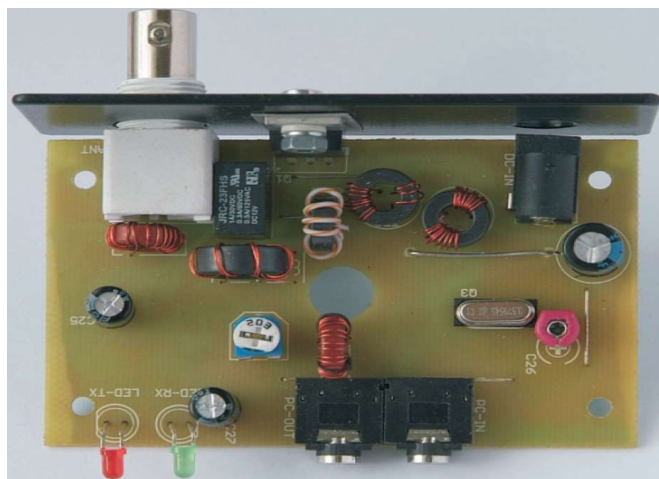


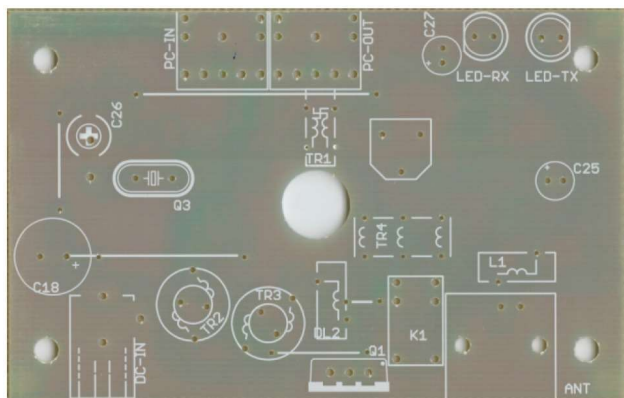
MINI TRANSCEIVER DIGI NIKI



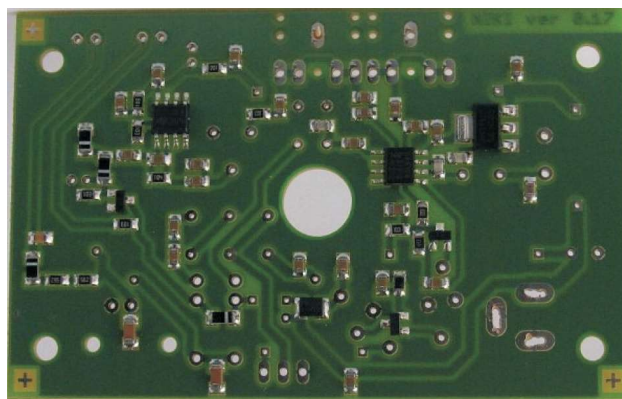
The project of the mini transceiver PSK NIKI received the main prize in the PUK competition organized by the editors of ŚWIAT RADIO and ELEKTRONIKA PRAKTYCZNA magazines with the participation of the SP-QRP group during the QRP Workshop in Burzennin in 2010.

Niki is a single-band minitransceiver with a direct conversion of frequencies for the work in DIGI mode.

This DIY set consists the pcb with smd components (already assembled), THT components, connectors and heatsink with holes.



