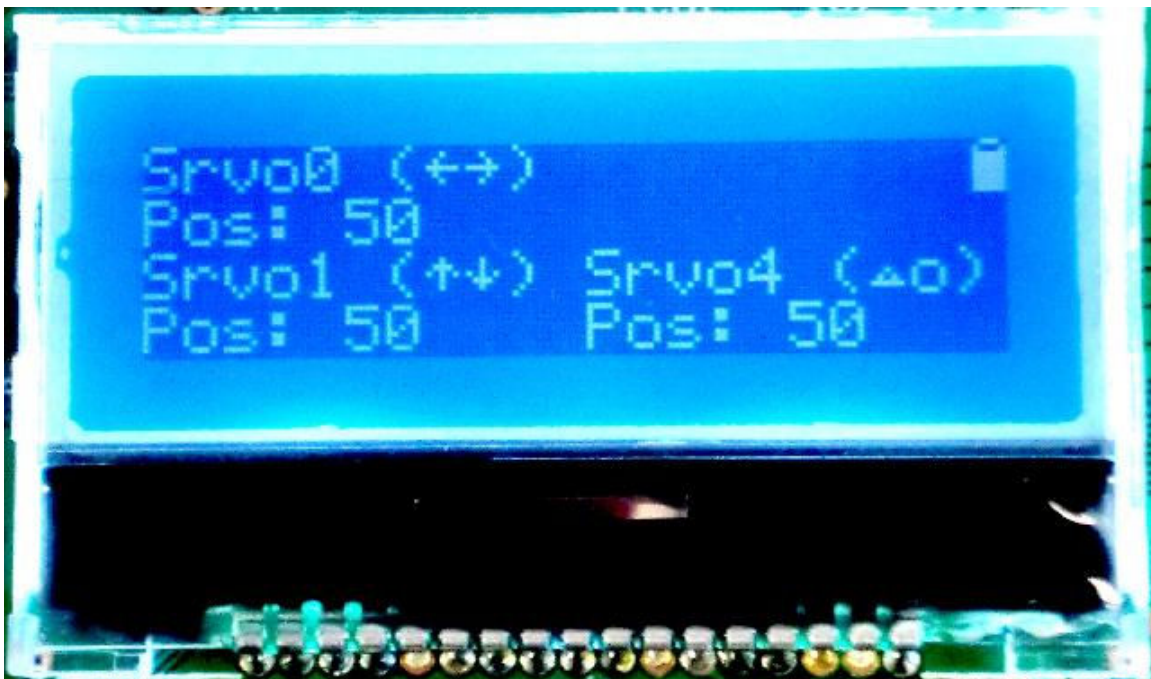


CEENBoT Firmware Features and Use
Servo Calibration
Version 0.01

Starting with version 1.104R of firmware, servo control is available for use with the wireless remote. This allows up to 5 servos to be operated with the remote control handset. Due to the limits of the remote handset, only 3 servos can be controlled without having to shift screens. Servos are numbered from 0 to 4.

