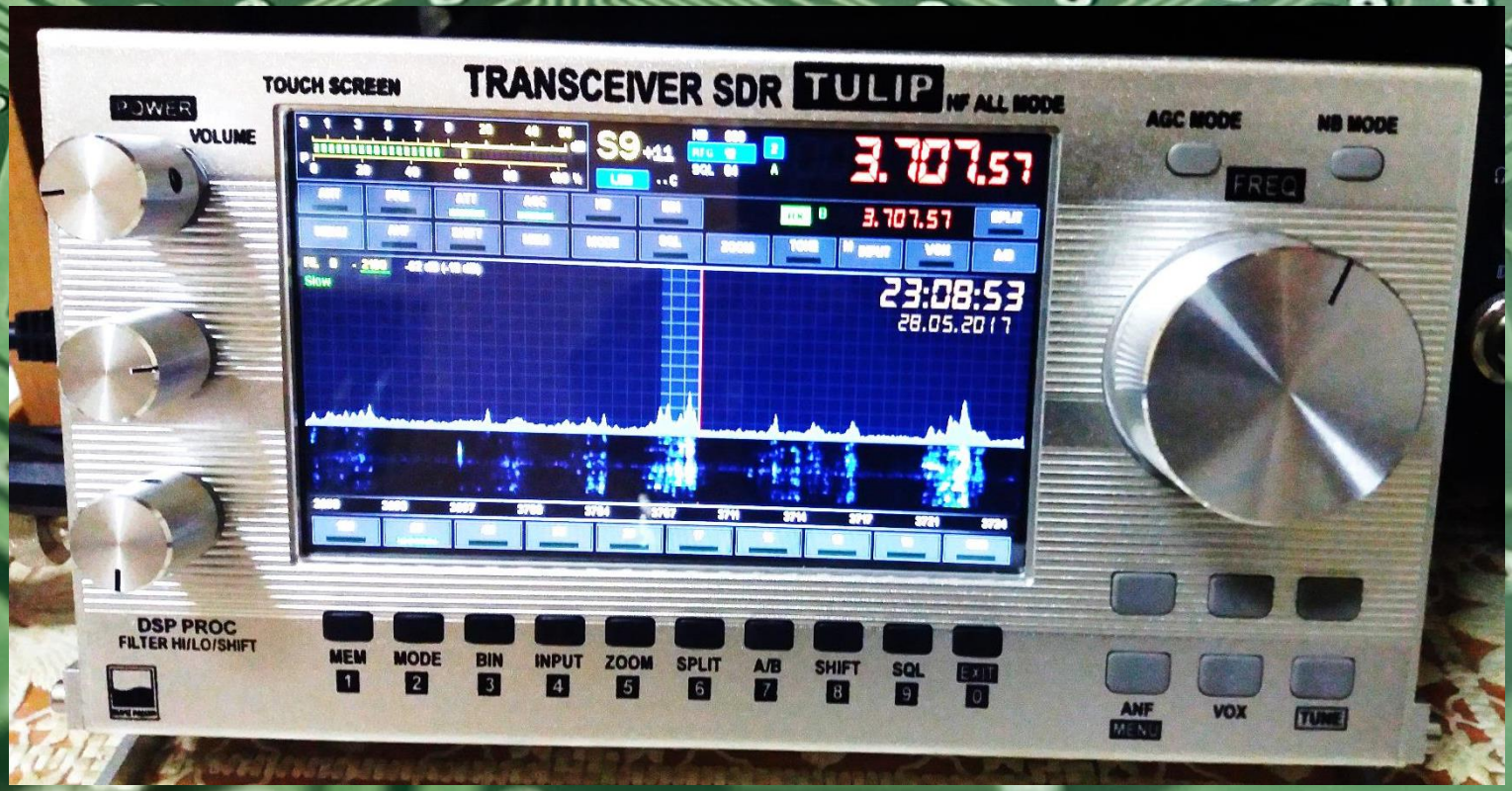
TULIP 2

SDR TRANSCEIVER

By YO2BOF



SIMPO 2017 - IZVORUL MUREŞULUI

- The project authors are Georghe Tulip RX9CIM and Vladimir R6DAN. The first mention of the project is 1 May 2015. A chronology of the evolution of this project can be found at: http://forums.qrz.com/index.php?threads/

- The project was taken over by many amateurs and continuously improved.
- Fascinated by the concept SDR (Software Defined Radio) during December 2015 April 2016 we released the first version of the transceiver TULIP.
- Transceiver performance pleased I decided to share my experience and other amateurs eager to build a standalone SDR taransceiver.
- For information to be more accessible we have created a blog at http://tulipsdr.wordpress.com I presented all the technical details on implementation of this transceiver.

I participated in this work TULIP SDR TRANSCEIVER the technical creation Championship that took place in 2016 in Targu Neamt. His second place.

