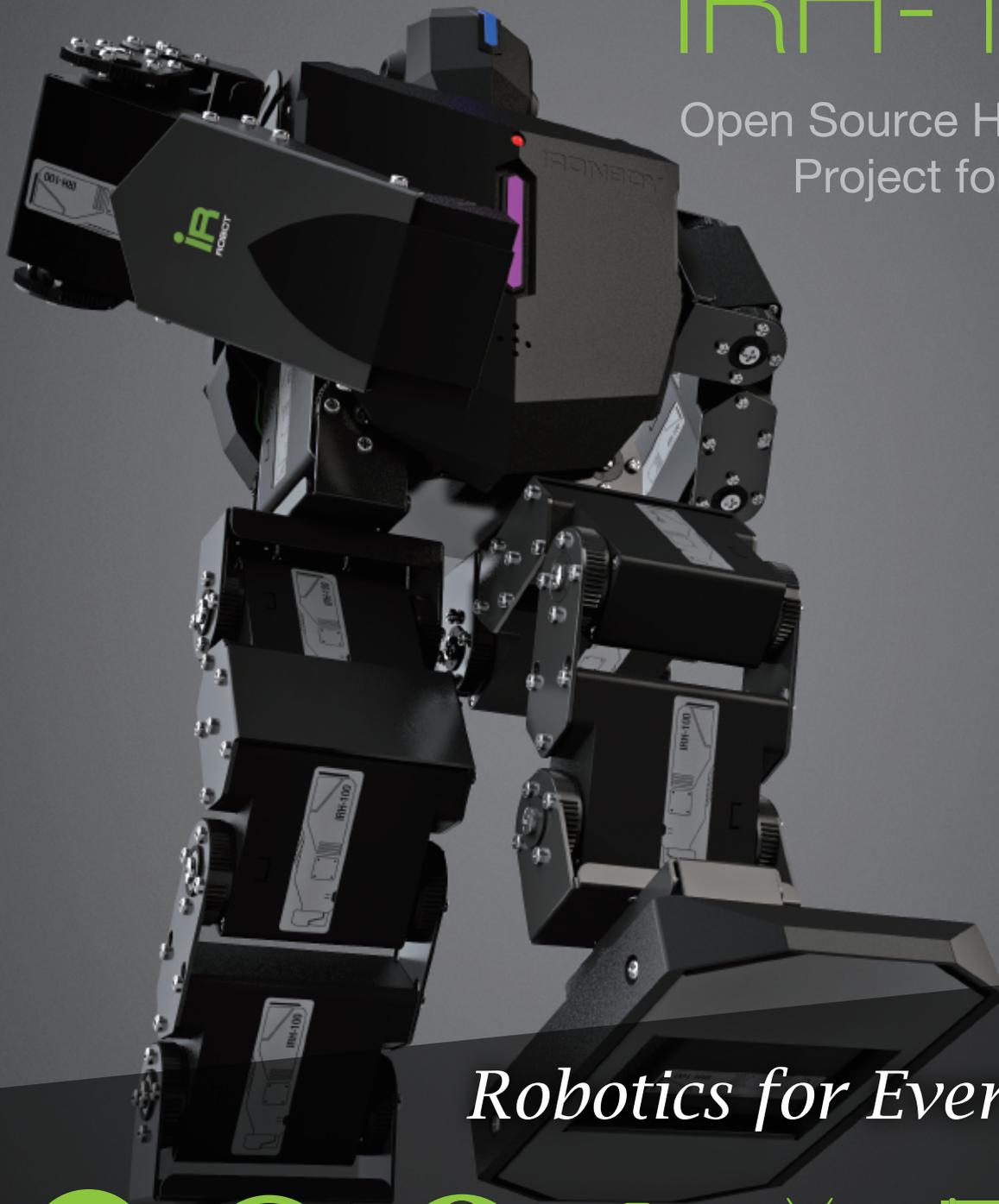


# iRONBOY

## IRH-100

Open Source Humanoid  
Project for Arduino



*Robotics for Everybody.*



**Open Source**

IRduino  
(Arduino- Compatible)  
Board Included



**Fully Assembled**  
(Trouble-Free)



**All-in-One**  
(Gyro, Bluetooth,  
IRduino Board)



**Powerful Battery**



**Mobile Control**  
(Bluetooth 4.0)



**Robot Stand**  
Included



**100 Basic**  
Preprogrammed  
Motions

## How IRH-100 works?

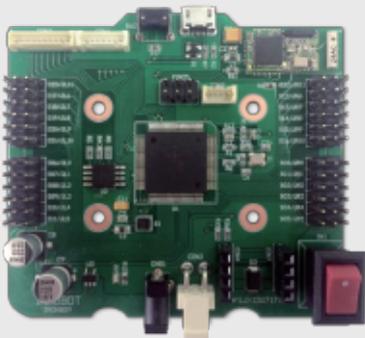
IRH-100 consists of 16 durable digital servo motors, dedicated main control board and metal frames with other hardware. For compatibility with Arduino, IRH-100 is also equipped with IRduino board which simply plugs into main control board. The IRduino board are perfectly compatible with all existing Arduino shields which extends capabilities of IRH-100 drastically. There are already various kinds of existing Arduino shields in the market and user may mount the shield onto IRduino board easily at really reasonable cost. We basically provide IRduino API & Libraries for IRH-100, so you can build your own unique robot tasks freely. Most flexible open source Humanoid is here and you can combine your imagination with IRH-100.



## Features

### Fully Assembled, Ready-to-Operate

It is our philosophy that current robot learning should be focused on learning software and its algorithm rather than learning hardware assembly. So, all IRH-100s will be delivered as a fully assembled version to minimize user's unnecessary effort to assemble the robot. You do not need to put your endeavor into time-consuming, troublesome assembling which sometimes results parts breakage. Just open the box and enjoy robot learning immediately.



### "All-in-One" Main Board

Do not buy optional components. The IRH-100 includes most of necessary robotic components in the box like 6 axis gyro/accelerometer sensor and Bluetooth 4.0 module. In addition, the biggest merit point of IRH-100 is that it also includes IRduino board which is perfectly compatible with most of existing Arduino shields. Simply dock IRduino board onto the main control board of IRH-100 to extend the capability. Last, but not least, IRH-100's main board supports to expand upto 24DOF maximum and faster data processing is available through 16bit microcontroller. 1MB data memory capacity enables user to be free from the restriction of storage unit. (100 different pre-programmed motions, plus 100 more motions created by user can be stored in IRH-100.)



