



Spark V is a low cost robot designed for robotics hobbyists and enthusiasts. It is jointly designed by NEX Robotics with Department of Computer Science and Engineering, IIT Bombay. Spark V will help you get acquainted with the world of robotics and embedded systems. Thanks to its innovative architecture and adoption of the 'Open Source Philosophy' in its software and hardware design, you will be able to create and contribute to complex applications that run on this platform, helping you acquire expertise as you spend more time with them.

Spark V robot is based on ATMEGA16A microcontroller. Robot comes with rechargeable 7.2V 600mA NiMH Battery and onboard intelligent battery charger. It has 3 analog white line sensors, 3 analog IR Proximity sensors, 3 directional light intensity sensors, battery voltage sensing, TSOP1738 IR receiver for TV remote control and Position encoders. Robot has support for 3 [MaxBotix EZ](#) series ultrasonic range sensors. It also has support for the servo mounted sensor pod which can be used to make 180 degrees scan for the map making. Robot is powered by 6 cell 7.2V 600mA rechargeable NiMH batteries which gives about 30 minutes battery operation. Robot has built-in Smart Battery Controller which charges the battery in intelligent way and also monitors the battery charge level when robot is in operation. Robot has 2x16 alphanumeric LCD, Lots of LED indicators for quick debugging, Buzzer etc. Motors are controlled by L293D motor driver. Robot gives top speed of 15cm to 20cm per second depending on the model.

Robot has USB interface for PC connectivity. Robot has onboard socket for [XBee wireless module](#) for multi robot and robot to PC communication. You can also control this robot over GUI from NEX Robotics over wired (USB) and wireless (XBee wireless modules) medium. Firmware (.hex file) is loaded on the robot using Bootloader Utility from NEX Robotics. There is no need to use external programmer. There are additional empty soldering points at each pin of the microcontroller so that you can access them for customization of the robot.

Robot requires regulated 12V DC supply for the battery charging. You can use 12V, 1A SMPS from NEX Robotics (not included with the robot) or any standard SMPS available. Do not apply more than 12V DC at the charging point of the robot.

Spark V robot also has Spark V prototyping board which is mounted on the top of the Spark V robot to add more sensors or electronics on the robot.

**Note:** If required you need to buy [MaxBotix EZ](#) series ultrasonic range sensors, [XBee wireless module](#) and 12V SMPS based power supply for the battery charging separately.

## Specifications

**Microcontroller:** ATMEL ATMEGA16A

**Programming:** Using Bootloader Utility from NEX Robotics via USB port (no need of separate programmer)

### Sensors:

Three white line sensors

Three IR proximity sensors

Three directional light intensity sensors

2 Position encoders with 12.97mm resolution

[MaxBotix EZ](#) series ultrasonic range sensors (optional)

Servo mounted Ultrasonic Range Sensor (optional)

Battery voltage sensing

TSOP1738 IR receiver for TV remote control (Support code not included)

### Indicators:

2 x 16 Characters LCD

Indicator LEDs

Buzzer

Battery low indication

### Locomotion:

Two DC geared motors and caster wheel as support

Top Speed: 15 to 20cm / second depending on the motor type.

### Operational Modes:

Standalone (Autonomous Control)

PC as master and robot as slave

Distributed (multi robot communication)

### Communication:

USB

XBee wireless module (ZigBee(IEEE 802.15.4) Robots to Robots and Robots to PCs (Optional)

Wired RS232 (serial) communication at TTL level.

Simplex infrared communication (From infrared remote to robot) (support code not included)

## Power:

7.2 V 600 mA rechargeable NiMH battery

Onboard Smart Battery Controller charges the battery in intelligent way and also monitors the battery charge level when robot is in operation.

## Dimensions:

Diameter: 15cm

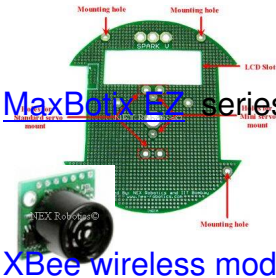
Height: 7cm

## Kit contains

- Spark V Robot with all the sensors mentioned in specifications
- Documentation CD
- USB Cable

### Optional Accessories:

## Spark V prototyping board for adding your own sensors / electronics on the robot



## MaxBotix EZ series ultrasonic range sensors

## XBee wireless modules



## Software Support:

## GUI Based control, AVR studio, WINAVR

# Microsoft robotics studio Visual Programming Language

## Spark V Robot control GUI for controlling robot in wired and wireless mode

Spark V can be controlled using the Spark Visual programming tool language

