Simple 3-band receiver of direct conversion

The receiver has the best much sensitivity and dynamic band, the increased adjacent channel selectivity, smaller overall dimensions, is more economic, but thus it is simpler in assembly and adjustment. There are no scarce details and even the beginners in radio will be able to build it.

Main technical features:

Ranges of operating frequencies 7, 14, 21 MHz
Bandpass range of a receiving path (on the level of-6 dB) 300... 2600 Hz
Sensitivity of a receiving path from an antenna input: not worse 0,7 μV
The dynamic range on cross modulation (DD2): at least 75 dB
Adjacent channel selectivity, when detuning from the frequency bearing on 10 kHz is at least 70 dB
The current consumed from external regulated power supply with tension 9V: 10 mA

The schematic diagrams of the receiver are below. The difference is tuning schematic: in first case we use variable capacitor; on second case – varicap + multi-turn potentiometer.

The signal from the antenna connector goes to the adjustable attenuator – the doubled potentiometer R1. It allows ensure the optimum functioning of the receiver with any antenna. Band Switcher is SA1. On the diagram shown the band 21MHz. When switching to 14MHz - the additional condensers C1,C3 and C6, C14 are connected. When switching to band 7MHz condensers C2,C4 and C8, C15, C7 are not connected that is necessary for obtaining the optimum form Amplitude-frequency Characteristic for that band.

