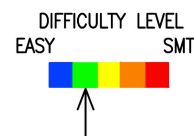
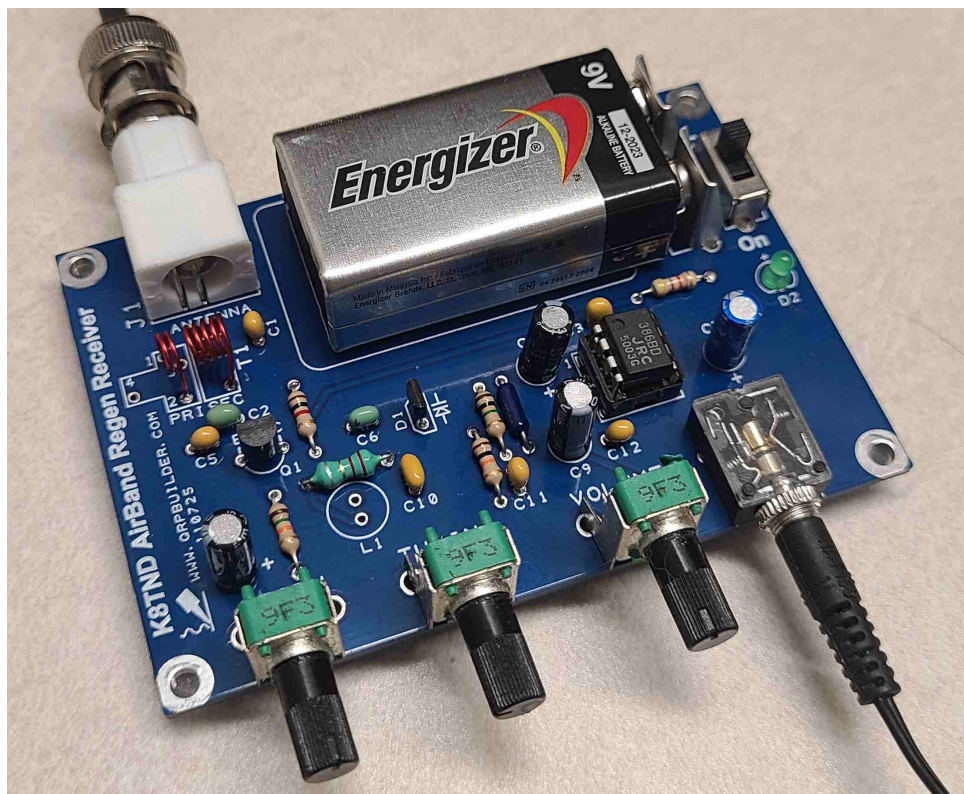




QRPBuilder K8TND VHF Regenerative Receiver for AM Aircraft Band



First, familiarize yourself with the parts and check for all the components. If a part is missing, please contact us at qrpbuilder@gmail.com and we will send you one.

Please read all the instructions before starting to assemble the receiver.

Parts List

- 1 – QRPBuilder K8TND VHF Regenerative Receiver PCB
- 1 – U1, LM386 DIP IC
- 1 – Q1, BF199 transistor
- 1 – D1, BB910 varactor diode, marked 910
- 1 – D2, green led
- 1 – R1, 4.7K resistor (yellow-violet-red-gold)
- 1 – R2, 1K resistor (brown-black-red-gold)
- 1 – R3, 1M ohm resistor (brown-black-green-gold)
- 1 – R4, 39K resistor (orange-white-orange-gold)
- 1 – R5, 15K resistor (brown-green-orange-gold)
- 1 – R6, 10K resistor (brown-black-orange-gold)
- 1 – L1, 2.2uH molded inductor (red-red-gold-silver)
- 5 – C1,3,5,11,12, .01uF (10nF) mono capacitor, marked 103
- 1 – C2, 10pF NP0/C0G capacitor, marked 10 or 100
- 3 - C4,8,9, 10uF electrolytic capacitor
- 1 – C6, 100pF NP0/C0G capacitor, marked 101
- 1 – C10,.001uF (1nF) mono capacitor marked 102
- 1 – C7, 100uF electrolytic capacitor
- 3 – VR1,2,3, 10K PCB potentiometer
- 1 – J1, BNC female pcb connector

