Electronic Kit for Scratch&Arduino

Contents

Introduction

Electronic Kit for Scratch&Arduino is a customized electronic kit designed for educator to teach scratch programming, for students to learn scratch programming. It constains 7 pcs sensors each with a color-coded connector.

In the past, students usually write scratch scripts on computer. All scripts is run on computer virtually, students can't touch. Now you can use electronic kit to communicate with scratch(such as controlling a fan, control the led, read vales from Me light and grayscale sensor, Me PIR

motion sensor and so on). If graphical programming is too easy for you and you want to challenge a little bit difficult code programming, you can learn Arduino code programming.

Part List:

Me Baseboard × 1
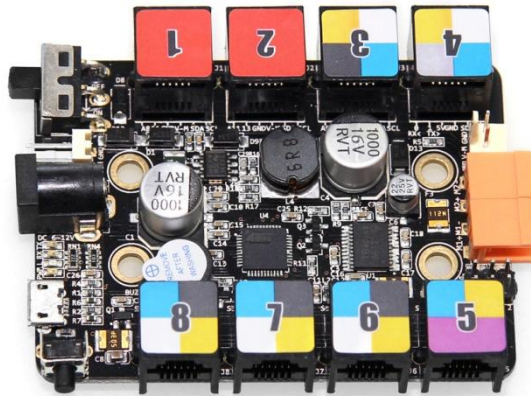
Me Ultrasonic Sensor × 1

Me Light and Grayscale Sensor × 1

Me Gyro Sensor × 1

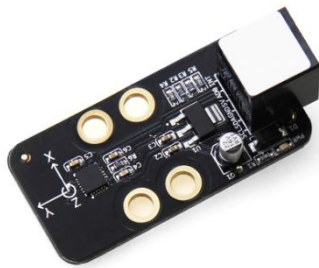**Me Temperature Sensor × 1**

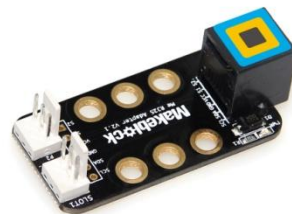**Me 130 DC Motor × 1**

Me RGB LED × 1

Me Joystick × 1

Me RJ25 Adapter × **1**

6P6C RJ25 cable-20cm × 4

6P6C RJ25 cable-35cm × 2

Battery Holder for (6)AA × 1

And with a USB 2.0 A-Male to Micro B-Male Cable(white color)

Scratch Programming

1. Install software Scratch For Robot

Download software Scratch For Robot from the link:
http://makeblock-makeblock.stor.sinaapp.com/Scratch_for_Robot_lastest.zip. After following installation suggestion to complete the whole installation, you can see the logo link of Scratch for robot on your computer desktop。
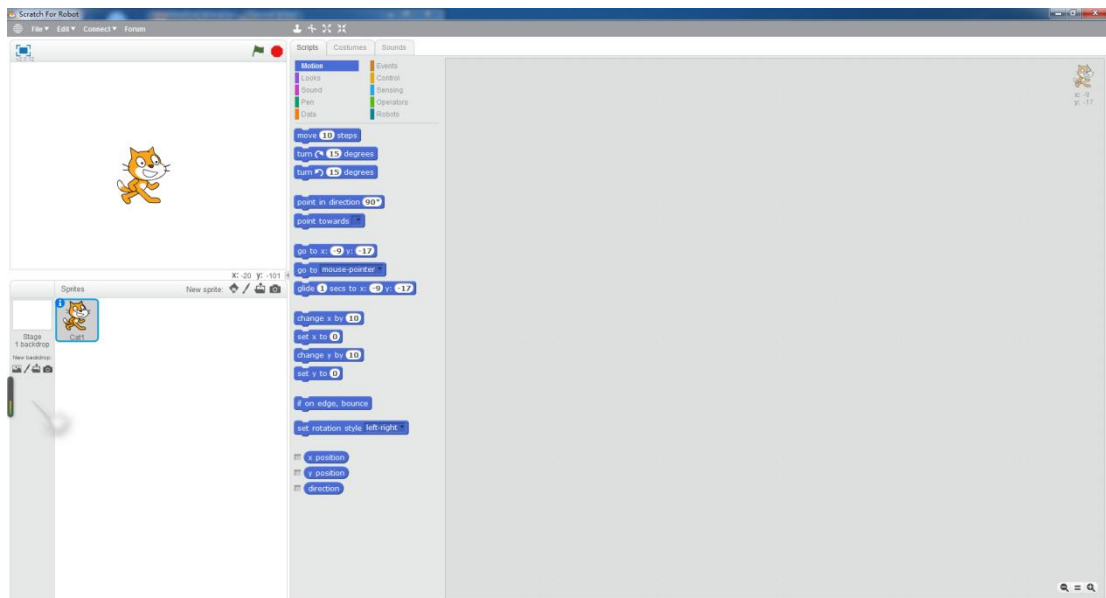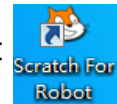
2. Upload the firmware