Diagram with Variable capacitor in VFO

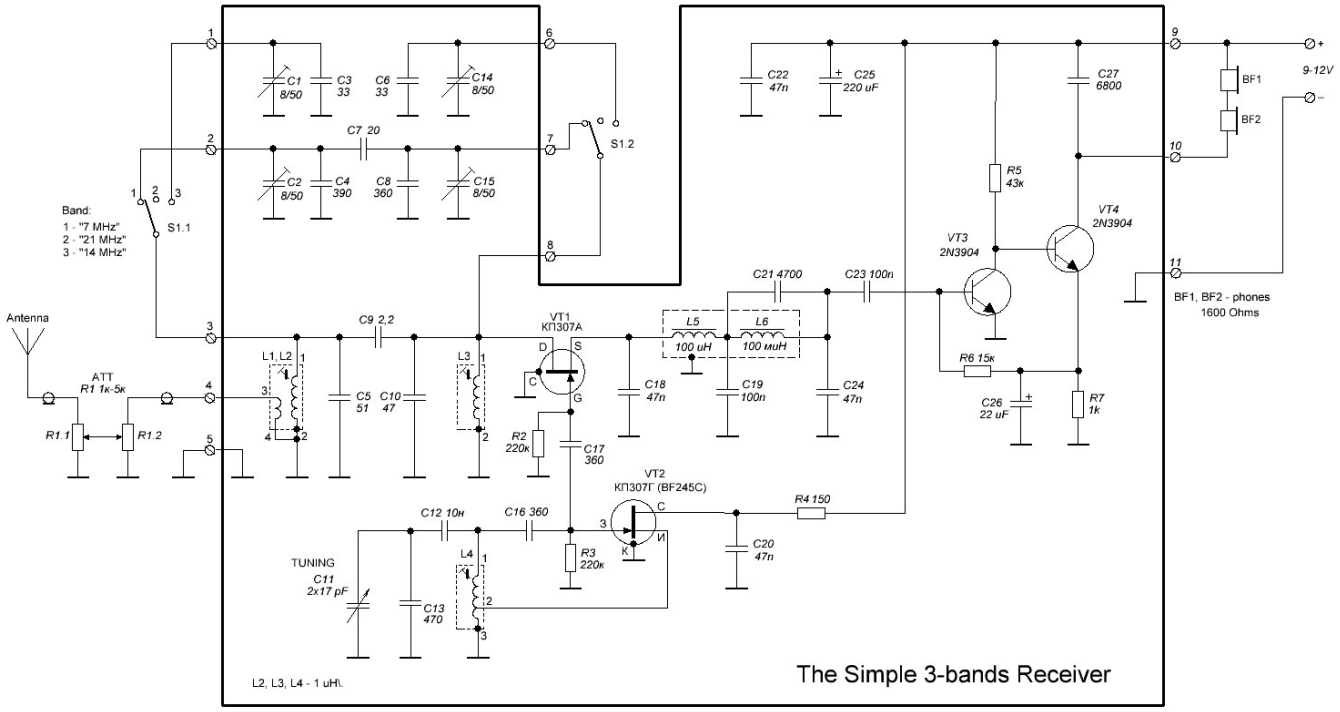
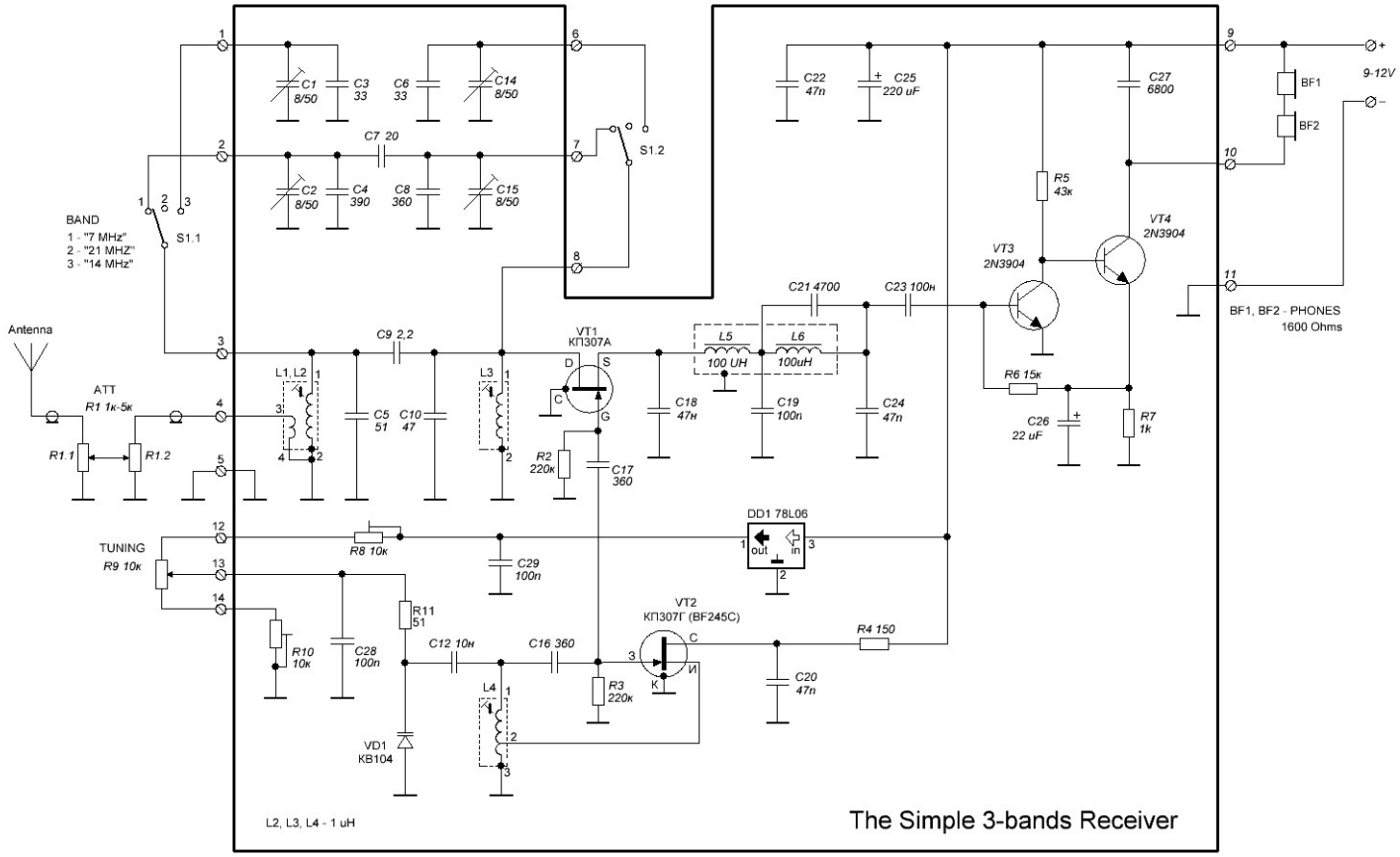


Diagram with multi-turn potentiometer in VFO



Attention!

