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Engineering Design Project-II (UTA 024)

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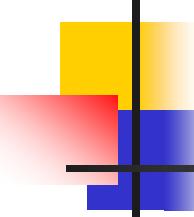


Engineering Design Project-II

(UTA 024)

Buggy Lab

Dr. Amit Mishra



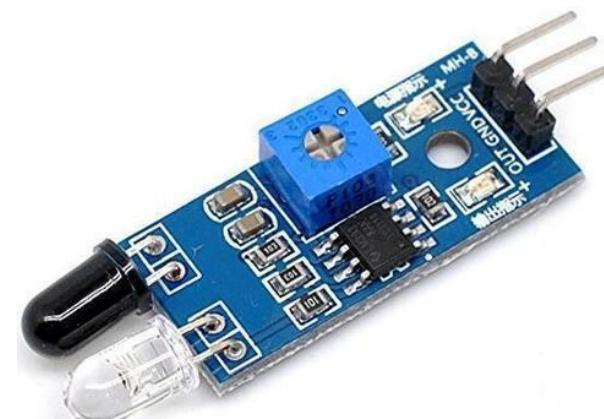
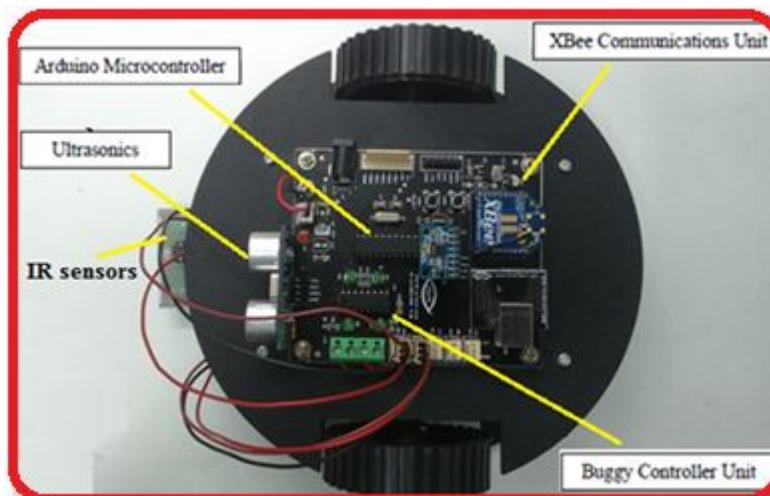
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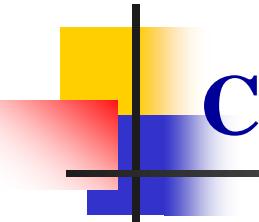
- **Objective**
- **IR sensor Circuit schematic diagram**
- **Component list**
- **Design Specification and selection of components**
- **IR sensor Circuit on PCB**
- **IR sensor Circuit testing**
- **Reference**

Objective

Design and testing of IR sensor module circuit which helps Buggy robot to move on a predefined path as a line follower.

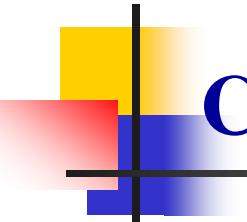
- ❖ To solder IR sensor module circuit on a general purpose PCB.
- ❖ To test the output pulses of IR sensor module on predefined track as path follower.



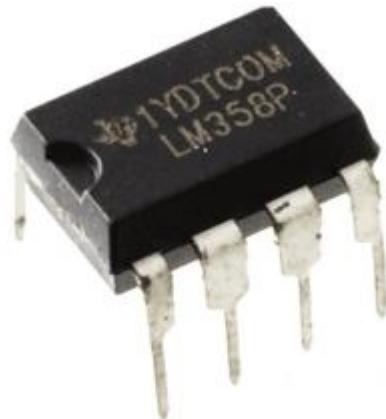


Component List

Sr. no	Component	Count	Specification
1	High Gain Operational Amplifier	01	LM358
2	IR sensor pair (Transmitter, Receiver)	02	
3	Resistors	04	330 Ω
4	Potentiometer (Variable resistance)	2	10 K
5	LED	02	
6	DC power supply	01	5V
7	PCB (small piece)	01	General purpose