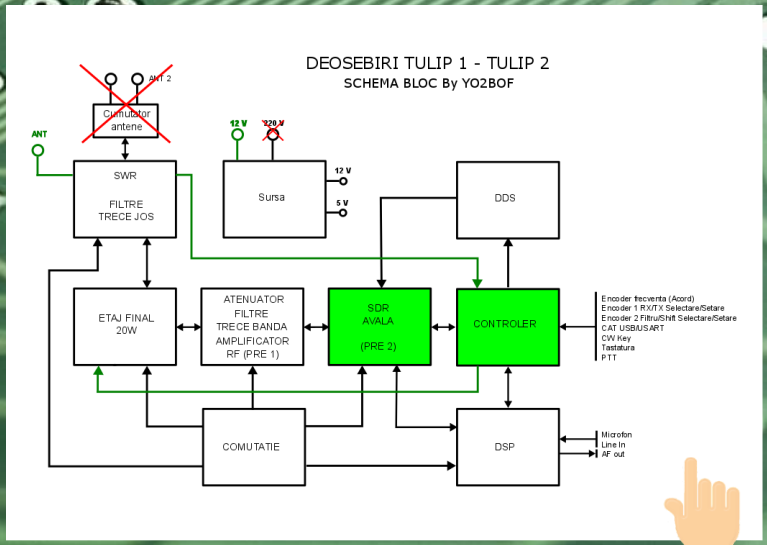
- In September 2016 I found out an upgraded version of the transceiver made by Artur SP3OSJ. Studying new version on the website or http://www.sp3osj.pl/ We decided to develop this version, which we call a generic TULIP 2.
- Making new versions become easier by the possibility of buying the kit to SP3OSJ mechanically. It consists of: a) the set of cables (3 pieces), b) housing, c) buttons,

  d) keys, e) screens between the modules (wiring), f) for clutches. microphone, headphone, and AF-out socket

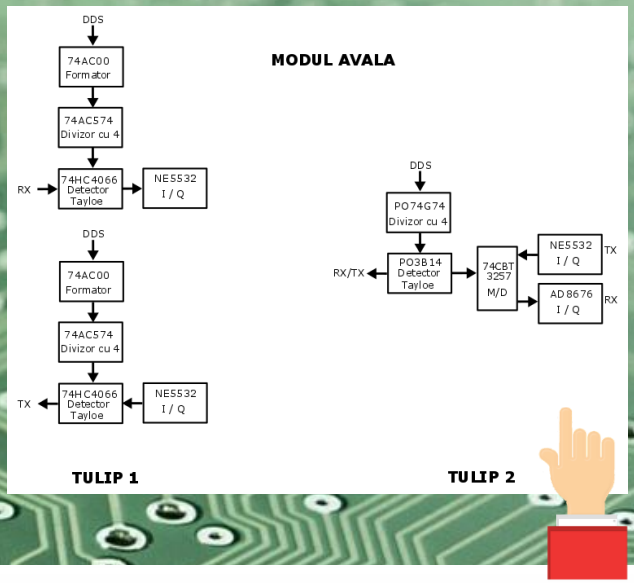
  bios battery.
- The analysis schemes during construction and found a number of changes from version 1 (Russian).

- 1. The transceiver is equipped with one antenna terminal. Removed relay switching antennas.
- 2. supply transceiver is achieved only 12V. Internal 5V voltage is obtained.

- 3. The controller scheme was added to a final stage protection circuit SWR greater than 3.



4. In the circuit diagram Avala training module and division by 4 (one for transmission and one for reception) were replaced by a single divider 4, more efficient PO74G74 able to work at frequencies up to 600 MHz, which has improved higher bands than the signal in the form of