First, connect Me Baseboard to your computer with USB cable. The on-board buzzer will beep after you have connected sucessfully. Click the top menu bar "connect—>COM11"(COM11 is a example. COM1,COM2 is not allowed to be selected, please choose other COM ports.).
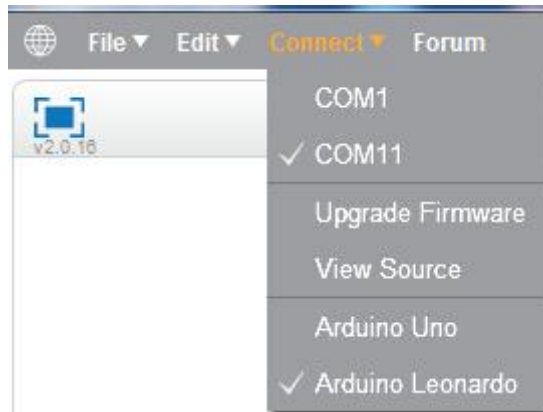
After you have sucessfully connected to COM11, you can see the red indicator turns into green in Scripts—>Robots section.
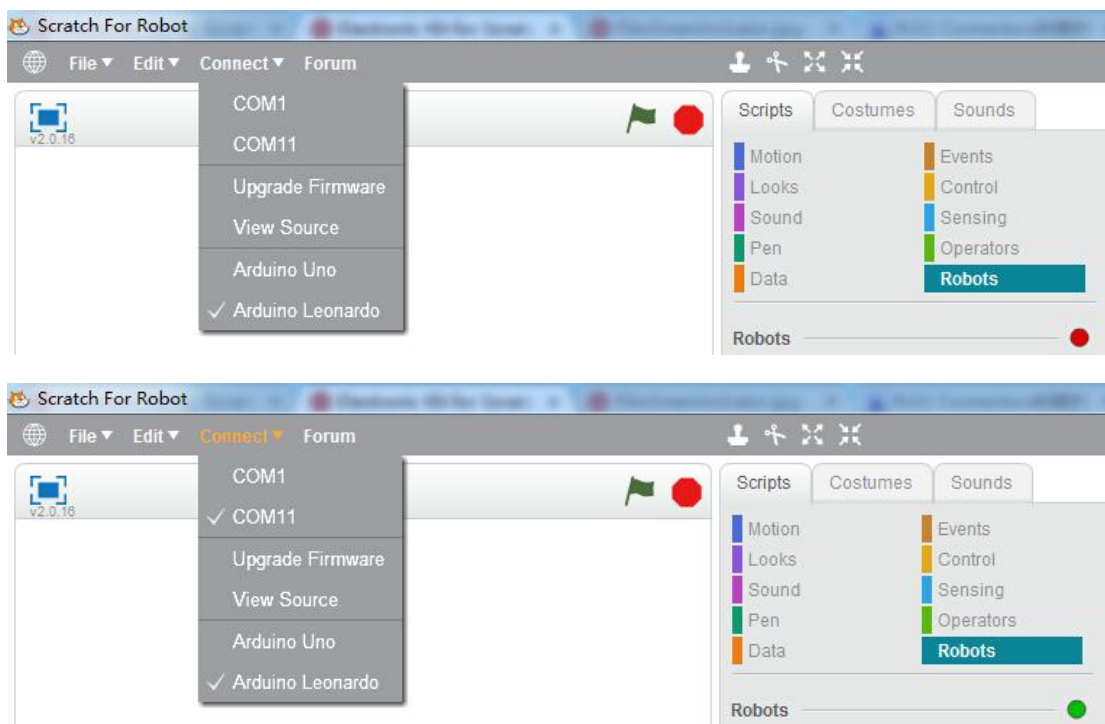
Then Make sure that you have choosen "connect—>Arduino Leonardo" ,"connect—>COM11" from the top menu bar. Next you can click menu "connect—>Upgrade Firmware" to upload the Arduino code to Me Baseboard. When uploading, blue on-board LEDs and red on-board LEDs will flash continually and there is a processing bar showing the uploading progress.
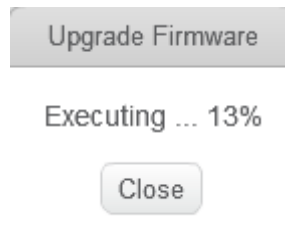
when finished, you will hear a beeping of the on-board buzzer.

