Fable
User guide

v.1.3.8

Contents

Chapter 1: Fable at a glance

The Fable System

The Fable Robot System is a modular robotic system that makes it easy and fun for anybody to build their own robots. While creating robots, students can learn about math, physics, programming, innovation, engineering and more.

The Fable system consists of the components shown below.

Construction System

The Fable modules are either passive (containing no electronics) or active (containing electronics, motors, sensors) and are assembled using a strong magnetic connector system.
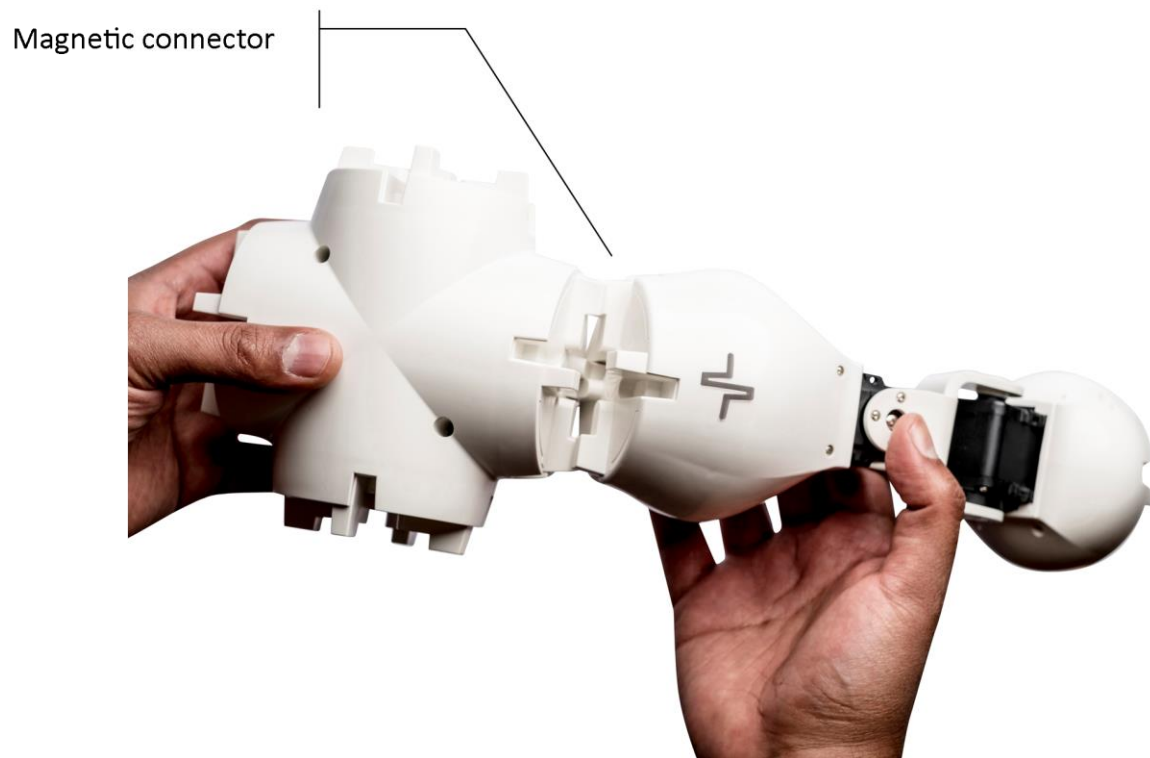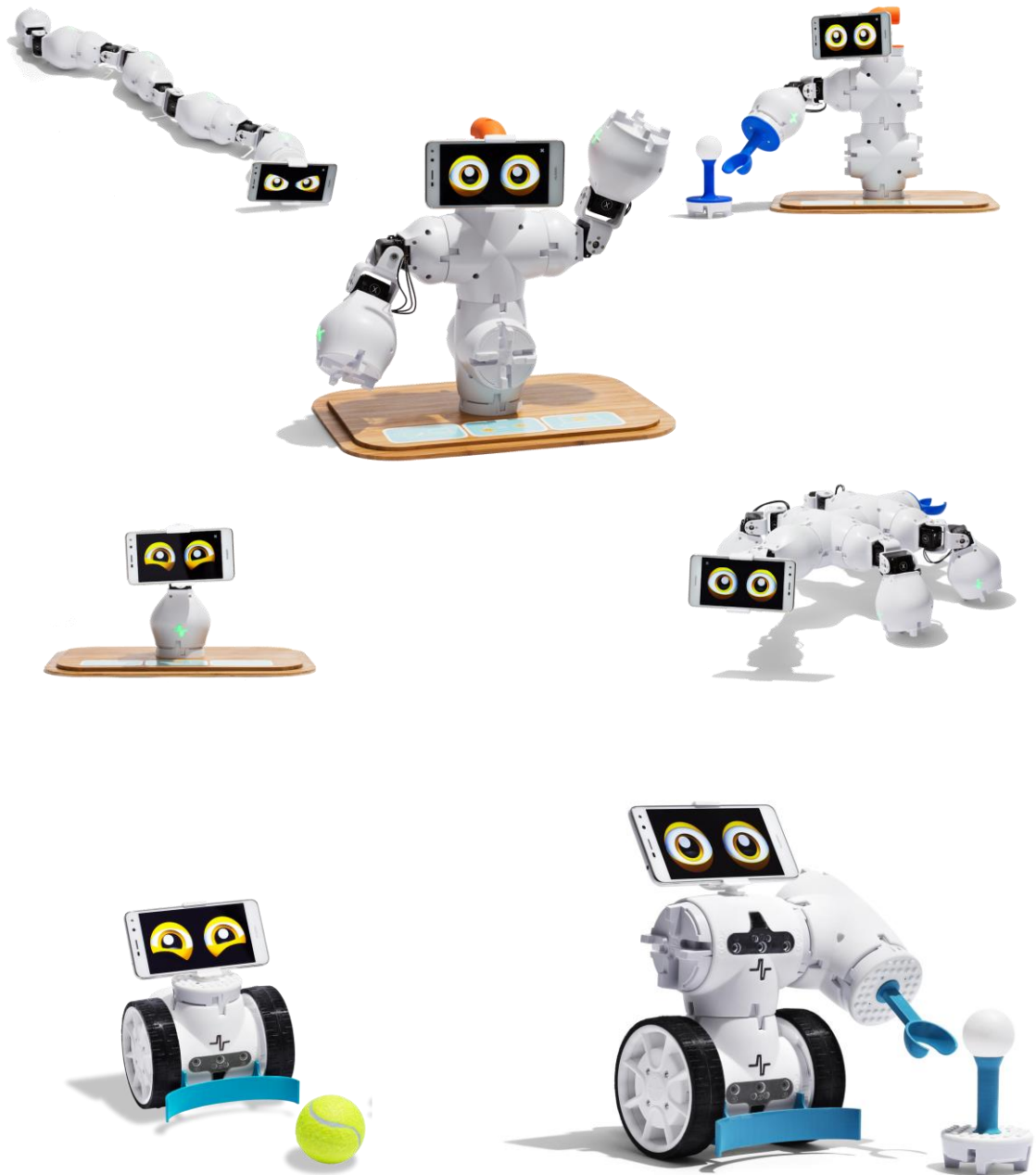
Magnetic connector

