

Stduino Ultrasonic Sensor

Manual



This manual explains the Stduino Programming Environment and how to use it. As the Stduino Programming Environment develops, this manual may be edited or revised. You can find the full manual below.

- Installing Stduino Software

http://artec-kk.co.jp/stduino/docs/en/Stduino_setup_software.pdf

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1. About Your Ultrasonic Sensor

1.1. Overview

Your Ultrasonic Sensor sends and receives high frequency sound waves, using the time it takes between sending the wave and receiving the echo to measure distance.

1.2. Specifications

Ultrasonic Sensor Module	HC-SR04
Operating Voltage	4.4V-5 V
Measuring Range	2-400 cm
Measuring Angle	< 15°

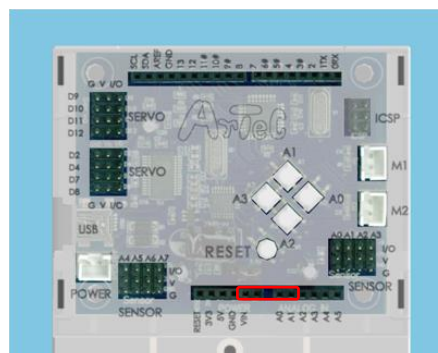
★ Insufficient battery power may result in inaccurate measurements. Try changing your batteries if this happens.

2. Connecting to Studuino

- ① Use the four-wire 30 cm Ultrasonic Sensor connecting cable (product 086881, sold separately).
- ② When plugging the male end of the cable into your Studuino, the black wires connect to GND and VIN, while the gray wires connect to A0 and A1. The metal side of the female connector should face upward.
- ③ When plugging the male end of the cable into your Studuino, the black wires connect to GND and VIN, while the gray wires connect to A0 and A1.



Ultrasonic Sensor
The metal side of the female connector should face upward.

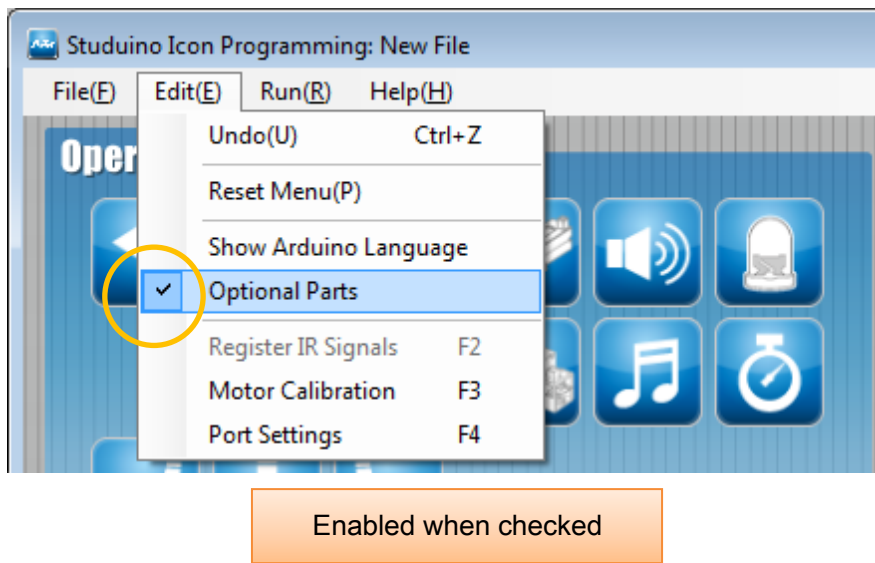


Make sure the cables are inserted correctly!
Black: GND
Black: VIN
Gray: A0
Gray: A1

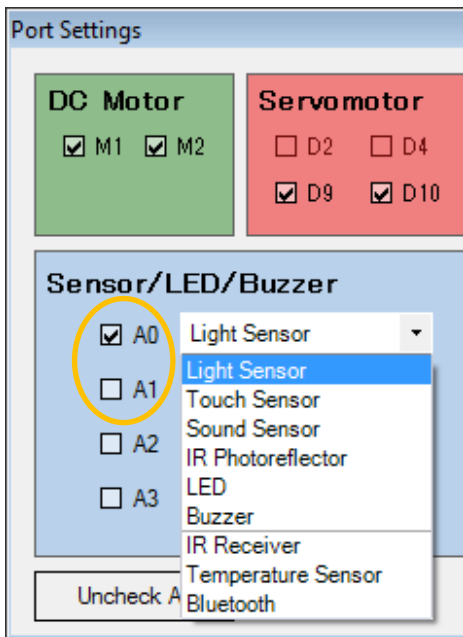
3. In the Studuino Icon Programming Environment

Familiarize yourself with the basics of the Studuino Programming Environment by reading the [Studuino Programming Environment Manual](#) and the [Icon Programming Environment Guide](#).

