

Tickle pour Studuino

Manuel d'instructions

Table des matières

1. Getting Started.....	1
2. ArtecRobo and Tickle.....	1
2.1. Overview and Features.....	1
2.2. The Tickle Environment	2
2.3. About Studuino.....	2
2.4. Setup	4
3. The Tickle Basics.....	5
3.1. Overview and Features.....	5
3.2. My Projects.....	6
3.2.1. New Projects.....	6
3.2.2. Saved Projects.....	7
3.3. The Project Screen.....	9
3.3.1. The Command Group and Block Palettes.....	10
3.3.2. More About Blocks.....	11
3.3.3. The Add Variable Button	24
3.3.4. The Script Area and the Play Button.....	25
3.3.5. Port Settings	27
3.3.6. The Studuino Icon.....	30
4. Tickle vs. the Block Programming Environment	35

1. Getting Started

This instruction manual is intended for Studuino units running Tickle, a visual programming software created by Tickle Labs.

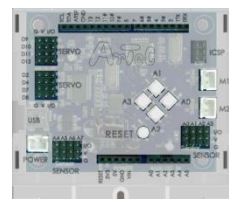
See Getting Started on our Tickle for Studuino page

(<https://www.ecolerobots.com/studuino/>) to learn more about programming your Studuino parts.

The information in this manual is subject to revision at any time.

2. ArtecRobo and Tickle

2.1. Overview and Features



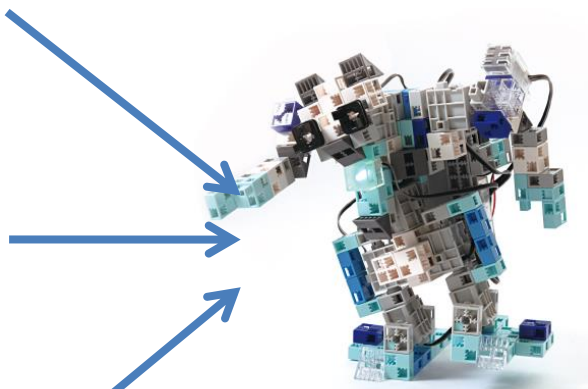
Arduino-compatible
Studuino



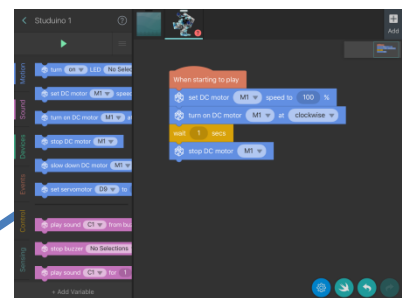
Artec
Blocks



Parts
Motors, LEDs,
Buzzers, and Sensors



Combine blocks and parts
to build your robot!



Tickle

Now program it using your
iPad and iPhone!

ArtecRobo sets include a Studuino, Artec Blocks, and electronic parts. The user builds their own robot by combining these various parts before programming it with programming software.

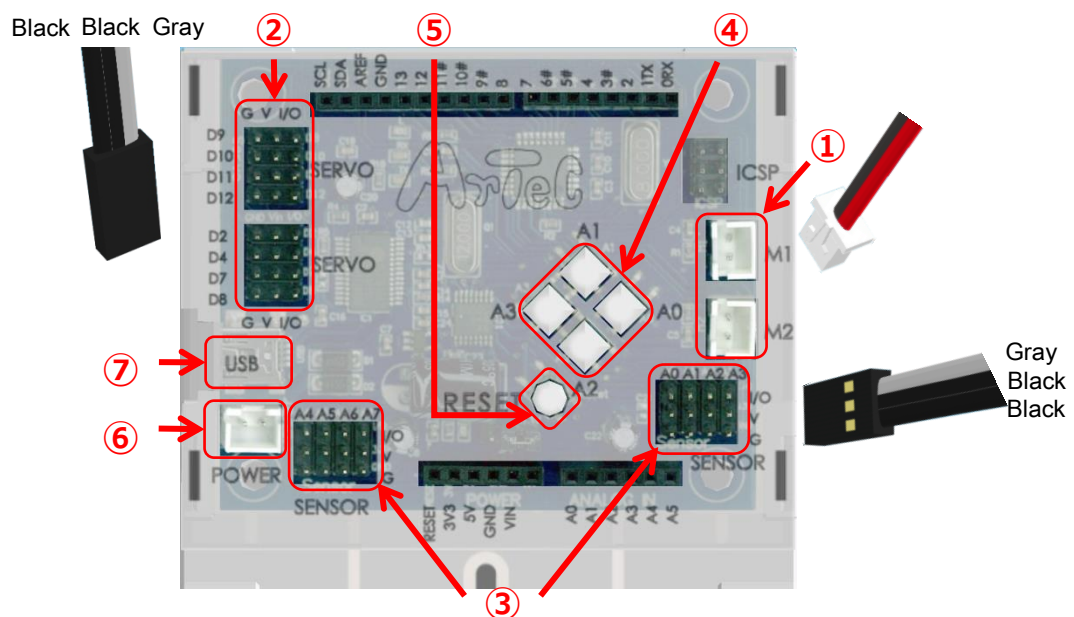
Tickle is a visual programming application developed for the iPad and iPhone by Tickle Labs, Inc. This application allows you to program your ArtecRobo set using these devices. The drag and drop interface allows even beginners to create advanced programs for the robots that they create.

2.2. The Tickle Environment

Tickle is compatible with any iPad or iPhone running iOS9 or higher. This compatibility may change depending on future releases of the application.

2.3. About Studuino

Here you can find out more about the Studuino ports you'll use to make your robots.



- ① DC Motor Connectors
Use these to connect DC Motors. Up to two DC Motors can be connected to M1 and M2.
- ② Servomotor Connectors (Multiple-pin Digital Connector)
Use these to connect Servomotors. You can connect up to eight Servomotors to D2, D4, D7, D8, D9, D10, D11, and D12. The gray signal wire of your Servomotor must face towards the inside of the Studuino.
- ③ Sensor / LED / Buzzer Connectors (Multiple-pin Analog)

Use these connectors for LEDs, Buzzers, and other sensors. These connectors are assigned to A0 through A7 and can be used for any sensor besides Touch Sensors and Accelerometers. Connectors A0 through A5 can be used for Touch Sensors in addition to LEDs and Buzzers. Accelerometers use both connectors A4 and A5 simultaneously. The gray signal wire of your sensor, LED, or Buzzer must face towards the inside of the Studuino.

④ Push-button Switches

These are button switches. Push-button switches are assigned to A0 through A3. When you use the push-button switches, connectors A0-A3 cannot be used for sensors, Buzzers, or LEDs.

⑤ Reset Switch

Use this button to reset your Studuino. It can come in handy when you need to format or you find that your Studuino isn't working correctly.

⑥ POWER Connector

Use this to connect the Battery Box. A power supply is always required when using Tickle with your Studuino.

⑦ Communication Jack (USB mini-B)

This connector is used to communicate with a PC via a USB (mini-B) cable. You can use any commercially available USB cable in addition to the one included. The communication jack can't be used with an iPad or iPhone.