Before starting installation, please check the availability of all elements according to the list of equipment.

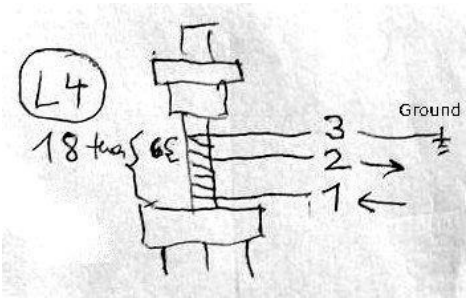
Claims for the complete set are accepted within 14 calendar days from the date of receipt of the order.

If you have any questions, feedback and suggestions, you can contact us by e-mail SALES@RV3YF.RU or through the contact window on our website WWW.RV3YF.STORE

Assembly details.

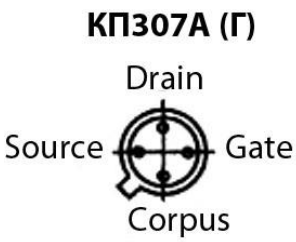
The most of elements of the receiver are mounted on the high quality printed circuit board according to the diagram (marking on PCB helps to assembly faster and decrease the time of assembly).

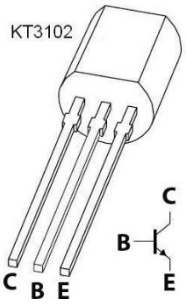
Coils of the L1-L4 are constructed on small-size wireframes (see picture). L2-L4 coils contain on **18 turns** of a wire 0.16mm. Leadout of L4 coil is made from the sixth round, considering from the output and connected to the common wire. The coil L1 is wound over the lower part of the L2 coil and contains **3 turns** of the same wire. Winding should be carried out with the maximum tension of a wire, uniformly placing rounds in all sections of a frame. All coils should be put into the standard brass screen.



As L5, L6 - lowpass filters coils – it is possible to use any available new or second-hand heads from stereotape recorders. Their inductivity, as a rule, is in the range 60-180mH that to us quite suits (in a KIT – 2pcs of 100 mH should be connected consistently) . That's only for saving frequency of a cutoff of Low pass filters it is necessary to change nominals of C18,C19,C21,C24 condensers in inverse proportion. It will be easy to be made aurally during the first tests of the receiver on air.

The datasheets for transistors and are below. (bottom-view for КП307Г – be careful)