Figure 1 - Assemble your custom robots by snapping various modules together.

Fable Robots
Different types of robots can be assembled in seconds by snapping various Fable modules together.

Dongle

The Fable Dongle provides wireless communication between the PC, tablet or smartphone and one or several modules.

PC: To use with a PC the Dongle must be connected with a USB cable[1]. On some operating systems a driver must be installed.

Tablet: To use with a tablet or smartphone the Dongle must be powered using a USB charger or PC. The tablet or smartphone can then connect via Bluetooth.

Pairing: To pair a group of modules with a Dongle users must select the same light color by pressing the color selector buttons on each device.

Figure 2 - Dongle.

---

[1] All USB cables used must be shorter than 3 meters in length.

Joint Module

The Fable Joint Module provides movement to Fable robots using two motors: X and Y.

Wireless Communication: Joint modules are controlled wirelessly using the Dongle.

Servos: The two servos are identified as **X** and **Y** and their position can be set from -90 to +90 degrees. The speed of movement can be controlled and the angle can be measured.

Pairing: Joint Modules have a button which, if pressed, will change the LED color. The color of the light indicates the type of Dongles that would be able to detect the module. Only matching colored devices are able to communicate with each other, (e.g. red Joint Modules with red Dongles).

Self-protection: Joint Modules continuously monitor the load and temperature on the motors and the battery level. As a self protection mechanism, Joint Modules will automatically turn off if an overload or low battery level event is detected. **You should avoid overloading, blocking or pulling locked motors as they can be damaged**.

Figure 3 - Front side of Joint Module

ID: Each module has a unique ID written on the back of the module.This ID is used to identify the module in the Fable programming software.

On/Off: An on/off switch is located in the back of the module.

Battery: The joint module contains a rechargeable battery capable of 2-3 hours of normal operation.

Charge: The battery is charged using a standard Micro-USB charger. Charging can take several hours depending on depletion and the charger used.

Figure 4 - Joint Module shown from the back.

PC Software

Users can program their robots by using the Fable software. The interface supports block-[2] and text-[3] based programming:

The software supports three complexity levels:

Simple: Block based programming for beginner or younger children. A limited number of blocks makes the interface easily accessible.

Full: Blocks based programming for more experienced or older children. Support for more advanced features such as math, functions, logic and variables.

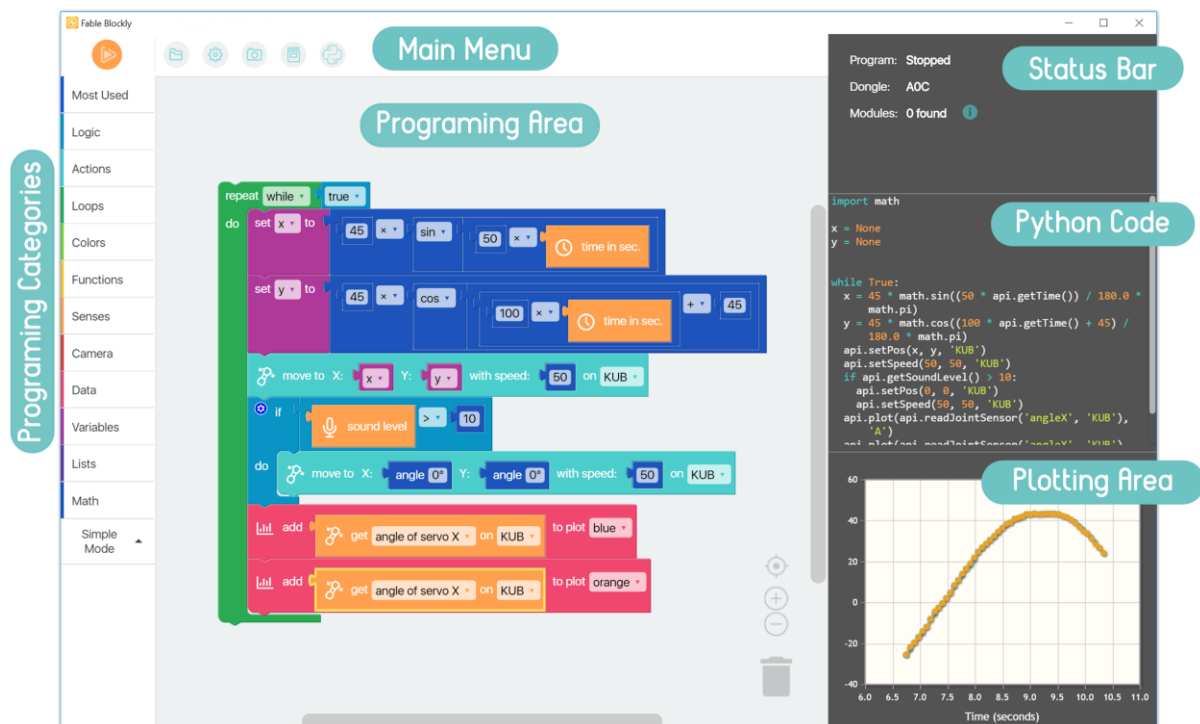**Python:** Text based programming using the Python programming language.