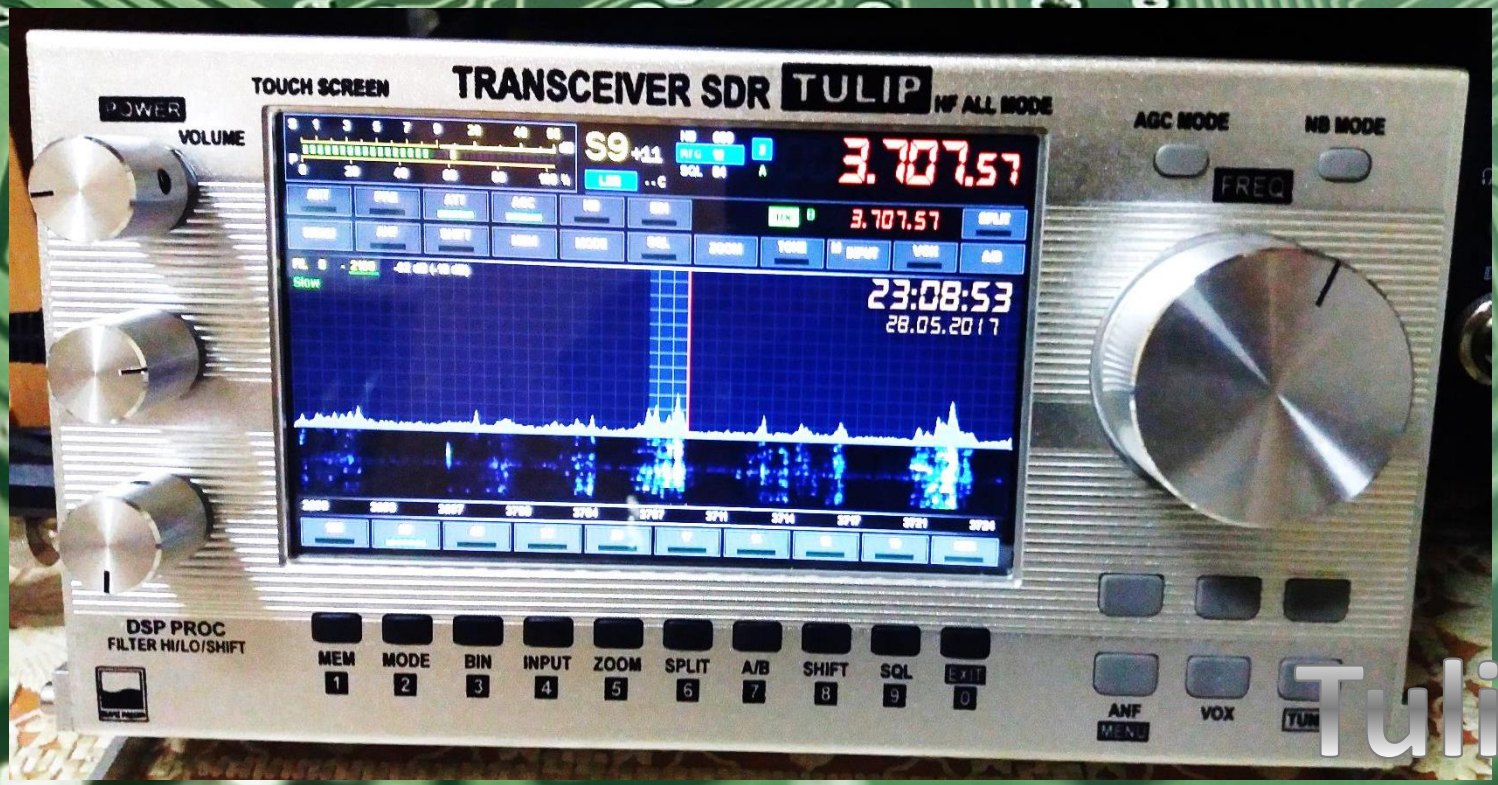


- The major difference lies, however, in replacing Tayloe detectors (one for transmission and one for reception) with a single detector chip PO3B14 Tayloe achieved. PO3B14 chip is multipexor / demultiplexer with 4 channels can work to their common order GHz and a very low noise due to special technology of achievement.
- Using a single detector Tayloe band filters allow connection with the transformer broadband TC4-1T which makes answer in the range 1.8 MHz to 30MHz or better than, the output power is the same in all bands.
- Switching detector Tayloe reception or the emission is made with chip 74CBT3257 multiplexer / demultiplexer 4-channel FET transistors and achieved high performance in terms of resistance crossing is very very small, which reduces signal loss.

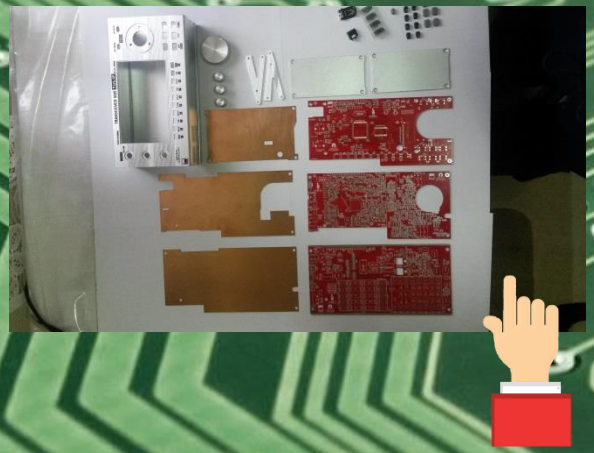
- Another important change is the replacement of an extract operationalelor circuit I and Q signals with the AD8676 type NE5532. The latter is an operational precision and much lower noise.

- 5. The adaptation of the power amplifier output is improved, the final stage is much more linear in the band from 1.8 to 30 MHz.
- The rest is the same as the wiring diagram of version 1

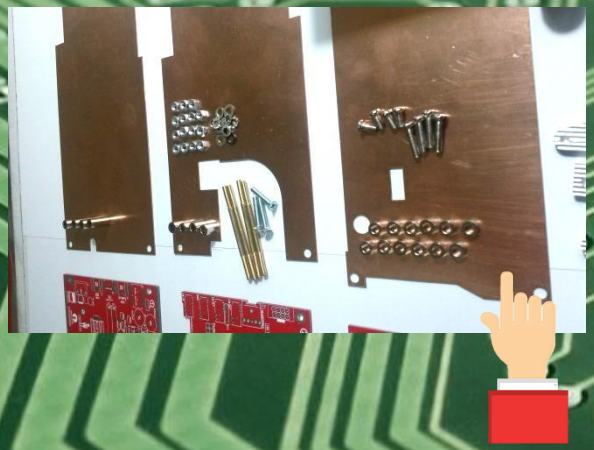
Excellent operation, small size (ideal for portable) version 2 reward good looks construction effort.

