"Sproutie" Regenerative Receiver
by
Dave Richards, AA7EE
built by
Jerry Wolczanski, KI4IO

SUMMARY

Dave Richards built a superb regenerative receiver called the "Sproutie". It's well documented and can be seen here: https://aa7ee.wordpress.com/2014/08/21/the-sproutie-a-general-coverage-regen-receiver-with-plug-in-coils/ There are also a number of YouTube videos which show off this radio. I've built a single-band version of the Sproutie for 40 meters. Dave's version is general coverage and uses plug-in coils.

I was inspired by Bill Meara's (Soldersmoke) Q-31 shortwave AM quarantine receiver, which covered the 31-meter SW BC band. Bill made his radio a super-heterodyne. I exchanged a few emails with Bill and, around the same time, I fired up an ancient HQ-180 and heard Radio Slovenia on the 31-meter band. Hey - we vacationed there in 2018! I was hooked. Yeah, the SW bands aren't what they used to be, but there are still a few interesting stations out there.

So I built a SW BC band receiver based on the 'Sproutie", but in that wonderful process that leads up to any project (the dream phase!), I decided to make it band-switched and my junk box yielded a 6 position switch with more than enough sections.

Front Panel

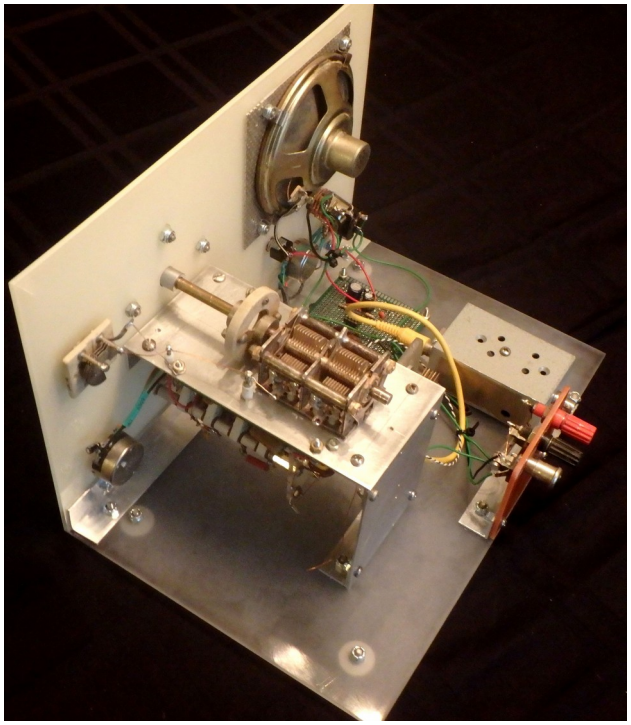
Bottom row, left-to-right:
Audio gain & on/off switch
RF attenuator pot
Antenna coupling
Band-switch
Regeneration control

Under the speaker
Phone jack
Speaker/Phone selector

Top
Main tuning
Band-spread

Construction

The radio covers the CW portion of 160, 80/75 meters, 49 meters, 40/41 meters, 31 meters, and the 25 meter band. Dave used plug-in units for each band. I used one inductor with switched taps along with padding capacitors and caps in series with the tuning cap to set the range of each band. I first calculated the necessary values and then used trial & error to finalize the component values.



The band-switch is mounted beneath the L-shaped bracket. Above it, and hidden in this view, is the RF portion of the receiver.

The small box on the far side is a high-pass filter with a cut-off of 3MHz. I have a 22kW AM BC station 3km from my QTH. This filter keeps that signal out of the radio.

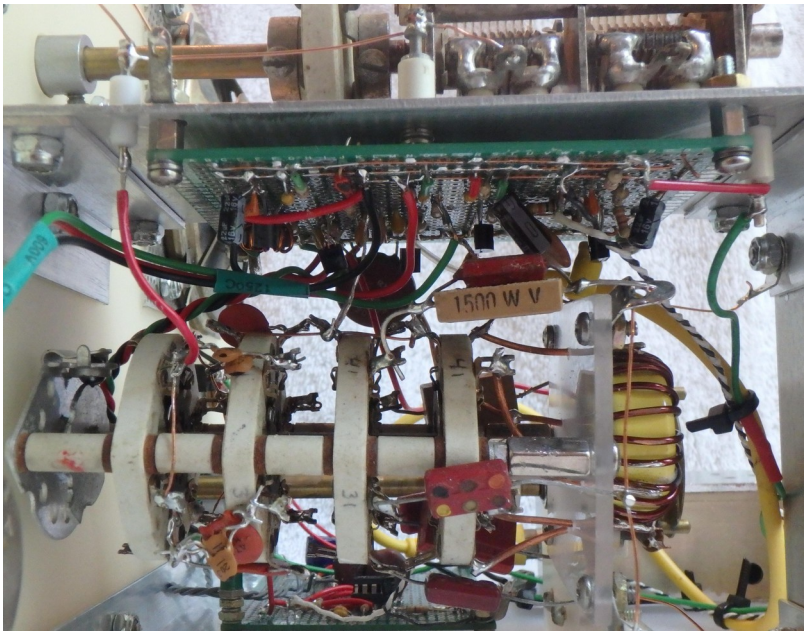
The radio only has two boards, the RF board and the audio board shown below the speaker.