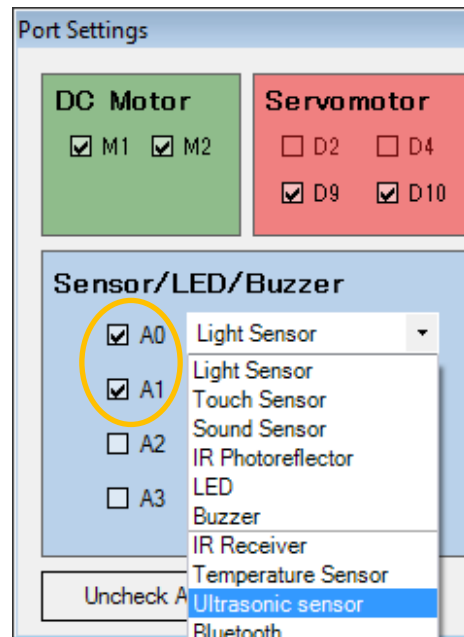
From the Edit menu click Optional Parts. A check will appear beside this option when enabled.



Your Ultrasonic Sensor uses both ports A0 and A1. Under Port Settings check the boxes for ports A0 and A1 in the Sensor / LED / Buzzer section. You will need to check both of these boxes to use the sensor.

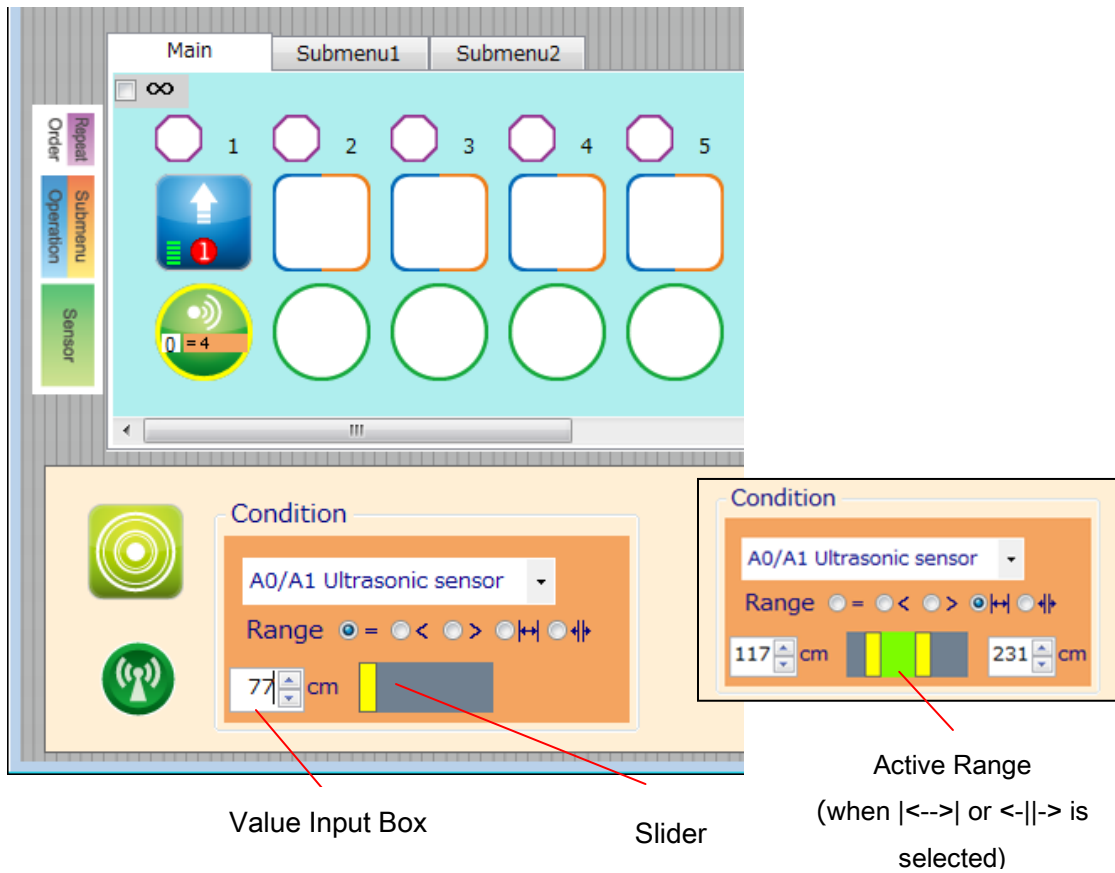


Unavailable when only A0 is checked



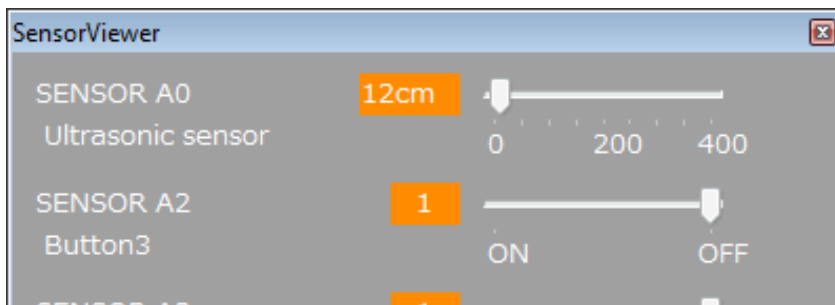
Available when both boxes are checked

Place the icons shown below and choose A0/A1 Infrared Receiver. Select a conditional expression and use your mouse to drag the (yellow) Range slider to set the values of the condition. You can also type values directly into the value input box. Click the arrows on the right to raise or lower the value. The |<-->| and <-||-> conditions have two sliders and the active range will be shown in yellow. Values can be set from 4 to 400 cm.



3.1. Using the Sensor Viewer

The Sensor View shown below will show the distance detected by your Ultrasonic Sensor.

