HD-3001HB/1501MG
RC Servo Motor

User's Manual

V1.0

MAY 2014

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1. INTRODUCTION/OVERVIEW

Radio Control (RC) hobby servos are small actuators designed for remotely operating model vehicles such as cars, airplanes, and boats. Nowadays, RC servos are becoming popular in robotics, creating humanoid robot, biologically inspired robot, robotic arm and etc. This is because its' ability to rotate and maintain the position or angle according to control pulses from a single wire. Inside a typical RC servo contains a small motor and gearbox to do the work, a potentiometer to measure the position of the output gear, and an electronic circuit that controls the motor to make the output gear move to the desired position. Because all of these components are packaged into a compact, low-cost unit, RC servos are great actuators for robots.

Features:

- Control position through Pulse Code Modulation
- Pulse width range: ~ 0.8ms – 2.2ms
- Come with servo horn and screw accessories

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2. PACKING LIST

Please check the parts and components according to the packing list. If there are any parts missing, please contact us at sales@cytron.com.my immediately.

HD-3001HB RC Servo

HD-1501MG RC Servo

1. 1 x RC Servo
2. RC Servo accessories

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3. SPECIFICATION

Cytron Technologies offer great range of RC servo motor. With the combination of various gear type, speed, torque and voltage, users are free to choose the suitable RC servo for project development. Of course, it can also be used for RC application. Below is product specification for Cytron RC Servo motor. This document is meant for two type of RC servo model. HD-3001HB and HD-1501MG

Specification	HD-3001HB	HD-1501MG
Speed @ 4.8V (s/60º)	0.14	0.16
Speed @ 6.0V (s/60º)	0.12	0.14
Torque @ 4.8V (Kg.cm)	3.5	15.5
Torque @ 6.0V (Kg.cm)	4.4	17.0
Signal To Control Angle	TTL PWM	TTL PWM
PWM At Min Angle (ms)	0.8	0.8
PWM At Max Angle (ms)	2.2	2.2
PWM At Neutral Position (ms)	1.5	1.5
Operating Voltage (VDC)	4.8-6.0	4.8-6.0
Operating Frequency (Hz)	50.0	50.0
Moving Range(degree)	0-180	0-180
Wiring (Black/Brown Wire)	Ground	Ground
Wiring (Red Wire) (+VDC)	4.8 to 6.0	4.8 to 6.0
Wiring (Orange/Other Wire)	Signal	Signal
Dimension (mm)	~ 40.7x20.5x39.5	~ 40.7x20.5x 39.5
Weight (g)	43.0	60.0
Gear material	**Plastic Gear**	**Metal Gear**
Servo type	Standard	Standard