3. Write scripts

After you have uploaded, the COM ports will refresh, so you need to make sure that you have choosen "connect—>Arduino Leonardo" ,"connect—>COM11" from the top menu bar again. (COM11 is a example. COM1,COM2 is not allowed to be selected, please choose other COM ports)
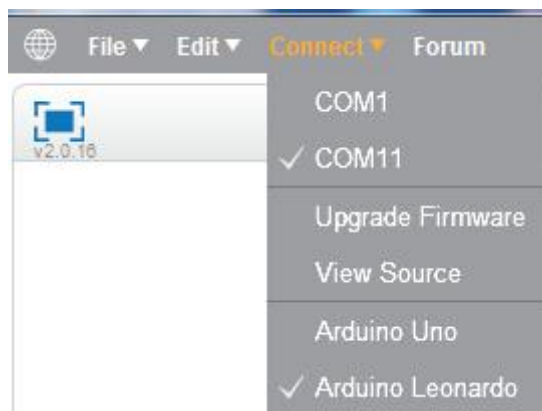
Then you can write scripts with electronic module script blocks in "scripts—>Robot" section. Here is a entry-level demonstration reading the value of ultrasonic sensor, which is connected to the port 3 of Me Baseboard.
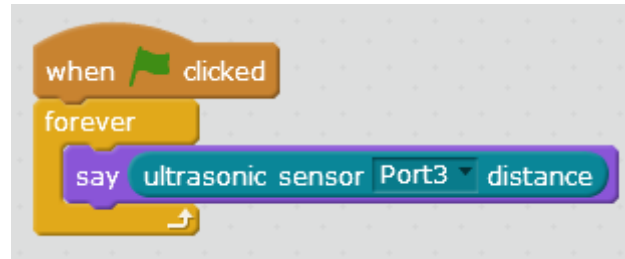
Note: Scripts—>Robots section have many electronic module script blocks, which is designed to communicate with Makeblock electronic modules. You can use these script blocks to control DC motors, servos, leds, 7-segments display, or reading values from all kinds of sensors such as light sensor, sound sensor, tempterture sensor and so on.
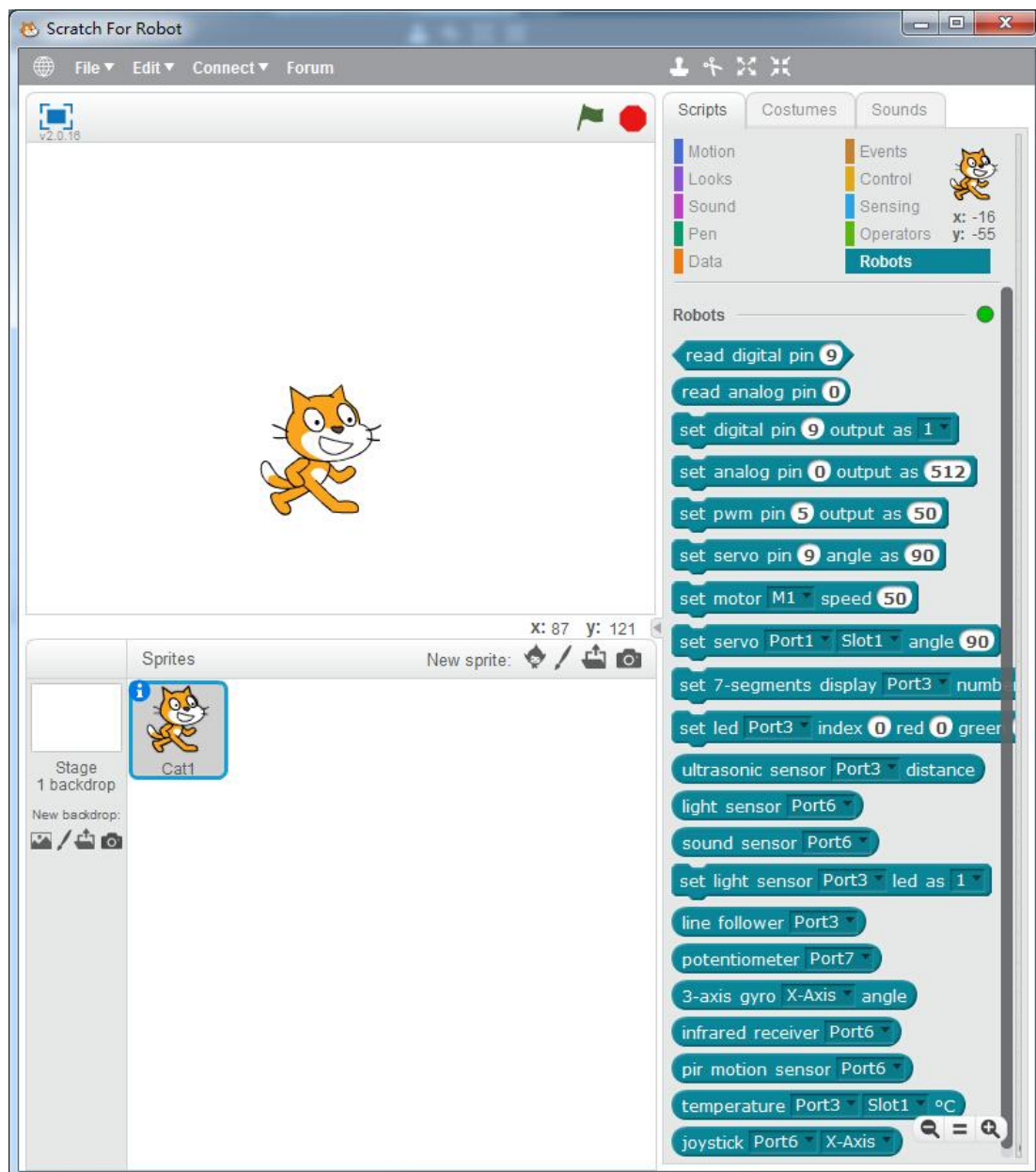
More details about how to use electronic modules script blocks, please see please see below Electronic module script blocks Usage.

Arduino programming

If graphical programming   is too easy for you and you want to challenge a little bit difficult code programming, please refer to this part

contents to study. But don't worry, we have provided Arduino library to simplify your programming. We

You can follow the video to finish how to upload the code, or follow the words below.

https://www.youtube.com/watch?v=yvz5V9nwbrQ&feature=youtu.be
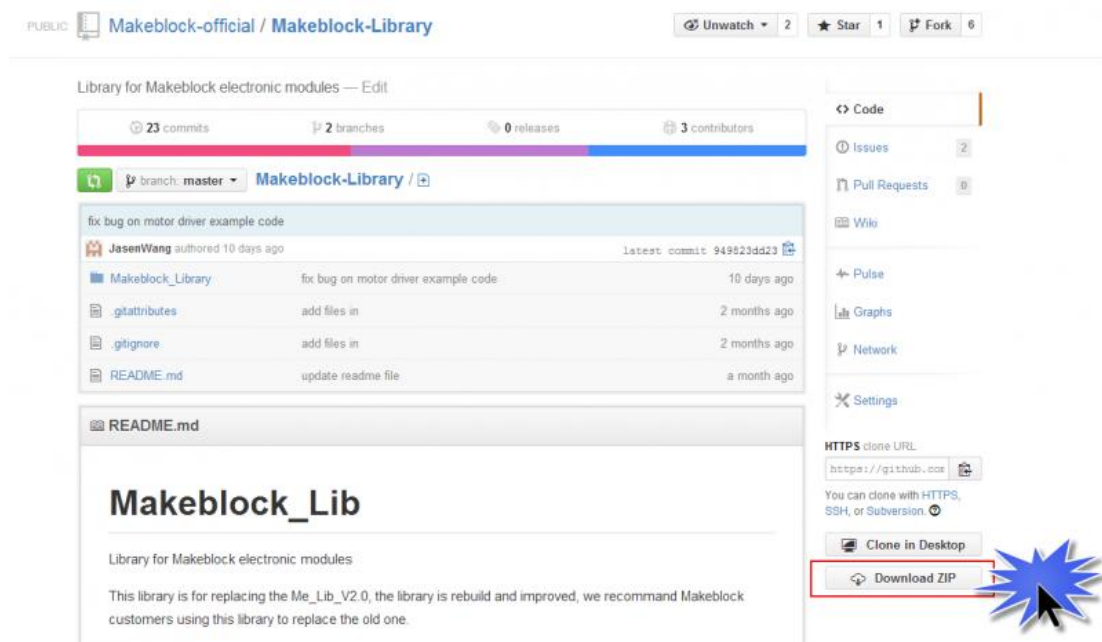
1. Install Arduino IDE

- Download Arduino IDE from Arduino official

  website: http://arduino.cc/en/Main/Software

- Follow the on-screen instructions to complete the setup. For more

  information, refer to: http://arduino.cc/en/Guide/HomePage

2.Install Makeblock library

Download Makeblock library
https://github.com/Makeblock-official/Makeblock-Library