Components



Dual Operational Amplifier



LED



Potentiometer



IR sensor pair



Resistor

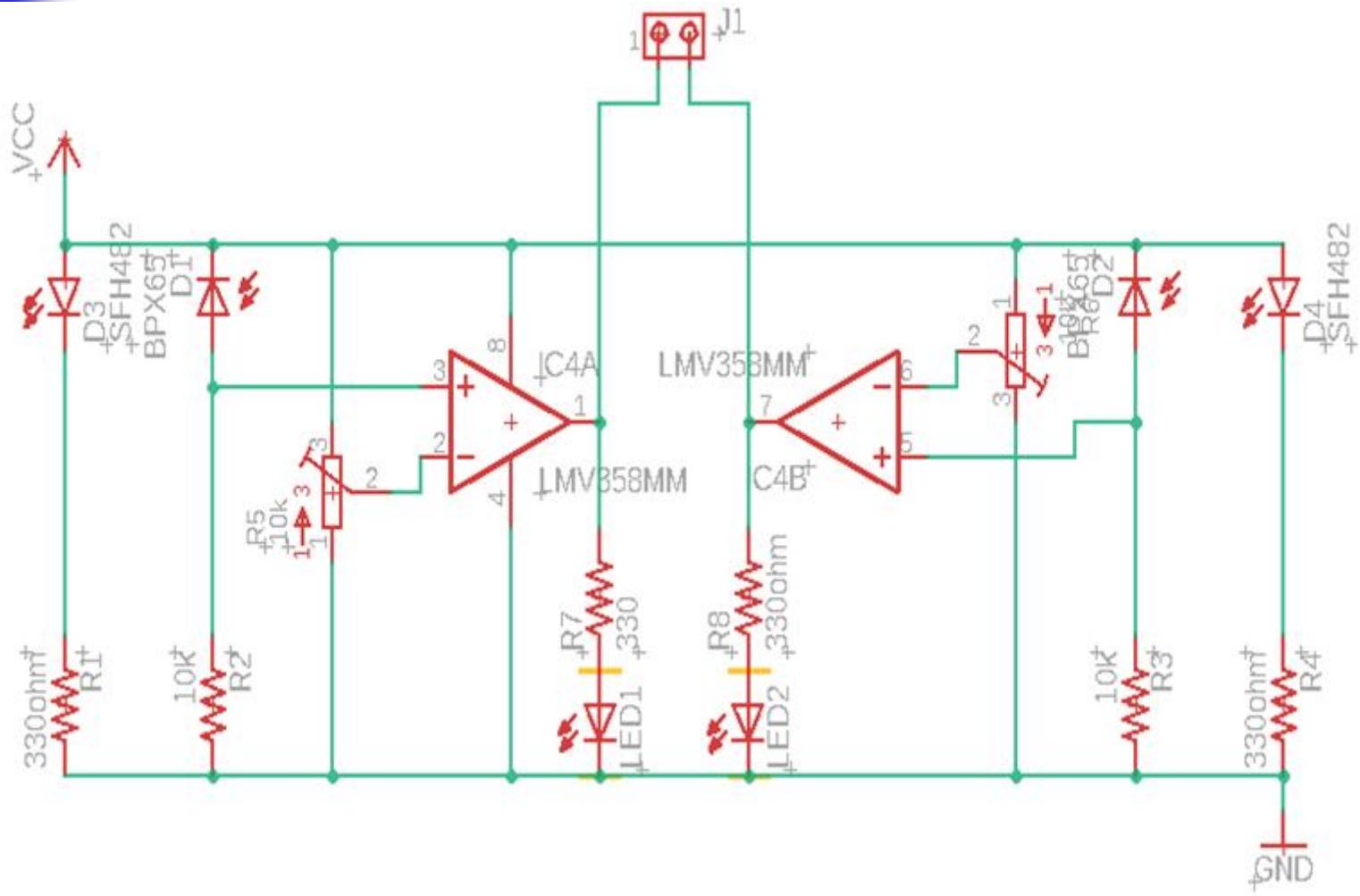


PCB (small piece)

September 22, 2020

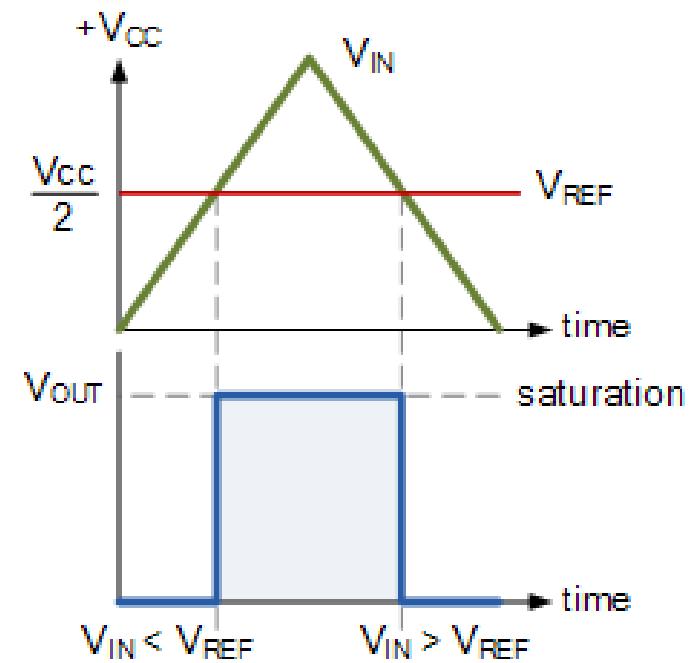
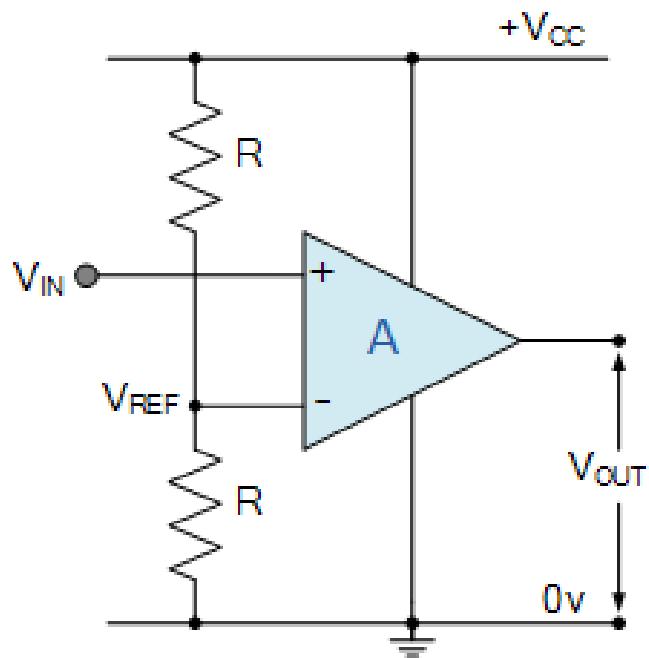
Image source: Google

IR Sensor circuit

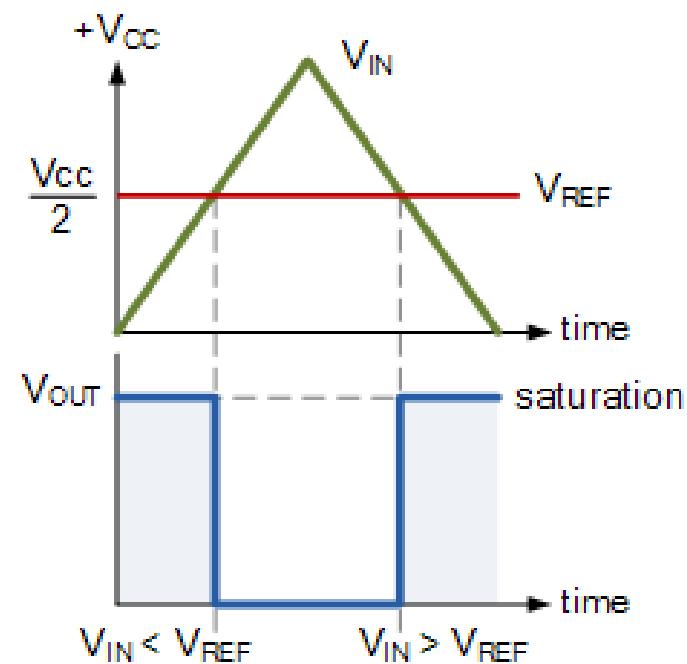
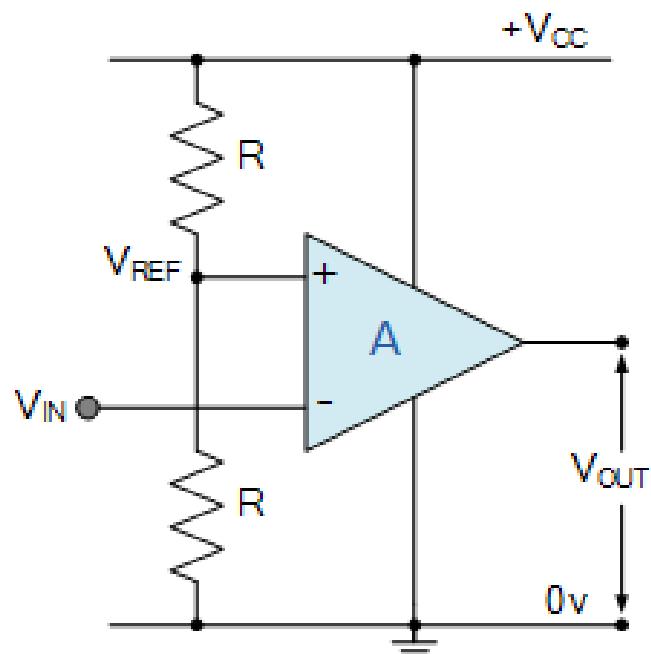


Working principle

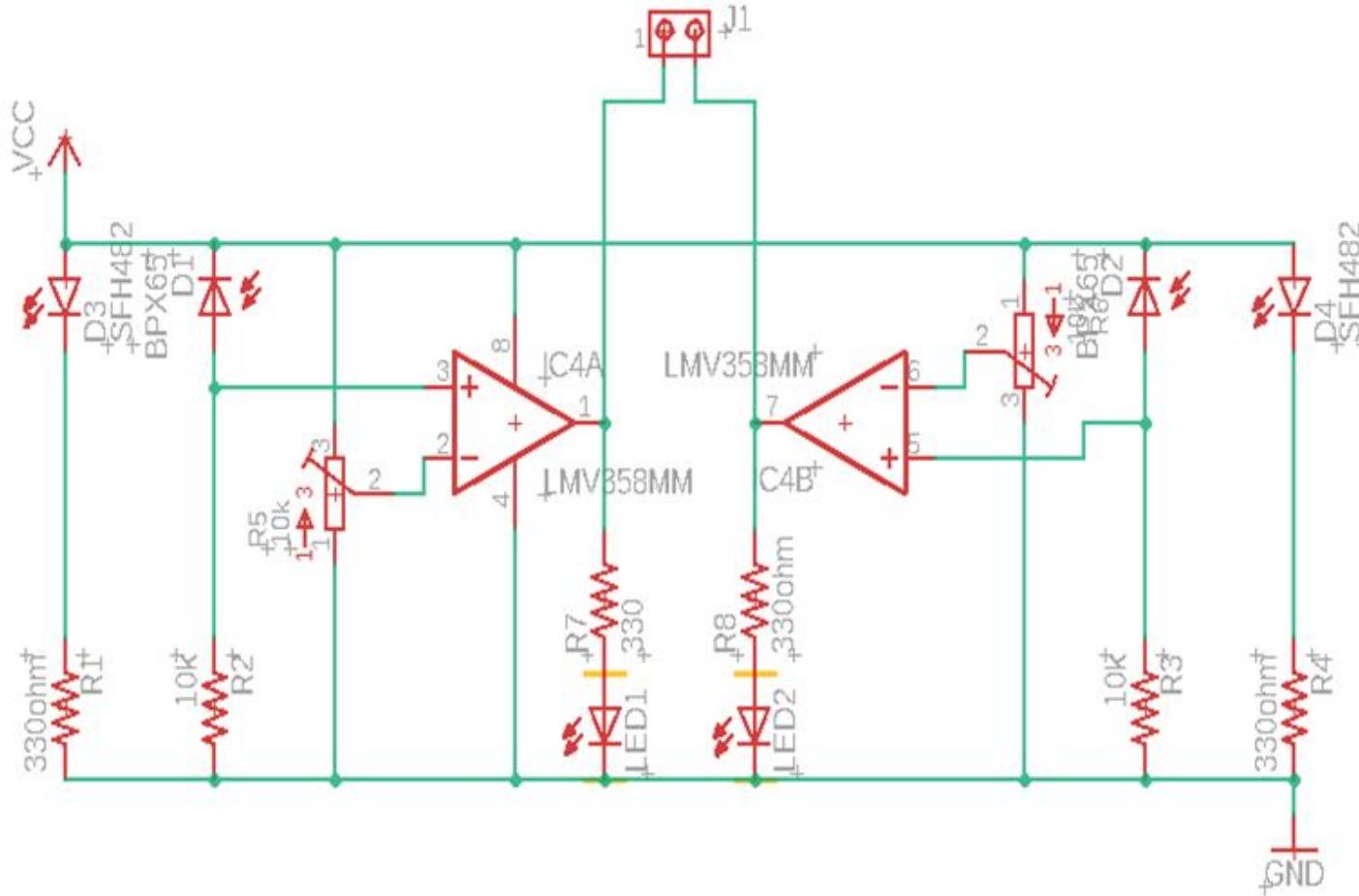
Non-inverting comparator



Inverting comparator

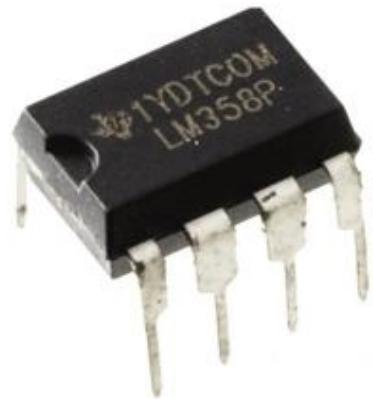


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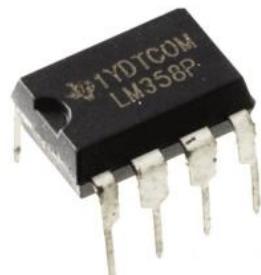
Selection criterion of Comparator



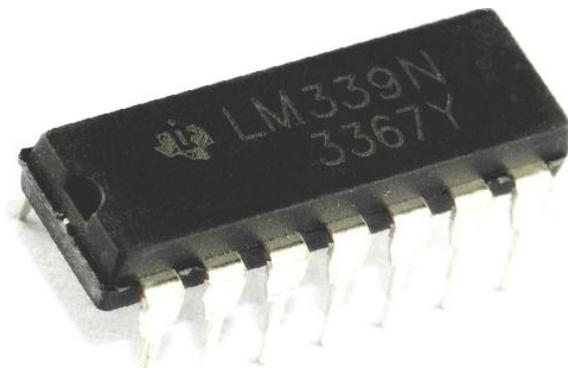
Options available

- ❖ LM 358
- ❖ LM 339
- ❖ LM324

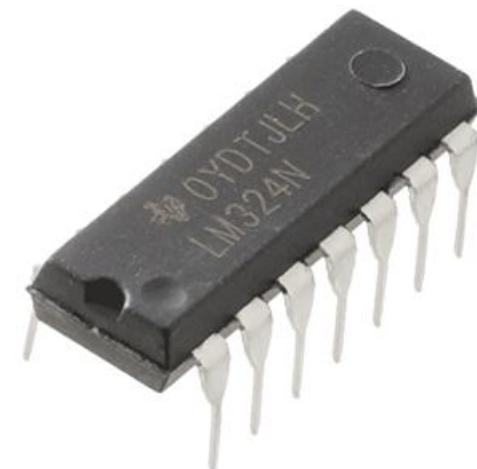
LM 358



LM 339



LM324

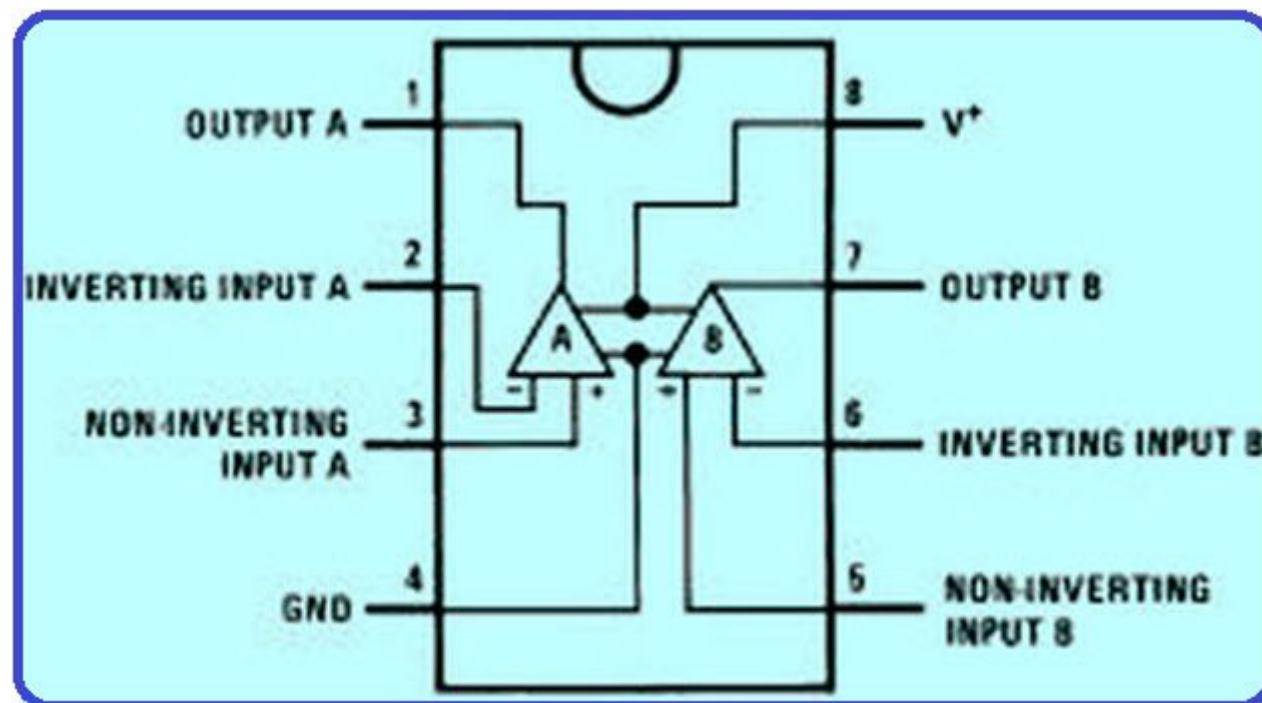


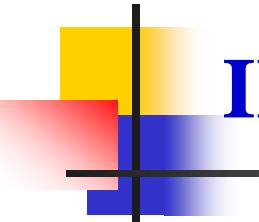
LM358: Dual comparator, 3 ~ 32V, 20-40 mA

LM339: Quad comparator, 2 ~ 36V, 800 μ A

LM324: Quad comparator, $\pm 1.5V$ to $\pm 16V$, 700 μ A

LM358: Dual operational amplifier

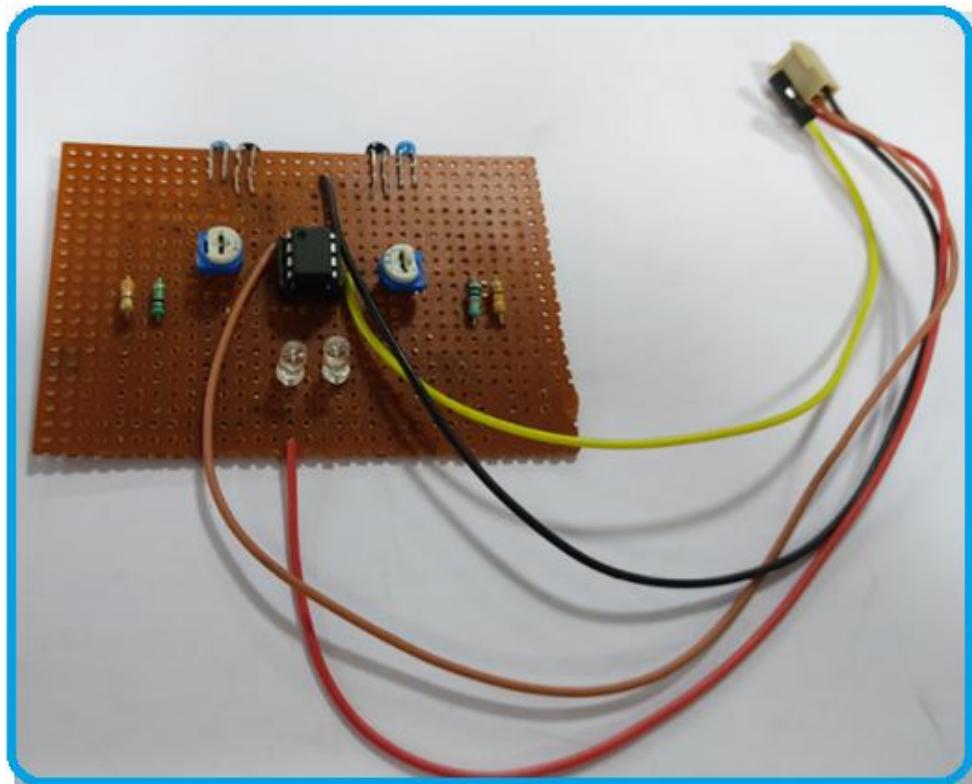
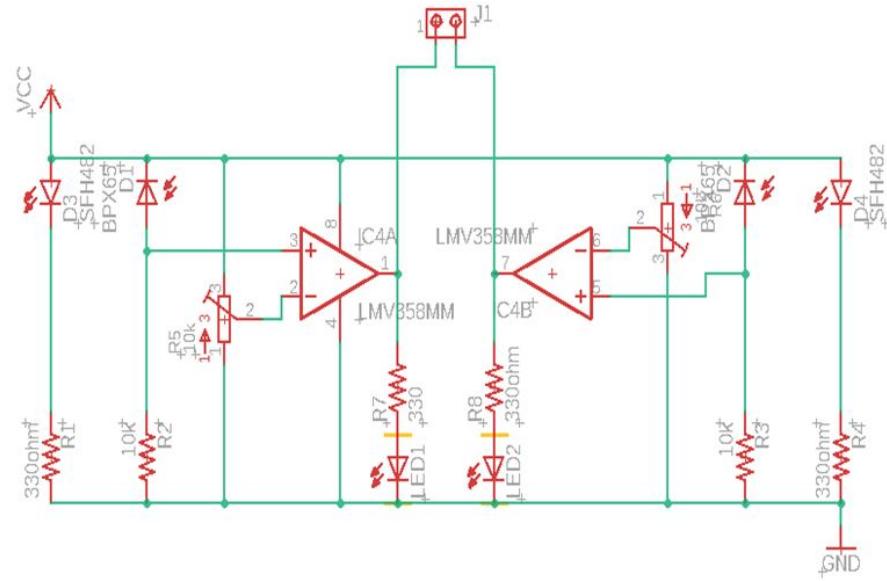
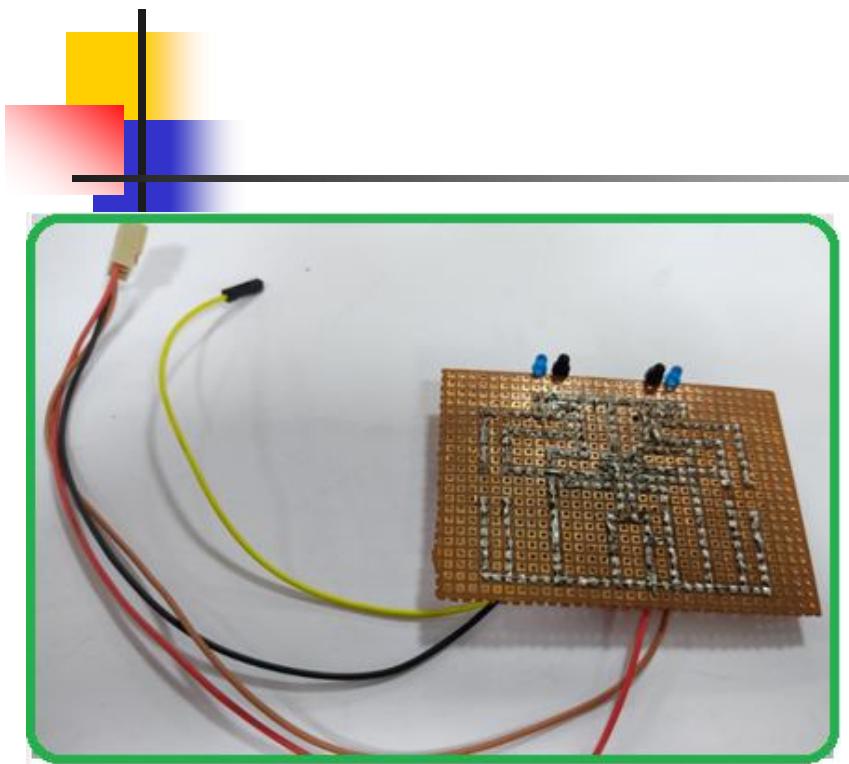




