Super Simple SSB

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Steal from one source, and its called plagiarism. Steal from many, and its research, right? If that's the case, this little project is research in its purest form……

"A 2-tube SSB Phasing Rig" [1] sounded like a fun little project, though I haven't built much with hollow state technology lately. It sat in my round tuit pile for 9 years in the somewhat vain hope that the appropriate parts would fall into my outstretched hand. When that didn't happen, I set about adapting it to the 90's vintage rubbish that inhabits my junk box. Not without trepidation, to be sure, as I, a B. Comm. paper-pusher by trade, am woefully under-qualified in circuit design. Be gentle – I probably haven't matched impedances or levels effectively, but the end result does work after a fashion, and probably represents all all-time low in parts count to put on actual SSB signal on air. This is also my first attempt of using MS Paint as a schematic drawing package, so don't laugh!

I debated about the wisdom of pursuing the design of a phasing TX in this era of high performance crystal filter stations, as phasing rigs are notoriously poor spectrum conservationists, but a sudden resurgence of interest of late in DSB QRP rigs overseas made it apparent that there is still room, at least at QRP power levels, for a few less-than-stellar performers on the bands. If DSB is acceptable, and we can achieve SSB with only a very few more parts, why not? Even a 6 dB suppression of the opposite sideband would translate into many more hours of battery operation for a portable or emergency station.

The oscillator section is a blatant theft from "A Vest Pocket QRP Rig" [2], a fairly hard-working single transistor Pierce oscillator that, on its own, is capable of producing a few hundred mW of CW. In my version at least, there is no provision to twiddle the output tank, so it is vital to confirm resonance at the signal frequency either with a dipper or an L/C meter.

The phasing network and balanced modulator were lifted en masse from the tube version. The only change I made was to use some 1.125 mH moulded RF chokes that had on hand in lieu of the rapidly vanishing traditional 2.5 mH 4-Pie chokes specified. Values for the balance of the components in this section are fairly critical – not fertile ground for wholesale substitution, though the whole circuit can be scaled for other bands by calculating reactances.

Conventional wisdom states that you should match your diodes carefully for forward voltage drop to achieve good carrier nulling. I played along, as I had quite a stash to choose from, though I'm a bit dubious about the necessity in this era of highly repeatable component performance.

Note that the ouput toroid **IS** resonated by the two 0.001 uF capacitors in series, so should be checked for resonance per my comments on the oscillator section. If you somehow end up with upper sideband in error, simply reverse the two audio leads at the RF chokes.