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Robotic Homework

The 555 timer IC circuit was first introduced in 1971. There are two types of IC circuit called monostable and astable. In monostable mode, the timer acts as a one-shot pulse generator. It begins the pulse when the trigger voltage falls below 1/3 of the voltage supplied. In astable mode, the timer puts out a continuous stream of rectangular pulses with a specified frequency. Both types of IC timer consist of 8 pin in which each pin has its own individual function.

**Pin Function**

**Pin 1 (Ground)** – Should be connect directly to the negative terminal of the Battery without any resistors and capacitors in between.

**Pin 2 (Trigger)** – Triggers when the voltage at this pin is usually 1/3 of the supply voltage.

**Pin 3 (Output)** – Connects to whatever you want to control or time with a timer, it could be LED or speaker.

**Pin 4 (Reset)** – When this pin is connected to the positive terminal of the power supply, the circuit will operate. However, if you connect this pin to the ground, it will reset the timer.

**Pin 5 (Control Voltage)** – applying a voltage (default to 2/3 of supplied voltage) to this input can modify the timing characteristics. For most applications this pin is not used.

**Pin 6 (Threshold)** – determines the timing cycle of the circuit. The output will be at logic 0 state when its voltage is equal or greater than 2/3 voltage supplied.

**Pin 7 (Discharge)** – used to discharge the capacitor once it is full.

**Pin 8 (VCC)** – Connect to the positive terminal of the power supply

Inside the IC Circuit there is 1 SR flip flop and 2 comparator circuits. The threshold comparator circuit will output a 1 to the SR flip flop if the threshold voltage is greater than the control voltage or 0 vice versa. The trigger comparator will output a 1 to SR flip flop if the Voltage supplied is greater than the trigger input or output a 0 vice versa. The state of SR flip flop is determined by the output of the threshold and trigger comparator circuits. It will determine the state of the SR flip flop, whether the state will change, remains the same, or reset. In SR flip flop, input of 0 and 0 will result a hold in the state. Input of 0 and 1 will result in the SR flip flop outputting the reset state. Input of 1 and 0 will result the SR flip flop to output the next state.