

Automatic Curtain Opener



Ton Smits (The Netherlands)

This circuit can be used with a timer clock to open and close curtains or (vertical) Venetian blinds. The curtain or blind is driven by an electric motor with a reduction gearbox fitted to the control mechanism of the curtain or blind. This circuit is ideal for giving your home an occupied appearance while you are away on holiday or for some other reason. In the author's house, this arrangement has provided several years of trouble-free service on a number of windows fitted with Venetian blinds.

The original design was a simple relay circuit with pushbuttons for opening and closing

and reed switches acting as limit switches. The mechanical drive is provided by a small DC motor with a reduction gearbox and pulley (all from Conrad Electronics).

It was later modified to work automatically with a timer clock. The timer operates a small 230-VAC (or 120-VAC) relay with a changeover contact. Thanks to the two timers, the motor stops after a few seconds if one of the reed switches is missed due to a mechanical defect.

The circuit works as follows (see Figure 1).

In the quiescent state, relays RE1–RE3 are de-energised and the motor is stopped.

Open the blind:

When the timer clock applies power to the 230-V (120-V) relay RE3, the voltage at the junction of C1 and R1 goes high. IC1 (a 555) then receives a trigger pulse on pin 2, which causes its output (pin 3) to go High and energise RE1, which in turn causes the motor to start running. When the magnet reaches reed switch S1 ('Open'), the 555 is reset. If the reed switch does not operate for some reason, the relay is de-energised anyhow when the monostable times out (time delay = 1.1 RC; approximately 5 seconds).

Close the blind:

The timer clock removes power from RE3, which causes a trigger pulse to be applied to

the other 555 timer (IC2) via R5 and C4. Now the motor starts running in the other direction. The rest of the operation is the same as described above for opening the blind.

Diodes D2 and D5 prevent the outputs of the 555 ICs from being pulled negative when the relay is de-energised, which could otherwise cause the timer ICs to malfunction.

All components of the mechanical drive come from Conrad Electronics [2]: a motor with a reduction gearbox (type RB32, order number 221936) and a pulley (V-belt pulley, order number 238341) on the output shaft. An O-ring is fitted to the pulley to provide sufficient friction with the drive chain of the Venetian blind. The magnet for actuating the reed switches is a rod magnet with a hole in the middle (order number 503659), and the chain of the Venetian blind is fed through this hole.

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Internet Links

[1] www.elektor.com/090150

[2] www1.conrad-uk.com

