**555 Timer Internal Circuit**

* A **comparator is a circuit** which compares an input with a reference voltage and outputs
* It compares if an input signal is higher or lower than existing signal.
* Pin 2 (trigger) compares to Pin 6 (threshold)
* Pin 7 (discharge) connects to capacitor to discharge the capacitor each time the trigger pin (pin 2) goes low.

**Monostable Mode**

**What is this circuit doing?**

* The capacitor stores energy.
* When press the push button the stored energy lights the LED.
* When the stored energy is exhausted the LED goes out (turns off).
* The size of the capacitor determines how long the LED will stay light after pressing the button.

**555 Timer chip circuit:**

* The push button is wired to the trigger pin (pin 2) naturally low state.
* When push button it sets the trigger pin (pin 2) to high state.
* This **high state** of trigger pin activates a discharge on pin 7 where we wired our capacitor.
* The capacitor’s discharge lights the LED
* When the capacitor’s energy is exhausted the trigger pin resets to low and the LED turns off.
* Pressing the push button restarts the cycle all over again.

**Astable Mode**

**What is this circuit doing?**

* astable mode, the output from the 555 timer is a continuous pulse waveform
* Specific frequency that depends on the values resistors and capacitors used in the circuit
* We connect the threshold pin (pin 6) to trigger pin (pin 2)
* The connect between pin 6 and pin2 creates a scenario where there is a continuous toggle between the high and low states
* This continuous toggle creates the waveform.

**555 Timer chip circuit:**

* We start with a capacitor with no charge
* We apply power and the capacitor begins to charge
* When the capacitor reaches full charge it flips the threshold pin to high
* The capacitor begins to discharge (pin 7)
* As the capacitor discharges the voltage lowers
* When the voltage is lower than the reference, the trigger pin flips back low
* The capacitor begins to recharge until it full and flips the trigger pin.
* This process repeats endlessly until we remove the battery supply.
* The repeating gives us the wave forms we are able to hear through the speaker.