KN-Q10A

80/40/20/15 Meter
SSB/CW Transceiver
Kit Manual

Rev. A
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Thanks to the following people for help and feedback.
Shi Ke, BA6BF
Mark, N7EKU
Qin Ling, BD4AHS
Yu Bo, BG5DLV

Thank you for purchasing your KN-Q10A 80/40/20/15 Meter SSB/CW Transceiver Kit from BD6CR/4. The kit was designed by Shi Ke, BA6BF. As the upgrade version of KN-Q10, the KN-Q10A fixed the main issues found on the KN-Q10, added the SWR protection circuit and enhanced firmware features.

Introduction

The KN-Q10A is a high-performance, synthesized, SSB/CW transceiver kit that covers 80, 40, 20 and 15 meter bands. It is a low cost yet full featured ham radio kit suitable for kit building and daily operation. The KN-Q10A provides over 10 watts of RF output on 80, 40 and 20 meter bands, and over 5 watts of RF output on 15 meter band. By modifying the driver stage transistor, the RF output on 15 meter band can be increased to about 10 watts. The modification kit is also provided in the kit resold by BD6CR/4. The receiver is a single conversion superheterodyne type with a +7dBm first mixer, a 5+2-pole variable band width 4.433MHz crystal filter and a TDA2003 audio amplifier. The VFO is a design of AD9832 DDS and MC145162 PLL chip.

Specification

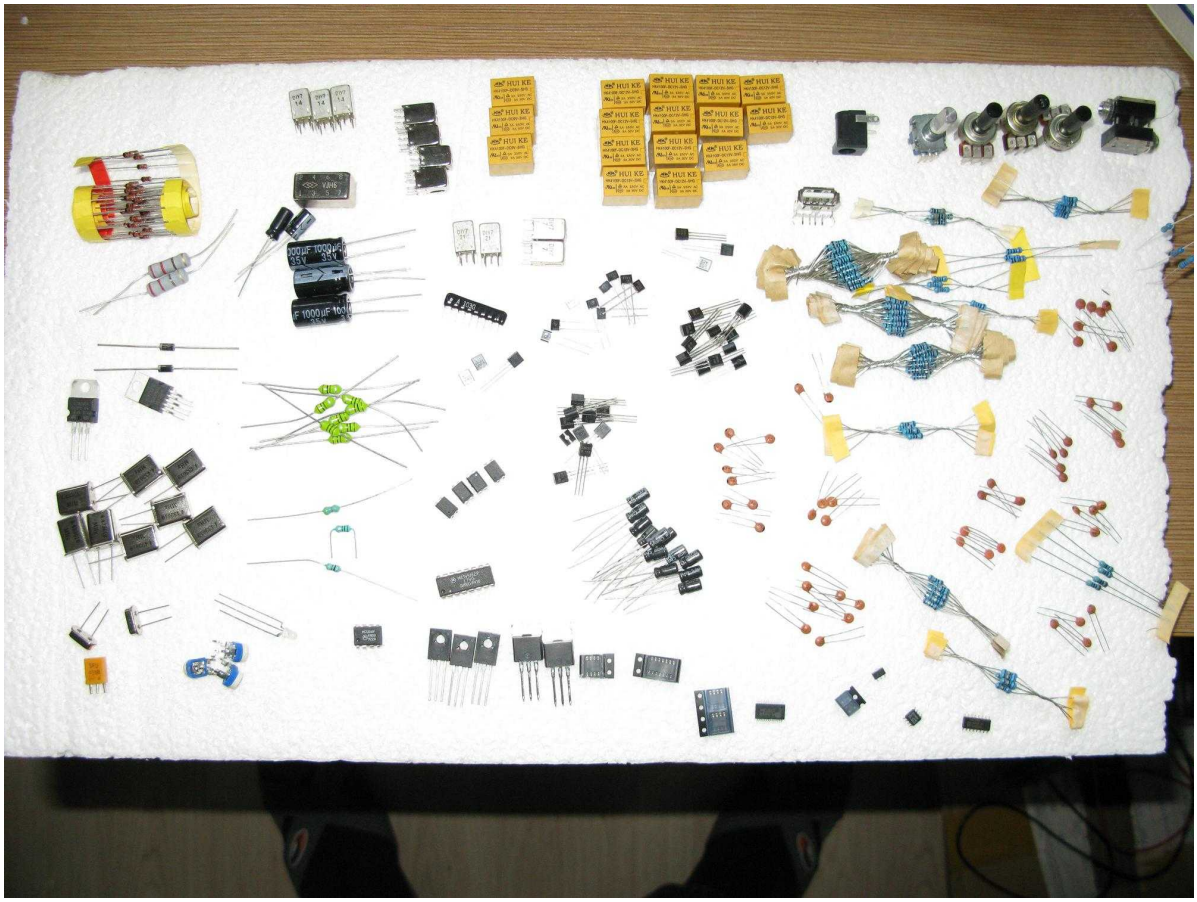
Weight: about 1.3 kg or 3 lbs
Dimension: 175 (D) x 136 (W) x 63 (H) mm, not including protrusion parts
Supply voltage: 13.8V DC +/- 5%
Current drain:
    Receive about 0.42A when LCD back light is on
    Transmit less than 4A
Frequency control: PLL synthesizer w/ single VCO, DDS as reference
Frequency ranges, MHz: 3.5-3.9, 7.0-7.3, 14.0-14.35, 21.0-21.45
VFO
    Resolution 10Hz
    Tuning Steps 10Hz, 100Hz, 1kHz, 10kHz, 100kHz and 1MHz
    Memories 10
RIT range +/-10kHz
Keyer speed range 5-49 wpm

Tools You Need

Soldering iron (20~25W), Solder (0.8mm OD or thinner), Screw drivers, Multimeter, Commercial amateur radio transceiver, Coaxial cable jumper, 50 ohm 30W dummy load

Parts Inventory

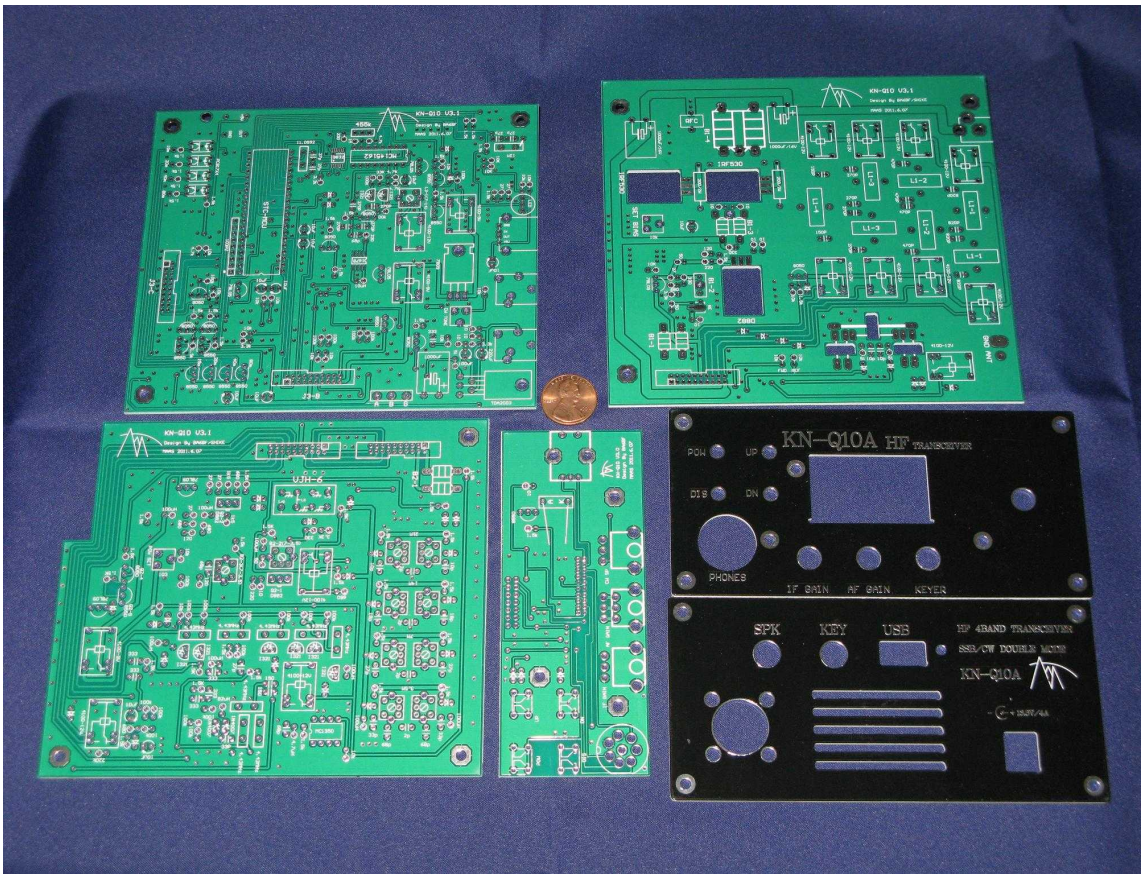
Refer to part list http://www.qsl.net/bd6cr/q10a_partlist_20110628.pdf, unpack bags marked 1, 2 and Upgrade, and do parts inventory as shown.



Bag 1

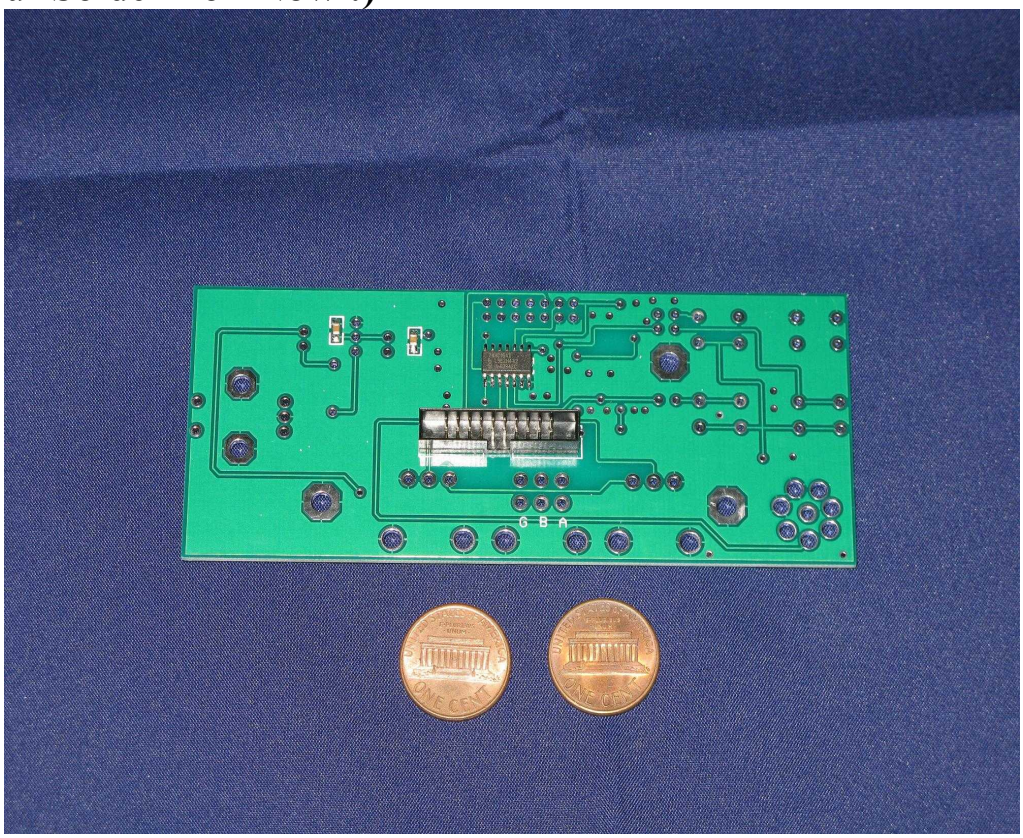
Bag 2

Upgrade Bag

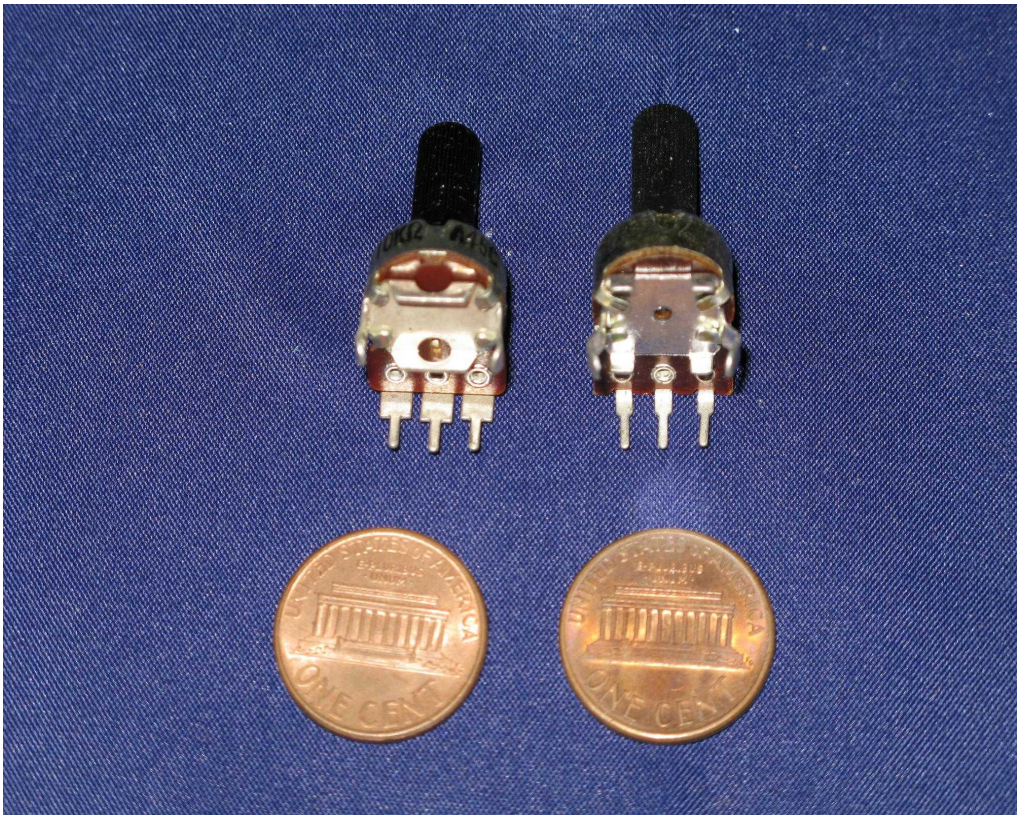


PCB's (Up left: Digital board. Up right: PA board. Down left: Analog board. Down middle: Front panel. Down right: chassis front panel and rear panel.)

