Celebrating 100 years of Amateur Radio in Tasmania - 2023
(If you wanted a transmitter 100 years ago, you had to build it!)

A project on behalf of NTARC.
(The Northern Tasmanian Amateur Radio Club Inc.)

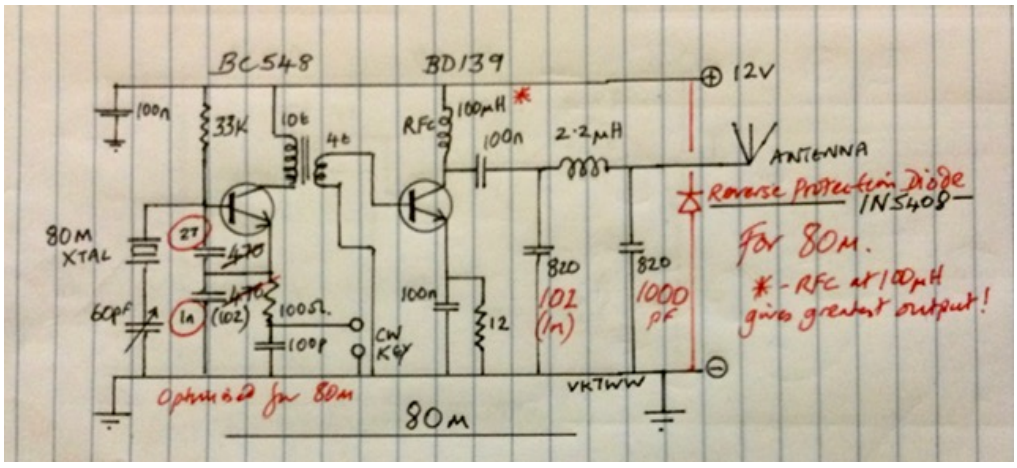
UPDATE #1

Diode – Reverse Polarity Protection
RF CHOKE Note
CRYSTAL OSCILLATOR Improvement
MODIFICATIONS for 40m
Adding SIDETONE

The Century "Cent" (1 Watt) 80m CW Transmitter Mk I

1. REVERSE POLARITY PROTECTION
As a safeguard to connecting the power supply/ 12v battery the wrong way round, I added a silicon diode (mine is a 3A IN5408, but you can use anything similar.)

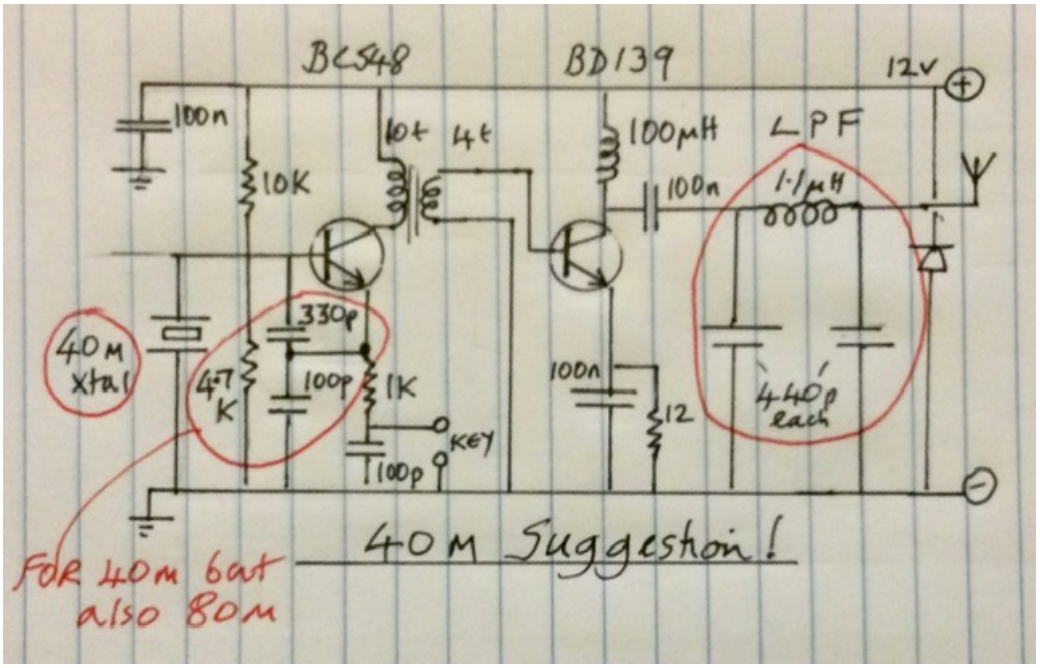
2. RF CHOKE
It is recommended that a 100uH RFC be used.
Tests with various values of RFC (e.g. 30uH and below) reduced the RF Output considerably.



