



A multi-use Antenna Tuner

A tuner like this has appeared with some of my high performance radios, such as my [#35](#) and [#50](#) sets. This type of tuner has worked very well with the accompanying detector board to make a nice dx crystal radio. My aim was to put as much versatility into this tuner project. When litz is this expensive, you can only go around once.

There are 4 uses I have found for this tuner. (This is why I call it a *multi-use* tuner.) The first use is a front end for my medium wave dx crystal or tube regenerative radios. Second is using the 4 gang capacitor with a loop antenna as a high performance crystal radio. Third is a long wave tuner and finally a signal booster for a nearby radio. Please look at the circuit below as I describe the different uses.

The medium wave (530-1700 broadcast band) crystal radio or one tube radio is set up by opening the two brass link switches between the capacitor gangs. The coil switches should be closed or shorted. By connecting an antenna and ground, this device becomes an antenna tuner. The signal is inductively coupled to the nearby crystal set detector.

The second use is to connect the tuner to a crystal loop antenna. To reduce circuit losses, only the stators of the capacitors will be connected. The links between the capacitor sections should be shorted together. Between the two sets of stators, the loop is connected. This can be done by using the A and G terminals. The effective capacitance is 500 pf. There is no wiper arm loss when using this 4 gang capacitor in that manner. The links to the coil should be opened.

The third use is for tuning in long wave stations. To tune the upper end of the long wave band, short all 4 links. If you wish to go lower, you will need a coil with higher inductance. This is easy to connect with this tuner. Open the two coil links and connect an external coil to the two thumb nuts that are now available. You will have 1000 pf capacitance across the coil and in series with the antenna available. Additional fixed capacitors may be used if a lower frequency is desired.

Finally, this tuner makes a great signal booster for a near by radio. I have had some e-mails from web visitors wanting to know how to make their little transistor radio work better. I did this in the 60's when I wanted to put a transistor radio on my bike. The signal was weak so I made a tuned circuit and connected it to a rod antenna. Open the links that are between the capacitor sections and close the coil links. Connect an outside antenna and earth ground to the A and G terminals. Tune in a station, then reduce the volume. Then tune the tuner for a peak. You will be surprised! Just think how your kids can blast the house with [Radio Disney](#) with the same 10 songs all the time. Who Let the Dogs Out!!

Ok, now for the *heißen eisen*, the construction details. My tuner is built on an oak board about 16 x 5.5 inches (40x14 cm). The variable capacitor is a 4 section, 500 pf per section. If this is going to be used as a dx tuner, please look around for a quality variable capacitor. That is one with at least ceramic insulators on the stators. Nothing will kill the Q faster than a crappy variable capacitor. The capacitor should be mounted on ceramic or styrene standoffs.

It is also important to note that the capacitor shaft is isolated from the vernier drive with a plastic shaft. This is very important as this reduces the hand capacitance. There is still some slight hand capacitance effects which would be made better by moving the capacitor further back.

A 6:1 vernier dial drive is used to allow for easy tuning. Trying to tune the MW band in a half turn when using big litz is tedious at best. A one inch (24 mm) hole is punched in the front panel and the drive is attached with two small screws and nuts. Allow for the front panel or capacitor to move a little so as to reduce the binding. When the sweet spot is found, then the capacitor and front panel may be tightened. The dial is a round piece of thin styrene that is attached to the vernier. Made the dial as you please. I use Brother P-Touch labels to dress up my dial.

The switches are made up of brass links machined to span the distance between the

two #8 screws. The panel material is styrene. Styrene has very good rf loss properties.

If you look at the switch drawings on the diagram, you will see a fixed side and a movable side. If the brass links are placed that way, the tuner will work as intended.

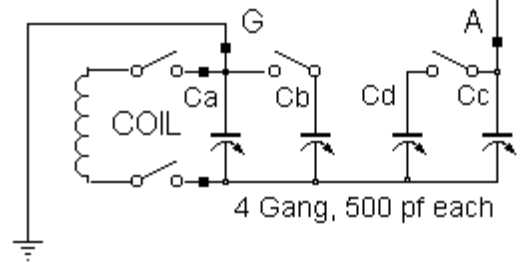
The coil form is a piece of 6x7x1/16 thick (152,5 x177,5 x1,6mm) styrene. There are 11 slits cut down to a hub diameter of 2 inches (5 cm). The wire is 660 strand, 46 gauge litz wire.

There is not too much more I can tell you about this project. If you have questions, please [contact me](#). 73 - Dave N2DS





Coil 660/46 Litz, 39 turns
Form: 2 inch id, 6 inch od



Antenna Tuner (c) 2005, D. Schmarder