

Modified "Prospector" metal locator

The metal locator described in the November 1979 issue of EA is sometimes difficult to set to a low growl, as suggested, because of a spurious oscillation which can occur when the two oscillators are very close to being harmonically related. This arises because the D flipflop can sample the reference oscillator very close to the level transition points, with any phase jitter producing the spurious high frequency tone at the flipflop output.

By adding a 4013 dual D flipflop to the circuit the problem can be overcome. One half of the 4013 is used to divide the reference oscillator frequency by 2; while the second half is used to synchronise the edge transitions of the

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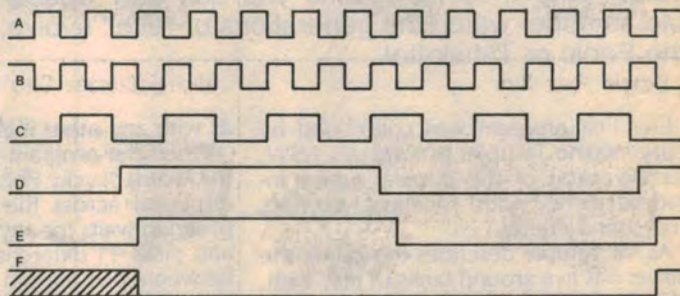
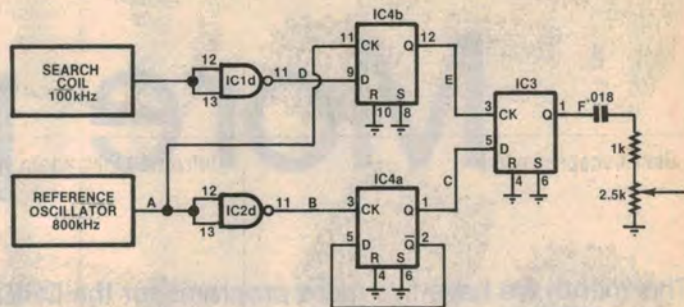
“Prospector” metal locator ctd . . .

search coil oscillator to the reference frequency.

Referring to the circuit diagram, the existing NAND gate IC2d is used as an inverter so that the clock inputs of the new flipflops, IC4a and IC4b, are driven out of phase. The result of this is that IC3, the existing flipflop, can only sample the output of IC4a midway between transitions. Note that this halves the effective reference frequency. But, whilst the sensitivity is thus slightly reduced, the modified metal locator still gives adequate sensitivity.

Modification of the unit is quite simple. The additional 4013 is mounted piggy-back fashion on top of the existing 4013. Pins 4, 6, 7, 8, 10 and 14 are soldered directly to the similarly numbered pins, whilst the remaining pins are bent at right angles and connected to the existing circuitry by flying leads. It is necessary to cut the tracks leading to pins 3 and 5 of IC3, and drill five holes in the printed circuit board to make connections to either side of these two

Circuit diagram for the modified “Prospector” metal locator. Waveform diagrams are shown for points A, B, C, D, E, F.



breaks, and to pin 12 of IC2d.

Operation of the modified metal locator is as described in the original article. The beat frequency should be set to

a low growl, so that the presence of metal leads to an increase in frequency.

D. Edwards,
Campsie, NSW.