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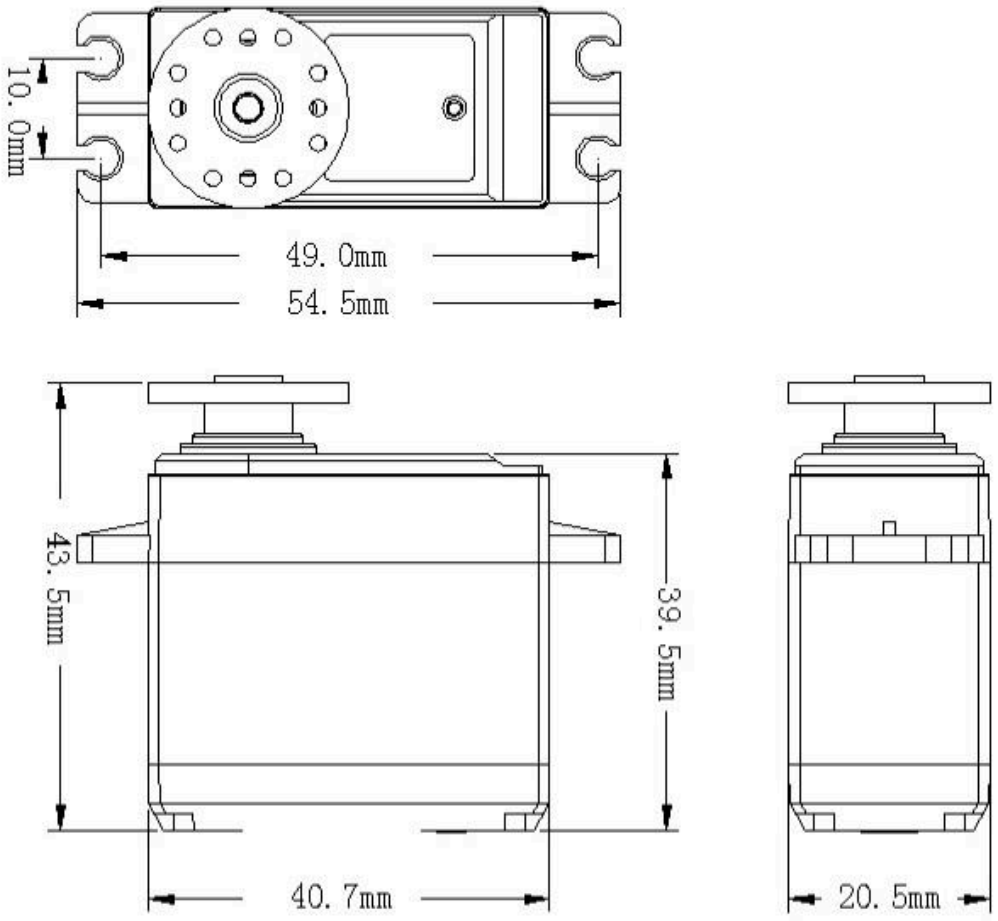
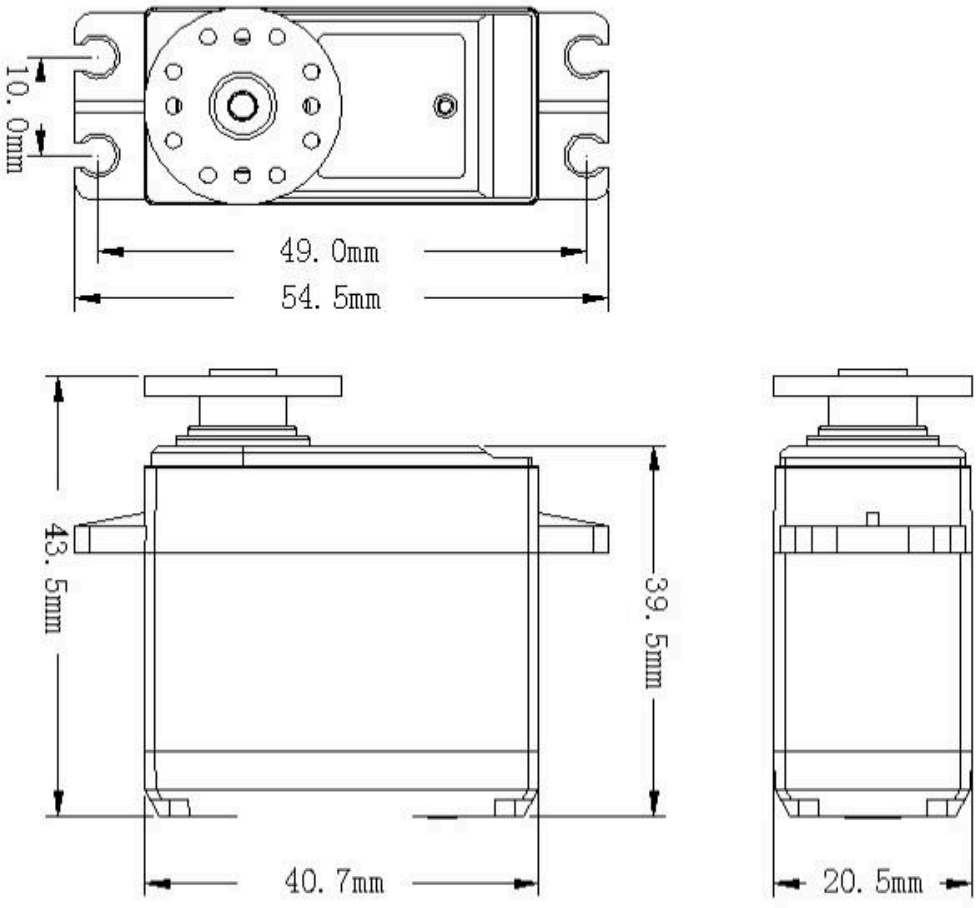
4. DIMENSION