The TOP view of pcb



The BOTTOM view of pcb

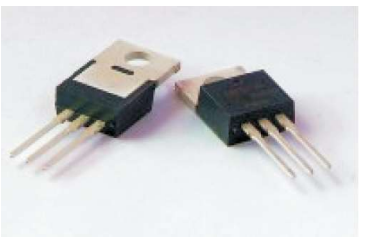




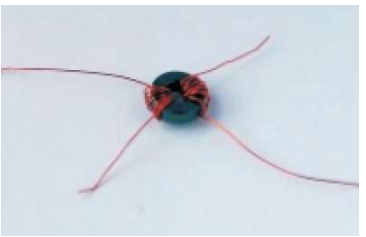
The project description

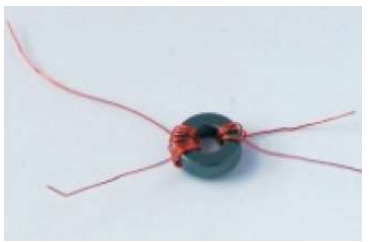
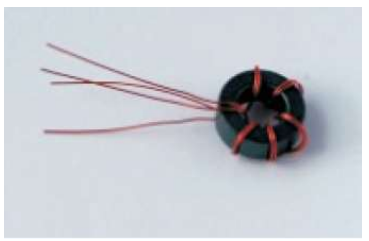

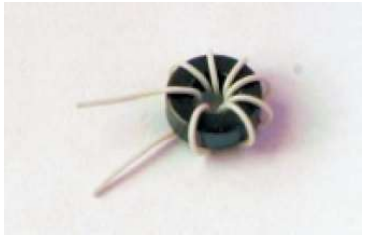
The transceiver circuit is based on the popular SA612A chip. Symmetrical system inputs allow for comfortable operation with the computer's sound card without additional switching systems. The frequency of the internal generator is stabilized by a quartz resonator. This allows for very stable operation of the PSK emission required during operation. Transistor T1 is used twice (RX and TX modes). In RX mode the transistor works as a AF amplifier. In TX mode it works as the first stage of RF amplifier. The signal from the Tr2 isolation transformer is given to transistor T2. From the collector of this transistor through the Tr3 matching transformer, the signal controls the power transistor Q1. Switching the antenna is controlled by VOX circuit based on on the TL062D or LM358.

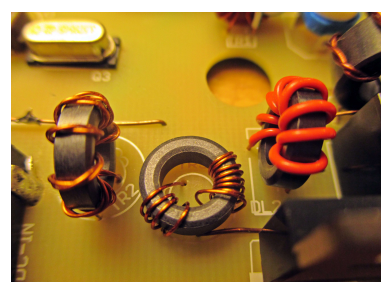
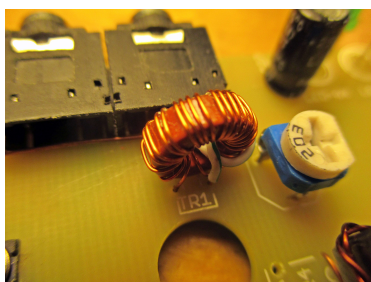
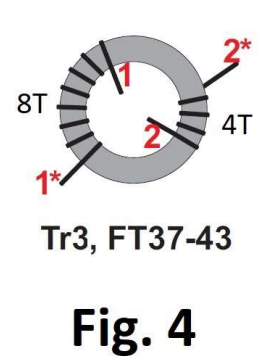
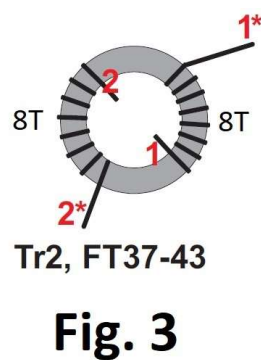
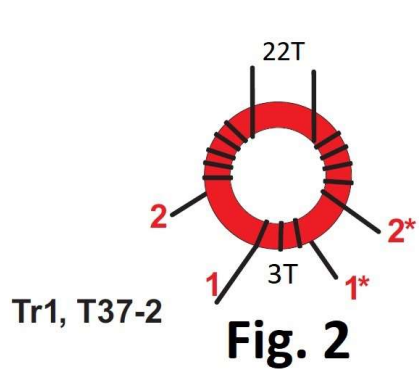
The Assembly

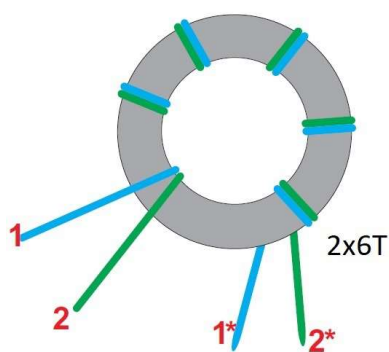
It is necessary to assemble some THT elements.