Figure 5 - Fable Blockly

---

[2] Based on Google Blockly
[3] Based on Python

# Chapter 2: Get started

Install the Fable Software

The newest version of the software can be downloaded and installed from
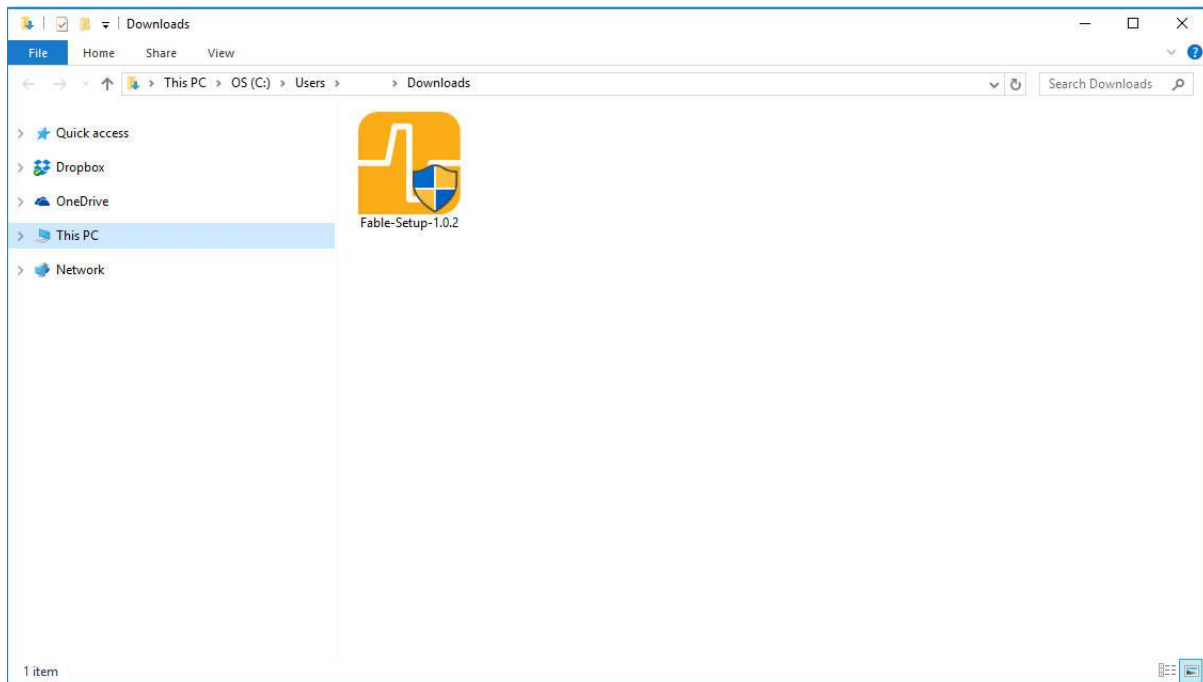www.shaperobotics.com/download

Supported Operating Systems:
- Windows 7, 8 and Windows 10
- Mac OS (See supported versions at www.shaperobotics.com/download)
- iOS for iPad.

Once you have selected your operating system click the **Save File** button on the popup window.
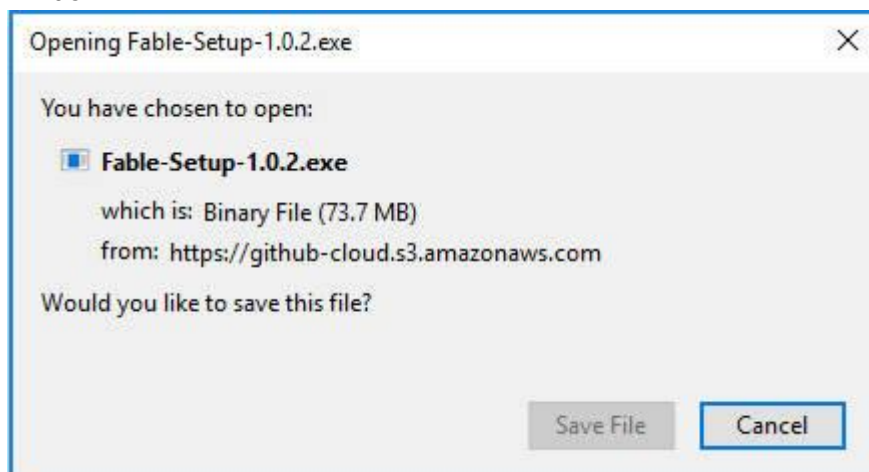
Once it finished downloading go to the destination folder and double click on the Fable-Setup icon.