A: Automatically Installation

Unzip the library. In the Arduino IDE, navigate to Sketch --> Import Library. At the top of the drop down list, select the option to "Add Library.
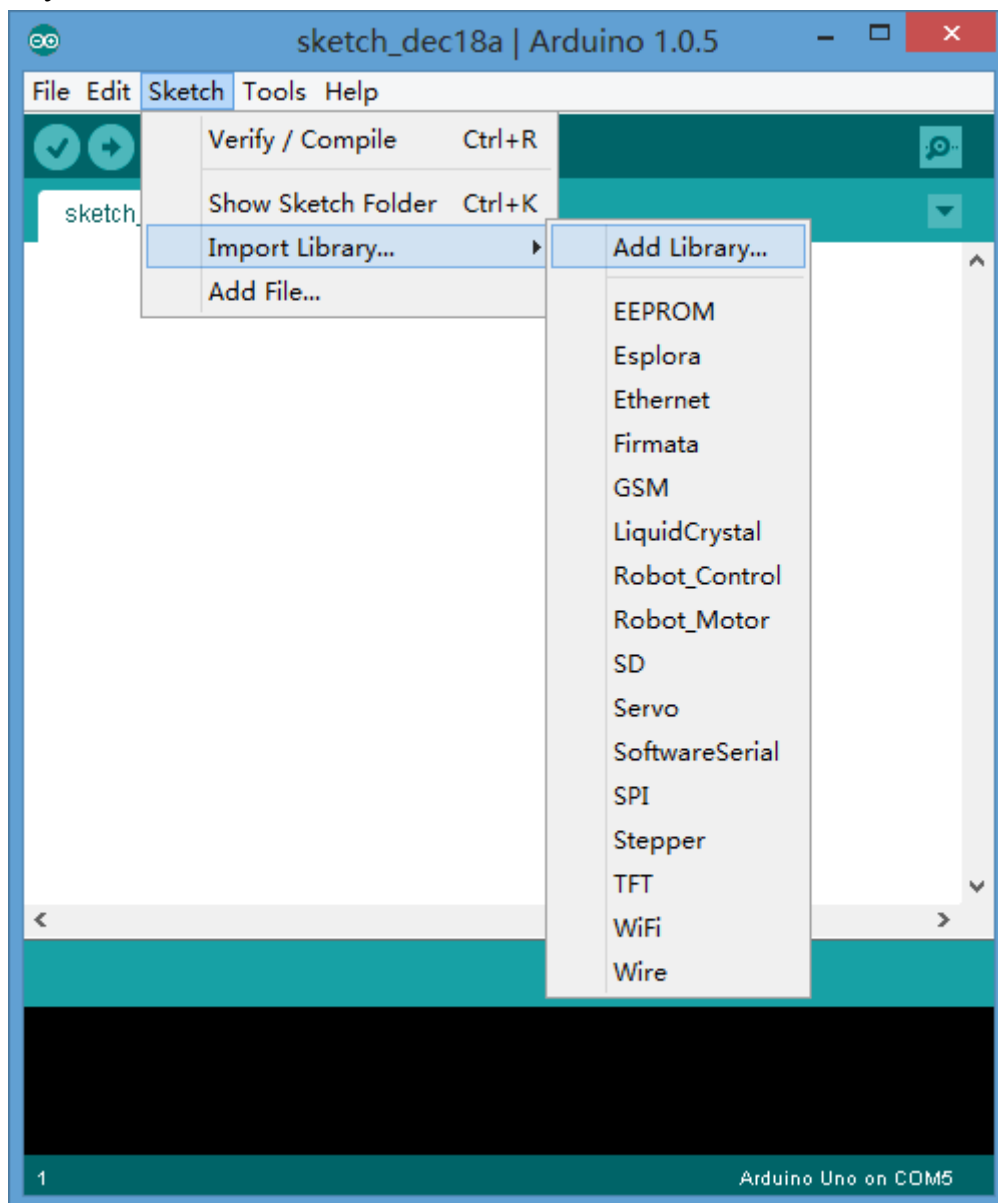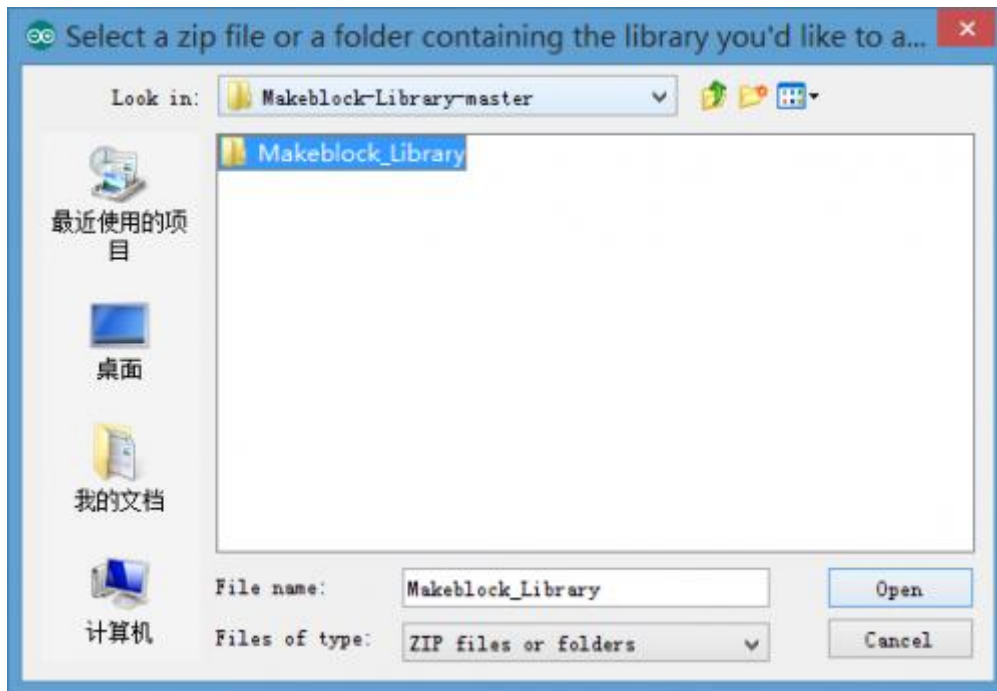
- **B: Manually installation**

Unzip the library file, copy the folder named "Makeblock_Library" into the libraries file of Arduino IDE.

Your Arduino library folder should now look like this (on Windows): My

Documents\Arduino\libraries\Makeblock_Library\Makeblock.cpp

My Documents\Arduino\libraries\ Makeblock_Library \Makeblock.h

My Documents\Arduino\libraries\ Makeblock_Library \ examples\

Makeblock_Robot_Starte_Kit ……..

or like this (on Mac):

Documents/Arduino/libraries/Makeblock_Library/Makeblock.cpp

Documents/Arduino/libraries/Makeblock_Library/Makeblock.h

Documents/Arduino/libraries/ArduinoParty/ examples\

Makeblock_Robot_Starte_Kit ……..

3.Run the Demo code

Use a USB cable to connect the Arduino board to your computer, when

you plug in the USB cable in your computer, your computer will
automatic install driver for the control board, this may take several
minutes.