3. CRYSTAL OSCILLATOR Improvement (80m)
After finding some old FT243, HC6U and 10X type quartz crystals for 80m, it was found that changing the two 470pf capacitors gave an improvement in output.

- The 470pf between the base and emitter change to 27pf.
- The 470pf to ground, change to 1n (102).

(Trying a 40m xtal in the original, or modified circuit above, did not work successfully.)



4. MODIFICATIONS for 40m
Note there is a reduced output, the higher in frequency (fx) you go.
Expect between 0.6 to .0.8w RF out instead of the 1.1W on 80m.

Two parts of the circuit need to be changed for operation on 40m.

A. The XTAL Oscillator; and,
B. Low Pass Filter (LPF).

A. The XTAL Oscillator is modified as follows:
Replace the 27pf capacitor with 330pf, and the 1n (102) with 100pf.
Note the changes in resistors, replace the 33k with a 15k, and add a 4.7k from the base to ground.

(80m xtals will also work with these changes, but this is for 40m. Consequently it's a compromise for 80m; so don't expect the same RF output on 80m using an oscillator optimised for 40m. But if you do, then don't forget to change the Low Pass Filter (LPF) back to 80m. It wouldn't be too difficult to turn the "Cent" into a dual-bander; perhaps more later!)

B. The LPF:

- Replace the 2.2uH with a 1.1uH (I used a 1uH)
- Replace both 820pf capacitors with 2x 410pf (I used a 390pf and 470pf)
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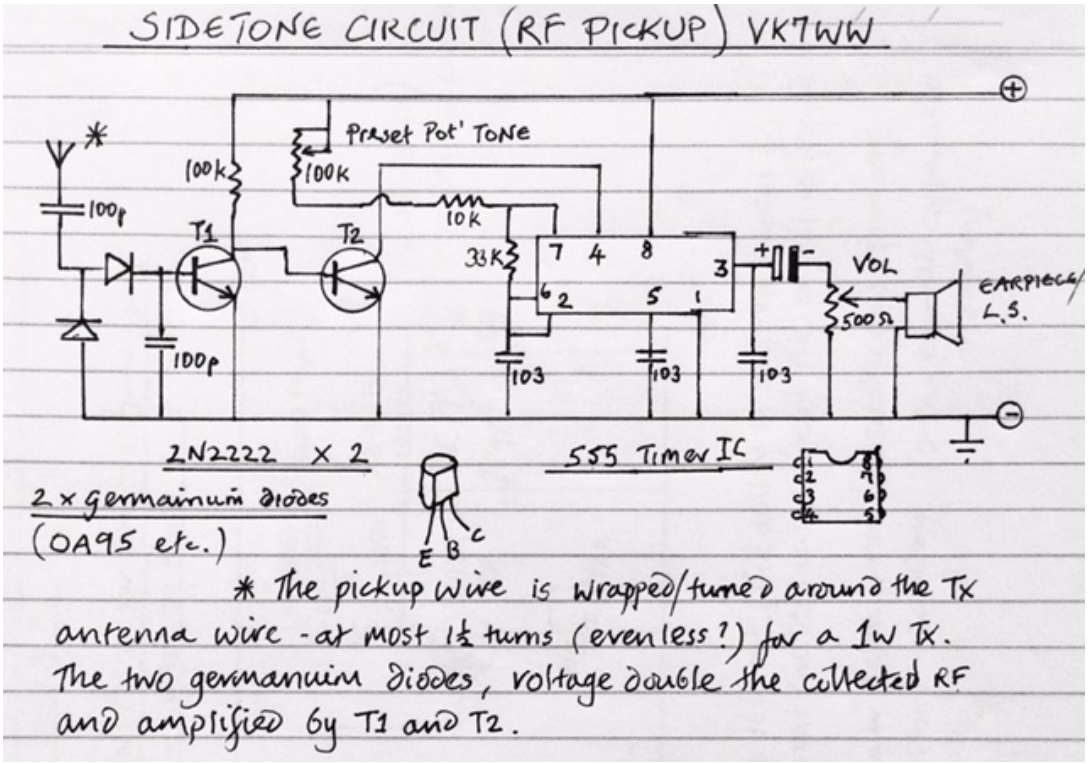
(NB. It is important to note that component values can be somewhat "flexible" at these LOW POWER Levels. This is not recommended for higher power levels e.g.5W and greater.)

