

## Overview:

6 DOF Biped Robot from Robokits comes with 6 degrees of freedom joints. Its actuated using 6 Metal Gear Standard Servo (or) Servo Economy. This Biped Robot is controlled by ARDUINO UNO R3 BASED USB 18 SERVO CONTROLLER (Optionally available with Bluetooth). It can also be controlled by PC using USB 18 Servo Controller Software. The software helps to develop the complex sequences in real time on the hardware. It also generates Arduino based code for the developed sequence which can be deployed on the controller on board thereby making the robot autonomous.

The power requirement for this robot is 5 to 6V DC 10 Amp power supply. It could be either battery or a AC power supply rated at 5-6VDC. You can also use a modified computer SMPS supply, it is available for sale on Robokits website. The detailed features of the Servo Controller are:

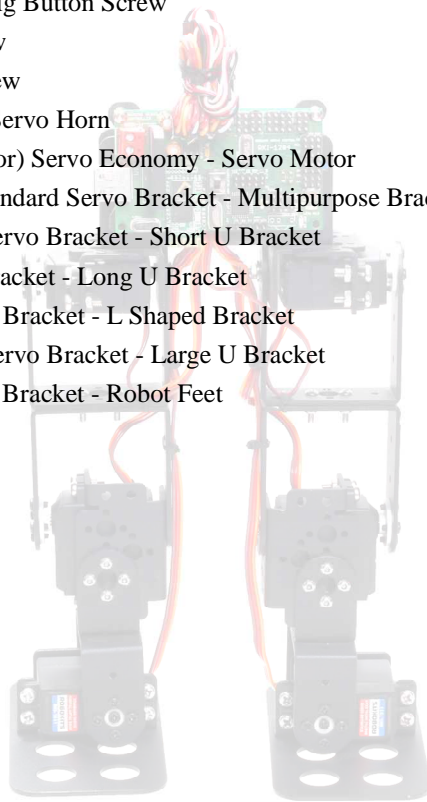
- Control 18 hobby servos from PC and Microcontroller
- USB interface
- Comes Pre-loaded Arduino Uno bootloader
- Software exports servo sequences to Arduino Uno for running servo sequences
- Independent range setting for each servo
- Independent offset, Maximum, Minimum and Direction setting for each servo
- 0.5-microsecond resolution
- 50 Hz update rate
- Small size of 80 X 47 mm
- Plug and Play, Auto detection of hardware
- Easy to use software
- Servo sequencer with speed, delay, goto and many other features
- Home and neutral position setting
- Easy to install USB driver and Application software
- Bluetooth interface for wireless control of robots (Optionally available)

After assembling the Biped Robot you will be able to control it from a Windows PC. You can also develop your own sequences in real time on hardware and can generate the code for Arduino which will be deployed onto the board making the robot autonomous.

Let's start with the basic assembly of Biped Robot. Some basic tools like screw drivers, pliers, small spanners, soldering iron, wire cutter, nipper, stripper are required to complete the assembly.

The notations used in this document for screws, nuts, bolts and other parts are like these:

1. M4 x 12 Screw - M4 Screw
2. M4 x 12 Screw Nut - M4 Nut
3. 3 x 6 Servo Screw - Servo Screw
4. Miniature Ball Radial Bearing - Bearing
5. 3 mm Nylock Nut - Lock nut
6. 3 mm Nut - Nut
7. 3 x 6 Button Head Screw - Small Button Screw
8. 3 x 10 Button Head Screw - Big Button Screw
9. 3 x 6 CSK Screw - CSK Screw
10. M3 x 8 Screw - M3 Mid Screw
11. Metal Horn for Servo 25T - Servo Horn
12. Metal Gear Standard Servo (or) Servo Economy - Servo Motor
13. Multipurpose Aluminium Standard Servo Bracket - Multipurpose Bracket
14. Short U Shape Aluminium Servo Bracket - Short U Bracket
15. Long U Aluminium Servo Bracket - Long U Bracket
16. L Shaped Interconnect Servo Bracket - L Shaped Bracket
17. Large U Beam Aluminium Servo Bracket - Large U Bracket
18. Robot feet Aluminium Servo Bracket - Robot Feet



**Steps to Assemble Biped Robot:**

**Step 1:** As shown in Image below take 2 x Robot Feet, 2 x Multipurpose Brackets, 8 x Lock Nuts and 8 x CSK Screws.



Fix the Multipurpose Brackets on the Robot Feet with the help of CSK Screws and Lock Nuts. The assembly will look as shown in the below Image.