Keep in mind that the following connectors and buttons can't be used simultaneously:

- DC Motor connector M1 and Servomotor connectors D2, D4
- DC Motor connector M2 and Servomotor connectors D7, D8
- Push-button A0 and sensor / LED / Buzzer connector A0
- Push-button A1 and sensor / LED / Buzzer connector A1
- Push-button A2 and sensor / LED / Buzzer connector A2
- Push-button A3 and sensor / LED / Buzzer connector A3

Use a DC Motor on M1, for example, and any Servomotors you have connected to D2 or D4 won't work properly. Conversely, using Servomotors on D2 or D4 means that a DC Motor on M1 won't work either.

2.4. Setup

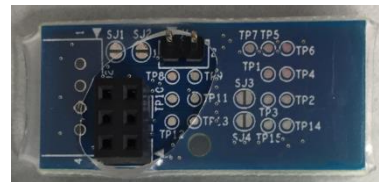
In order to use your Studuino with Tickle, you'll need to connect a Bluetooth Module (Product 151094: Bluetooth 4.0 Module for Robots). This module is sold separately.

Your Bluetooth Module uses the following connectors:

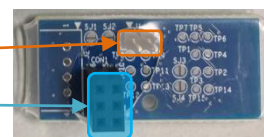
Bluetooth 4.0 Module for Robots



Front



Back



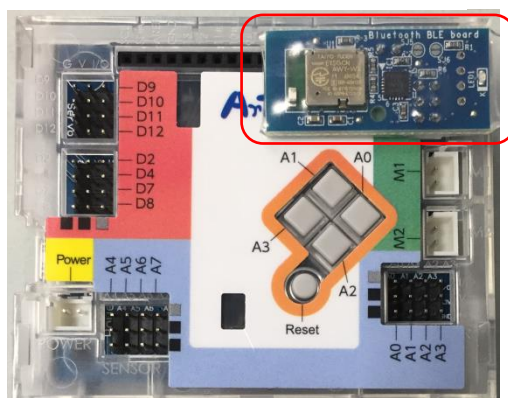
These are the different types of pins:

1TX (Female) x 1 pin

0RX (Female) x 1 pin

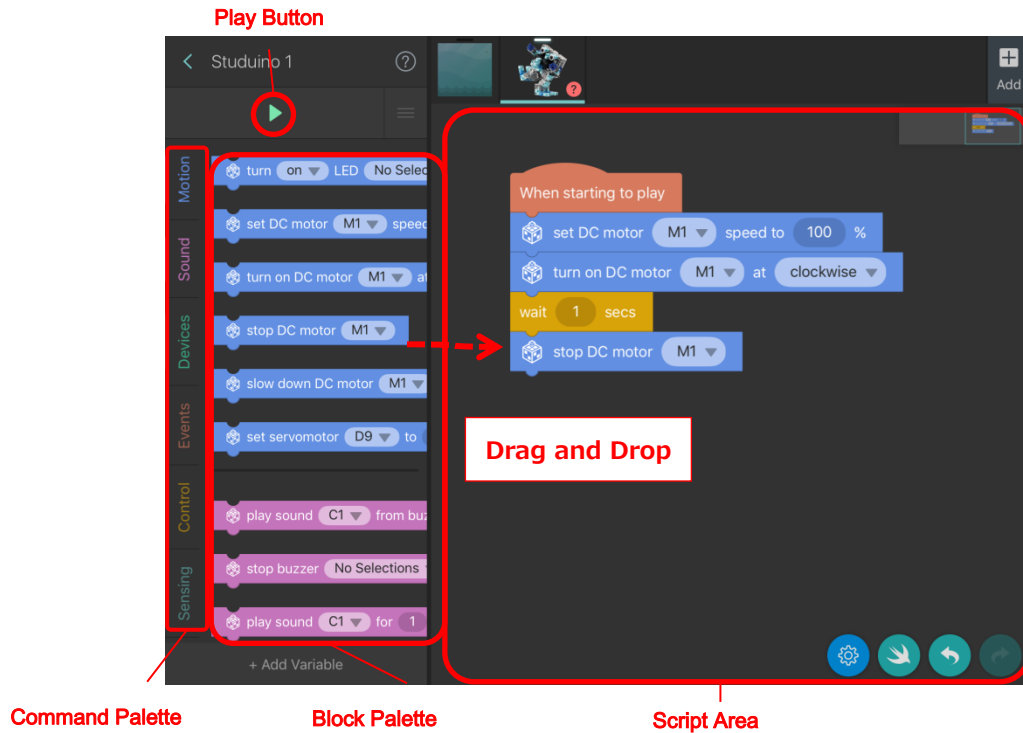
ICSP (Male) x 6 pins

And when the Module is connected...



3. The Tickle Basics

3.1. Overview and Features



Tickle, developed by Tickle Labs, Inc., is the visual programming software you'll be using to program your Studuino. Create programs by dragging blocks from the Block Palette and dropping them to connect them to other blocks.

These blocks can be used to make basic programming components such as conditions, repeats, and variables in a way similar to real-world programming languages like C.

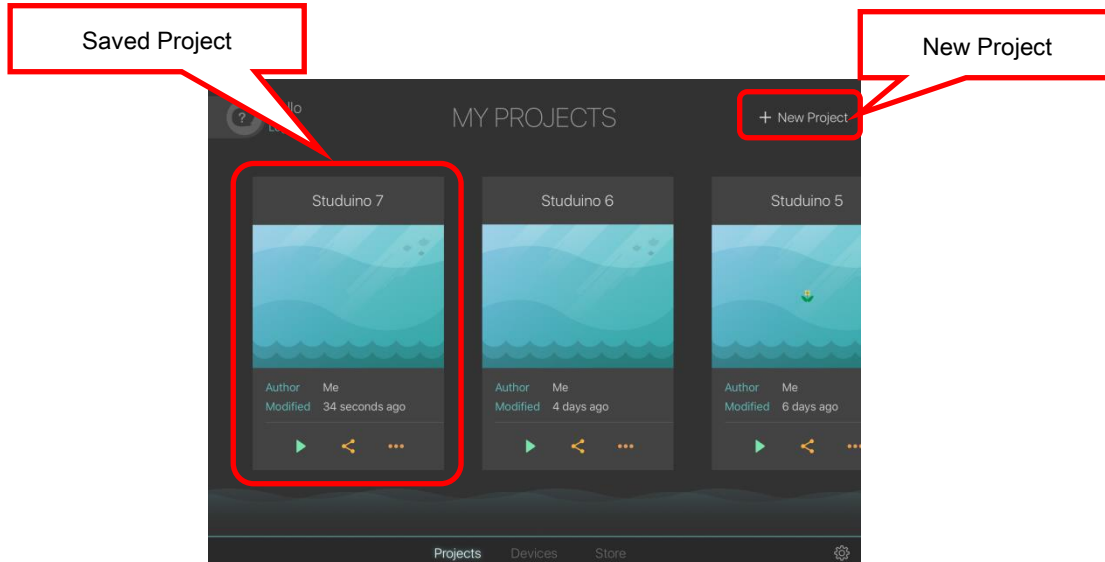
Connect your Studuino to Tickle via Bluetooth and you can press the Play button to run the program you created for your ArtecRobo robot.