IR sensor circuit on PCB

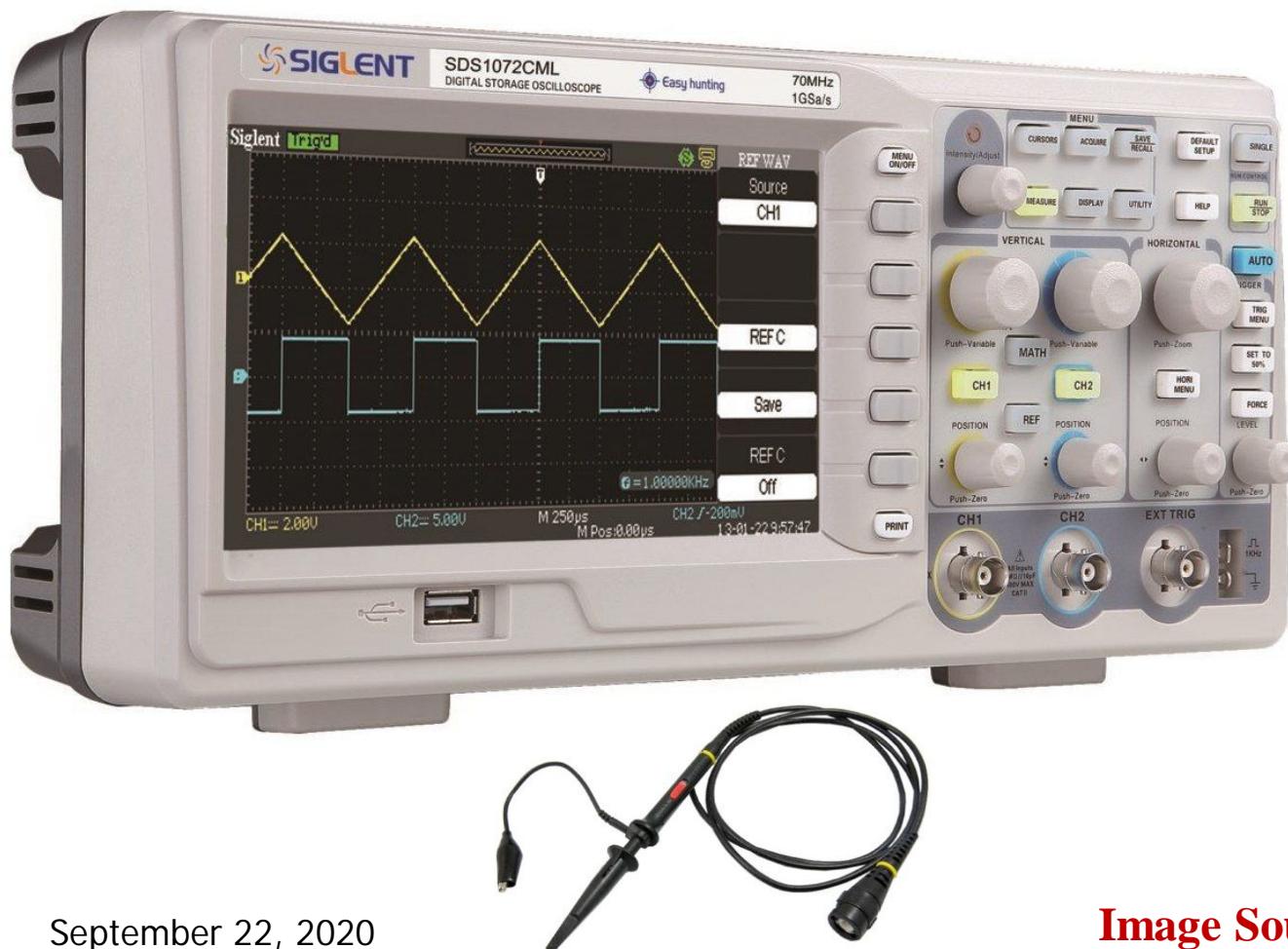


IR sensor circuit on PCB



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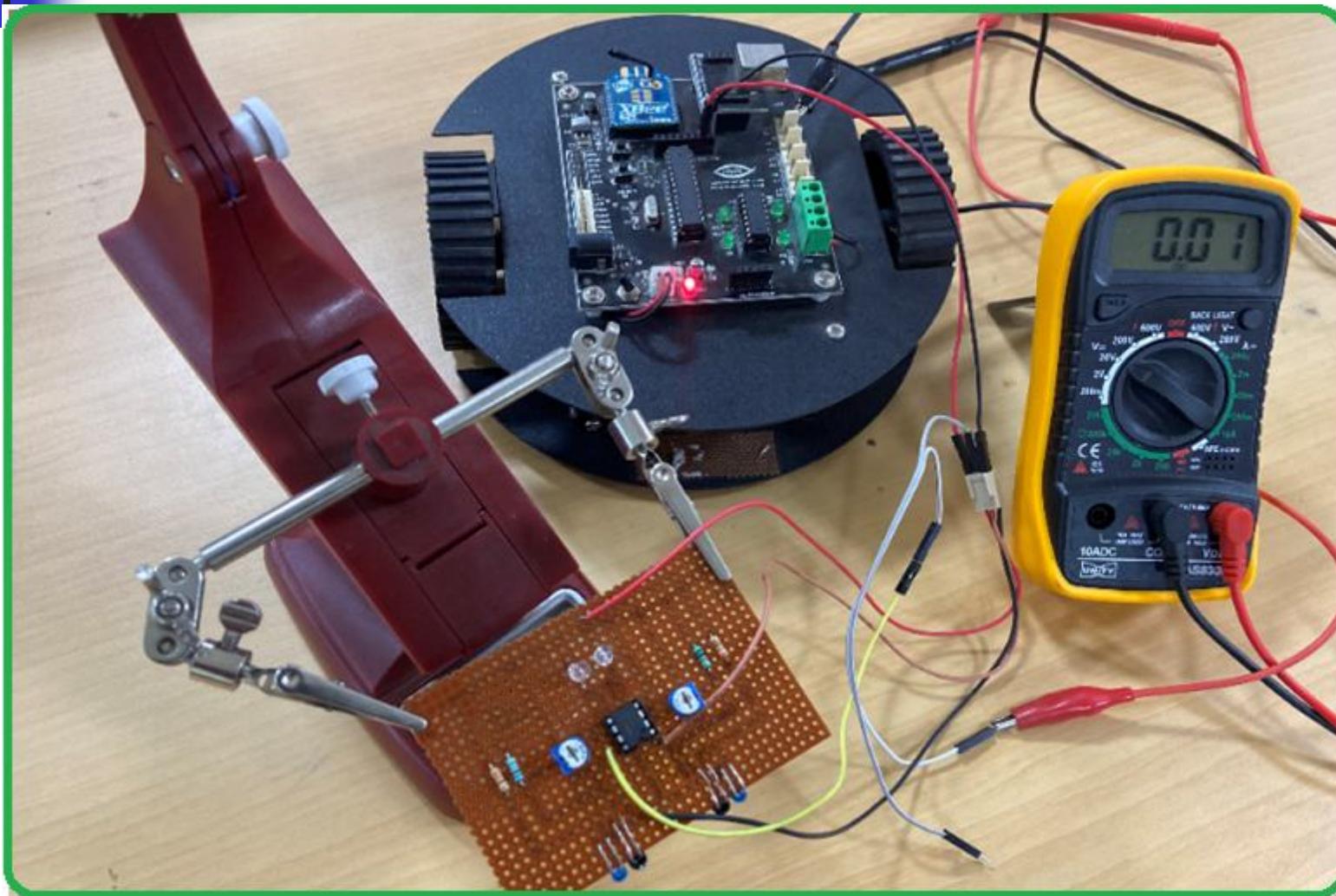
IR sensor circuit Testing