The radio is constructed from two sheets of 8 x 12" acrylic sheet. The front panel is painted and the bottom is translucent.

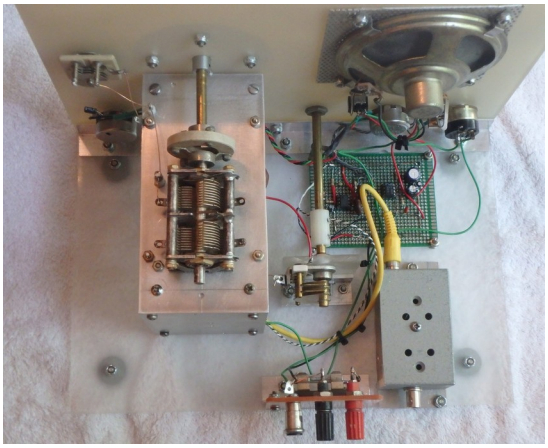
On the bottom side of the L-bracket is the RF board and below it is the band-switch.

There is only one inductor and it has multiple switched taps for all the bands.

The capacitor and inductor values were all calculated. In some cases, a variable capacitor was inserted into the circuit and varied until the right range was found. The variable cap was then measured and replaced with a fixed value component.

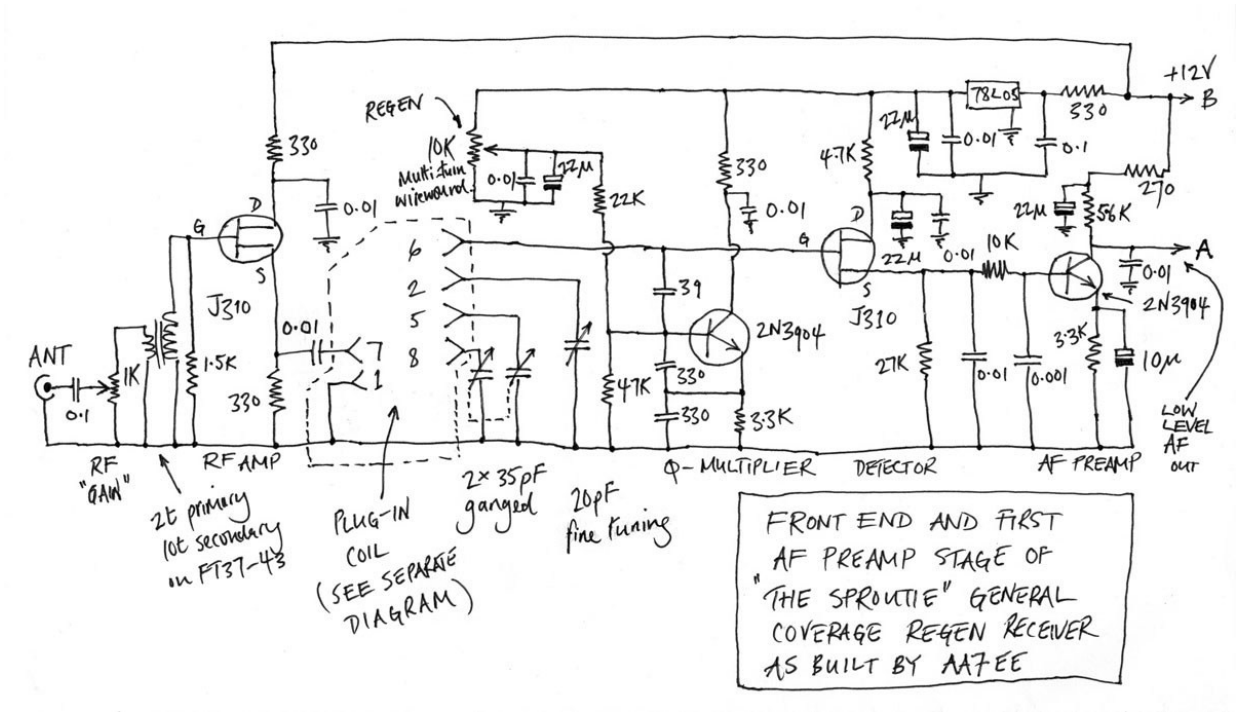


Top View

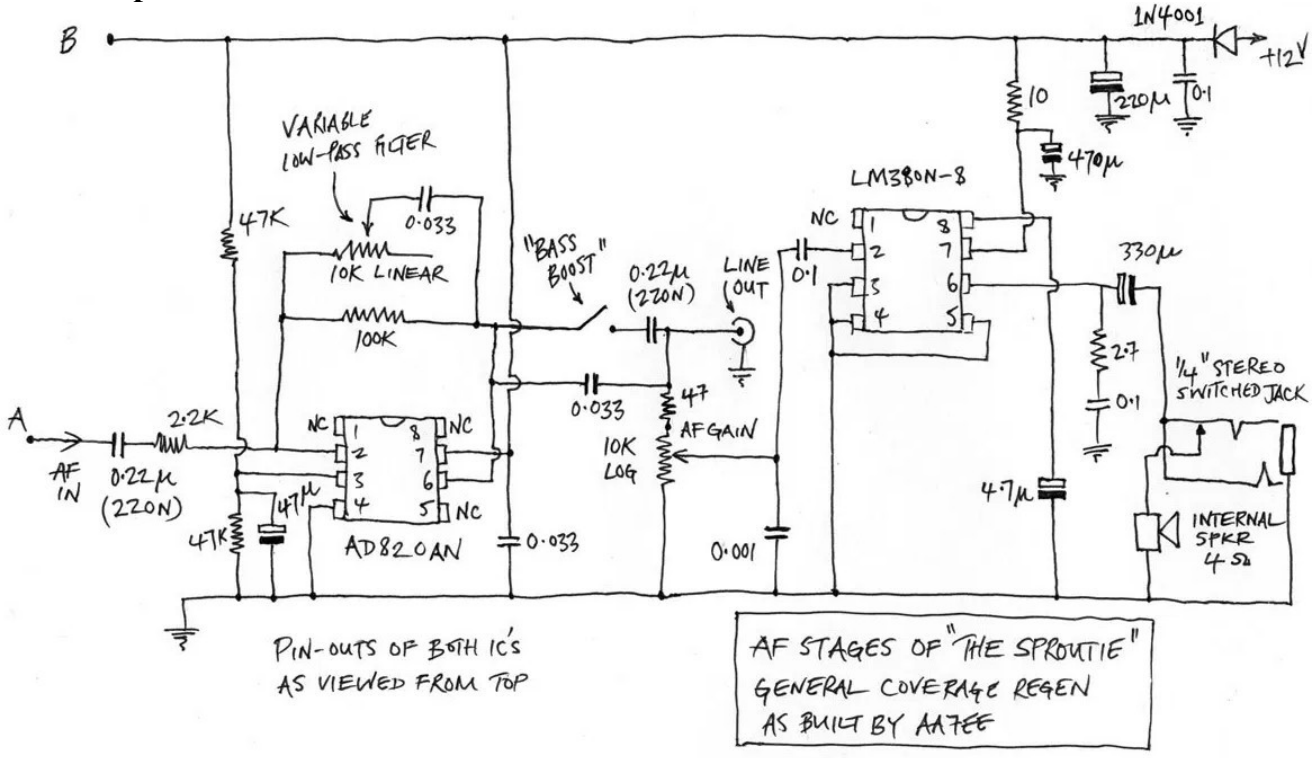


The antenna is coupled to the inductor via a link on the inductor. Too many turns on the link winding may adversely affect the regeneration. I kept removing turns until there was only one. In the end, I added a variable capacitor in the antenna link as well. There were no more turns to remove! I used a similar variable cap in the antenna link of a regenerative receiver I built many years ago.

