DIGITAL TRIGGER FOR OSCILLOSCOPES

A. Rigby

The circuit described here enables an oscilloscope to be triggered when a predetermined binary code word is applied to one of the circuit's inputs.

Integrated circuits IC1 and IC2 compare the 16 input levels with the code set by switches S1 and S2. If one of the inputs has a dataword that is equal for not less than 100 ns to that set by S1 and S2, pin 19 of IC1 goes high. Note that, because of the pull-up resistors, open inputs are treated as high.

When pin 9 of IC1 is high, monostable MMV2 is triggered and outputs a negative pulse from its pin 4. The length of this pulse is 0.1–1.5 µs, depending on the setting of P1. If during that time the predetermined trigger value disappears, no triggering takes place. Potentiometer P1 is a logarithmic type to enable very short times to be set accurately.

The output pulse from MMV2 triggers a second monostable, MMV1, whose monotime has been set to 1 µs by R23-C3.

Either the positive signal from the Q output or the negative signal from the $\overline{Q}$ output, depending on the setting of S3, may be applied to the oscilloscope.

The printed circuit board is relatively small. Most resistors are mounted upright. If difficult to obtain locally, the four single-in-line (SIL) resistor arrays may each be replaced by eight vertically fitted resistors whose top wires are cut short for connecting to a horizontally running wire to the +5 V line. ∎
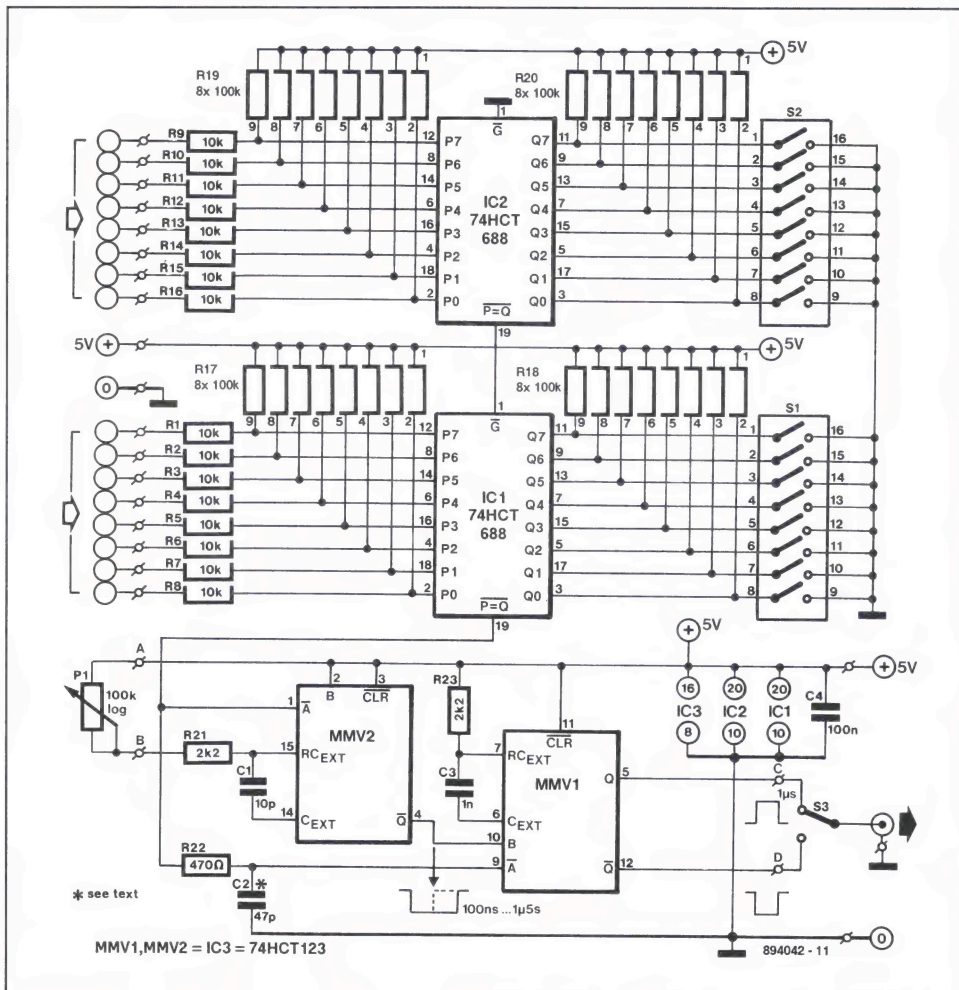
COMPONENTS LIST

Resistors:
R1–R16 = 10k
R17–R20 = 100k
R21;R23 = 2k2
R22 = 470 Ω
P1 = 100k logarithmic potentiometer

Capacitors:
C1 = 10p
C2 = 47p
C3 = 1n0
C4 = 100n

Semiconductors:
IC1;IC2 = 74HCT688
IC3 = 74HCT123

Miscellaneous:
S1;S2 = 8-way DIP switch.
S3 = miniature SPDT switch.
K1 = BNC socket.
Qty. 18: miniature test clip.
Enclosure: e.g., OKW A9010 065
PCB 894042