Once you have double clicked the Fable-Setup icon you should see a dialog box with a progress bar indicating the status of the installation process.
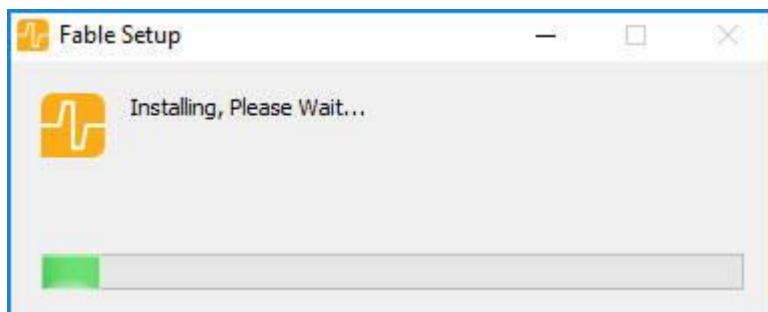
Plug in the Dongle to your PC's USB port. If you're running Windows 7 or 8 see the following section: Install the Dongle Driver (Windows 7 & 8).
Start the PC Program by clicking this icon located in your Desktop.

How to write a program

To get started with programming Fable follow these instructions:
1. Turn on a Joint Module
2. Pair the Dongle with the module.
3. Create a test program as the one shown below.
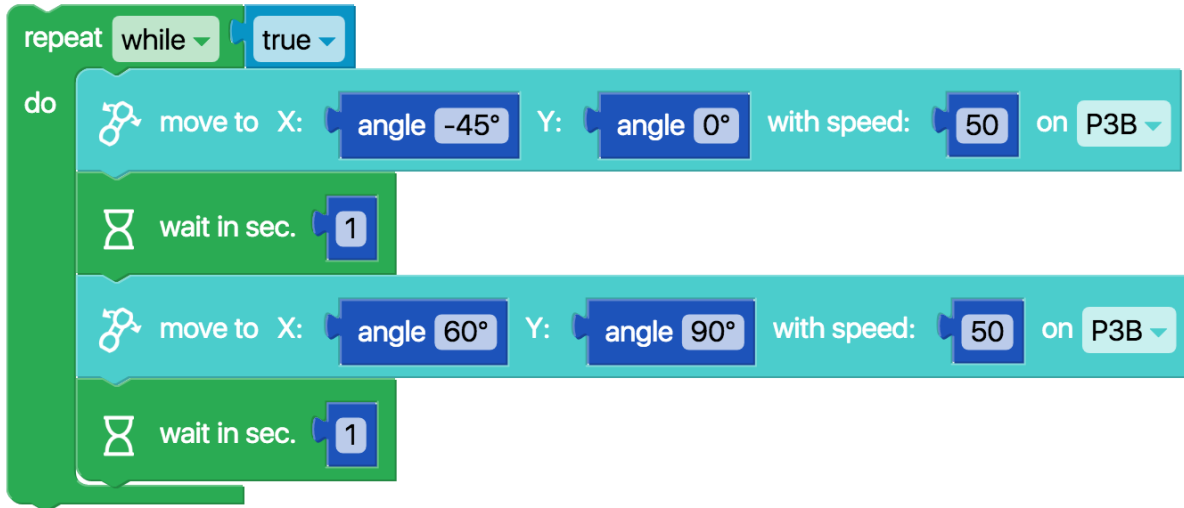
4. Press the Run button located in the software's menu.

5. If done correctly the Joint Module should move back and forth between two positions at 1 second intervals.Observe behavior

6. You can stop the program by pressing the Stop button. You can experiment with this program by changing the example code.

Install the Dongle Driver (Windows 7 & 8)

A driver for the Dongle only needs to be installed in Windows 7 & 8.

Step 1: Windows will alert you that the driver is not installed. Once this happens download the driver from www.shaperobotics.com/download and unzip in a folder. (See balloon 1).

Step 2: Locate the Dongle within Windows' Device Manager under Other devices, right click and select "Update Device Software". (See balloon 2).

Step 3: Browse to the the folder containing the driver that you downloaded. Accept if Windows warns you that the driver is unsigned. (See balloon 3).