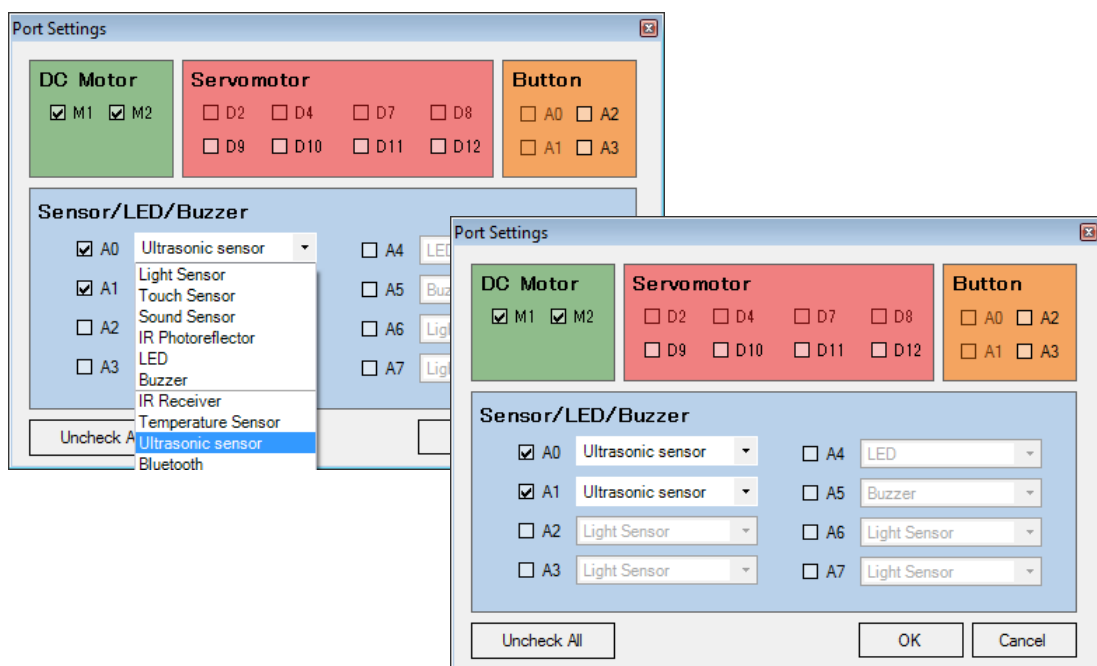


3.2. Sample Program

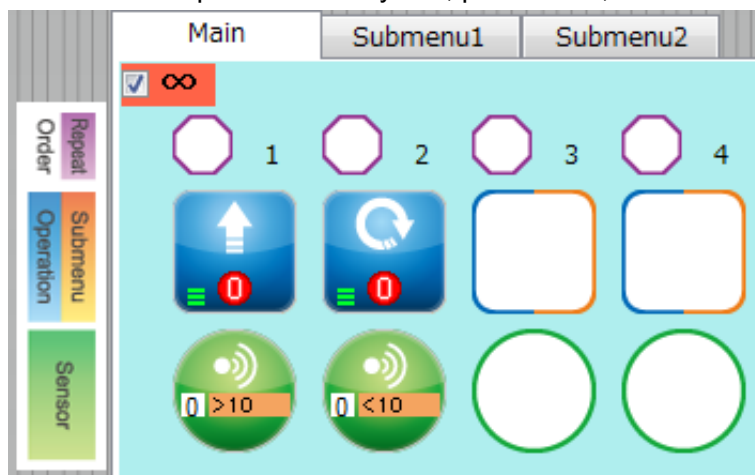
Familiarize yourself with the basics of the Studuino Programming Environment by reading the [Studuino Programming Environment Manual](#) and the [Icon Programming Environment Guide](#).

This program makes a collision-avoiding car which turns right if it detects an obstacle.


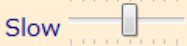
- ① Connect DC Motors to M1 and M2 and your Ultrasonic Sensor to connector A0 and A1. Choose the Ultrasonic Sensor in Port Settings. Choosing the sensor in either combo box will select it for both boxes.