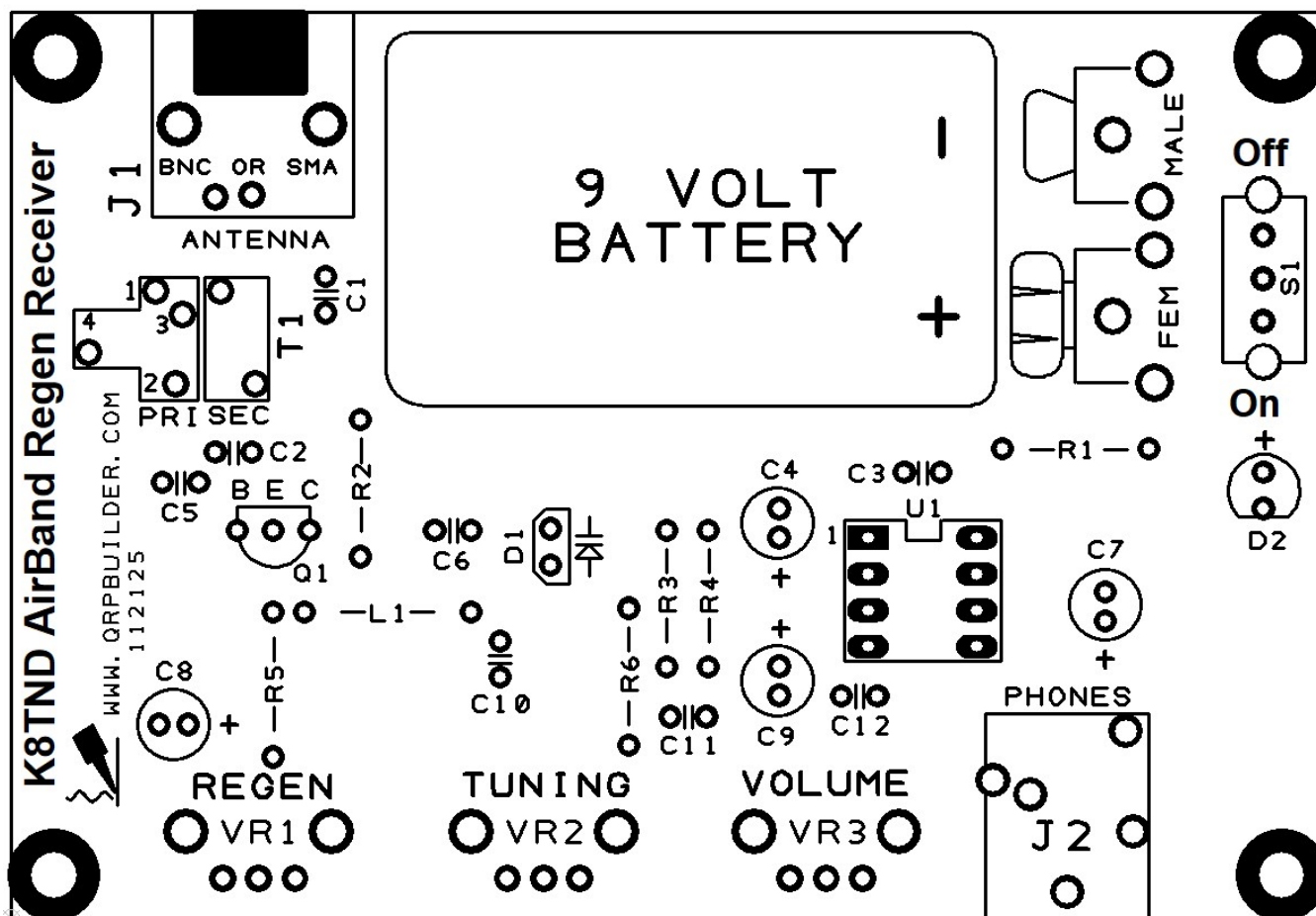
- 1 – J2, 3.5mm stereo pcb jack
- 1 - S1, SPDT slide switch
- 1 – 9V battery clip-female
- 1 – 9V battery clip-male
- 1 – 8pin DIP socket
- 1 - #10-24 x 1"L screw
- 4 – rubber self adhesive foot
- 1 – 12" #22AWG magnet wire