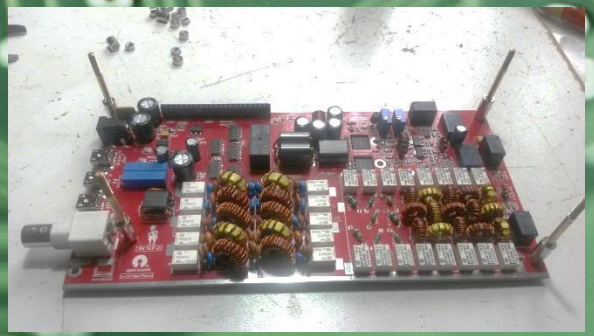


The kit obtained from Artur SP3OSJ contains housing, buttons encoders and volume control screens of modules supports tilt wiring (excellently performed) jacks for headphone, microphone in / out audio socket battery bios, controls button caps and end caps.



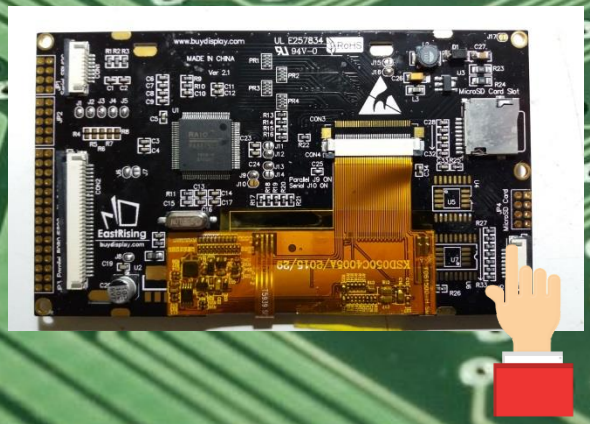
Do you need four M3 threaded rods with a length of 45mm to assemble wiring, nuts M3, M3 screws and a set of distanțere.Eu I fixed bars with nuts M3 threaded PCB1 one side and then we used the following spacers (found in www.tme.eu): 3mm, 4mm, 5mm, 7mm, 12mm. The need is 4 pieces. each type. Interior3,2mm diameter.

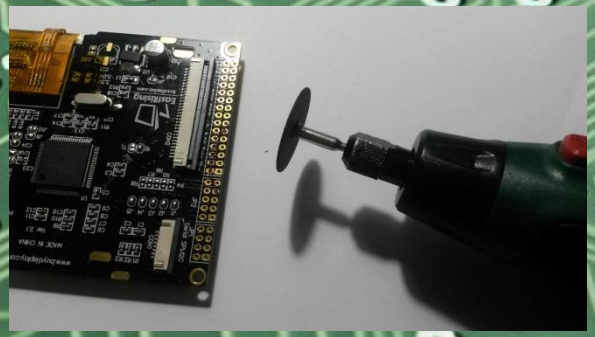


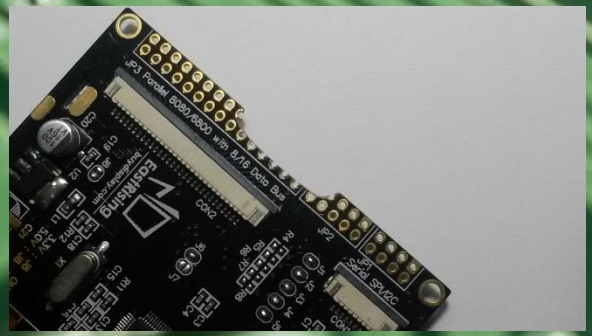


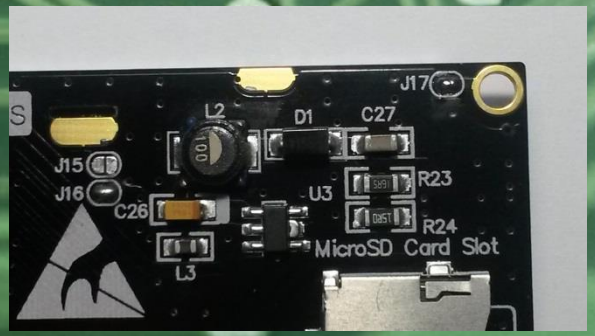
- ER-type screen TFTM050-3 purchased from www.buydisplay.com Be careful when you order by checking the Touch Panel (Atached by default) Interface - FCC 8080 Parallel Connection or Power suply 5V VDD.
- To make room for the optical encoder is needed to harness a minifreză cutting (or grinding).

- Edit condition Jumper J15 and J16 on the open closed. Check the state of the other jumpers to be like in the photo below.

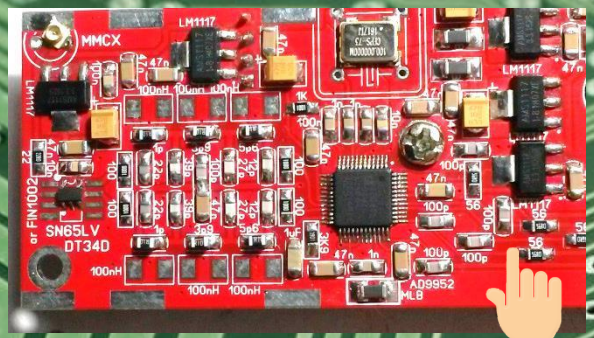


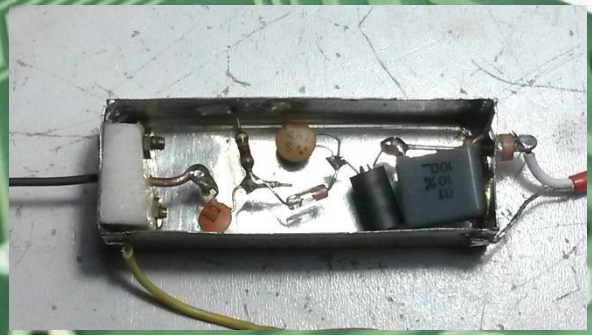






The last step is to check the settings PCB3 DDS's officials. You can do this very simply by using a RF probe and a voltmeter analogic.Urmariți photo gallery and video below.



