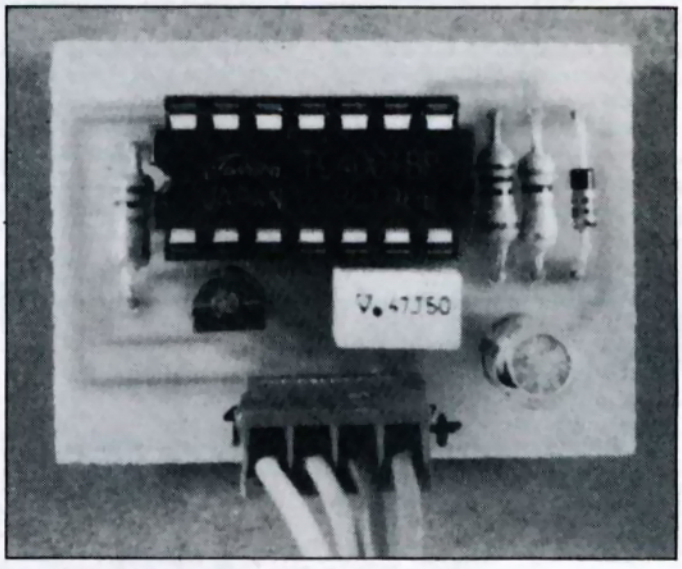
CHRONOSCOPE REVISITED



Paul Brow aims to please with this auto-reset addition to last year's fire-power project

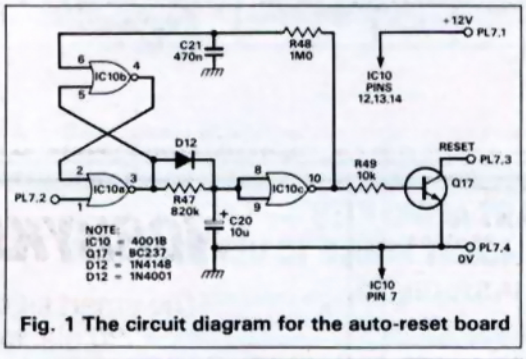


Fig. 1 The circuit diagram for the auto-reset board

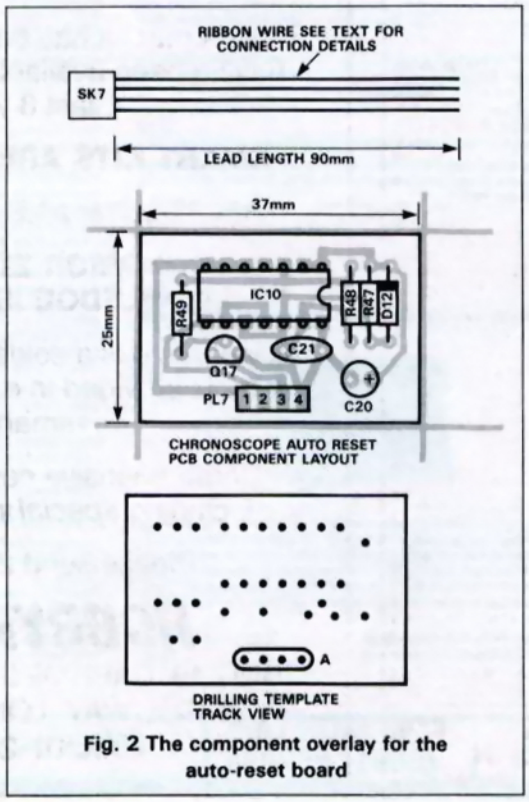


Fig. 2 The component overlay for the auto-reset board

It was last November that the complete design for the Chronoscope was published. It functioned as a self-contained unit that measured the velocity of an air pellet fired through the project case — preferably through the specially designed holes.

It was built on three PCBs: one for the counter, one for the display and the third for the sensors that had to reliably spot something travelling faster than . . . well as fast as a speeding bullet.

