555 Timer

Pins

From Wikipedia:

Pin   Name   Purpose
1   GND Ground reference voltage, low level (0 V)
2   TRIG The OUT pin goes high and a timing interval starts when this input falls below 1/2 of CTRL voltage (which is typically 1/3 of VCC, when CTRL is open).
3   OUT This output is driven to approximately 1.7 V below +VCC or GND.
4   RESET   A timing interval may be reset by driving this input to GND, but the timing does not begin again until RESET rises above approximately 0.7 volts. Overrides TRIG which overrides THR.
5   CTRL   Provides "control" access to the internal voltage divider (by default, 2/3 VCC).
6   THR The timing (OUT high) interval ends when the voltage at THR is greater than that at CTRL (2/3 VCC if CTRL is open).
7   DIS   Open collector output which may discharge a capacitor between intervals. In phase with output.
8   VCC Positive supply voltage, which is usually between 3 and 15 V depending on the variation.

From https://www.youtube.com/watch?v=SX01x1z7fTY (Excellent youtube on 555)

555 Timers – Pin explanation

- **Pin 8 – POWER-** Connect to +V
- **Pin 1 – 0V –** Connecto to Zero volts (-Ve)
- **Pin 2 – TRIGGER –** Pulling this pin LOW will start the timing . – Can be done with a switch (see monostable circuit) or by its own circuit (connect 'discharge' pin 6 to pin 2)
- **Pin 3 – OUTPUT –** This is connected to whatever you are trying to control or 'time' with a timer. – It could be an LED or a speaker, maybe even a motor
- **Pin 5 – CONTROL–** Not really used for 90% of GCSE projects – Ignore.
- **Pin 4 – RESET –** Connecting this pin LOW means the chips 'timing' will reset. – This pin should be held HIGH if the chip is to operate.
- **Pin 6 – THRESHOLD –** This pin monitors the 'voltage' across the capacitor and therefore is measuring the 'time' it takes the capacitor to fill 2 thirds full
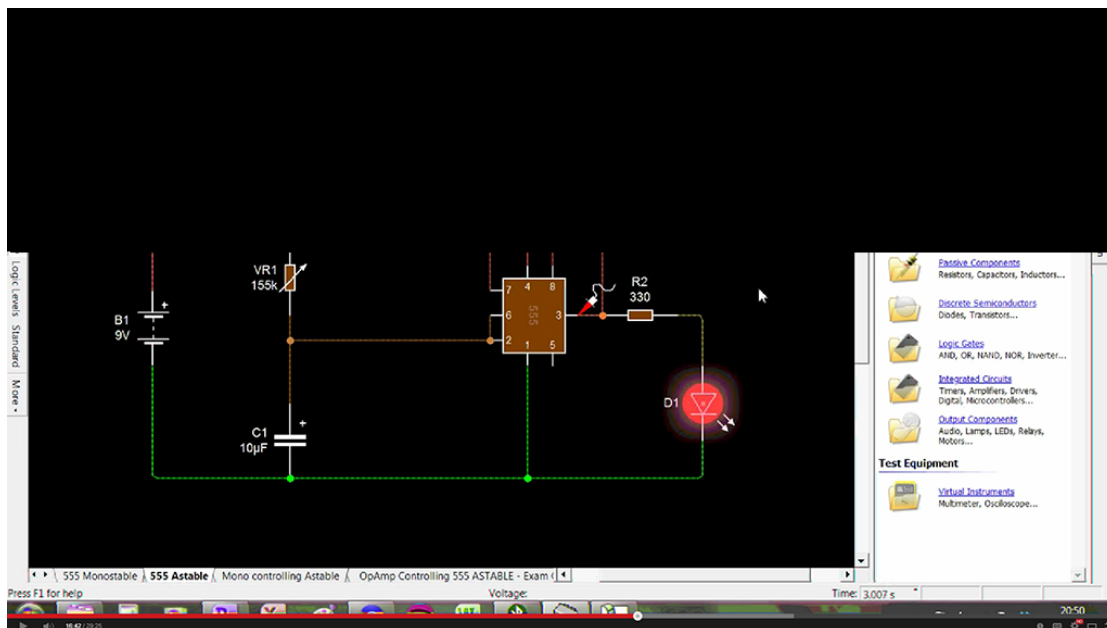- **Pin 7 – DISCHARGE –** This pin is used to discharge the capacitor once it is full

Monostable Configuration

Uses a switch to trigger the start/reset of the timer on pin 2
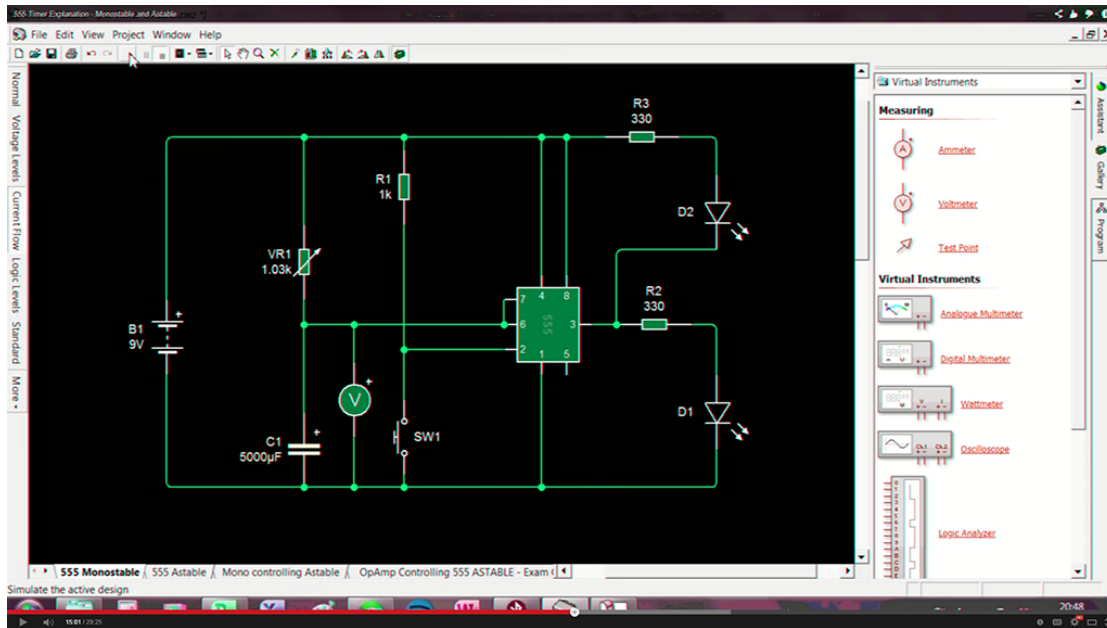
Astable Configuration

Uses the 555 chip itself to control the start/reset of the timer on pin 2, by connecting it to discharge pin 6.

Combined Monostable and Astable

The monostable 555 resets the astable 555 when the switch is pressed, this controls how long the astable 555 will flash the LEDs back and forth. When the SW1 is open then pin 3 on the monostable acts

as a sink for pin 4 on the astable 555 which causes it to be low (in constant reset mode), and when low the astable 555 is not operational. When SW1 is briefly pressed pin 3 on the monostable 555 becomes an output source which sets pin 4 high on the astable 555 making this chip operational. Once the capacitor C2 has discharged below the threshold pin 3 becomes a sink again, and the astable is no longer operational (not flashing, with D2 on solid)