Here are some basic items you'll need to know in order to program your Studuino in Tickle:

3.2. My Projects

Tap the Tickle icon and you'll see the My Projects screen.

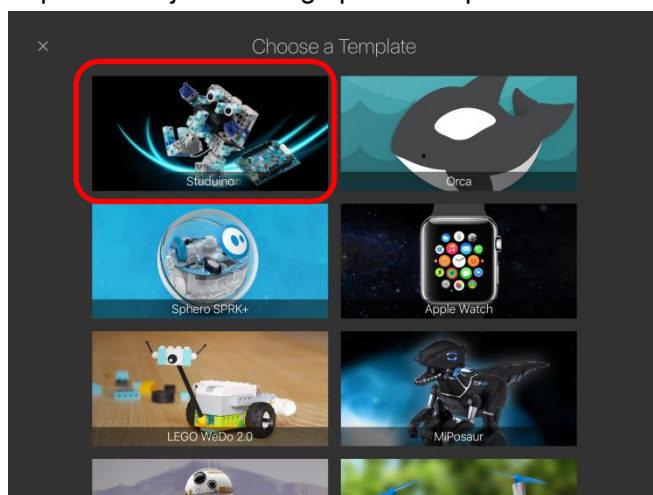
★ All screenshots were taken on an iPad.



The programs and data you create in Tickle are saved as Projects. You can create New Projects as well as open existing ones on the My Projects screen.

3.2.1. New Projects

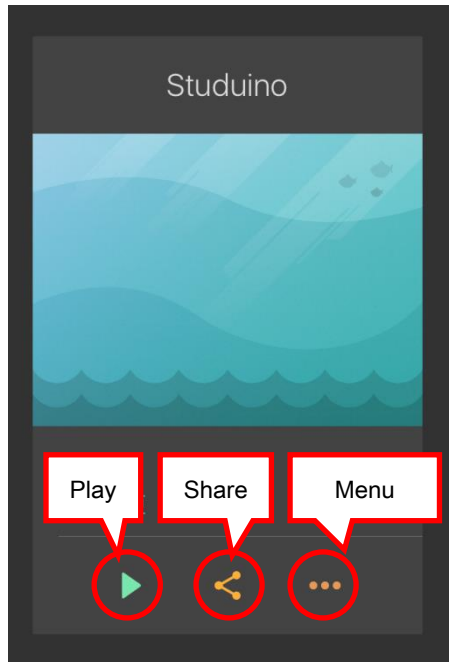
Tap New Project to bring up the Templates screen.



Select the Studuino template to open the Project screen (see **Erreur ! Source du renvoi introuvable.**) and start making a program for your Studuino.

3.2.2. Saved Projects

Tap any project under the My Projects screen to open that project (see **Erreur ! Source du renvoi introuvable.**). You'll see three buttons with the following functions under each project:

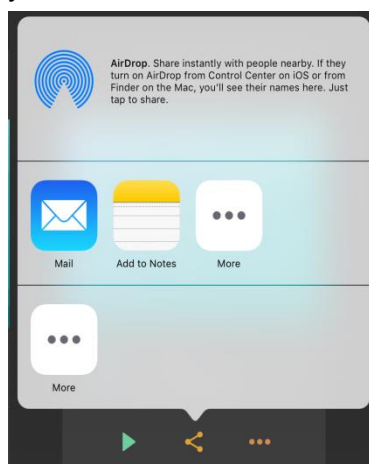


Play

Immediately open and run the project that you select.

Share

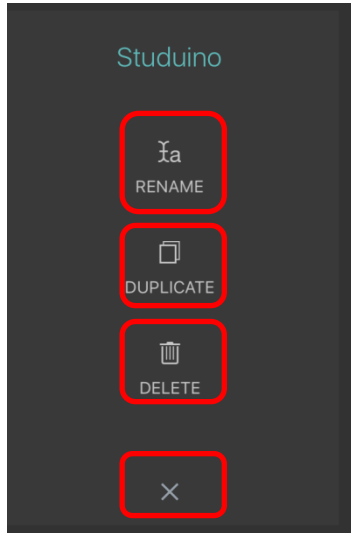
Send your program from your iPad/iPhone using AirDrop, email, or other applications on your device.



You'll see different applications here depending on which ones are installed on your iPad or iPhone.

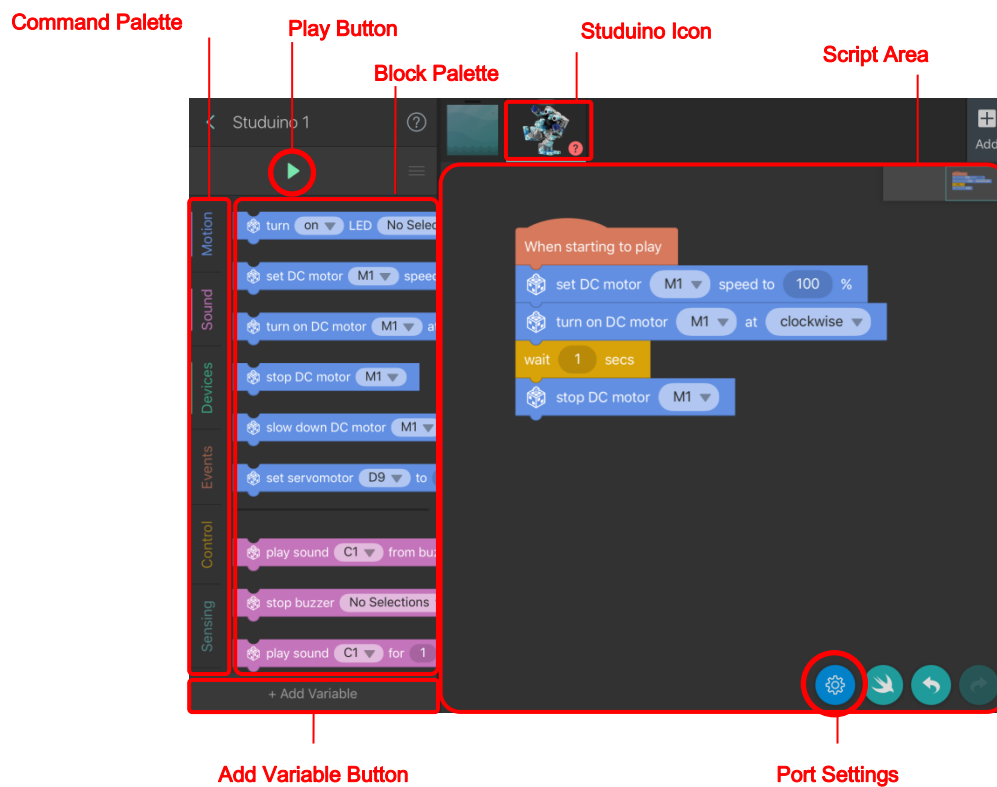
Menu

Rename, duplicate, or delete your project.



Menu Item	Function
Rename	Rename your project.
Duplicate	Copy your project. "Copy" will be added to the name of any new projects.
Delete	Delete your project.
×	Close the Menu.

3.3. The Project Screen



Open the Project screen and you can start programming your Studuino. Turn to the next page for an overview on this screen.