- **Starting the demo code:**

In the Arduino IDE, navigate to
file >examples>Makeblock_Library>examples>makeblock_Robot_Start
er_Kit>...
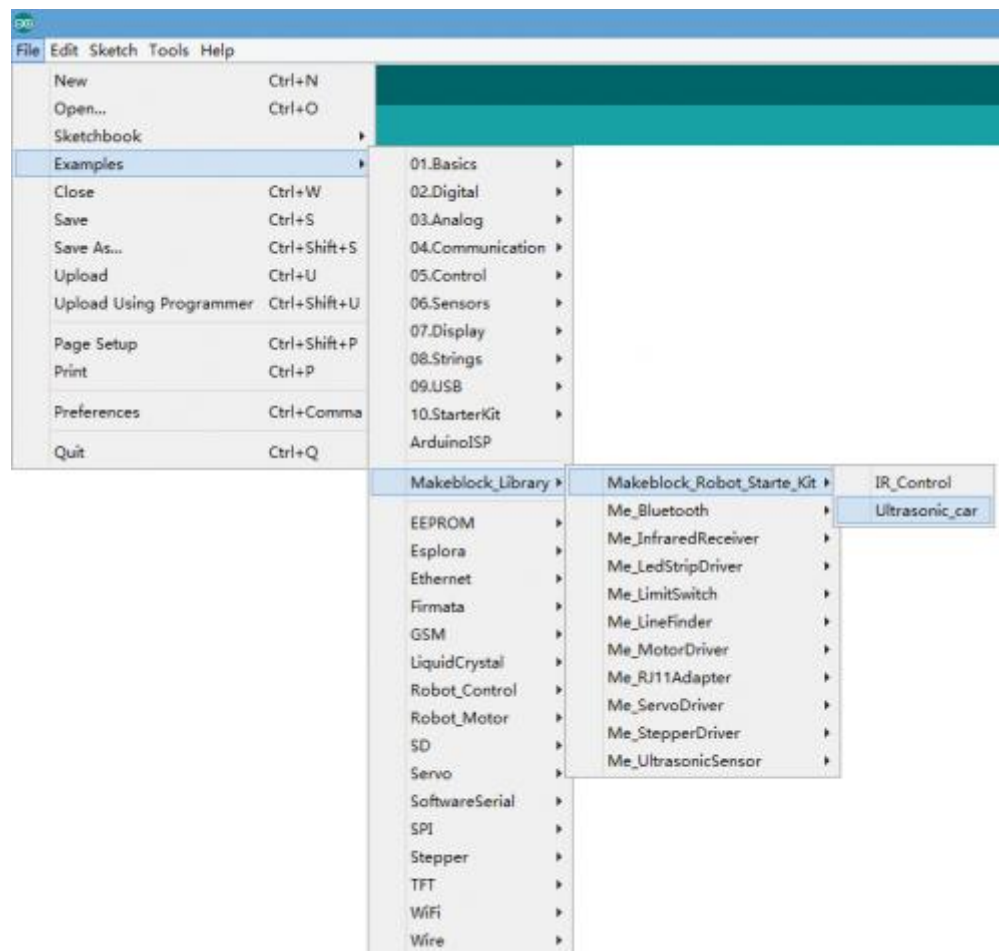
- **Choose the board type**

In the Arduino IDE, navigate to Tools>Board>Arduino Leonardo

- **Choose the serial port**

In the Arduino IDE, navigate to Tools>Serial Port>Com x

```
File Edit Sketch Tools Help

                    Auto Format              Ctrl+T
                    Archive Sketch
   Ultrasonic_car   Fix Encoding & Reload
/***************    Serial Monitor           Ctrl+Shift+M    *************
* File Name
* Author          Board                    ▶
* Updated         Serial Port              ▶  ✔  COM5
* Version
* Date            Programmer               ▶
* Description     Burn Bootloader             kit, two motors
                        connect on the M1 and M2 port of baseshield,  the Ultrasonic sensor
                        connect on port 3.
* License         : CC-BY-SA 3.0
* Copyright (C) 2013 Maker Works Technology Co., Ltd. All right reserved.
* http://www.makeblock.cc/
********************************************************************/
#include <Makeblock.h>
#include <Arduino.h>
#include <SoftwareSerial.h>
#include <Wire.h>

MeDCMotor MotorL(M1);
MeDCMotor MotorR(M2);
MeUltrasonicSensor UltrasonicSensor(PORT_3);
```

- **Upload the code**

Click the "upload" button to compile and upload the code to the control board. It will show "Done uploading" when finished.

Got problem running the code?