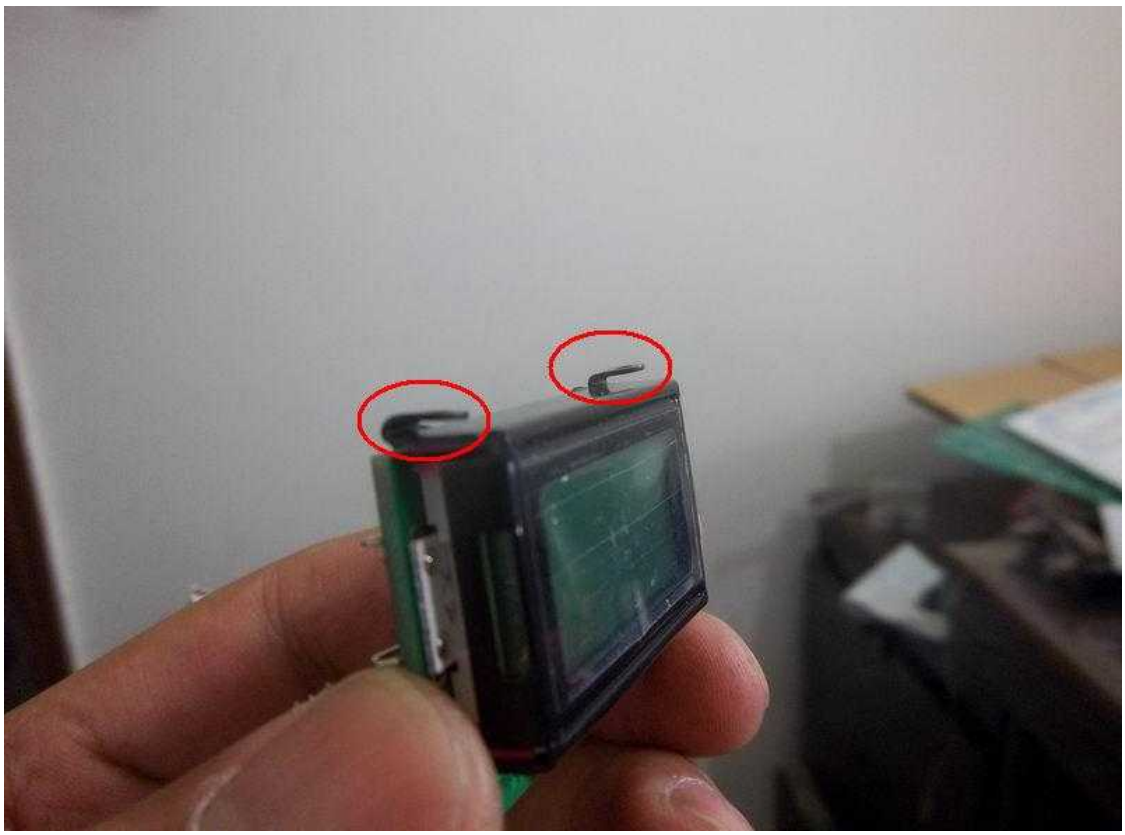
Plug Your Solder Iron **Now :)**



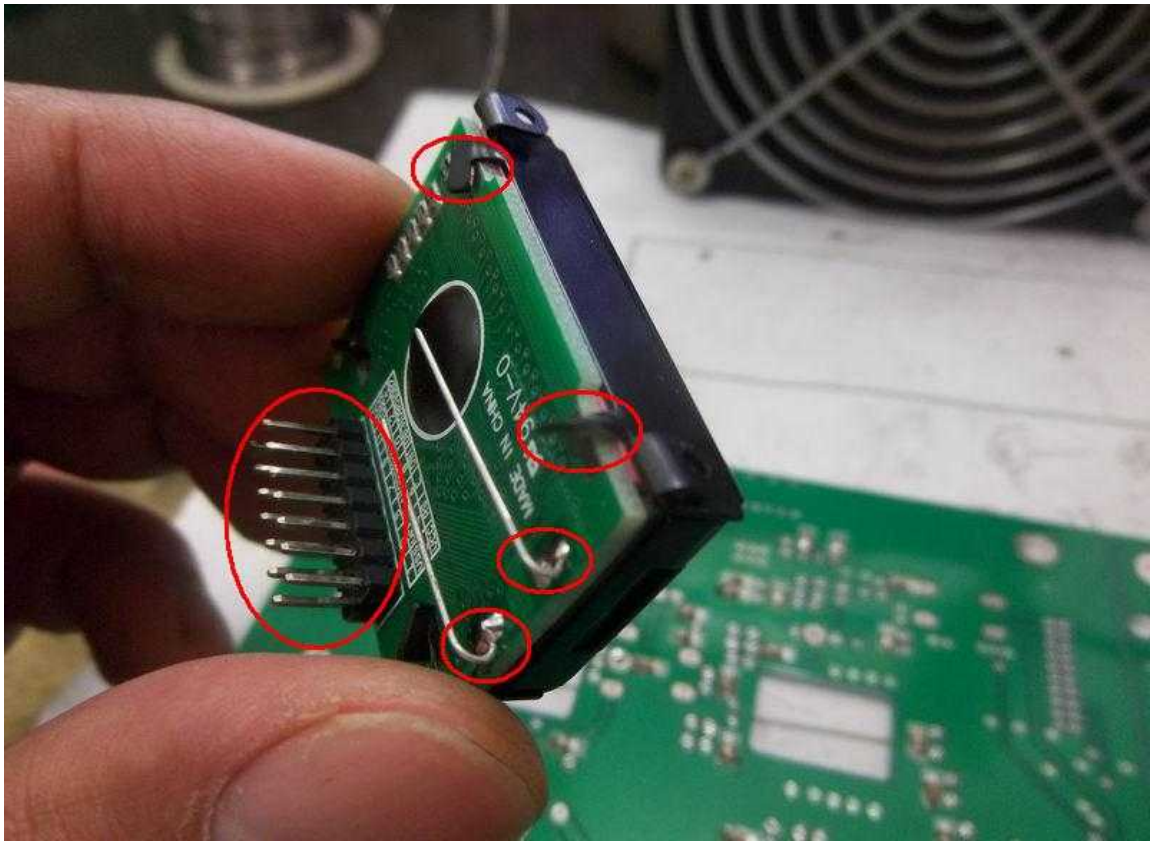
Start from front panel solder layer (bottom layer), install two 104 SMD capacitors and 74HC164D, and IDC connector. Make sure the IC is installed with marking upright and the IDC connector notch downwards, as shown.



If your kit contains two different kinds of potentiometers, use the left one to install it in AF GAIN location (middle) to avoid short circuit with pads marked as G, A and B which are used for audio connection.



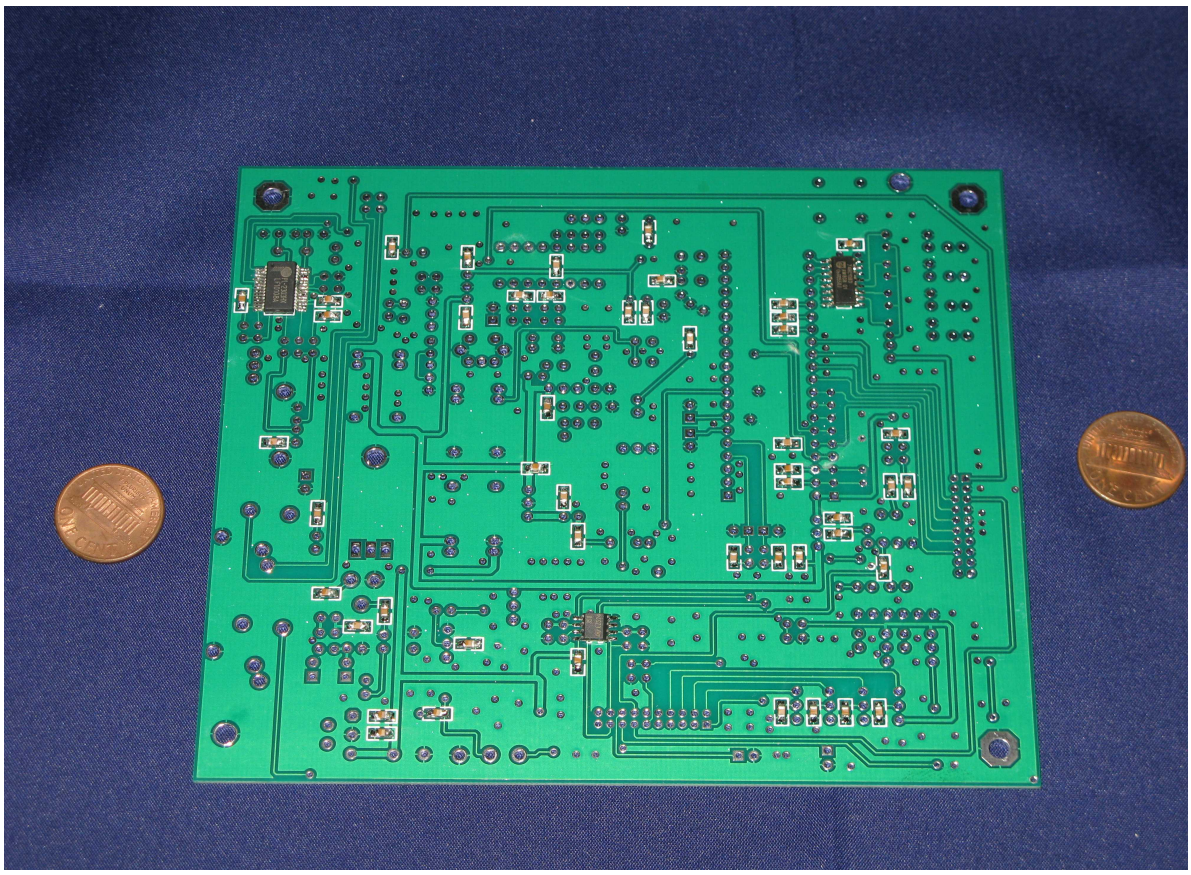
Now you need to do some rework for LCD module. If your LCD module still contains the installation plates (haven't been cut), bend them as shown, or they will interfere with potentiometers.



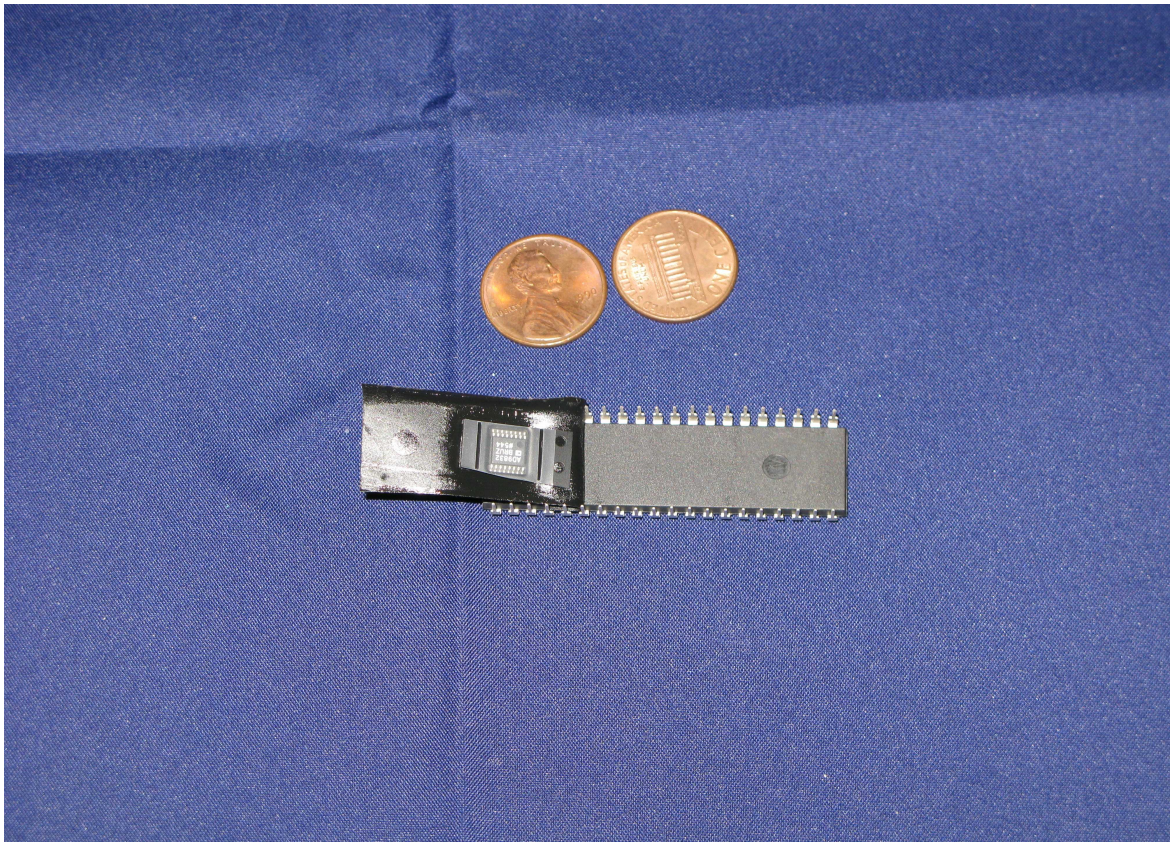
You will also need to bend the plates on PCB to ensure it will not short circuit with front panel when installed. Install the 7 pin IDC header x2 first, and solder two component pins (about 1 inch long) to use as back light connection.

Now install the components on the component layer (top layer) of the front panel. Install resistors and diodes first, install LCD module the latest. Make sure potentiometers are installed vertically. Here you need to rework the encoder before you install it on board. The purpose of the rework is to make the resolution per circle 4 times higher than the original. See the rework instructions here http://www.qsl.net/bd6cr/reworkencoder.pdf. If you don't make the rework, one step of tuning will generate four steps in frequency display.

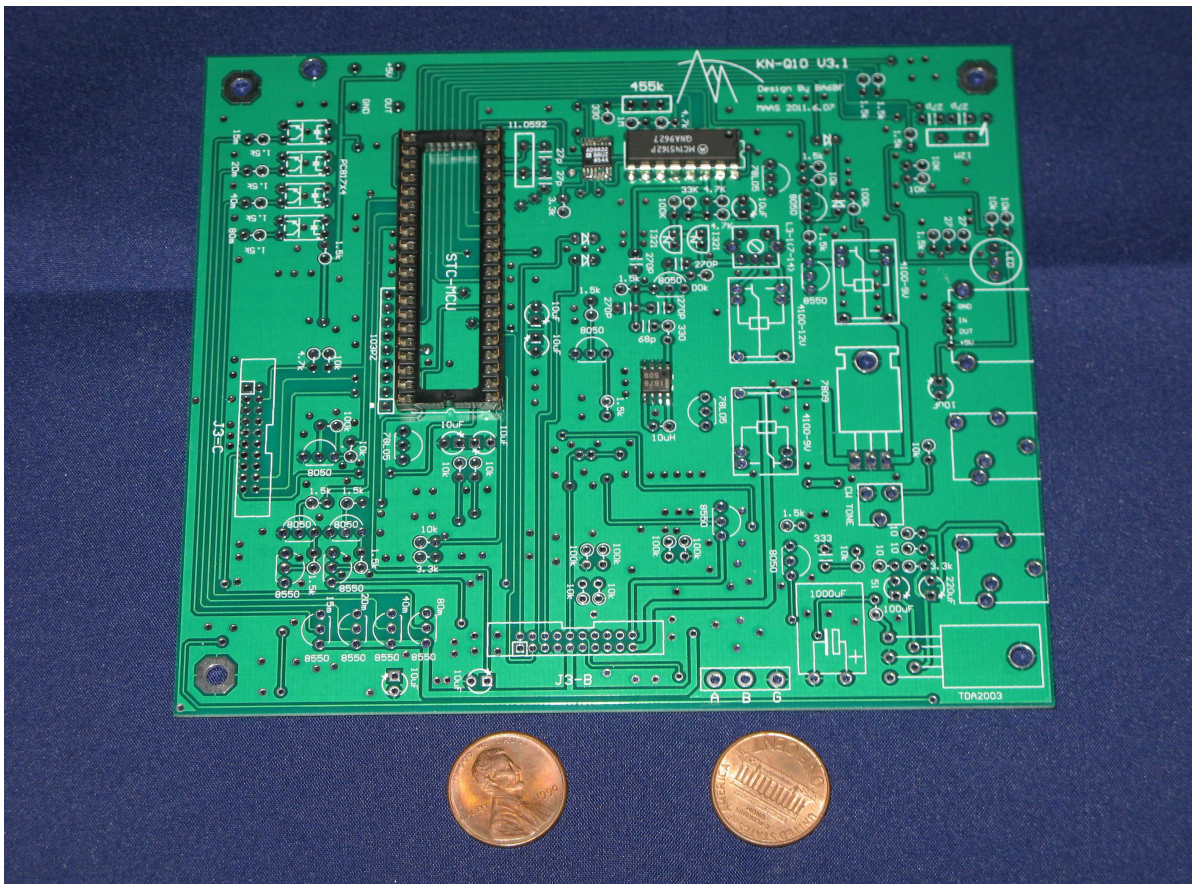
Congratulations, now you have completed the front panel board!



Now the digital board. 104 SMD caps on solder layer first, then other SMD IC's on solder layer. If you don't have experience to install SMD IC, especially PL2303, please get some training first, or ask for help from the experienced people. Overheating will cause permanent damage to IC's and the PCB.

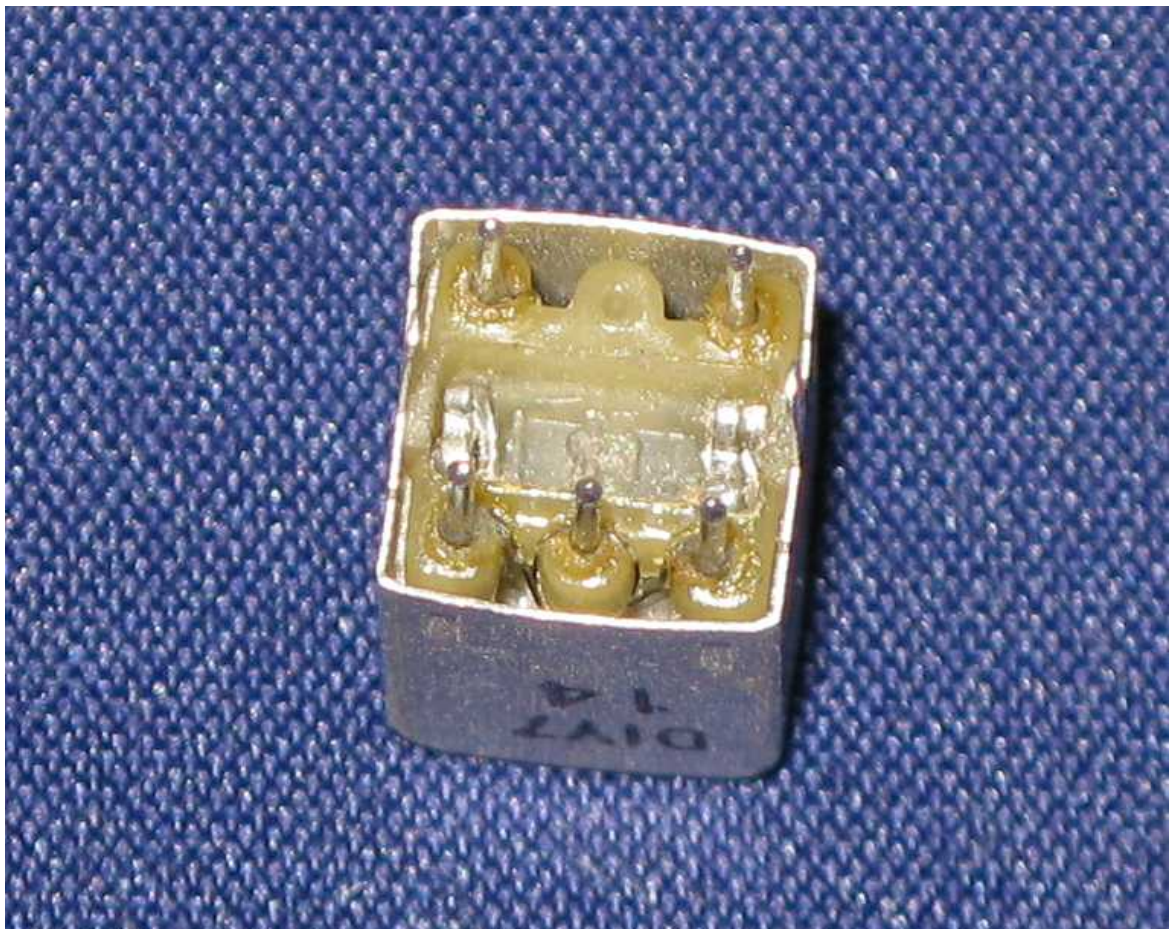


This picture shows how you can find the DDS chip AD9832. It is packed with the MCU chip.