Front-end

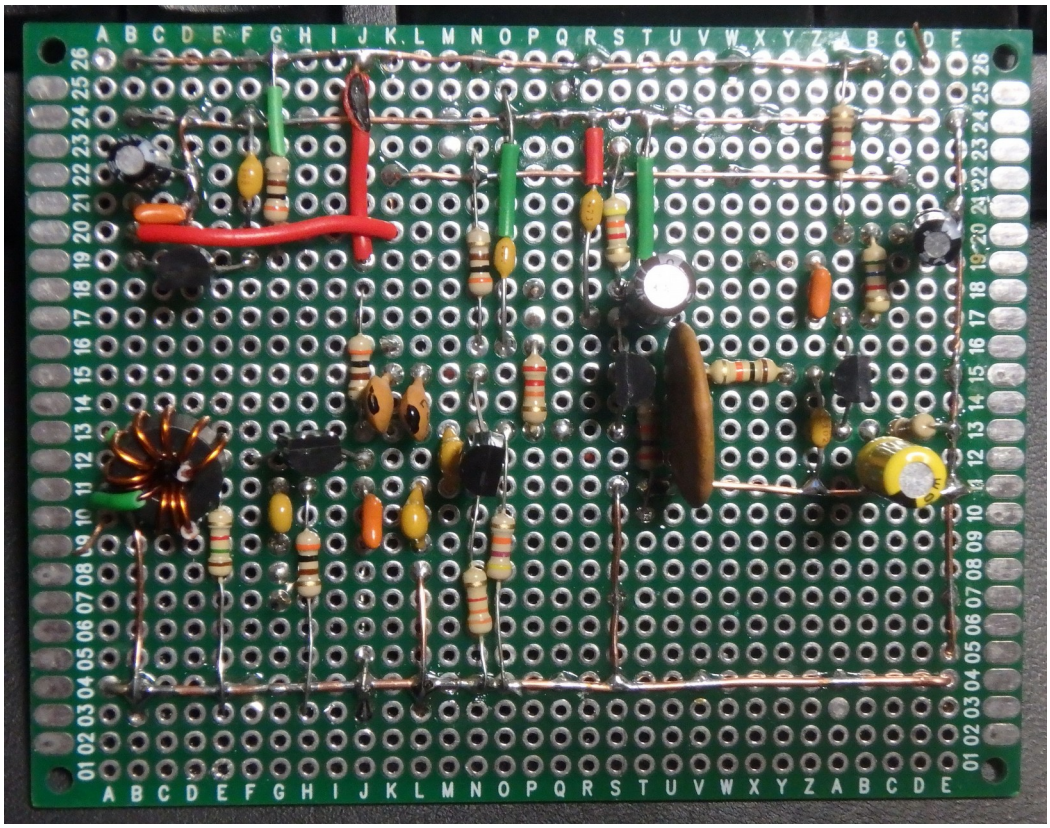


Audio Amp



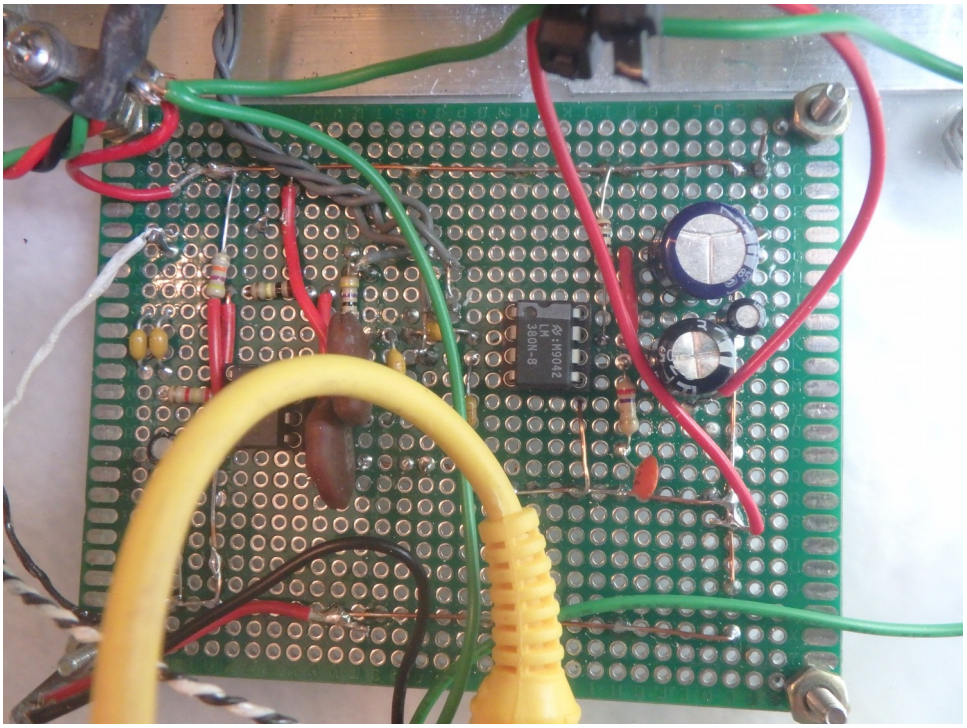
There are improvements to the Sproutie which can be found at:
https://aa7ee.wordpress.com/2015/09/14/the-sproutie-mk-ii-hf-regen-receiver/

The RF board



The Audio Board

I bought a batch of these 7x9cm prototype boards from ebay - they're perfect for one-off projects like this.

