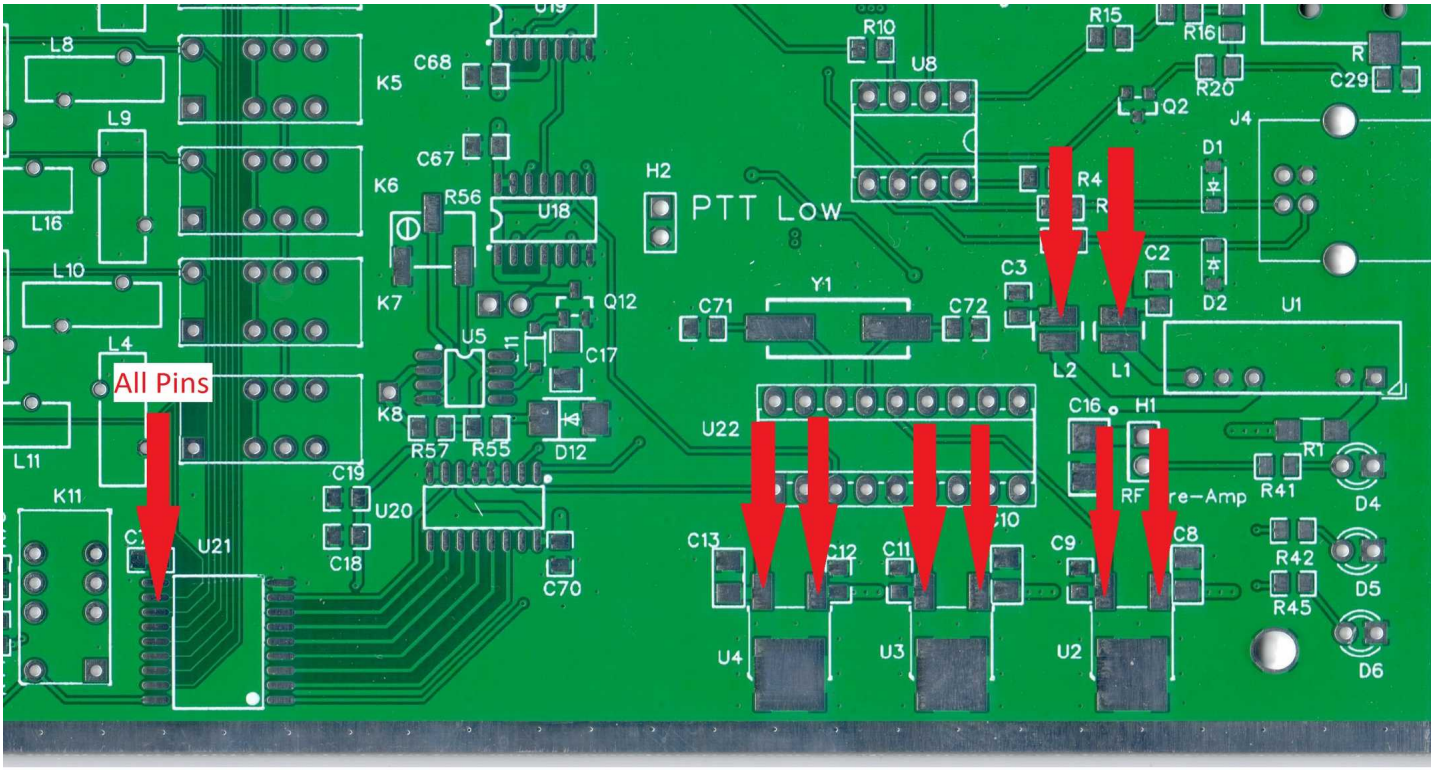
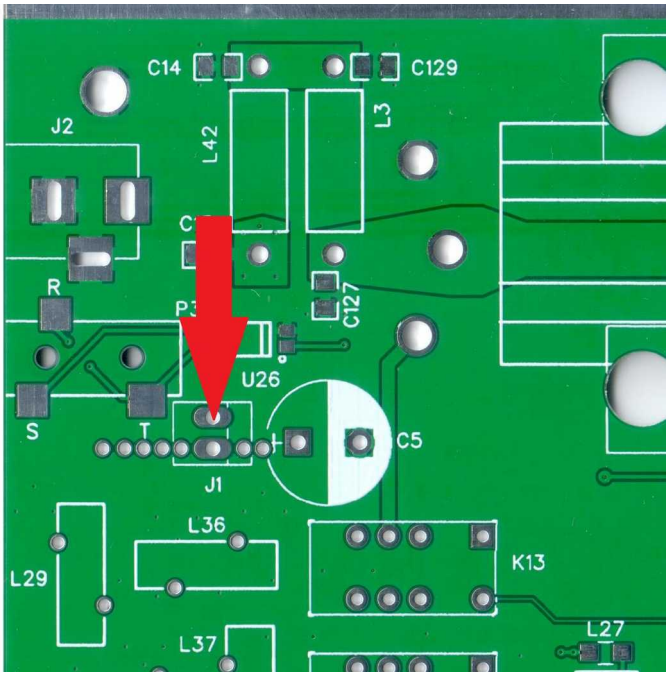
The Veteran SDR Transceiver
Assembly Instructions

Section 1: Checking PCB for internal Shorts

The first step is to check PCB for errors and to then check the power traces and relay control signal traces for shorts. Below are pictures with arrows showing where to test for shorts.

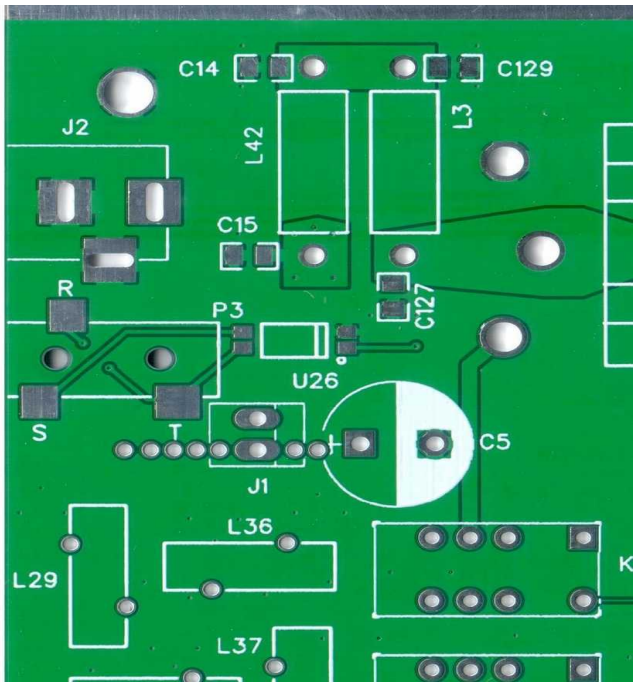




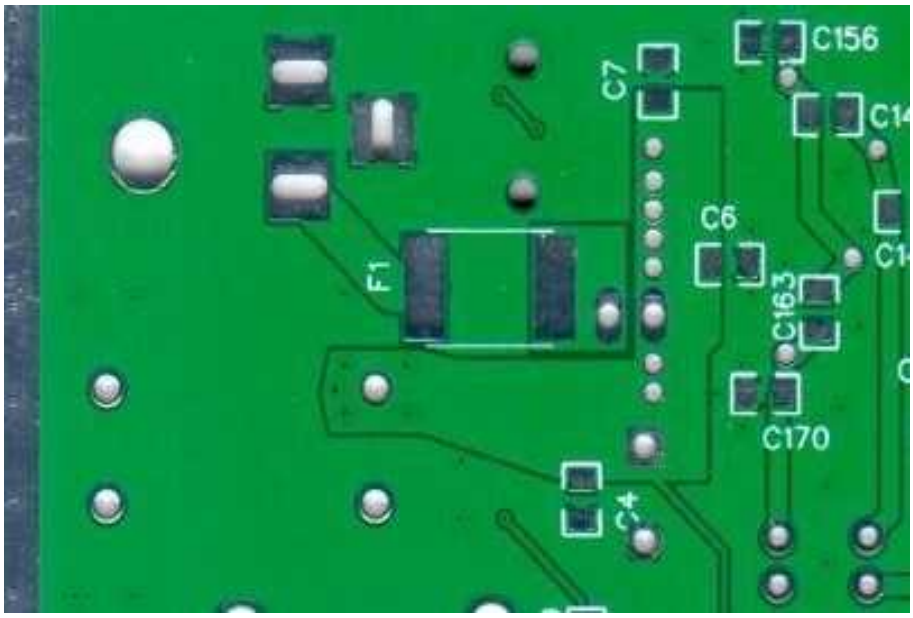
Section 2: Power Circuits

Installation of the Power regulators and associated components. The output of the NMV1215SC without a load will be well over 15 volts. To apply a load I install the DRV135 and INA163 Op Amps. Make sure you install the gain resistors for the DRV135 too. Once this is done check the output voltages, 3.3V, 5V and +- 15V at the output of the L2/L3.