ELEMENTS	
Electrolytic capacitor C18 470uF/16V	
Electrolytic capacitors C25, C27 100uF/16V	
Trimmer C26	
Quartz crystal Q3	
Relay DC12V HFD23	
Potentiometer trimmer US1 20k	

Transistor Q1 IRF520, Fig. 1	
CONNECTORS	
Power supply connector	
In / Out AF connectors	
ANT RF connector	
INDUCTORS	
Toroidal transformer Tr1, Fig. 2	
Toroidal transformer Tr2, Fig. 3	

Toroidal transformer Tr3, Fig. 4	
Toroidal transformer Tr4, Fig. 5	
Inductor L1, Fig. 6	
Inductor DL2, Fig. 7	





Tr5, FT50-43

Fig. 5

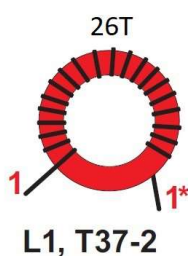


Fig. 6

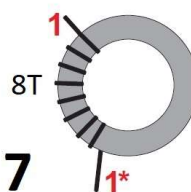


Fig. 7

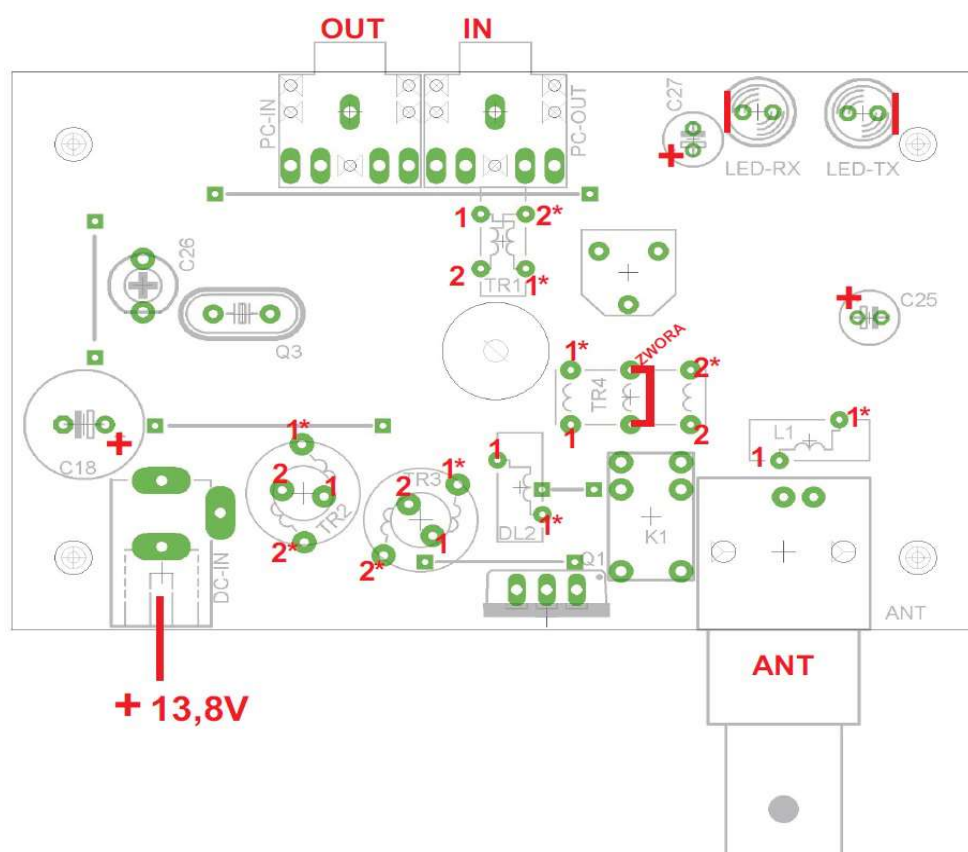
DL2, FT23-43(FT37-43)

The assembly of the device starts with the making of inductors and transformers in accordance with the drawings and photographs. For winding use 0.3mm DNE winding wire. In the first place, assemble the crosses marked on the board, including the jumper under the output transformer of the end-stage power.

