

Differential Amplified Loop Receive Antenna (G8CQX revisited)

December 26, 2012 By N3LLL

I have lived in current Houston home for about 15 years. We live on a golf course and have deed restrictions with no chance for external antennas. I restore old military radio's R390 / 51J Collins and have always been disappointed with the ability of my attic antenna on AM broadcast, 160 and 80 meters reception. My attic loop works relatively well of 40 – 15 meters but tends to hit the ionosphere at a high angle so it works better regionally than nationally.

In my search for a solution I experimented with a tuned loop on AM which was a little tricky to remotely tune and worked on a fairly narrow bandwidth without extensive modifications.

What I was looking for was a broadband loop that would require no tuning. Perusing the Internet I came across an article by M0AYF.

<http://www.qsl.net/m0ayf/active-loop-receiving-antenna.html>

The design seemed to meet all of my requirements, broad band, compact and fairly simple to build. I built a prototype on a board and put it in the attic, I was duly impressed, WWL in New Orleans 250 miles away sounds like a local station, radio Havana on 6 MHz sounds like HI-Fi on my R390A. I was so impressed with the circuit I reproduced it in kit form. The only modification I made was to add a voltage regulator for the relay and the amplifier B+ and to drop the voltage for the antenna isolation relay which is 5 volts.

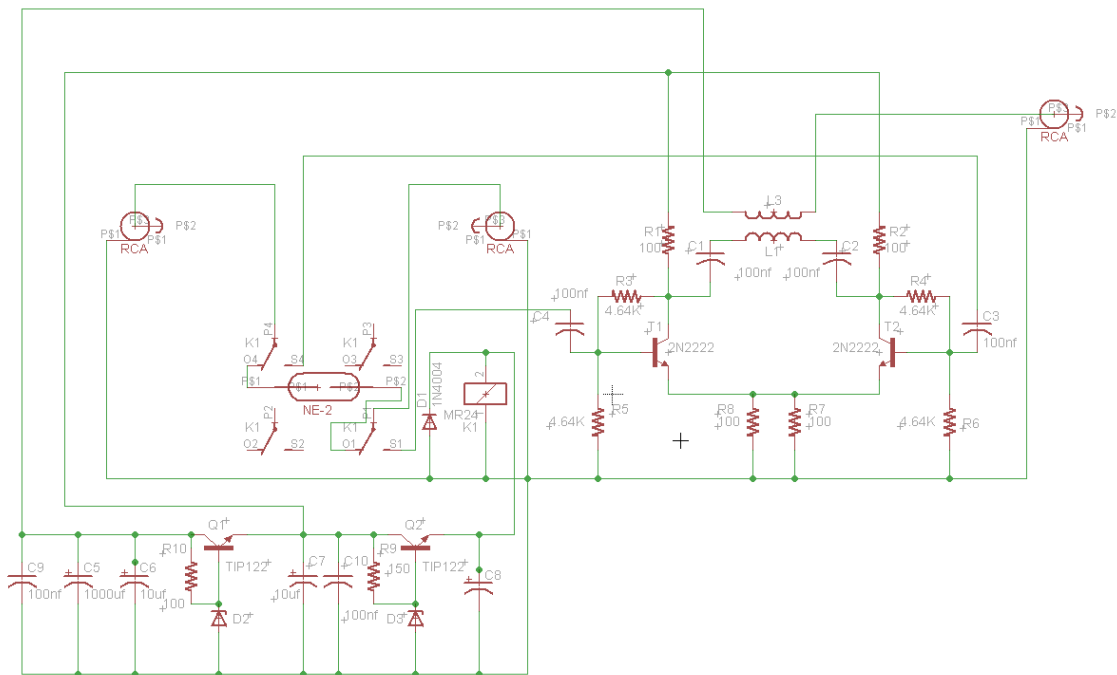


Figure 1

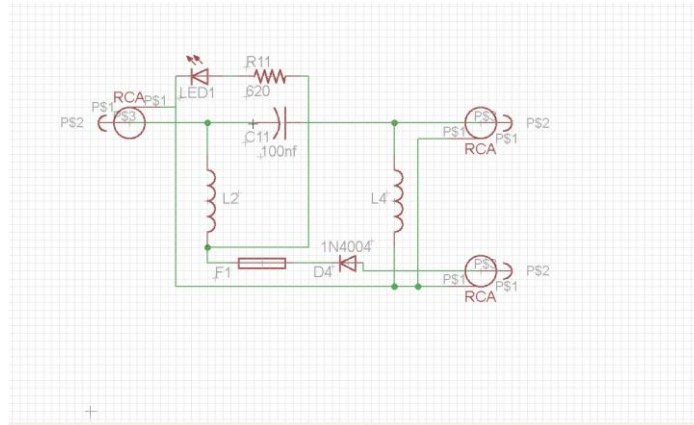


Figure 2

In order to test the gain, I terminated one side of the amplifier and used my network analyzer to sweep the amplifier. The gain drops off approximately 12db fro 0 – 30Mhz