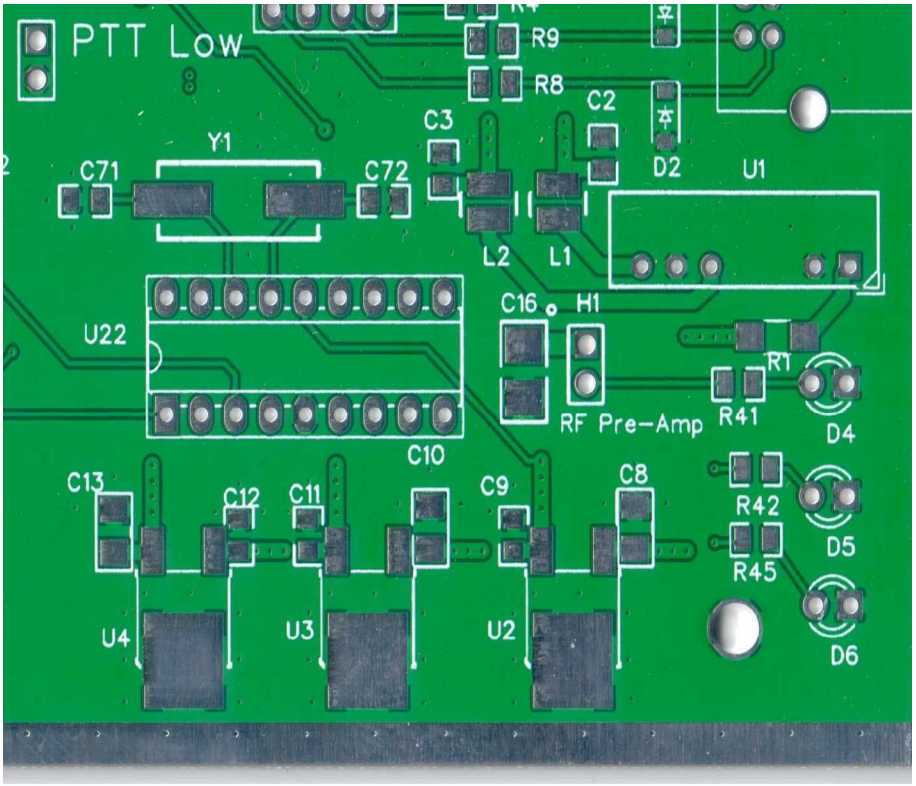
Install: J1
J2
C5



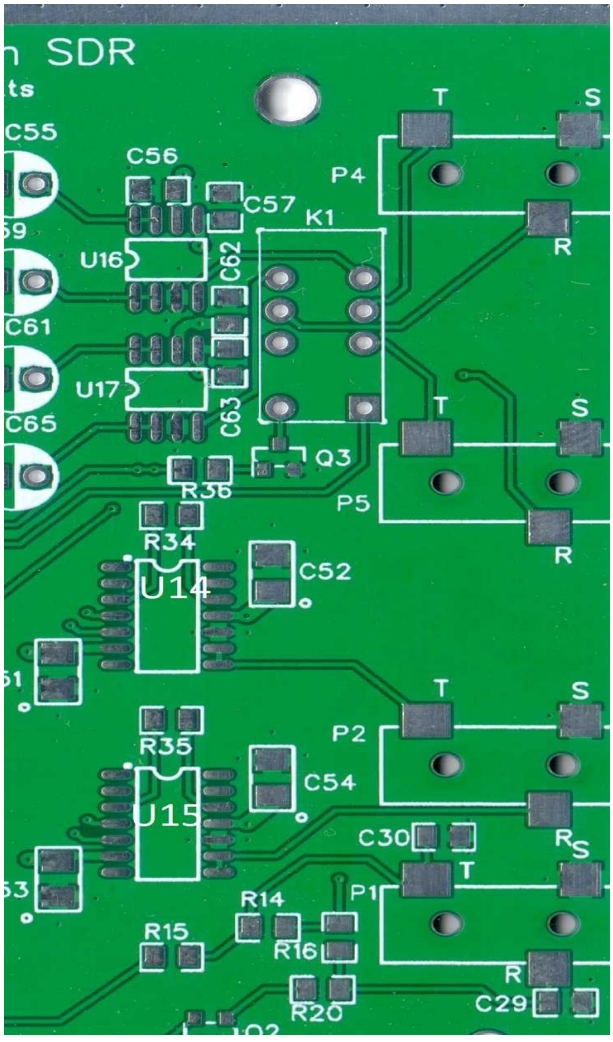
Install: F1
C4
C6
C7



Install: U1
U2
U3
U4
C8
C9
C10
C11
C12
C13
C2
C3
R1
L1
L3

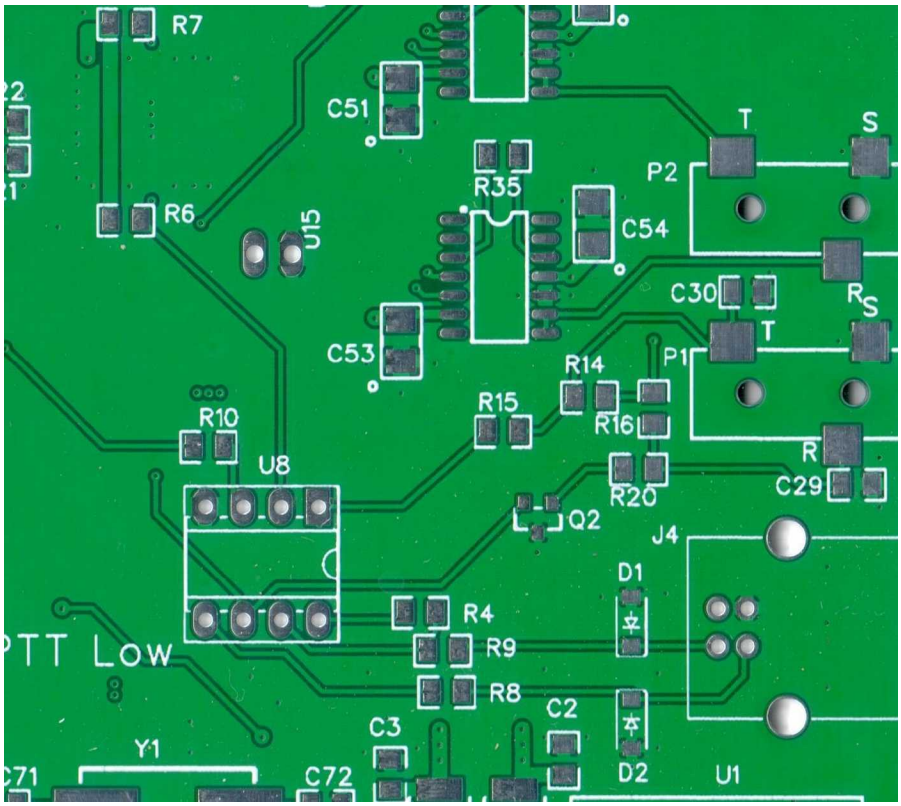


Install: U14
U15
U16
U17
C51-54
C56
C57
C62
C63
R34
R35

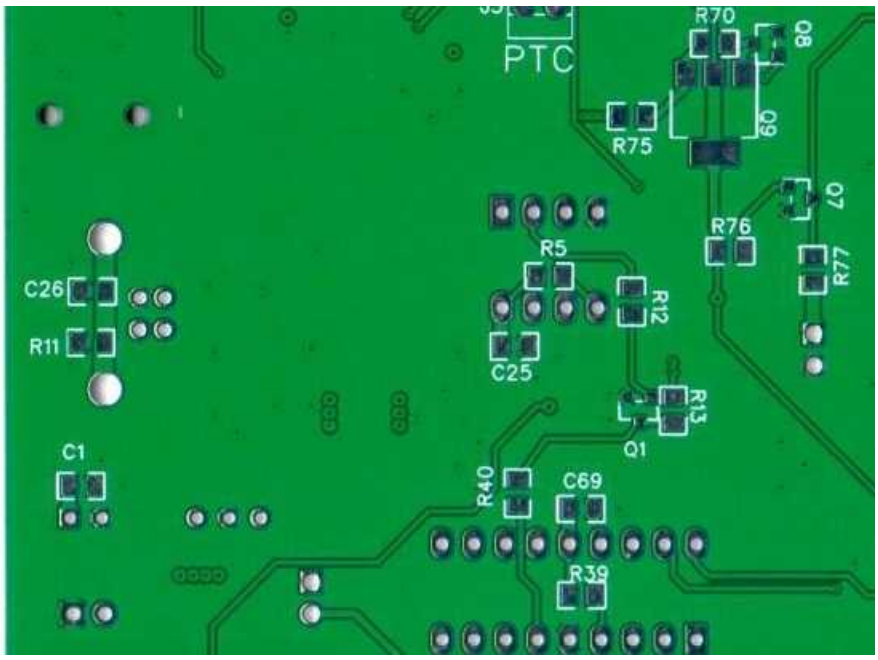


Section 3: USB Control Circuit and Oscillator

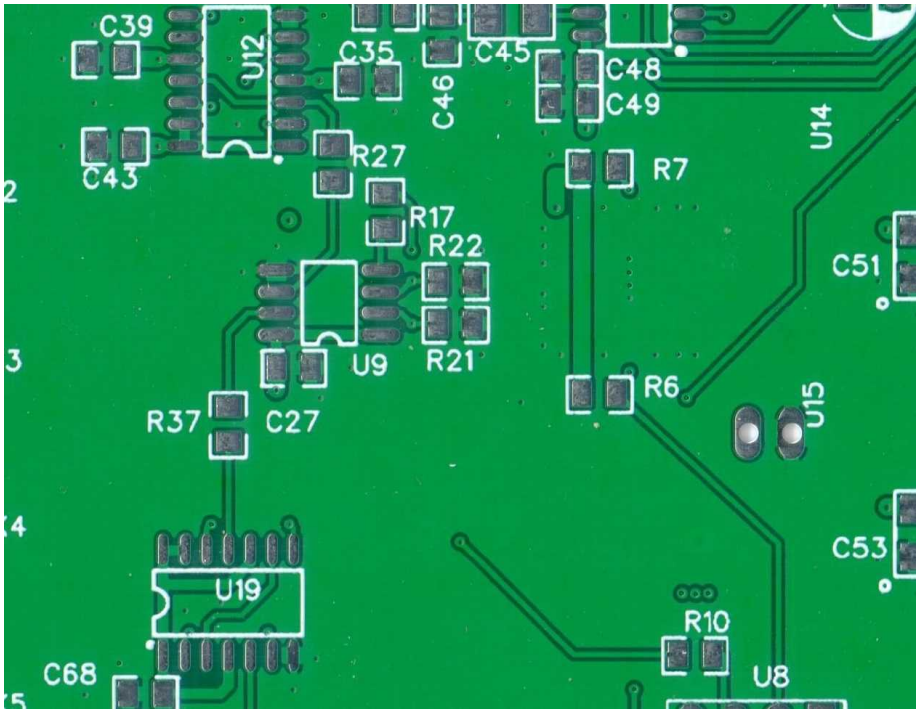
Install: U8 Dip Socket
J4
P1
P2
C29
C30
D1
D2
R4
R8-10
R14-16
R20



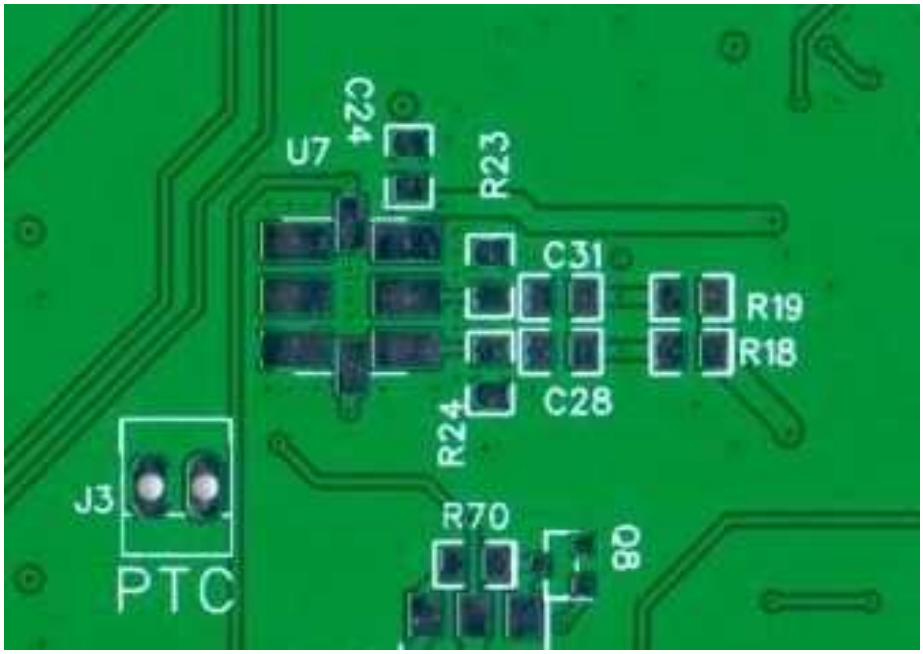
Install: Q1
Q7-9
C25
C26
R5
R12-13
R70
R75-77



Install: U9 C27
R6,7
R17
See below for R21,22



Install: U7
C24
See below for C28,C31, R18,19,28,31

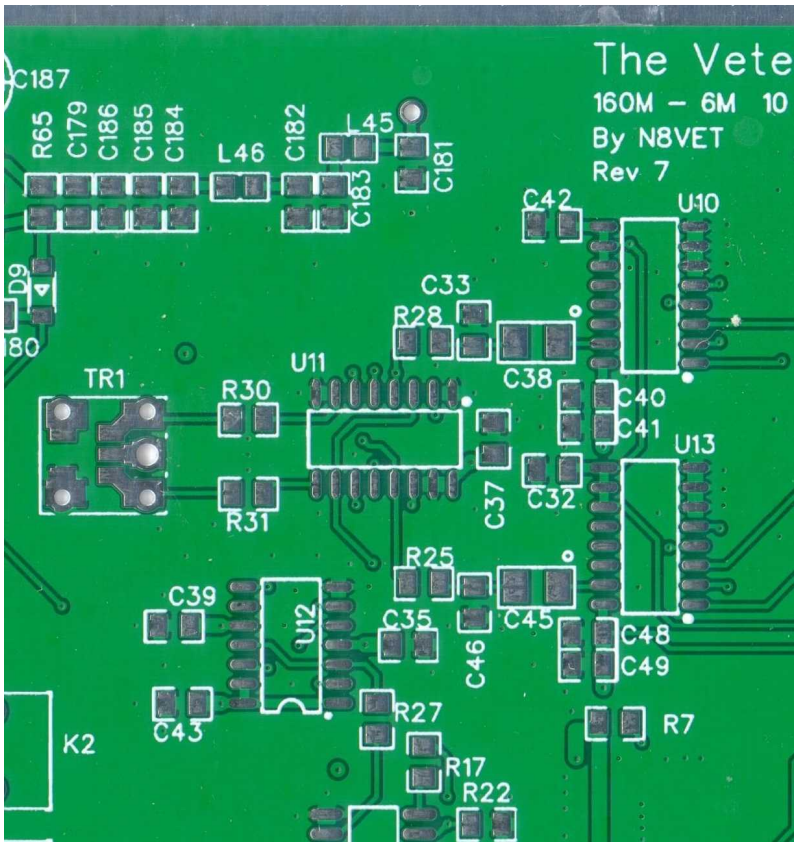


Si570 Options:

LVPECL install R21,22-130R; C28,31 0R; DNI the rest
LVDS Install C28,31-0R; DNI the rest
CMOS Install C31-0R; C28-0.1uF; R18-1.2K; R21-1K DNI the rest