**Step 2:** Now take 2 x Short U Brackets, 2 x Servo Horns, 8 x Servo Screws, 2 x M3 Mid Screws, 2 x Nuts ( Figure shows Lock Nuts but you can use Nuts provided in the Kit ) and 2 x Bearings as shown in the below Image.



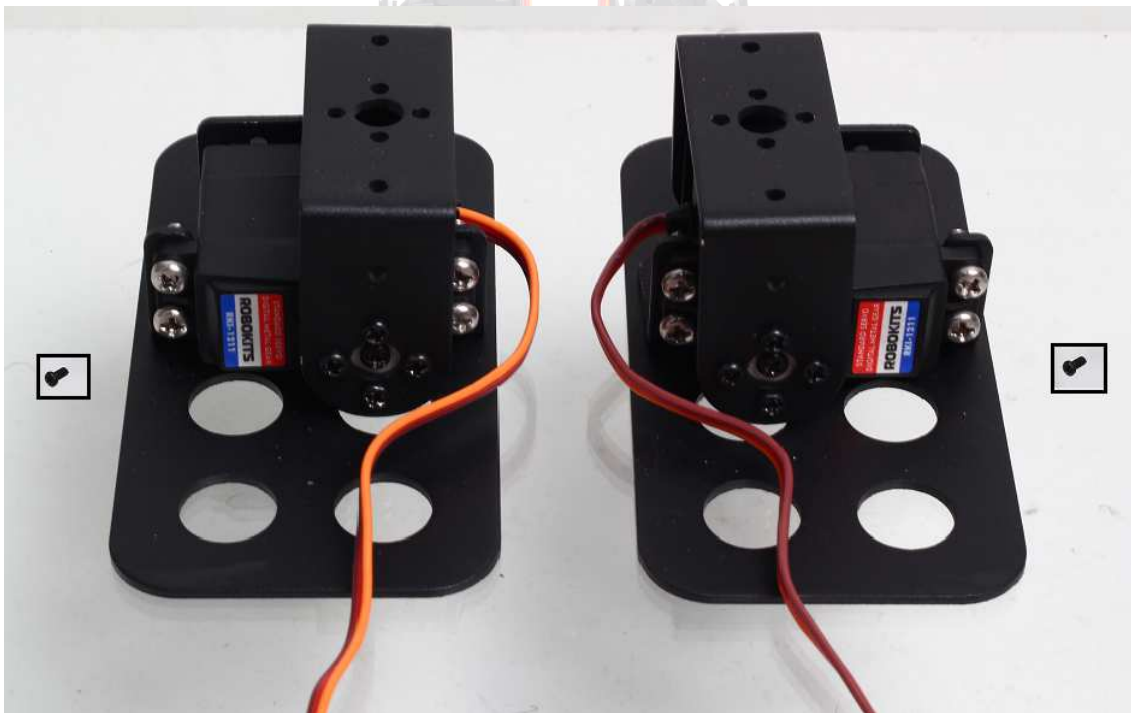
Fix the Servo Horns with the help of Servo Screws on the Short U Brackets. This Short U Brackets will be fixed to the Robot feet with the help of M3 Mid Screws, Nuts and Bearings. Below image shows how it looks after fixing.



**Step 3:** Now take 2 x Servo Motors, 8 x M4 Screws and 8 x M4 Nuts as shown below.



Fix the Servo Motors in the assembly as shown below with the help of M4 Mid Screws and M4 Nuts. Now the Black Box in the below image shows the Servo Screw which is to be fixed to Servo Motor Shaft after Neutralizing the Servo Motor. To Neutralize connect the Servo Motor to Servo Controller. Power up Servo Controller with 5 to 6 VDC power supply and connect to PC software with USB or Bluetooth connection. Neutralize the servo (Put the servo to center position) using software. After that tight the Servo Screw (Shown in Black Box) to the Shaft of the Servo Motor as shown in the below image.