Alternate components for 6m reception

- 1 – L1, 1mH choke, marked (brn-blk-red-gold)
- 1 – R5, 24K 1/4W resistor (red-yellow-orange-gold)
- 1 – T1 secondary, 12" #26AWG magnet wire

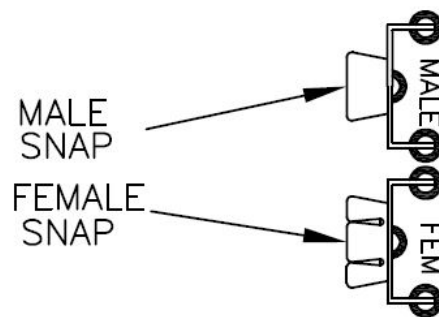
Installing the three 6 meter alternative components are covered at the end of the document

Using the guide below, start assembling with the smallest parts first. On any component, I always solder a single lead first, align the component if needed. and then solder the other pad(s).



- [] Install C1,3,5,11,12, .01uF (10nF) mono capacitor, marked 103
- [] Install C2, 10pF NP0/C0G capacitor, marked 10
- [] Install C6, 100pF NP0/C0G capacitor, marked 101

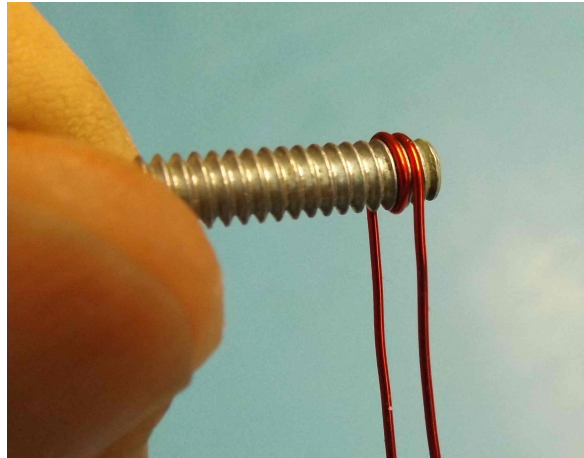
- [] Install C10,.001uF (1nF) mono capacitor, marked 102
- [] Install R1, 4.7K resistor (yellow-violet-red-gold)
- [] Install R2, 1K resistor (brown-black-red-gold)
- [] Install R3, 1M ohm resistor (brown-black-green-gold)
- [] Install R4, 39K resistor (orange-white-orange-gold)
- [] Install R5, 15K resistor (brown-green-orange-gold), “6 meter” value 24K(red-yellow-org-gold)
- [] Install R6, 10K resistor (brown-black-orange-gold)
- [] Install L1, 2.2uH molded inductor (red-red-gold-silver), “6 meter” value 1mH
- [] Install 8pin DIP socket
- [] Install D1, BB910 varactor diode, *polarity sensitive, match the board outline*
- [] Install D2, green led, *observe polarity, the long lead is positive*
- [] Install Q1, BF199 transistor, *match the board outline*
- [] Install S1, SPDT slide switch
- [] Install C4,8,9, 10uF electrolytic capacitor, **long lead is “+”**
- [] Install C7, 100uF electrolytic capacitor, **long lead is “+”**
- [] Install J2, 3.5mm stereo jack
- [] Install 9V battery clips, as shown below



