

**Active antenna for reception**

Even if you have a larger short-wave antenna, you typically connect it to a transceiver, so there is no aerial left for an additional receiver. Here is a simple FET-based active antenna circuit giving good results from **30 kHz to 30 MHz**. A 75-cm steel rod or a telescopic aerial is used. The circuit must be directly at the bottom of the rod to avoid additional input capacitance. The supply voltage can be derived from the receiver in most cases. Since the circuit requires less than 10 mA, even a battery can be used for portable operation.

The active antenna is very linear. However, the receiver should have a good dynamic range or at least have a switchable attenuator to avoid intermodulation effects, since very loud signals can occur on the medium and short wave broadcast bands. With an AR5000 from AOR it was often possible to receive hamradio stations on 20 m which were weak on a [G5RV](#) antenna (unfortunately you cannot send over the active antenna!). You should place it far away from any interference sources like computers or TV sets and with a good ground connection at the antenna foot.

## KC8AON's QRP PROJECTS

### MINI T MATCH TUNER

**TUNES ALMOST ANY ANTENNA YOU CONNECT IT TO !**

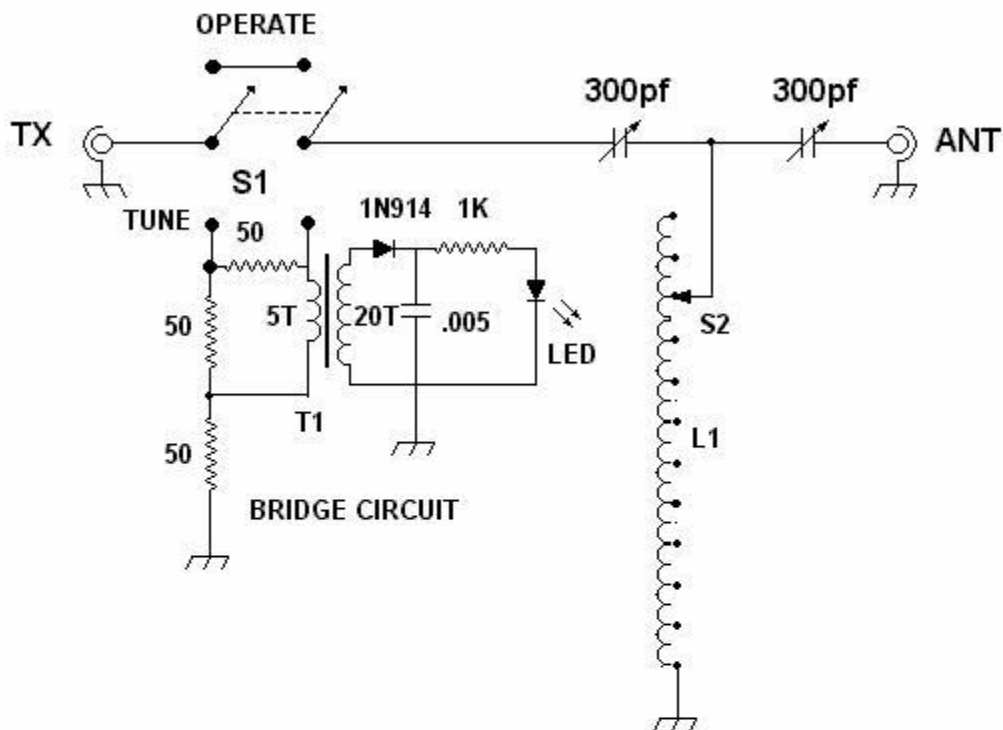


Recently after building my SW-30+ from Small Wonder Labs, I found out that the little BLT tuner I had been using for my QRP operations would not tune my 40 meter Extended Double Zepp (178' centered with 450 ohm balanced line) on 30 meters. Not to fault the BLT, as it is a fine little work of art to say the least, my antenna just happened to be out of limits for it. So what could I do to put the new 30 meter rig on the air ? Well, for that evening, I managed to