Adjustment and calibration

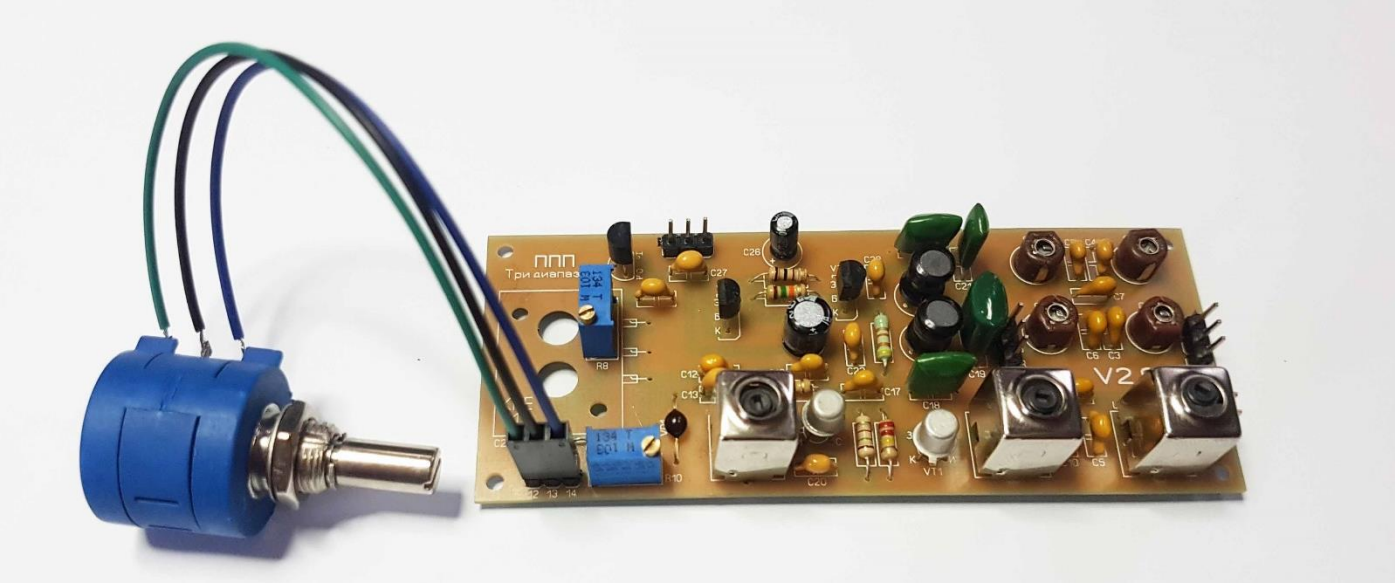
Correctly mounted receiver starts working on the first switching on. It is possible to check the general operability of the main sites of the receiver by using of a normal multimeter. At first, having included a multimeter in the mode of measurement of current in a rupture of a supply circuit, we check that the consumed current doesn't exceed a 12-15mA, in earphones intrinsic noises of the receiver shall be listened quietly.

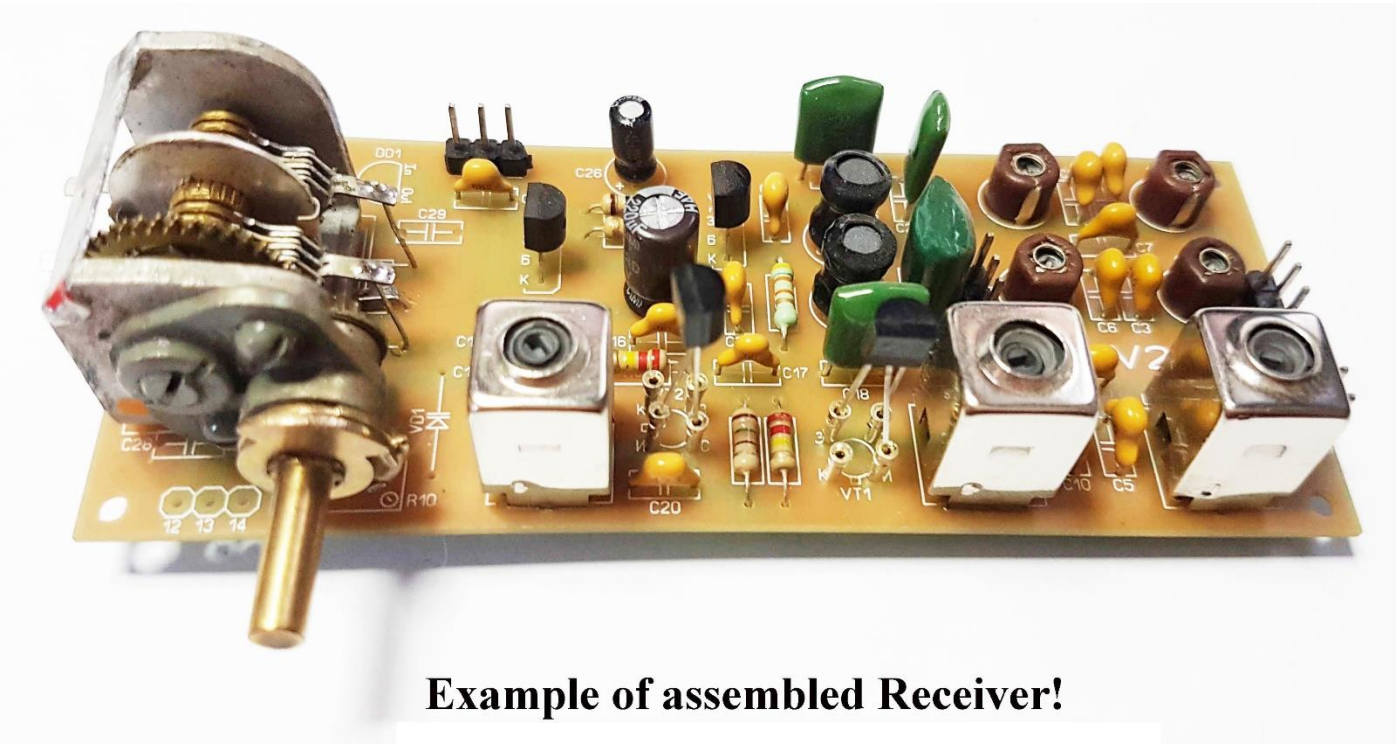
Further, having switched a multimeter in the mode of measurement of constant voltage, we measure tension on the VT4 emitter makes about 0,5V. In case of operational Note magnifier the hand tangency to its input circuits shall cause appearance in the speaker of the loud, growling sound. If heterodyne works fine – it should be negative voltage on gates of VT1 & VT2 (few volts)

