AF 2 Tone Test Osc Design

TWO TONE AUDIO OSCILLATOR (Updated Jan 16)
(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

NEED

A two tone non harmonically related sine wave test oscillator is used for setting up & testing basic linearity of linear amplifiers & RF Tx stages, using a scope to see the RF waveform or AF/DC from a diode detector.

A simple solution may seem to use a DTMF encoder as it is a 2 tone generator. But for SSB testing the 2 tone levels need to be independently adjustable, to allow for the variation in mic response, mic amp response, & SSB filter shape etc. to ensure the exact balance through the RF stages so the desired RF test signal is obtained. However you may be lucky with the odd pair of DTMF tones being just right for your rig, so give it a try & see the IN USE bit.

MY DESIGN FEATURES

POWER :- This unit run from a 9V PP3
On 12V it charges the PP3.

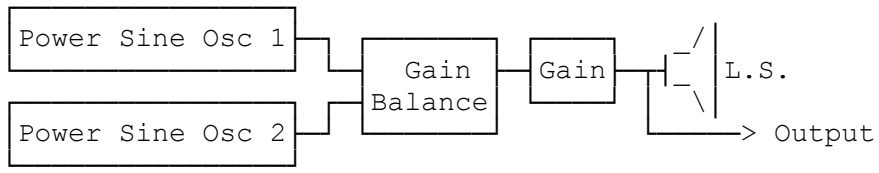
OUTPUTS :- Internal Hi Z LS (EARPIECE) high enough for acoustic coupling.
or jack for mic input hookup.

BALANCE :- A control for setting the relative tone levels
(as needed in Tx mixer for balance)

VOLUME :- A control for setting the AF output level for no Tx clipping.

RF IMMUNITY:- only 2 power transistor with base stoppers, so very immune.

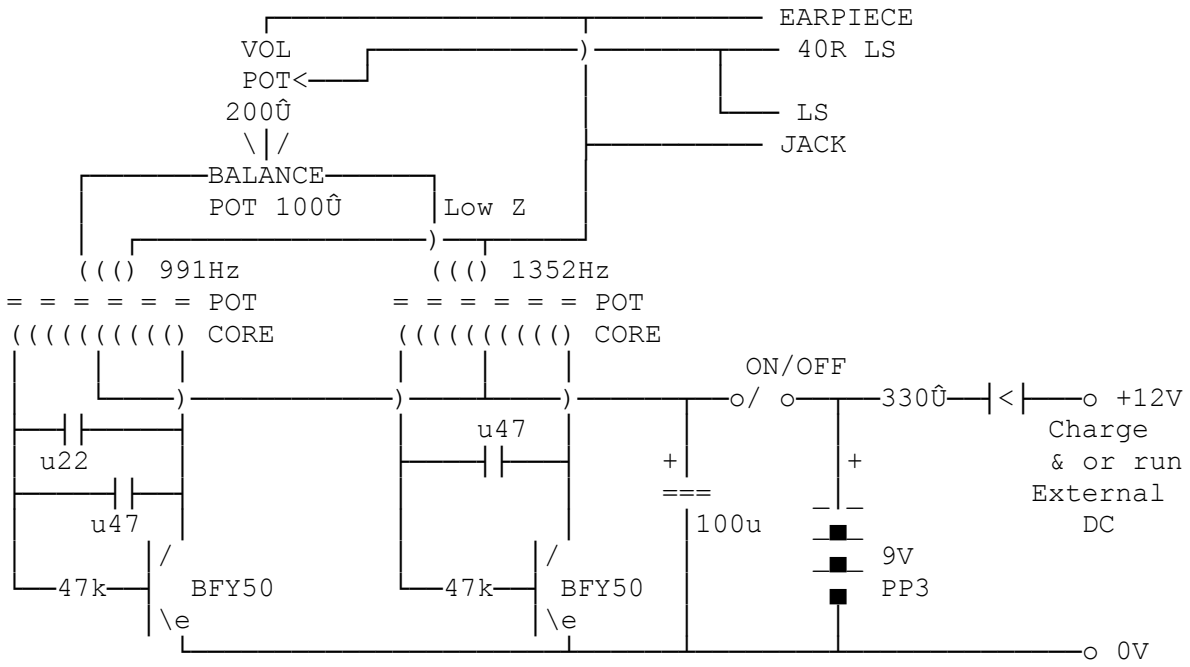
BLOCK SCHEMATIC



CIRCUIT

This uses 2 ferrite pot cores with 3 windings on each, 2 make a centre tapped winding of about 32 mH, & the other winding about 1/4 of the turns giving a low Z output. This forms the heart of the two power sine wave oscillators.

Each oscillator circuit is a single TO5 (BFY50) transistor connected in Hartley configuration with a tuning capacitor across each centre tapped winding. The 2 tones must not be mathematically related e.g. harmonics etc. Mine turned out to be 991 & 1352Hz. Each oscillator level is set by the 47k bias resistor located at the transistor base which also makes the transistor stage immune to RF!