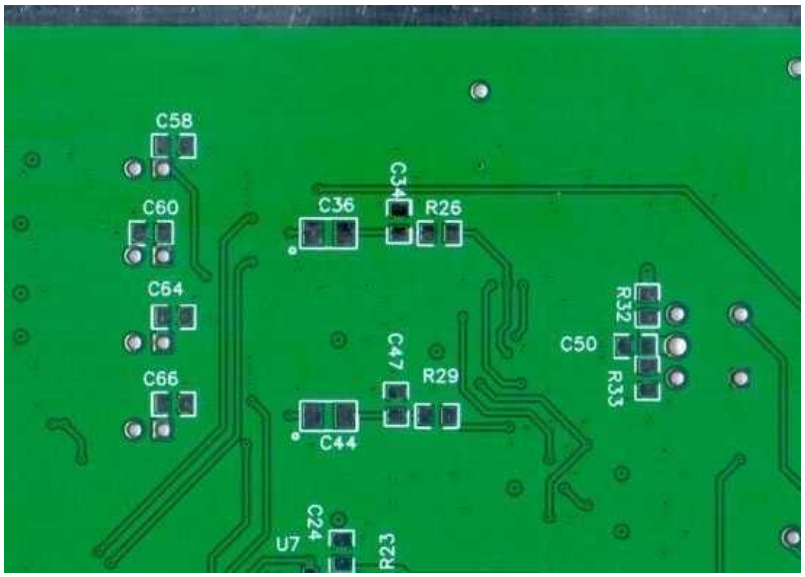
Section 4: Divider, Mixer and Audio Switching circuits

Install: U10-13
C32,C33,C35,
C37,C38,C39,
C40,C41,C42,
C43,C45,C46
C48,C49
R27-33
TR1



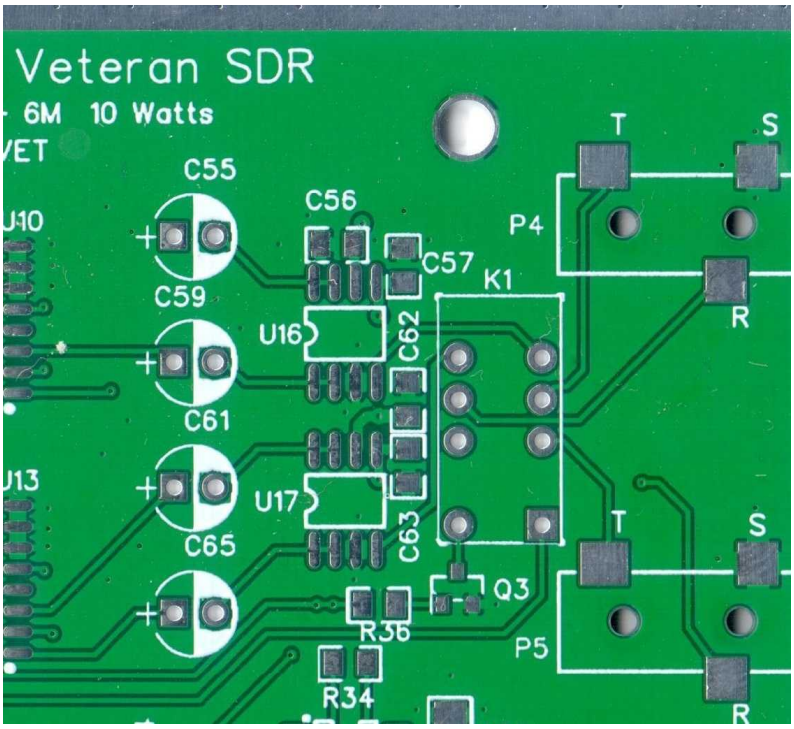
Install: C34,C36,
C44,C47,C50,
C58,C60,C64,C66

R26,R29,R32,R33



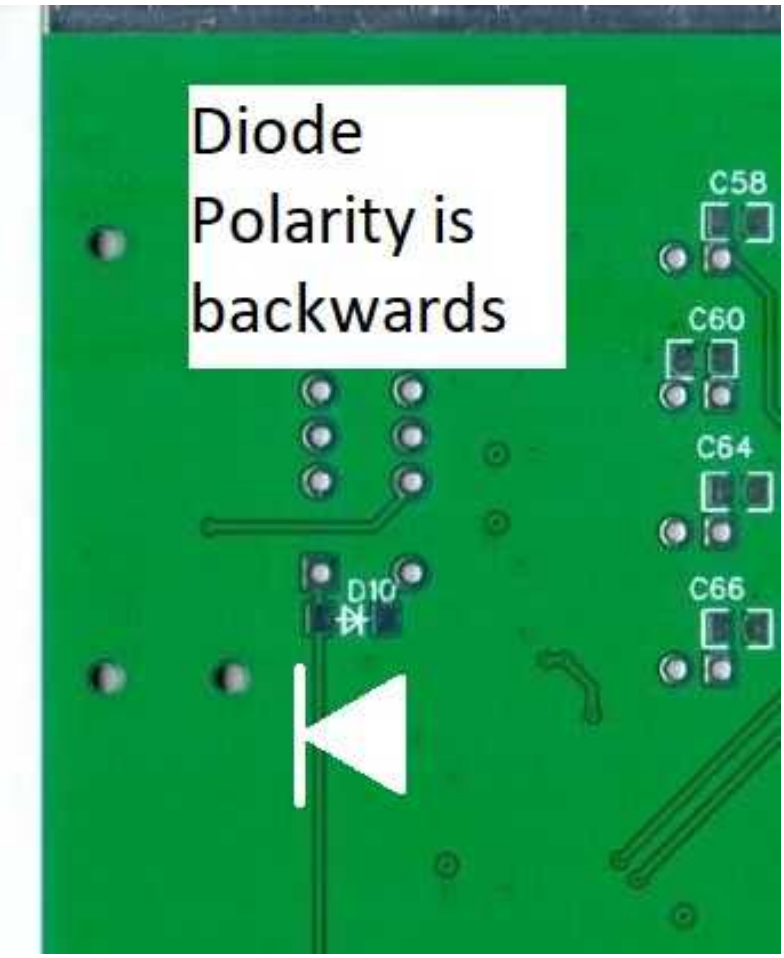
Section 5: TX circuit

Install: P4,5
Q3
K1
C55
C59
C61
C65
R34



On PCB's marked Rev 7 the diode silkscreen is backwards. Boards marked Rev 2.2 is correct

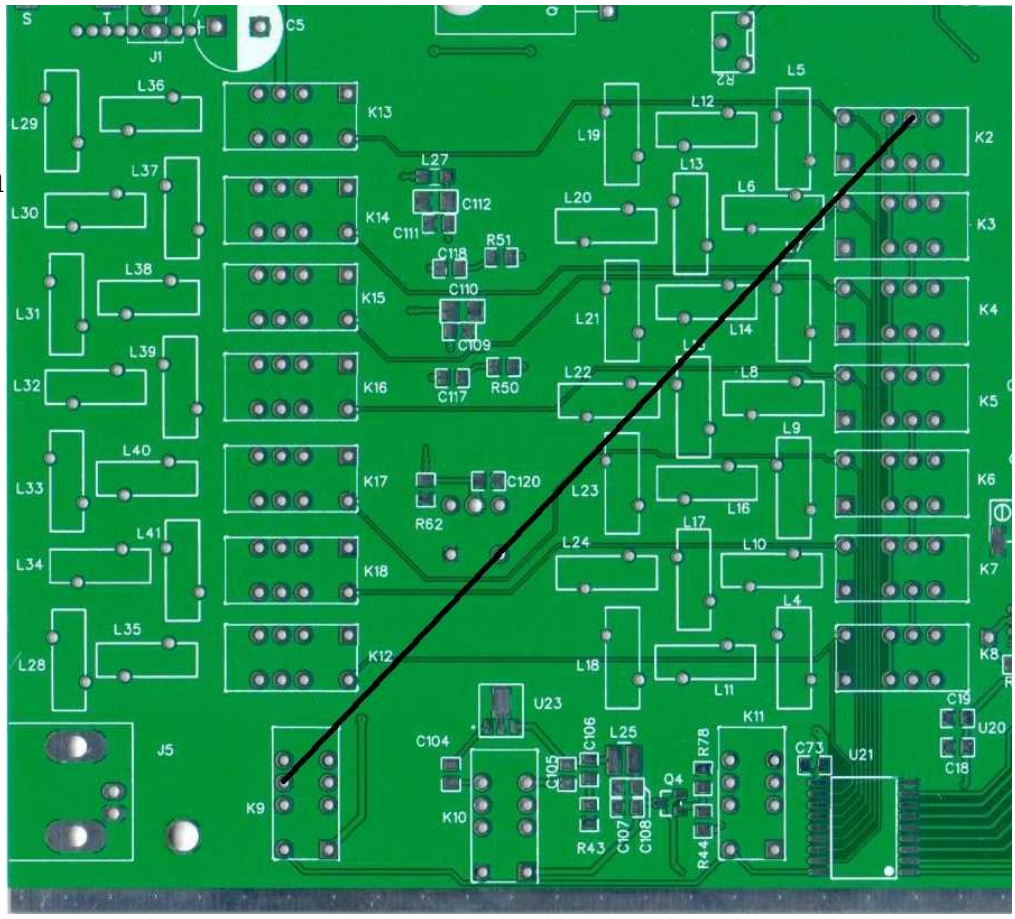
Install: D10



Section 6: Testing the Receiver

Install: J5 Jumper from K2 to K9 as shown in picture.

Connect to antenna :)

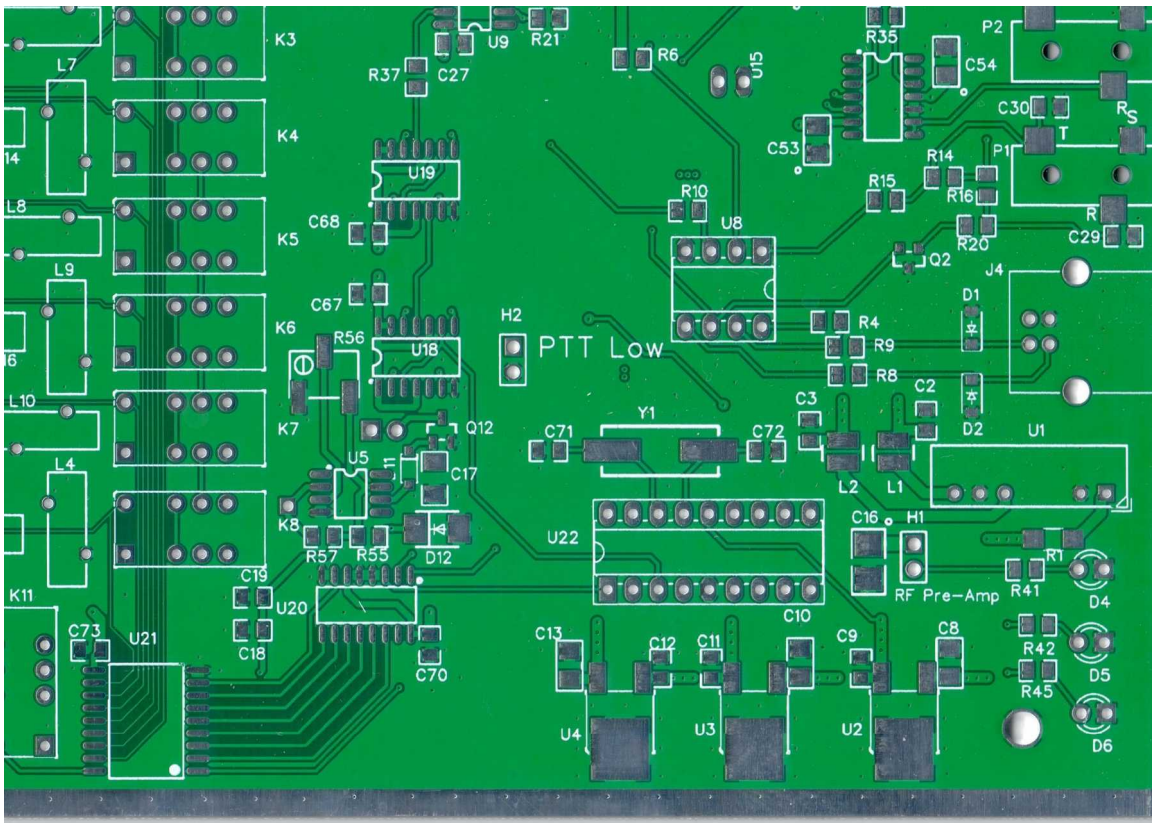


Refer to Software Setup and calibration Document to test radio.

