Introduction to Alphabot ATmega328P Robotics Research Platform

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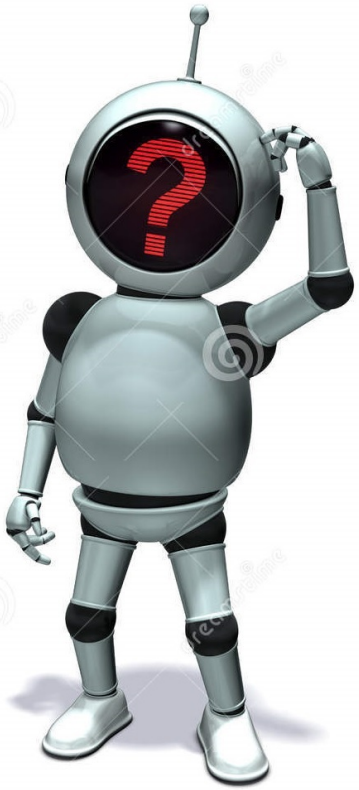
Indian Institute of Technology, Bombay

Agenda for Discussion

1. Introduction to Robotics
   - Major Components of a Robot
2. Alphabot Flavours
   - Alphabot Version 1
   - Alphabot Version 2
3. Components on Alphabot
   - Sensors
   - Actuators
   - Control
   - Power
   - Communication
   - Indicating Devices

Major Components of Robot

What are the Major Components needed for designing a Robot?



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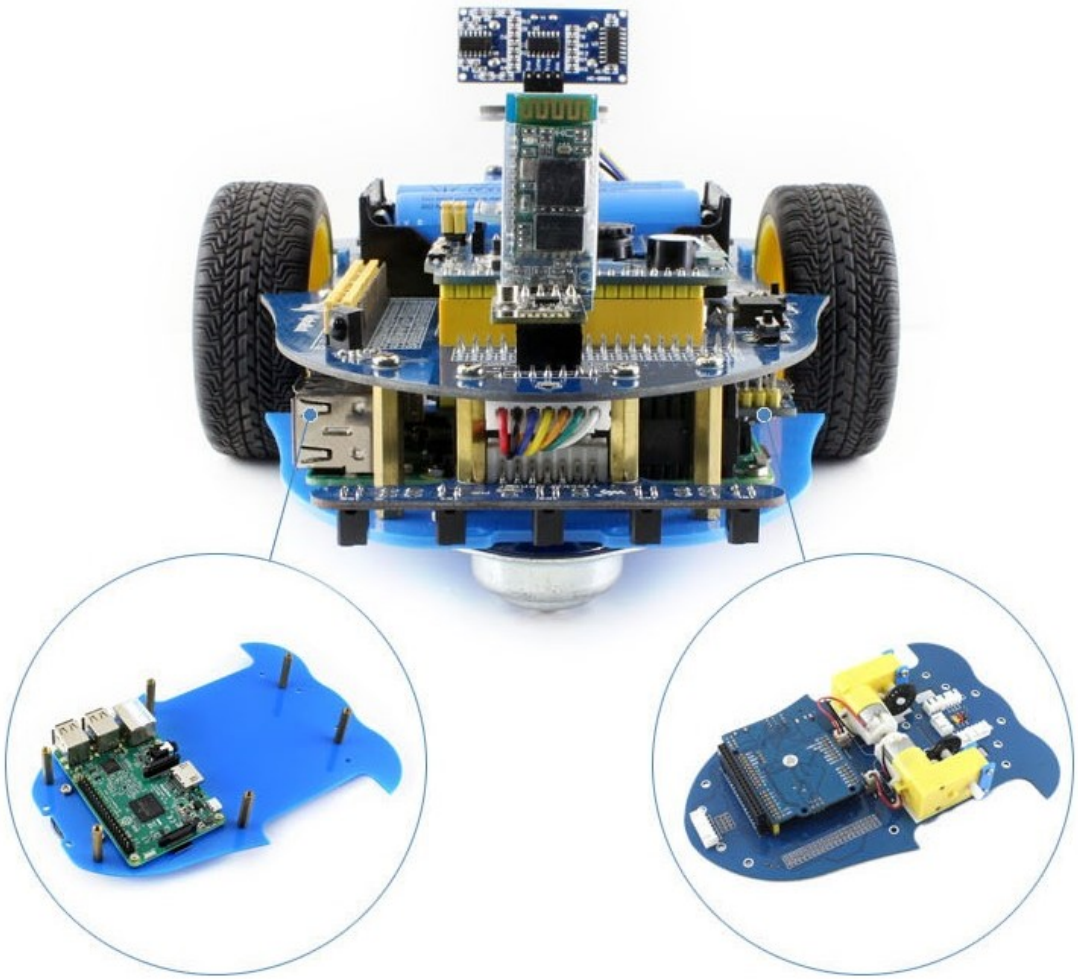
3. Control: Controller/Processor as brain of Robot
4. Intelligence: User written command(s) to perform desired set of action
5. Power: A necessity for making a system work
6. Communication: Robot can talk to another robot/PC

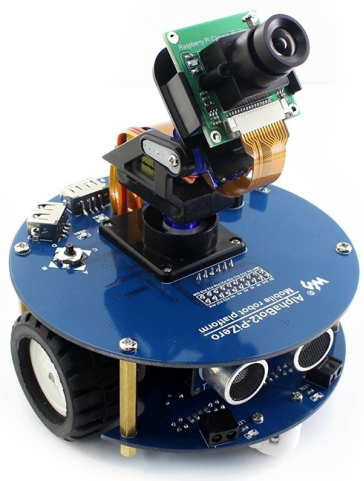
Alphabot Version 1

Alphabot Version 1



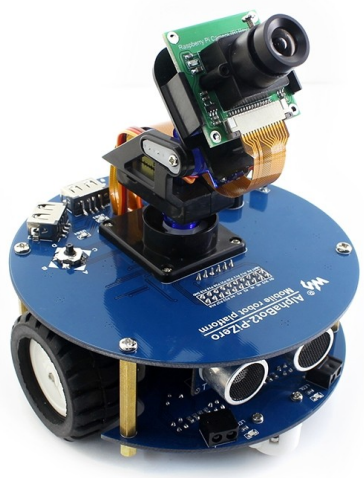
Alphabot Version 2

Alphabot Version 2



Alphabot 2 Pi

Alphabot Version 2

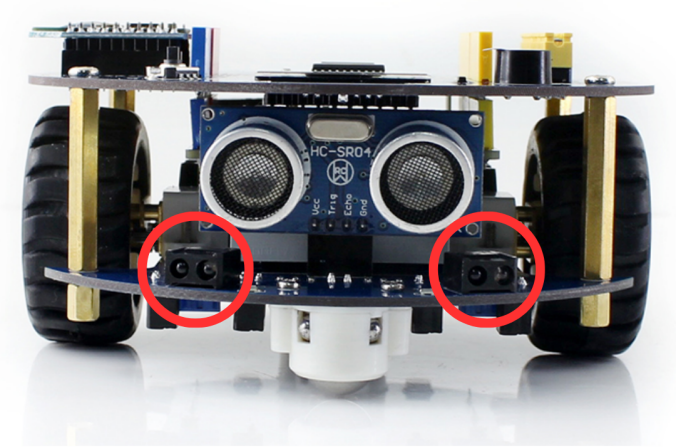


Alphabot 2 Pi

Alphabot 2 Ar

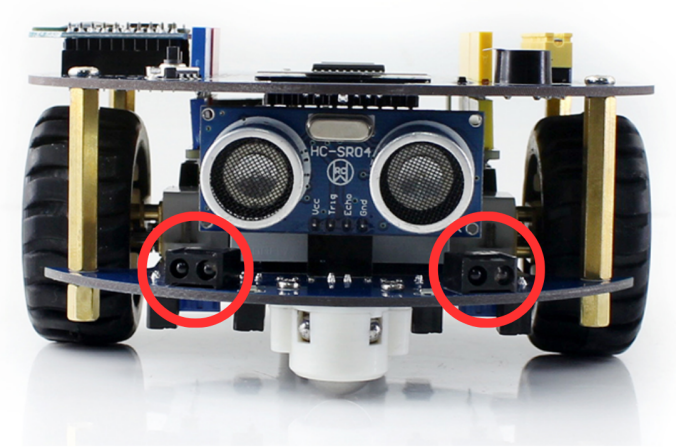
Sensors on Alphabot

1. IR Proximity Sensors



Sensors on Alphabot

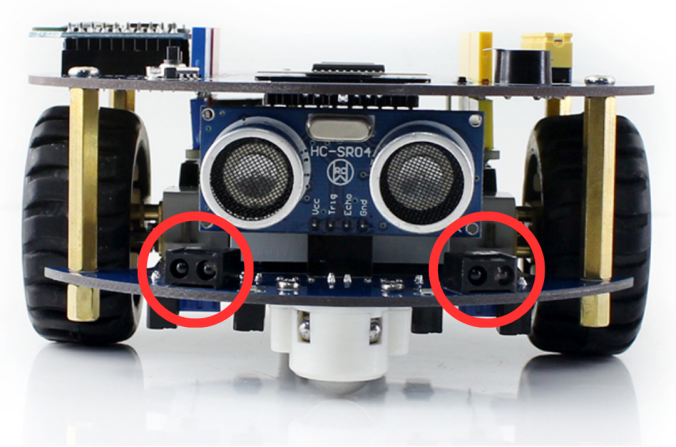
1. IR Proximity Sensors



1. Transmitter: IR LED
   Receiver: Photo-Diode

Sensors on Alphabot

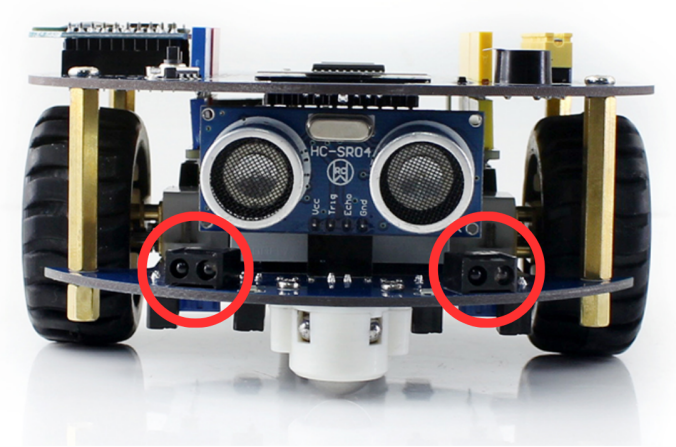
1. IR Proximity Sensors



1. Transmitter: IR LED
   Receiver: Photo-Diode
2. Count on Alphabot: 02

Sensors on Alphabot

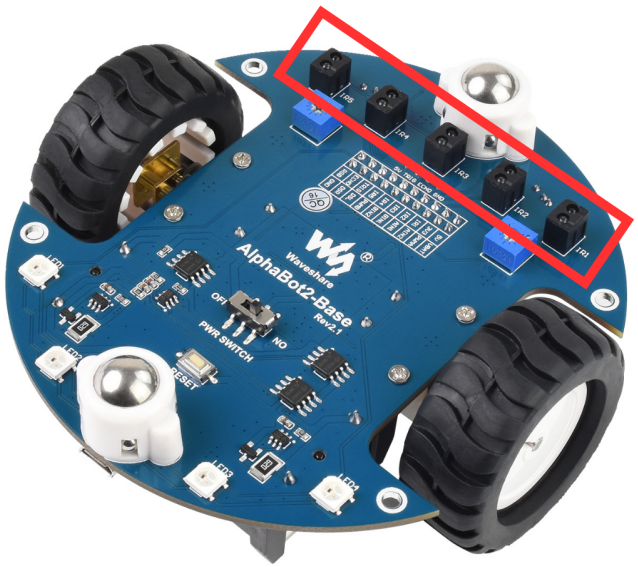
1. IR Proximity Sensors



1. Transmitter: IR LED
   Receiver: Photo-Diode
2. Count on Alphabot: 02
3. Connected to IO Port Expander (PC8574)

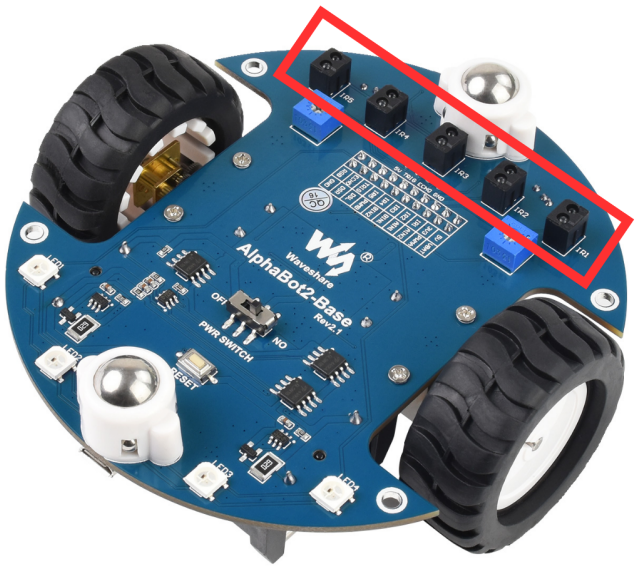
Sensors on Alphabot

2. White Line Sensors



Sensors on Alphabot

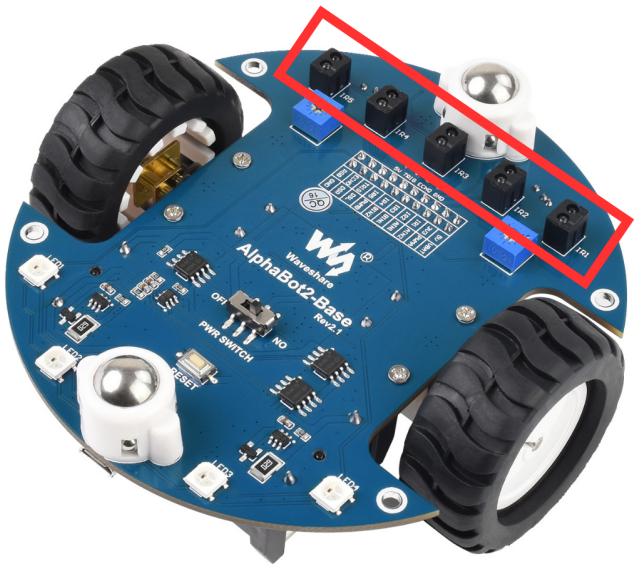
2. White Line Sensors



1. Transmitter: IR LED
   Receiver: Photo-Transistor

Sensors on Alphabot

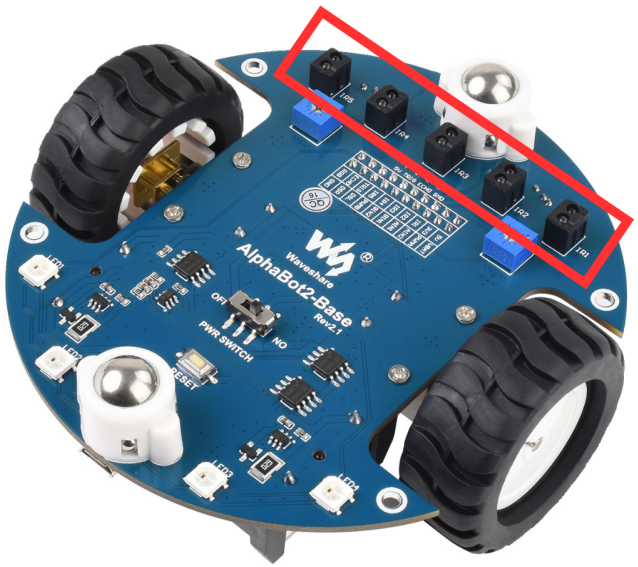
2. White Line Sensors



1. Transmitter: IR LED
   Receiver: Photo-Transistor
2. Count on Alphabot: 01

Sensors on Alphabot

2. White Line Sensors



1. Transmitter: IR LED
   Receiver: Photo-Transistor
2. Count on Alphabot: 01
3. Connected to external ADC (TLC2543)

Sensors on Alphabot (cont.)

3. Ultrasonic Sensor

Sensors on Alphabot (cont.)

3. Ultrasonic Sensor

1. Transmitter: Ultrasonic wave transmitter and receiver

Sensors on Alphabot (cont.)

3. Ultrasonic Sensor

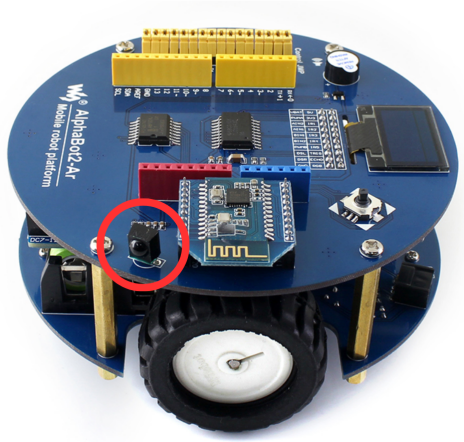
1. Transmitter: Ultrasonic wave transmitter and receiver
2. Count on Alphabot: 01

Sensors on Alphabot (cont.)

4. Infrared TSOP Receiver

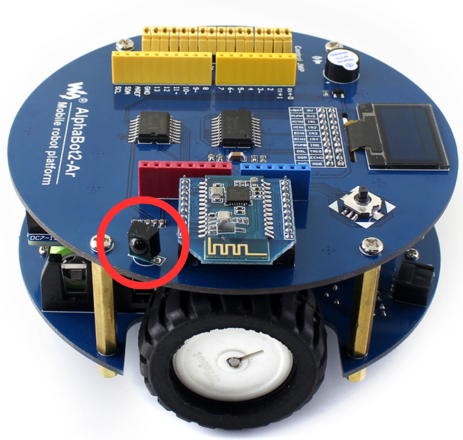
Sensors on Alphabot (cont.)

4. Infrared TSOP Receiver



Sensors on Alphabot (cont.)

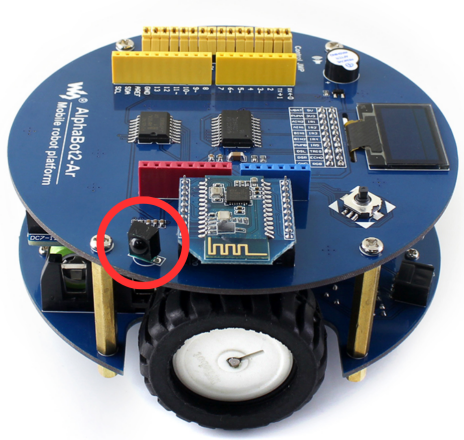
4. Infrared TSOP Receiver



1. Receiver: Photo-Transistor

Sensors on Alphabot (cont.)

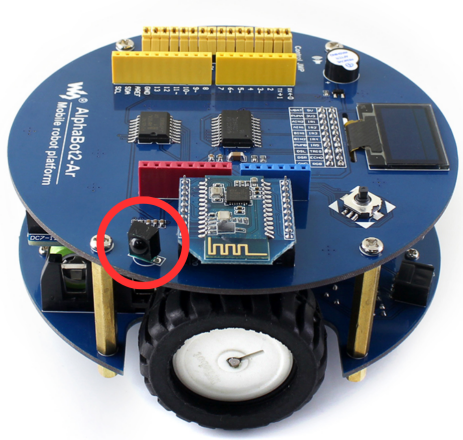
4. Infrared TSOP Receiver



1. Receiver: Photo-Transistor
2. TSOP1738

Sensors on Alphabot (cont.)

4. Infrared TSOP Receiver

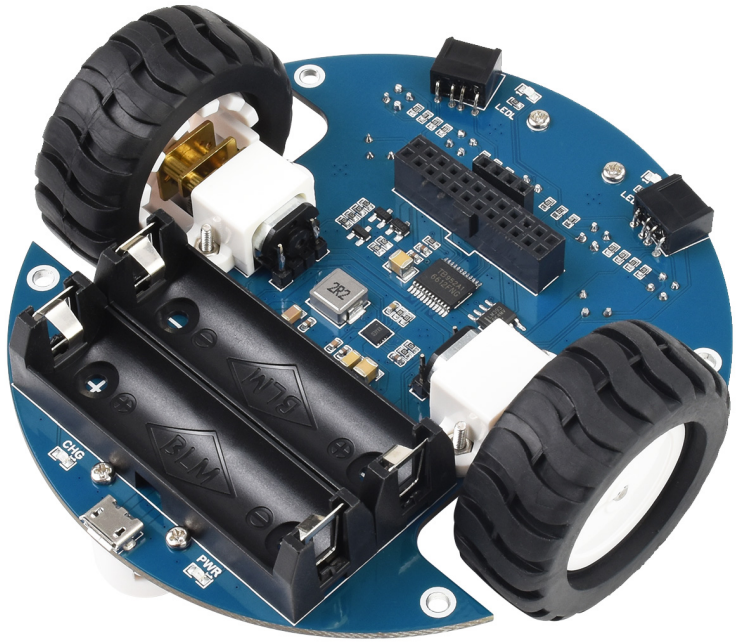


1. Receiver: Photo-Transistor
2. TSOP1738
3. Count on Alphabot: 01

Actuators

Actuators

N20 Micro Gear Motor



Control Room of Robot

Control Room of Robot

1. Arduino Uno board
2. ATMEL Manufactured AVR architecture based ATmega328P microcontroller

How is Robot Made Intelligent

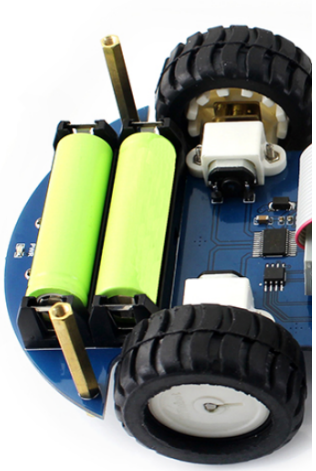
How is Robot Made Intelligent

1. Language used for programming: EMBEDDED 'C'
2. EMBEDDED 'C' similar to C.

Powering the Robot

Powering the Robot

1. Battery Powered: 7.4V, 1100mAH, Li-ion battery



2. 5V USB battery charging port

Communication

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- Wired Communication: Between Robot and System

Communication

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  1. USB;

Communication

- Wired Communication: Between Robot and System
  1. USB;
- Wireless Communication:Between Robot and System and Robot and Robot

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- Wireless Communication:Between Robot and System and Robot and Robot
  1. Xbee and Bluetooth

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  1. USB;

- Wireless Communication:Between Robot and System and Robot and Robot
  1. Xbee and Bluetooth

  2. Infrared Remote

Indicating Devices

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- 128x64 OLED

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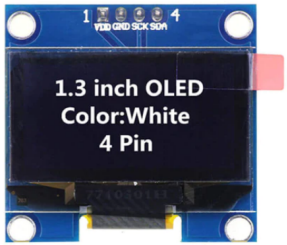
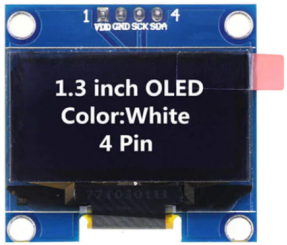
- 128x64 OLED



Indicating Devices

- 128x64 OLED



- Buzzer

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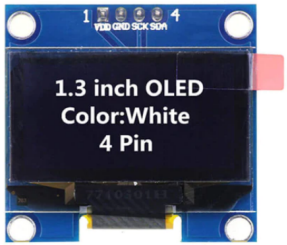

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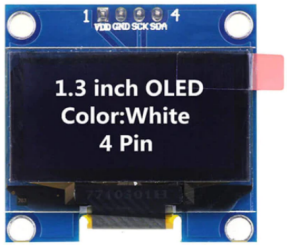

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- LED Array

Indicating Devices

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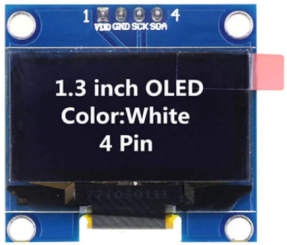

- Buzzer

- LED Array

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Thank You!

Post your queries on: support@e-yantra.org