Then, assemble all inductors in accordance with the drawings. The other elements are assembled in the following order: electrolytic capacitors, potentiometer (trimmer), quartz resonator, trimmer (capacitor), relay, connectors, LED diodes. Transistor Q1 is soldered at the end. When mounting electrolytic capacitors pay attention to the correct polarity.

After checking the correctness of assembly, connect the device to the power supply (13.8V) and control the current consumption. The current consumption should be 20-25mA when receiving (RX mode).

When connecting the power supply, pay attention to the correct polarity. Transceiver has no protection against reverse power connection !!!



The assembled transceiver has an output power of about 2.5 W.

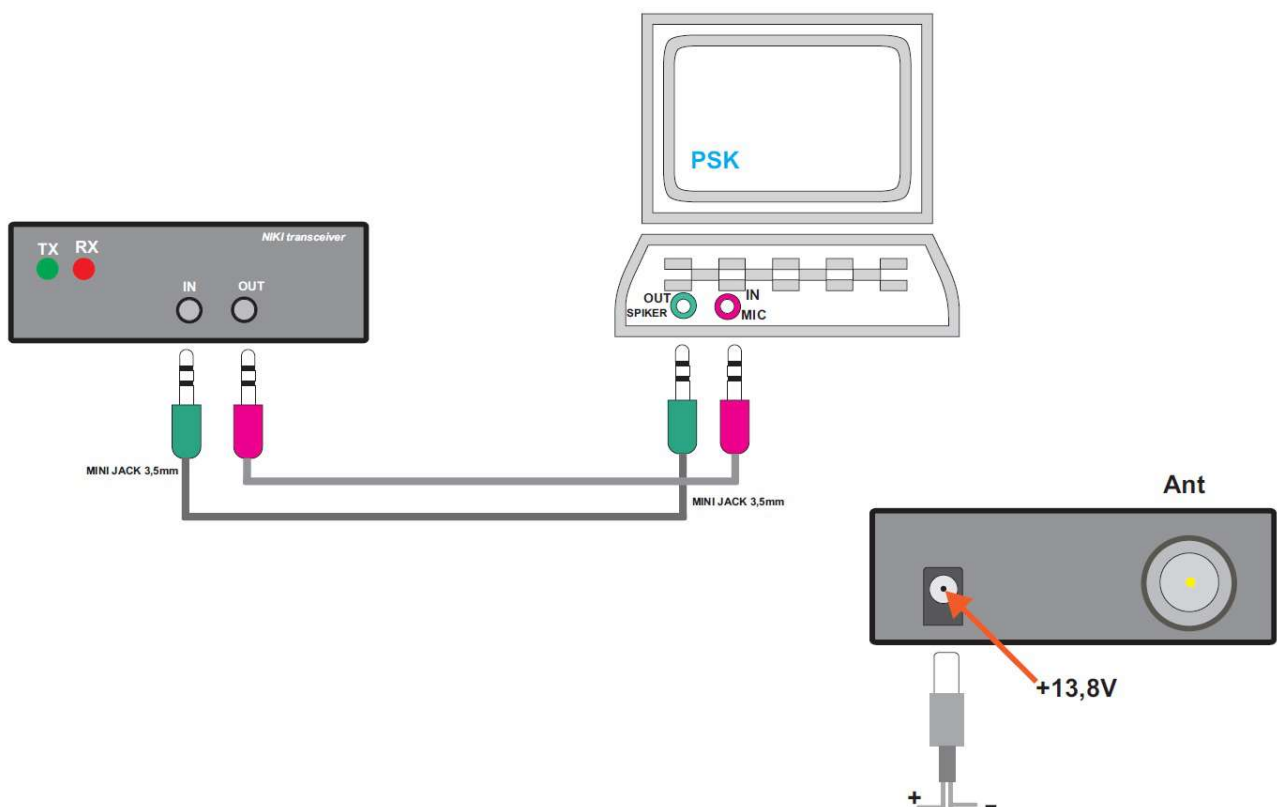
The output power can be easily increased by reducing the R5 10ohm resistor value.

