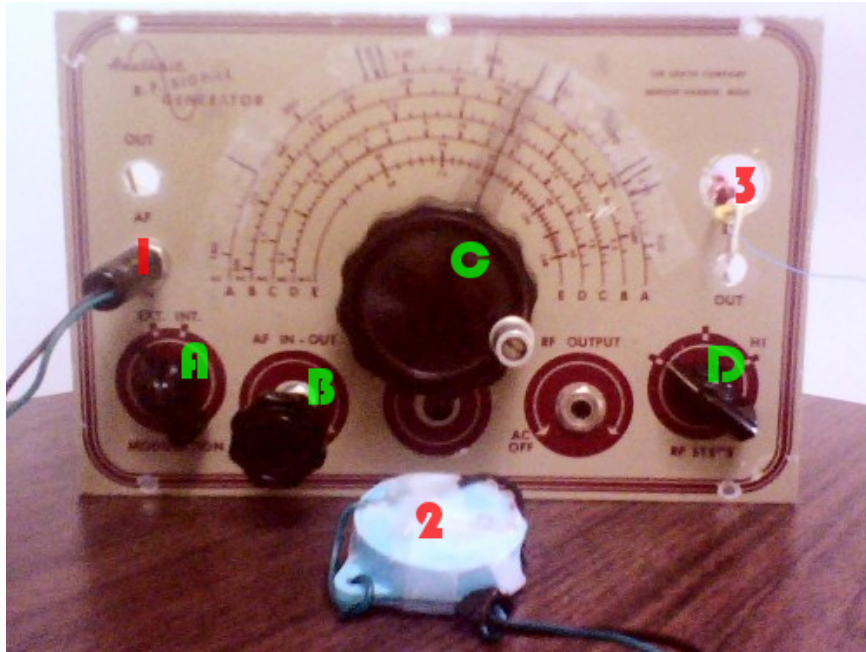


QRP TUBE SUPERREGENERATOR

SINGLE PENTODE SHORTWAVE RADIO

VERSION 2 ©2011



The information below is not guaranteed to be free of errors.

1. ABSTRACT

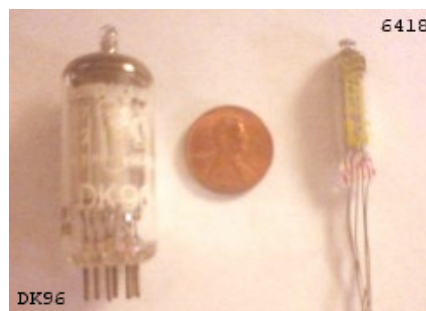
The regenerative radio shown above is capable of hearing, softly, the stations present on the 25M, 31M, 41M, 49M, and 60M bands. Power consumption via one pentode is a mere **17 mW**.

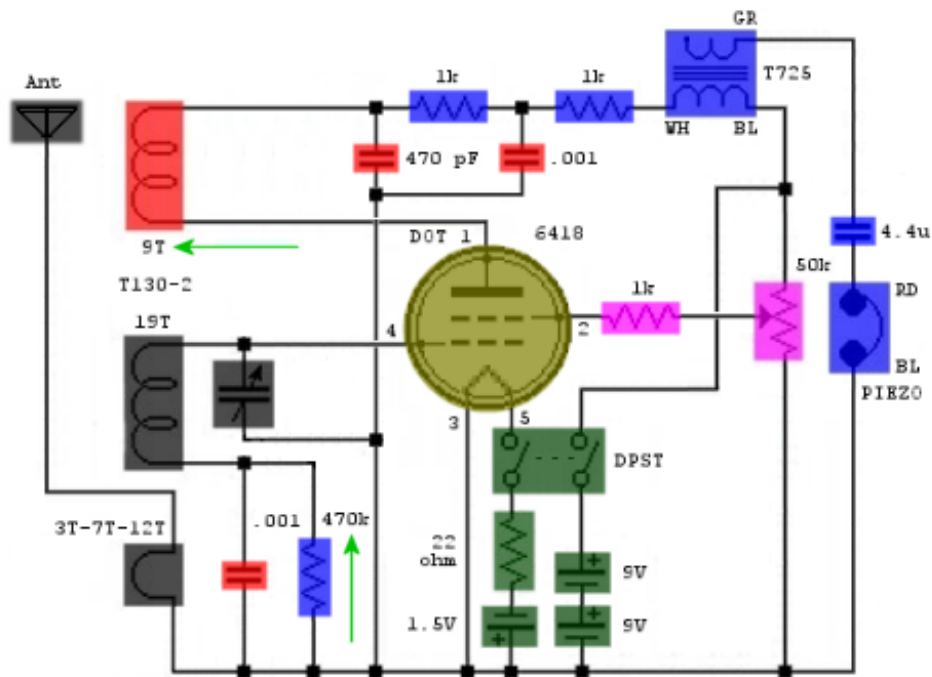
2. CK6418 PENTODE

The Raytheon CK6418 **power amplifier** (2.4 mW max out) is just 1.25 inches tall. Filament power is 1.25 V at 10.0 mA; plate power is a non-lethal 18 V at 0.24 mA. Plate resistance is 420k ohms while transconductance is 300 μ MHOs. The 6418 is efficient in terms of mW filament power per mA of plate current. This tube was brought to my attention by [Dave Schmarder](#) via his grand website. An *exhaustive* search of over 13,000 valves did not yield a finer low-power vacuum tube.

3. PHOTOS

Pictured above is the receiver as a prototype. Switch **A** applies power to both the filament 'A+' and plate 'B+' circuits. Potentiometer **B** controls regeneration. Vernier **C** with drive reduction ($\sim 3:1$) controls the frequency. Switch **D** alters the antenna coupling. Jack **1** connects to the piezo headphone **2** and the terminal **3** is an antenna hookup. The 6418 is shown next to a penny below.





4. CIRCUIT DESCRIPTION **UPDATED**

The radio is super-regenerative. The combination of the below-tank grid-leak made up of a 470k- Ω resistor (with 1000 pF capacitor) and 9-turn tickler disrupts the grid in a rhythmic fashion. This principle is used in the Angelodyne. The RC time constant is similar to a 4.7M- Ω resistor with a 100 pF capacitor. The green arrows show the minor alterations needed to make the superregen.

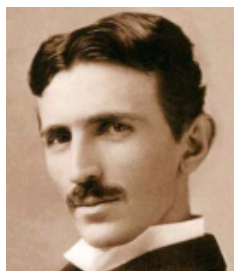
The plate circuit RF choke was replaced by two RC networks (1k- Ω resistors). This reduces radio frequency energy by about 65 dB at the cost of about 2% power loss at the piezo earphone.

The radio uses three antenna taps (3, 7, and 12 turns), a T130-2 tank toroid, Bogen T725 transformer, and 25+ feet of wire wrap for an antenna. The piezo element earphone, is similar to the KBT-44SB-1A. Performance is rock solid but will never take the prize as far as output energy. **CAUTION: piezo earphones can emit a deafening pop under some circumstances** (the 4.4 uF cap helps). This radio is efficient enough that it could run ~1400 hours on a set of alkaline batteries.

I wish to thank Bill "Exray" for answering many questions as I started back into the hobby. Be sure to visit Dave Schmarder's [Homemade Radios](http://makearadio.com/index.php) website: <http://makearadio.com/index.php>. The **RadioBoard** is a great forum for crystal and tube radio lovers: <http://theradioboard.com/rb/>.

REFERENCE

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