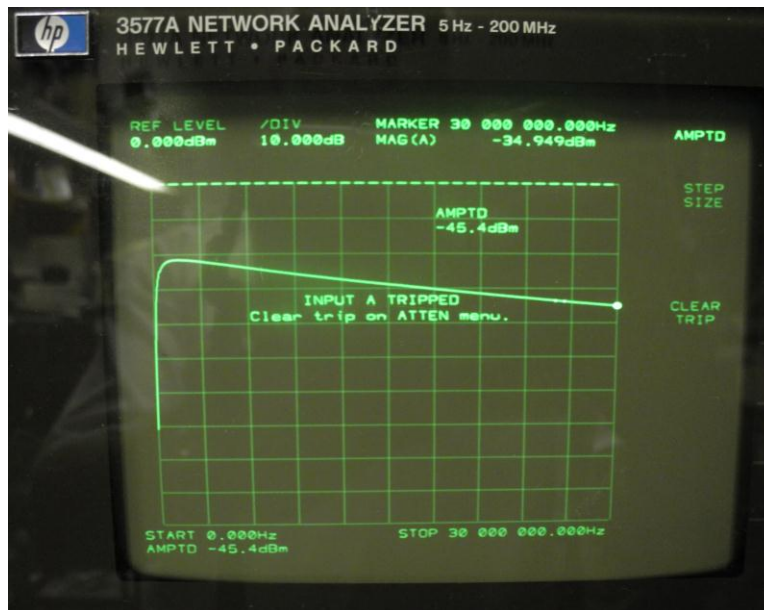


Figure 3

Once the prototype was tested, I set about committing the design to a circuit board, since many of these units will be installed in attics or protected areas I opted to use RCA connectors to keep the cost down. My thought was if a user was to mount the unit in a water tight enclosure he could solder directly to the board and not install the jacks. Both the attic and indoor units ended up fitting in a compact Serpac 121 (2.5" x 4") enclosure, see figure 4 & 5.

Another option might be could be the addition of a Moibus loop instead of a simple 1 meter loop.

<http://www.ece.unm.edu/summa/notes/SSN/note7.pdf>

My current attic loop is 1 meter in diameter hung from trusses in the attic, in a symmetric loop with the amplifier at the bottom, figure 6.

At any rate I believe this to be an easy kit building block for a simple phantom powered broadband loop antenna.