5. Adding SIDETONE
Some operators may use a communications Rx (receiver) to listen to their Sidetone when they Tx CW, with an attenuator switched in, RF gain and volume turned down, and/or the Rx antenna shorted to ground. However, this can be awkward when switching back to receive; quite apart from risking damage to the front end of your solid-state Rx. (If you have an old valve or tube Rx, they are much more robust and can be confidently used for Sidetone.)

Here is a Sidetone circuit that can be used with any Tx. It is very sensitive and lends itself for QRP. (I claim no originality for the circuit as this is based on the work of Drew Diamond VK3XU and Peter Parker VK3YE.)



The circuit picks up a small amount of RF, that is rectified through the two diodes acting as a voltage doubler. The two transistors further amplify the voltage before it is used to turn on the 555 timer IC, that acts as a tone oscillator. The tone is adjusted by the 100k pre-set pot', and the volume by the 500 ohm pot. A small loudspeaker or headphone insert can be used.

This can be built in a stand-alone box or fitted inside the Tx. One turn of the RF pickup wire, or less! … is all that is needed for 1w or less. (See the WHITE Wire in the photo.)
No loss in RF output was noted.

Two building methods are shown, the Island or Blob Board (Paddy Board) method and the "Criss-Cross" or "Zig-Zag" saw cut method.

Another "CENT" update soon: (Notes on using a DDS for the "CENT" and a real 80m VFO with Buffer).
73 Nic, VK7WW.

See Photos Below:

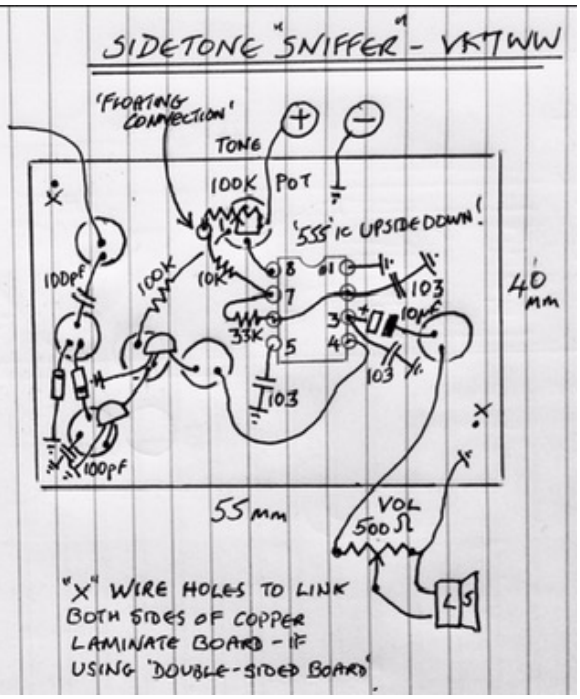
THE "CENT"