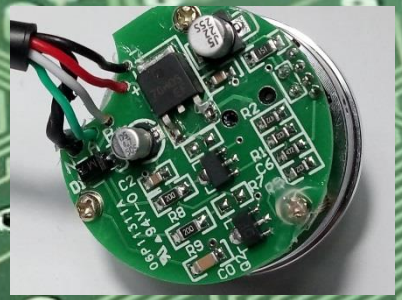


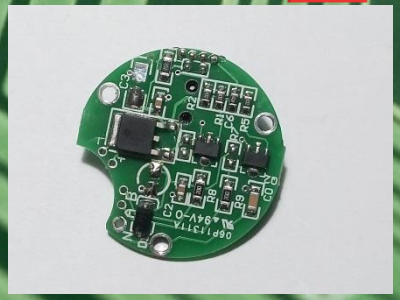
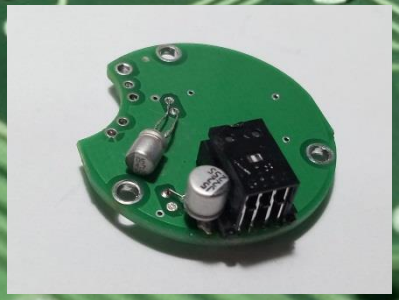
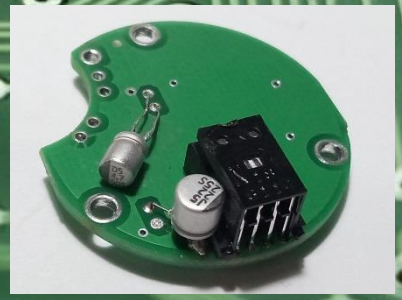
Internet connection required

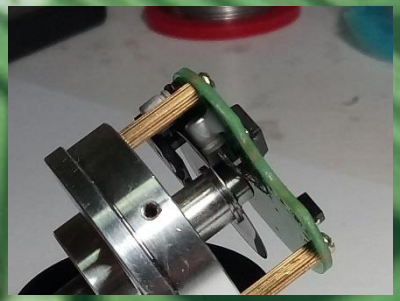
Insufficient space for optical encoder. It is therefore necessary to modify the optical encoder as follows: 1. Loosen optical encoder, remove the connection cable 2. electrolytic capacitors moves to the other side of wiring, 3. cover its length is shortened so not with mount exceed 27.7

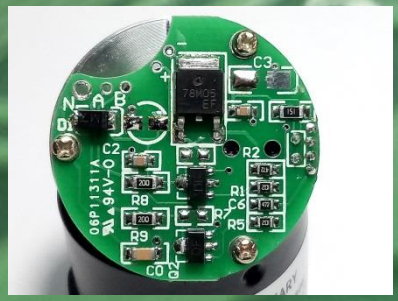
mm. The sheet is marked line that will be fixing holes. 4. Mounted connection wires. See photo gallery below.



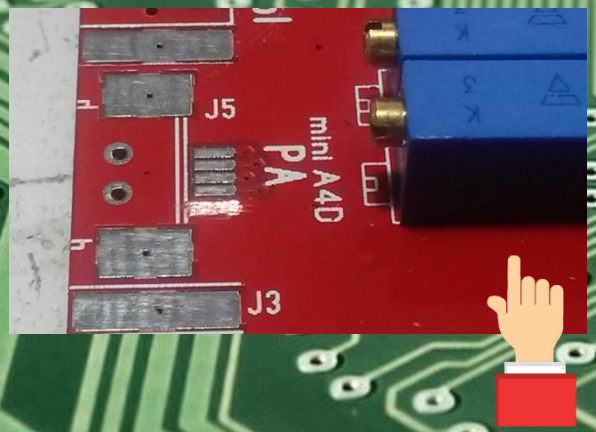


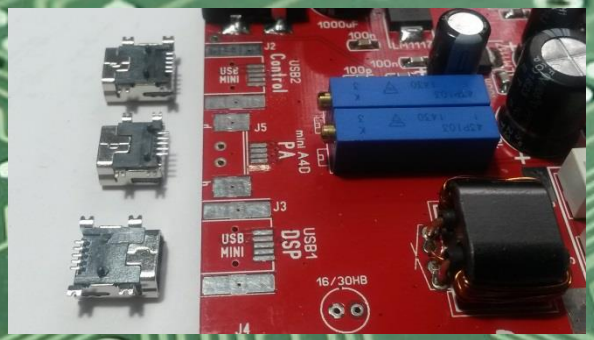




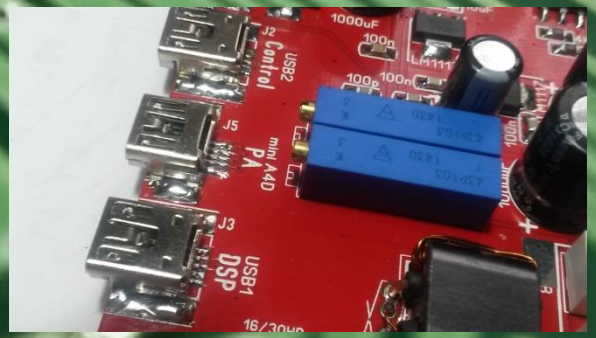




One of the USB connectors is especially the 4 contacts. Because this type of USB cable connector is less we replaced this connector with a Mini USB connector with 5 contacts normal. This connector is used to control an external linear. View gallery.