Step 4: The Dongle driver should now be installed. It can be checked under the "Ports" section in Device Manager. The Dongle will automatically be assigned as a COM port. (See balloon 4).
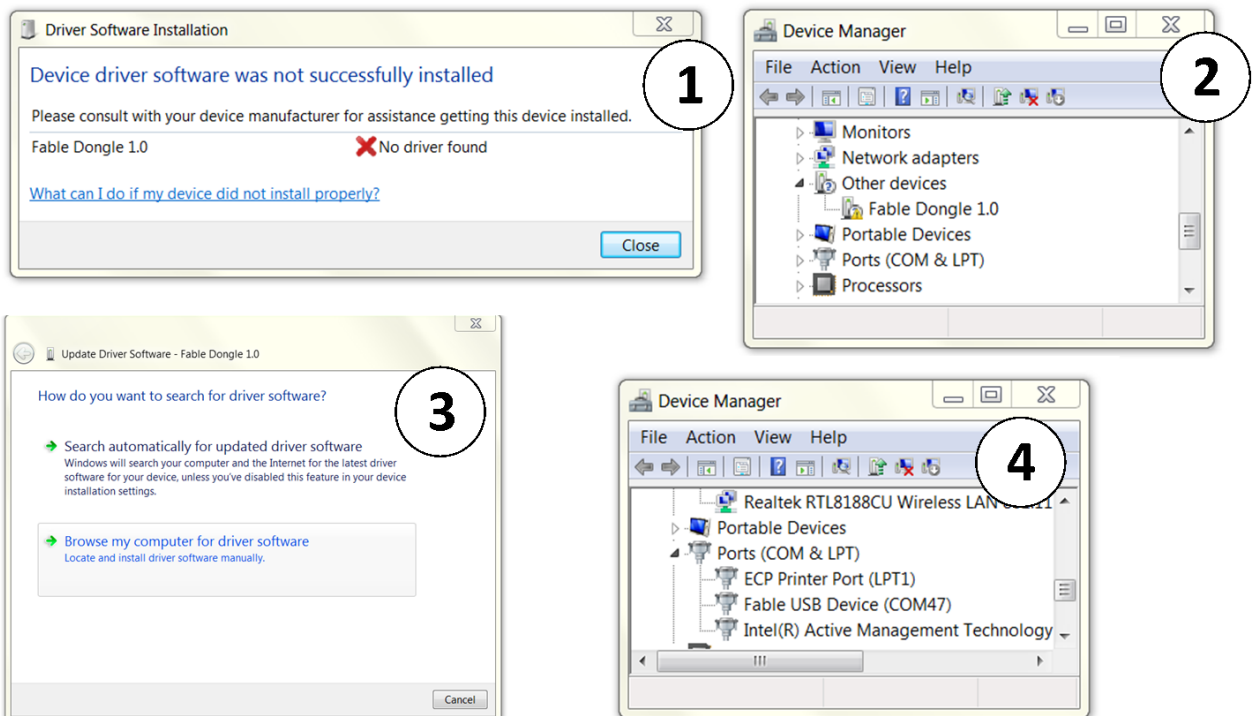
Chapter 3: Basics

Turning the Joint Module On/Off

The on/off switch can be found on the back of the module, as highlighted in Figure 6 - Turn the switch left and right to turn the Joint module (letf) on or off..

On: When the module is on it can be programmed wirelessly, the module's button will light up and the color will change when pressing the button.

Off: When the module is off the colored light is off unless it is charging or the button is being pressed. If the button is pressed while the module is off, the light will turn on and display the module's battery level.

Triggering Sleep Mode in Fable Spin

Fable Spin can be put into Sleep Mode, as highlighted in Figure 6 - Turn the switch left and right to turn the Joint module (letf) on or off..

On: When the module is on it can be programmed wirelessly, the module's button will light up and the color will change when pressing the button.

Sleep Mode: When the module is in Sleep Mode the colored light is off unless it is charging or the button is being pressed. If the button is pressed while the module is sleeping, the light will turn on and display the module's battery level.

Figure 6 - Turn the switch left and right to turn the Joint module (letf) on or off. For Fable Spin press on the Shape logo for 3 seconds to put in sleep mode.

Battery Management

The Joint Module contains a rechargeable LiPo Battery.