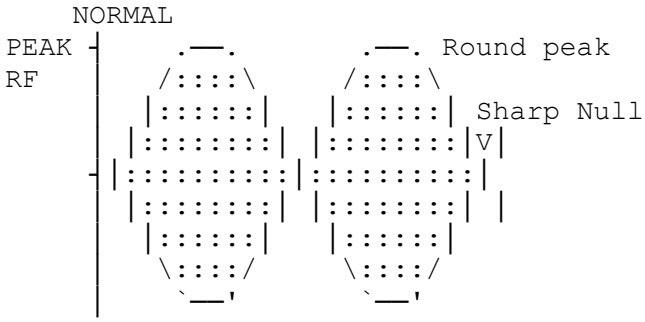


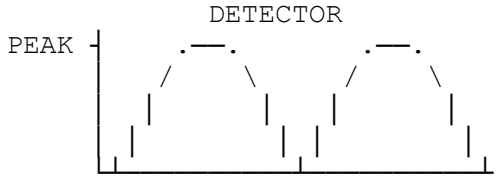
The output windings feed the balance pot that works like a stereo pot selecting the proportion of each tone. The tuned power oscillators have enough Q that the output coupling via the 100Û does not affect each oscillator frequency & the outputs are quite good sine waves.

The 200Û volume pot set the overall level in use. The internal LS was a old 40Û (4T) telephone earpiece that gives high AF level, ideal for putting next to the Tx's mic.

Construction can be on PCB or ugly, & housed in any plastic or metal box. But access to the controls is needed when a Tx mic is placed on top of the internal LS.

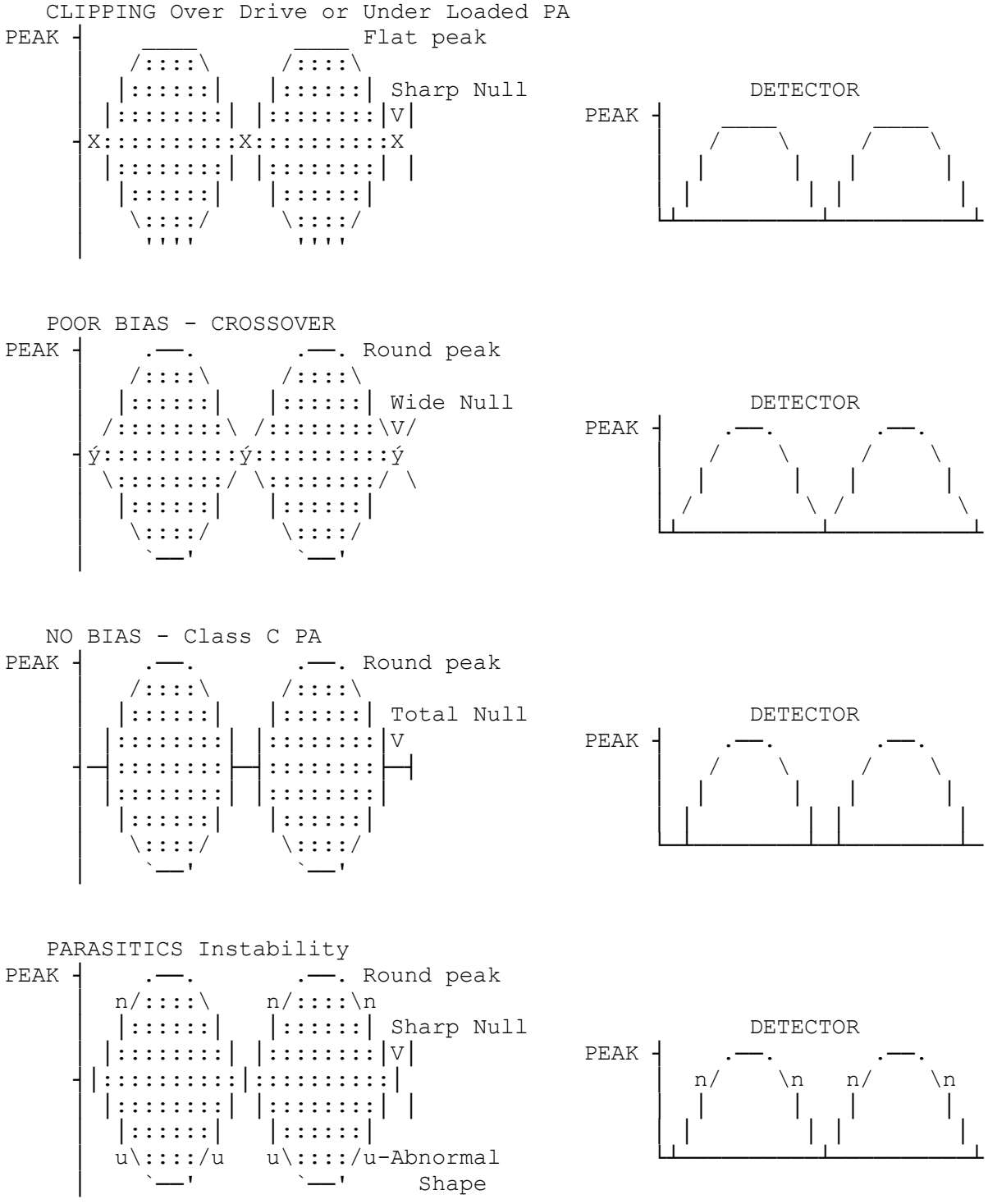
IN USE
Using into SSB Tx, the resultant output once balanced & not overdriven it looks like this on a scope as RF Envelope & as a loaded DC Detector display.





A scope connected to the RF output of a linear will produce the classic bridge rectifier envelope. This can even be done at VHF & UHF using a suitably loaded diode detector into the scope probe.

e.g.
Over drive ... shows up a flat topping of the envelope waveform.
Poor bias .... shows up as poor crossover on the envelope.
Instability .. at specific power levels shows up as fuzzy bits on the envelope.



See my Tech Bul "PA instability in ICOM IC735" & "QRO 1kW HF Metered Dummy Load".

Why don't U send an interesting bul?

73 De G8MNY @ GB7CIP