Quick 741 and 555 Tester

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Gone are the days when the ICs 741 and timer 555 were rare and expensive. Now these are the most frequently used ICs, even by an average hobbyist. These are very versatile and damage-resistant.

The tester described here tests both these ICs instantly and uses only a few resistors, switches, sockets and capacitors which cost only about Rs 20, excluding the PCB and the 7-segment display. This tester is equally useful for a shop or a factory.

Circuit description

As evident from the circuit diagram in Fig. 1, the heart of this tester is the astable multivibrator formed around IC 555

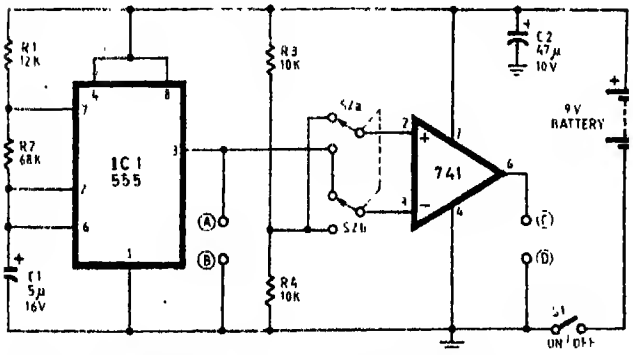

Fig. 1: Circuit diagram of 741 and 555 tester.

PARTS LIST

Semiconductors:	
IC1	555 timer
IC2	741 op-amp
D1, D2	5mm light emitting diode
DIS1	FND507/LT542 Common anode display
Resistors (all ¼ watt, ±5% carbon):	
R1	12-kilohm
R2	68-kilohm
R3, R4	10-kilohm
R5-R12	1-kilohm
Capacitors:	
C1	5µF, 16V electrolytic
C2	47µF, 10V electrolytic
Miscellaneous:	
S1	On/off toggle switch
S2	DPDT miniature switch for mounting on PCB
BATT.	9-volt, battery
	IC sockets, PCB, connecting wires, enclosure, hardware etc

with approximately 2 Hz frequency. So, the output LED D1 (as shown in Fig. 2) blinks at a rate of 2 Hz if the IC 555 inserted in the socket works well.

This output at pin 3 is also given through a DPDT switch to the pins 2 and 3 of IC 741 op-amp. The switch S2 selects the inverting or non-inverting input of the IC2. In this way the LED D2 (Fig. 2) also blinks at a 2Hz rate if the IC2 (741) inserted is OK.

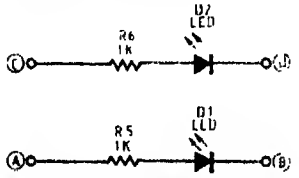

Fig. 2: Optional two LED display.

If S2 selects inverting mode, then D1 and D2 blink alternately and if S2 selects non-inverting mode then D1 and D2 blink simultaneously.

You may use 3V to 12V DC supply voltage safely. However, 9V DC is recommended.

Optional

As an interesting feature which gives a digital display

without any confusion, you may use a common anode seven segment display. With IC2 in inverting mode, the display shows 7 and 5 alternately. In the non-inverting mode it shows 9 and _, alternately.

Both, the two LEDs and digital display options are given in Fig. 2 and Fig. 3 respectively.

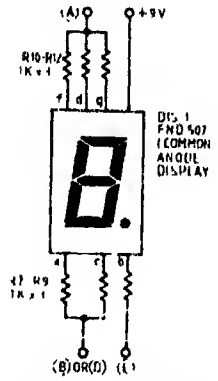

Fig. 3(a): Digital display using common anode seven-segment display.

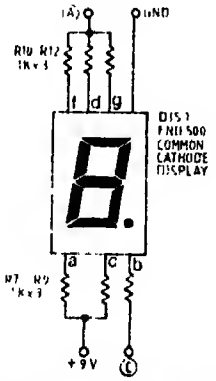

Fig. 3(b): Digital display using common cathode seven-segment display.

Fig. 4: Pin configuration of seven-segment display.

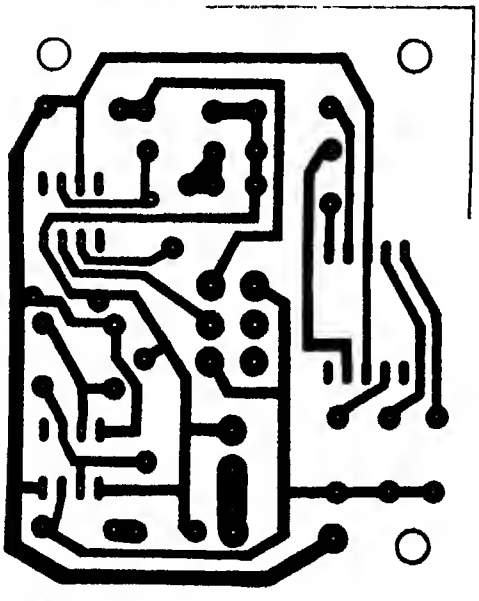

Fig. 5: PCB layout for the circuit.

You may use a common anode display having a damaged decimal dot and/or segment 'e' which are not used here. You may also use a common cathode display here by just interchanging the connections of common cathode from positive to the negative of the supply on the PCB (see Fig. 5) near the switch S2. Similarly, interchange the connections of R7 and R8 from negative to positive of the supply as shown in Fig. 3(b).

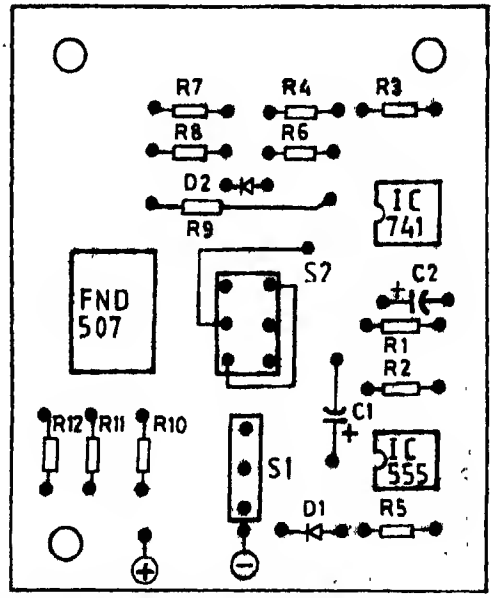

Fig. 6: Component layout for the PCB.

Testing

Put a new set of 741 and 555 and see on display the figures 7 — 5 and 9 — 7 at the flip of switch S2. The display blinks (shows 5 and 7 even in absence of 741) only if the IC 555 is OK. Anything else blinking on display implies a faulty IC 741. So keep a set of good ICs on board. Keeping one IC as good one, you can test the other type of ICs.

LAB NOTE: It has been noted that when both IC 741 and 555 are faulty or in non-operating condition, the display shows 7 (but there is no change in the display while changing the switch S2), and when IC 555 is working and 741 is in non-operating condition the display shows 5 and 7 alternately and when IC 555 is not working but 741 is alright, then display shows 7 in inverting mode and 7 in non-inverting mode, but does not flash. □

Have You Any Idea?

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2. The circuit has been tried by you and was found to work satisfactorily.