3.3.1. The Command Group and Block Palettes

You can find every block you'll use to program your Studuino in the Command Group and Block Palettes. Tap the buttons in the Command Group to switch between Block Palettes. Look at the table below to see the Block Palette for each button.

Group	Blocks
Motion	These blocks control DC Motors, Servomotors, and LEDs.
Sound	These blocks control Buzzers.
Devices	These blocks retrieve the values of Light Sensors, Sound Sensors, IR Photoreflectors, Touch Sensors, Accelerometers, buttons, and more.
Data	These blocks let you create and work with variables. Press the Add Variable button to create a variable (see 3.3.3) and display this Palette.
Lists	These blocks let you create and work with lists. Press the Add Variable button to create a list (see 3.3.3) and display this Palette.
Events	Use these blocks to start your program or send Events from your iPad to your Studuino.
Control	The blocks control basic programming elements such as conditions, functions, and wait processes.
Sensing	Use these blocks to input text strings, timers, and times into your program.
Operators	These blocks are used for basic arithmetic, as well as math and logic operations.

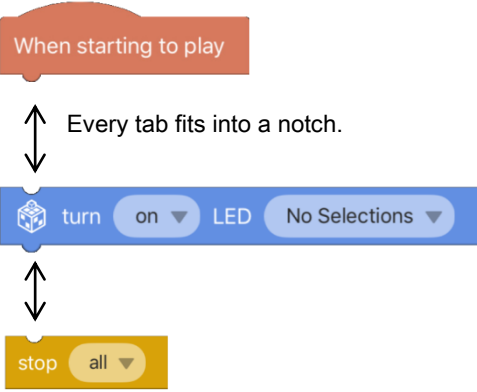
3.3.2. More About Blocks

You can use two kinds of blocks with Tickle:

1. Process Blocks

You can create your program by connecting the notches and tabs of these blocks. You won't be able to connect blocks without a notch or a tab to other blocks.


You can't connect blocks to the top of any block without a notch.



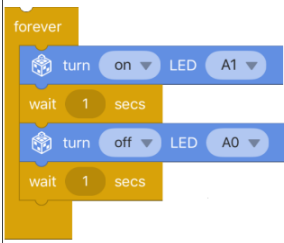
Every tab fits into a notch.

These blocks can't be connected to blocks without a notch at the bottom.

You can insert other blocks into C-shaped blocks.

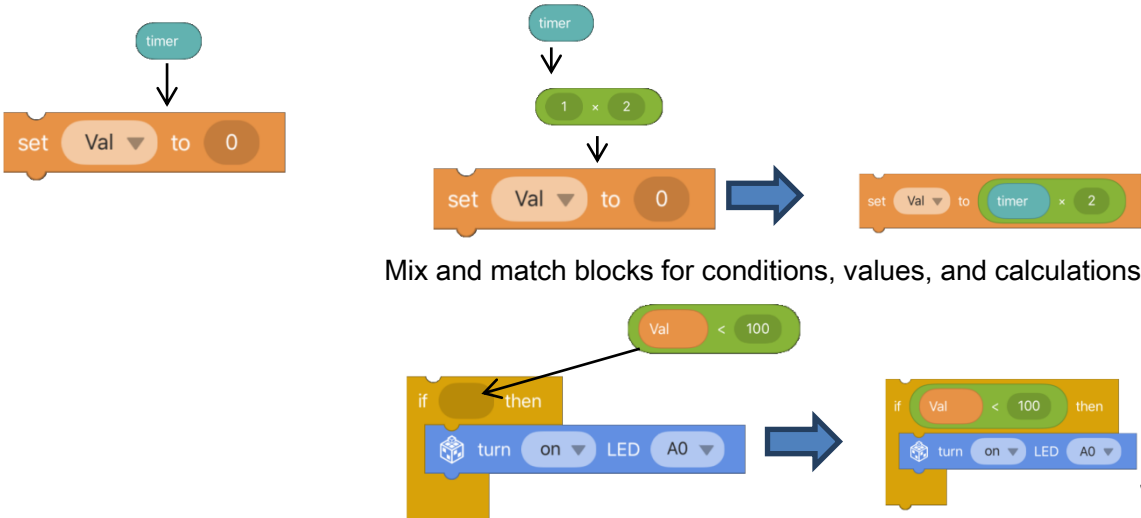


And there's no limit to how many blocks will fit.



2. Condition/Value Blocks

Blocks for conditions and values have rounded edges and can be placed inside of process blocks.



Mix and match blocks for conditions, values, and calculations.

Continue reading to learn about the functions of each group of blocks.

While Tickle has quite a few other blocks you can use, this manual only covers the one's you'll use to program your Studuino.

■ Motion

The blocks in the Motion Palette control the different parts of your robot.

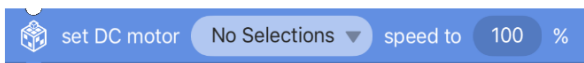
● LED Blocks



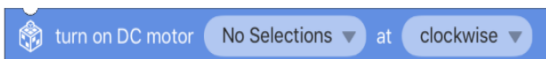
Use this block to turn any LED connected to A0-A5 on or off.

● DC Motor Blocks

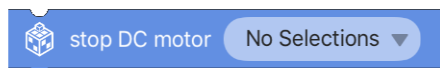
Use these blocks to control the DC Motors connected to your Studuino.



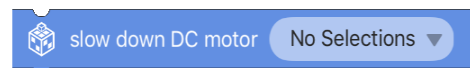
Sets a speed of 0-100 for a DC Motor on M1 or M2. The higher the speed, the faster the DC Motor will rotate. Setting a speed lower than 0 or higher than 100 will cause your program to freeze due to an error.



Sets the direction of a DC Motor on M1 or M2 to clockwise or counterclockwise.



Makes a DC Motor use its brakes to stop.



Makes a DC Motor stop rotating and coast to a stop.

- **Servomotor Blocks**

Use these blocks to control the Servomotors connected to your Studuino.



Sets an angle of 0-180 degrees for any Servomotor on D2 through D12. Setting an angle lower than 0 or higher than 180 will cause your program to freeze due to an error.

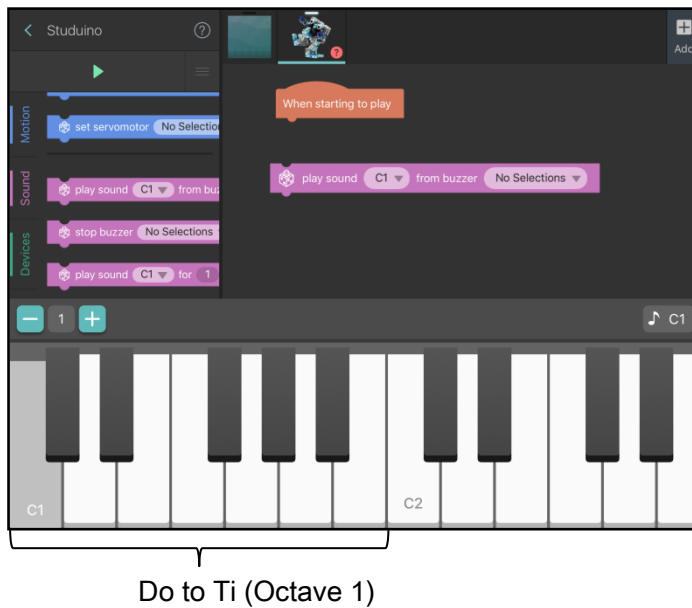
■ Sound

The blocks in the Sound Palette control Buzzers.

