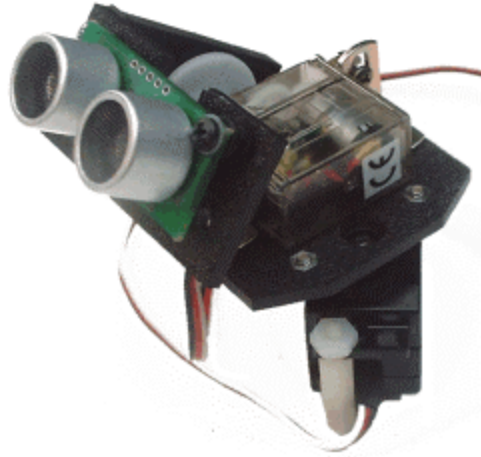


Budget Robotics

Servo Sensor Pan-Tilt Turret

For Devantech SRF0x Ultrasonic Modules

Assembly Instructions



The Budget Robotics Servo Pan-Tilt Turret provides a quick and inexpensive way to provide 160°-plus coverage of sensors. The turret is available to match the mounting requirements of several sensor types. The Servo Pan-Tilt Turret kit does not come with the sensor module, but does include two R/C servos and all hardware.

This document describes the servo turret designed for the Devantech SRF04 and SRF08 ultrasonic distance modules. These modules are available from a network of dealers and distributors. See the Sources section for more detail.

Parts List

Quantity	Description
1	Pan servo (low-profile type), with servo horn screw
1	Sub-miniature tilt servo, with servo horn screw
1	Pan plate (includes servo horn, steel angle brackets, and mounting hardware) -- pre-assembled
1	Tilt plate (includes servo horn and mounting hardware) -- pre-assembled
1	Sensor module mounting plate
2	4-40 x 5/16" machine screws
2	4-40 hex nuts
2	#4 self-tapping screws
2	4-40 locking hex nuts
2	4-40 x 1/2" machine screws
2	#4 washers

2	Rubber grommets
4	Nylon standoffs, 6-32 threads
4	Nylon hex nuts, 6-32 threads
4	Nylon machine screws, 6/32 x 1/2"
1	Dual Lock strip

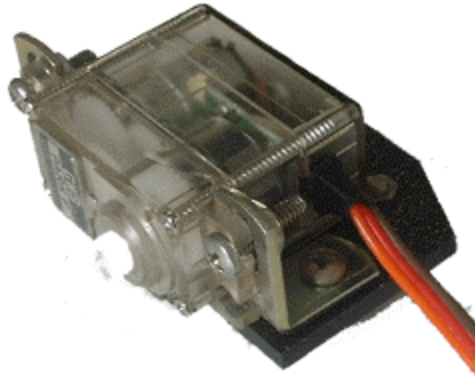
Assembly Steps

Step 1-Mount Tilt Servo

Use:

- (1) Tilt servo
- (1) Pan plate
- (2) 4-40 x 5/16" screws
- (2) 4-40 hex nuts

Attach the tilt servo to the pan plate as shown, using the supplied 4-40 screws and nuts. The mounting flange of the servo should be located *in front* the steel brackets.



Step 2-Mount Tilt Servo

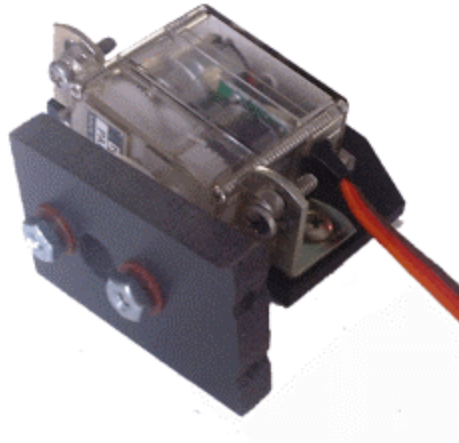
Use:

- (1) Assembly from Step 1
- (1) Tilt plate

Remove the servo horn retainer screw from the tilt servo and store in a safe place.

Attach the tilt plate to the tilt servo. As necessary, slowly rotate the tilt plate to the left/right extremes of the servo. Ensure that the servo is at its approximate mid-point when the plate is parallel to the case of the servo.

Once oriented, secure the plate to the servo using the servo horn retainer screw.

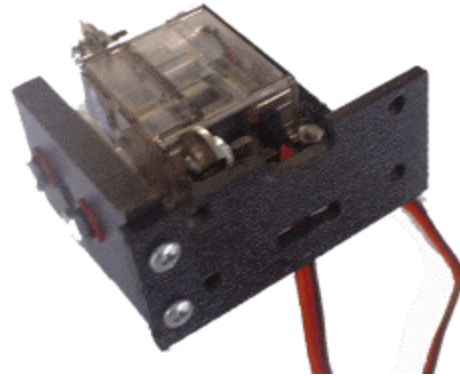


Step 3-Mount Sensor Module Mounting Plate

Use:

- (1) Assembly from Step 2
- (1) Sensor module mounting plate
- (2) #4 self-tapping screws

Orient the sensor module mounting plate so that set of two extra holes is on the left (as shown), and the notch is on the top. Using (2) #4 self-tapping screws secure the mounting plate to the tilt plate. The screws go through the two extra holes on the left of the plate.



(The rippled side of the sensor module mounting plate should face outward.)