For a 5 ohm resistor, the 5W of output power can be obtained. A short-circuit in the resistor allows to obtained the 8W of output power.

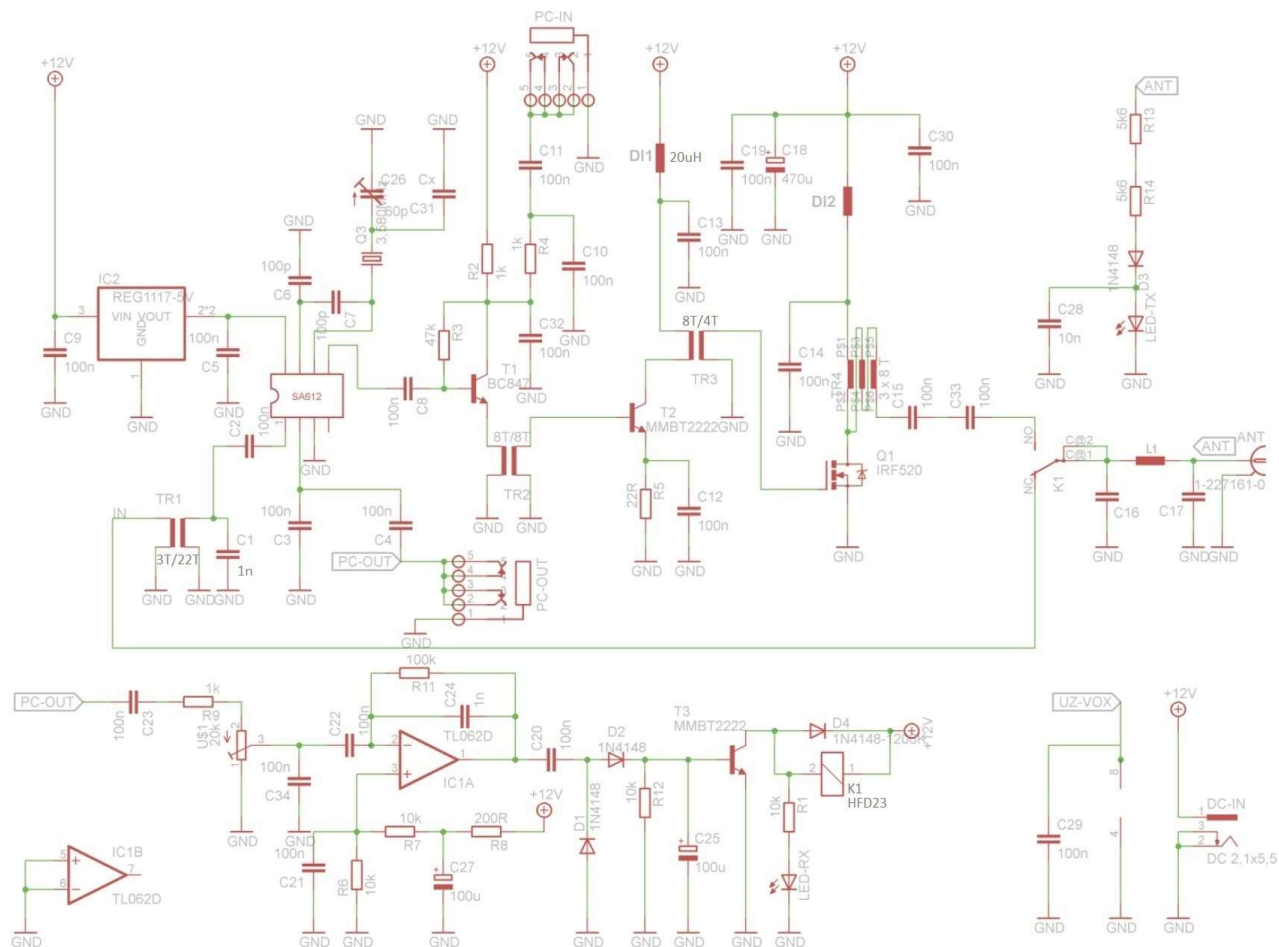
It is also possible to use a TR5 transformer with a 1:9 ratio.