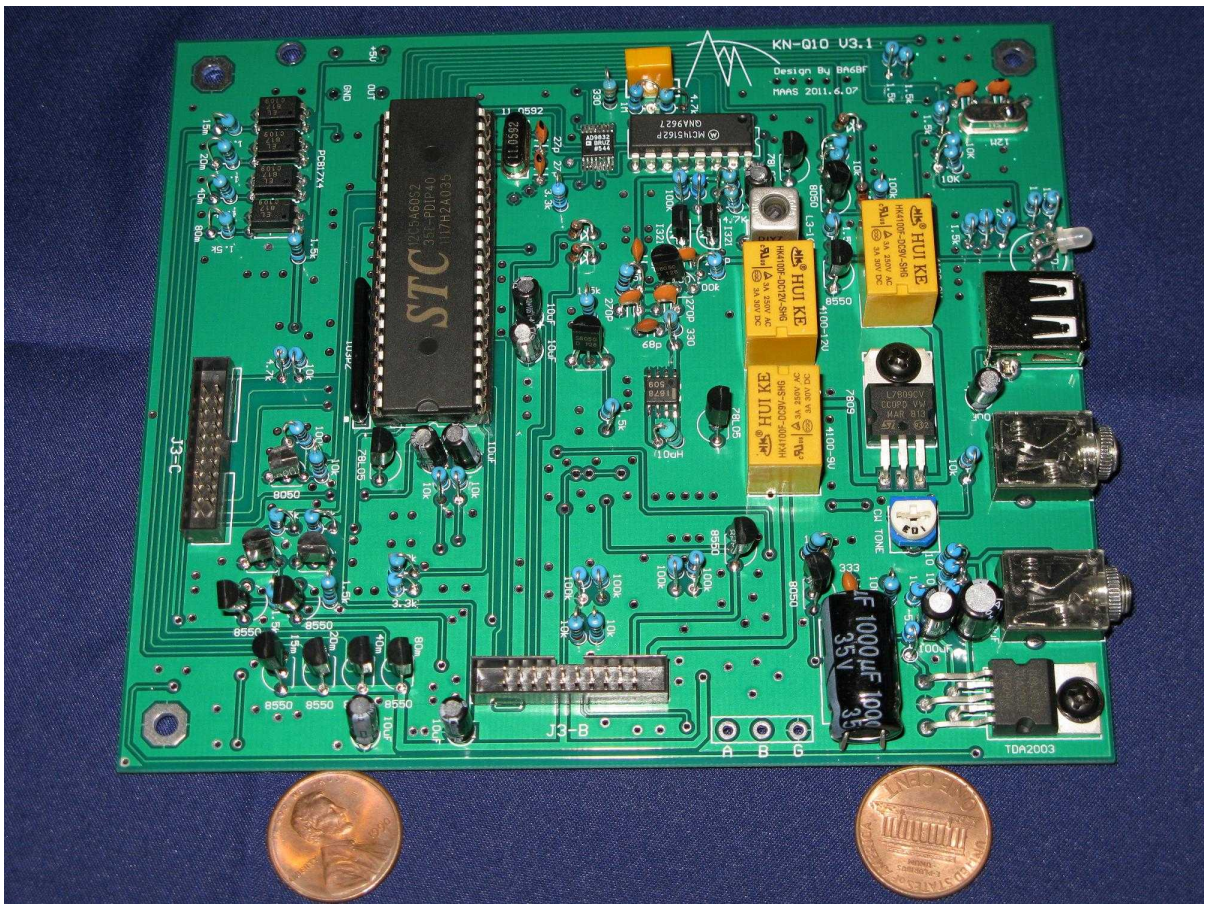


Install SMD chips on the component layer. AD9832 is extremely difficult, so be careful. After finishing AD9832 and upc1678 installation, install MCU socket and brand new PLL chip MC145162 from the upgrade bag. You can discard the PLL chip in bag 1 or keep it for later use.

You see all the IFT's contain built in tube capacitors. Use screwdriver to destroy and remove the tube capacitors from ONE DIY7 14 IFT now.



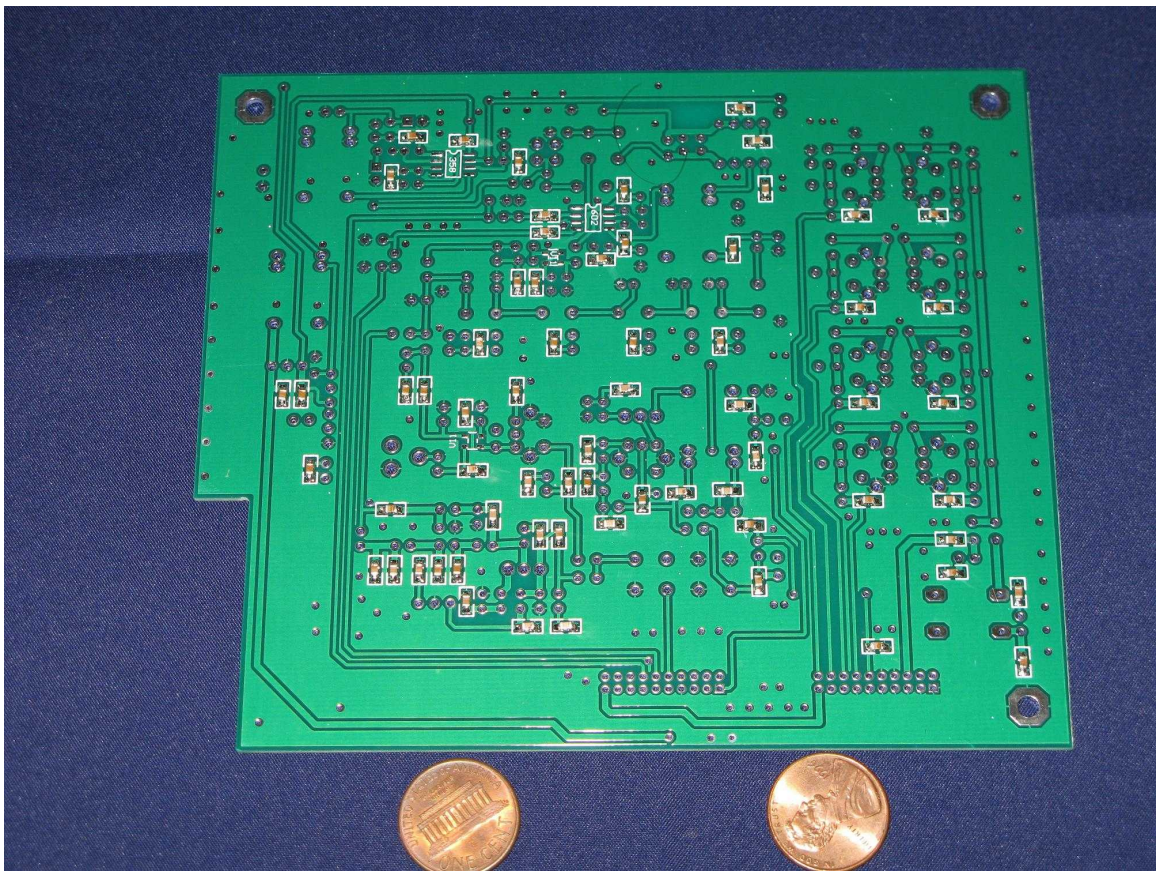
After you are done, the IFT bottom looks like this. Install it in the location of L3-1 near the PLL chip. You will also need to use the same way to rework 4 DIY7 3.5 IFT's when you install the Analog board.



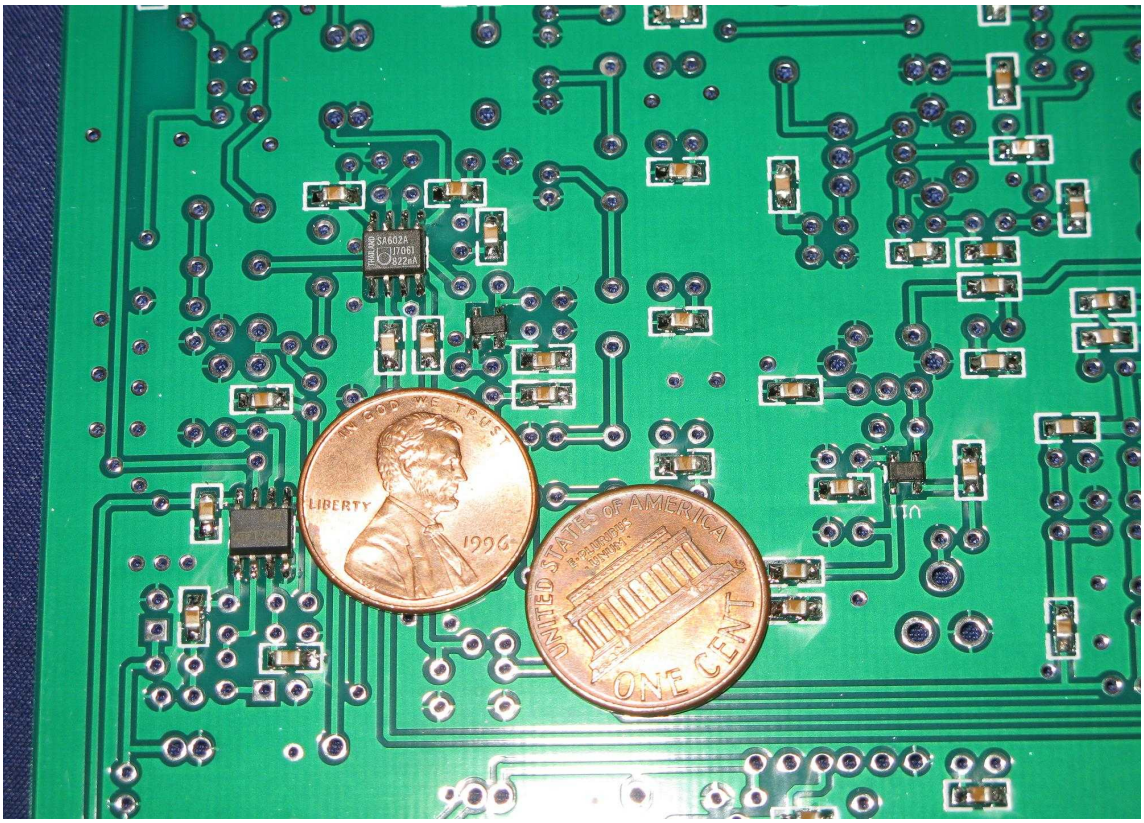
Install all the rest of the components. A few important notes:

1. Some relays are 9V type and some relays are 12V type, although they look similar.
2. Ground 12MHz and 11.0592MHz case with component pins.
3. It is very easy to mix S8550 and S8050. Double check before you solder.
4. Use the 455k ceramic filter in upgrade bag, and discard the original one in bag 1. You can install 455k ceramic filter either way, no polarity.
5. Use M3x6 screw and nut to properly secure 7809 and TDA2003 to PCB to use PCB as heat sink, because they are quite hot in working status.
6. Install LED at your will, don't mind the polarity.
7. The 1000uF capacitor is too long, so bend the pins first before installing, or it will cover 333 capacitor and one transistor.
8. Install 103 for all capacitor marked 333.
9. White dot means the pin 1 for the resistor pack.
10. Don't stuff four free pads at the top left of this picture. Three of them have marking “+5V”, “GND” and “OUT”.

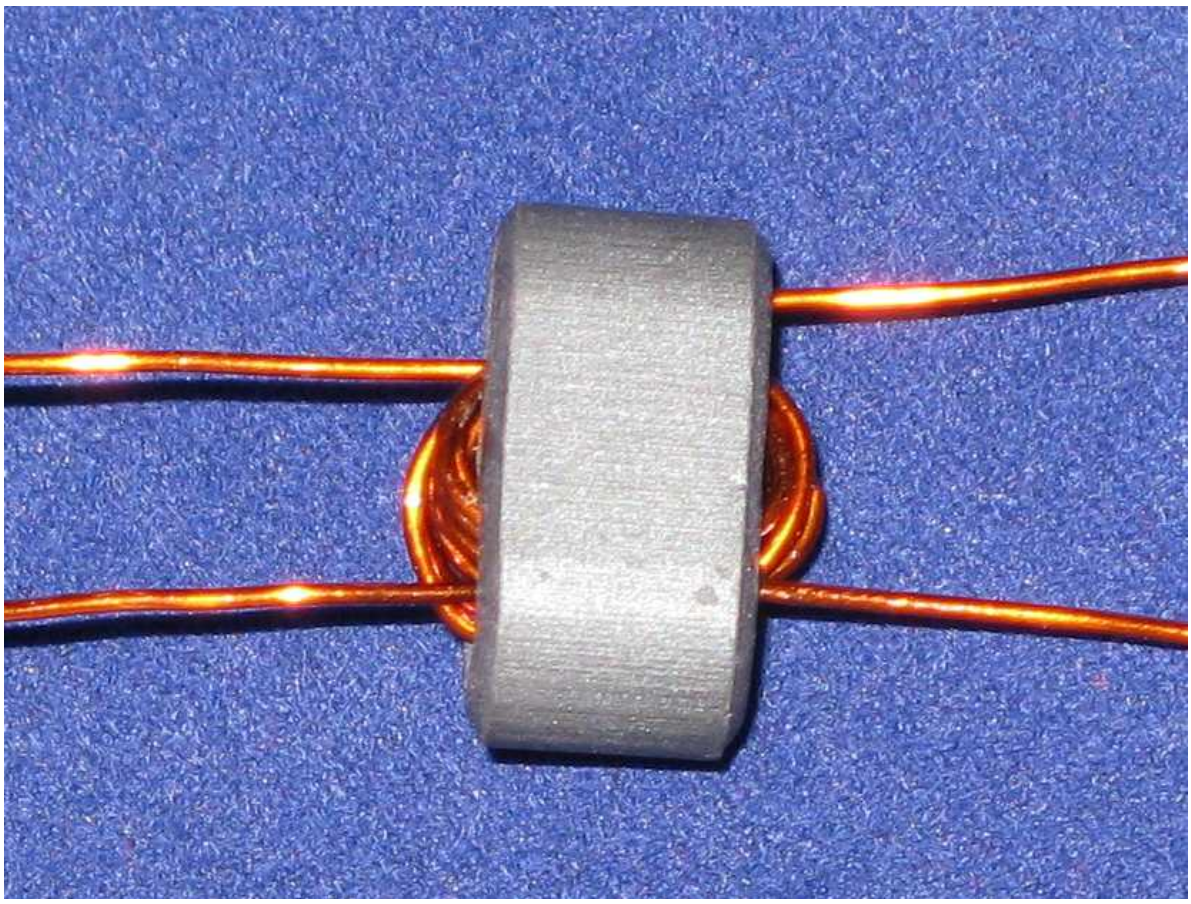
Congratulations, you have completed the digital board installation.



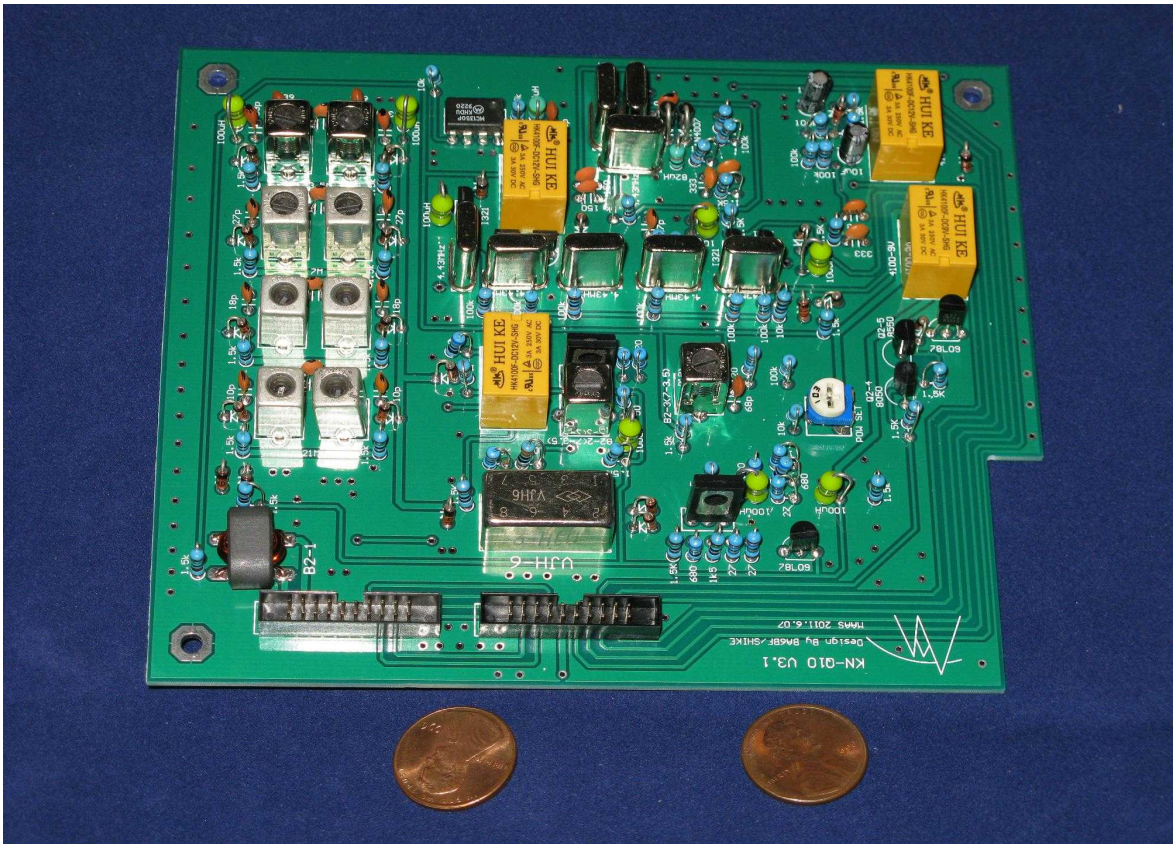
Now the Analog board. Install 104 SMD capacitors on the solder layer of the board first.



Then, install SMD IC's and two MOSFETs marked V11. Follow the silkscreen printing on PCB to make sure the orientation is correct. The MOSFET's are electrostatic sensitive components, so handle them with care.



Take one small binocular core to wind 6T:6T transformer as shown. No bifilar winding is required.