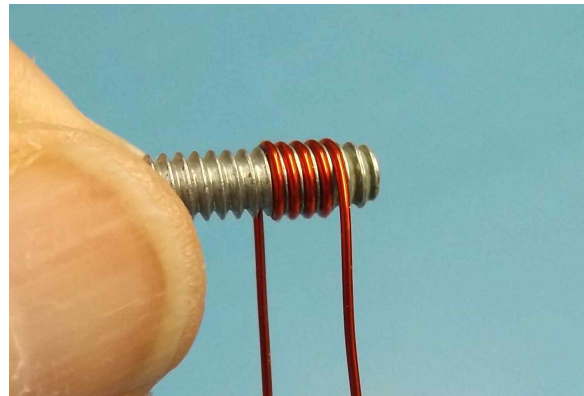
- [] Install J1, female BNC connector
- [] Install VR1,2,3, 10K PCB potentiometer
- [] Install the four rubber feet in the corners

The last item to install is the T1 air wound transformer. We provide a #10-24 screw to act as a winding form for the coil. It is mounted about a half inch above the surface of the pcb to allow some adjustment of the winding distance between the secondary and primary. Make two as shown below.

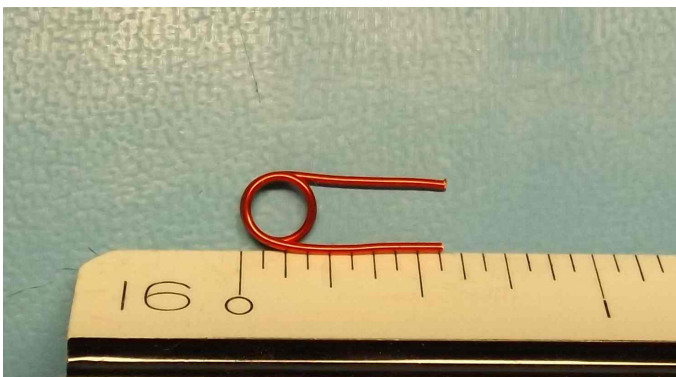
- [] Wind the Primary, (1 1/2 turns) on the supplied screw into the grooves of the screw thread as shown below, with the 22awg magnet wire. *Wind the same for 6 meters.*



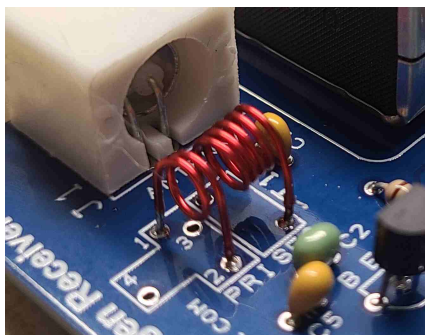
- [] Wind the Secondary, (4 1/2 turns) on the supplied screw into the grooves of the screw thread as shown below, with the 22awg magnet wire. *For 6 meters, wind 10 1/2 turns #26awg on a .20" diameter form.*



- [] Trim both primary and secondary to 9/16" length and tin 1/8" of the lead ends as shown below.

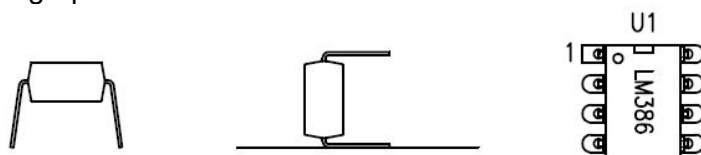


- [] Position and solder T1 primary and secondary windings elevated from the surface of the board as shown. The spacing between the coils should be approx. 1/8" (3mm) This will allow for spreading or adjustment between the two, during the setup procedure. For Aircraft band use holes marked 1 and 2 for the primary.



This completes the assembly

- [] Next, power up the receiver with a 9V battery. Turn on and the LED should illuminate. Check for 9V on pin #6 of the U1 socket. If all is ok, install the LM386 into the socket noting the position of pin 1 shown in the graphic below.



When inserting IC, the pins are flared so that they can be retained by automatic insertion tools. Gently rock it on a flat surface so the pins are parallel and it will insert into the socket more easily.

Alignment and Setup:

There are three ways to align your K8TND VHF Regenerative Receiver for the AM aircraft band.

The "spacing between coils" should be approx. 1/8" (3mm). The further the spacing (to a limit), the more selective the receiver will be.