HD-3001HB

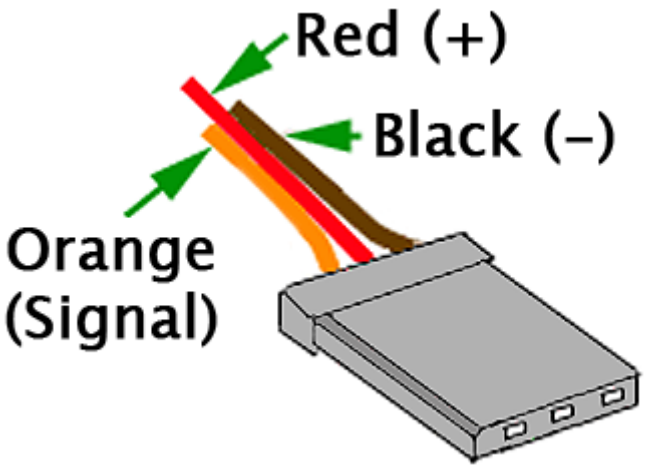


HD-1501MG

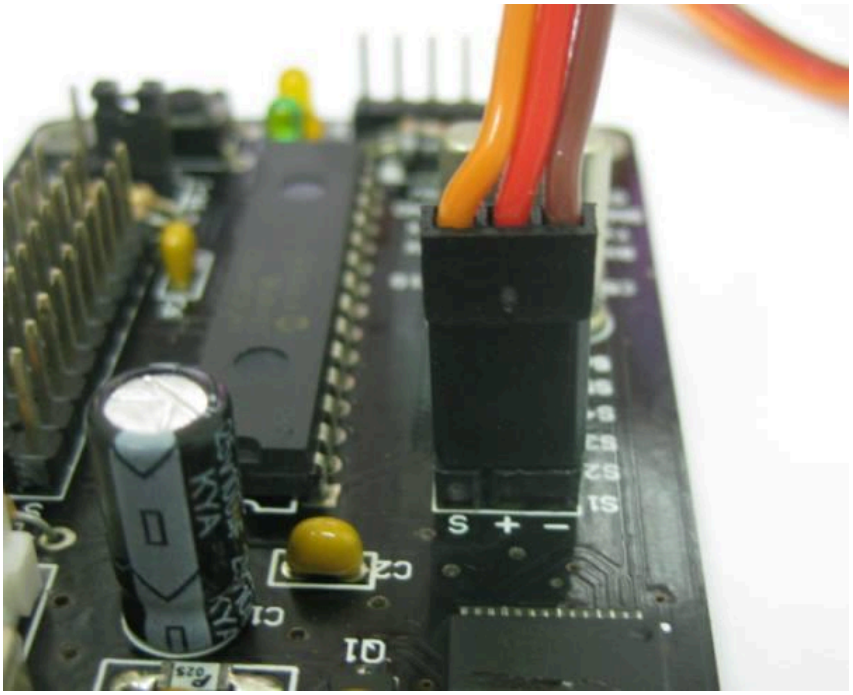

10. 0mm
49. 0mm
54. 5mm
43. 5mm
39. 5mm
40. 7mm
20. 5mm

1501MG
Analog Servo
Power HD

5. HARDWARE



Below is example connection of RC Servo Motor to SC16A. (+) for VCC, (-) for GND and (s) for signal.



