Long Delay Timer with Real-Time Clock Display

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Often we forget to switch-off the water pump on time and it results in overflow of water from the overhead tank. Fortunately, there are many solutions available for switching-off the motor automatically. Most water-level controllers require a level monitoring system for the tank, which is not so easy to install due to complicated electrical connections.

One of the simplest alternatives is a countdown timer circuit described here. This circuit shows the real-time clock in hours, minutes and seconds, with AM/PM on LCD display. It eliminates the use of additional peripherals like DS1307 RTC and I²C bus programming. Thus, cost of the circuit is reduced significantly as compared to other real-time clock circuits.

Circuit and working

The circuit diagram of a long delay timer with real-time clock display is shown in Fig. 1. The circuit consists of three push-button switches (S1, S2 and S3), one on/off switch (S4) and LCD display. The heart of the circuit is AT89C51 microcontroller (IC2).

AT89C51 microcontroller. AT89C51 is a CMOS 8-bit microcontroller having 4kB Flash memory, 128 bytes of RAM, 32 I/O lines, five-vector two-level interrupt architecture, two 16-bit timers/counters, full duplex serial port, on-chip oscillator and clock circuitry.

It is used to run both the real-time clock and countdown timer. One of its internal timers is used to configure the countdown timer. The four ports of the microcontroller are used as I/O pins. The push-button switches are connected to port pins P1.0, P1.1 and P1.2, respectively. The buzzer is connected to port pin P3.0 through transistor T1 (BC547). On/off switch S4 is connected to port P1.3 for controlling the timer and buzzer. Pins 18 and 19 of IC2 are connected to a 12MHz crystal oscillator and capacitors C1 and C2 (22pF each).
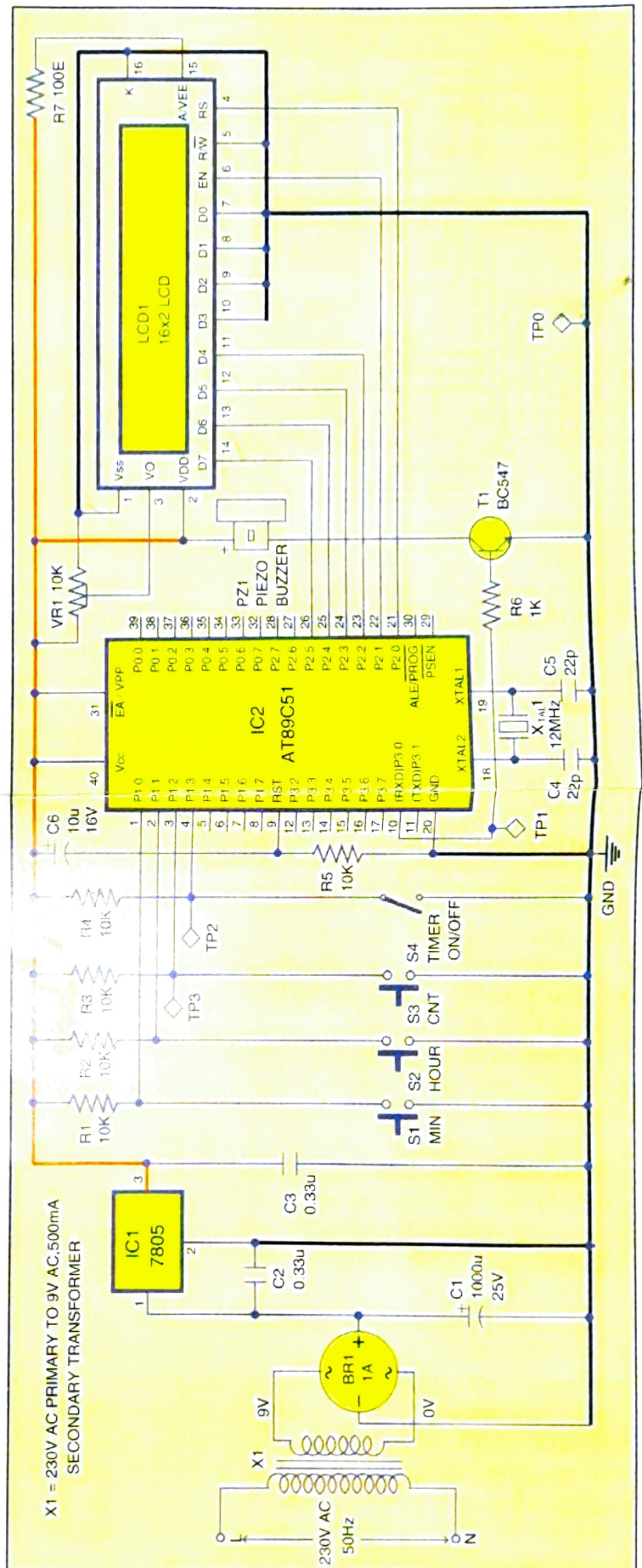

Fig. 1: Circuit of the long delay timer with real-time clock display