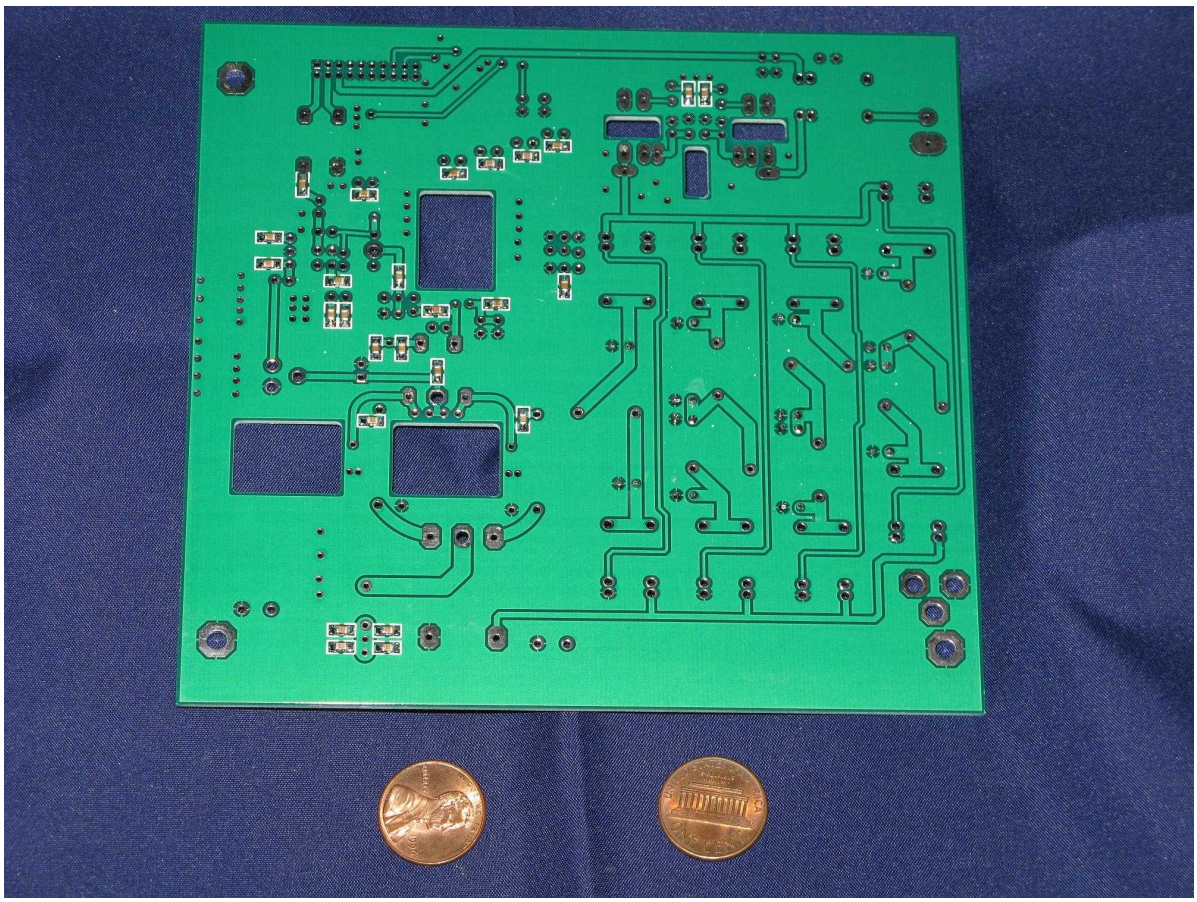
Now install the rest of the parts. A few important notes:

1. Follow the same way to remove built in tube capacitors for ALL DIY7 3.5 IFT's, but KEEP

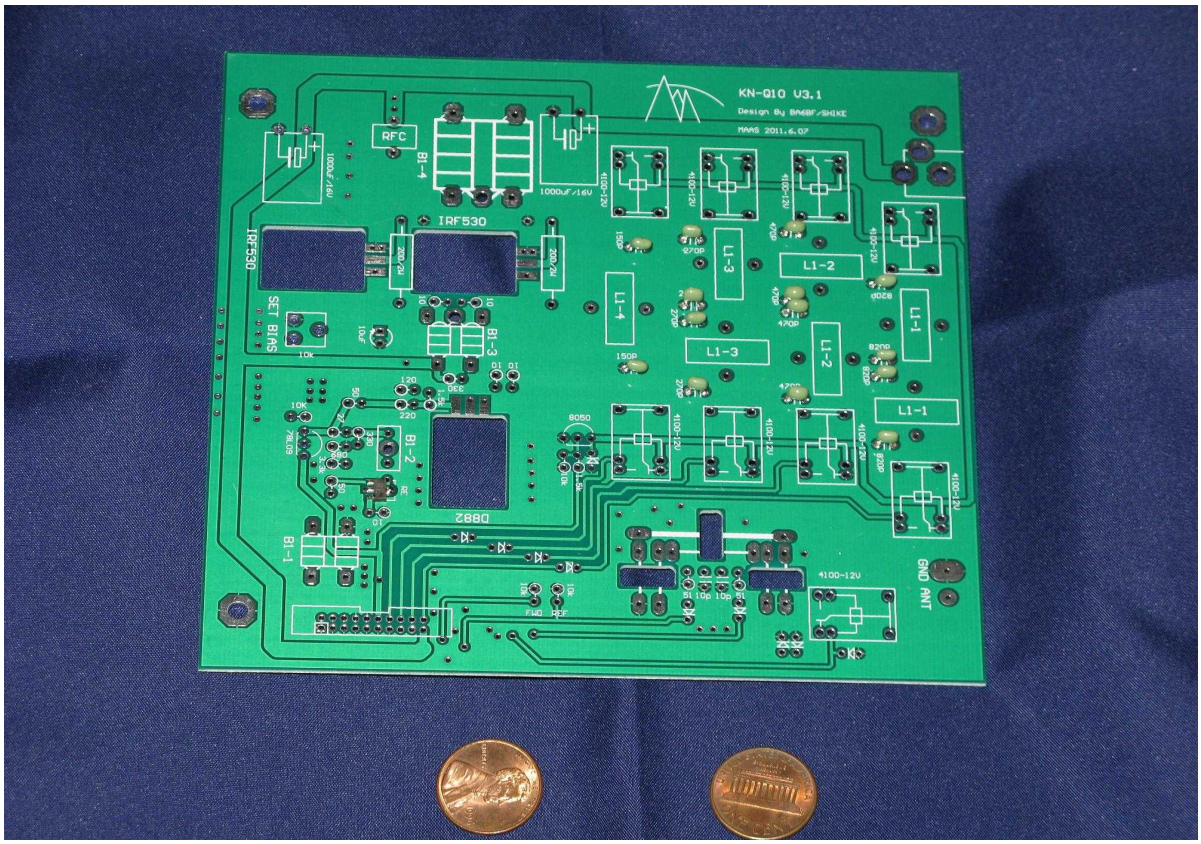
the tube capacitors for DIY7 7, DIY7 14 and DIY7 21 IFT's on this board.

2. Again, don't mix S8550 and S8050.
3. Again, don't mix 9V relay and 12V relay.
4. You don't have to ground all the crystals on this board. Especially you cannot ground on the top, as it might short circuit with other board when they are stacked up.
5. For 50 and 220k marking, use 51 ohm and 200k parts.
6. Polarity of 1N4148 should be right.
7. Don't install the parts taller than the crystals.
8. Again, install 103 for all capacitor marked 333.
9. 00k mark near L3-1, that's 100k.
10. 1.5k = 1k5, just in case you are not sure.
11. For two D882 transistors, you need to install them no taller than relays. If not possible, you can bend the transistors a little bit. Make sure the printing on the transistors face the crystals.
12. Make sure the orientation of VJH6 is correct before soldering. Solder it as quickly as possible to prevent any overheat. VJH6 is made in China and equivalent to SBL-1.

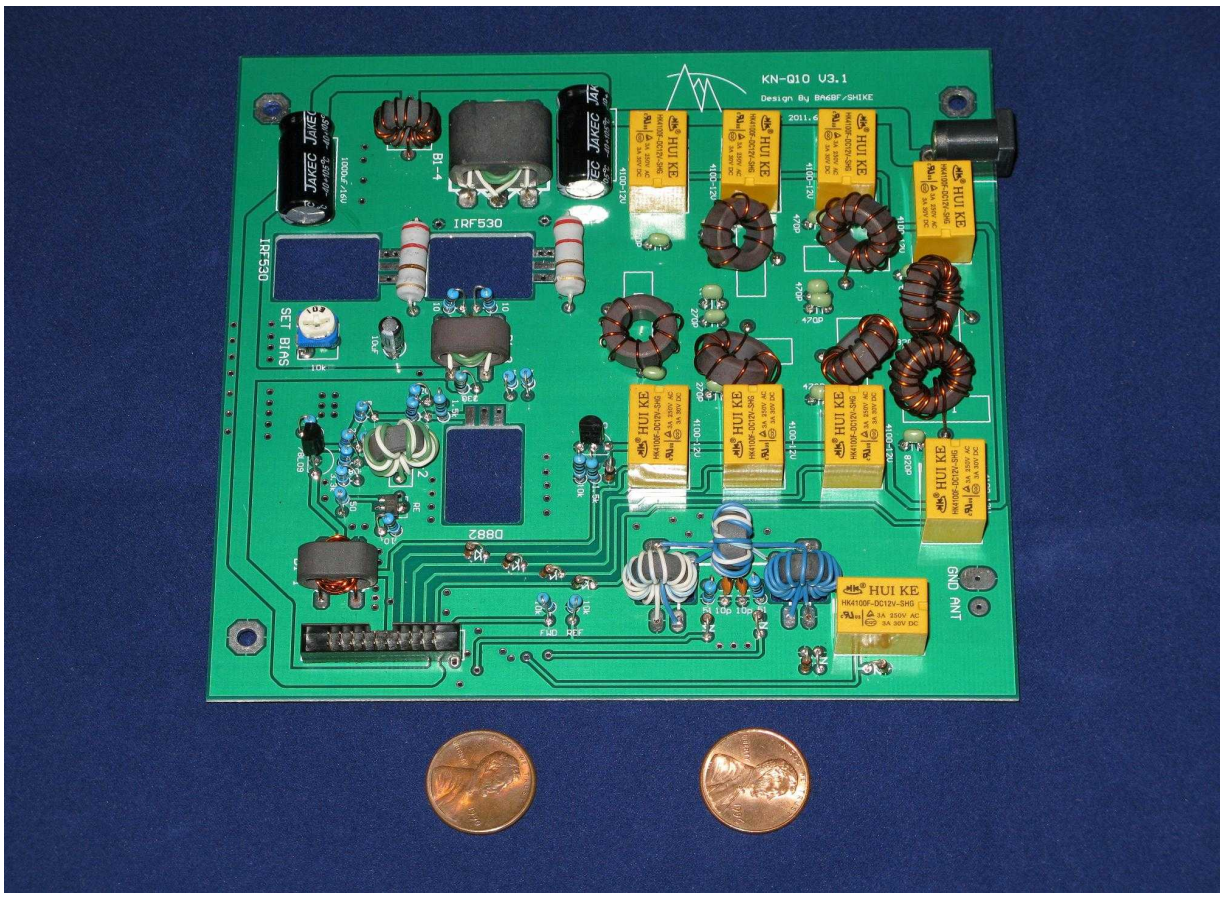
Congratulations! Up to now, you have completed the analog board. You have completed about 75% of the work.



Continue to install PA board. Populate the 104 SMD caps first on the solder layer.



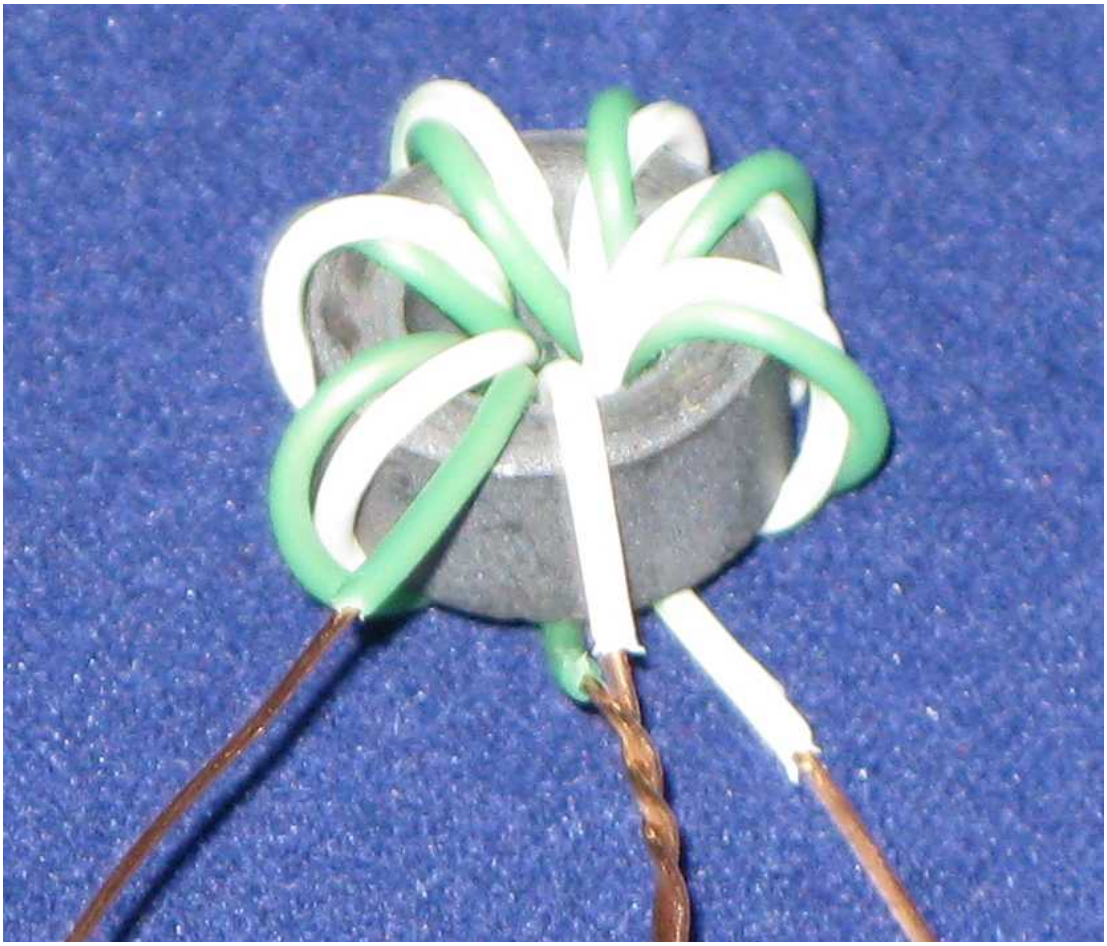
On the components layer, you will need to install all LPF capacitors first. Use the green ones in the upgrade bag. Also, install a SMD transistor marked RE near D882 hole.



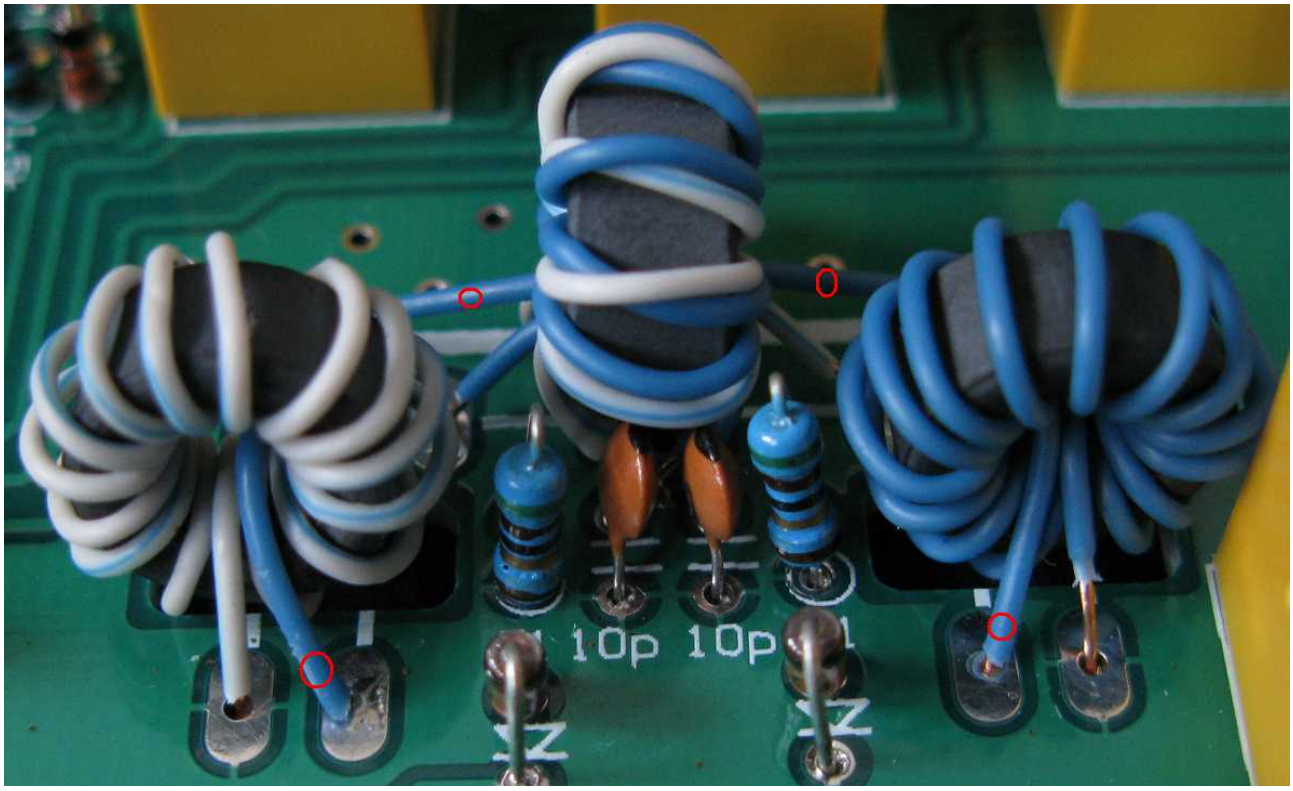
Install the rest of the components. A few important notes:

1. Install the parts no taller than the relays.
2. All relays are 12V type on this board.
3. Install 220 ohm/ 2W in the place of 200 ohm/ 2W.
4. Don't install IRF530's and D882 yet. They will be installed in the final assembly stage on chassis.
5. Again, make sure polarity of 1N4148 is right. Especially the ones near the down right corner.
6. For core winding, I will show you some pictures next. Especially the SWR bridge part.