Charging: The battery is recharged with a USB charger and can be charged while the module is either on or off.

Timeout: To save battery the module will automatically turn off after being inactive for 10 mins. To turn it on again, the on/off switch must be toggled or the module's button pressed.

Battery level:
Color of the module button will indicate battery level in the **off** state, when:
- Charging
- Button is pressed

Battery level is indicated in a scale: Green = full level, yellow = medium level, red = low level.

Self-protection: To protect the battery the module will automatically power down if the battery level becomes too low. Recharge the module to make it functional again.
Lifetime: To maximise battery lifetime, avoid full battery depletion before recharging.
Storage: If a module is to be stored for months without being used it should be charged to at least the yellow battery level before being stored.

Figure 7 - Joint Modules being charged by using a charging station. Each module shows a different battery level. Where green depicts full battery, yellow is medium level, and red is low level.

Wireless communication

Dongle and modules communicate wirelessly using radio signals.

Channels: The radio signals can be on different channels, each of the channels is indicated by the Dongle's or module's LED color. If a Dongle and a group of modules are on the same channel they are able to communicate.

Color pairing: The color on the modules and Dongle indicates the radio channel. To pair modules with a Dongle simply match the color by pressing their buttons.

Interference: Several Dongles and robots can be on the same channel, however, performance will gradually decrease due to interference. In environments where many users work with Fable robots interference can be reduced by distributing evenly on the different channels.
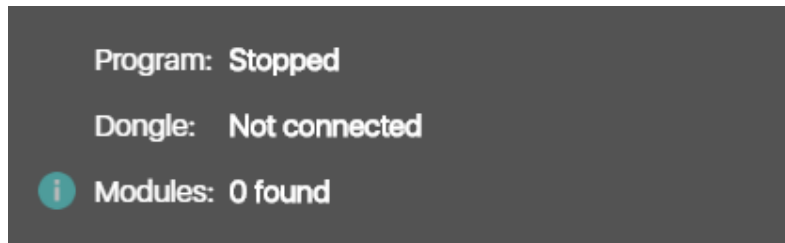

Figure 8 - Paied Joint Module with Dongle.

Chapter 4: Troubleshooting

Dongle not found

Symptoms: The Dongle is not detected by the computer/software. The issue can be confirmed by inspecting the status window in the PC software.

Possible issues and suggested solutions:
- Dongle is frozen - plug out and back in the Dongle from the USB port.
- Port is frozen - restart the computer
- Operating system is not supported - check list of supported OS.
- Driver not installed (Windows 7 & 8) - install driver and inspect Device Manager to verify. See Install Dongle Driver in Chapter 2.
- USB Cable broken - replace cable
- Dongle broken - contact Shape Robotics
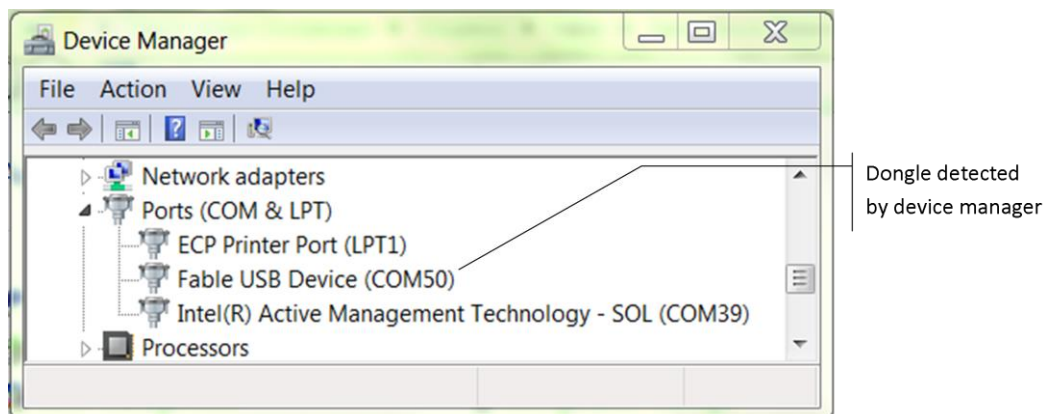
Module not found

Symptoms: The module does not show up with its ID in the graphical user interface.