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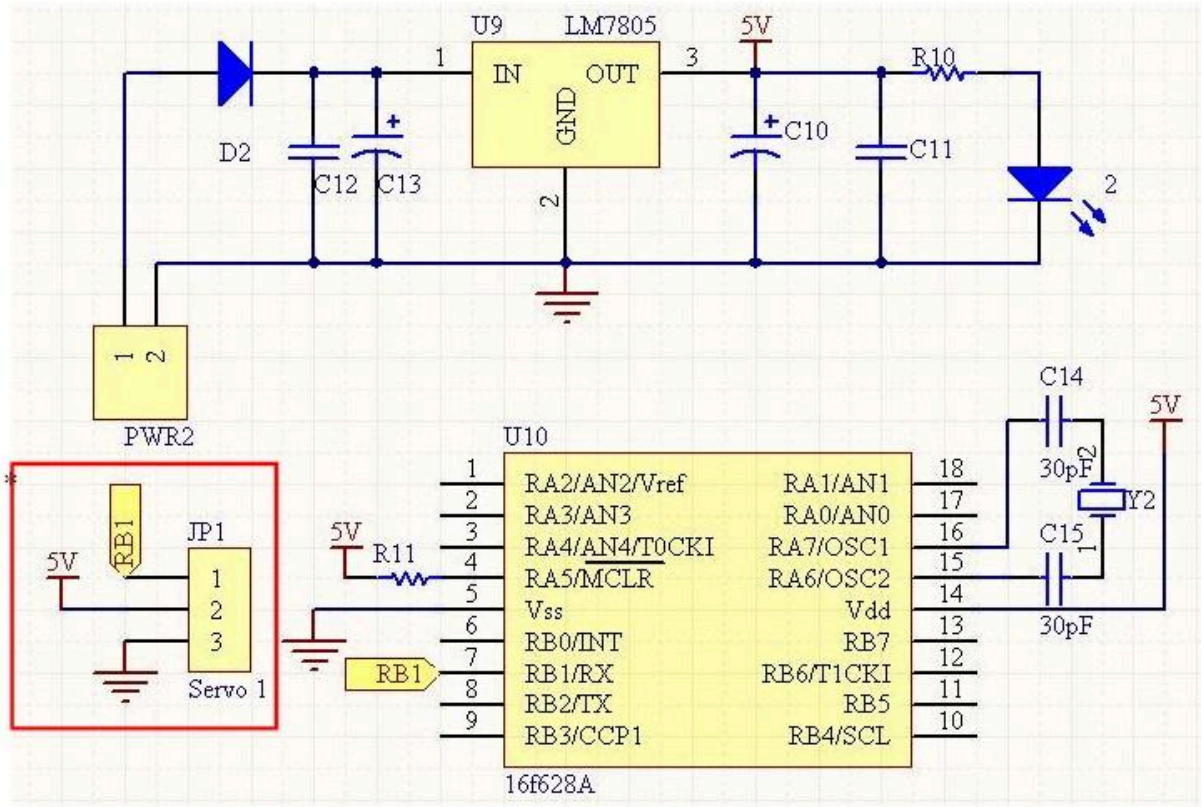
Below is an example connection between servo motor and PIC