- ② Check the Repeat Indefinitely box, place icons, and set them as shown below.





No. 1

 **Speed**
Slow  Fast
6

Time
0.3 sec



Brake
 ON
 OFF

 **Condition**
A0/A1 Ultrasonic sensor
Range = < > < > < > < > < >
10 cm



Action: Forward, Speed: 6, Time: 0.3 sec, Brake: OFF
Condition: Ultrasonic Sensor Value > 10cm


No. 2


 **Speed**
Slow  Fast
6

Rotation
 Clockwise
 Counterclockwise

Time
0.3 sec

Brake
 ON
 OFF

 **Condition**
A0/A1 Ultrasonic sensor
Range = < > < > < > < > < >
10 cm

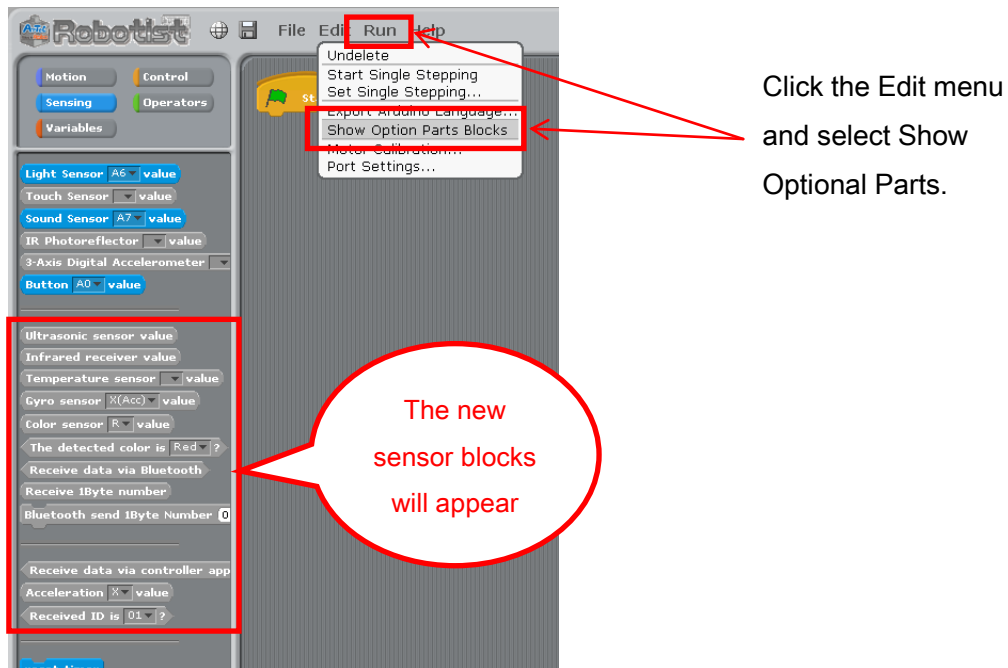


Action: Right Turn, Speed: 6, Time: 0.3 sec, Brake: OFF
Condition: Ultrasonic Sensor Value < 10cm

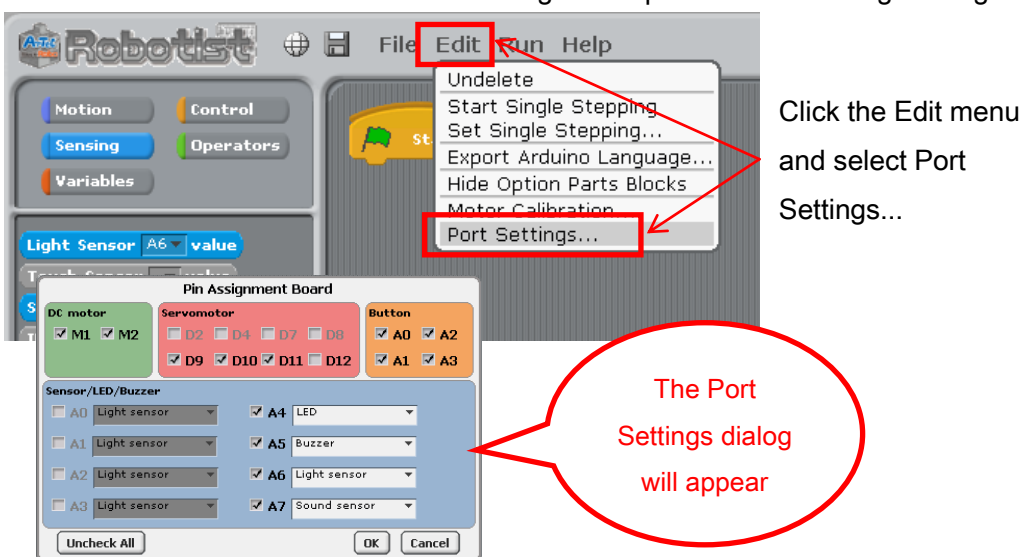
4. In the Studuino Block Programming Environment

To use your Ultrasonic Sensor in the Block Programming Environment you will need to make sure the Ultrasonic Sensor block is available and active. Follow the steps below to do this:

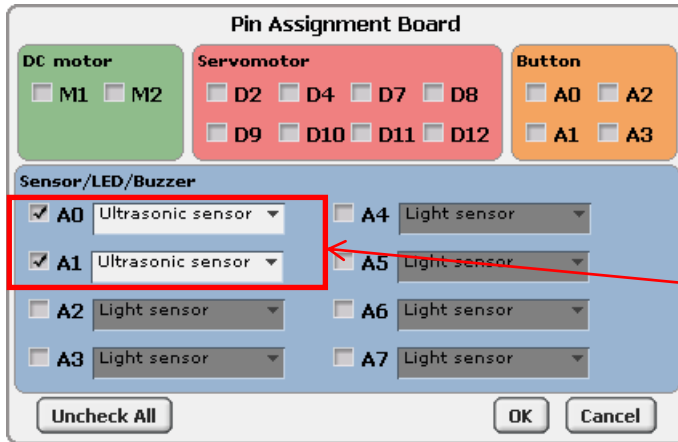
- ① From the Edit menu, choose Show Optional Parts to display the new sensor blocks.



- ② Click the Edit menu and choose Port Settings... to open the Port Settings dialog.



- ③ Under the Sensor / Buzzer / LED section of the Port Settings dialog, check boxes A0 and A1 and use the combo box to select the Ultrasonic Sensor. Click OK.



Check boxes A0 and A1 and choose the Ultrasonic Sensor.

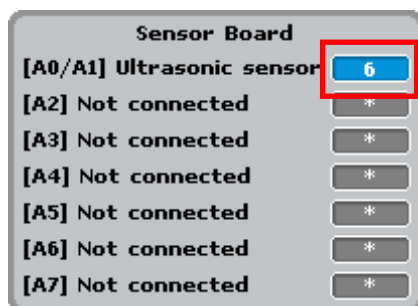
- ★ The option for the Ultrasonic Sensor will not appear until both boxes A0 and A1 are checked.

- ④ The Ultrasonic Sensor block will become active.



4.1. Ultrasonic Sensor Values

The Ultrasonic Sensor block returns the distance to an object measure by the sensor. The block values are from 0-400 and measured in centimeters. The picture below shows the Ultrasonic Sensor in the Sensor Board when Test mode is on.



Returns values from 0-400 (in cm).

4.2. Sample Program Using the Ultrasonic Sensor

The picture below shows an example program using an Ultrasonic Sensor. This program makes twin-DC Motor move forward at top speed until it is 5 cm away from an object.



The Ultrasonic Sensor block returns values from the sensor while the program is running. As shown, this block can also be used with conditional blocks.