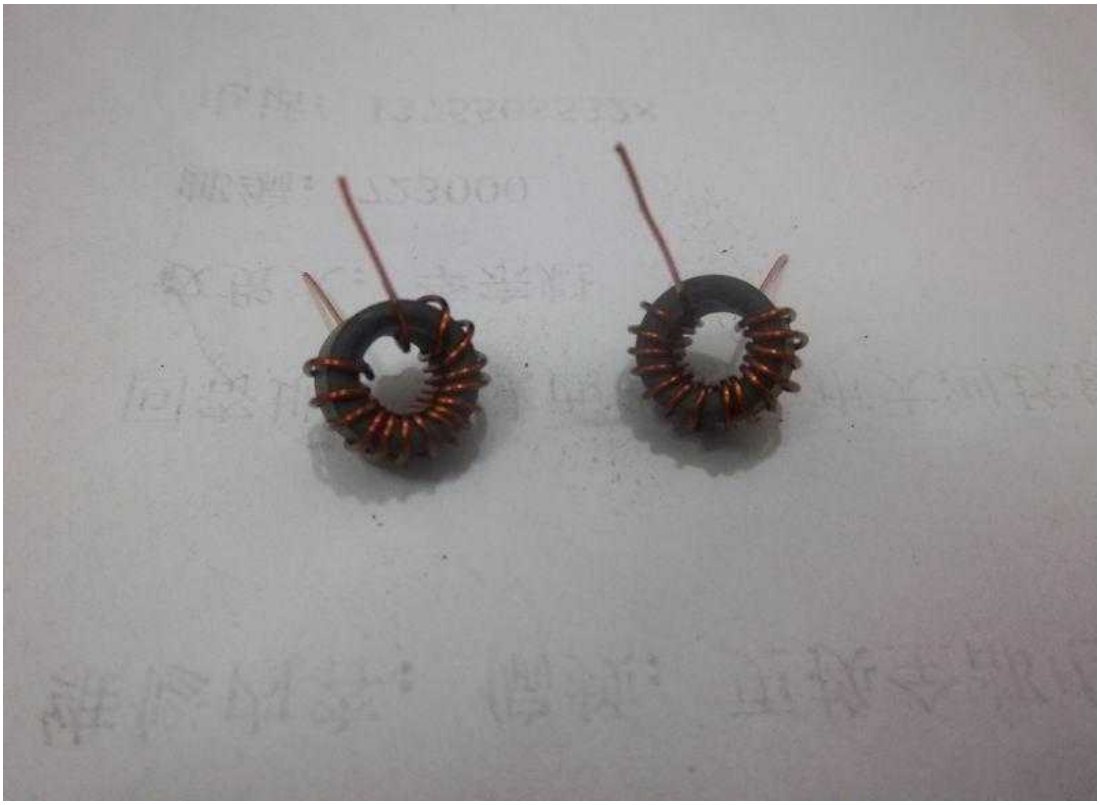
The picture shows 15 turns on NXO-100 small toroid, used for RFC. Note how I account 15 turns.



Here is the way I wind bifilar windings. I used twisted pair Ethernet cable. This example is for B1-2, near D882. Actually, twisted pair Ethernet cable is a good source of enamel wire replacement for toroid winding and it is less prone to scratch.

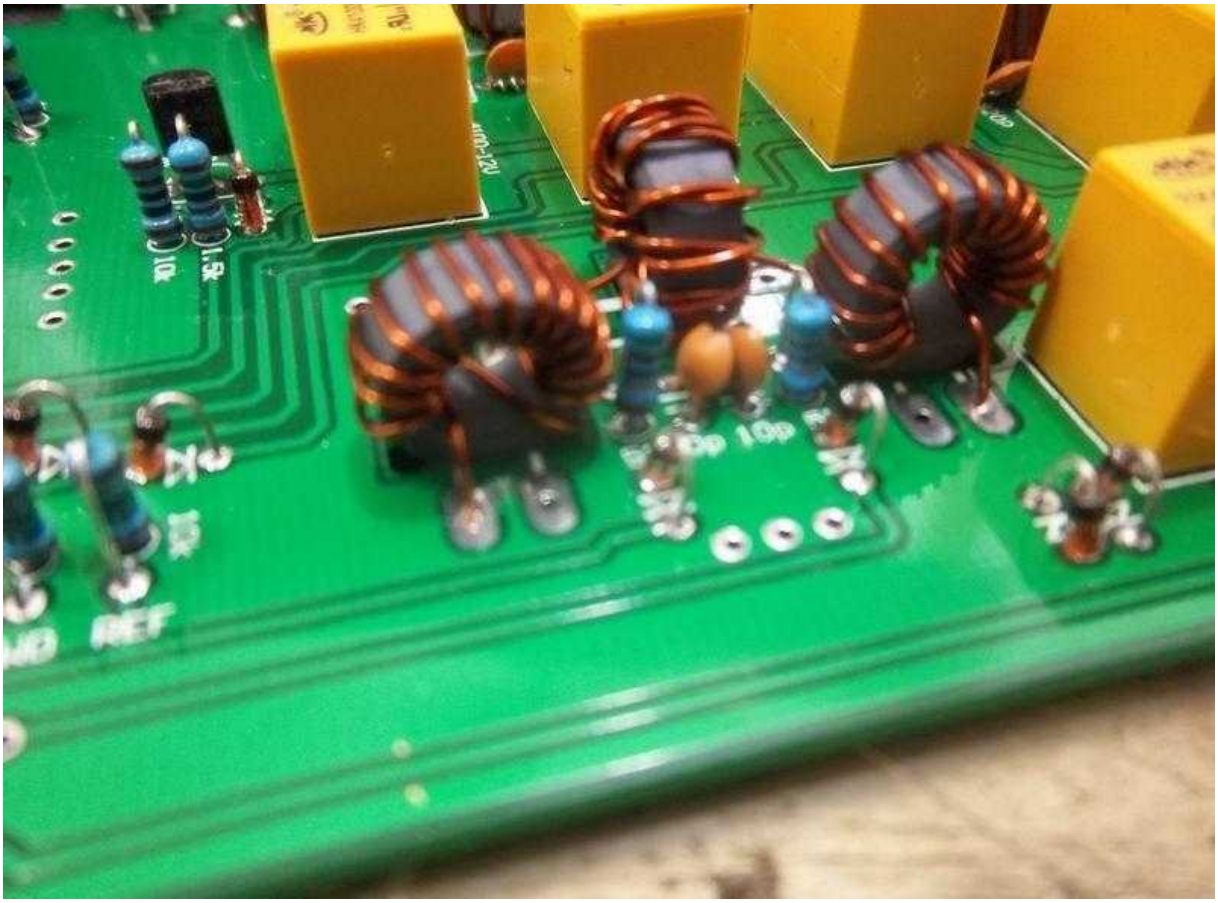


This picture shows how I wind the toroids for SWR detection. Down left is 15 turns, down right is 15 turns as well, but different phase (see what is different phase below). Up middle is 9 turns bifilar, then connect in the middle to make it total 18 turns. After you are done with the toroid installation, you will need to solder one turn wire through the toroid, as shown in red circle.

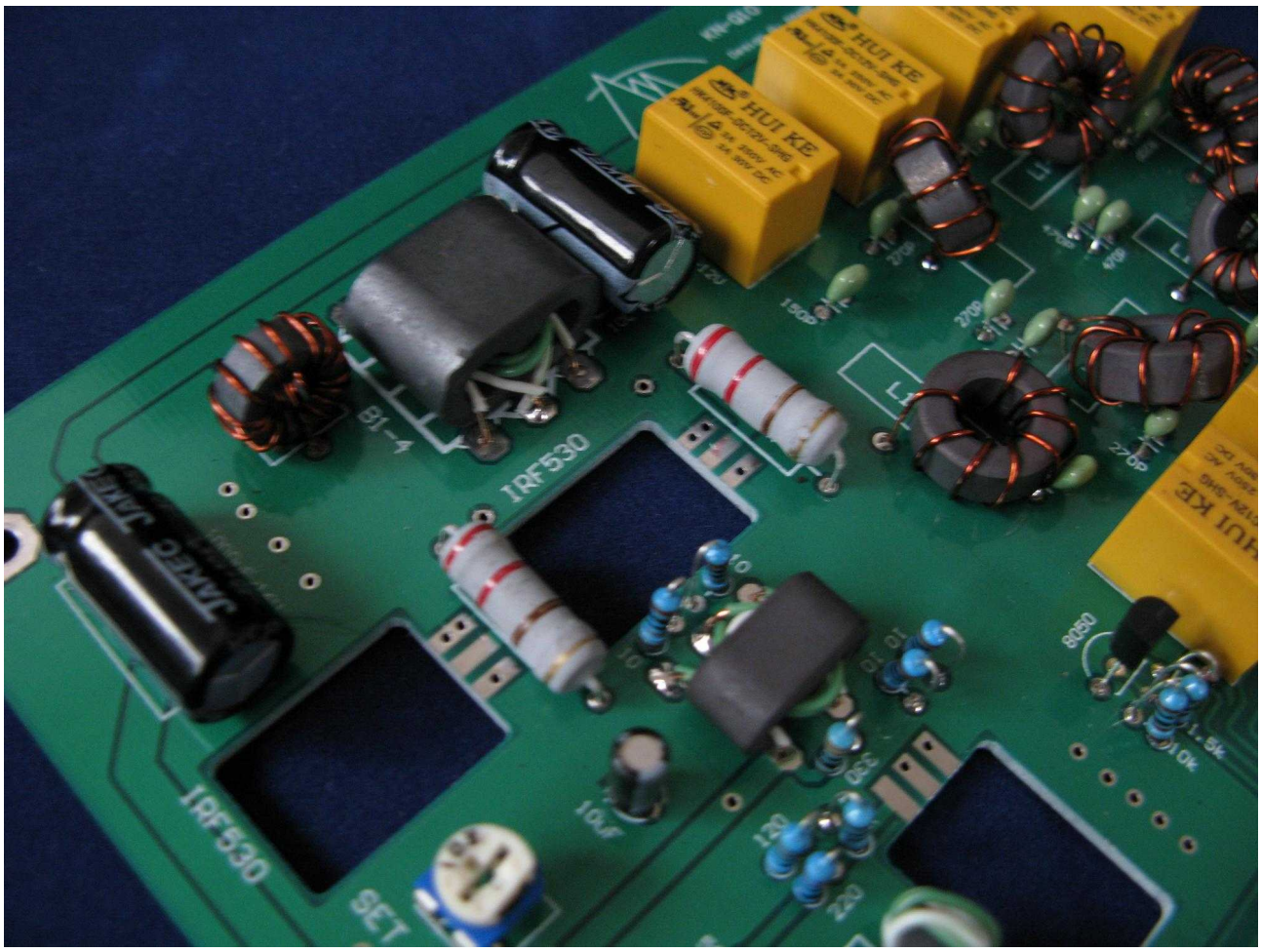


This picture shows different phase coils for SWR detection circuit.

This picture shows the way to wind the bifilar coil in SWR detection circuit. Note that bifilar coils are connected end to end in the middle, and soldered.



The picture shows the coils are partially soldered on the PCB. Note that different phase coils are installed but one turn is not added yet.



This picture shows the way to wind two binocular cores used for power amplifier.

Here I quote the text I wrote in KN-Q10 manual for coil winding, KN-Q10A is same here except the newly added SWR detection coils which we have clearly explained.

- B1-1 (PA board) and B2-1 (analog board): Use small binocular cores, wind 6 turns with 0.2~0.3mm (0.5~0.7mm is ok) diameter magnetic wire. Primary and secondary windings are not important to differ when you install them on boards, but exchange the primary and secondary will slightly impact power output based on what we have observed in experiment.
- B1-3 (PA board): Use small binocular core, wind 4 turns on the primary winding, and 1+1 turns on the secondary, tapped in the middle. The diameter of magnet wire is recommended to be 0.2~0.3mm. Wind the primary winding first, then wind the secondary evenly over the primary winding. Note not to scratch the enamel coating of the wire, or it may cause short circuit.
- B1-4 (PA board): Use big binocular core, wind 1+1 turns with tap in the middle on the primary winding, and 3 turns on the secondary. Because this high frequency transformer is used in the power output stage, magnet wire of 0.5~0.7mm diameter should be used. Again, don't scratch the enamel coating of wire.
- B1-2 (PA board): Use NXO-100 toroid (black, small), wind 5~6 turns using twisted pair magnet wire, connect one beginning end with the other finishing end as the middle tap.
- RFC (PA board): Use NXO-100 toroid (black, small), wind 15 turns evenly using 0.5mm diameter magnet wire.

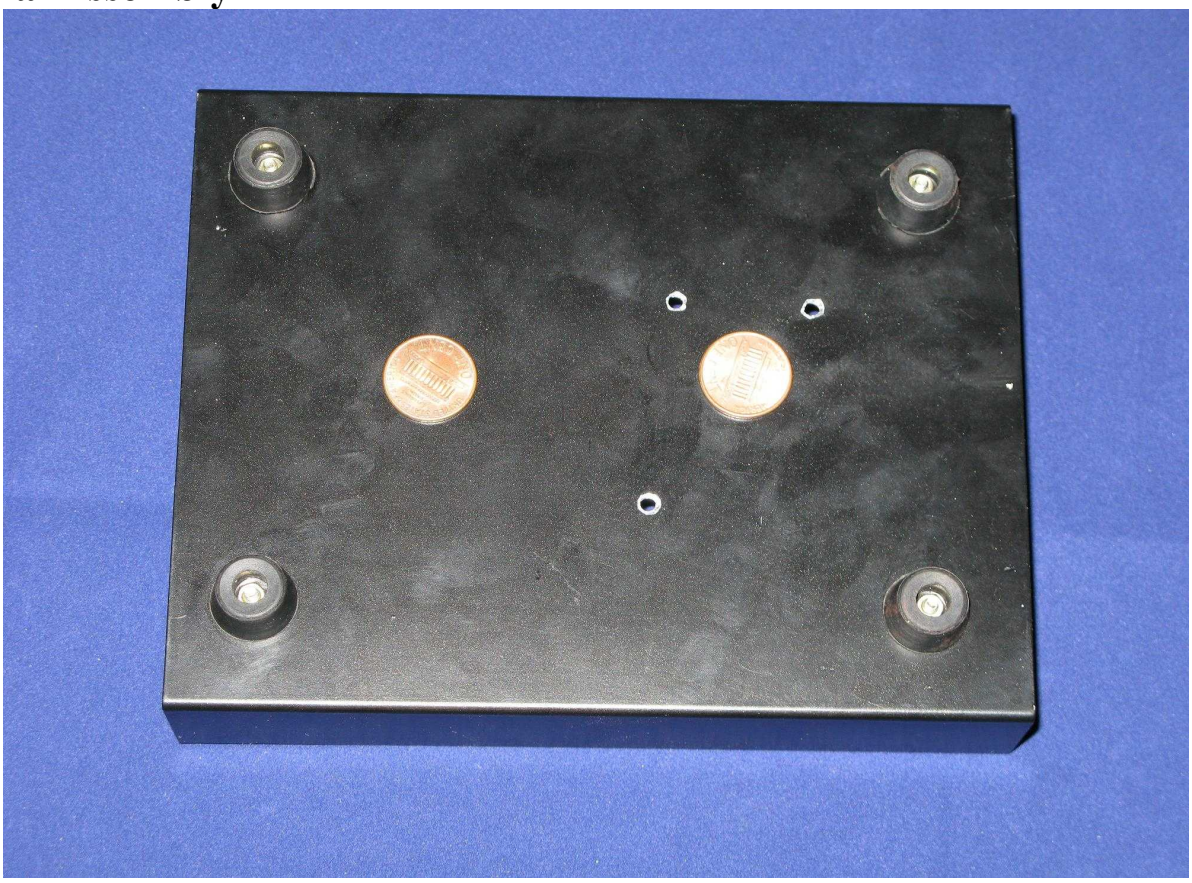
LPF coils (PA board):

- L1-1 (80m band): works with capacitors of 820pF. Use NXO-10 toroid (gray, big), wind 18 turns evenly using 0.5mm diameter magnet wire.
- L1-2 (40m band): works with capacitors of 470pF. Use NXO-10 toroid (gray, big), wind 12 turns evenly using 0.5mm diameter magnet wire.