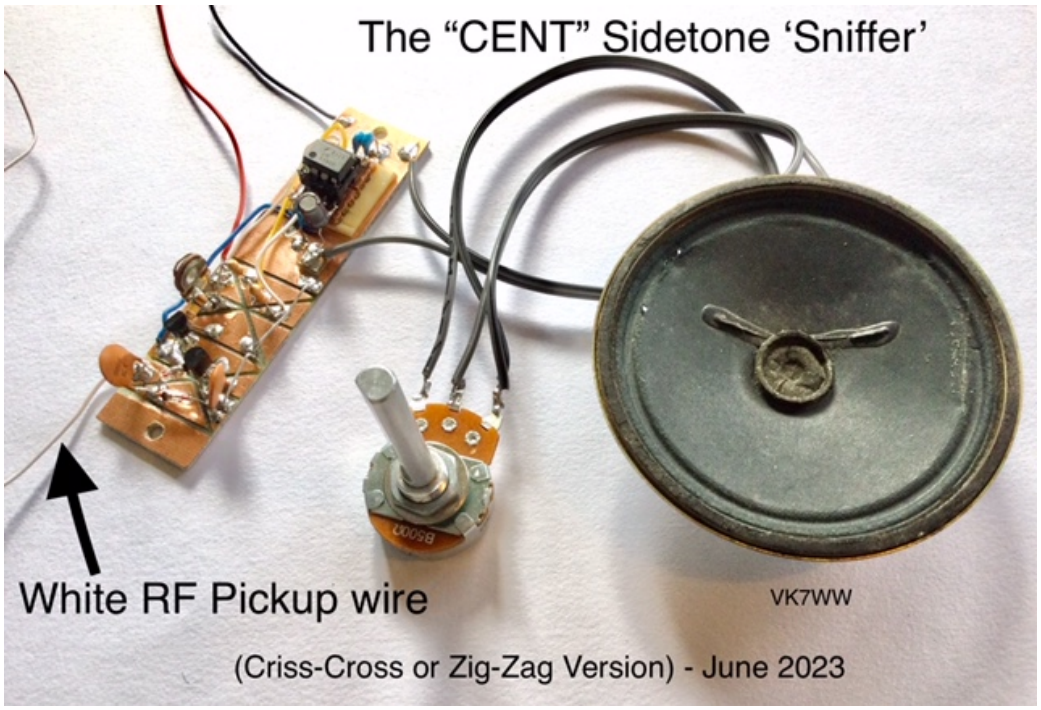
June 2023

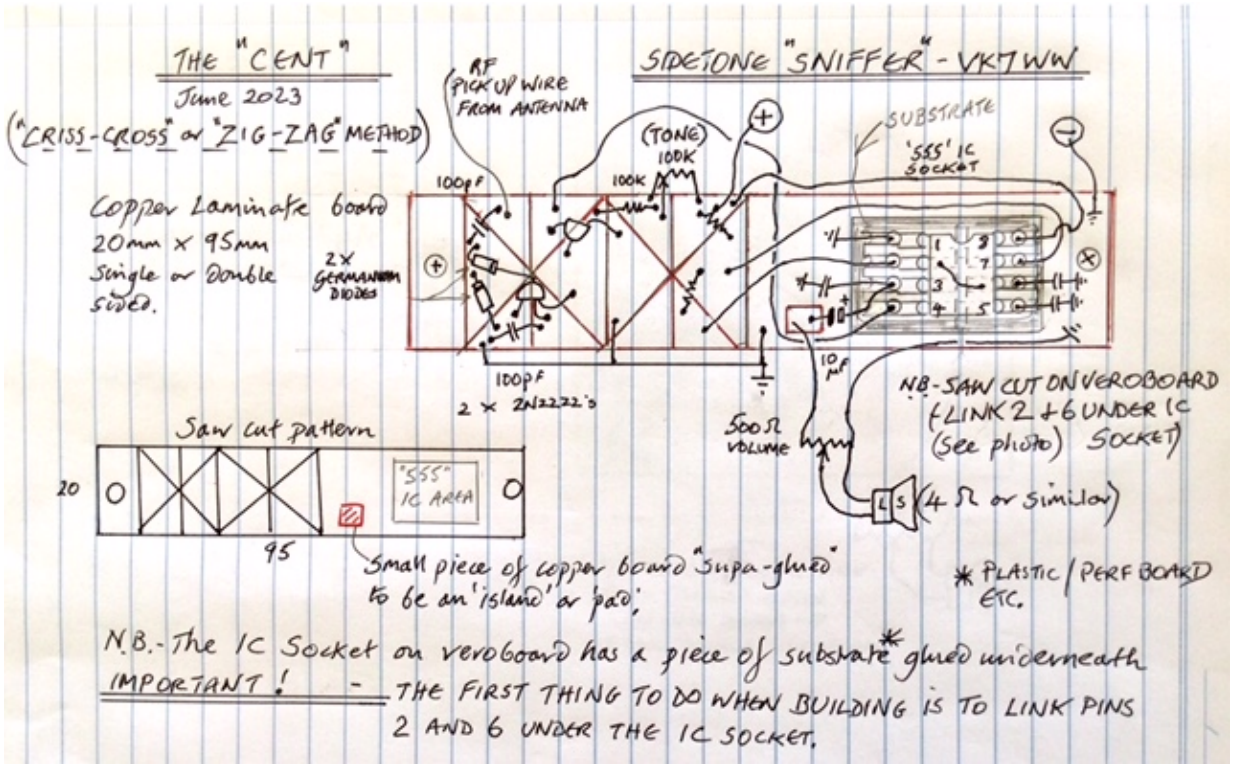
("ISLAND" OR "BLOB BOARD" METHOD)