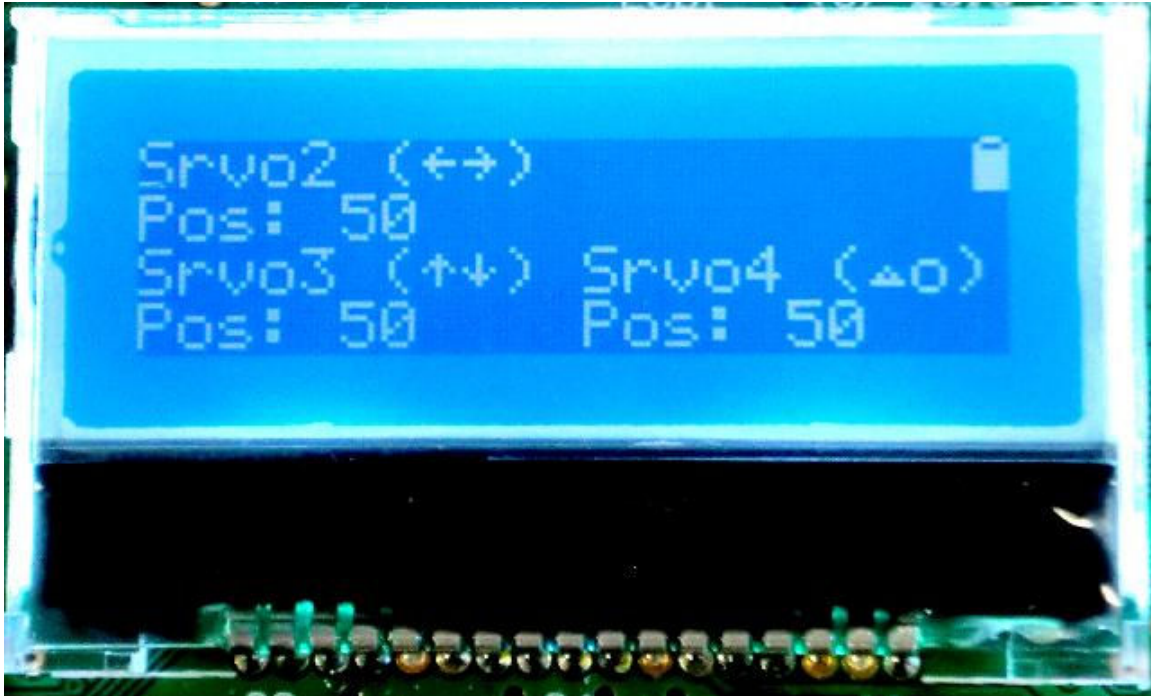
Controlling Servos with the Remote

By default, servo 0 and 1 can be controlled with the cross control on the left side of the remote, and servo 4 can be controlled with the triangle and circle buttons on the right. Pressing the middle switch (S4) shifts the display to show servos 2 and 3, and 4. When the control is shifted, servos 2 and 3 are now controlled with the cross, and servo 4 remains under the control of the triangle and circle buttons.



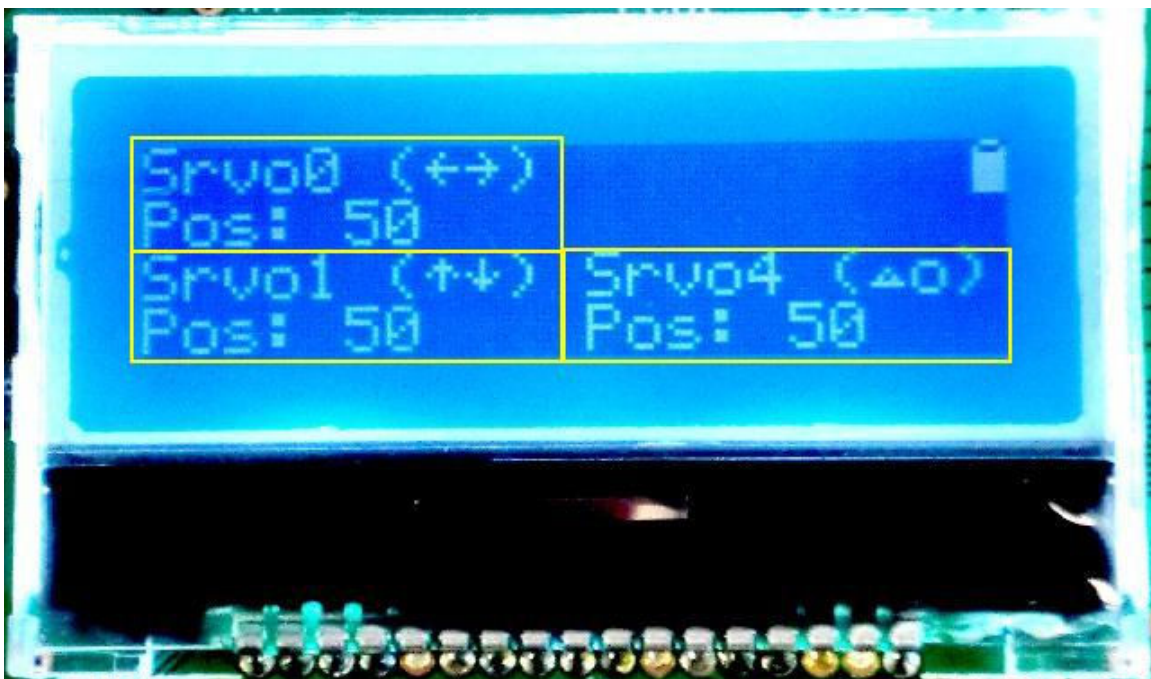
Viewing Servo Information

To view the servo screen with current information and to access the configuration screens, press the left (S3) button 5 times or the right (S5) button 4 times. You will find current information for servos 0,1 and 4. Press the middle (S4) button to shift to the second screen with servos 2,3 and 4.



The screen is split into three areas for the three servos. The upper left area shows servo 0 details, including a cue to use the remote control cross left and right buttons, and the current position of the servo (from 0 to 100).

The lower left screen shows a servo 1 cue to use the cross up and down buttons, and the current position (between 0 and 100)



The lower right area always shows information for servo 4. The remote control cues are to use the triangle and circle buttons.

Setting Servo Speed

The remote control can adjust the speed that the servos move so that operations requiring more accurate control can be slowed, or if a faster movement is required, the servos can be sped up. On the middle area of the remote handset, the Select and Start buttons will change the speed. Just like the motor speed control, the buttons will also cause the robot to beep as speed changes, going higher in pitch to indicate faster speed, or lower in pitch to indicate slower.

Custom Servo Settings

All remotes have different characteristics including torque (power to turn), range (how many degrees it can rotate from one direction to the other) and speed (how quickly it can move). Since each servo is unique, you can use the configuration screens on the CEENBoT to set the minimum position (the farthest counter-clockwise) the servo is allowed to go, the maximum position (the farthest clockwise) the servo is allowed to go, and the starting position for the servo.

Limiting clockwise and counter-clockwise rotation is important because most servos will be damaged by trying to drive them beyond their limits. The startup position can be important to put whatever the servo is moving into a safe position after startup.

Configuring Servo Settings

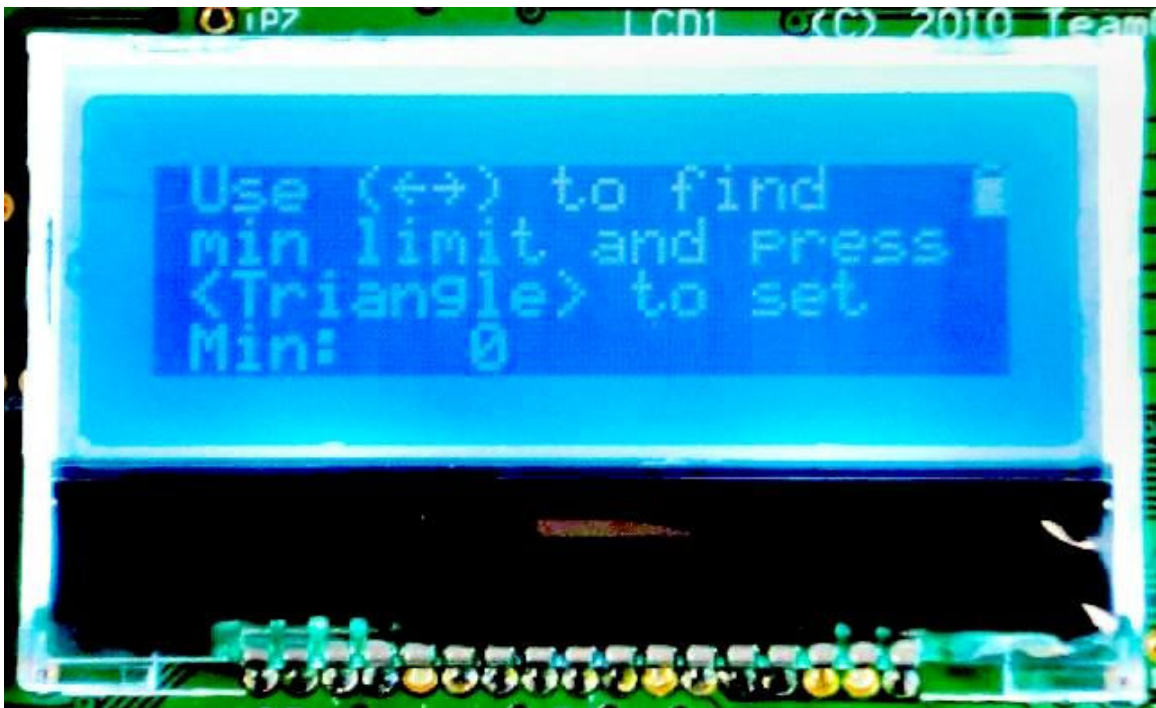
To enter the servo configuration screens, go to the servo information screen using S3 or S5. When the servo information screen is displayed, press S4 twice and a message will display prompting you to press the triangle button on the remote control handset to enter configuration mode for the selected servo.

By default, servo 0 is displayed. Pressing the S5 button will step up through the rest of the five servos. Pressing S3 will step down through the servos. When the desired servo is selected press the triangle button on the remote.



Setting Minimum Limit

After pressing the triangle button, a screen will prompt you to use the cross left and right buttons to adjust the minimum position the servo will be allowed to turn.



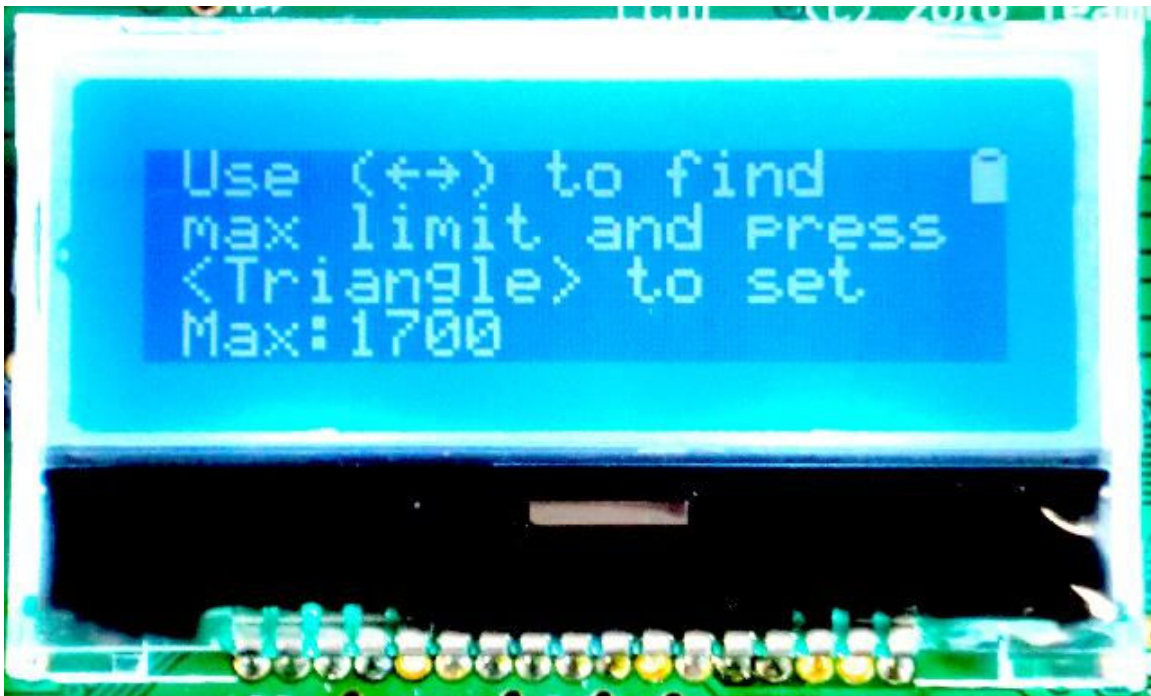
We suggest first setting the stepping speed to low so you have more control over the servo's motion. Then move the servo one button press at a time until it either reaches the location needed for the project, or until the servo will no longer turn. If you reach the lower limit of the servo and still need to turn the servo further, step the servo back to a value where it moves. Then remove and adjust the hardware attached to the servo and re-install it at the minimum position.