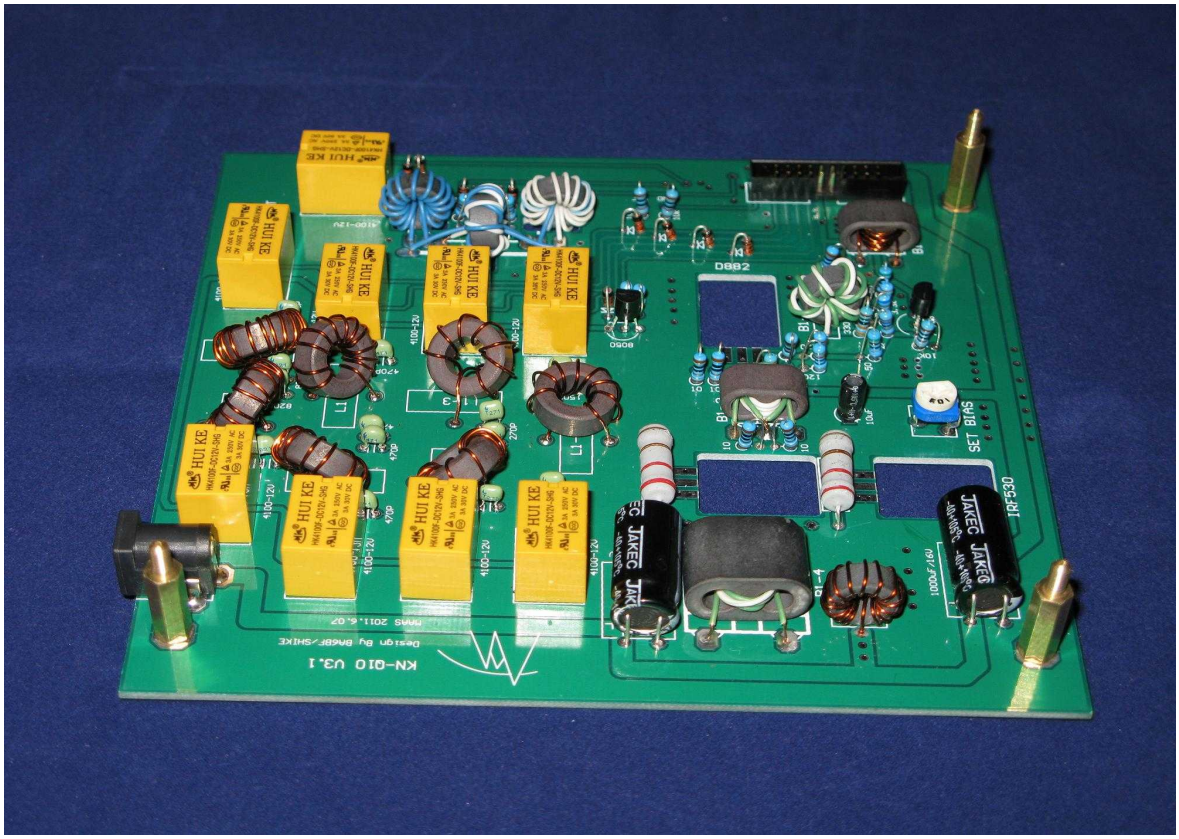
- L1-3 (20m band): works with capacitors of 270pF. Use NXO-10 toroid (gray, big), wind 8 turns evenly using 0.5mm diameter magnet wire.
- L1-4 (15m band): works with capacitors of 150pF. Use NXO-10 toroid (gray, big), wind 8 turns evenly using 0.5mm diameter magnet wire.

Congratulations. This is the end of the board assembly. Next you will follow me to do the final assembly.

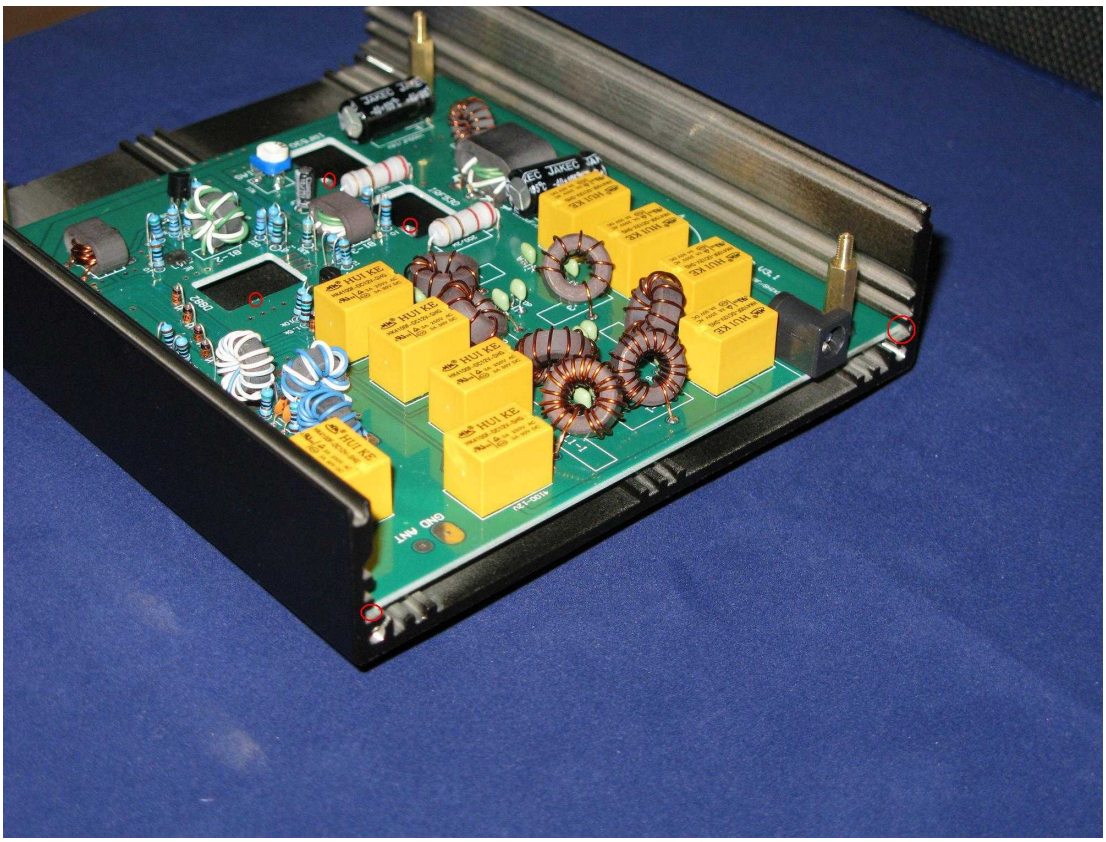
Final Assembly



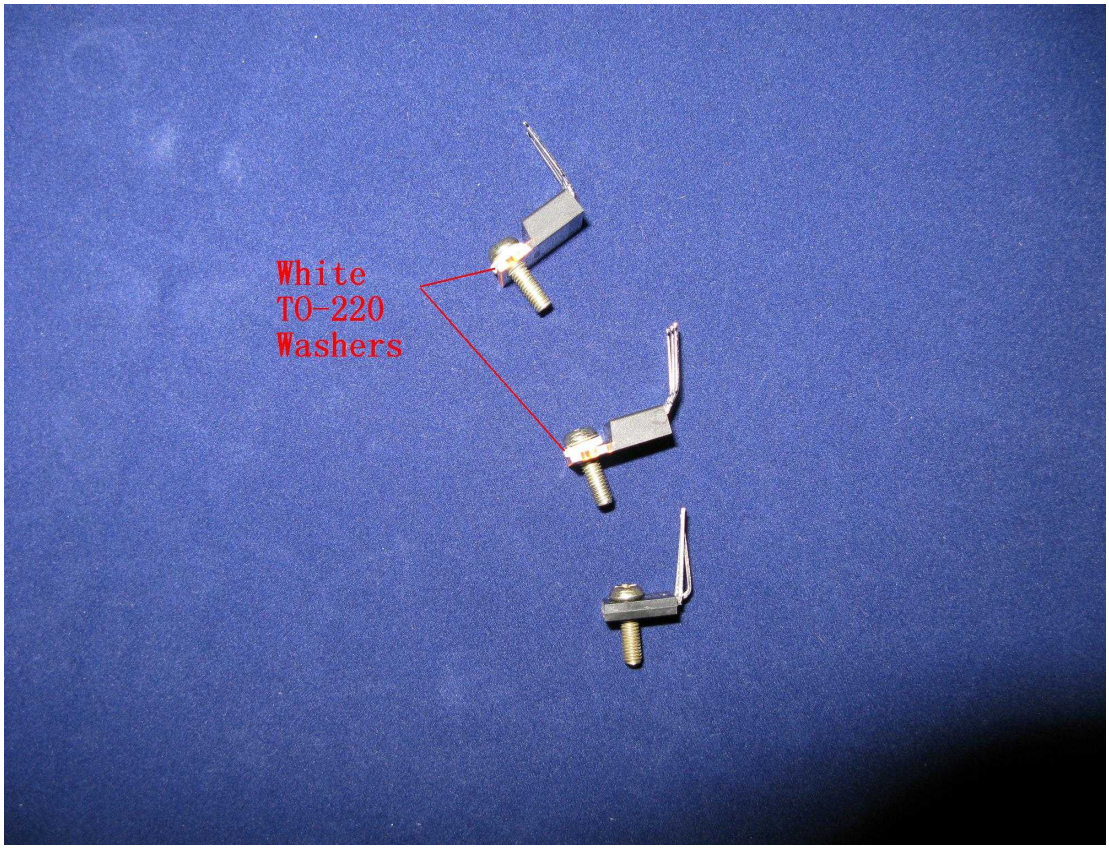
Install four rubber feet on the pre-drilled bottom chassis. Use 4 pairs of M3x10 screw and nut. Put nuts in the hole of rubber feet. Fasten with screw driver.



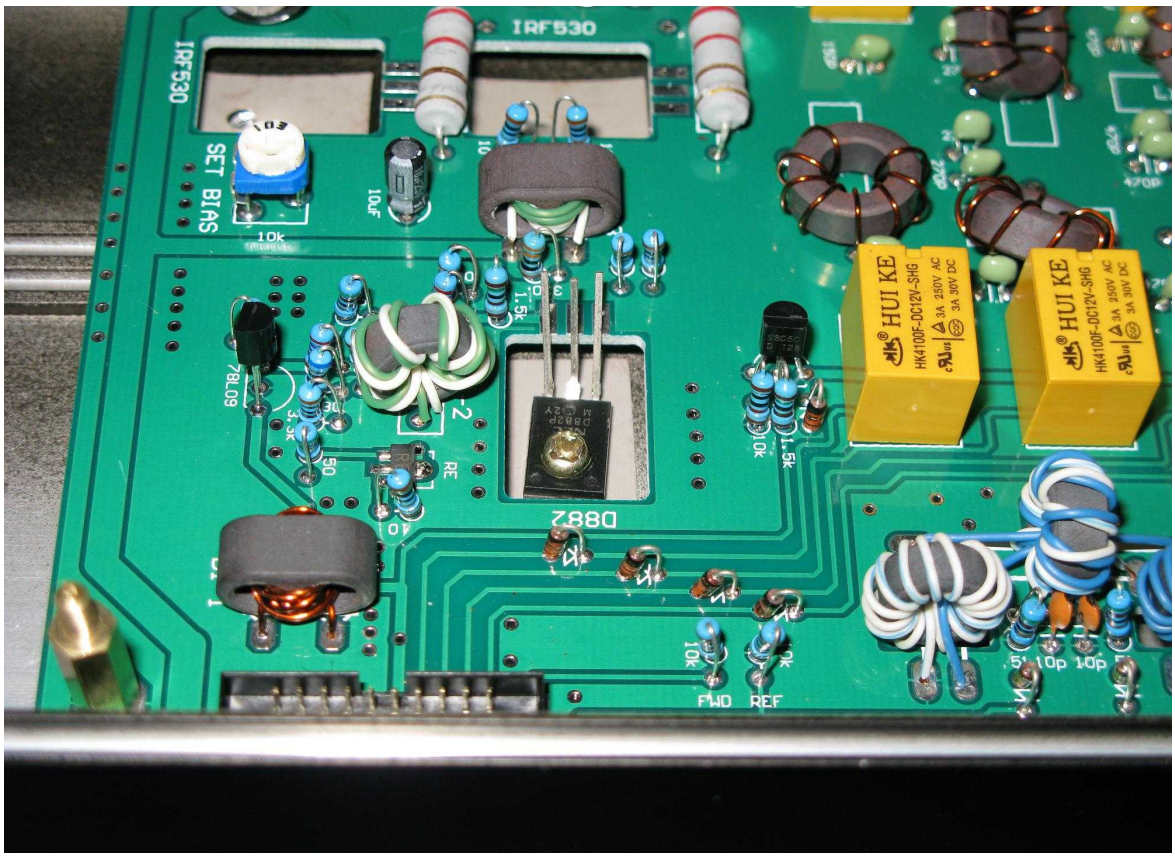
Install three 15mm standoffs on PA board. Use M3x6 screws to fasten from the bottom of the board.



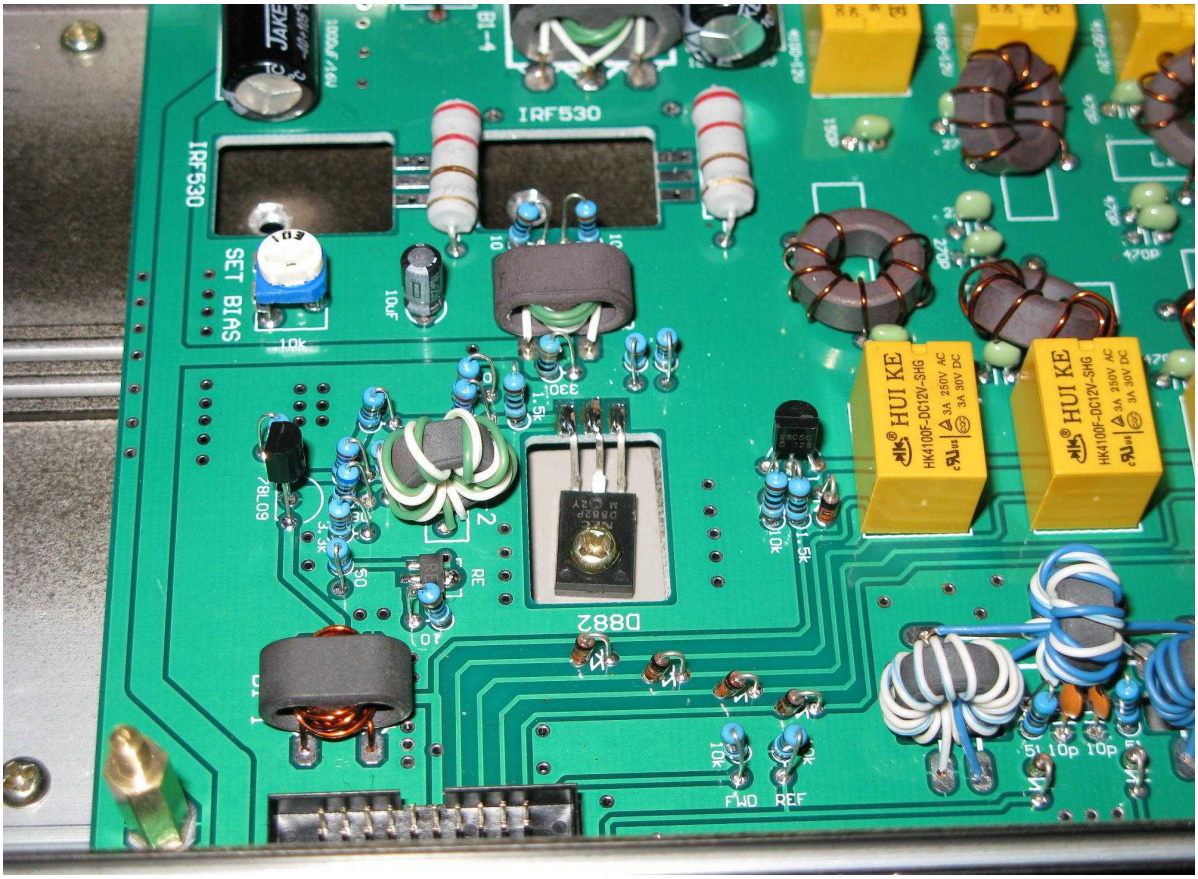
Slide the PA board through the lowest possible slot on bottom chassis, make sure the solder layer is not short circuit with the bottom chassis, also make sure you can see three pre-drilled holes through three rectangular holes on board.



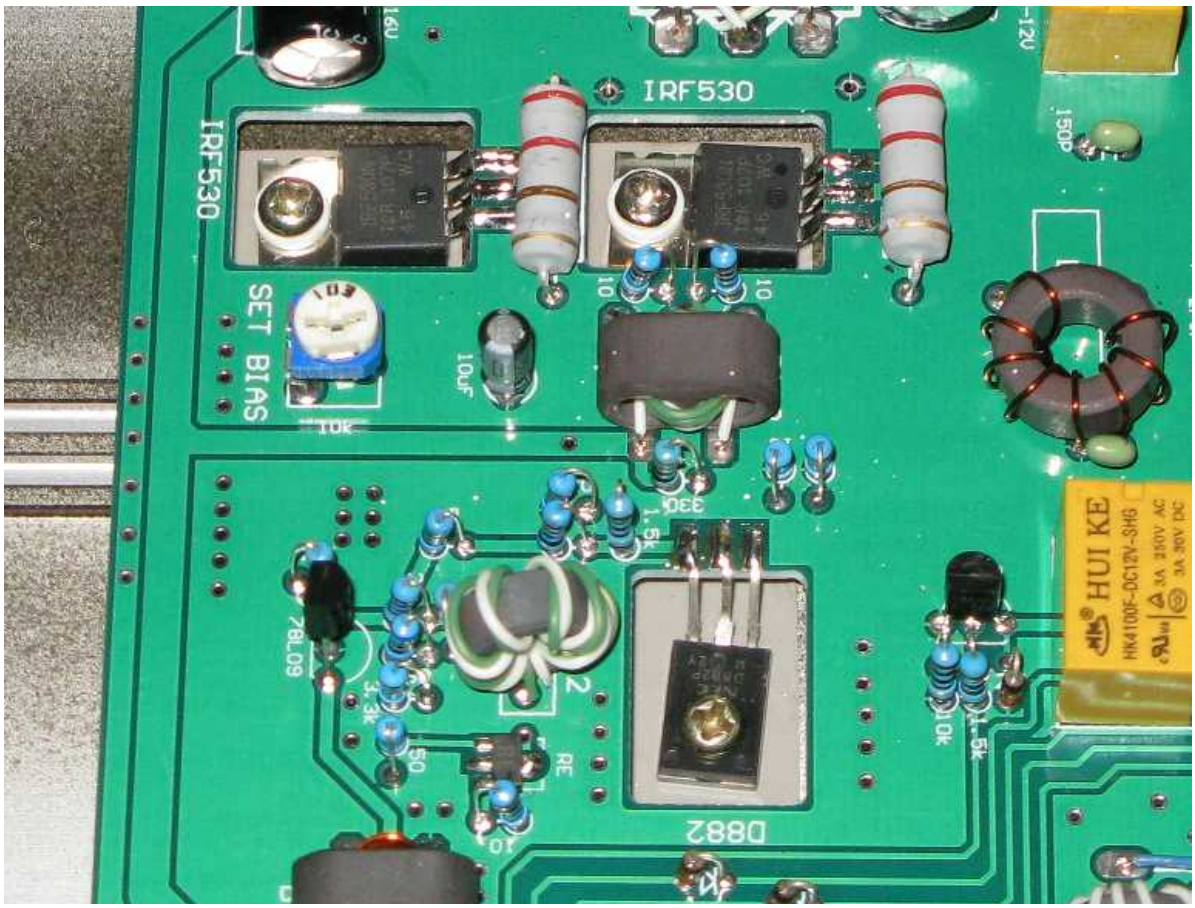
Bend the pins of two IRF530's and one D882. Prepare three M3x10 screws. On IRF530's, use small white TO-220 washer to put between screw and transistor. The IRF530's are electrostatic sensitive components, so handle them with care.