get on the air using my old MFJ-901B which has no meter, but does have a resistive bridge and LED indicator that I added for SWR indication. With this setup, I easily managed to get a match on 30 meters and was making contacts within minutes. I already had the SW-40, and the SW-20, and the little BLT worked just fine on those 2 bands, but I thought that it would be nice to have a very small, wide range tuner for working several bands. I looked over several designs, and then thought I had better look in my junk box to see what I had on hand before I decided on what to build. Well, I managed to find 2 identical poly variable capacitors that checked out to range from 15 to 300 pf, and they even had 1/4" shafts for mounting knobs. Don't ask where I got these, as I've had them for a long time (I hear that Emtech carries them) but had forgotten about them even being here ! Then I thought that they would be perfect in a simple T match circuit. The T match isn't the best or most efficient tuner circuit around, but it will tune darn near anything you connect it to ! With that range of capacitance, I figured I should be able to build a tuner that would at least cover 10 through 80 meters. So I started looking around for inductor ideas, and first thought about toroidal inductors, but didn't have one on hand to wind the amount of inductance I was looking for on. So I decided to wind the inductor on an insulating coil form, and in this case I used some thin wall 3/4" pvc pipe which is slightly larger than 1" outside diameter. Then I figured that to cover down to 80 meters I would need somewhere around 25 uH of inductance. So my Hamcalc program (thanks Murph !) made an easy job of designing the coil. It told me to wind 36 turns of #20 enamel wire on a form of 1.09" to achieve 25 uH. So I wound the coil, and placed a tap every 3 turns and wired it to a 12 position rotary switch I picked up at Radio Shack. I then mounted the caps, and prewired switch/inductor combo into a little enclosure I had sitting around that wasn't a lot bigger than the BLT tuner. For SWR indication, I duplicated the bridge circuit in the BLT tuner and used a super bright red/water clear LED as the indicator. The caps had no mounts of any kind built in, so I mounted them with double sided tape long enough to hold them in place and then anchored them with hot melt glue. After mounting 2 surplus SO-239 chassis connectors, I finished wiring the thing up, and then labeled the front and rear panels with my electronic label maker and clear label tape. Now for a test drive. I dug out my trust old MFJ-259B antenna analyzer and connected it to the input of the tuner, and connected my 40 meter zepp to the output. I tried various frequencies, and was able to get a good match on basically every one I tried from 80 meters on up to 10 ! So, I then tried it with my SW-30+, and right away got a good match with the LED going completely out, and was on the air making contacts within minutes. I now have a functional tuner that will tune almost anything, and it will fit in my coat pocket with room to spare ! I know that my BLT is a more efficient design, and will tune in the field with the right antenna, but with it and my little homebrew Mini-Tune in my bag, I will be able to match just about anything I decide to use ! I have even used it with my Icom 703 on 80 meters with up to 10 watts and no apparent problems so far, and have also found that it will load my zepp on 160 but I have to reduce power to prevent arcing there !

