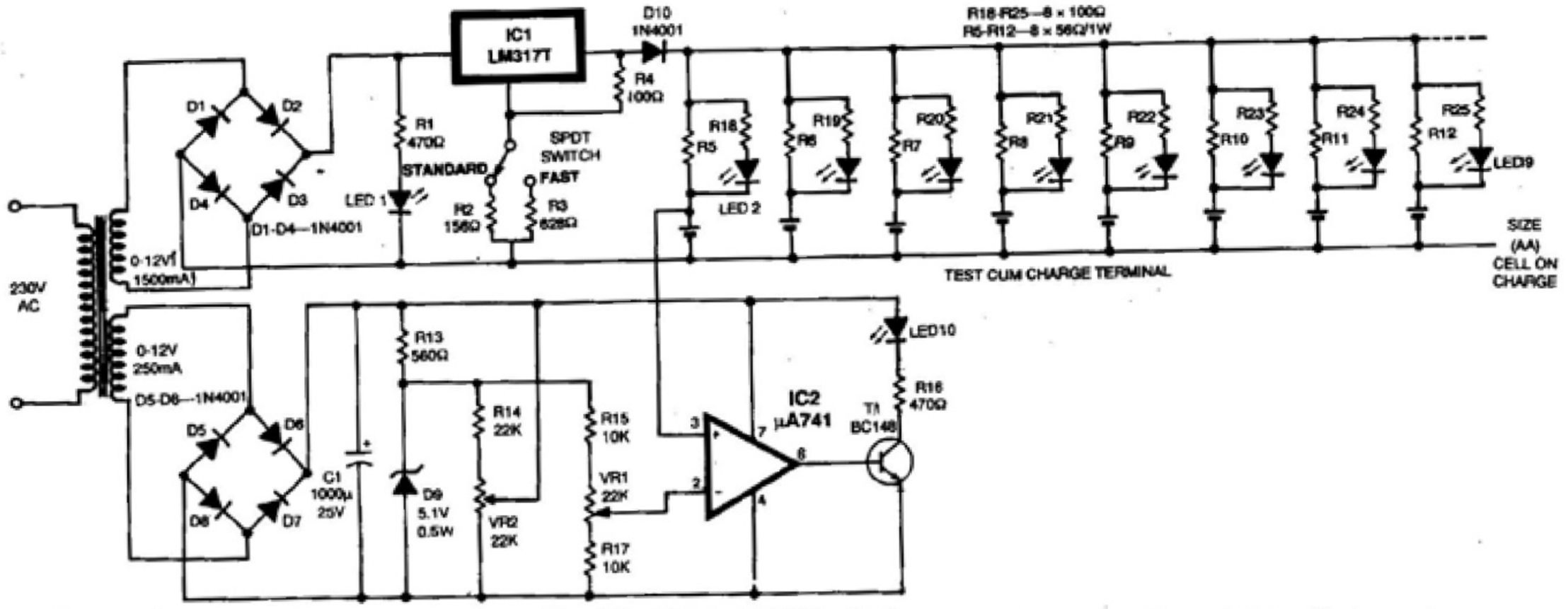


the main supply.