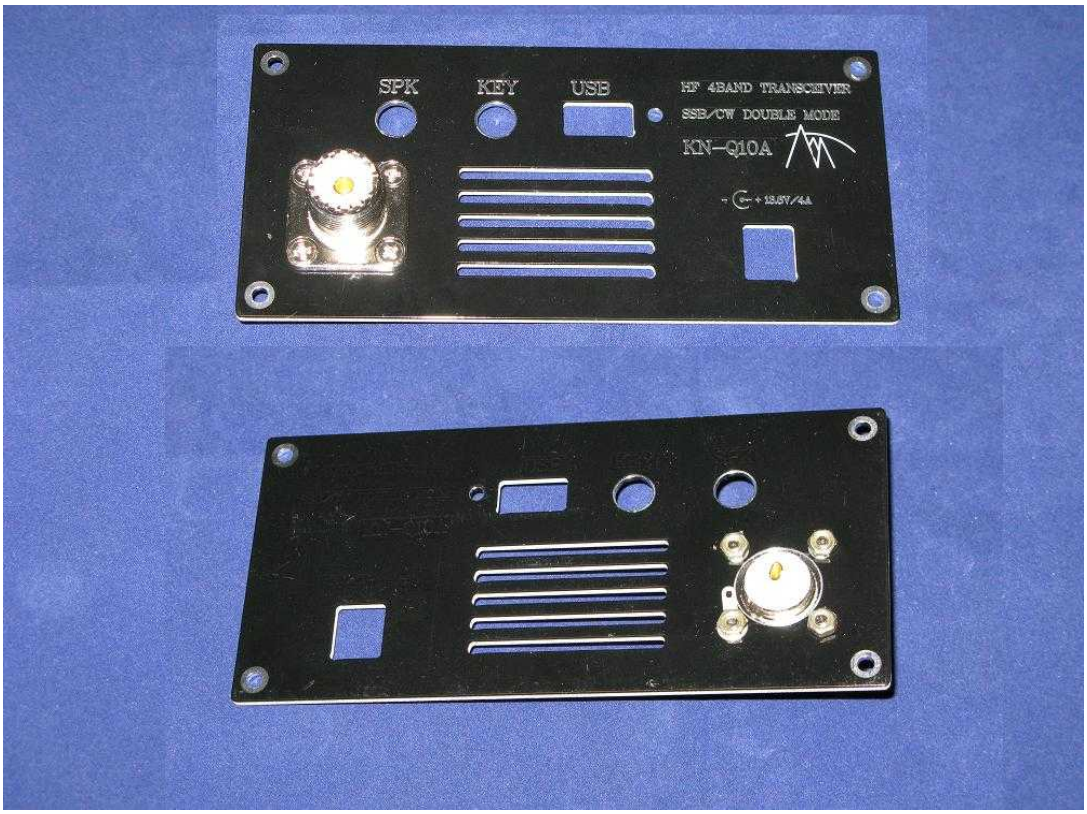
Put three thermal pad in place. Use M3 nut and washer to secure D882. Don't try to fasten it too much now, as it might make the D882 tilt.



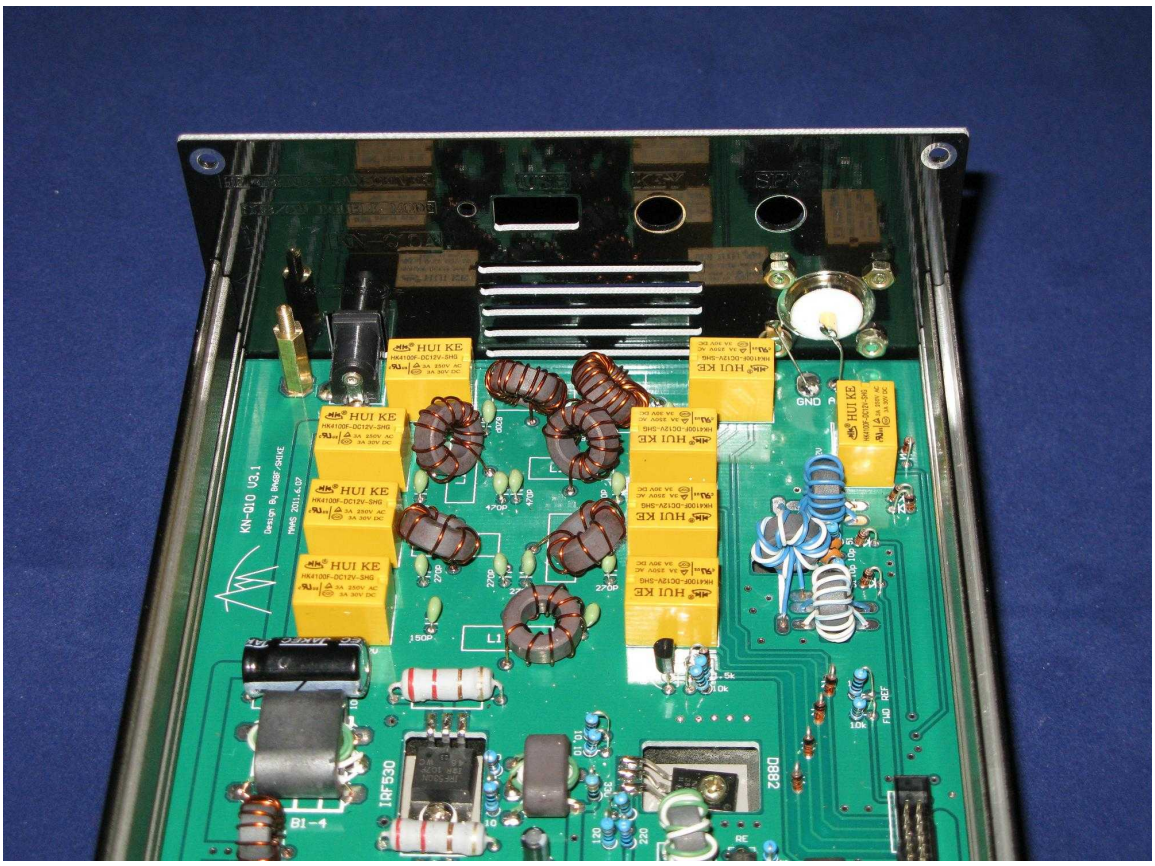
Trim the pins of D882 and bend them close and flat to the corresponding pads on board, then solder. Make sure there are no solder bridges.



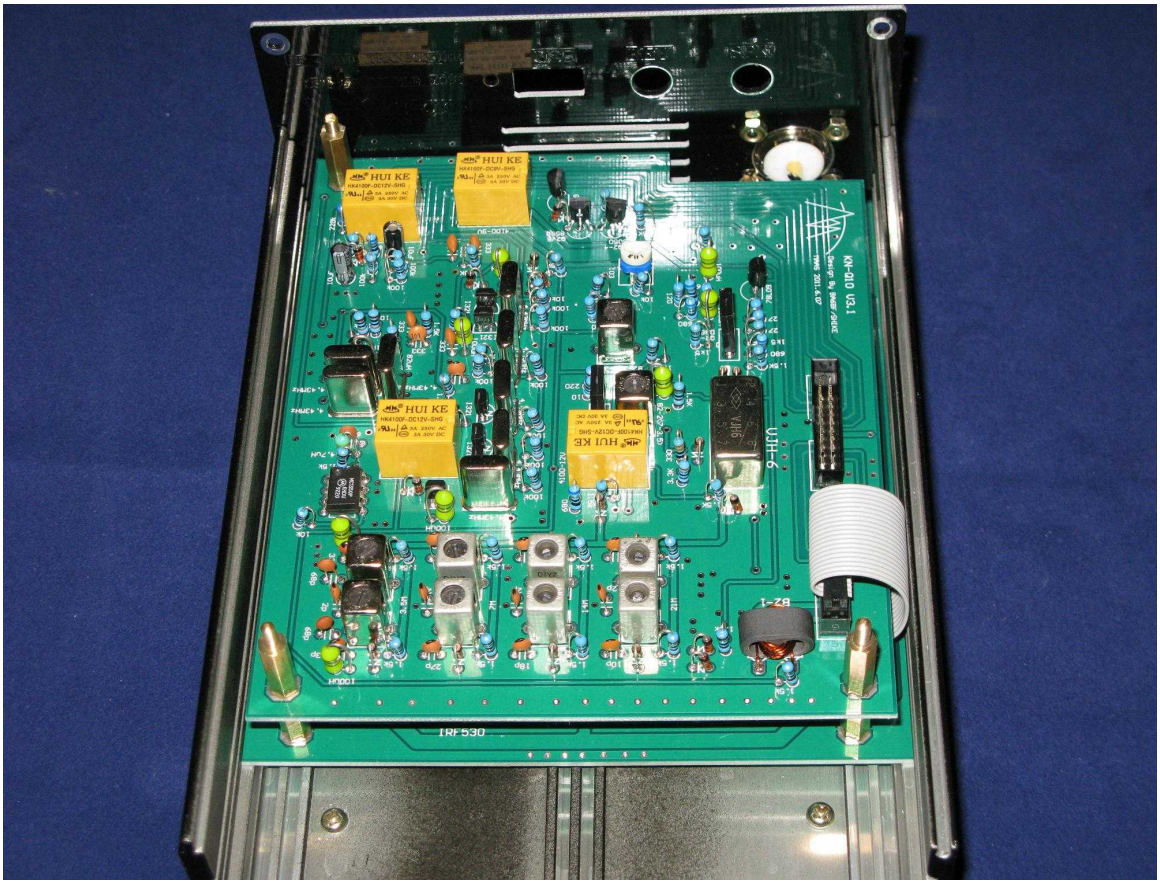
Follow the same way to solder IRF530's. Now you can fasten three transistors as tight as possible, so the bottom chassis can better act as heat sink. Note before you apply power, the SET BIAS trimmer should be adjusted fully counter clockwise, as shown.



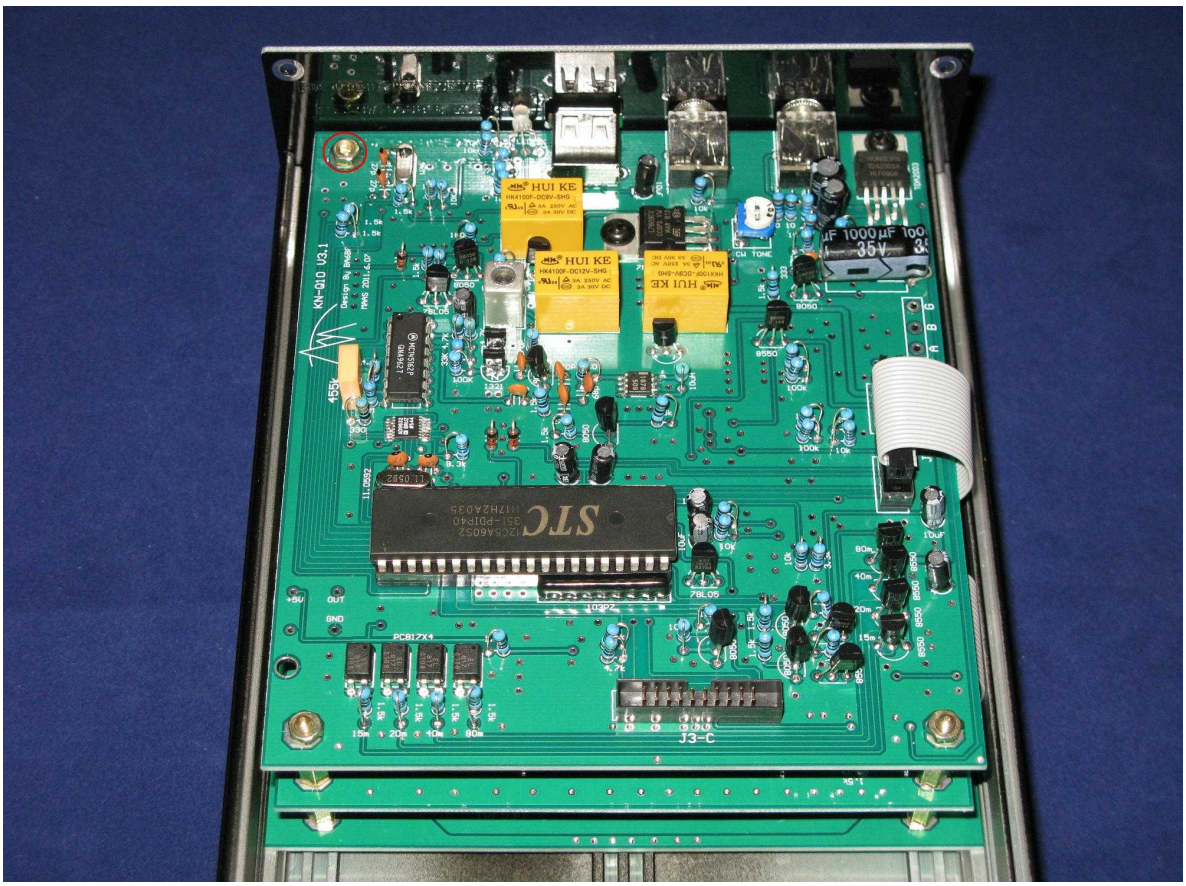
Use 4 flat head silver screws and 4 nuts to install the M connector on the rear chassis panel. Note that a solder plate should be installed as well for ground connection.



Use two black chassis screw to install the chassis rear panel on the bottom chassis, then use component pins to connect the ANT and GND pins on board to M connector.



Use IDC cable to connect the PA board to the analog board, stack the analog board on the PA board, then fasten with another three 15mm standoffs.

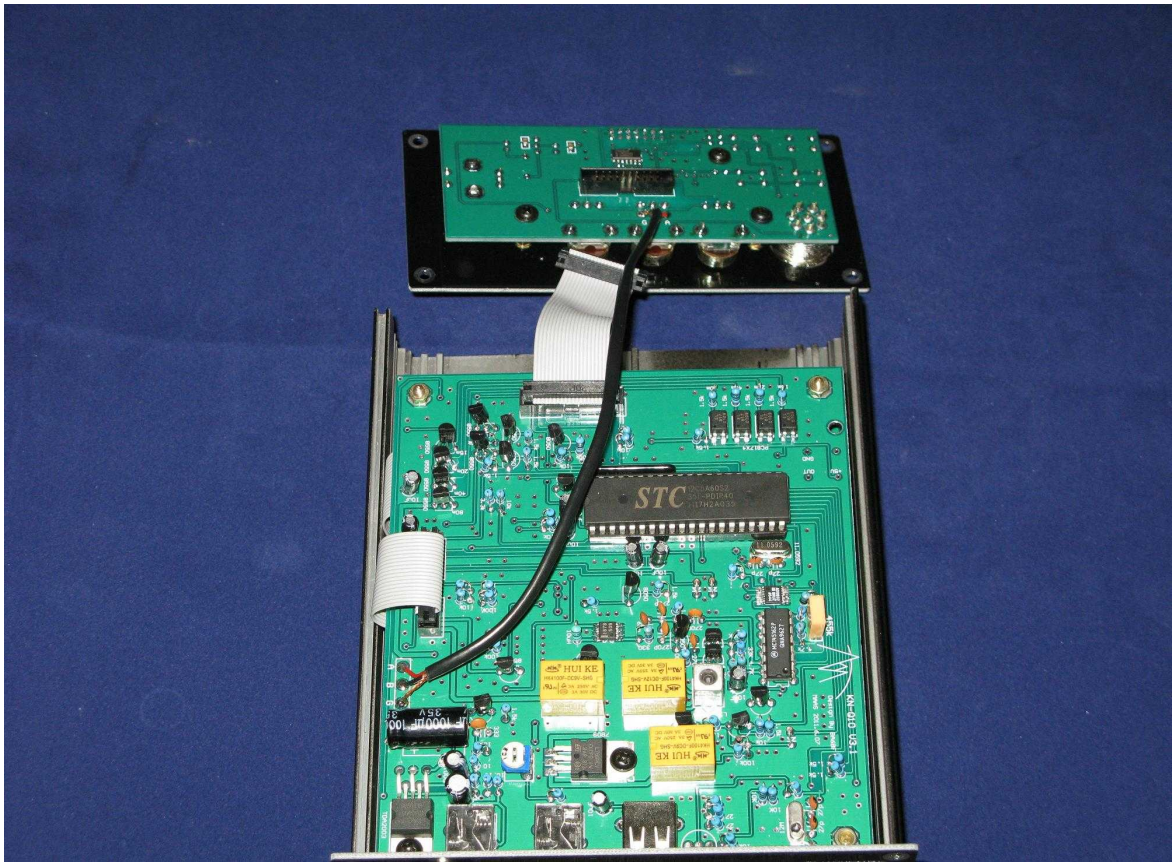


Connect the IDC cable from the analog board to the digital board. Stack the digital board on the analog board and then fasten with 3 nuts. It is a bit tricky to install the digital board. The key is to plug in the hole in red circle first, then make sure the LED, USB connector, and two 3.5mm audio connectors are in place, then plug in the front two holes. For each stack installation, observe there is no short circuit between boards, as they are very close.

Install three 10mm standoffs with three M3x6 screws.

Install the chassis front panel, then fasten three black chassis screws on the standoffs.