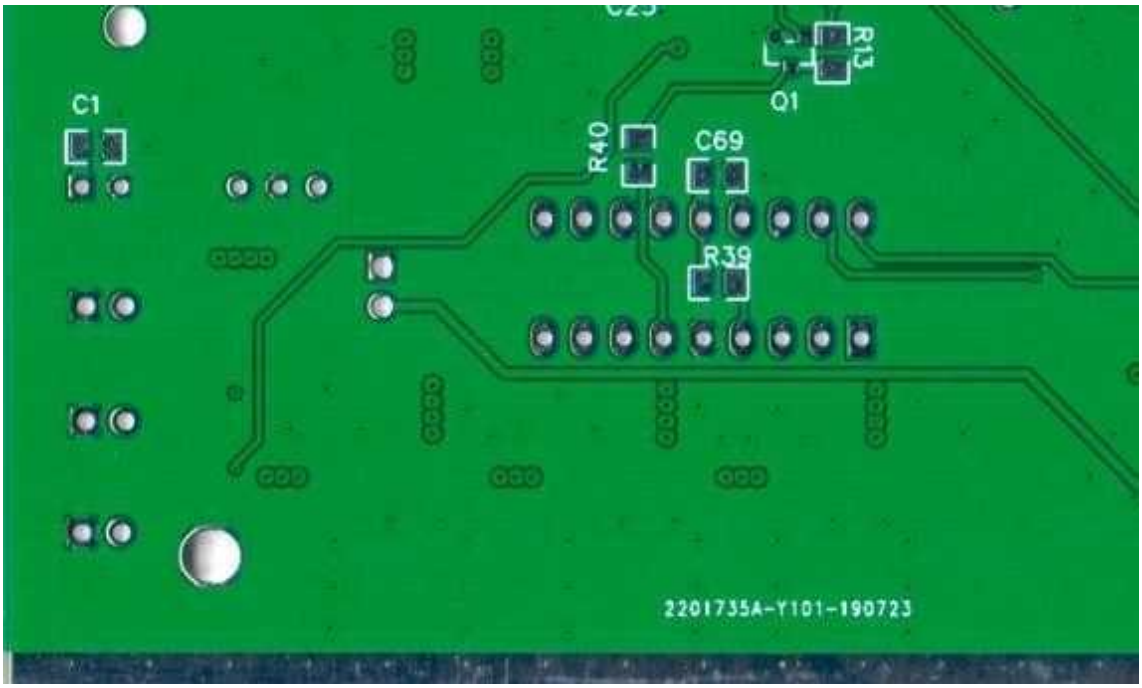
Section 7: Filter Switching Circuits

Install: 18pin
DIP Socket

U18-22
C67-68
C70-73
R37-40
Y1

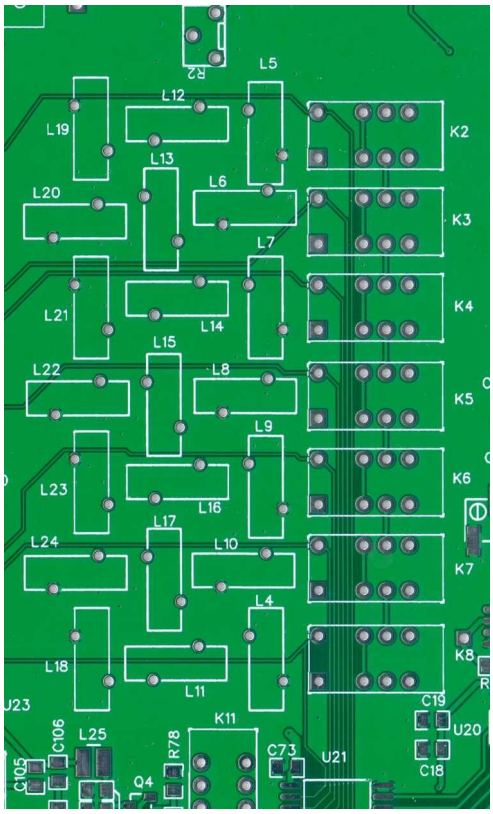


Install: C69
R39
R40

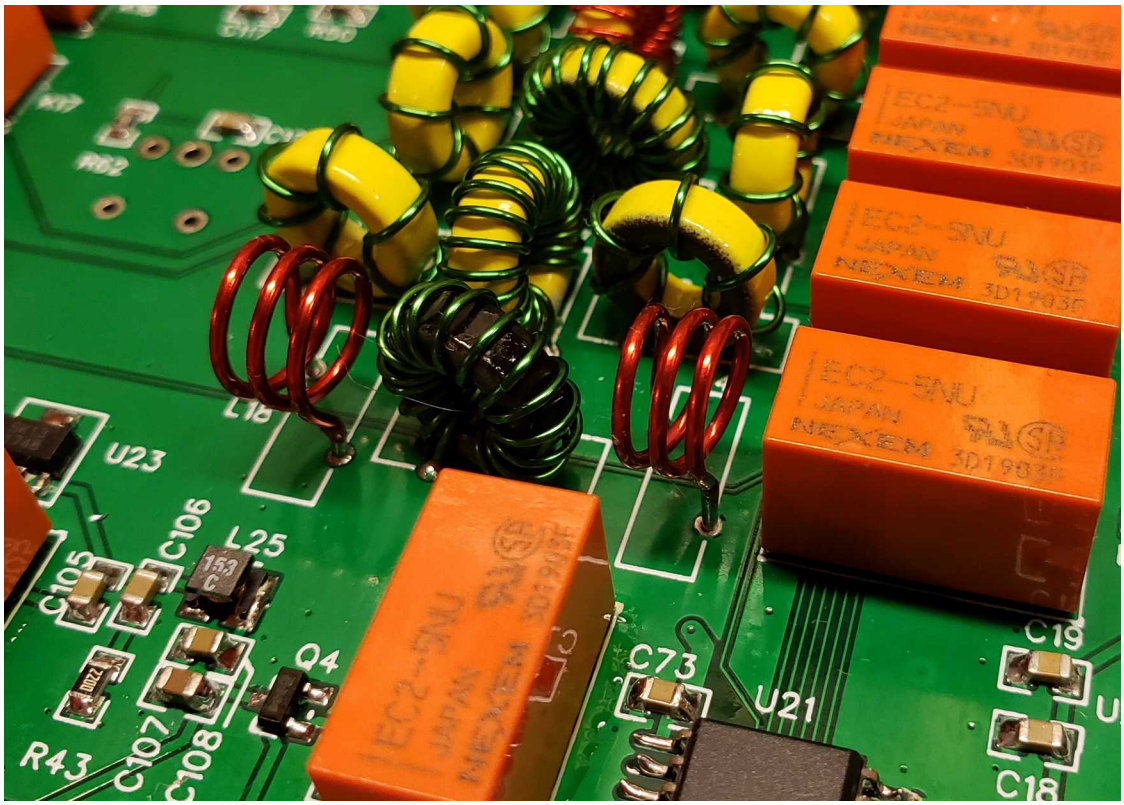


Section 8: Band Pass Filters

There are a lot of part there so I won't go into each part. Generally the assembly should go like this. Install all the capacitors according to the BOM/Schematic. Wind and mount the toroids. Then mount the relays. Make sure you use solder flux/flux pen on the relay pins to ensure good solder flow.



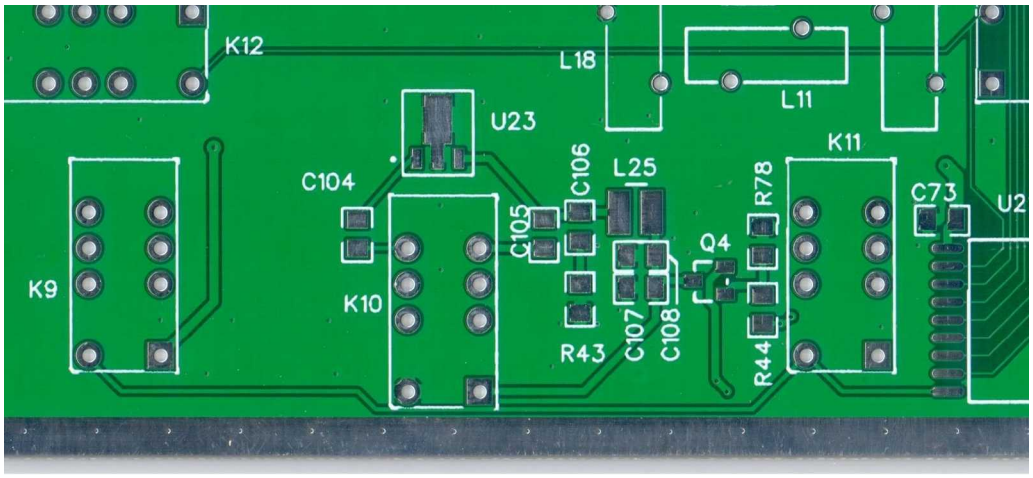
Here is what the 6M filter should look like. Make sure the air coils are mounted above the PCB.