Due to Me BaseBoard core (Leonardo controller ATmega32U4), sometimes when you try to upload, an error message maybe pops up: "Couldn't find a Le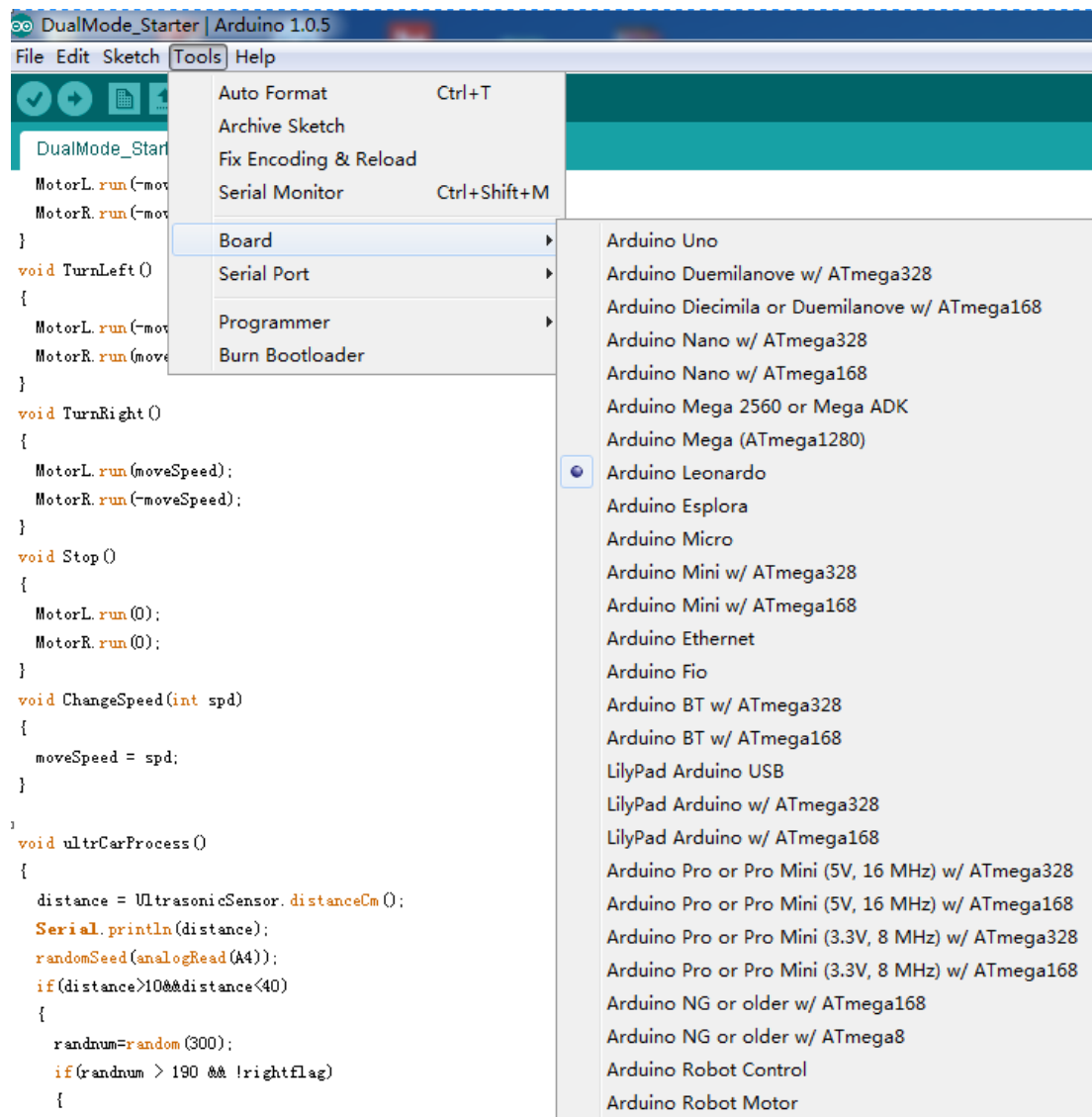onardo on the selected port". Check that you have the correct port selected. If it is correct, try pressing the board's reset button after initiating the upload. More details please visit Makeblock forum
(http://forum.makeblock.cc/t/me-baseboard-leonardo-error/)
If you have any question about this product or you need technical support, please post it in Makeblock forum(forum.makeblock.cc).

Electronic module script blocks Usage
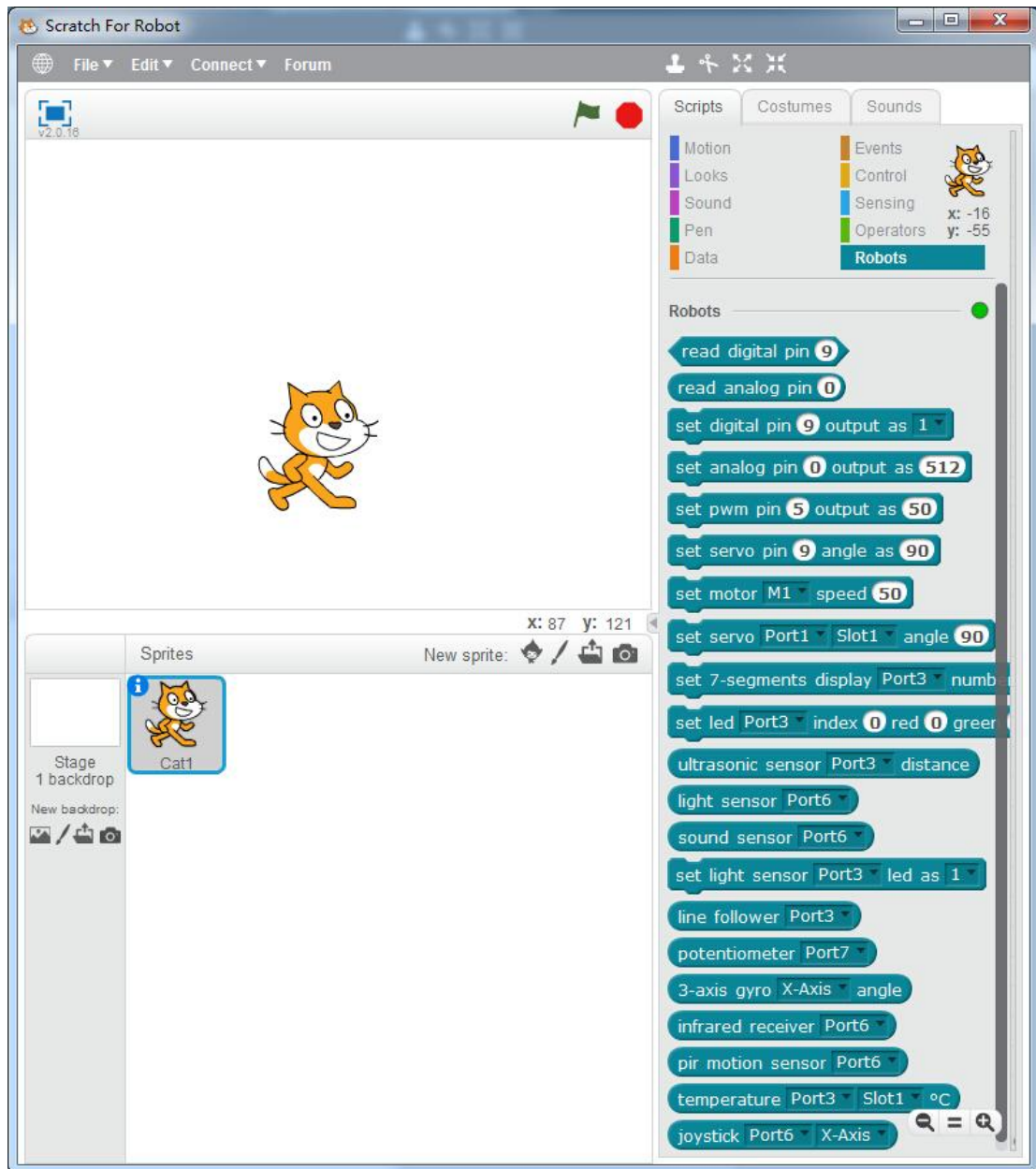
Note: please follow Scratch Programming step3-4 to make sure the connection between Me Baseboard and Scratch For Robot is gonna to work well.