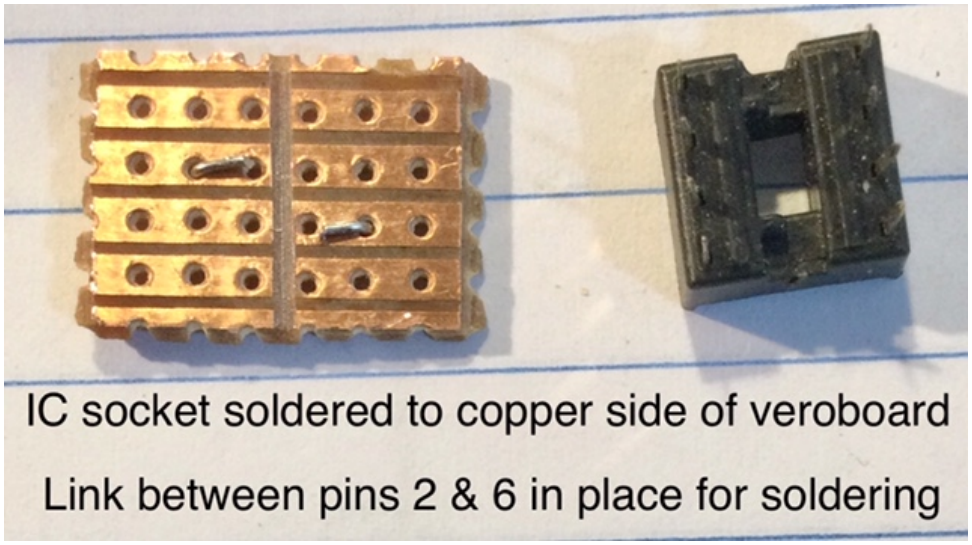
(Copper Laminate board single or double sided)

N.B. Use super-glue to glued IC onto board - use a pencil to mark pin No 1 !