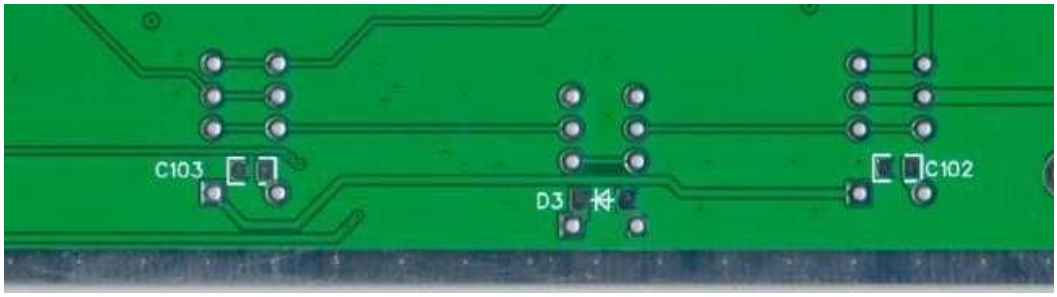
Section 9: RF Pre-Amplifier

Install: U23
C104-108

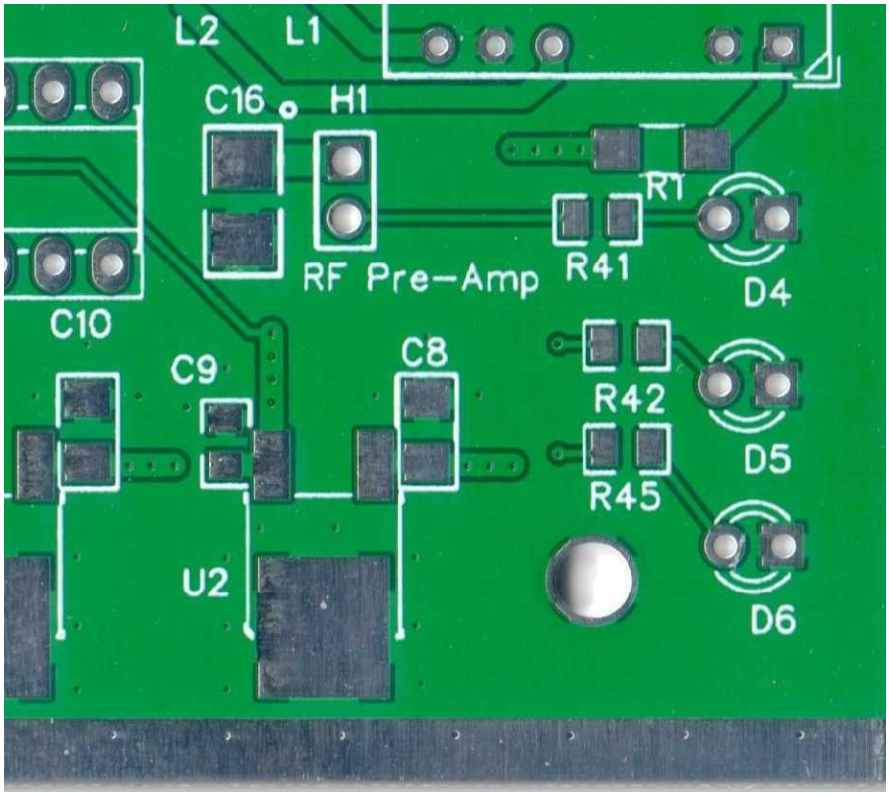
R44,43
R78
L25
K10,11



Install:
C103,102
D3

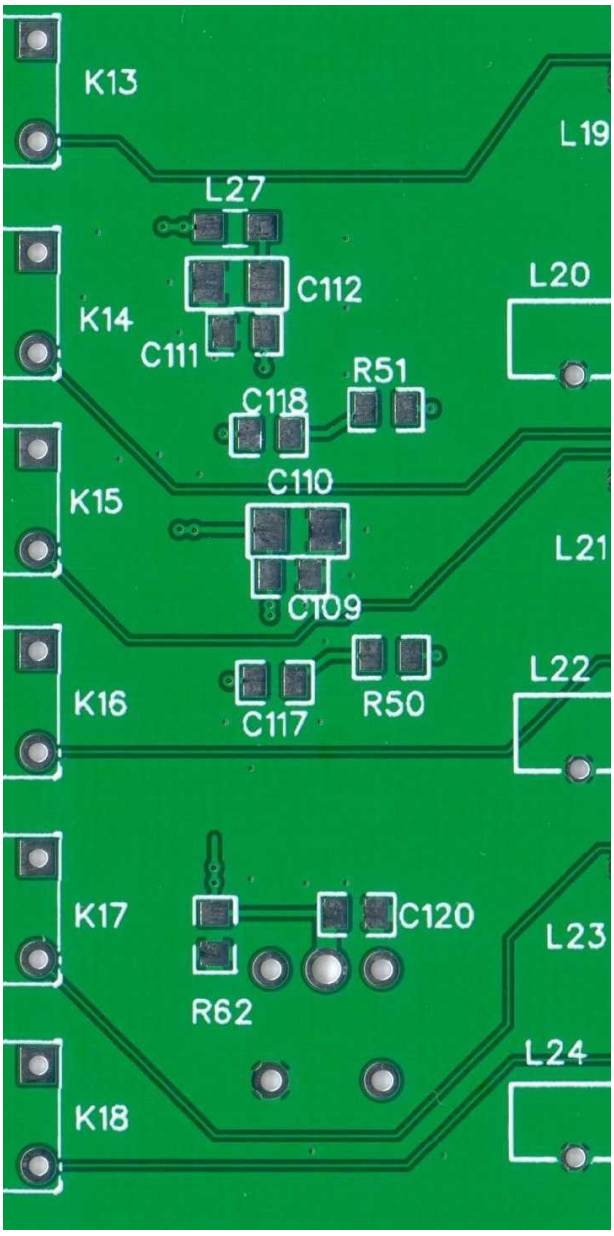


Install: R41,42,45
C16
D4,5,6
H1



Section 10: Amplifier Driver Stage

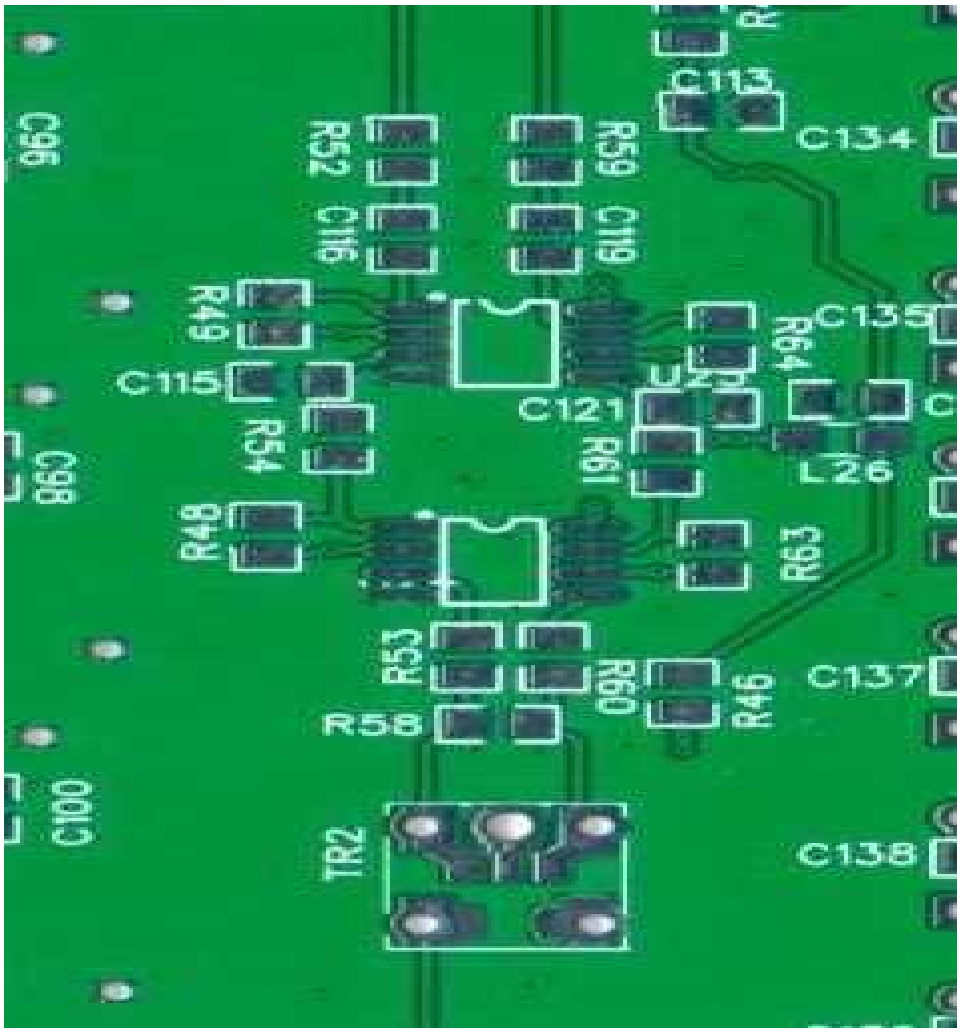
Install: C109,110,111,112
C118,120
R50,51,62
L27