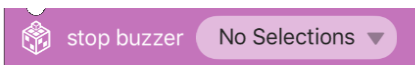
● Buzzer Blocks



This block plays the specified note using a Buzzer connected to A0-A5. You can choose from seven octaves ranging from 33 Hz to 3951 Hz.



A DC Motor connected to M1 won't work properly while the note is playing. If you want to use a DC Motor on A1, stop your Buzzer using the block shown below before using your DC Motor blocks.



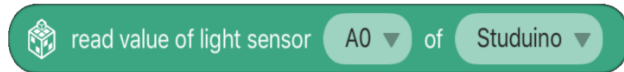
Stops a Buzzer connected to A0-A5.



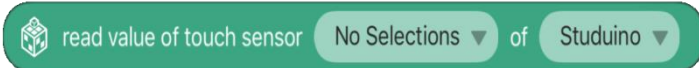
Plays a note for the specified number of seconds using a Buzzer connected to A0-A5.

■ Devices

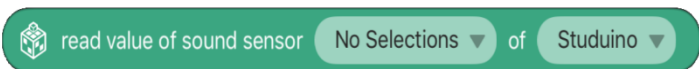
The blocks in the Devices Palette are used to look up sensor values.



Looks up the value of a Light Sensor connected to A0-A7.



Looks up the value of a Touch Sensor connected to A0-A5.



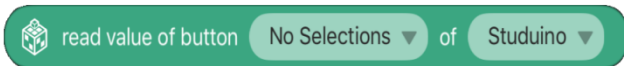
Looks up the value of a Sound Sensor connected to A0-A7.



Looks up the value of an IR Photoreflexor connected to A0-A7.



Looks up the X, Y, or Z axis of an Accelerometer.



Looks up the value of Push-button Switches A0-A3.

The value ranges of each sensor are as follows:

Sensor	Value
Light Sensor	Dark (0 - 100) Light
IR Photoreflexor	Black (0 - 100) White
Sound Sensor	Quiet (0 - 100) Loud
Accelerometer (X/Y/Z)	-2 g - 2 g
Touch Sensor and Push-button Switches	Pressed: 0, Released: 1

■ Data

The Data Palette contains blocks used for variables. This Palette will only appear once you create a variable (see 3.3.3).

Create a variable named Val and you'll see the blocks below:



Looks up the value of the variable.



Sets the variable to the specified value.



Adds the specified value to the variable. Use a negative value if you want to subtract from the variable.

■ Lists

The Lists Palette contains blocks used for lists. This Palette will only appear once you create a list (see 3.3.3).

List blocks can be used to handle multiple pieces of data. Create a list named “list” and you’ll see the blocks below:



Looks up the value at the top of the list.



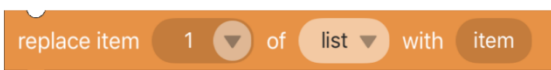
Adds the specified value to the bottom of the list.



Deletes the element at the specified position.



Inserts the value at the position specified.



Replaces the value at the position specified.



Retrieves the value at the position specified.



Retrieves the length of the list.



Checks whether the specified value is included in the list.

■ Events

The blocks in the Events Palette are used to start different processes.

A red block with a semi-circular top-left corner and a small tab on the bottom-left. It contains the text "When starting to play" in white.

The process under this block starts once you press the Play button on the Project screen (see 3.3.4).

A red block with a semi-circular top-left corner and a small tab on the bottom-left. It contains the text "When I receive" in white, followed by a rounded rectangle containing "Event 1" in white.

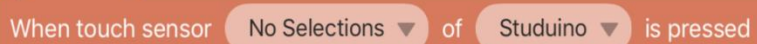
Starts the process once the specified event happens. You're free to choose any event you wish.

A red block with a semi-circular top-left corner and a small tab on the bottom-left. It contains the text "broadcast" in white, followed by a rounded rectangle containing "Event 1" in white.

Sends the event required to start another process while the program is running.

A red block with a semi-circular top-left corner and a small tab on the bottom-left. It contains the text "When button" in white, followed by a rounded rectangle containing "No Selections" and a downward arrow, then "of", followed by a rounded rectangle containing "Studuino" and a downward arrow, and finally "is pressed" in white.

Starts the event when you press a button on your Studuino.

A red block with a semi-circular top-left corner and a small tab on the bottom-left. It contains the text "When touch sensor" in white, followed by a rounded rectangle containing "No Selections" and a downward arrow, then "of", followed by a rounded rectangle containing "Studuino" and a downward arrow, and finally "is pressed" in white.

Starts the event when you press the Touch Sensor.

■ Control

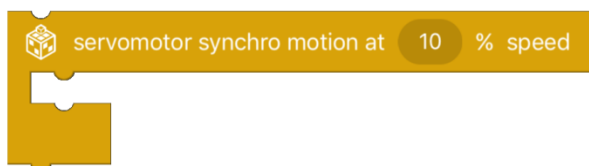
The blocks in the Control Palette are used to change how your program works.



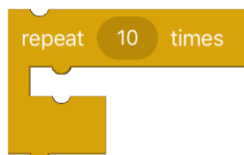
Pauses the program for the specified time.



Makes the program wait until the specified condition is met.



Makes any Servomotor blocks inside of it turn at the specified speed. This block will only work with Servomotor blocks. Putting any other block inside of this one will cause your program to freeze due to an error.



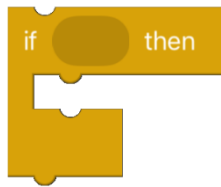
Repeats the process inside of it the specified number of times.



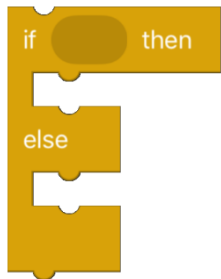
Repeats the process inside of it forever.



Repeats the process inside of it until the condition is met.



Runs the process inside of it only once the condition has been met.



This block runs the process on the top once the condition is met. If the condition hasn't been met, it will run the process on the bottom.

■ Sensing

The Sensing Palette contains blocks for timers and other input data.



Starts the timer from 0.



Retrieves the timer value in seconds.

■ Operators

The Operators Palette contains blocks that will perform math and logical operations on the values you input. See below for descriptions of each block:

● Arithmetic Blocks



These blocks will do calculations on the two values you specify.

Choose from four operations: addition (+), subtraction (-), multiplication (x), or division (÷).

● Remainder Block



Divides one value by another and calculates the remainder.

● Comparison Blocks



These blocks compare two values. You have the following types of blocks: less than (<), equal or less than (<=), equal (=), equal or greater than (>=), or greater than (>).

● Logic Blocks



These blocks perform logical operations for two conditions. You have the following types of blocks: AND, OR, or NOT.

● Rounding Blocks



Rounds the value down to the nearest decimal point.

● Rando Blocks



Chooses a random number between two values.