Step 4-Mount pan servo

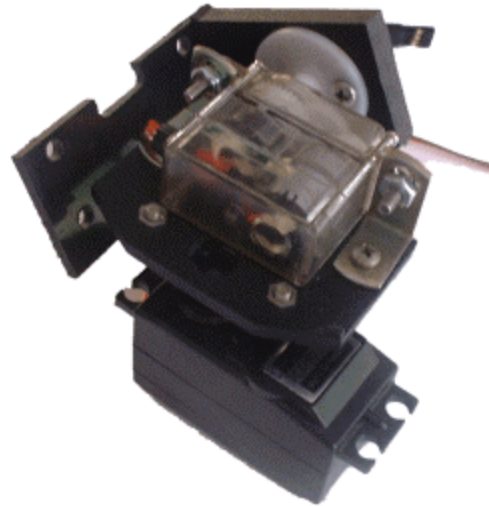
Use:

- (1) Assembly from Step 3
- (1) Pan servo

Remove the servo horn retainer screw from the tilt servo and store in a safe place.

As necessary, slowly rotate the pan plate to ensure that it is centered when the servo is at its approximate mid-point.

Once oriented secure the plate to the servo using the servo horn retainer screw.



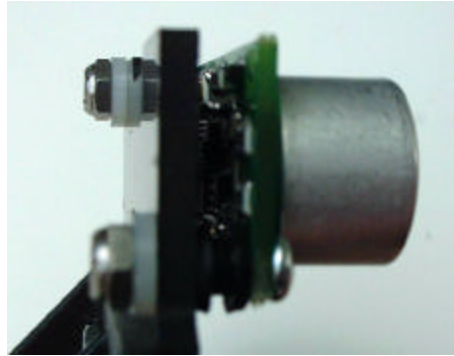
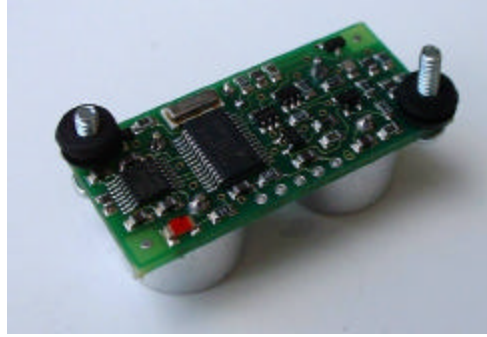
Step 5-Attach sensor module

Use:

- Assembly from Sep 4.
- Devantech ultrasonic sensor module (you supply)
- (2) Rubber grommets
- (2) 4-40 x 1/2" machine screws
- (2) Nylon washers
- (2) 4-40 locking hex nuts

Place a nylon washer onto each screw, then push both screws through the available holes on the Devantech sensor module.

Attach the Devantech module to the sensor module mounting plate, and secure using the two 4-40 locking hex nuts.



You may mount the pan servo to your robot or other base using either the four nylon standoffs, or the Dual Lock fastener. The standoffs use standard 6-32 threads. Mount the standoffs to the servo using the supplied 6/32 hex nuts. (You may need to twist the power cable of the pan servo so that it is sideways between the two standoffs.)

Drill 1/8" holes in the robot or other base to match the footprint of the four standoffs. You can use chalk or an ink pad to transfer the footprint of the standoffs to your base.

For a less permanent mounting, use the supplied strips of 3M Dual Lock fastener to attach the servo to your robot base. Cut the fastener strip in half. Clean the surfaces of the servo and base. Peel off the paper on one strip and apply it to the base as desired. Press tightly. On the other strip peel off the paper, and apply it to the bottom of the servo. Press tightly. Join the Dual Lock pieces. For best results, allow the press-on adhesive to cure for 6-12 hours for the strongest bond.

Sources

The Devantech SRF04 and SRF08 ultrasonic distance sensors are manufactured by Devantech Ltd, located in the UK. They are available from a network of dealers and distributors. A full list of dealers is provided on their Web site:

Devantech Ltd (manufacturer)

<http://www.robot-electronics.co.uk/>

North American dealers/distributors include the following. Prices vary.

Acroname

<http://www.acroname.com/>

Hobby Engineering

<http://www.hobbyengineering.com/>

Junun Robotics

<http://www.junun.org/MarkIII/Store.jsp>

Lynxmotion

<http://www.lynxmotion.com/>

Superdroid Robotics

<http://www.superdroidrobots.com/>

Wehali Engineering

<http://wehali.com/>

Zagros Robotics

<http://www.zagrosrobotics.com/>

Servo Control

The Servo Sensor Turret uses a standard-size radio control servo. The servo can be operated at 4.8-6.0 vdc. The plug is the "universal" type and will mate with Hitec/JR, Futaba-J, and Airtronics-Z style connectors. The wiring is color-coded:

- Brown - Ground
- Red - +V
- Orange - Signal

The servo is controlled with a series of pulses on the Signal line. The pulses vary between 1.0 milliseconds (ms) and 2.0 ms. A 1.5 ms pulse will move the servo to its approximate center. A 1.0 ms or 2.0 ms pulse moves the servo to its normal clockwise or counter-clockwise position. The pulses are sent at approximately 50 Hz.

If you require a greater arc swing, you can supply pulses shorter than 1.0 ms, and longer than 2.0 ms. But exercise care so that the servo does not hit its internal stops. Damage will result to the servo if this condition is allowed to continue. When a full arc is needed trial and error is the best method for determining the absolute minimum and maximum settings for the servo.

As the programming requirements vary for each microcontroller, we recommend that you consult the documentation for the controller you are using for more information on using R/C servos.

The Servo Pan-Tilt Sensor Turret is available from:

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Oceanside, CA 92056

<http://www.budgetrobotics.com/>
orders@budgetrobotics.com

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