1. If you have an Elmer or friend that has a signal generator, you can set it for 123 Mhz., which is the center frequency of the AM aircraft band. Then adjust the larger coil near the antenna connector by slightly spreading it open or closed to make the radio pick up the signal generator near midpoint on the tuning control.
2. If you don't have access to a signal generator, you can also adjust the larger coil by stretching it open or squeezing it closed until you get the lower, most counter-clockwise point on your tuning control to just barely pick up the highest frequency FM broadcast station. This should give you a tuning range that covers most of the aircraft band.
3. An easy, but not so accurate method, is to adjust the larger coil until you center the most active channels in the middle of the tuning control range. Traditionally, most of the activity on the air band tends to be near the center of that allocated spectrum.

If you need more audio gain, change R4 to a lower value, but not less than 15K.

The REGEN is easy to adjust on this receiver. Turn the control all the way down, counter-clockwise, then slowly turn it clockwise and you'll hear a little "pop", which means the receiver has gone into regeneration.

With a little practice, you'll soon find the magic spot on the REGEN control where the signal is the loudest and the static is the lowest. Once you've found this spot on your control, there should be no need to adjust the REGEN control again, unless you so desire.

Other tips on regenerative receiver tuning can be found here at the ARRL site, <http://www.arrl.org/tuning-a-regenerative-receiver>

Schematic:



For 6m reception

K8TND has successfully moved the coverage to 6 meters, by changing three components to the values below.

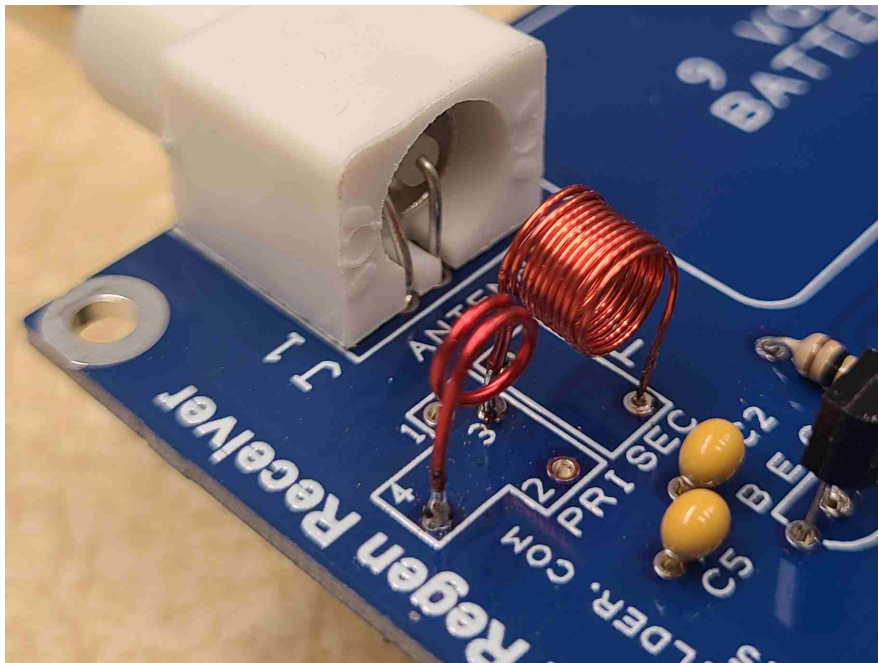
L1 – 1mH molded inductor, marked (red-black-red-silver)

R5 – 24K 1/4W resistor, (red-yellow-orange-gold)

T1 primary – same as for Air band

T1 secondary - 10 1/2 turns #26awg on a .20" diameter form

- [] Wind the primary as described for Air band and install the primary of T1 on holes 3 and 4.
- [] Install T1 secondary with 10 1/2 turns #26awg on a .20" diameter form. The primary and secondary should be placed side by side as shown.
- [] Install R5, 24K resistor (red-yellow-orange-gold).
- [] Install L1, 1mH (brn-blk-red-gold) molded inductor where indicated on the pcb.



This will cover the entire 6m band. Moxon antennas work very well on 6m. There are many simple Moxon antenna plans on the internet.

Notes:
