Introduction to Firebird V ATmega 2560 Robotics Research Platform

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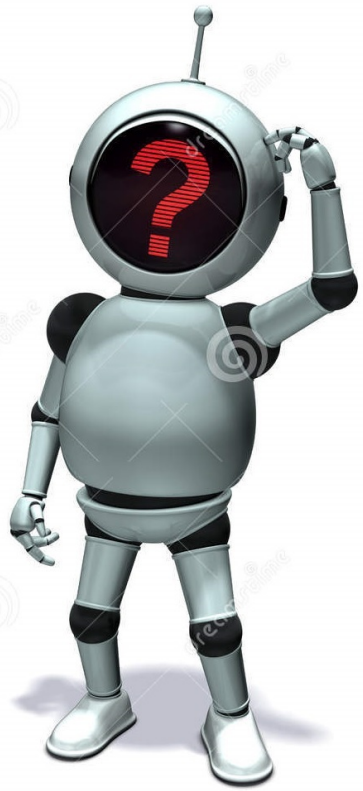
Agenda for Discussion

1. Introduction to Robotics
   - Major Components of a Robot
2. Flavors of Firebird V Platform
   - Firebird V 8051 Platform
   - Firebird V AVR Platform
   - Firebird V ARM Platform
3. Introduction to Firebird V ATmega 2560 Platform
   - Major Components of a Robot
   - Sensors
   - Actuators
   - Control
   - Intelligence
   - Power
   - Communication
   - Indicating Devices
   - Block Diagram

Major Components of Robot

What are the Major Components needed for designing a Robot?



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Firebird V P89v51RD2 Platform

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1. This Platform has 8051 architecture based adaptor board.

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2. Microcontroller used is Philips manufactured P89v51RD2 as master.

Firebird V ATmega2560 Platform

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1. This Platform has AVR architecture based adaptor board.

Firebird V ATmega2560 Platform

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2. Microcontroller used is Atmel manufactured ATmega2560 as master.

Firebird V LPC2148 Platform

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Firebird V LPC2148 Platform

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2. Microcontroller used is Philips manufactured LPC2148 as master.

Major Building Blocks of Robot

What are the Major Components needed for designing a Robot?

1. Sensors: For sensing the environments
2. Actuators: For movement of robots and its parts
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

Sensors on Firebird V ATmega 2560 Platform

1. Sharp IR Range Sensors

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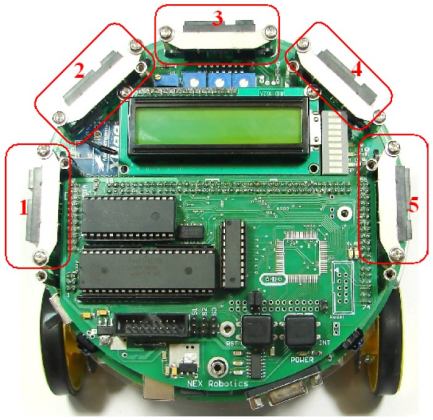
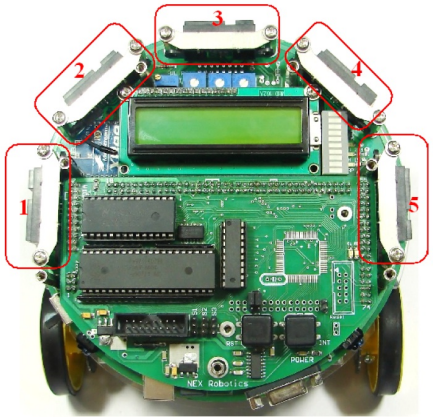
1. Sharp IR Range Sensors



Sensors on Firebird V ATmega 2560 Platform

1. Sharp IR Range Sensors



1. GP2Y0A02YK (10cm-80cm)

Sensors on Firebird V ATmega 2560 Platform

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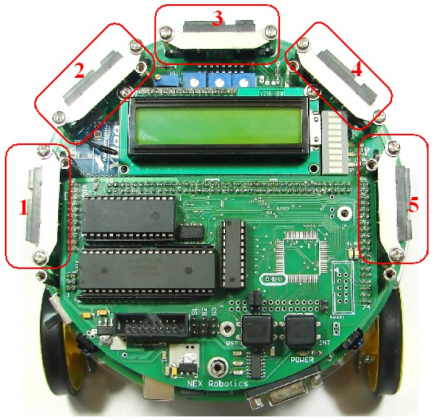

1. GP2Y0A02YK (10cm-80cm)
2. Transmitter: IR LED
   Receiver: CCD Array

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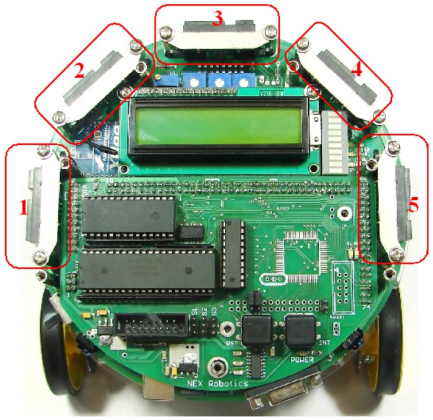


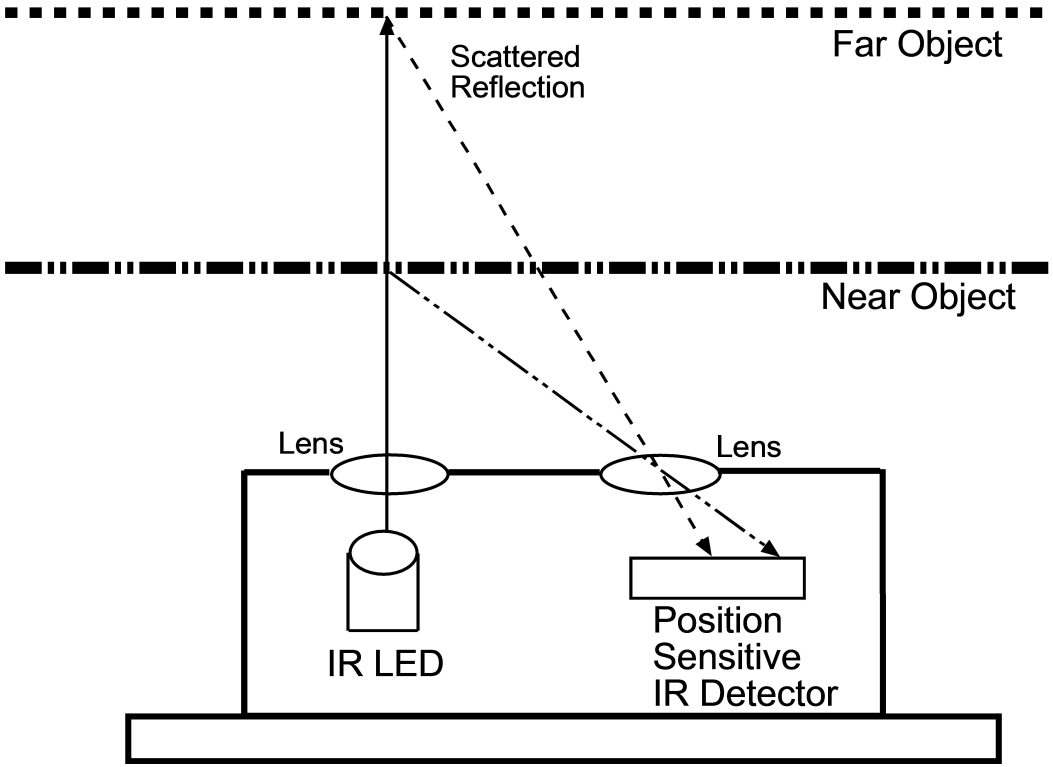
1. GP2Y0A02YK (10cm-80cm)
2. Transmitter: IR LED
   Receiver: CCD Array
3. Count on Firebird: 05

Sensors on Firebird V ATMEGA 2560 Platform (cont.)

Working of Sharp Sensor

Sensors on Firebird V ATMEGA 2560 Platform (cont.)

Working of Sharp Sensor



Sensors on Firebird V Platform (cont.)

2. IR Proximity Sensors

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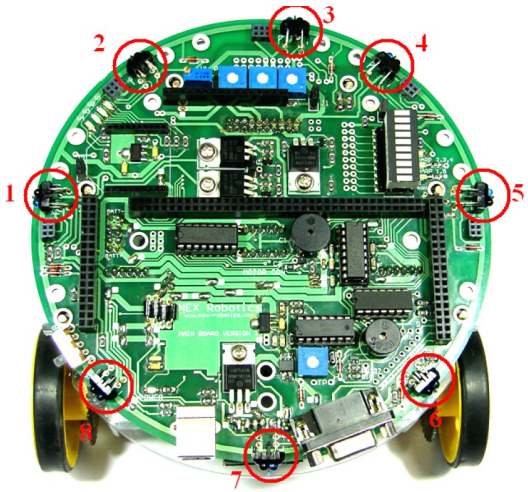

Sensors on Firebird V Platform (cont.)

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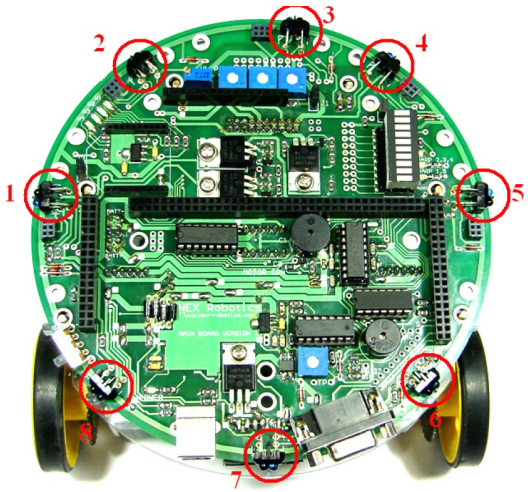

1. Transmitter: IR LED
   Receiver: Photo-Diode

Sensors on Firebird V Platform (cont.)

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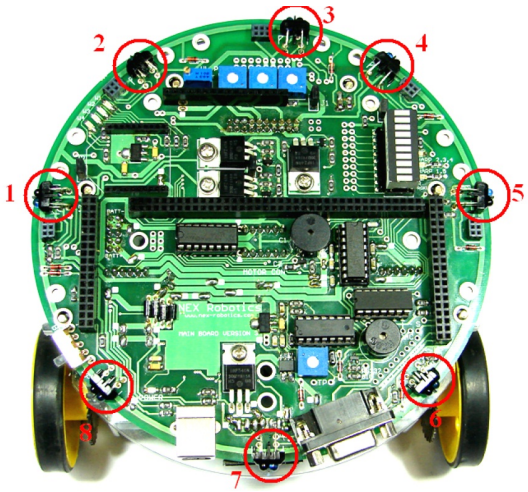
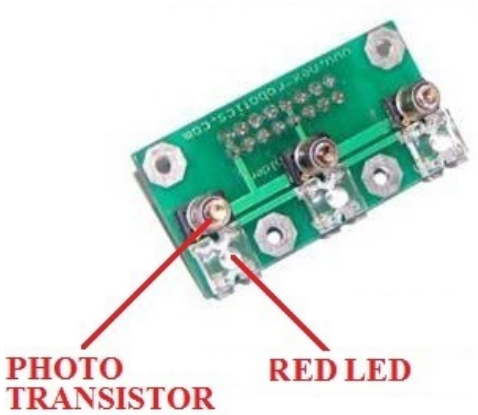


1. Transmitter: IR LED
   Receiver: Photo-Diode
2. Count on Firebird: 08

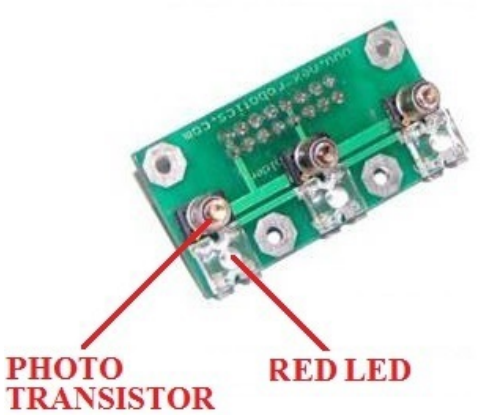
Sensors on Firebird V Platform (cont.)

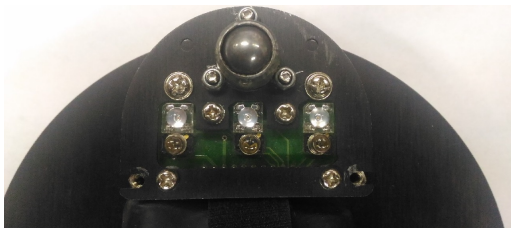
3. White Line Sensors



Sensors on Firebird V Platform (cont.)

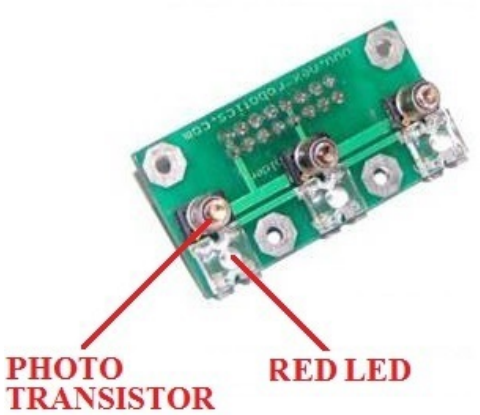
3. White Line Sensors

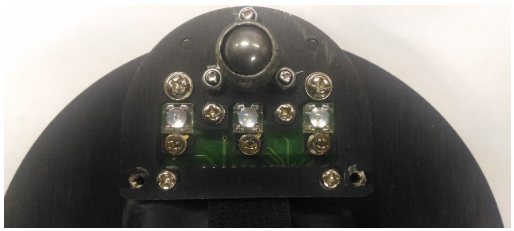




Sensors on Firebird V Platform (cont.)

3. White Line Sensors

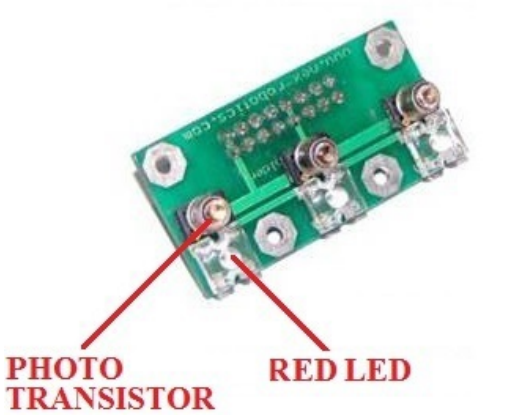


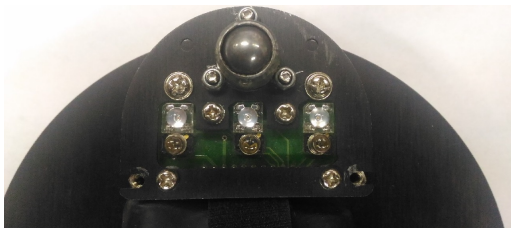


1. Transmitter: Red LED
   Receiver: Photo-Transistor

Sensors on Firebird V Platform (cont.)

3. White Line Sensors





1. Transmitter: Red LED
   Receiver: Photo-Transistor
2. Count on Firebird: 01

Sensors on Firebird V Platform (cont.)

4. Position Encoder

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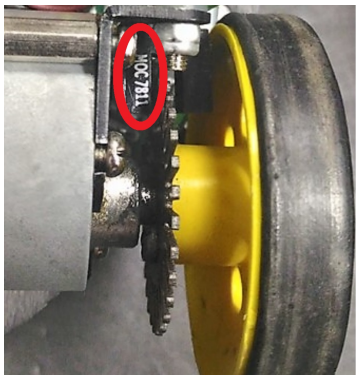
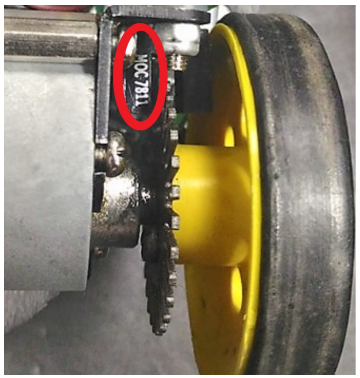
4. Position Encoder



Sensors on Firebird V Platform (cont.)

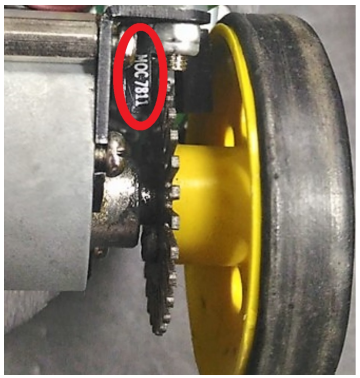
4. Position Encoder



1. Transmitter: IR Transmitter
   Receiver: Photo-Transistor

Sensors on Firebird V Platform (cont.)

4. Position Encoder



1. Transmitter: IR Transmitter
   Receiver: Photo-Transistor
2. Count on Firebird: 02

Sensors on Firebird V Platform (cont.)

5. Infrared TSOP Receiver

Sensors on Firebird V Platform (cont.)

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Sensors on Firebird V Platform (cont.)

5. Infrared TSOP Receiver

1. Receiver: Photo-Transistor

Sensors on Firebird V Platform (cont.)

5. Infrared TSOP Receiver

1. Receiver: Photo-Transistor
2. TSOP1738

Sensors on Firebird V Platform (cont.)

5. Infrared TSOP Receiver

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

Sensors on Firebird V Platform (cont.)

6. Servo Mounted Sensor Pod

Sensors on Firebird V Platform (cont.)

6. Servo Mounted Sensor Pod

1. Purpose: Mount Camera or Sensor

Sensors on Firebird V Platform (cont.)

6. Servo Mounted Sensor Pod

1. Purpose: Mount Camera or Sensor
2. Count on Firebird: Optional Add-on Module

Actuators

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1. Two 60 RPM DC Geared Motor

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2. Servo Motors

Control Room of Robot

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1. ATMEL Manufactured AVR architecture based ATmega 2560 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: 9.6V, 2100mAH, NiMH battery

2. Auxillary Power: 12V, 1A Adaptor

Communication

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- Wired Communication: Between Robot and System

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- USB; RS-232 Serial; USB-to Serial

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- Wireless Communication:Between Robot and System and Robot and Robot

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- Infrared Remote

Indicating Devices

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- 16x2 Alpha numeric LCD

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- 16x2 Alpha numeric LCD

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- 16x2 Alpha numeric LCD

- Buzzer

Indicating Devices

- 16x2 Alpha numeric LCD

- Buzzer

Indicating Devices

- 16x2 Alpha numeric LCD

- Buzzer

- Bar-LED

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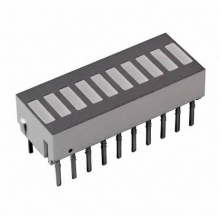

Block Diagram of ATmega2560 based Robot

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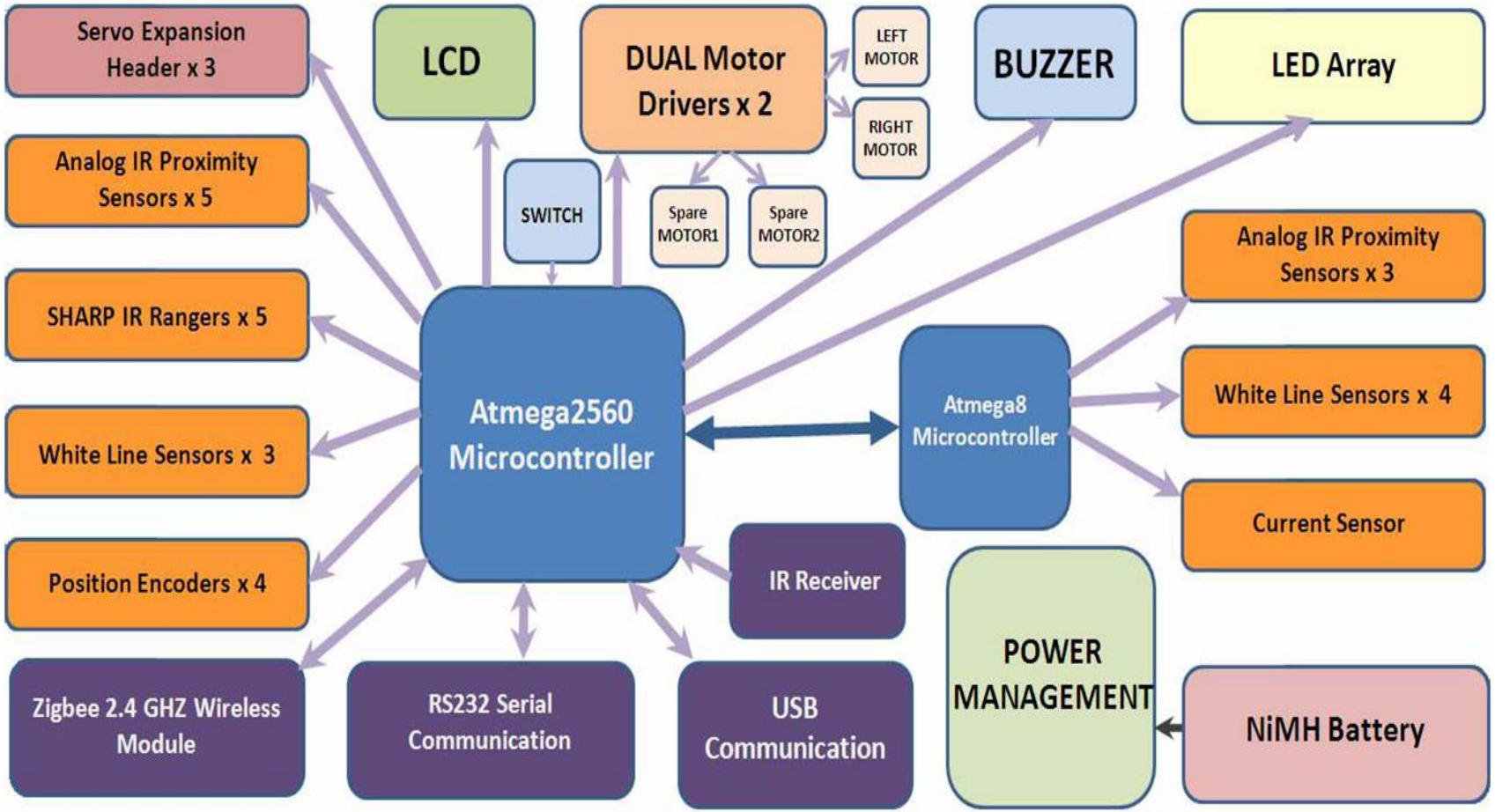

Thank You!

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