All well and good. However, while using the Chronoscope, I found that having to press the *reset* button after every shot was getting on my 'wires'! I had to do something about it, hence the circuit diagram in Fig. 1. Its function is to provide a reset pulse eight seconds after the shot was fired. This allows sufficient time to note the display reading and prepare to shoot again.

Construction

The circuit is constructed on a PCB about 25mm square and has a detachable lead, which is soldered to the other boards. After testing it can be stuck down inside the Chronoscope with double sided tape pads.

Connections

The new board has four connections to the existing Chronoscope boards. These are as follows:

Auto board pin 1 wire to C15 +ve on sensor board.

Pin 2 wire to R40 (end near D10) on sensor board.

Pin 3 wire to SW5 pins nearest edge of display board.

Pin 4 wire to C15 −ve on sensor board.

Solder the wires to the component side on the sensor board and to the track side of the display board.

After testing, stick the auto reset board down with double-sided tape in the space available.

UPDATE

HOW IT WORKS

When a pellet is fired through the Chronoscope, it is initially detected by D4-D6 and IC7b goes high momentarily, setting bistable IC8a.

The new board connects to the output of IC7b so this pulse also sets the bistable formed by IC10a and IC10b.

Prior to a trigger pulse, C20 would be fully charged keeping Q17 turned *off* via inverter IC10c. When the pulse sets the bistable, C20 slowly discharges into IC10a via R47 (taking about eight seconds to reach the switching threshold of IC10c). IC10c output now goes high, turning *on* Q17 (which resets the unit).

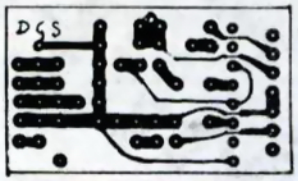
However IC10c output (delayed by half a second by R48/C21) also resets bistable IC10a/IC10b and recharges C20 via D12. The result of this is a short (0.5s) negative pulse on the reset line about eight seconds after a pellet is fired.

PARTS LIST

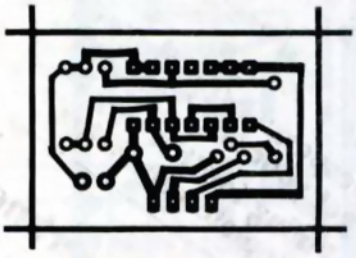
Component numbering continues from that used in the original article.

R47	820k
R48	1M0
R49	10k
C20	10µ 16V radial electrolytic
C21	470n miniature polyester
IC10	4001B
Q17	BC237 (BC107 or similar)
D12	1N4148
PL7	4-way pin header
SK7	4-housing and terminals

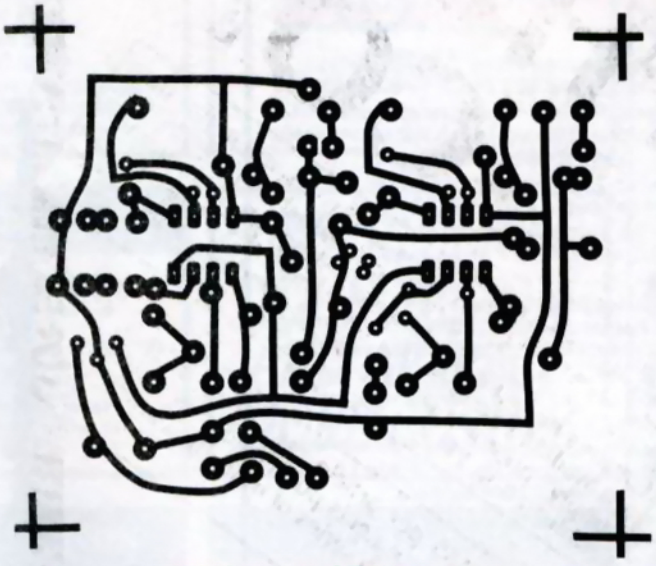
PCB. IC socket. 4-way ribbon cable.