Install: U24,25
C113,115,
116,119,121

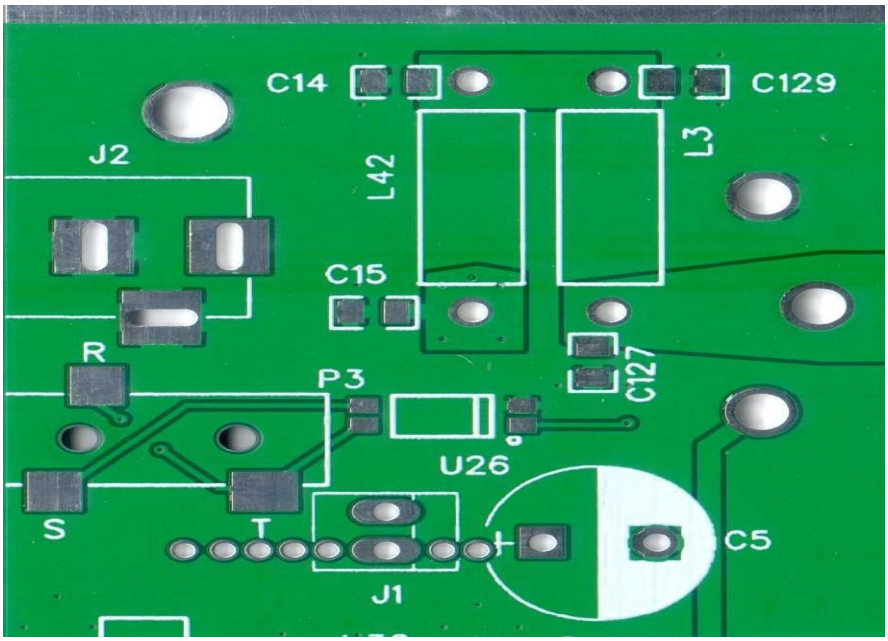
R46,48,49,
52,53,54,
58,59,60,
61,63,64

L26
TR2

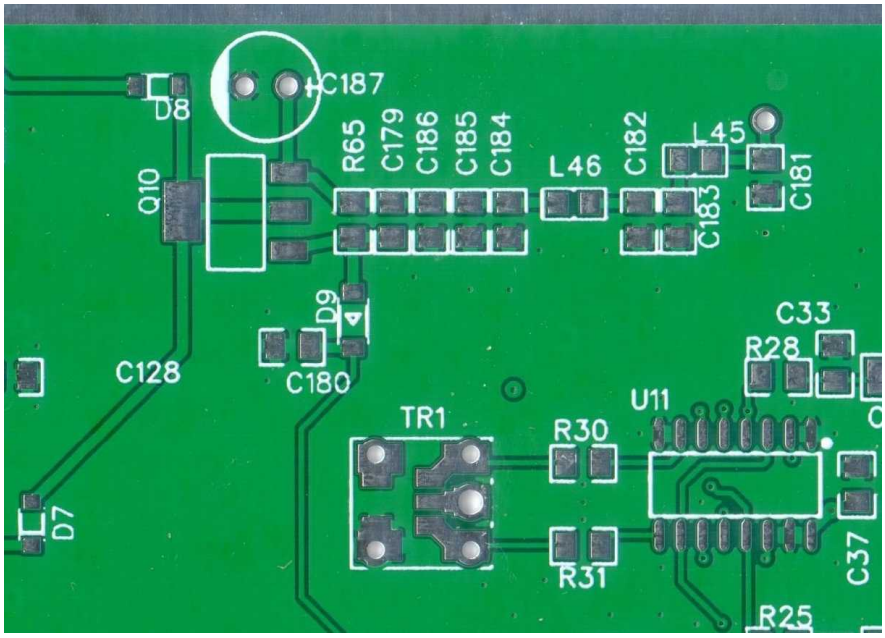


Section 11: Amplifier Section

Install: U26
P3
C14,15
C127,129
L3,42

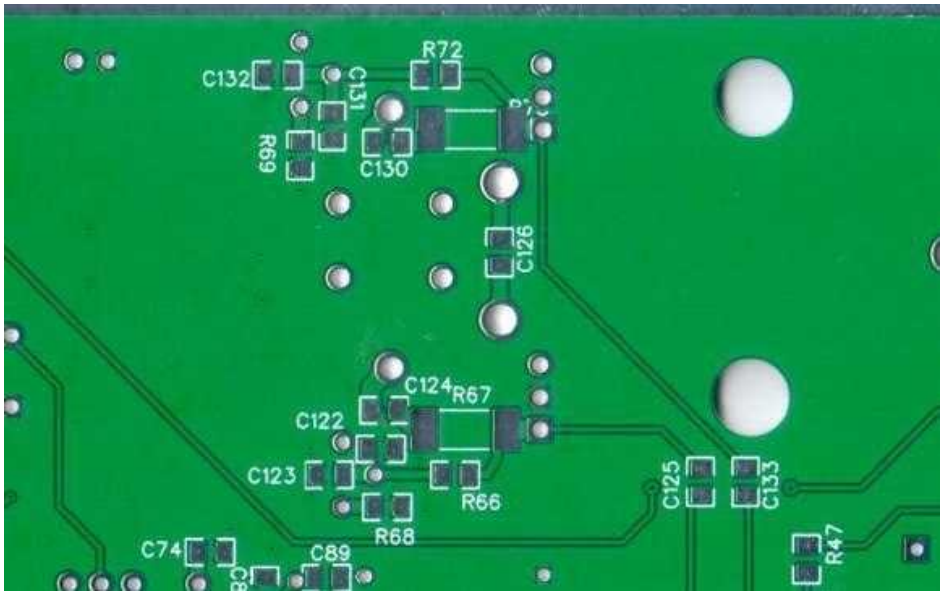


Install: Q10
C65,179,180
181,182,183
184,185,186
187
D7,8,9

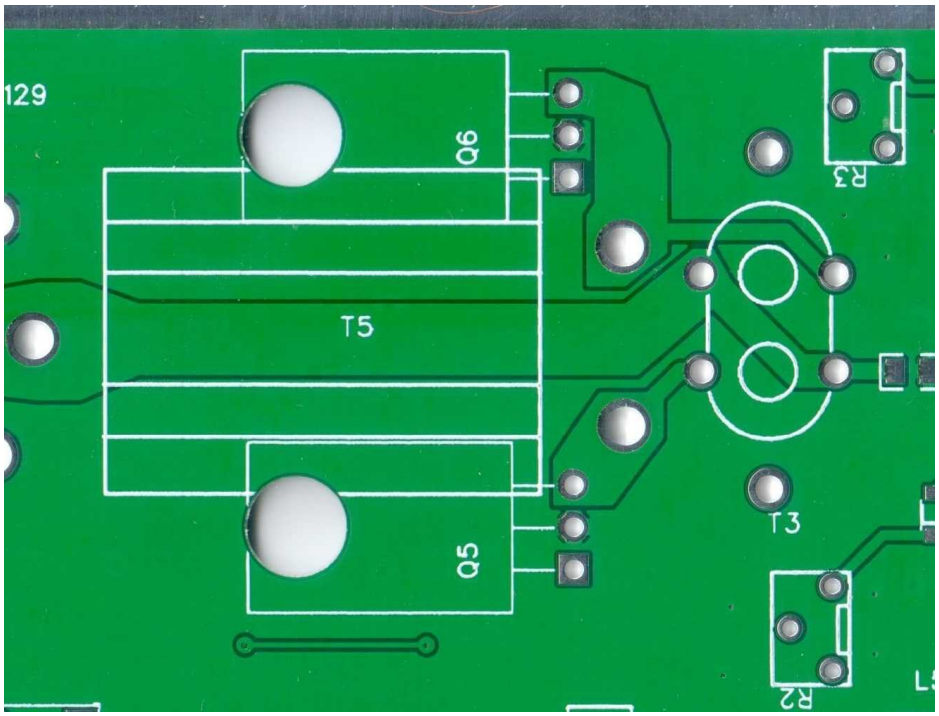


Install: C122,123
124,125
126,130,
131,132,
133

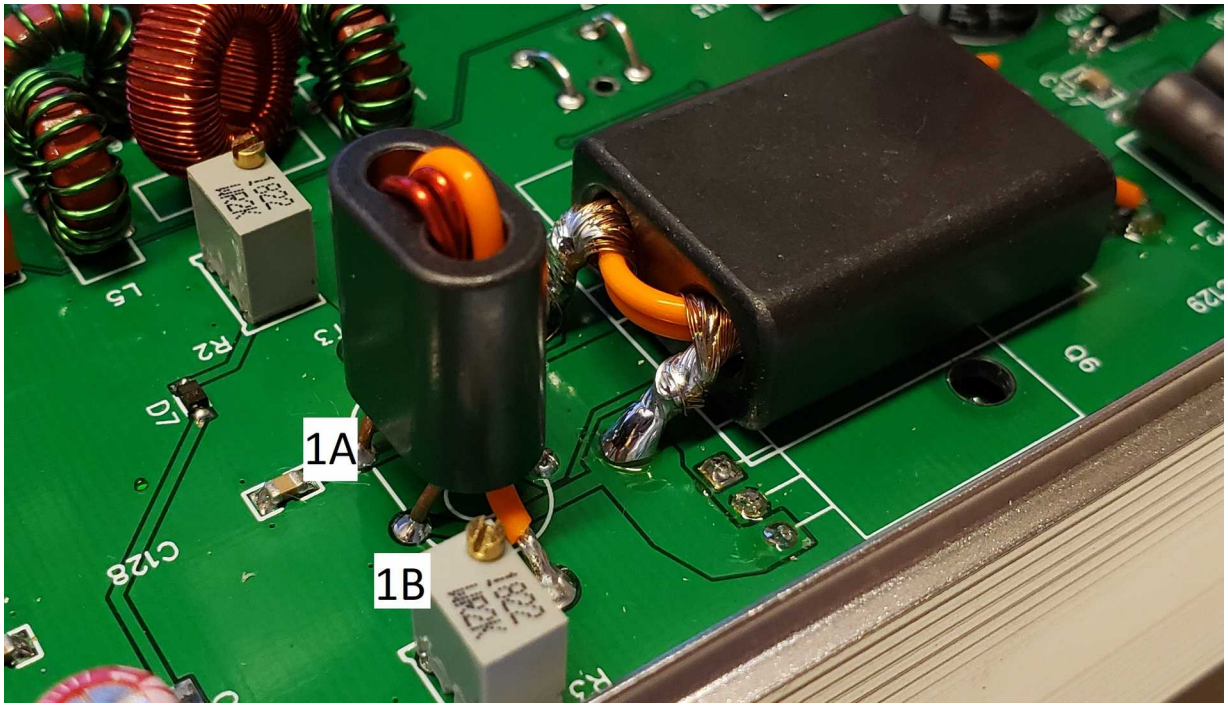
R66, 67
68,69,72
73

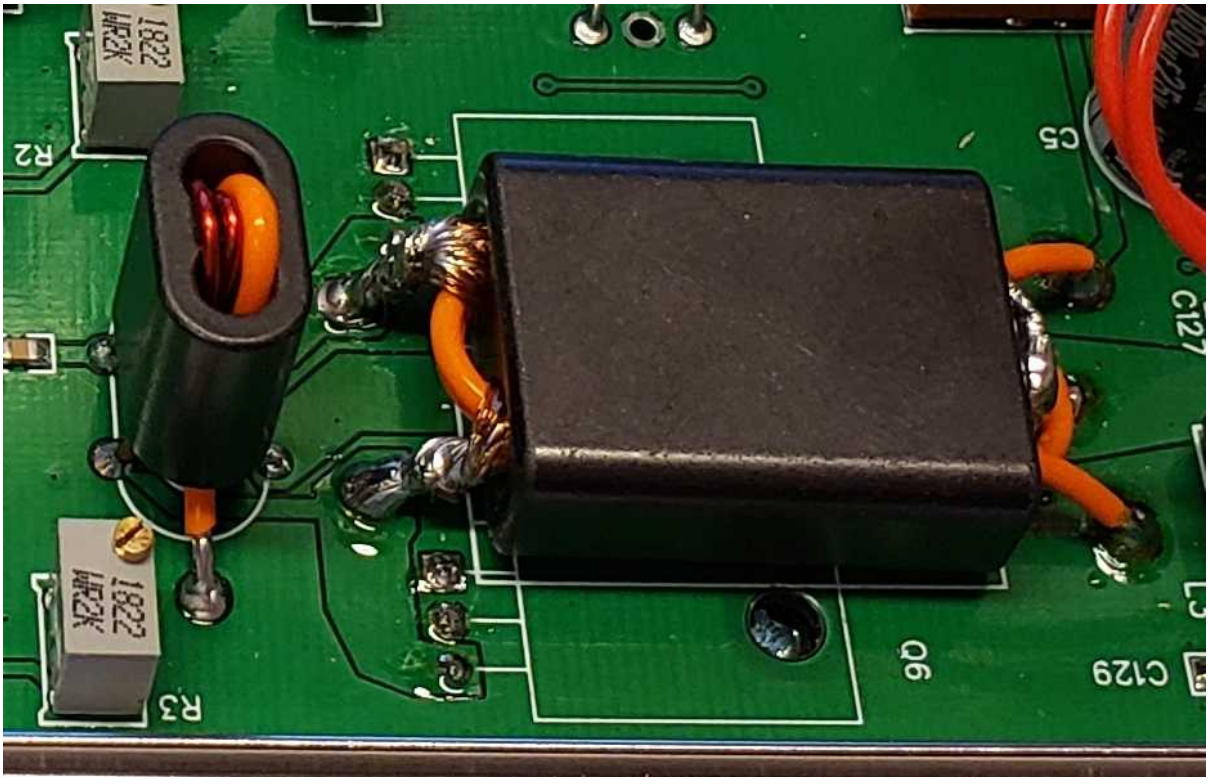


Install: C126
R2,3
T3
T5



T3 and T5 details below

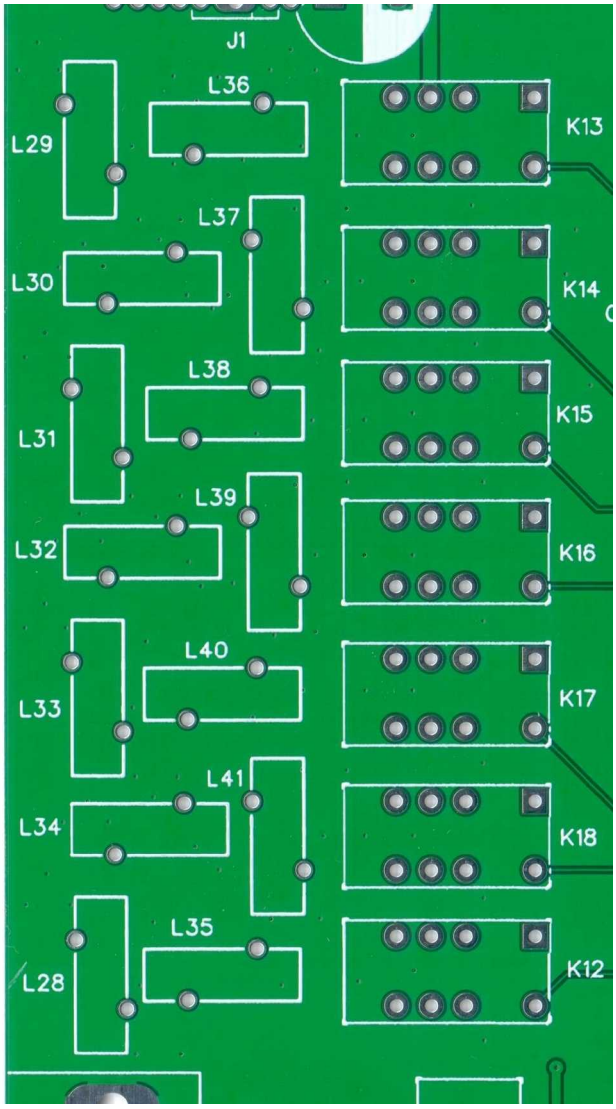




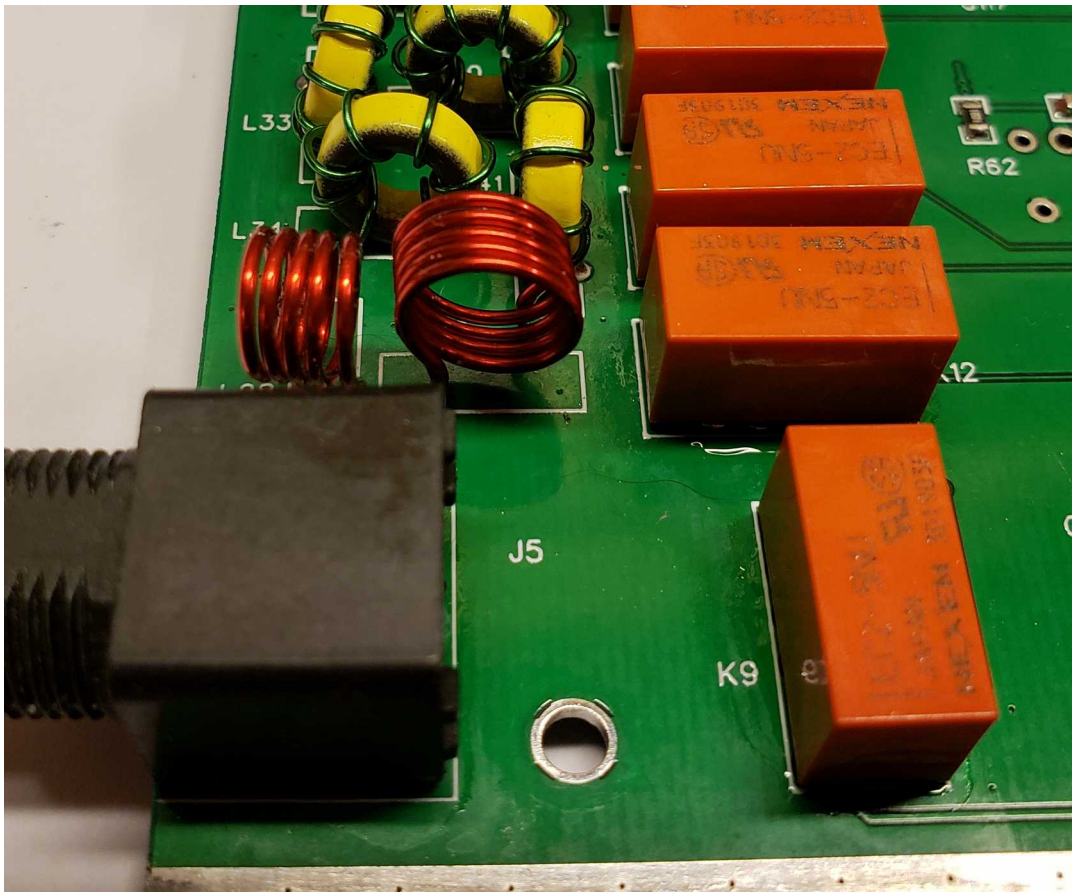
T3 has 3 One turn windings on a BN43-202. As you can see in picture winding 1 end are at 1A and 1B. 2A and 2B is on the back side. The orange wire connects to the pads on either side of core.
T5 uses a BN43-3312 with one turn of coax shield and 2 turns placed inside.

Section 12: Low Pass Filters

Again, there are a lot of part there so I won't go into each part. Generally the assembly should go like this. Install all the capacitors according to the BOM/ Schematic. Wind and mount the toroids. Then mount the relays. Make sure you use solder flux/flux pen on the relay pins to ensure good solder flow.



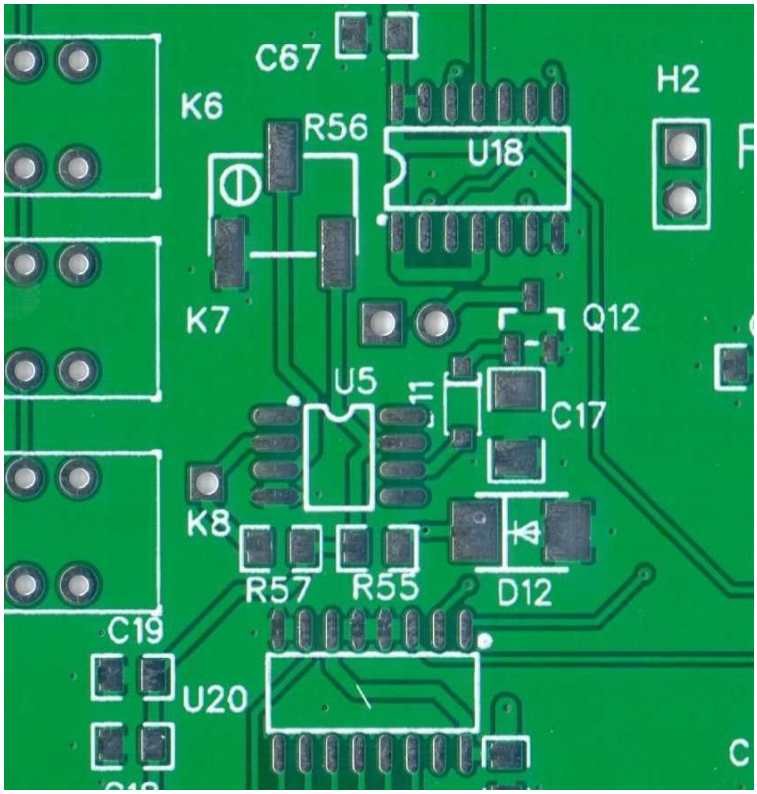
Here is what the 6M filter should look like. Make sure the air coils are mounted above the PCB.



