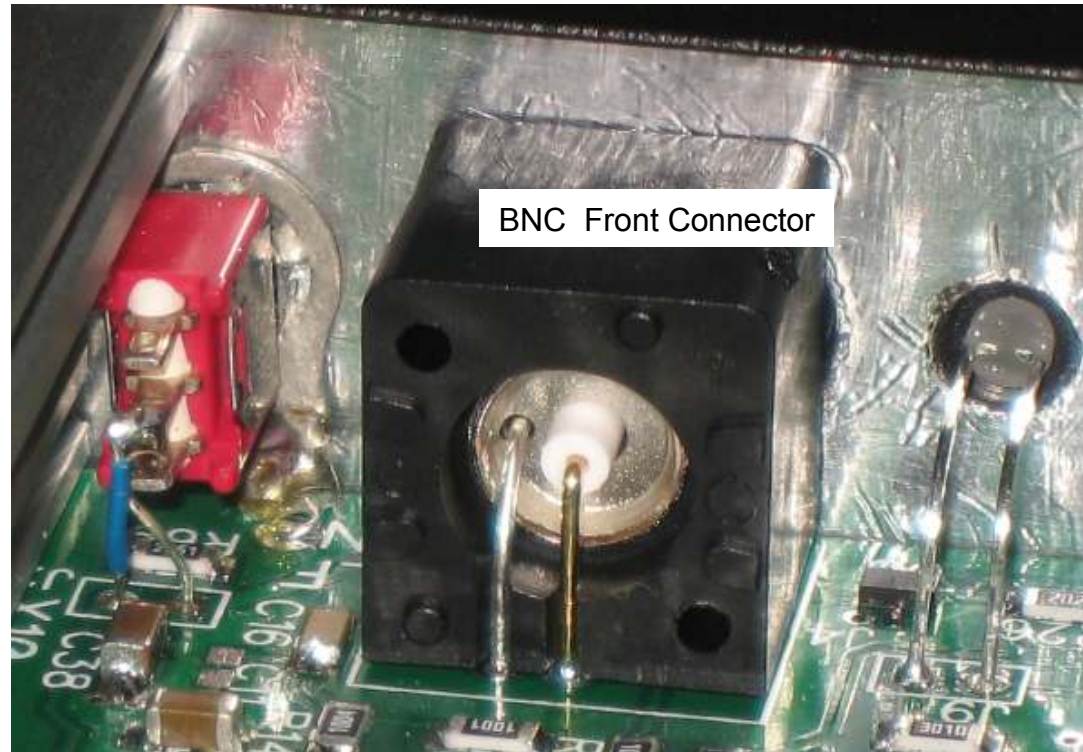
Front and rear drill templates and face plates



FINAL ASSEMBLY



- Bend the lug as shown.
- Solder two #26 wires to the switch, and one to the lug as shown.



- After the PCB has been assembled and tested...
- Install the switch with its lug on the front panel. Note that the lug is tilted somewhat.
- Place the front panel over the two BNC and orient the three wires in the pcb holes as shown in the picture. Use the hex nuts to attach the front panel to the two BNC. Use a long socket and finger tight only.
- Form the two leads of the led in a curved manner, so that the short lead will go in the square hole. Insert led in the panel and leads in the pcb at J9 location.
- Verify that the front panel fits properly in the cabinet, with the pcb attached.
- Solder all wires to the pcb.
- Apply power and check that the green led is on. Increase VNA output until LED turns red or up to approx. +6 dBm.
- Attach the rear faceplate. The VNA Adapter is ready to go. Set all 3 pots at mid position.
- Connect a coax between the LF Adapter out to in. Set the VNA to 100 Hz IF Bandwidth, 0 dBm output level.
- Sweep 10 MHz + 20 Hz to 10 MHz + 1000 Hz and adjust the internal LO amp null R60 to maximize attenuation.
- Adjust the LO Phase null pot R63 to maximize attenuation. Repeat with R60 and R63.
- Before making high attenuation measurements in the 20 Hz to 2 KHz region, adjust the two rear pots R74 and R63.