Possible issues and suggested solutions:
- The Dongle is not connected (see above).
- The joint module is not on. Even if it has a color it may be charging while turned off. Press the module's button to see if the color changes, if it does it means it is turned on, if not then check the on/off switch.
- The Joint Module has crashed - try restarting the module by toggling the on/off switch.
- The joint module is broken - contact Shape Robotics.
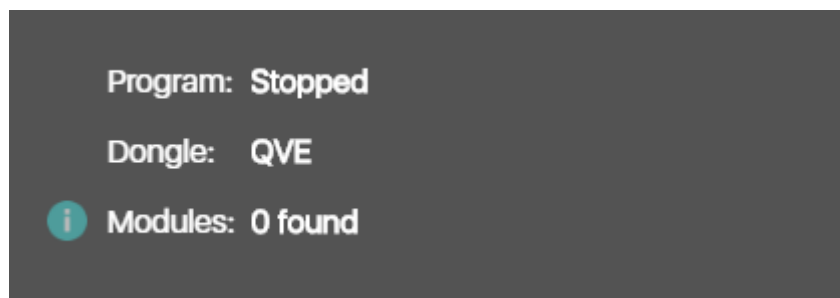
Module overloaded

Symptoms: The joint module blinks red and stops moving for a period of time.

Possible issues and suggested solutions:
- A motor on the module has been overloaded, i.e. commanded to perform a movement which it does not have the strength to perform. To solve: Modify program and/or robot configuration to avoid damaging the motor.
- A motor has overheated. To solve: Let motor cool down.

Chapter 5: Safety, handling and support

Important Safety and Handling Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. **Notice:** Any changes or modifications not expressly approved by Shape Robotics for compliance could void the user's authority to operate the equipment.

Warning: Failure to follow these safety instructions could result in fire, electric shock, injury, or damage to Fable or other property. Read all the safety information below before using Fable.

Not a toy: Fable is intended for use for educational purposes in schools and other pedagogical contexts under the surveillance of an adult instructor. Do not let children use Fable without supervision.

Handling: Handle Fable with care. It is made of plastic and has sensitive electronic components inside. Fable can be damaged if dropped, stalled, pulled, overloaded, burned, punctured, or crushed, or if it comes in contact with liquids. Do not use a damaged or malfunctioning Fable module.

Repairing: Do not open any Fable modules, nor should you attempt to repair Fable yourself. Disassembling Fable may damage it or may cause injury to you. If Fable is damaged, malfunctions, or comes in contact with any liquids, contact Shape Robotics.

Battery: Don't attempt to replace the battery in a Fable module yourself - you may damage the battery or module, which could cause overheating and injury. The lithium-ion battery in the module's should be replaced only by Shape Robotics.

Charging: Charge Fable with the included USB cable and power adapter, or with another certified USB charger or cable, with a maximum rating 5 V and 2.1 A. The USB cable should have a maximum of 3 m in length. Using damaged cables or chargers, or charging when moisture is present, can cause fire, electric shock, injury, or damage to Fable or other property.

Denmark. If another power adapter is used other than the one delivered with the unit, the used power adapter must have a built-in fuse (Danish National Condition, §5.6.1)

Medical device interference: Fable contains magnets, electronic components and radios that emit electromagnetic fields. These fields may interfere with pacemakers, defibrillators, or other medical devices. Maintain a safe distance of separation between your medical

device and Fable. Consult your physician and medical device manufacturer for information specific to your medical device. If you suspect Fable is interfering with your pacemaker, defibrillator, or any other medical device, stop using Fable.

Extreme risks: Fable is not intended for use where the failure of the device could lead to death, personal injury, or environmental damage.

Choking hazard: Some Fable accessories may present a choking hazard to small children. Keep these accessories away from small children.

Operating climatic conditions: Fable is designed to work only in an indoor environment with ambient temperatures between 0° and 35° C and stored in temperatures between 0° and 45° C. Fable should not be used in high humidity environments, e.g. wet environments. Fable can be damaged and battery life shortened if stored or operated outside of these temperature ranges. Avoid exposing Fable to dramatic changes in temperature or humidity. When you're using Fable or charging the battery, it is normal for Fable to get warm.

Fable Support

Support information are available online at http://shaperobotics.com
For personalized support contact Shape Robotics at: support@shaperobotics.com