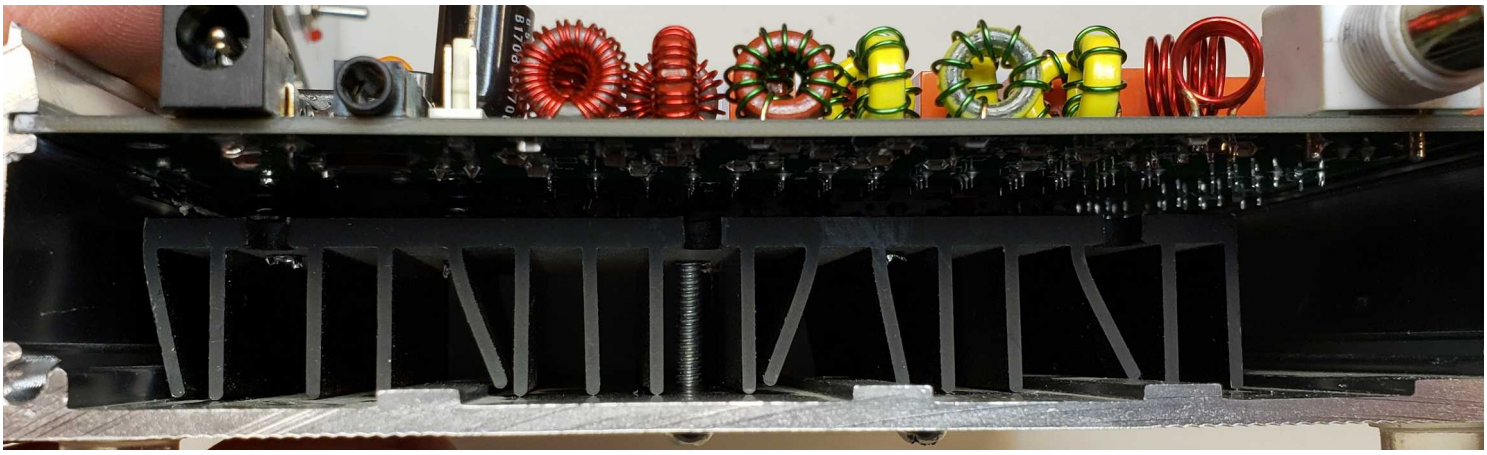
Section 13: Fan Controller

This Circuit is optional depending on heat sink used. If you use a heat sink 18mm high that mounts securely to enclosure bottom then there will be enough heat transfer where a fan is not needed. Or is you use a heat sink that is elevated above enclosure bottom then a heat sink can be used. I have build a radio with both options. I prefer not to use a fan because enclosure doesn't need as much fabrication.

Install: U5 Q12
C17,18,19
R55,56,57
D11
D12

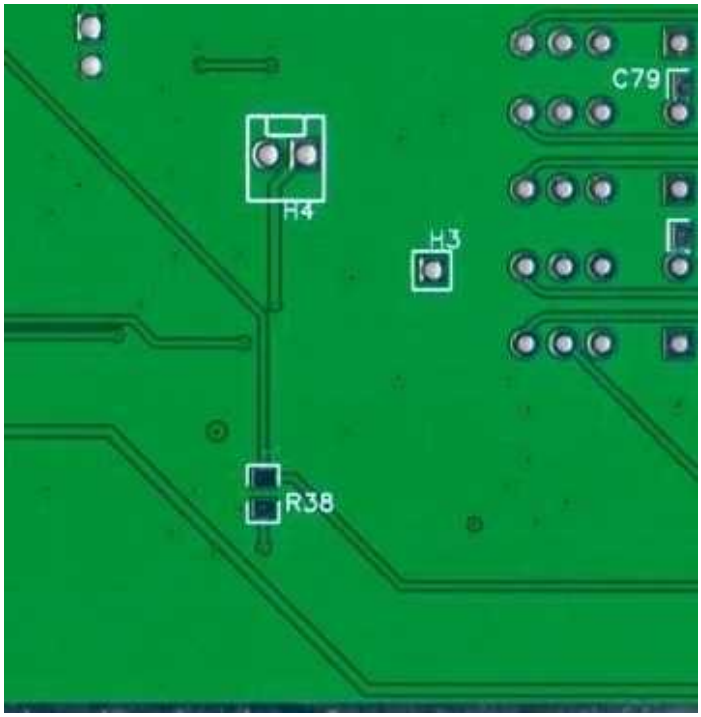


D12 is optional to control fan speed. R55 of 155ohm with the fan current draw is enough to slow the fan I use down. The intent is to remove the heat in enclosure gently and not affect Si570 drift with high volume of air. The circuit is designed to allow the fan to remain on for a period of time after the temperature threshold is met. This helps prevent fan cycling on and off during when crossing the temperature threshold. C17 controls this. Using 0.1uF the fan stays on for a few seconds and using .22uF the fan will be on for a few minutes. The value is your choice. I prefer to keep the heat sink near the temperature threshold so I use 0.1uF. That way there isn't a large temperature swing while operating.

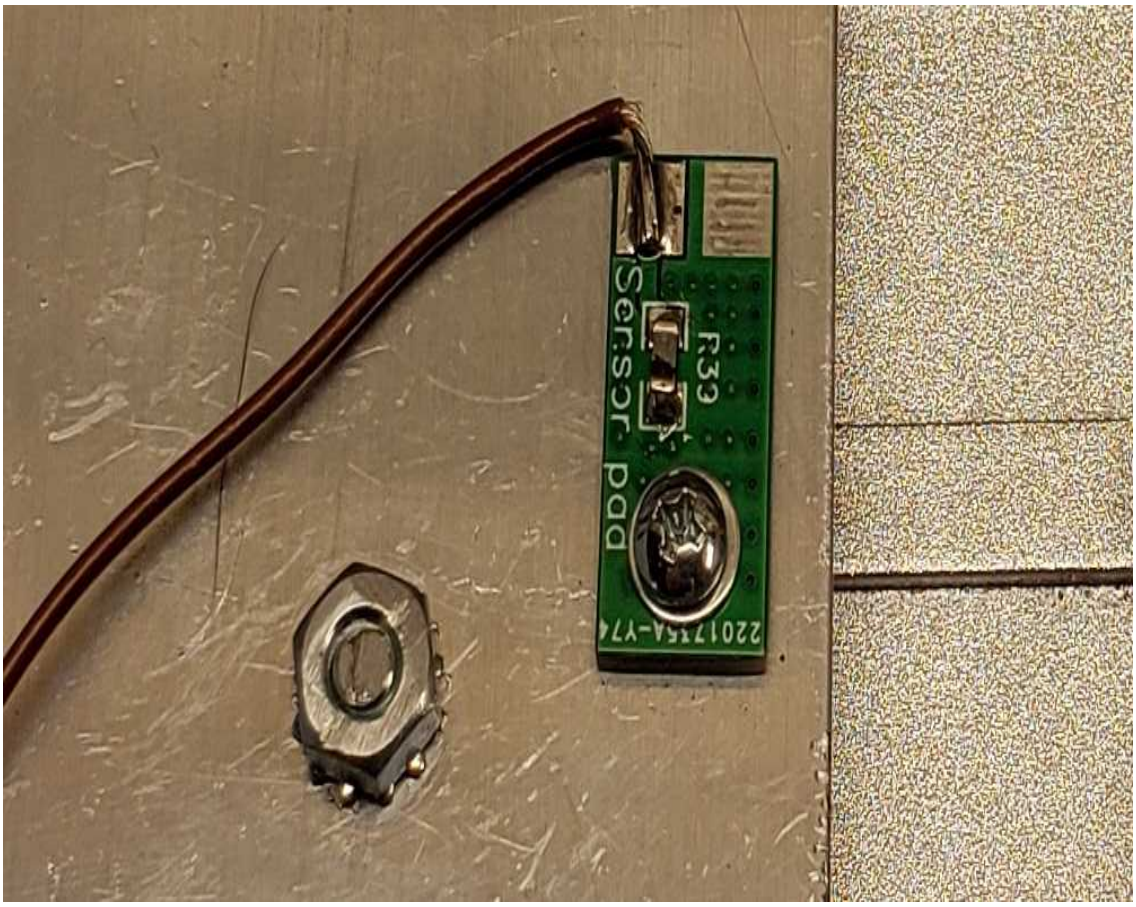


I didn’t do this but you could drill some holes under heat sink for natural convection. This an old Pentium Processor heat sink. I wish I could fine a source because it is a perfect fit.

Install: H3,4



Install: NTC on sensor pad



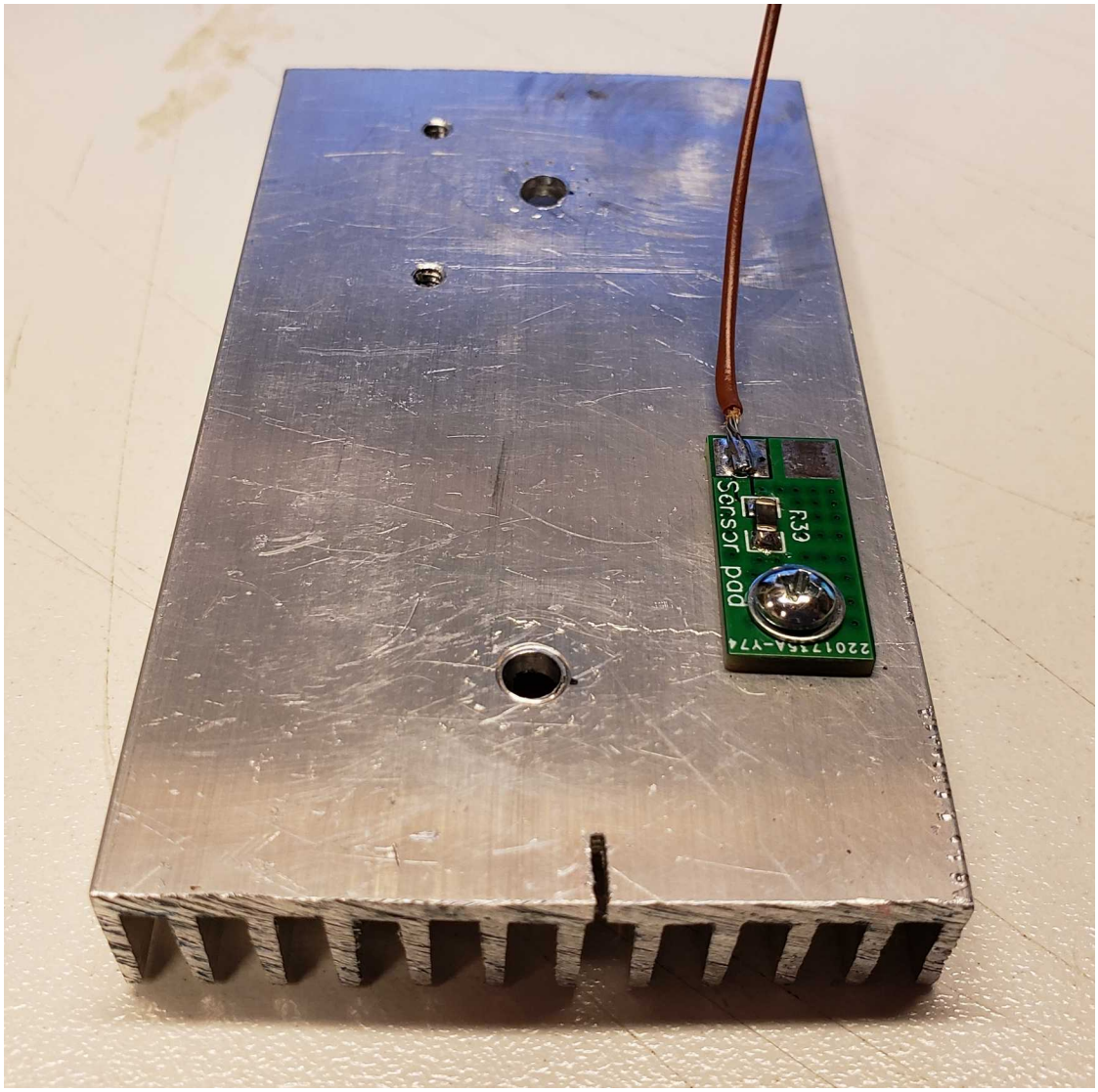
Section 14: Enclosure Assembly

If your using a fan make the required hole with a hole saw or other method.