Increasing the output power results in an increase in the level of distortion.

The connections between NIKI and the computer



SCHEMATIC

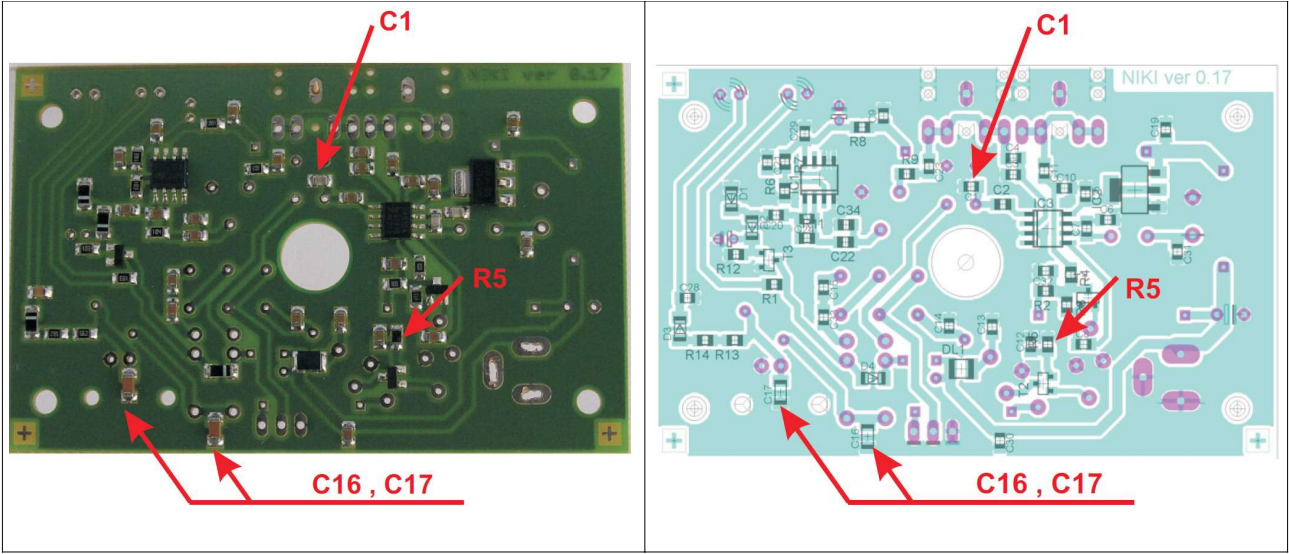


The band information – elements details

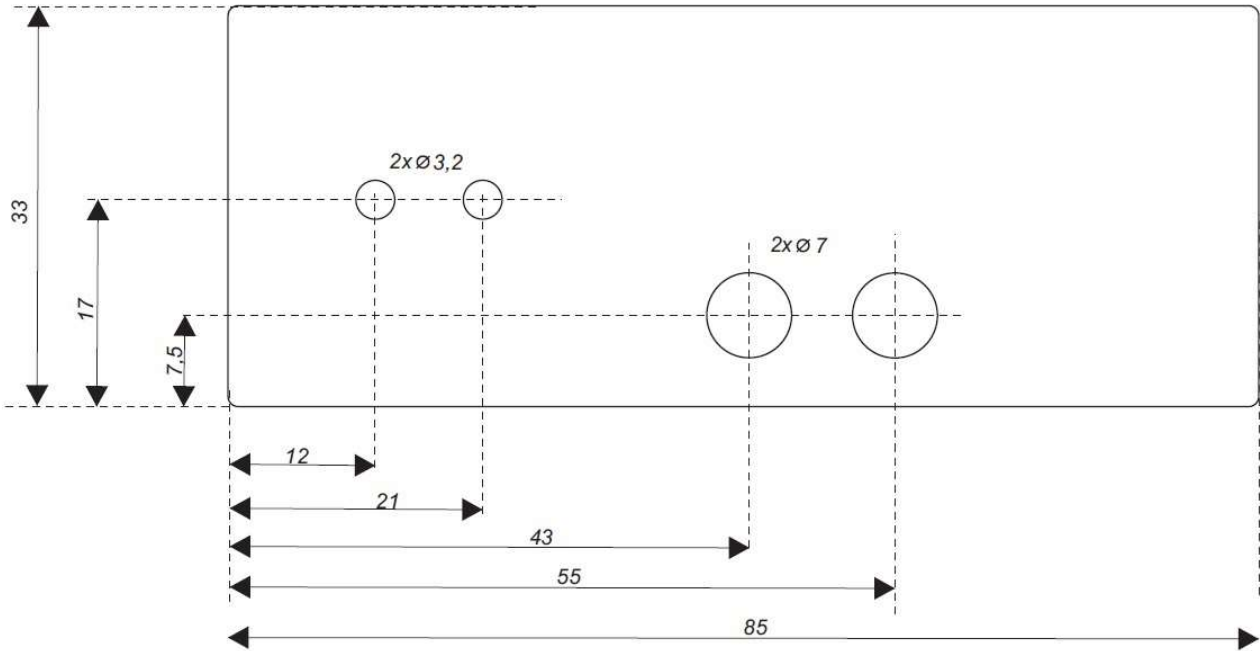
Band	Resonator freq.	Tr1	C1	L1	C16, C17
80m	3580kHz	22T/3T, T37-2	1nF	26T, T37-2	2x1nF
40m	7040kHz	24T/2T, T37-2	220pF	16T, T37-2	2x390pF
30m	10140kHz	20T/2T, T37-2	160pF	13T, T37-2	2x270pF
20m	14070kHz	22T/2T, T37-2	91pF	13T, T37-6	2x200pF