**SCHEMATIC FOR THE MINI T - GUESS YOU CAN TELL I LIKE TO BUILD TUNERS !**

# **MINI - TUNE T MATCH CIRCUIT** By: Rick McKee, KC8AON



**S1 = DPDT**

**T1 = 20 TURN PRIMARY, 5 TURN SECONDARY #24 MAGNET WIRE ON T50-2 TOROID**

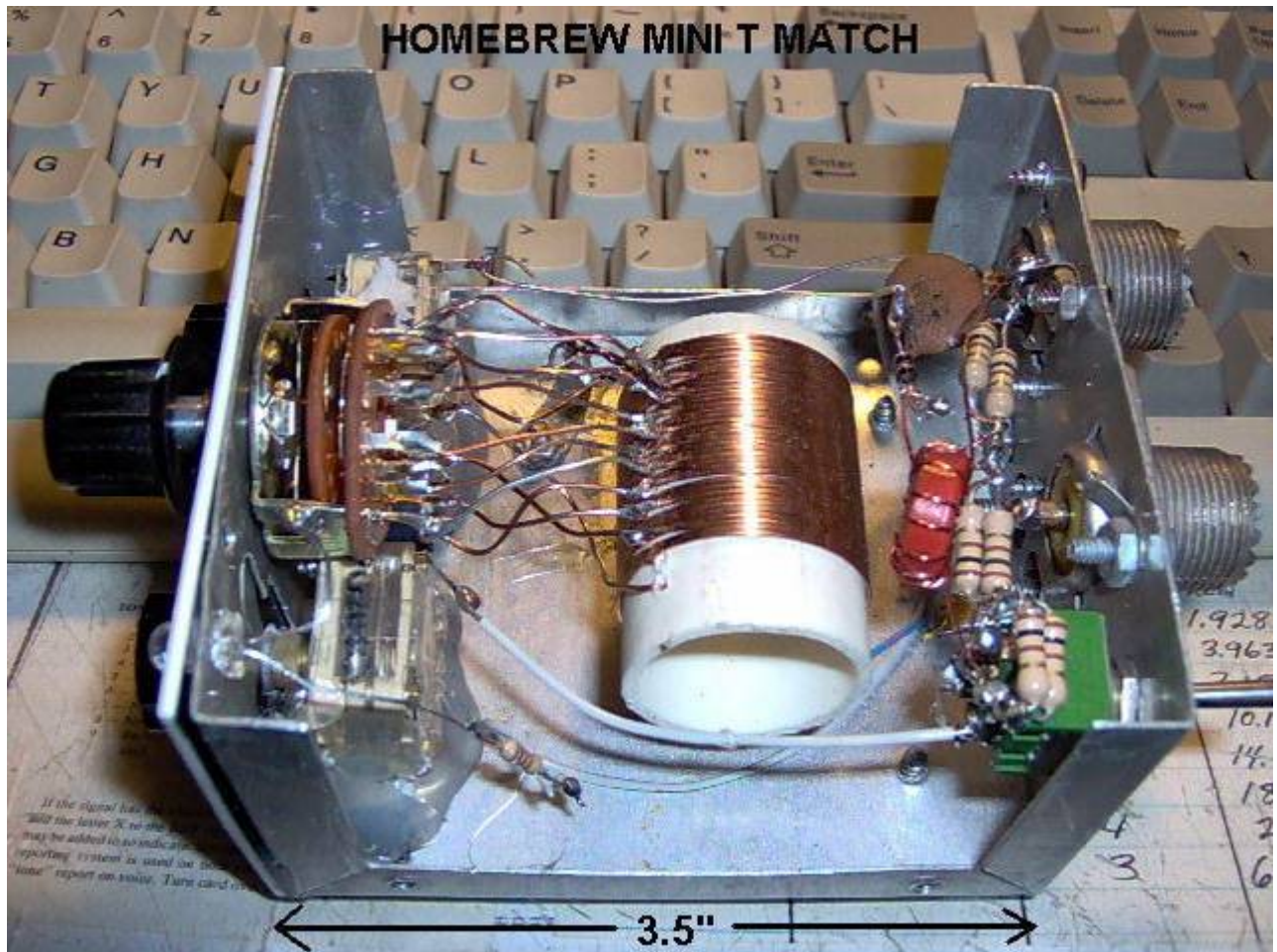
**L1 = 35 TURNS #20 MAGNET WIRE CLOSE WOUND ON 1" FORM, TAP EVENLY IN 12 PLACES**

**S2 = 12 POSITION ROTARY SWITCH**

To use, first set both TX and ANT caps in center position. Select inductor setting with S2 that gives a peak in receiver noise or signal. Then place S1 in tune position, apply transmit power, then tune TX and ANT caps until LED goes out. If LED doesn't go out, try selecting an inductor setting of one higher or lower and then retuning. You may not be able to get the LED all the way out, in that case, tune until it is as dim as you can possibly get it. Once tuned to this condition, place S1 back in the operate position and you are ready to transmit. This circuit will work 10 thru 80 meters in most cases.

The schematic for the Mini T Match Tuner shows that it is nothing more than a standard T match circuit just like the circuit used in most commercial tuners these days, with the exception that this is a miniature sized version.

## INTERNAL WORKINGS OF THE MINI T MATCH TUNER



Here's a shot of the internal parts layout in the Mini T Match. As you can see, this is a very compact tuner that will travel along with you almost anywhere and will tune almost anything including the proverbial bedsprings !