Install frequency knob. If your frequency knob comes with rubber ring, remove the rubber ring first.



Solder the audio cable. Make sure G-G, A-A, B-B connections are correct. The shield is used for G-G connection.

Connect the IDC cable from the front panel to the digital board, and install two black chassis screws to fasten the front chassis panel with the bottom chassis. Install the rubber ring to the frequency knob. It is now all set for alignment. Congratulations!

Alignment

Impedance check

Do not connect the power supply to the radio yet. Use ohm meter to check the DC impedance of pin 1 and pin 3 of 7809 voltage regulator against ground (pin 2 of 7809). Due to capacitor charge effect, the reading might be small at first, and increase gradually. After a while, both pin 1 and pin 3 readings should be greater than 1k ohm. If not, check the boards again before connecting power supply. Note if you skip this step, there might be short circuit and overheat.

Hearing protection warning

Before you power on the radio, please understand there is no built-in speaker, and no headphone connector either. Note that if you connect your headphone to SPK connector by mistake, your headphone might be damaged, or your hearing might get impairment. Always use external speaker to connect to the SPK connector, or you can use the speaker in the hand microphone, if you have one.

Power on the radio

You can use any standard 13.8V power supply with current output capability higher than 4A. Find a 2.1mm power connector, connect the power cable to make sure the tip is positive. Note that if you connect the power with wrong polarity, it will damage the radio.

Connect the power supply to the radio. Press POW key on the front panel. If you can see KN-Q10 on LCD display with back light, and no smoke. Congratulations! If you have chance to measure the overall receive current, do now to verify if it is within 410mA +/- 30mA. If you see display is blinking, see VCO alignment section.

Connect an external speaker to the SPK connector, adjust AF GAIN potentiometer to fully clockwise, you should hear some background noise from the speaker.

Basic menu operation

When the radio is powered on, it will show frequency in the upper line, and other info (status, meter readings, menu items and etc) in the lower line. The default is like this:

7.05000
VFO S R

VFO means VFO mode. M-0 to M-9 means memory mode and the number means the memory channel number.

S means SSB, if you press and hold DIS key now, it will be switched to C (CW).

R means Receive mode, T means Transmit mode.

You can tap POW key to switch on or off LCD back light now. Press and hold the POW key will turn the radio off.

If you tap UP or DN now, it will switch band. Press and hold UP to lock the frequency knob, and press and hold DN to unlock the frequency knob.

If you tap DIS now, it will switch to the user menu items.

Here is the list of menu items and some brief description.

Frequency Step: Use UP or DN to select 10Hz, 100Hz, 1kHz, 10kHz, 100kHz or 1MHz as the step. The arrow will show you the step.

Filter selection: Use UP or DN to select Filter 1 ~ 6. By default, FILT 1~3 are used for SSB mode, and FILT 4~6 are used for CW mode. These filter parameters can be set in the hidden menu.

AGC on/off: Use UP or DN to toggle between AGC on or off.

Pre-amplifier on/off: Use UP or DN to toggle between pre-amplifier on or off.

V/M V>M: Use UP or DN to toggle between VFO or memory mode.

RIT: Use UP or DN to adjust the receiver frequency but not to change the transmit frequency.

The range is up to +/-10kHz.

Meter enable or disable: MET EN means Meter display is enabled. MET DIS means Meter display is disabled. Use UP or DN to toggle.

S/P MET or SWR MET toggle: Use UP or DN to toggle. S/P means S meter during receive and Power meter during transmit. SWR means SWR is displayed during transmit.

Power voltage display.

Back to frequency display toggle (BACK DIS): Use UP or DN to toggle if it automatically go back to frequency display during menu operation.

CW practice function toggle (PRAC ON/OFF): Use UP or DN to toggle between on or off. When the function is on, no RF will output when keyed in CW mode.

To enter the hidden menu, press and hold DIS and power on. We will introduce in more detail later about the hidden menu.

VCO alignment

The purpose of the VCO alignment is to make sure PLL can be locked in all four ham radio bands. The LCD will blink if the PLL is not locked, so it is a good indicator. Rule of thumb is to tune to 15.000MHz and adjust the L3-1 core deeper to get it just locked. If you cannot get it locked, check the 455kHz ceramic filter to see if there is 455kHz signal present on the input and output pins.

Transmitter alignment

Disassemble the front panel board, digital board and analog board, but keep the PA board in the chassis. During this period, please preset the trimmers. Preset the trimmer on the digital board to fully clockwise then back a little bit. The trimmer controls the side tone of CW and it normally too loud if you don't do this preset. Preset the trimmer on the analog board to fully clockwise. Preset the trimmer on the PA board to fully counter clockwise.

Connect all the IDC cables, and layout the boards to avoid any short circuit possibilities. Connect a microphone to the microphone connector. Connect a dummy load of 50 ohm 30W or higher to the antenna connector. Connect a current meter of 10A range in series to the radio. Power on the radio and make sure it is in SSB mode. Press PTT switch and don't speak to the microphone, the overall current should be 0.85A to 0.9A. Use a screwdriver to slowly adjust the trimmer on the PA board, to make the overall current 0.1A higher. That is to say, if the original current is 0.85A, you need to adjust the trimmer to make it 0.95A.

If you want to make a microphone by your own. You can refer to the following pinout.

After it is done, disconnect the power cable from the radio, and stack up the analog board over the PA board using the standoffs, and power on again, and choose 3.8000MHz in CW mode, also

enable the meter and select S/P MET, so you can read the power in transmit mode. Press the PTT, and adjust the corresponding two BPF IFT's to peak the power. Switch band using UP or DN, and do the same. You should be able to get more than ¾ full range in power meter display in 3.5M, 7M and 14M bands, and about 1/3 full range in power display in 21M band. You will also need to adjust B2-3 IFT to peak the power, but it normally does not impact too much. After you are done with all the bands, you complete the transmitter alignment.

Receiver alignment

Since you have aligned BPF for transmitter, you also aligned for receiver automatically, so if you connect an antenna to the radio, you should be able to hear loud band noise and some signals while you are tuning. Now if you hear some vague voice signal even you tune very carefully, it is normal. You will need to use hidden menu to set filter parameters including bandwidth, BFO frequency and etc.

To enter the hidden menu, press and hold DIS and power on. After the normal menu items, it follows MCU crystal frequency calibration (**XTAL?**), S-meter calibration (**S-BAJ S1** and **S-BAJ S9**), filter parameter setting (**FILT1SET, FILT2SET, FILT3SET, FILT4SET, FILT5SET** and **FILT6SET**), CW side tone adjustment (**CW TONE?**), filter mode (**FILT MOD**), keyer mode (**KEY MOD?**), QSK delay setting for CW (**CW DELAY**), high SWR protection setting (**HIGH SWR SET**), TX/RX transition delay to mute noise (**SQL SET**), CAT baud rate setting (**CAT Band**) and serial number display.

Anytime before you adjust crystal frequency or BFO frequency, you'd better cover all the chassis and power on the radio and wait 20~30 mins in receive status. The time of warm up will make your frequency adjustment more accurate. So cover the top chassis now, and take time to do the following menu settings.

S-meter alignment is quite easy if you don't need very good accuracy. Just set **S-BAJ S1** to 65 and **S-BAJ S9** to 630. The menu operation is like this: Tap DIS till you see **S-BAJ S1**, then press and hold DIS to activate the S-meter S1 setting, use UP or DN to adjust to the value you want, then press and hold DIS to exit the setting. Follow the same way to adjust S-meter S9 setting in **S-BAJ S9** menu item. If you need high accuracy, you can inject 50uV to the radio by a signal generator, and adjust **S-BAJ S9** menu item to set exactly the same value that the radio is reading.

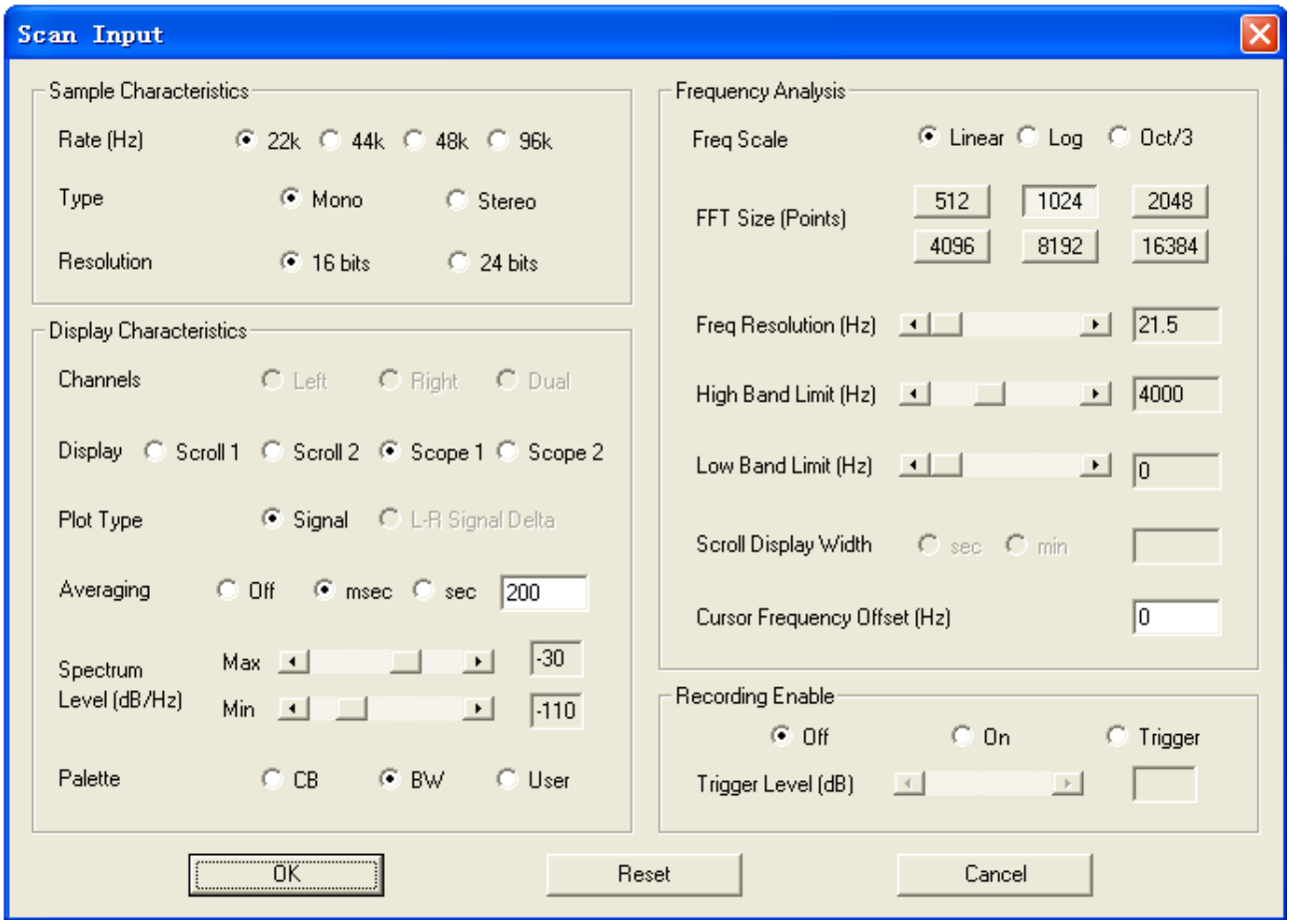
Follow the similar menu operation to set CW side tone to 700Hz, CW Delay to 0.6s, SWR protection to 2.5, SQL SET to 0.25s.

You must be curious about **FILT MOD** and **KEY MOD**. When **FILT MOD** is auto, it will automatically choose FILT 1~3 for SSB and FILT 4~6 for CW. When it is GENE, either SSB or CW can choose from FILT 1 to 6. **KEY MOD** selects keyer mode, NORMAL means straight key, while LEFT and RIGHT are used for built-in keyer. Remember anytime in CW mode, you can use keyer knob to adjust keyer speed from 5 to 49 wpm.

Now assume that warm up time is enough. Let's start MCU crystal frequency calibration. You can connect the radio to a commercial amateur radio using a coaxial cable jumper, just like the one used for SWR/ Power meter. Set LSB or USB mode for the commercial radio, and receive the leakage signal and tune to zero beat the leakage signal to measure the frequency. Now tune to 11.0592MHz and tune up slowly. You will hear a tone. To verify the tone is leaked from the KN-Q10A radio, you can turn off the KN-Q10A to see if the tone is gone. Tune to the point to zero beat the tone, and you can read the actual MCU crystal frequency and set in the **XTAL?** menu item. Note that in this step you must not put the KN-Q10A radio in transmit, or your commercial amateur radio will be damaged.

The last but not the least, let's set the filter parameters. Totally there are 6 filter parameters. We can set FILT 1~3 for SSB, and FILT 4~6 for CW. In each filter setting, you will set bandwidth, BFO frequency, LSB IF frequency and USB IF frequency.

It is recommended that you use a freeware called Spectrogram. It is used for audio frequency spectrum analysis. It is very helpful to adjust filter bandwidth and BFO frequency. The below is my setting in Spectrogram 16 for your information.



It is recommended that you set the following parameters for each filters:

FILT#	Bandwidth	Frequency range
1	2.7kHz	300Hz~3kHz
2	2.4kHz	300Hz~2.7kHz
3	2.0kHz	300Hz~2.3kHz
4	1.5kHz	300Hz~1.8kHz
5	0.7kHz	300Hz~1kHz
6	0.4kHz	500Hz~900Hz

Connect to a noise generator, or connect to an antenna and choose a quiet frequency to use the band noise. Menu operation is like this(take FILT 1 as example) : Tap DIS to display menu item **FILT1SET**, press and hold DIS to activate setting. The first is bandwidth, and you can use UP or DN to setting from 0 to 255. The lower the value, the wider the bandwidth. Set it to about 2.7kHz. After you are done, tap POW to BFO setting, use UP or DN to set right BFO frequency to allow frequency range of 300Hz~3kHz. Tap POW again, you will see LSB IF, tap again, so you will see some numbers like 4433550, tap DIS can change step, tap UP or DN can change setting. Tap POW again, you will see USB IF, tap again, you will see some numbers like 4433770. You can get familiar with menu operation now, but don't change LSB IF and LSB IF frequencies yet. After you are done, press and hold DIS to exit, and tap DIS again to set the next filter parameter.

Now you will feel very comfortable to receive some signals, but you might still find there is some frequency display offset. Use your commercial amateur radio again to receive a clear voice signal on 40m band and 20m band. Remember the frequencies. Then use the KN-Q10A to receive the same signals, and check the offset, and also check the Filter selected. Compensate the offset in this filter's LSB IF setting for 40m signal , and USB IF setting for 20m signal. You will need to do this step for each filter.

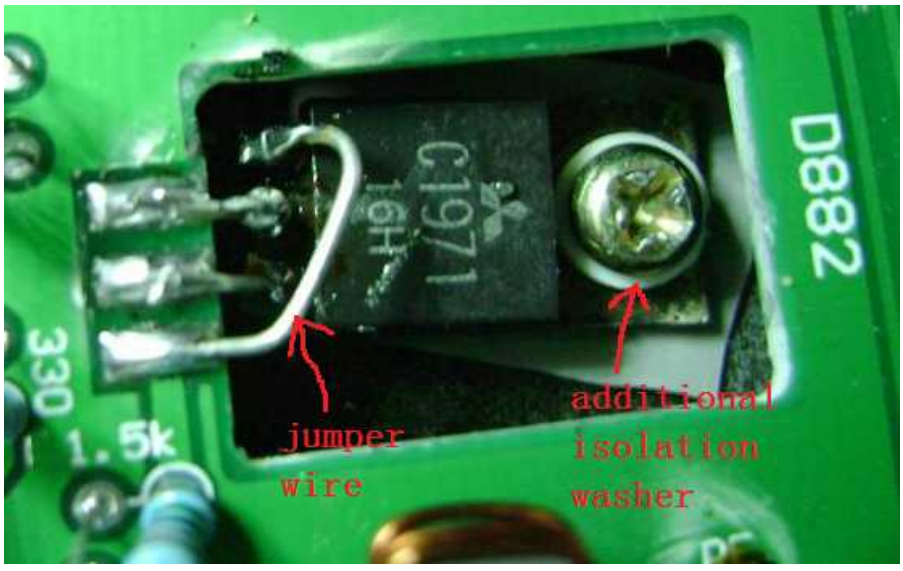
Modifications

It is recommended that you put some shielding between the analog board and the digital board, because they are too close and you can hear a tone near 5kHz, and some noise while tuning, if you don't make this modification.

For each modification, you need to disconnect the power supply cable. Only power off the radio is not good enough.

Due to the overall height limitation, you will have to take care to put the shielding very near to the digital board but not to short circuit any pins. It is recommended that you use the tinfoil paper in cigar-boxes, since one side of the paper is conductive and the other is not. Put the conductive side towards the analog board, and the non-conductive side towards the bottom of the digital board. It is recommended that you use some glue to stick the tinfoil paper on the bottom side of the analog board. It is very important to connect the conductive side to the standoffs, so it can be grounded well.

If you like to have higher RF power on 15m band, you will need to modify the driver transistor D882 to replace it with C1971 that I have provided in the upgrade kit. However, the pinout is different, see the following picture. Use additional isolation washer for C1971. You don't need to change bias resistors for this modification, but the overall current will change and it is normal.



Final Words

I have decided not to cover CAT and FW upgrade details into this manual. The CAT software for KN-Q10 can be used for KN-Q10A, but no SWR reading provided so far. The CAT software was written by a Chinese amateur and both English and Chinese versions are provided. This software if free. Send email to pcauto@126.com to request. Indicate your call sign, email, KN-Q10's S/N and software language. To use CAT and FW upgrade, you will need to connect the radio's USB connector to a PC by a cable with both USB Type A connectors, and you will need to find and install a driver for PL2303 chip for your computer first.

Should you have any questions and comments, you are welcome to join yahoo group http://groups.yahoo.com/group/CHINA_QRP/ and send a post, or you can feel free to send me email. The email address is on the cover page of this document.