### IRduino Board

The IRduino is a microcontroller board based on the ATmega32u4 and it simply can be docked onto IRH-100's main board. It has 20 digital input/output pins (7 can be used as PWM outputs and 12 as analog inputs), a micro USB connection, a power jack, an ICSP header, and a reset button. To manage port expandability efficiently, user may select between Hardware serial and Software serial communication. Also, you are able to use IRduino board as an individual microcontroller board which is completely compatible with Arduino for your further robotic task. API, examples and Library will be provided with API manual.



### Servo Motor

The IRH-100 consists of 16 durable, energetic programmable digital servos called IRS-430. Featured with highly durable super engineering plastic gear train, powerful motor and elaborate circuit board with 32bit Micom and 4096 resolution, IRH-100 ensures users to perform various challenging robot tasks. Overload protection and position feedback feature are basically available for this sturdy servo motor.

## Total Manager Software

Total Manager Software is an intuitive interface software for setting of motion, motion task, programming LEDs/Buzzer and monitor various sensor value. Thanks to "Inverse -Kinematics" UI and motion synchronization for the left and right, users are able to create their own motions intuitively and time for motion creation will be saved drastically.



## Why Open-source?

### Open source for everybody.

**Open source from beginner to expert :** IRduino is an open-source platform based on easy-to-use hardware and software which is easy-to-use for beginners, yet flexible enough for advanced users, so developer may edit it freely & flexibly.

**Abundant information :** Developer may easily acquire abundant technical information through Arduino community. There are tons of Arduino communities on the web and even beginner may get necessary information, advice easily from the communities and may also approach various kinds of self-teaching books for Arduino anywhere, anytime.

### Simple, Easy & Hassle-Free.

- With IRduino, you do not need to be an electronic professional. Even many artists like interactive music and video artist may utilize it for their project.
- Non-professional may learn Robotics easily and build their own robotic structures effectively for proto type using IRduino platform based on easy programming and abundant information on the internet.
- Soldering will be minimized thanks to "Breadboard" system.

### Best solution to learn C language.

- Since IRduino is using similar language as C, it is a good tool to learn C language effectively. The language can be expanded through C++ libraries, and user who wants to understand more technical details may skip to the AVR C programming language on which it's based.
- On the other hand, user may add AVR-C code directly into their IRduino programs if they wish. Also, you may utilize your knowledge if you have some experience in Flash, Android, MaxMSP, Processing and Object C.