**Step 4:** Now take Structure assembled in previous step along with 2 x L Shaped Brackets. Also take 8 x Big Button Screws and 8 x Lock Nuts.



Fix the L Shaped Brackets as seen in the below image.



**Step 5:** Now take the structure assembled in previous step along with 2 x Multipurpose Brackets, 8 x Small Button Screws and 8 x Nuts.



Assemble the structure as shown in the below image.





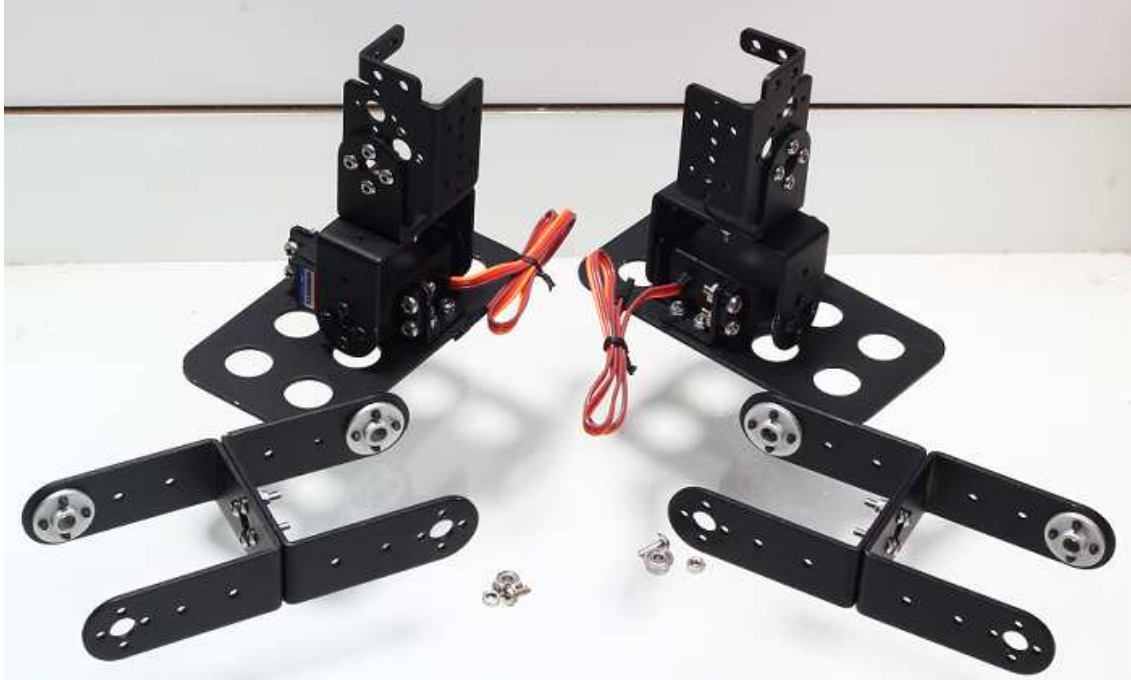
**Step 6:** Now take 2 x Long U Brackets, 2 x Servo Horns and 8 x Servo Screws as shown below.



Fix both the Long U Brackets with 4 x Big Button Screws and 4 x Lock Nuts as shown in the below image. Also fix the Servo Horns on the Long U Brackets. Assemble the same structure for other leg of the Robot.