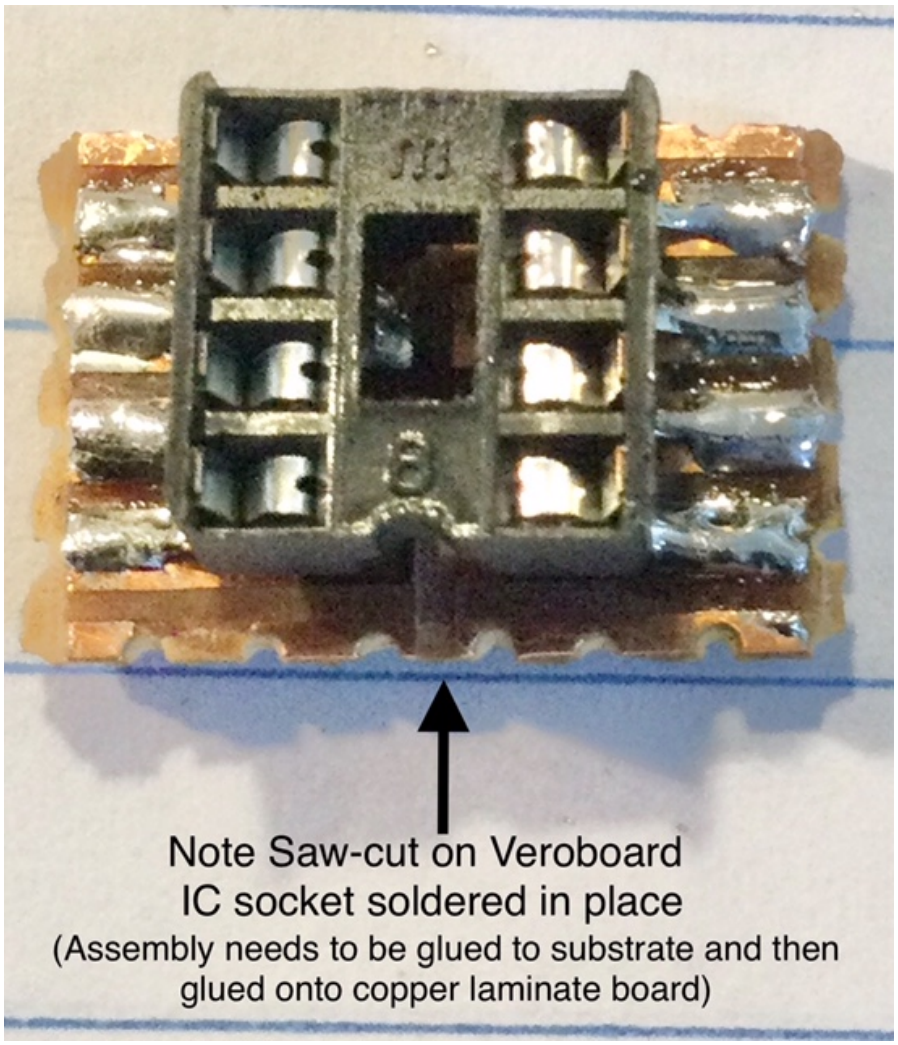

The “CENT” Sidetone ‘Sniffer’
White RF Pickup wire
VK7WW
(Criss-Cross or Zig-Zag Version) - June 2023


THE "CENT"
June 2023
("CRISS-CROSS" or "ZIG-ZAG" METHOD)
SIDETONE "SNIFFER" - VK7WW
RF PICK UP WIRE FROM ANTENNA
(TONE) 100K
100K
100pF
SUBSTRATE
'555' IC SOCKET
Copper Laminate board
20mm x 95mm
Single or Double sided.
2x GERMANIUM DIODES
100pF
2 x 2N2222's
10 µF
500Ω VOLUME
NB-SAW CUT ON VEROBOARD (LINK 2 & 6 UNDER IC SOCKET) (See photo)
Saw cut pattern
20
95
"555" IC AREA
LS (4Ω or similar)
Small piece of copper board "Supa-glued" to be an 'island' or 'pad'.
* PLASTIC / PERF BOARD ETC.
N.B.- The IC Socket on veroboard has a piece of substrate* glued underneath
IMPORTANT! - THE FIRST THING TO DO WHEN BUILDING IS TO LINK PINS 2 AND 6 UNDER THE IC SOCKET.