WARNING: Attempting to drive the servo beyond it's minimum and maximum limit may cause permanent damage to the servo.

Once the servo and the hardware are where you want them, and the servo is NOT turned beyond it's limit, press the triangle button on the remote.

Setting Maximum Limit

After setting the minimum position, the screen will display a prompt to set the maximum position. Again, adjust the servo speed to a low setting. Like the minimum setting, use the left and right cross buttons to move the servo to the maximum position. Do not continue to increase the setting if the servo reaches it's physical limit.

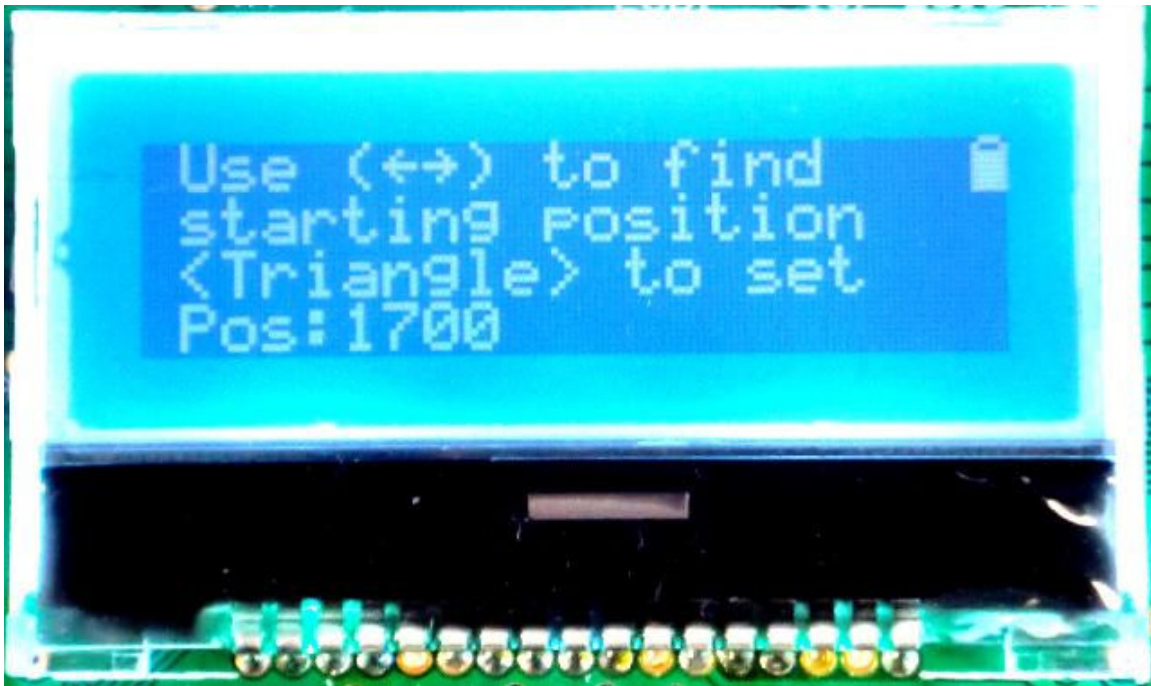


Once the servo and the hardware are where you want them, and the servo is NOT turned beyond it's limit, press the triangle button on the remote.

If you are unable to get enough rotation from your servo by changing the hardware attachment and the minimum and maximum settings, you will need to either get a servo with a wider rotation range, or redesign your project to work within the range of this servo.

Setting Startup Position

Once the minimum and maximum limits are set, you may want to adjust where the servo turns when the robot is powered on or reset. The process for setting startup position is the same as setting minimum or maximum. Using the cross control left and right buttons, adjust the servo to the desired starting position.



When the servo is where you want it, press the triangle button to save all settings and return to the servo information screen.