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Fire Bird V Hexapod is based on Fire Bird V ATMEGA2560 platform. It has six legs, each leg has 3 degree of freedom (3 DOF). Robot has 18 NRS-995 dual bearing high torque metal gear servo motors. Robot is powered by 7.4V, 1800mAh, 20C Lithium Polymer battery. Robot can be controlled by modified Sony PS2 wireless remote control.

Fire Bird 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. Fire Bird V is designed by NEX Robotics and Embedded Real-Time Systems lab, CSE IIT Bombay.

As a Universal Robotic Research Platform, Fire Bird V provides an excellent environment for experimentation, algorithm development and testing. Fire Bird V is evolved from Fire Bird IV and Fire Bird II which are being used in IIT Bombay to teach embedded systems and robotics. Its modular architecture allows you to control it using multiple processors such as 8051, AVR, PIC and ARM7 etc. Modular sensor pods can be mounted on the platform as dictated by intended applications. Precision position encoders makes it possible to have accurate position control. The platform can be upgraded to tank drive and Hexapod insect or any other desired form very easily. It is powered by high performance rechargeable NiMH batteries. A 2.4 GHz ZigBee module provides state of the art secure and multi-channel wireless communication up to a range of one kilometer.

[See Video](#)

Research Areas

Artificial Intelligence

Multi-Agents System  
Control systems  
Autonomous navigation  
Mobile sensor network  
Collaborative robotics  
Real-Time systems  
Automotive technologies

### Unique Features

- Ideal for doing research in the areas of robotics, embedded systems, artificial intelligence and sensor networks etc.
- Modular Design: Unique layered design gives versatility in design
- Hands-on learning platform
- Covers wide range of subjects like Microcontrollers, Embedded Systems, Mechatronics, Sensor Networks, Image processing.
- Detailed tutorials help in interactive learning.
- Ideal for doing research in the areas of robotics, embedded systems, artificial intelligence, sensor networks etc.
- Supports Microsoft Robotics Developer Studio (MRDS)
- Modular Design: Unique layered design gives versatility in design
- Powered by rechargeable 9.6V 2100mAh NiMh battery pack with smart battery charger
- High performance white line sensors with the illumination modulation facility for improved performance in line grid based navigation with improved power conservation
- Up to five IR range sensors covering front half of the robot with range up to 150cm for intelligent navigation
- Eight analog IR proximity sensors for close proximity detection up to distance of 20cm
- Eight directional light intensity sensors
- Supports three DC motors with position encoders
- Battery voltage monitoring and audible battery low warning for battery protection
- Battery current monitoring
- Closed loop motion control using position encoders
- 16x2 character LCD for displaying sensor data or any other information
- Easy to interface with PC using wired and wireless communication
- Supports 2.4GHz Wireless ZigBee for communication with multiple robots or with PC
- Extensive hardware and software documentation and many application notes and example C programs in AVR studio.
- Available in Hexapod, Omni directional robot, tank drive, Insect and 4 Wheel drive with gripper configuration
- Supports servo motor based wireless camera with pan and tilt motion, IP camera and

sensor pods.

- Easy hardware integration for add on sensors like GPS, Magnetometers, accelerometers and gyroscope etc.

**Note: This product will be shipped with in 20 days after the order confirmation**

[Download Fire Bird V Flyer](#)

[List of international and national publications on the Fire Bird platforms](#)

[Current deployment](#)

[Videos of the Robots](#)

## Specifications

### Microcontroller

Atmel ATMEGA2560 as Master microcontroller

Atmel ATMEGA8 as Slave microcontroller

### Sensors

Three white line sensors (extendable to 7)

Five Sharp GP2D12 IR range sensor (80cm) (One in default configuration) (Also supports GP2D120 (30cm) and GP2Y0A02 (150cm))

Eight analog IR proximity sensors (20cm)

Eight analog directional light intensity sensors

Two position encoders (extendable to four)

Battery voltage sensing

Current Sensing (Optional)

Servo mounted sensor pod (optional)

Wireless colour camera (optional)

Ultrasound scanner (optional)

Gyroscope and Accelerometer (optional)

Magnetometer (optional)

GPS receiver (optional)

## Indicators

2 x 16 Characters LCD  
Indicator LEDs  
Buzzer

### **Control**

Autonomous Control  
PC as “Master” and Robot as “Slave” in wired or wireless mode  
Distributed (multi robot) communication

### **Communication**

Wireless ZigBee Communication (2.4GHZ) (Optional)  
USB Communication  
Wired RS232 (serial) communication  
Simplex infrared communication (From infrared remote to robot)

### **Dimensions**

Height: 13cm (Base is on the ground)  
Height: 19cm (Standing)  
Diameter: 56cm (All the legs spread out)  
Diameter: 44cm (Standing)  
Weight: 2540gms

### **Power**

7.4V, 1800mAh Lithium Polymer battery (NR-BLiPo-2-1800) with smart battery charger  
NR-BLIC-03

### **Battery Life**

30 minutes while motors are powered at 75% of time

### **Locomotion**

Eighteen high torque, dual bearing, metal gear Servo motors (NRS-995) driving six legs (3 motors / leg)

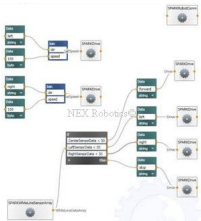
### Software Support

- AVR Studio
- Microsoft Robotic Developer Studio (MRDS) (limited)
- MATLAB

### Kit Contains

- Fire Bird V Robot with all the sensors mentioned in technical specifications
- Documentation CD
- USB Programmer (ISP)
- Smart Lithium Polymer battery charger with balance charging (NR-BLIC-03)
- Serial cable
- USB Cable

### Visual Programming Language in Microsoft Robotics Studio



### Fire Bird V in Microsoft Robotics Developer Studio (MRDS)