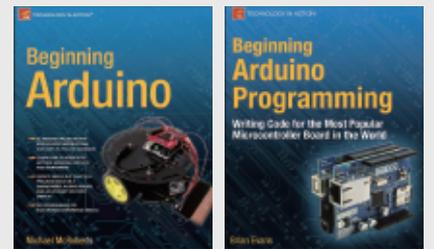
### Abundant "Shields" at reasonable cost in the market. Immediate solution.

- There are already existing "shield(like sensors)" which enable developer to try various kinds of robot tasks in short time. Most of Shield Boards are relatively reasonable in cost-wise comparing to other microcontroller system, so developer may also minimize development cost.

### Convenience

**Using USB port :** Thanks to using the most popular USB port (No Serial or Parallel port as like conventional Micom development). No need converting gender. Simply plug in your USB port to enter into the new world of IRduino.

**Cross-platform :** Compatible with the most of O/S like Windows, Mackintosh OSX and Linux operating system while most of micro-controller system support Windows only.



# Specification

| Robot                                    |   |
|--|---|
| <b>Control System</b>                    | Pulse Width Modulation Control, 1500usec Neutral  |
| <b>Degree of Freedom</b>                 | 16DOF (Expandable upto 24DOF)   |
| <b>Operating Voltage</b>                 | 6.0VDC (Ni-Mh)  |
| <b>Robot Control method</b>              | <ul style="list-style-type: none"> <li>• Mobile control using Android App via Bluetooth 4.0 BLE, or</li> <li>• IR Remote controller (Remote controller not included)</li> </ul>   |
| <b>Main Controller</b>                   | <ul style="list-style-type: none"> <li>• 16bit, ATXmega128, Firmware Upgradeable</li> <li>• 1MB data memory (Basic 100 motions to be provided, plus another 100 of user's motion can be stored.)</li> <li>• IRduino Docking Port</li> <li>• Gyro/Accelerometer sensor and Bluetooth 4.0 imbedded on the main board</li> </ul>   |
| <b>Management Software</b>               | <ul style="list-style-type: none"> <li>• Total Manager Software (Bundle Pack) featured with Motion Feedback, Motion Capture and Inverse-Kinematics.</li> <li>• Motion and Task setting</li> <li>• LED/Buzzer control and Sensor monitoring</li> </ul>   |
| <b>6 Axis Gyro/ Accelerometer Sensor</b> | 3 Axis Accelerometer, 3 Axis Gyro (Embedded on Main Controller)   |
| <b>Battery</b>                           | 1500mAh, 6.0VDC (Ni-Mh)   |
| <b>Arduino Compatibility</b>             | <ul style="list-style-type: none"> <li>- IRduino Board Included (Compatible with various Arduino Shields)</li> <li>- Arduino API, Example &amp; Library to be provided.</li> <li>- 20 digital input/output pins (7 for PWM outputs and 12 for analog inputs)</li> <li>- Micro USB connection, power jack, ICSP header, and reset button</li> <li>- 32KB Flash memory, 2.5KB SRAM, 1KB EEPROM and 16MHz Clock Speed</li> </ul> |
| <b>LED Control</b>                       | Programmable 3 color LED in chest, 1 Blue LED(Bluetooth Link) in Head   |
| <b>Operating Temperature</b>             | -20℃ ~ +60℃   |
| <b>Robot Stand</b>                       | Robot Stand with adjustable arm (3 axis)  |
| <b>Dimension</b>                         | 170 X 99 X 335mm  |
| <b>Weight</b>                            | 1.3kg   |
| Servo motor                              |   |
| <b>CPU</b>                               | 32Bit Micom, 4096 Resolution, Programmable  |
| <b>Operating Voltage</b>                 | 4.8 ~ 6.0VDC  |
| <b>Operating Temperature</b>             | -20℃ ~ +60℃   |
| <b>Speed</b>                             | 0.2sec at 6.0V  |
| <b>Stall Torque</b>                      | 8kgf.cm at 6.0V   |
| <b>Standing Torque</b>                   | 12kgf.cm at 6.0V  |
| <b>IDLE Current</b>                      | 20mA  |
| <b>Running Current</b>                   | 200mA / NO Load   |
| <b>Dead Band</b>                         | 5usec   |
| <b>Angle of Pulse</b>                    | 1° / 10usec   |
| <b>Maximum Angle Range</b>               | -65° +65°   |
| <b>Dimension</b>                         | 40 x 20 x 47mm  |
| <b>Weight</b>                            | 55g   |

※ Designs and specifications are subjected to be changed without prior notice for further improvement.