



Micro FM TX (Micromitter)

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A good friend of mine in Australia bought one of these kits. He was having some problems getting it to work properly. He posted it to me to look at. Here are my findings and some modifications I did. I will address it point by point:

- 1) Move this cap closer to pin 12. The PLL Vcc is very sensitive to any noise. (See PCB layout below)
- 2) Run the VCO tuning supply from a higher voltage than 5V. It must be regulated. This can be another small 78L09 or suitable Zener. This will help locking at bottom and top ends of the band without readjusting L1.
- 3) Reduce the 5.1k to about 2.7k (It will allow faster tuning). The 22k on the base of Q1 can also be made slightly smaller with not much effect on performance.
- 4) Try a variable capacitor there to alter the phase of the pilot for best stereo separation. You can replace it with a fixed value after measuring on a LCR meter.
- 5) Try to get the ratio of the (22pF, 33pF and VC1 to 10pF) as high as possible. This means the total capacitance by the 3 elements in the circle should be as large as possible while the series cap (10pF in this case) should be as small as possible. L1 should be as small as possible. This may take some experimentation to get values that will provide lock at the top and bottom end. If you operate on a single frequency this is not a problem. This will give lowest carrier noise sensitivity for this Clapp oscillator.
- 6,7) I found some slight loop instability (hunting) when tuned to the high end of the band. This sounded like a faint whistle on the audio. I think it is caused by some of the 100 kHz comp reference still getting into the VCO tuning line from the output of the charge pump. I solved this by using 2 separate transistors for Q1. This gave me access to the base of the second transistor. I removed the 47nF and placed a smaller 10nF (**make this 22nF, see next post**) as shown. This cured the instability and noise problem.

When you set up your transmitter at the low end and your voltage at TP1 reads lower than about 0.7V or is stuck at 0.6V then the VCO can't tune low enough to achieve lock. Screw in the core of L1 while monitoring TP1. Get it to at least 0.7V and within your supply limit at the high end. (Using 9V, try to keep it less than 8V).

You will need to increase the modulation depth control for operation at the high end due to reduced modulation sensitivity with frequency.