This is an add on for anyone who wants an optional automatic CW "K" PIP tone after each over. This used to be popular for short SSB overs under QSB/QRM conditions like during contests, as it stops doubling etc. & in my experience actually speeds up the contact with less contest orientated stations.

Other Morse letters are possible, but not exceeding 9 time slots that this circuit gives, see REPEATERS below.

It has an internal PP3 battery to run the unit while on Tx, which is very lightly trickle charged from the PTT line on Rx to maintain the battery.

Features include an LED showing PIP tone is armed (lit during Tx overs) & a "K" LED showing the K leaving.

CIRCUIT
COMPONENTS
C1,2,4,7,9.  10n   R1,2,3,5,6,10,11,12,13,15,16.  390kΩ
C3.  10p    R7,17,18,25.  10kΩ
C5.  47n    R8.  1MΩ
C6.  1n2    R4,9,14,19,20,21.  47kΩ
C8.  4n7    R22,23.  470Ω
C10.  10uF  R24.  100kΩ
D1-10  1N4148
IC1 4017 Cmos Ripple    LED1 Red
IC2 4011 4x Cmos Nand    LED2 Yellow
T1,2,5. Small signal PNP    SW1 Double pole C/O
T3,4,6. Small signal NPN

HOW IT WORKS
The On/Off switch, switches power & also re-routes the PTT line via steering diode D9 (in case the battery is flat). A light trickle charge for the battery via R27 & D10 is taken off the PTT line when on Rx whether the unit is switched on or off & is low enough current to be suitable for most dry cells.

When Mic PTT is low the LED1 lights via R22 & briefly pulses on T1 via C1 & R1 with C2 & R2 providing a power up pulse, T1 resets the ripple counter IC1 ready for the 1st CW clock pulse. The Mic PTT low also turns on PTT drivers T5 via R15 which turns on T6 via R17/18 to repeat the PTT condition to the Rig.

On release of the Mic PTT a long +ve pulse is feed into Gate A of IC2 via R7, C7 & discharged by R8. This enables the oscillator IC2 Gate A & B. With C5 & R10, R11 it oscillates around 27Hz which forms the "dot time" for the CW.

The CW CLOCK is filtered (kept clean on power up etc) with R5 & C3 to feed the ripple counter IC1. The "Q0" pin 3 output line is low from 0-10 count & is used to drive T5 via R16 for PTT as with the Mic while the "K" Pips are generated, & it also drives T2 via R6 to maintain the long CW CLOCK gate ON pulse.

Ripple outputs "Q1" to "Q9" Pins 2 4 7 = dash, 10 = gap, 1 = dot, 5 = gap, 6 9 11 = dash, are diode gated D1-D7 & R9 to make up the timings for the "K".

The +ve CW signals control the AF oscillator in the same way as the CW CLOCK. The AF oscillator is made from IC2 Gate C & D, & with the C6 & R12/13, it oscillates around 1kHz.

The square wave AF output from IC2D drives T4 via R19 to light the LED2 via R23 to indicate "K" is going out, & also feeds the AF to the Butterworth filter R20/21 & C7/8 to T3 emitter follower, to shape the tone to a near sine wave. T3 is only biased on by the mean DC level of the TTL output when present. T3 feeds the output level setting pot VR1 which in turn feeds the K tones to the Mic AF line via a DC blocking Cap C9 & a high value attenuator R24.

IN USE
This is not needed on FM as the squelch tail tells the end of overs quite well. But for weak fading SSB signals or under heavy QRM it gives a very clear & unambiguous end of the over, that like all CW can be easily heard compared to a voice ending.
REPEATERS

Lots more letters are possible for repeaters etc. without going into the complexity of computers & Pics etc. here with just a few more diodes & a pull down R per letter. But don't use more that 2 diodes in series to get a letter!


Letters that are NOT possible are.. J,O,P,Q,X,Y,2,3,4,6,7,8,9,0

A multi way logic selector etc, to select the letter before the AF osc to give... No modulation = no CW, K = OK, B = On Battery Power. L= Low Mod, H = High Mod, U = Freq Up, D = Freq Down, all depending on Modulation & FM Discriminator DC output etc..

Why Don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP