Radio Generator
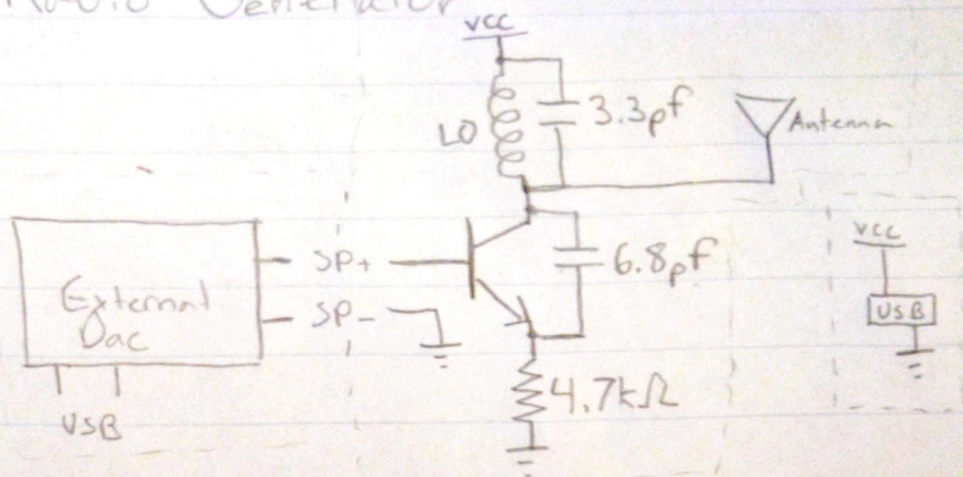

LO calculations:

$$f = \frac{1}{2\pi\sqrt{LC}}$$

$$4\cdot10^7 = \frac{1}{2\pi\sqrt{LC}}$$

$$4\cdot10^7 = \frac{1}{6.28\sqrt{L\cdot3.3\cdot10^{-12}}}$$

$$4\cdot10^7(6.28\sqrt{3.3\cdot10^{-12}L}) = 1$$

$$6.28\sqrt{3.3\cdot10^{-12}L} = \frac{1}{4\cdot10^7}$$

$$6.28\sqrt{3.3\cdot10^{-12}L} = 2.5\cdot10^{-8}$$

$$(\sqrt{3.3\cdot10^{-12}L})^2 = (3.98\cdot10^{-9})^2$$

$$3.3\cdot10^{-12}L = 1.585\cdot10^{-17}$$

$$L = 4.802\cdot10^{-6}$$

$$L = \frac{\mu_r\mu_0 N^2\pi r^2}{l}$$

$$4.802\cdot10^{-6} = \frac{\mu_r\mu_0 N^2\pi r^2}{0.01}$$

$$4.802\cdot10^{-8} = \mu_r\mu_0 N^2\pi r^2$$

$$4.802\cdot10^{-8} = 0.9999\mu_0 N^2\pi r^2$$

$$4.804\cdot10^{-8} = \mu_0 N^2\pi r^2$$

$$1.53\cdot10^{-8} = \mu_0 N^2 r^2$$

$$1.53\cdot10^{-8} = \mu_0 N^2(0.005^2)$$

$$0.000612 = \mu_0 N^2$$

$$0.000612 = 1.26\cdot10^{-6} N^2$$

$$N = 4.12$$

$$N \approx 4$$

*assuming $4\cdot10^7$ Hz (44Mhz) to penetrate atmos