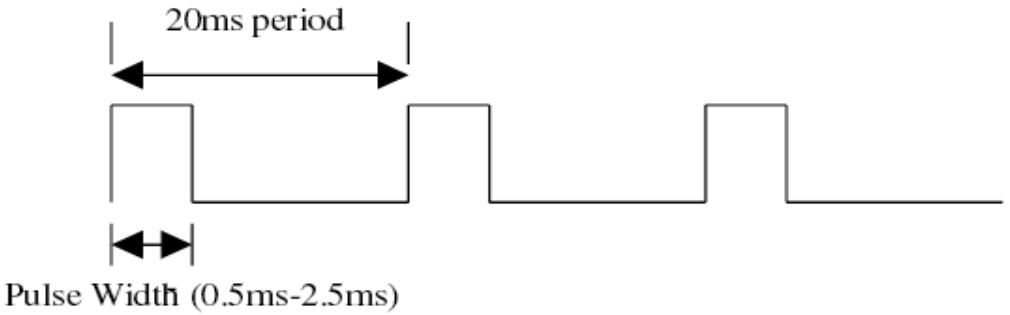


*** Connector for RC Servo. RB1 is signal pin which is connecting to PIC**

6. SOFTWARE

6.1 How RC Servo Works

Servos are controlled by sending them a pulse of variable width. The signal wire is used to send this pulse. The parameters for this pulse are that it has a minimum pulse, a maximum pulse, and a repetition rate. Given the rotation constraints of the servo, neutral is defined to be the position where the servo has exactly the same amount of potential rotation in the clockwise direction as it does in the counterclockwise direction. It is important to note that different servos will have different constraints on their rotation.



The angle is determined by the duration of a pulse that is applied to the signal wire. This is called Pulse Width Modulation. The servo expects to see a pulse every 20 ms. The length of the pulse will determine how far the motor turns. For example, a 1.5 ms pulse will make the motor turn to the 90 degree position (neutral position). However, the **exact correspondence between pulse width and servo varies from one servo manufacturer to another**.**1.5ms is not necessarily neutral or middle position.**

The position pulse must be repeated to instruct the servo to stay in position. When a pulse is sent to a servo that is less than 1.5 ms the servo rotates to a position and holds its output shaft some number of degrees counterclockwise from the neutral point. When the pulse is wider than 1.5 ms the opposite occurs. The minimal width and the maximum width of pulse that will command the servo to turn to a valid position are functions of each servo. Different brands, and even different servos of the same brand, will have different maximum and minimums. Generally the minimum pulse will be about 1 ms wide (some servo is 0.5ms) and the maximum pulse will be 2 ms wide (some servo is 2.5ms).

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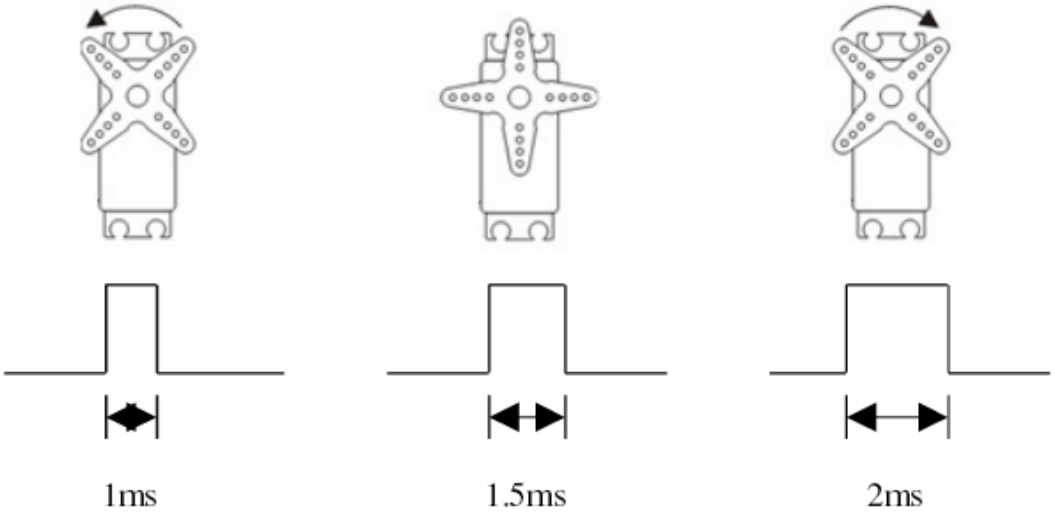

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Another parameter that varies from servo to servo is the turn rate. This is the time it takes from the servo to change from one position to another. The turning rate and torque value can be check at product specification section.

Caution: Over range of the pulses will damage the servos.

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7. WARRANTY

- Product warranty is valid for 12 months.
- Warranty only applies to manufacturing defect.
- Damaged caused by misuse is not covered under warranty
- Warranty does not cover freight cost for both ways.

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