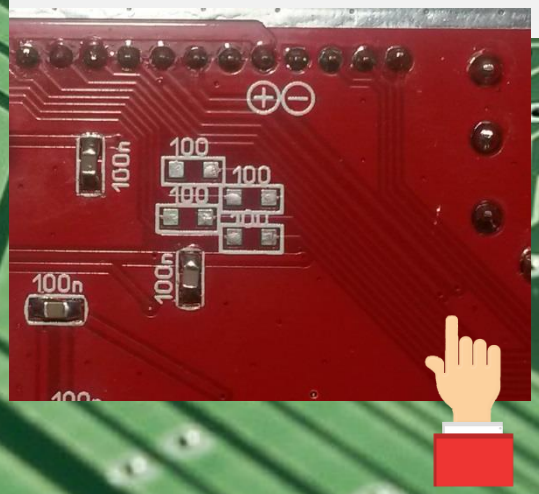


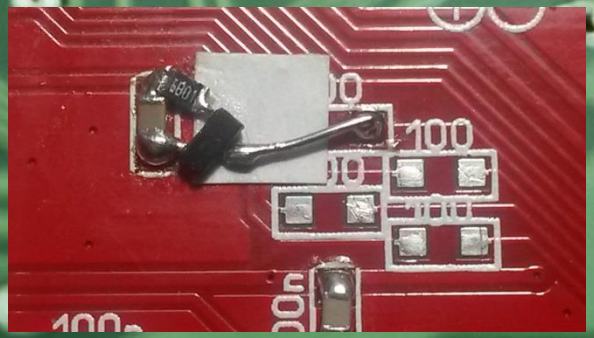


Order foreign ruler is designed for installation to automatically select and filter strip along the passage transceiver. Most linears need grounding line PTT, which is why I posted the following update:

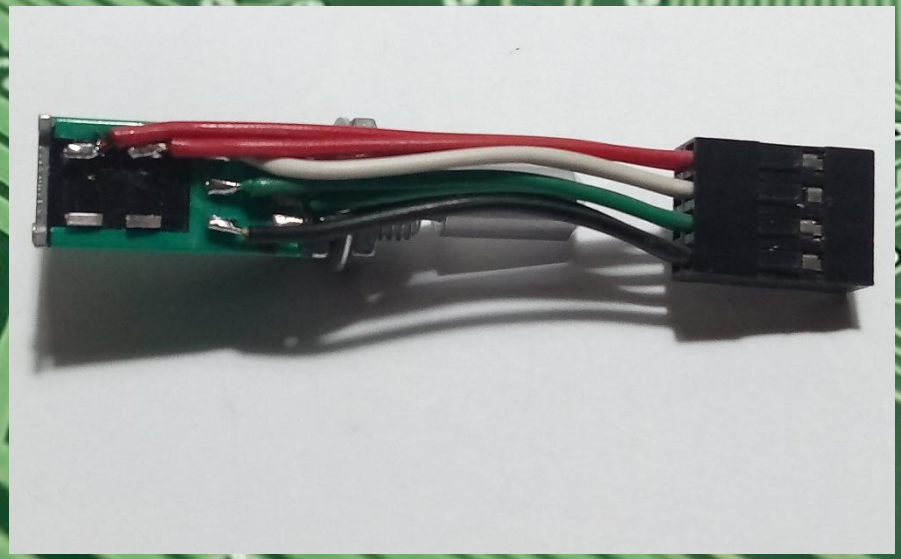
1. On PCB1 not 100 ohm resistors mounted controller connector connecting PTT,

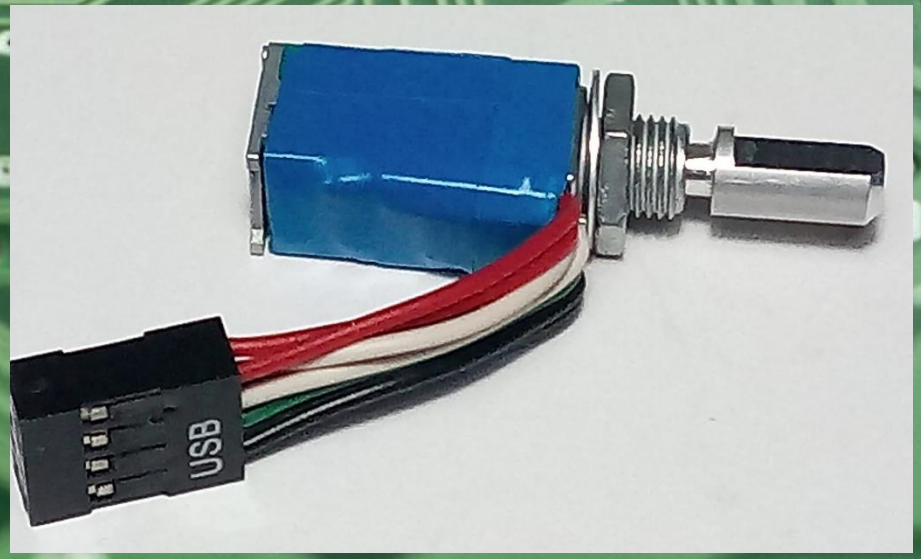
2. mounts an open-collector circuit consisting of a transistor and a resistor 6K8 BC847 as shown in Fig. View gallery.