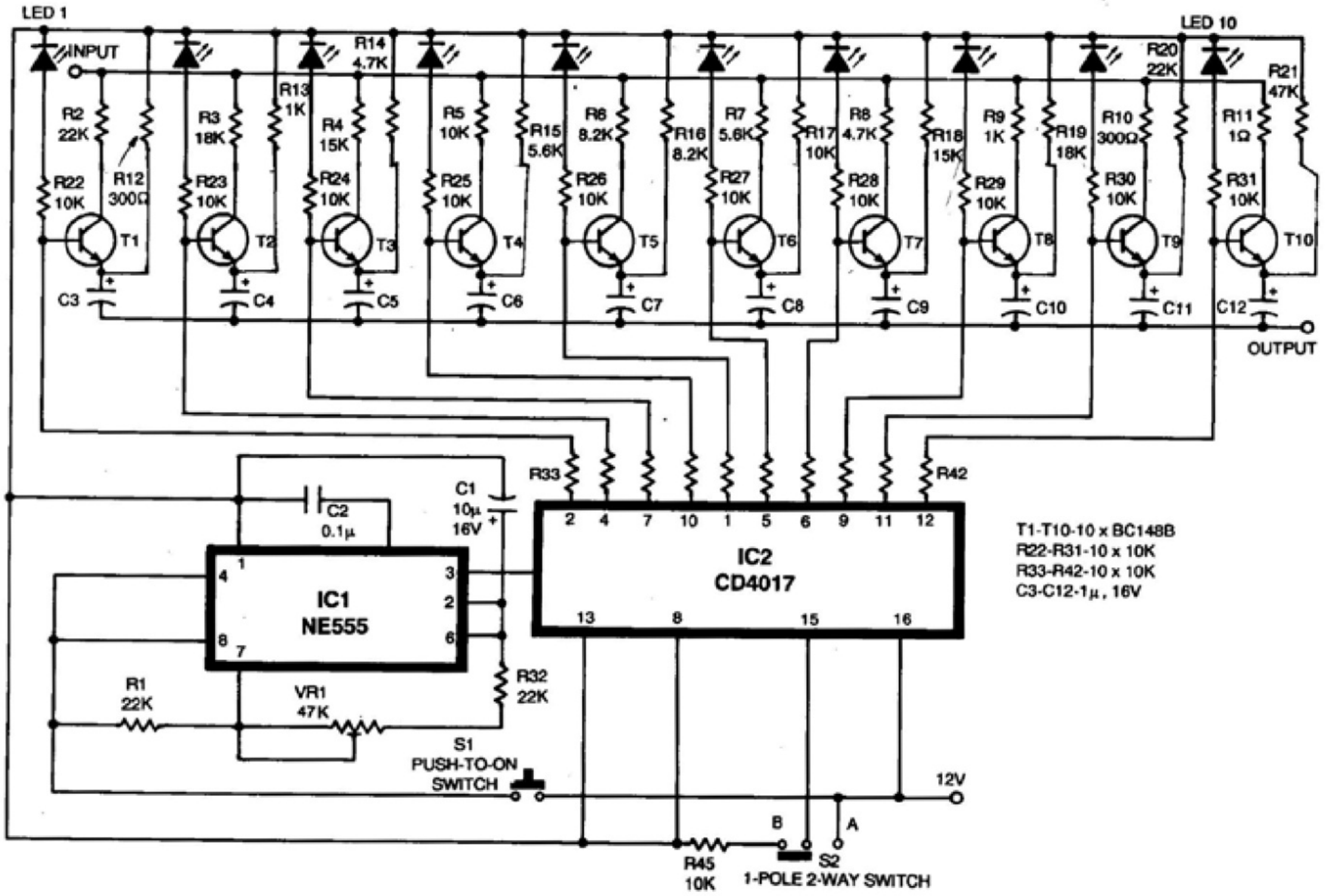
The transformer has two separate windings of 0-12V on the secondary side—the first being for the charging circuit and the second for the monitoring circuit. IC LM317T variable voltage regulator is the heart of the circuit which selects between the standard and the quick charging modes. Diode D10 blocks the reverse flow of current during mains off while R5 to R12 limit the current. Comparator IC2 µA741 compares the reference voltage with the monitoring voltage. When these are equal LED2 starts glowing, indicating full-charge condition. The monitoring circuit monitors only one cell at a time. A multi-way switch can be used to monitor the other cells.

This circuit can be used for charging more than eight cells by using a transformer and semiconductors of higher current capacity. IC LM317T should be used with a suitable heatsink. For the adjustment of VR2, adjust VR1 to read 3V and then connect a fully charged Ni-Cd cell in the test cum charge terminal. Adjust VR2 till LED10 just starts glowing. ❑

Digital Volume Controller

Umesh Kumar Pushkarna

The circuit shown here is based on the switching action of transistors. Volume of a stereo deck can be controlled with the help of a potentiometer which changes the resistance between the output of the preamplifier and input



of the amplifier. This can be done with the help of decade counter IC 4017 and some transistors.

The input is applied at collectors and the output is taken from emitters of the transistors. Depending upon the output of IC 4017, the corresponding transistor gets saturated. Output from the emitters is taken through a coupling capacitor to block the DC components. When pin 4 of IC 4017 goes high, the corresponding transistor (T2) gets saturated and the input signal is directly fed to the output through the collector resistance.

To start with, press switch S1. The timer IC (IC 555) will start generating pulses at equal interval of time which are fed to IC2. Depending on the output of IC 4017 the transistor is selected. When desired volume is reached, release the switch.

To reset the counter, switch S2 is brought to position A.

The time period of the output pulses can be set, using the formula

$T_d = 0.693 (R1 + 2VR1 + 2R32) C1$ seconds.

The circuit costs around Rs 60.

Phase Sequence Change Indicator

Biju M.J.O.

In electric motors, phase sequence in 3-phase configuration is very important. Change in phase sequence may cause trouble in machines. Here is a circuit which indicates the change in phase sequence by a beeper or an LED.

Transistors T1, T2 and T3 are used to square the 3-phase waveforms. The resistor value should be such that the transistor gets fully saturated when the base voltage becomes 10V. During negative cycle, the diode at the base keeps the reverse voltage below 0.6V.

It is assumed that if the phase sequence is correct, the red-phase lags