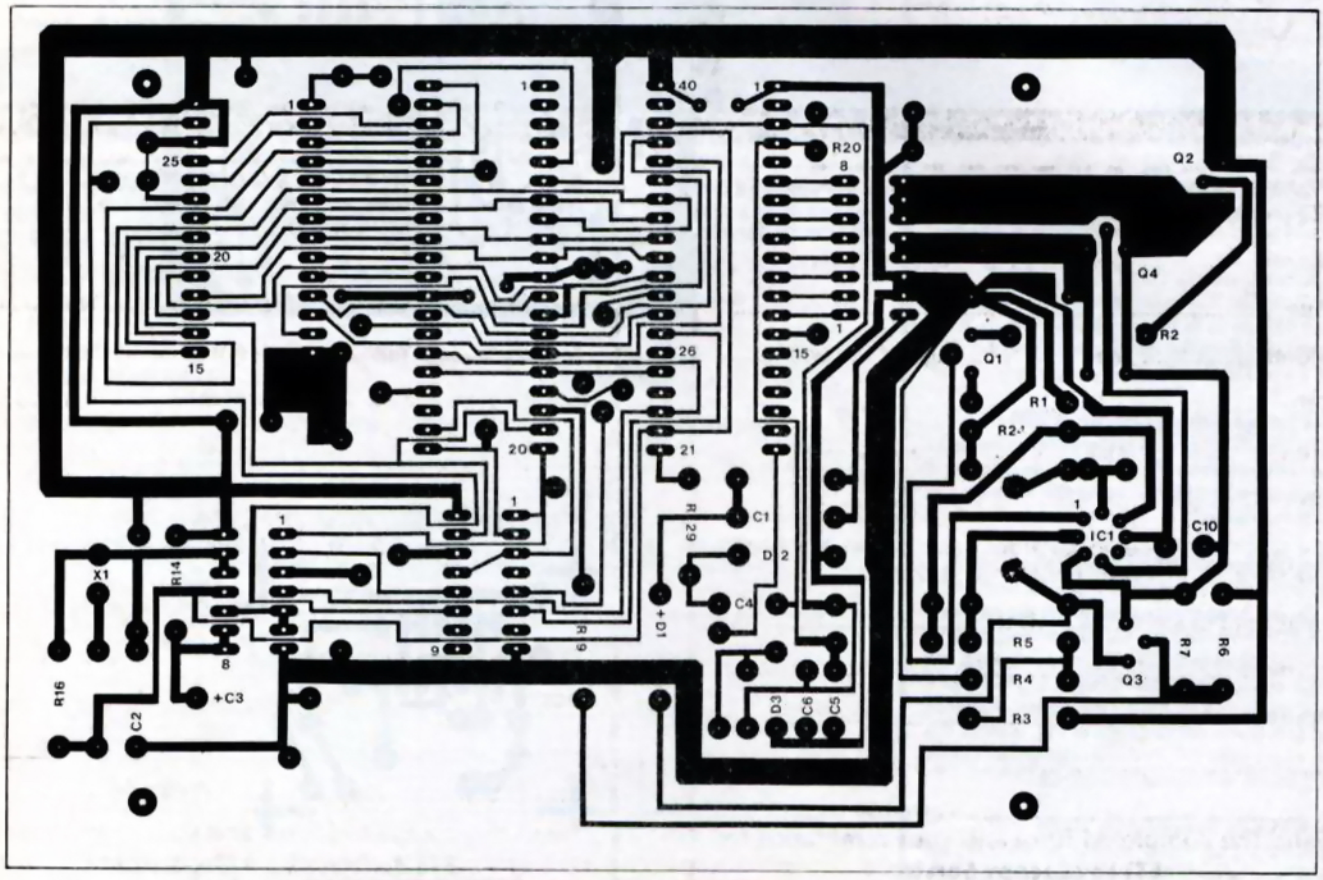
Field power supply foil pattern



Chronoscope auto-reset foil pattern



Active speaker foil pattern



The Polybel foil pattern