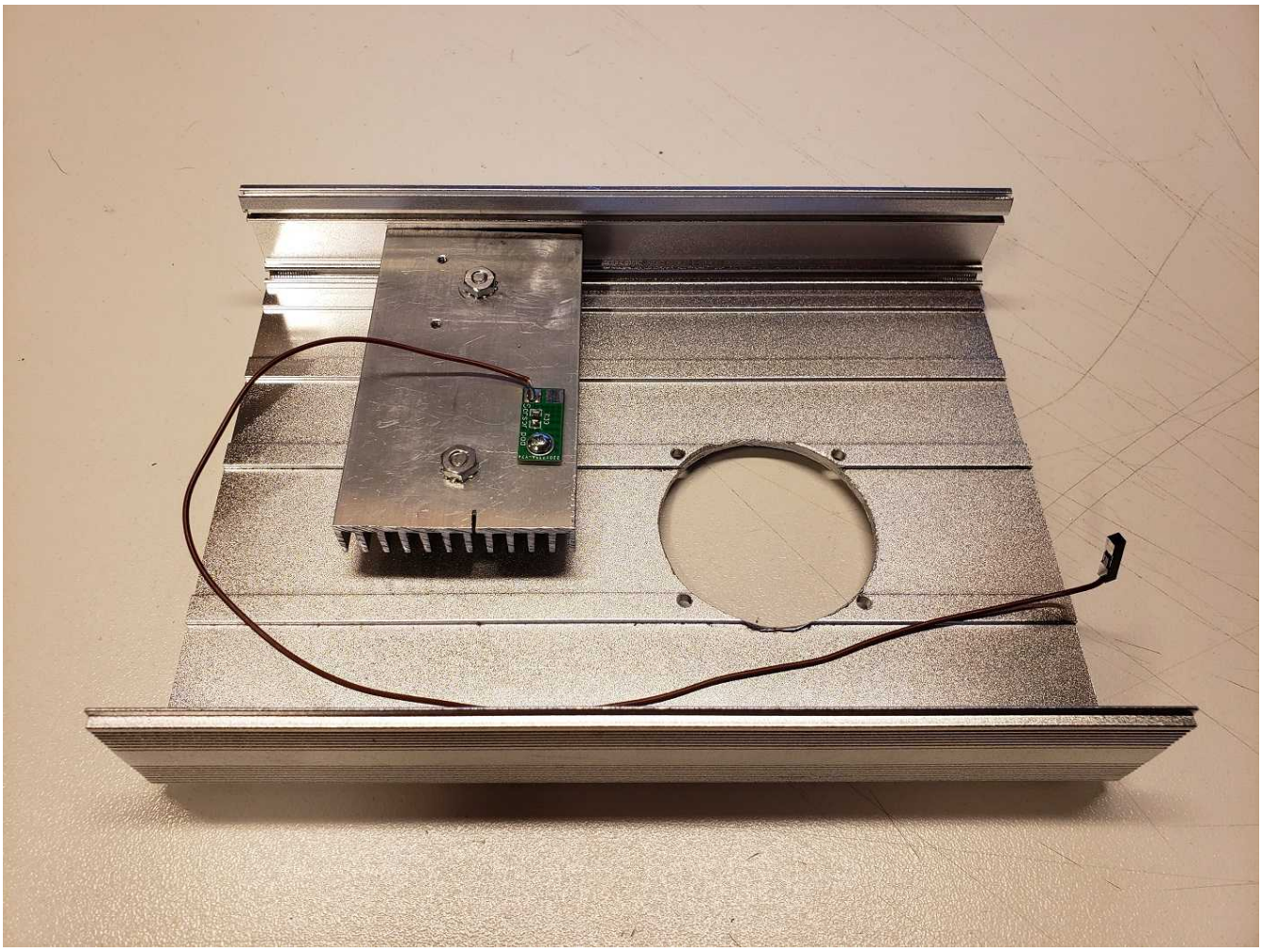
Locate heat sink mount points. You will need to watch out for interference of Amp finals placement on heat sink. Screw high need to be trimmed so they will not interfere with PCB.

Once holes are located in heat sink mount on case and slide PCB into case to locate Q5 and Q6 mount holes. Mark heat sink centered through holes in PCB. Trill and tap for 4-40 screws. It would be best of you can locate all holes between heat sink fins.

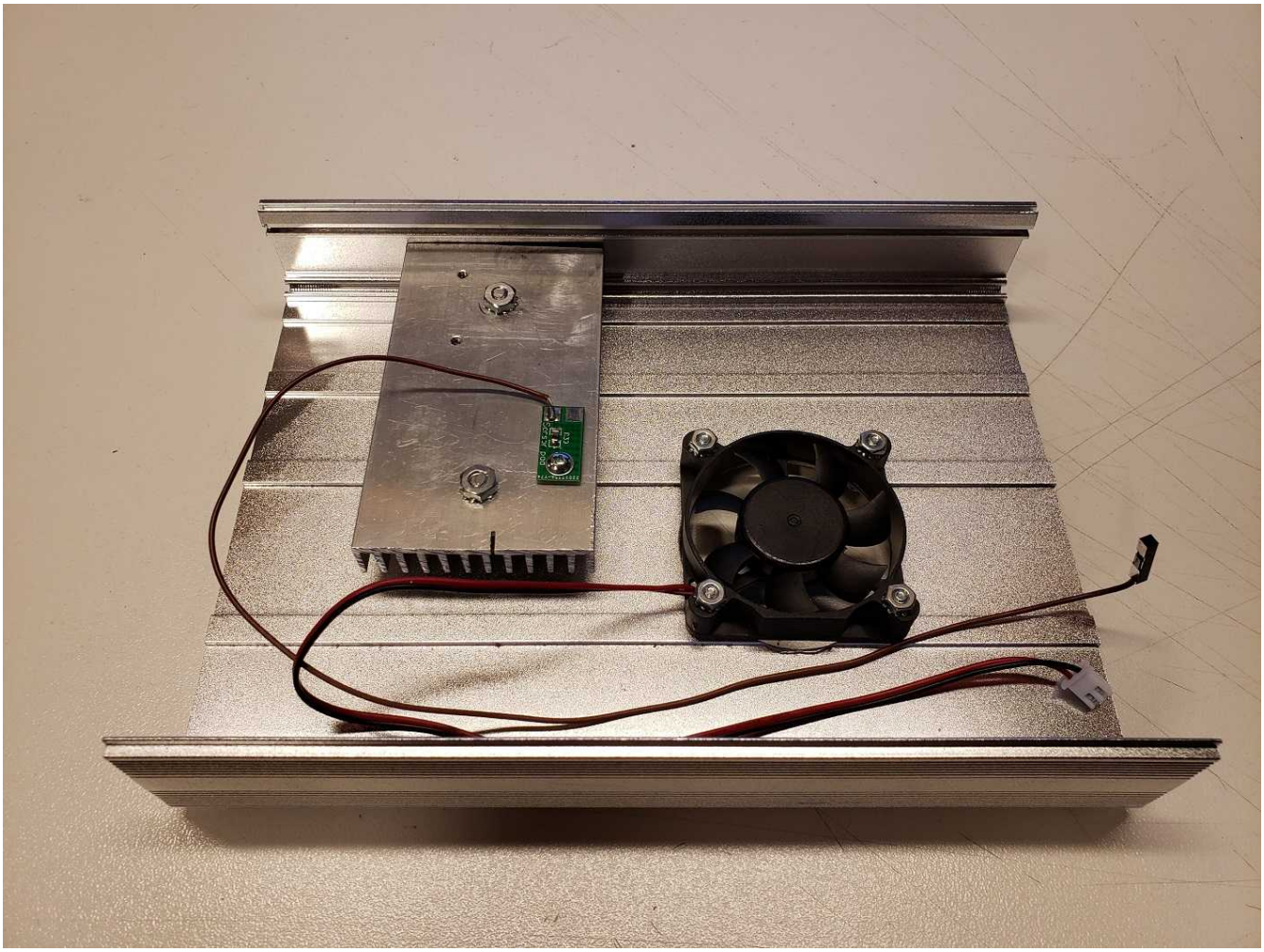
Locate and drill/tap 4-40 for sensor pad screw.



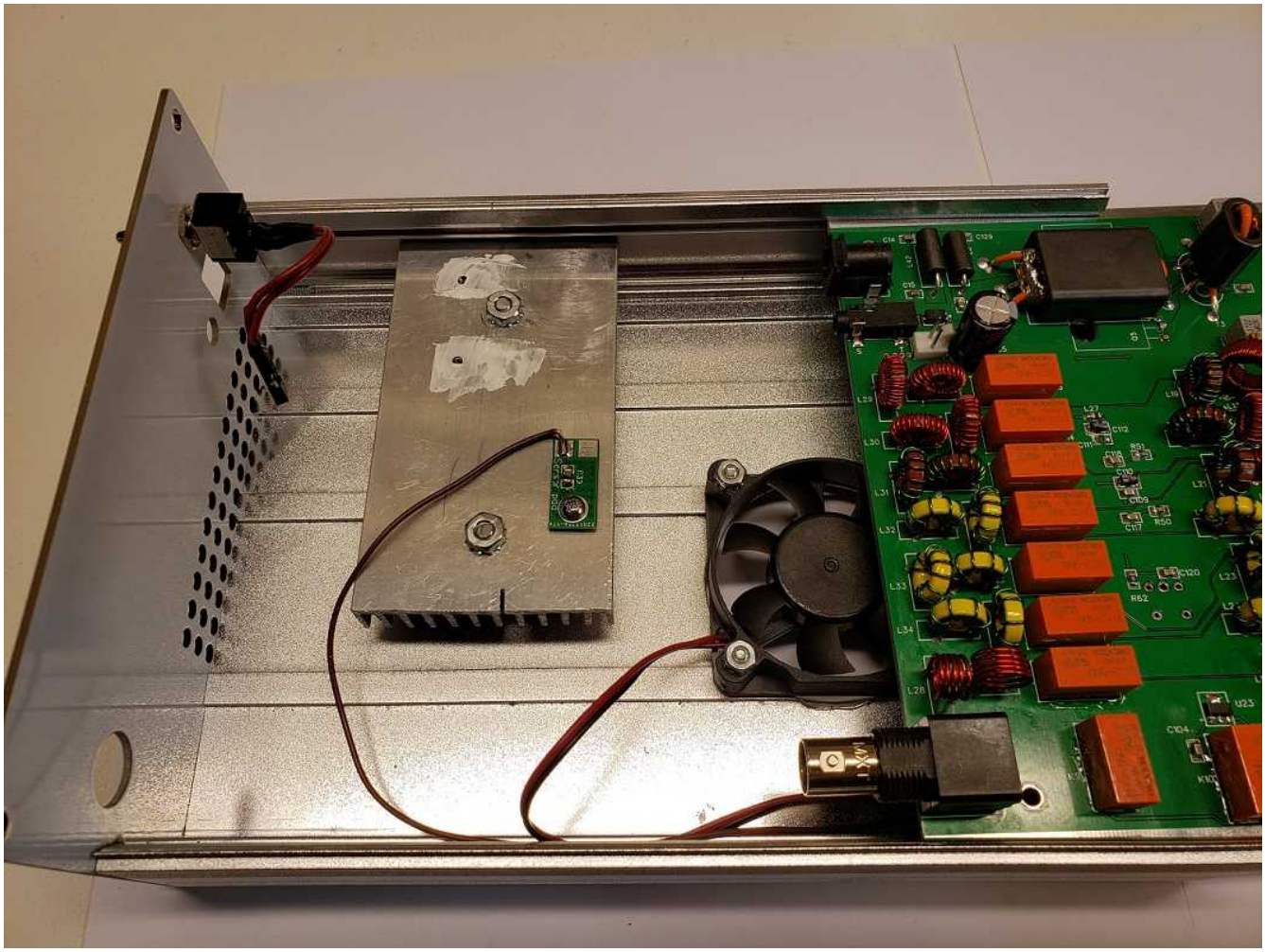
Mount heat sink and sensor wire. Wire need to be long enough to connect to bottom of PCB as you slide it in.



Fan Mounted with enough wire slack to connect to bottom of PCB.



Apply thermal compound, connect sensor and fan wires. Then slide PCB into place.



Refer to Software Setup and Calibration document