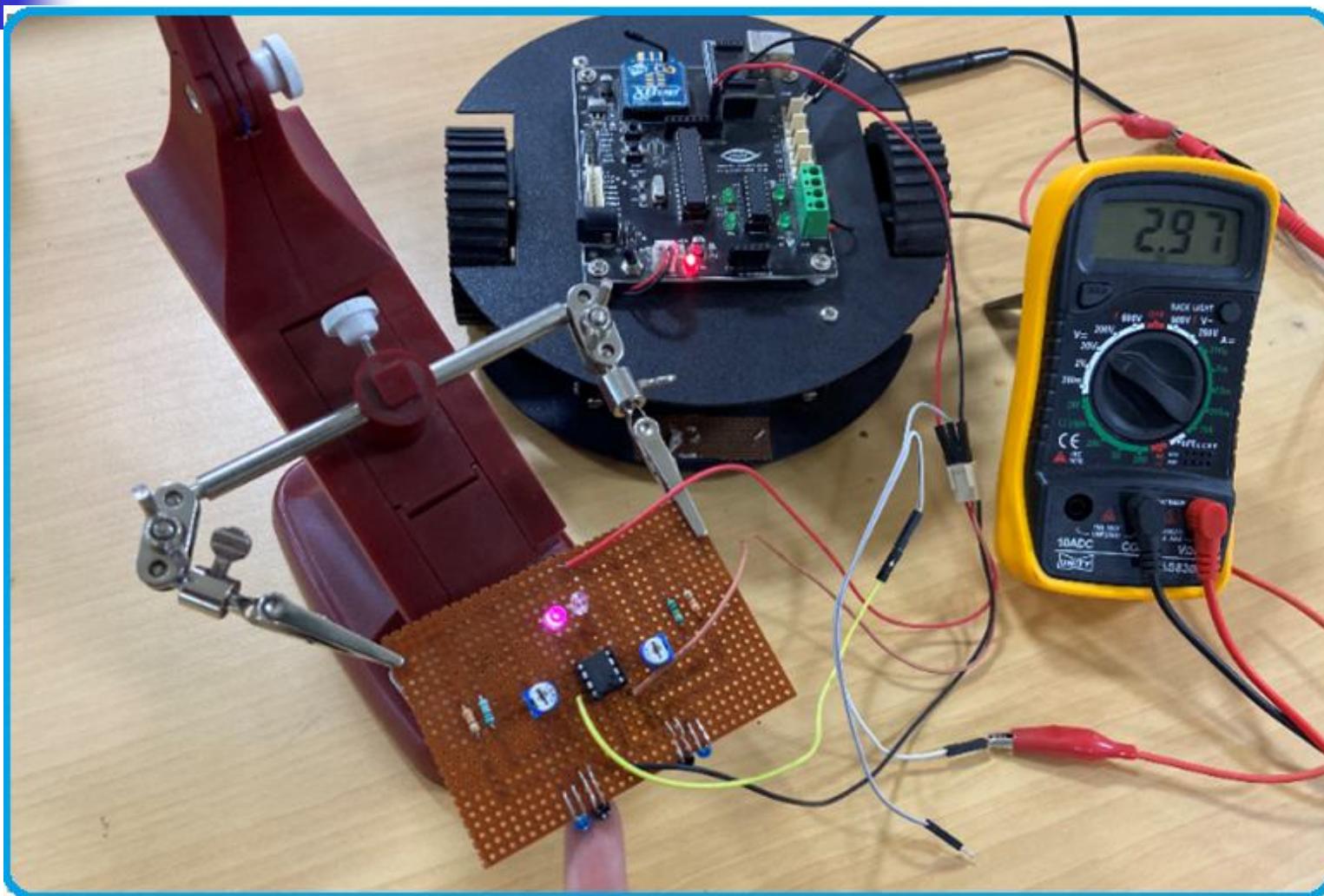
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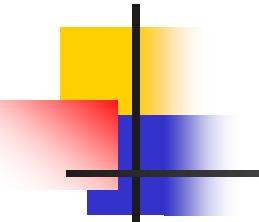
Image Source: Google 16

Testing: IR sensor Circuit



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References

- ❖ <http://www.bristolwatch.com/ele/vc.htm>

- ❖ https://www.ti.com/lit/ds/symlink/lm358-n.pdf?ts=1595072390098&ref_url=https%253A%252F%252Fwww.google.com%252F



Thanks !