Adjustment of the receiver is simple and is reduced to laying down of heterodyne frequency on the range 7MHz and setup of input circuits of bandpass filters to the maximum of a signal. It is convenient to do it by means of the generator of standard signals (GSS). We switch the receiver to the range 7MHz. GSS is set up on the frequency of 6,98 MHz and, having set the level of its output signal on 30-100mv, we connect it to the antenna. The rotor of variable capacitor is transferred to the provision of the maximum capacity. Having set the switch to 7MHz, rotation of the core of the L4 coil - we achieve listening of a signal of GSS. If it doesn't work well, we adjust C14 capacitor capacity. Having rebuilt the receiver on the upper end of

the band, we are convinced that the upper frequency of reception is at least, than 7,18MHz. If necessary we achieve it selection of capacitor capacity of C13. After the carried-out changes, procedure of installation of the beginning of the range should be repeated.

Adjustment of coils of bandpass filters should be begun with the range 21MHz. Having connected to a receiver output the level meter of an output signal (the voltmeter of an alternating current, an oscilloscope, and even simply a multi-meter in the mode of strain measurement of a direct current to C42 condenser outputs) we set GSS frequency on the middle of the band, i.e. 21.22MHz. Having set up by rotation of cores of L2,L3 coils we achieve a maximum level of a signal (the maximum volume of reception). In process of growth of volume it is necessary to control by attenuator R1 the signal level on low-frequency amplifier output approximately of a 0,3-0,5V. In case of rotation of the core after achievement of a maximum lowering of noise is watched, it means that the input circuit is built correctly. Then, we return the core on maximum and start checking the next band.
If rotation of the core (in both sides) it is impossible to fix an accurate maximum, - the signal continues to grow, our coils sets incorrectly up and selection of the condenser is required. So if the signal continues to increase in case of full twisting of the core, C5 circuit capacitor capacity (or C11) should be reduced a little, as a rule (if the coil is executed correctly) to deliver the following next capacitor nominal enough. And again we check possibility of setup of an input circuit in a resonance. To the contrary, if the signal continues to decrease in case of a full twist of the core, C5 circuit capacitor capacity (or C11) should be increased. Similarly we set up a circuit of bandpass filters for bands 14Mhz and 7Mhz, having set the frequency of GSS at 14,18Mhz and 7,05Mhz respectively, but only regulation of trimmers (cores of L2,L3 coils thus we don't touch any more).
C18,C19,C21,C24 – are MKT series capacitors.





Example of assembled Receiver!