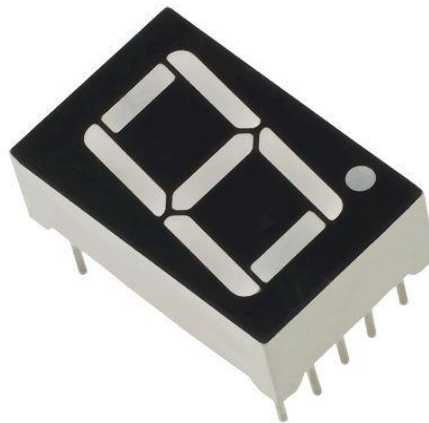


Introduction

- 7-segment LED displays are formed by LED segments. It is basically used to display numerical values from 0 to 9. One more segment is also present there which is used as decimal point.

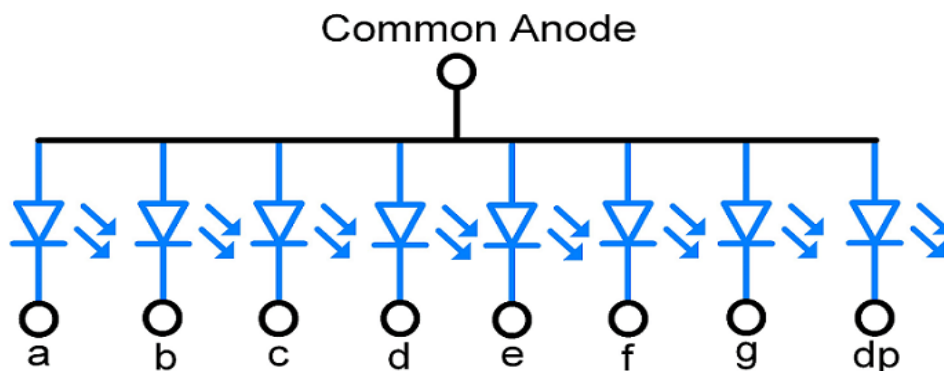


7-Segment Display

- In 7-segment displays there are two types, common anode and common cathode.

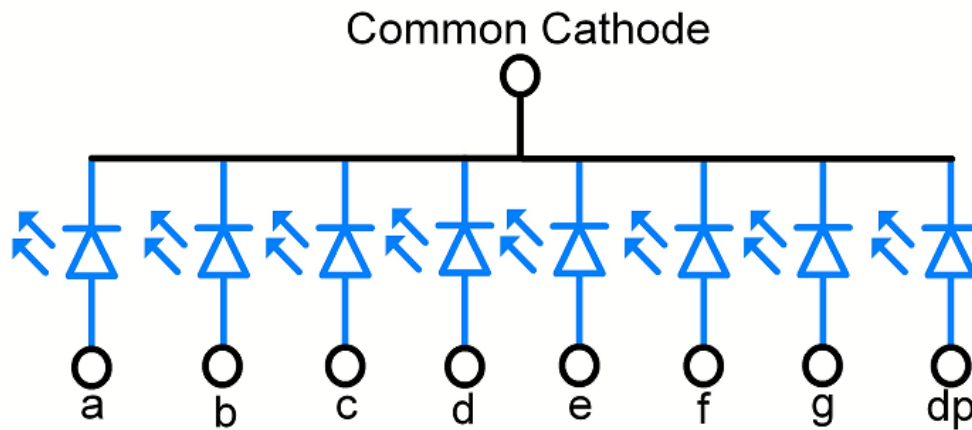
1. Common Anode (CA)

In common anode display, all anode pins are connected together to VCC and LEDs are controlled via cathode terminals. It means to turn ON LED (segment), we have to make that cathode pin logic LOW or Ground.