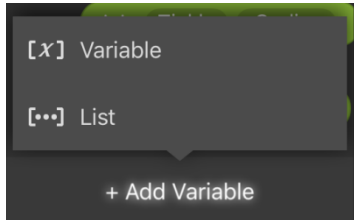
- **Other Blocks**



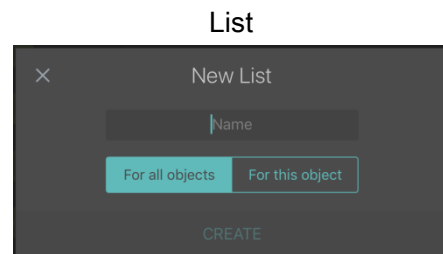
Use these blocks for square roots, absolute values, signs, rounding, sin, cos, tan, asin, acos, atan, ln, log, e[^], 10[^] and more.

3.3.3. The Add Variable Button

Use this button to create blocks for variables and lists. You can create a new variable or list by tapping the Add Variable button at the bottom of the Project screen.



Create a variable list and you'll see the screen below. Choose a name, pick whether your variable or list is **For all objects** or **For this object**, and tap Create.



You can use multiple devices and characters with Tickle. Choose **For all objects** to make your list or variable available for all devices and characters, or **For this object** to give the devices and characters you create in this project exclusive access.

If you aren't sure which one to pick, choose **For all objects**.

Create a variable and the Data Palette will appear in the Command Group Palette, while the List Palette will appear when you create a list. Any variable or list you create will appear in these Groups.

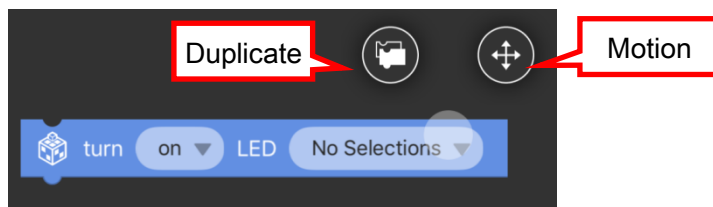


3.3.4. The Script Area and the Play Button

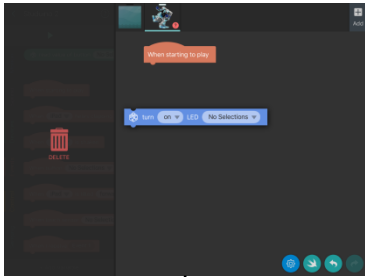
You program in Tickle by dragging, dropping, and connecting blocks in the Script Area. Create a new project and you'll see the When starting to play block in this area. Any program you make needs to be connected to this block. Tapping the block will run any program connected to it.

You can also duplicate any blocks you've placed in the Script Area.

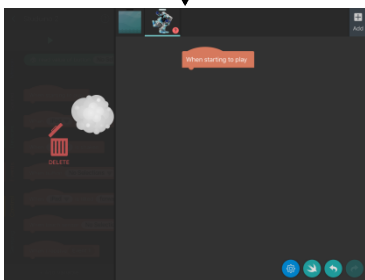
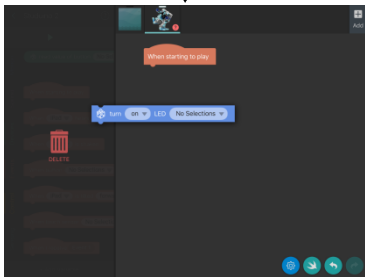
Press and hold the block and you'll see two buttons. Drag your finger to the left or right to select them.



Function	What it Does
Duplicate	This makes a new, identical set of blocks (including values and conditions).
Move	This allows you to move your blocks. Use this to move your blocks when you've accidentally pressed the screen for too long.



Drag blocks within the Script Area and you'll see the Delete icon appear in the Block Palette. Drag and drop blocks to the Block Palette to delete them.



The Play button will change to a Stop button while the program is running. Tap this button to stop your program.



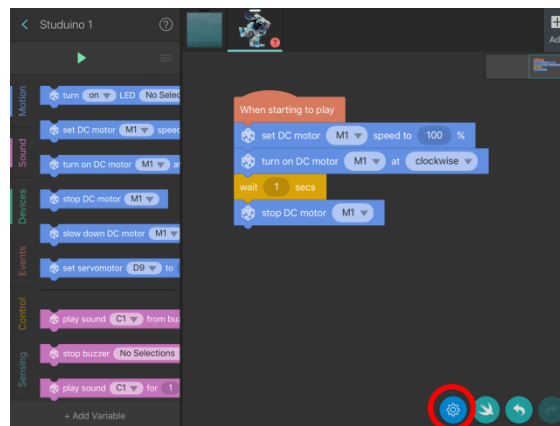
Play Button



Stop Button

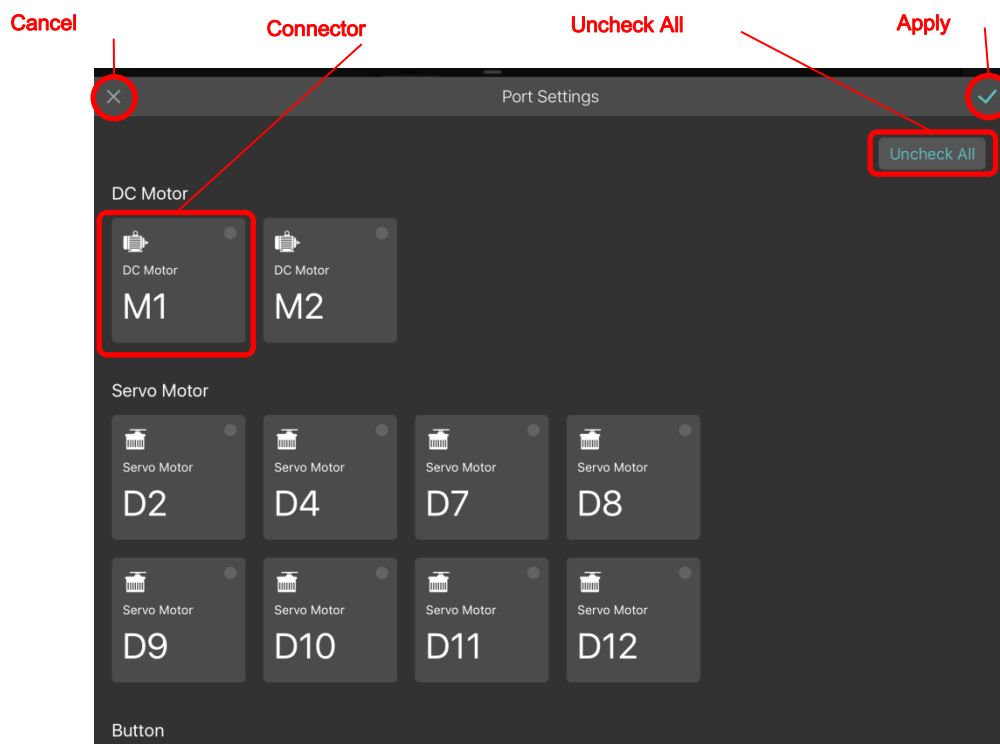
3.3.5. Port Settings

This button is used to open the Port Settings screen. Here is where you set which electronic parts are connected to your Studuino.

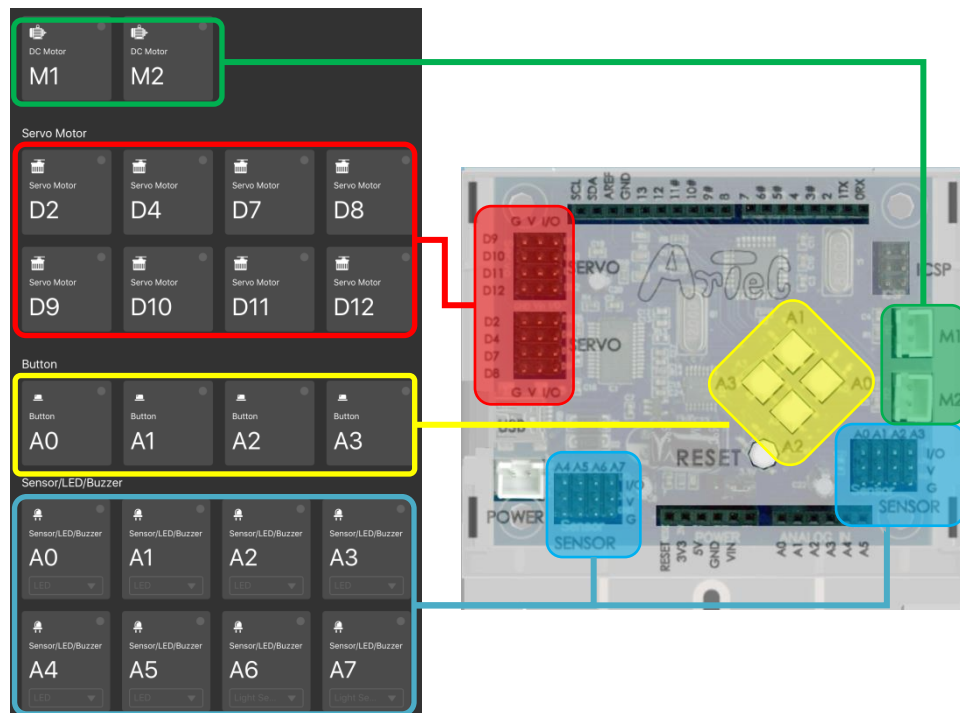


Port Settings

You'll see a Cancel, Apply, and Uncheck All button as well as buttons for each of your connectors. You can select or unselect different parts for your Studuino by using the connector buttons.

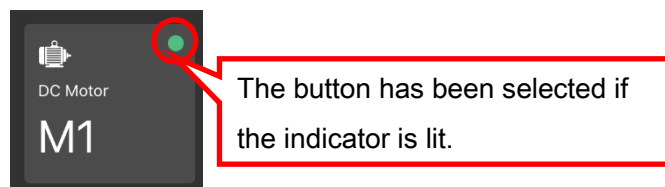


Each connector button is labeled according to the connectors on your Studuino.

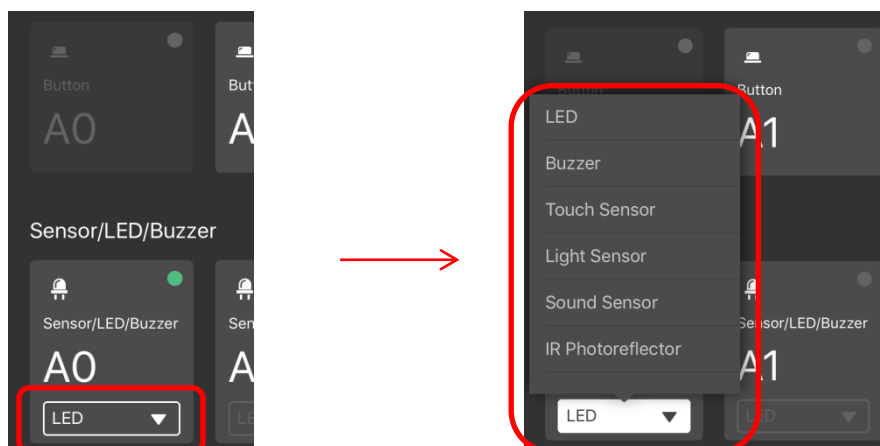


Select or unselect a connector by tapping it.

Look at the top right of a button to see whether it's been selected.



You can choose which part you're using with the Sensor/LED/Buzzer Connectors on A0-A7 (shown in the blue box above) once you've selected the button.



Both connectors A4 and A5 must be selected in order to use an Accelerometer.

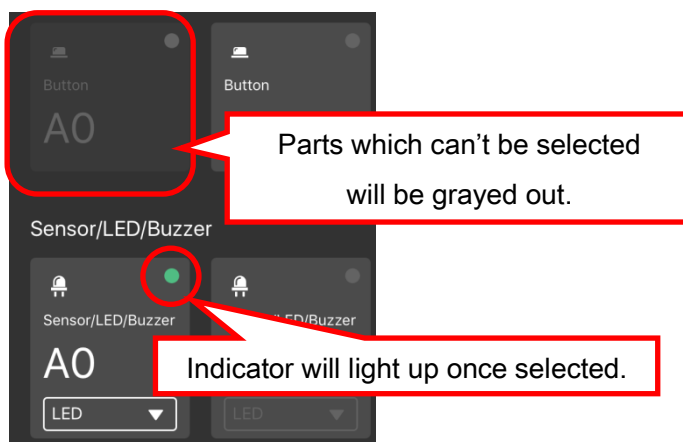
Selecting only A4 or A5 and choosing Accelerometer will select the second connector automatically.



Choose Accelerometer for either A4 or A5...

And the second connector will also be selected.

For connectors assigned to both Push-buttons and Sensors/LEDs/Buzzers, selecting the button for one will automatically gray out the other.



Tapping the Uncheck All button will unselect every connector button.

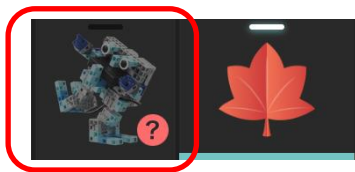
Tap the Apply button in the Port Settings screen to apply your changes or tap the Cancel button to discard them.

3.3.6. The Studuino Icon

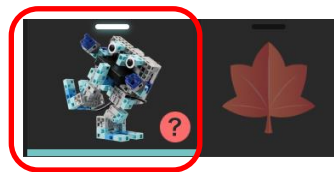
Tap the Studuino icon to connect and disconnect from your Studuino as well as change other settings.

Tap a grayed out icon to see its status.

Tap this status icon again to connect and disconnect from your Studuino as well as change other settings.

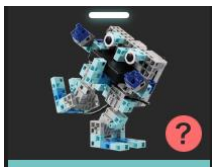


Unselected

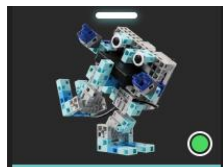


Selected

The status of your Studuino will be shown by a ? or a green ● at the bottom right.