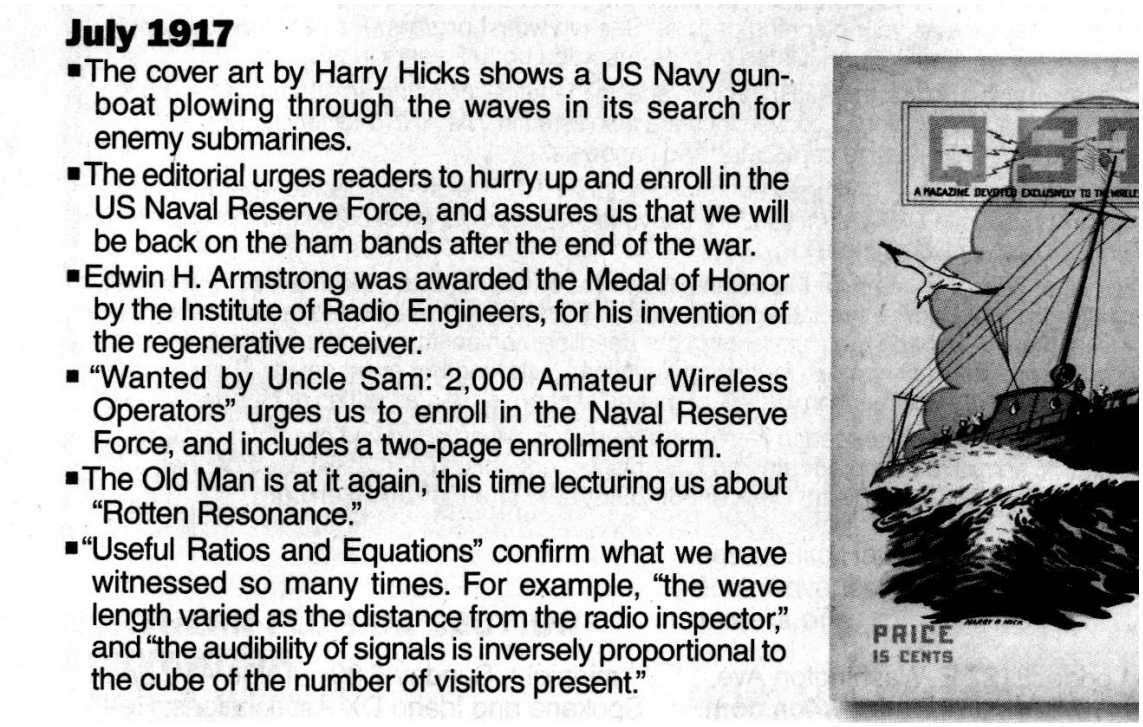


Conclusion

As Dave Richards points out in an email, "The main downside is that regens are very susceptible to nearby strong signals, and crumble easily. Other than that, they are a whole lot of fun! I think I'm going to make a few changes:

1) The regeneration control is really touchy. I'm going to replace it with 10-turn pot.
2) Like Dave, I'm going to add some audio filtering, perhaps a 4 or 5 kHz low-pass. There's a little more high-frequency energy than I like. I may also lower the value of the audio coupling capacitors.

The radio is both primitive and fun, taking one back 100 years. Need proof?



July 1917

- The cover art by Harry Hicks shows a US Navy gunboat plowing through the waves in its search for enemy submarines.
- The editorial urges readers to hurry up and enroll in the US Naval Reserve Force, and assures us that we will be back on the ham bands after the end of the war.
- Edwin H. Armstrong was awarded the Medal of Honor by the Institute of Radio Engineers, for his invention of the regenerative receiver.
- "Wanted by Uncle Sam: 2,000 Amateur Wireless Operators" urges us to enroll in the Naval Reserve Force, and includes a two-page enrollment form.
- The Old Man is at it again, this time lecturing us about "Rotten Resonance."
- "Useful Ratios and Equations" confirm what we have witnessed so many times. For example, "the wave length varied as the distance from the radio inspector," and "the audibility of signals is inversely proportional to the cube of the number of visitors present."

73

Jerry Wolczanski
KI4IO
Warrenton, VA
jerrywlinux@comcast.net