**Step 7:** Now take both assembled structures as shown below along with 2 x M3 Mid Screws, 2 x Nuts and 2 x Bearings.



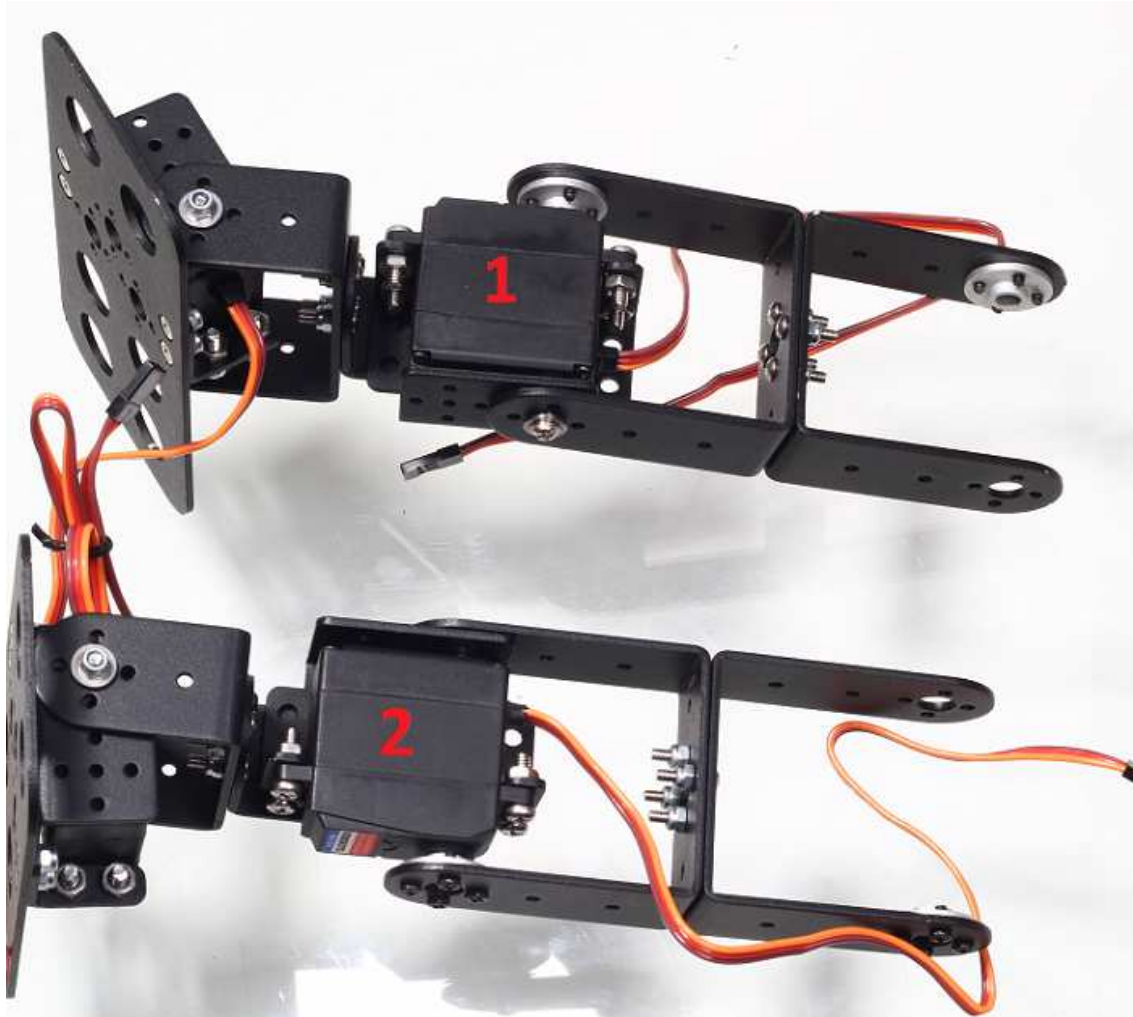
Fix both the structures as shown in the below image.



**Step 8:** Now take 2 x Servo Motors, 8 x M4 Screws and 8 x M4 Nuts.



Fix the Servo Motors at place 1 and 2 shown in the below Image. Also Neutralize both the Motors and tight the Servo Screws on the Shaft of the Servo Motors once Neutralized.



**Step 9:** Now take 1 x Large U Bracket, 2 x Multipurpose Brackets, 8 x Small Button Screws and 8 x Nuts.



Fix the Brackets as shown in the below Image.



**Step 10:** Now take both the structures which are assembled in the previous steps and are shown below along with 2 x M3 Mid Screws, 2 x Bearings and 2 x Nuts.



Fix them as shown in the below Image.



**Step 11:** Now take 2 x Servo Motors, 8 x M4 Screws and 8 x M4 Nuts as shown in the below Image.



Fix both the Servos at Place 1 and 2 as shown below. Also neutralize the Servo Motors and tight the Servo Screws on the Shaft of Motor once Neutralized.



After following all the steps 6 DOF Bipedal Robot will be assembled and it will look like the one shown in the below Image.

