Ahsanullah University of Science and Technology

Dept. of EEE

Measurement and Instrumentation Project

Project Name: Turning On A Load With Adjustable Minute Timer

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Switching On a Load with Adjustable 1-10 Minute Timer

The adjustable timer circuit starts timing when switched on. The green LED lights to show that timing is in progress. When the time period is over the green LED turns off.

The time period is set by adjusting the variable resistor. It can be adjusted from 1 to 10 minutes (approximately) with the parts shown in the diagram.

It should be noted that the range of time periods is only approximate. With perfect components the maximum time period should be 4½ minutes, but this is typically extended to about 10 minutes because the 220µF timing capacitor slowly leaks charge. This is a problem with all electrolytic capacitors, but some leak more than others. In addition the actual value of electrolytic capacitors can vary by as much as ±30% of their rated value.

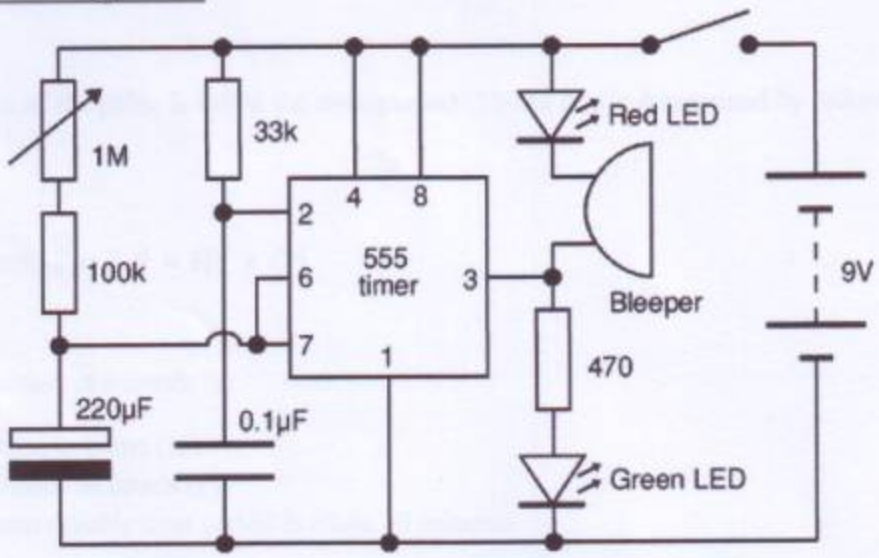
This project uses a power-on triggered 555 Monostable Circuit.

After setting a specific time with this adjustable timer we can turn on a load (e.g. light, fan etc)

Parts Required:

- resistors: 470, 33k, 100k
- variable resistor: 1M
- capacitors: 0.1µF, 220µF 16V radial
- LEDs: red, green
- bleeper 9-12V
- 555 timer IC
- 8-pin DIL socket for IC
- on/off switch
- battery clip for 9V PP3
- stripboard 10 rows × 22 holes
- load (e.g. light, fan, etc)

Circuit diagram



Principle of operation of 555 timer IC

A monostable circuit produces a single output pulse when triggered. It is called a monostable because it is stable in just one state: 'output low'. The 'output high' state is temporary.

The waveforms in figure 1 illustrate the operation of a monostable. A monostable circuit produces one pulse of a set length (time period T) in response to a trigger input such as a push button. The output of the circuit stays in the low state until there is a trigger input, hence the name "monostable" meaning "one stable state".

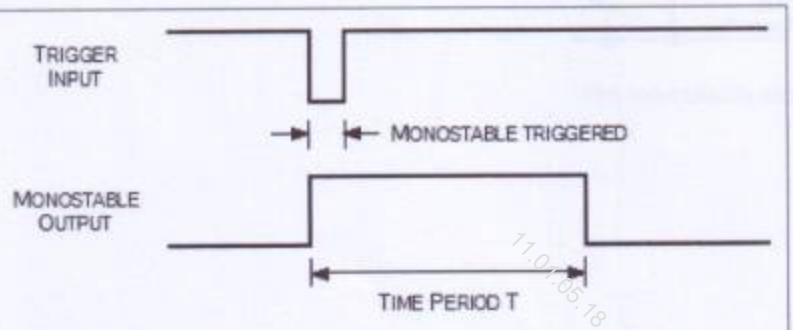


Figure 1: The monostable input and output waveforms

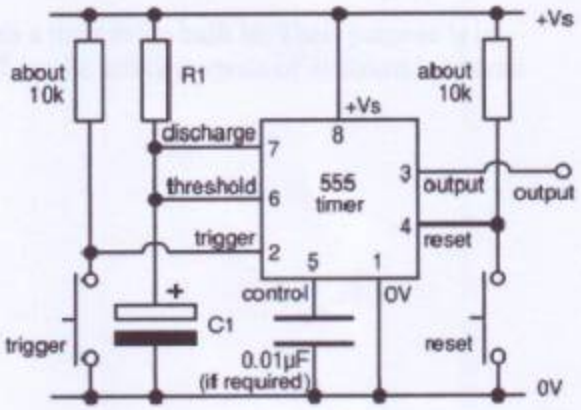
The duration of the pulse is called the **time period** (T) and this is determined by resistor R1 and capacitor C1;

time period, **T = 1.1 × R1 × C1**

T = time period in seconds (s)

R1 = resistance in ohms (Ω)
C1 = capacitance in farads (F)
The maximum reliable time period is about 10 minutes

- **Choose C1 first** (there are relatively few values available).
- **Choose R1** to give the time period you need. R1 should be in the range 1kΩ to 1MΩ, so use a fixed resistor of at least 1kΩ in series if R1 is variable. .



555 monostable circuit with manual trigger

Applications:

1. This can be equipped with a type of shock absorber that does not allow full power to flow immediately. Power is delayed and allowed to flow slowly in or out of the coil. Here are a few uses of timers, which are utilized especially in the industrial environment.

2. Several lamps today make use of timer to switch themselves off and on again after a little while. However, two time delay relays are required for a lamp to do this; they need to work simultaneously in order to give the lamp uniform frequency and measure time for the light that is omitted by the lamp.

3. By using a minute timer it can be ensured the safety of many electronic devices.

This minute timers are used to control relays with a time delay built in. Their purpose is to control an event based on time. It is mainly used for the safety purpose of different industrial sectors.