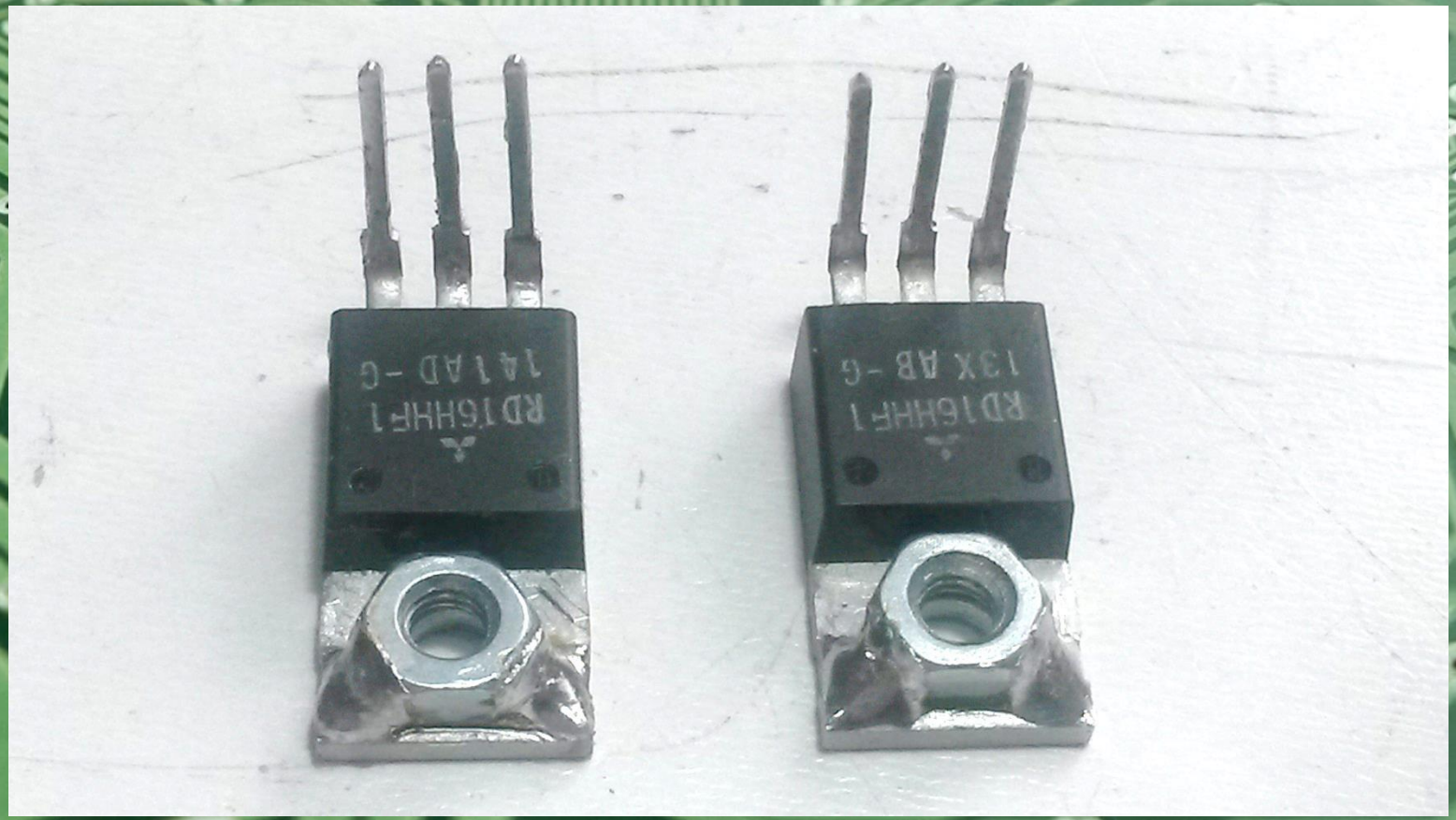


A separate piece is the volume control. It is a special track because it has very small dimensions and a particular form. In YO found RK097122200G model, ALPS, distributed by http://www.adelaida.ro/ . Is a 50K stereo potentiometer with switch by pressing. The connection is made by six wires of about 60 mm. I use a PC recovery USB connector to which I added a thread.

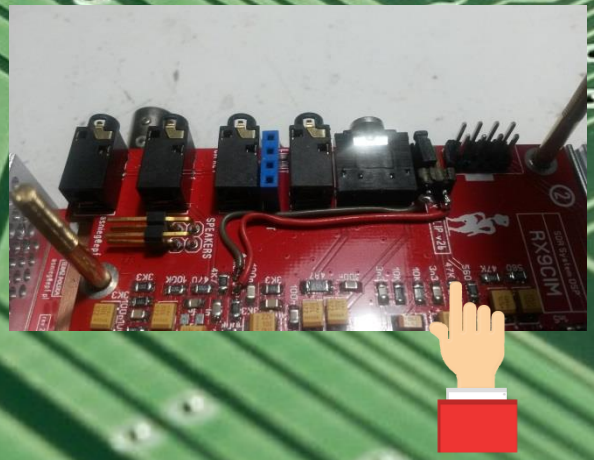




Fixing the final transistors box I made it after several attempts by a simple method that has proven very practical. I soldered a sink transistor M3 nut and have set a transistor M3 countersunk head screw.

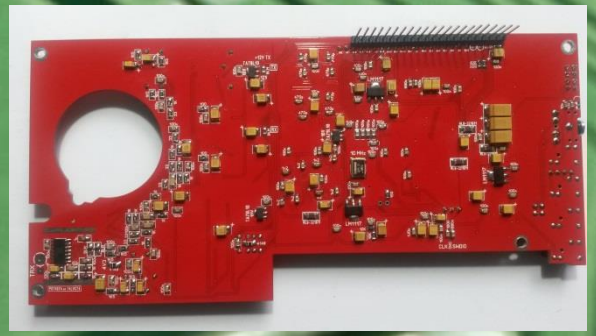


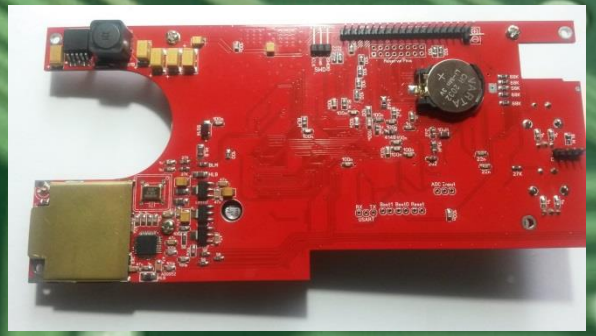
The scheme allows the use of a dynamic or electret microphone. For electret microphone requires a supply voltage of about 5V. This can be done by adhering a resistor "zero" in the assembly ohms. This is hard if we want to change the microphone temporarily deoarce require dismantling transceiver. To remove this disadvantage I stuck a jumper near the connector support potentiometer and I wired with wires. Such electret microphone for coupling positions is sufficiently removing the left side cover (4 screws) and change-of jumperu position. See photo.



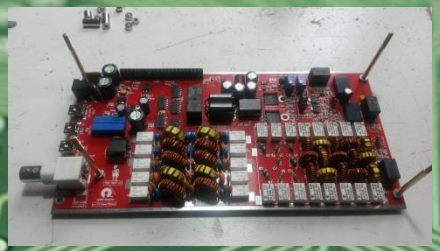
Board PCB1 is very close to the ground plane is necessary to watch carefully to fix them as possible places where taps. Two areas that are vulnerable can see in the photos below. It is necessary to shorten their pins and isolation of a textile tape (which is thick). See photo.

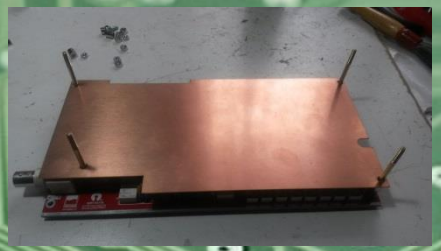
Mounting components must be done very carefully. In the first stage we mounted all resistors, inductors, capacitors and all stabilizers. At this stage we made the first hot checks, checking the main stresses in the diagram. In the second phase we Tufted Switching Power 5V, all the relays and connectors. Then at a time starting with PCB3, at the end PCB1 and PCB2 have mounted active components

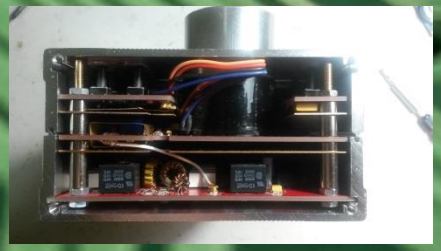


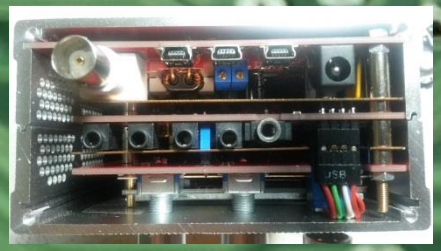


Next you can watch the main phases of installing the casing. View gallery.









From the first day I was finished I did the baptism in traffic. I was surprised from the beginning of very low noise and very good sensitivity. Emission impeccable. After small settings in the software I was very pleased with the operation of the transceiver. The first occasion I visited a friend who works in a laboratory with the necessary equipment and we measured the sensitivity of the device. The unit may receive signals

-130 dBm meaning as S1 (0.2 microvolts or -121dBm).