Bedside Lamp Timer
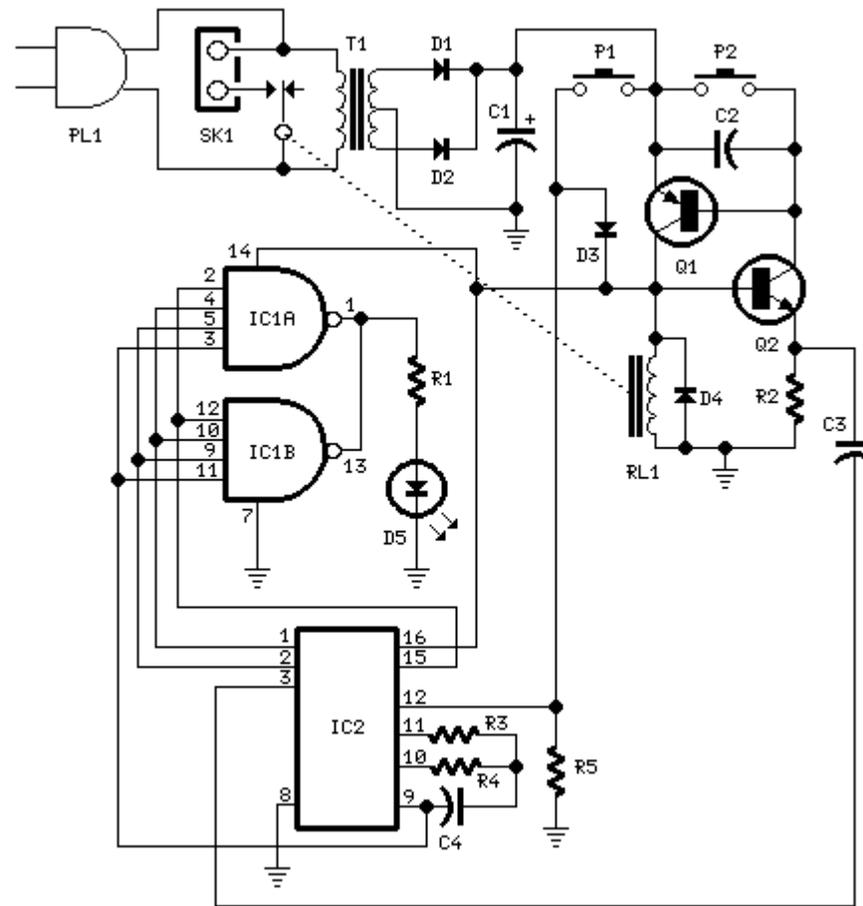
source:

30 minutes operation

Blinking LED signals 6 last minutes before turn-off

Parts:

R1_____1K 1/4W Resistor
R2_____4K7 1/4W Resistor
R3_____10M 1/4W Resistor
R4_____1M 1/4W Resistor
R5_____10K 1/4W Resistor

C1_____470˘F 25V Electrolytic Capacitor
C2-C4____100nF 63V Polyester Capacitors

D1-D4____1N4002 100V 1A Diodes
D5_____5mm. Red LED

IC1_____4012 Dual 4 input NAND gate IC
IC2_____4060 14 stage ripple counter and oscillator IC

Q1_____BC328 25V 800mA PNP Transistor
Q2_____BC238 25V 100mA NPN Transistor

P1,P2____SPST Pushbuttons

T1_____220V Primary, 9 + 9V Secondary 1VA Mains transformer

RL1_____10.5V 470 Ohm Relay with SPDT 2A 220V switch

PL1_____Male Mains plug

SK1_____Female Mains socket

Device purpose:

The purpose of this circuit is that of power a lamp or other apparatus for a given time (30 minutes in this case), and then to turn it off. It's useful when reading at bed by night, turning off the bedside lamp automatically in case the reader falls asleep... After turn-on by P1 pushbutton, an LED lights for c25 minutes, but 6 minutes before the turn-off, start blinking for two minutes, then stop blinking for other two minutes and finally blinks for

other two minutes, thus signaling that the on-time is ending. If the user want to prolong the reading, can earn another half-hour of light by pushing on P1. Turning-off the lamp at user's ease is obtained pushing on P2.

Circuit operation:

Q1 and Q2 forms an ALL-ON ALL-OFF circuit that in the off state draw no significant current. P1 starts the circuit, the relay is turned on and the two ICs are powered. The lamp is powered by the relay switch, and IC2 is reset with a positive voltage at pin 12. IC2 start oscillating at a frequency settled by R4 and C4. With the values shown pin 3 goes high after c30 minutes, turning off the circuit via C3. During the c6 minutes preceding turn-off, the LED does a blinking action by connections of IC1 to pins 1,2 & 15 of IC2. Blinking frequency is provided by IC2 oscillator at pin 9. The two gates of IC1 are in parallel to source an higher current. If needed, a piezo sounder can be connected at pins 1 & 14 of IC1. Changing IC2 brand name, varies the oscillation frequency. In particular Motorola's ICs run faster. Obviously, time can be varied changing C4 and R4 values.