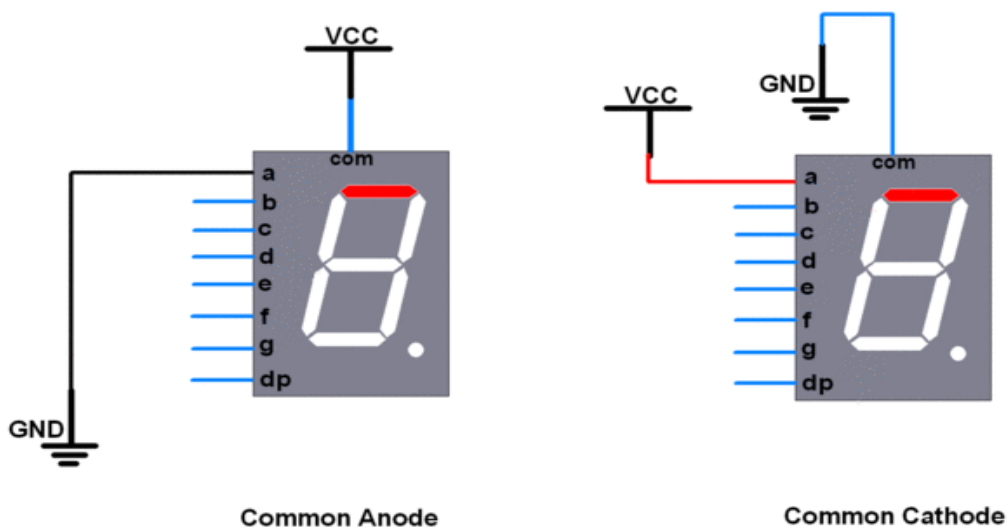


2. Common Cathode (CC)

In common cathode display, all cathode pins are connected together and led are controlled via anode terminal. It means to turn ON LED (segment), we have to apply proper voltage to the anode pin.

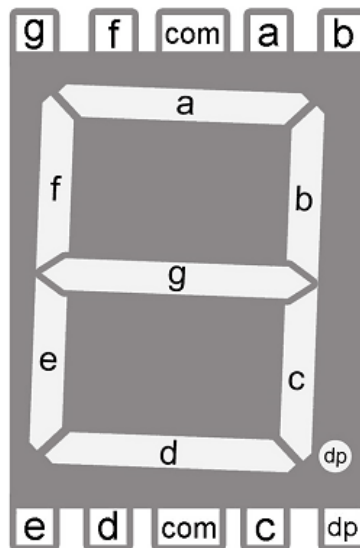


Following demonstration will show the working of above configuration,



Pin Diagram

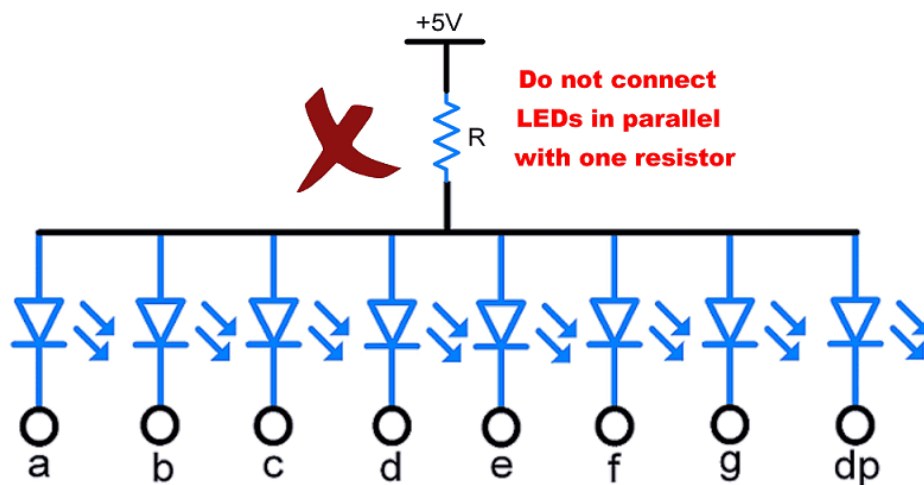
- 7-segment display has total 10 pins.
- The common pin (com) is connected either in common anode or common cathode configuration.



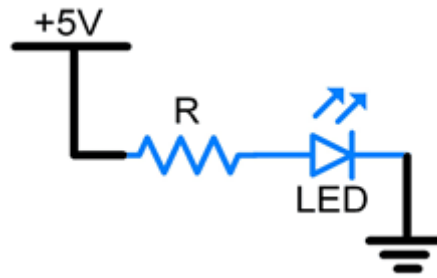
Pin Diagram of 7-Segment Display

Resistor Connections

- We have to connect resistor to each segment individually.
- Avoid LED's connection in parallel with one resistor, because each LED segment doesn't have exact same forward voltage drop.
- If we connect one resistor to the parallel LEDs then some LEDs will glow and some will not. Because forward voltage drops are different for each LEDs, LEDs which are having lowest voltage drop across them will only glow. And though if we connect LEDs with ideally equal voltage drop, current will get divided and brightness will get affected each time while switching the LEDs.



Calculation of Resistor Value



$$R = (V_S - V_{LED}) / I_{LED}$$

Where,

R = Resistor in series with LED.

V_s = Source voltage.

V_{LED} = LED forward voltage drop.

I_{LED} = LED forward current.

Example

Normally voltage is 5volt and abs. max. current is about 20mA to 25mA. Let's take current I_{LED} = 10mA (considering safer margin) as 10mA is sufficient to glow the segment.

V_S = 5V and V_{LED} = 1.7V then resistor value is.

$$R = (5 - 1.7) / 0.010 = 300 \text{ Ohm}$$