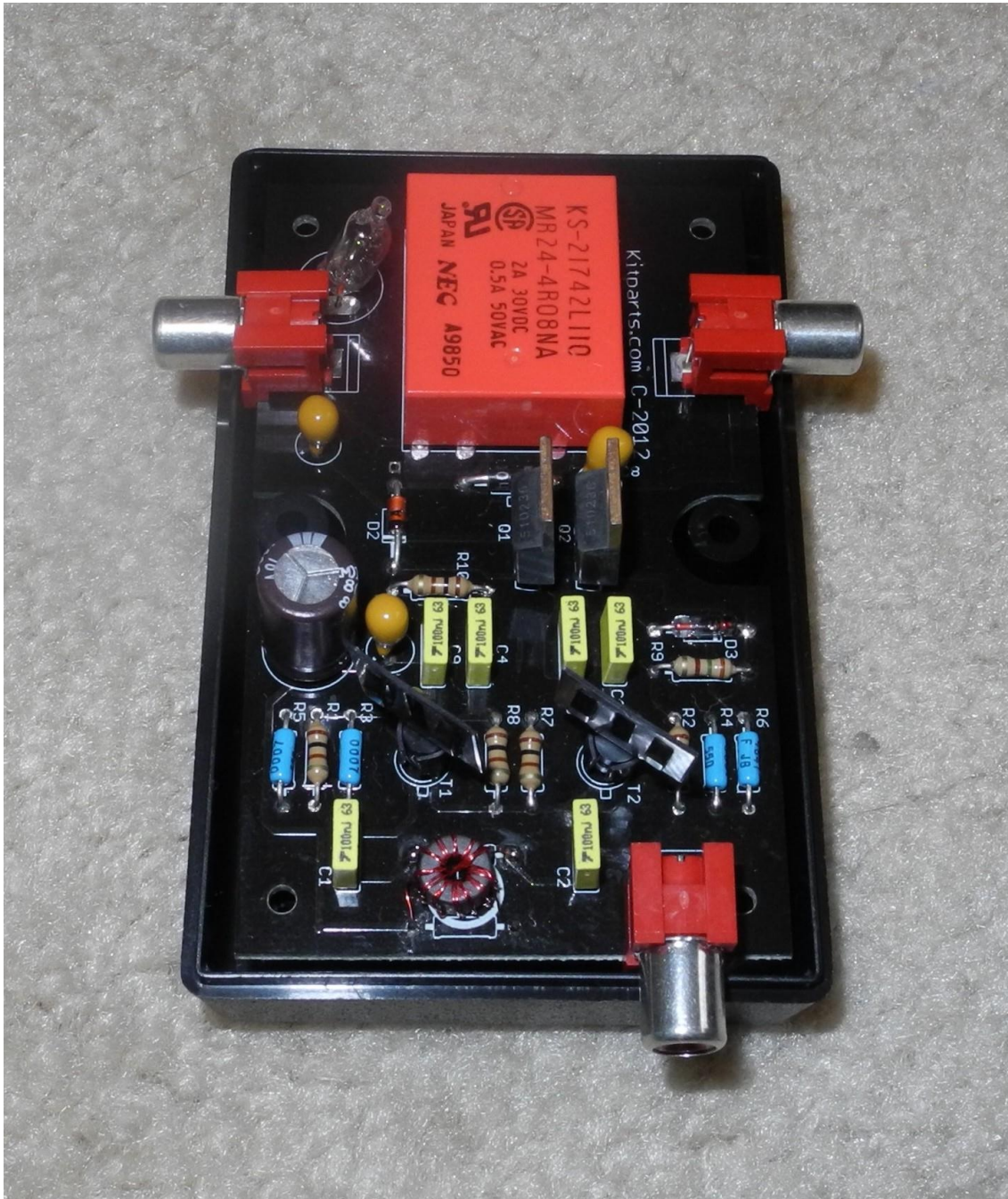


Figure 4

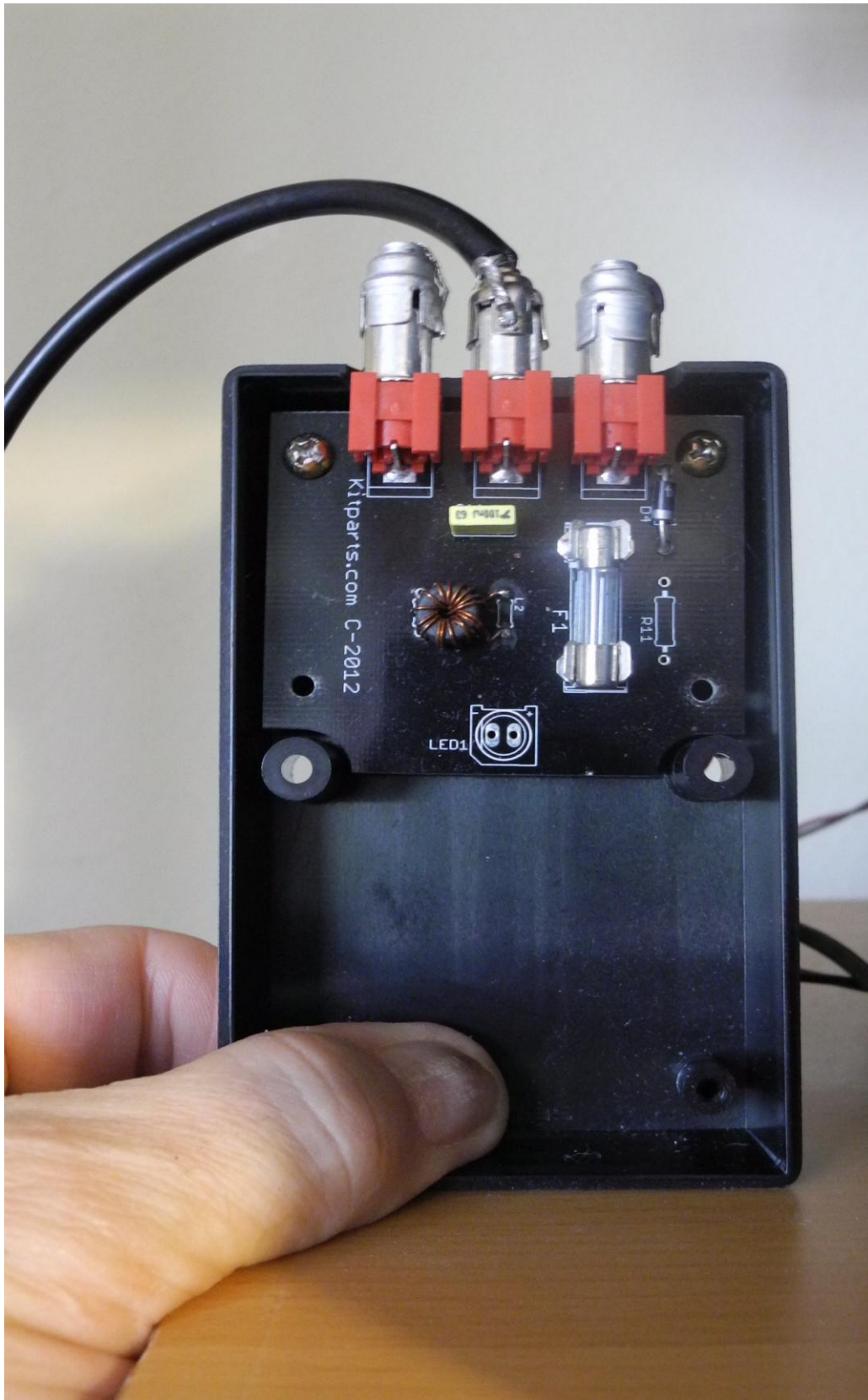


Figure 5



Figure 6