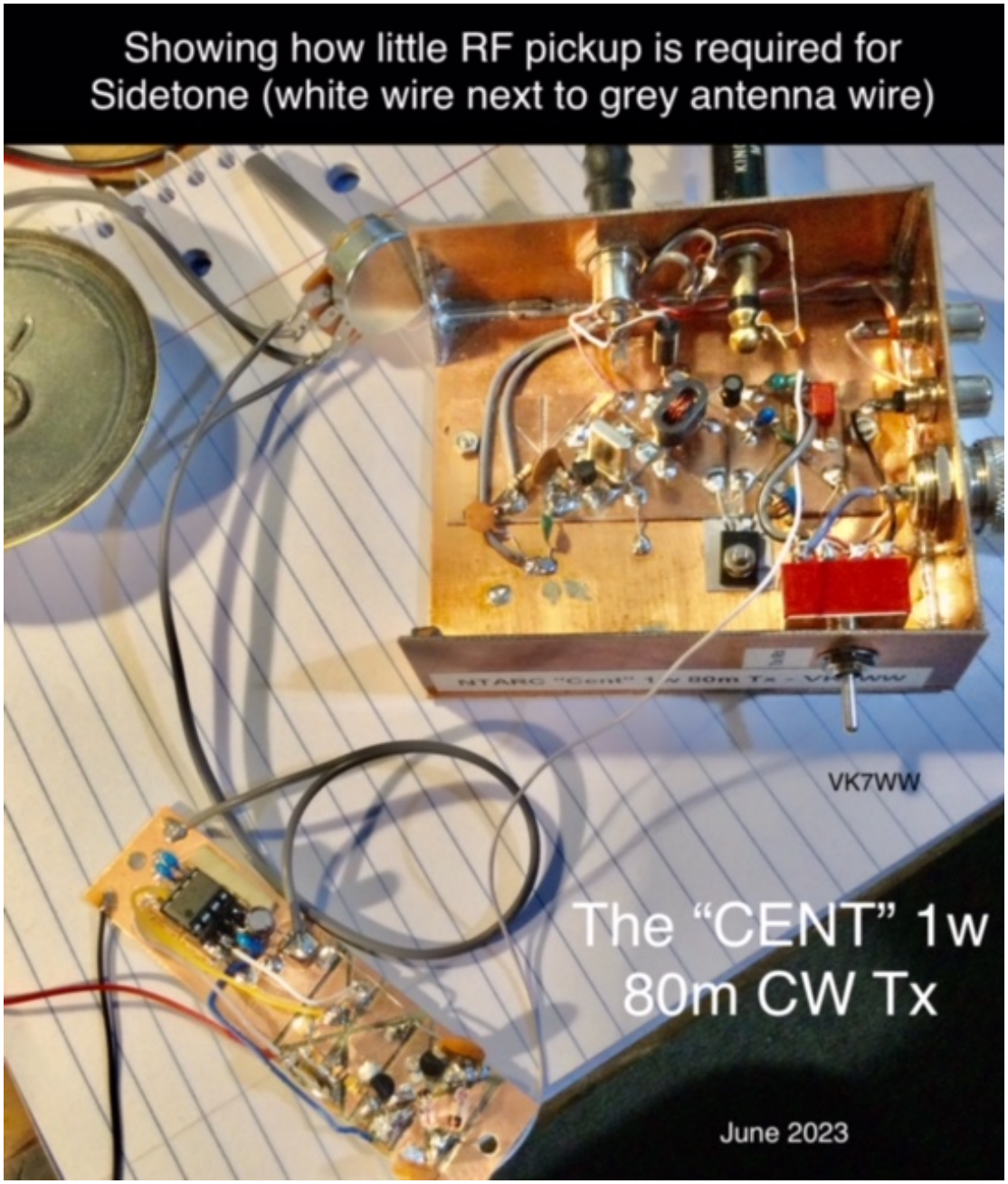


IC socket soldered to copper side of veroboard

Link between pins 2 & 6 in place for soldering



Note Saw-cut on Veroboard
IC socket soldered in place
(Assembly needs to be glued to substrate and then glued onto copper laminate board)


Showing how little RF pickup is required for
Sidetone (white wire next to grey antenna wire)
VK7WW
The “CENT” 1w
80m CW Tx
June 2023