Disconnected



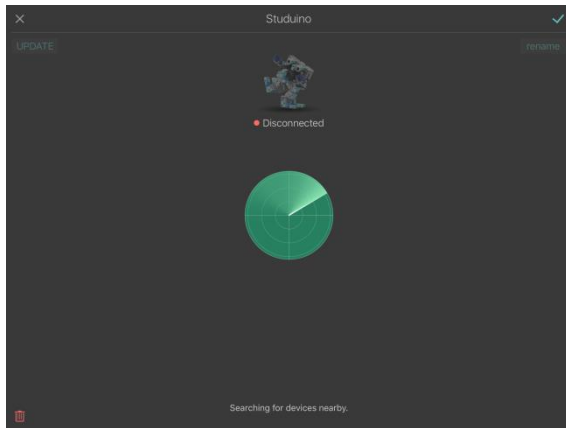
Connected

Turn to the next page to learn how to connect to and disconnect from a Studuino.

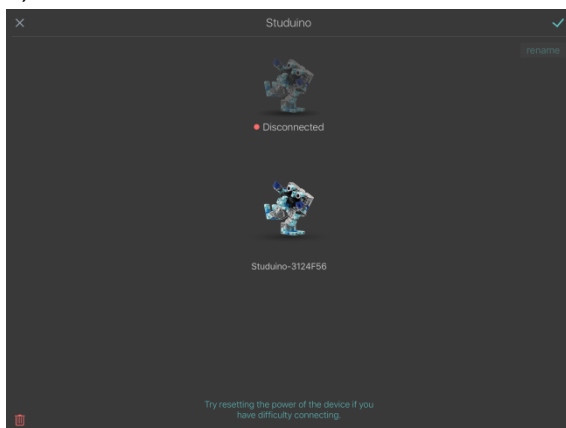
■ When Disconnected

1) Tap the disconnected Studuino icon and Tickle will begin searching for any available units.

Searching for a Unit



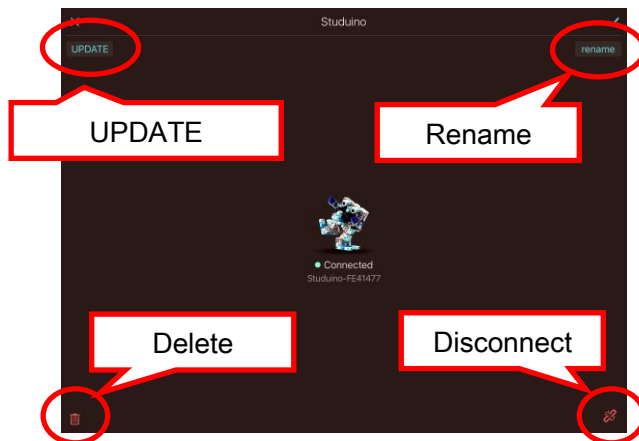
2) You'll see icons and names for these units. Tap an icon to connect to the Studuino.



3) You'll be taken back to the Project screen automatically once connected.

■ When Connected

Tap the connected Studuino icon to see which unit is currently connected. You can then disconnect or change the name of the unit.



Function	What it Does
1. UPDATE	This function formats your Studuino, allowing it to run programs made in Tickle.
2. Rename	Change the name of your Studuino.
3. Disconnect	Disconnects your Studuino.
4. Delete	Deletes the selected unit.

Learn more about these functions below.

1. UPDATE

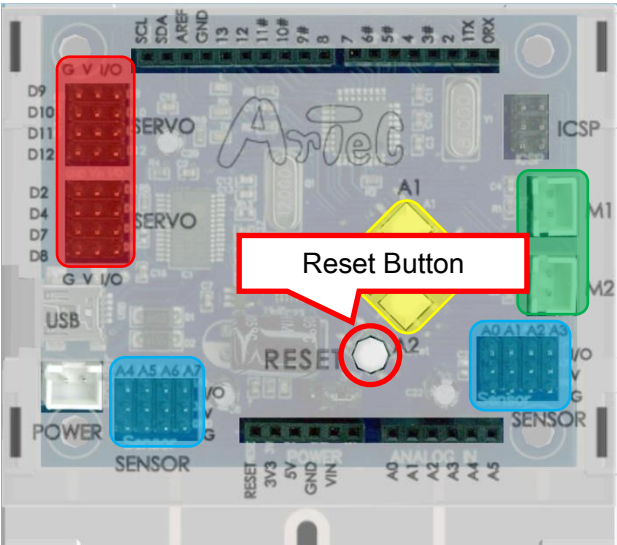
The UPDATE button formats your Studuino, allowing it to run programs made in Tickle. Follow the steps on the next page in order to use this button.

This process will start automatically when a Studuino connects to Tickle for the first time.

Updating is a one-time process. You'll only have to update your Studuino again if you use it outside of Tickle.

1) You'll see the following dialog if you choose to update your Studuino or connect a Studuino which hasn't been formatted.

Update Now?
This update takes several minutes. Please keep the Tickle app open and the Studuino powered during the update.
Press the Reset button on your Studuino to begin.



2) Press the Reset button to begin and you'll see the following screen:

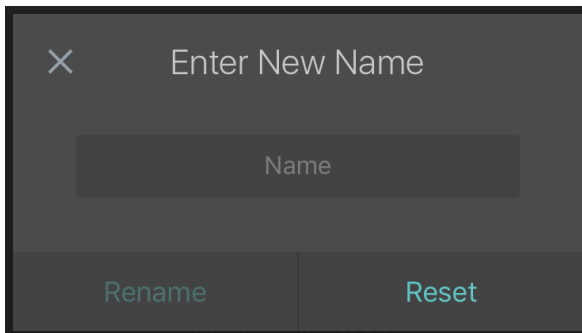
Updating Studuino
(Progress Bar)
Cancel

3) This window will close once the update is complete. You'll see the screen below if the update fails. Choose Try Again to go back to step 2).

Transfer Failed
The transfer has failed. Please try again.
Try Again

2. Rename

This allows you to change the name of your Studuino. Tap it to enter a new name using alphanumeric characters.



3. Disconnect

Click the disconnect button to the lower right in order to disconnect the Studuino shown in the center of the screen.

4. Delete

Delete the selected unit. This will also delete your program.

4. Tickle vs. the Block Programming Environment

There are a few differences in functionality between Tickle and Artec's Block Programming Environment (BPE). Follow the table below to see the major ones:

Function	BPE	Tickle	Notes
Transfer	O	X	Any programs you make in Tickle can't be transferred and run on your Studuino. Your Studuino must be connected to an iPad or iPhone running Tickle in order for your program to run.
Sensor Board	O	X	Tickle doesn't have a Sensor Board, which means that you'll have to make a separate program in order to check your sensor's values in real time.
DC Motor Calibration	O	X	Tickle doesn't have a Motor Calibration feature. You'll have to use your program to account for differences in each motor.
Partial Execution	O	X	Tickle can't run individual sections of a program.
Realtime Servomotor Adjustment	O	X	Unlike the BPE, Tickle doesn't allow you to adjust the angles of your Servomotors as you program.
Simultaneous Control	X	O	Tickle allows you to run two or more devices (including non-Studuino devices) simultaneously.
iPad/iPhone Connectivity	-	O	Tickle allows you to control your Studuino with your iOS device's tilt sensor, use the clock to set an alarm, and much more.