17m	18095kHz	18T/2T, T37-2	82pF	12T, T37-6	2x160pF
15m	21070kHz	16T/2T, T37-2	72pF	11T, T37-6	2x140pF
12m	24915kHz	15T/1T, T37-2	63pF	10T, T37-6	2x120pF
10m	28070kHz	14T/1T, T37-2	56pF	9T, T37-6	2x100pF

The pre-assembled pcb has capacitors for the **80m band**. When changing the band, remove them and solder the capacitors according to the table.

R5 – the output power regulation.



Front panel



The Q1 transistor mountig

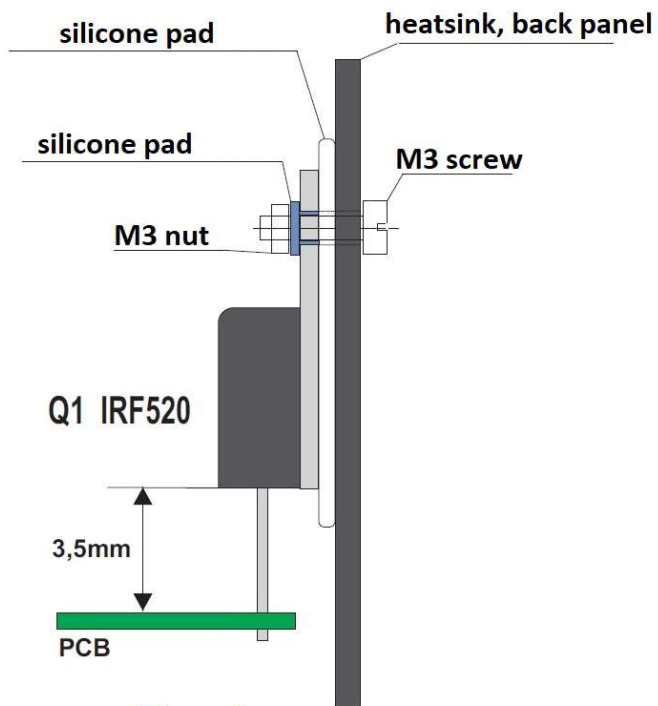


Fig. 1

The LED diode mounting