1. Control digital pins of Me Baseboard

Me Baseboard has 13 digital pins in total. You can use the script

block to set the output value of the digital pin as 0 or 1.. At the same time, you can read the input of the digital pin. Here is a scratch demo.
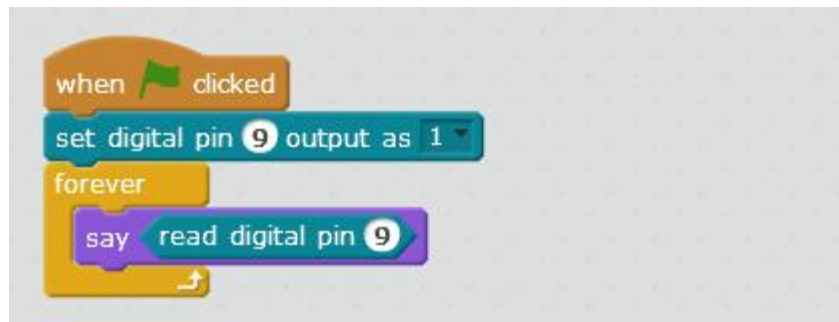
Note: digital pin value range: from 0 to 13, output value: 0(LOW) or 1(HIGH).

2. Control analog pins of Me Baseboard

Me Baseboard has 11 analog pins in total. You can use script blocks to set the output value of the digital pin as 0 to 1023. At the same time, you can read the input value of the analog pin. Here is a scratch demo.

Note: analog pin value range: 0 - 11, output value: from 0 to 1023.

3. Control the DC motor

Me Baseboard has 4 DC motor interfaces in total. There are two

interfaces(M1,M2) intergrated on Me Baseboard and other two interfaces is connected to the port 1,2 of Me Baseboard via addtional electronic module—DC Motor Driver.

DC motor is connected to the on-board M1 of Me Baseboard directly

DC motor is connected to the on-board M1 of Me Baseboard via Me DC Motor Driver.

4. Control the servo

Servo is not allowed to connect to Me Baseboard directly. So you may need to use Me servo driver to driver servos by connecting to Port1, 2 of Me Baseboard.

Pictures below shows that Servo is connected to the slot1 of Me Dual Servo driver V2.1 and the Adapter is connected to Port1 of Me Baseboard directly.
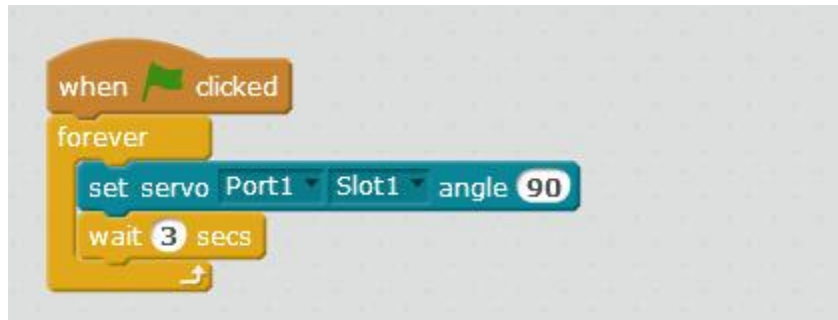
Note: Me Servo Driver has two slots, so you may need to check out which slot you have choosen in Scratch is the same as which slot you have plugged.

5. Control 7-segments display

7-segments display is usually used to display numbers and a few special characters. You can easily use it in your robot project to show speed, time, the value of sensors, or scores.

7-segment display is allowed to connect to Port3, 4, 5, 6, 7, 8 of Me Baseboard directly. Here is scratch demo.

Picture below shows that Me 7-segments display is connected to Port3 of Me Baseboard directly.
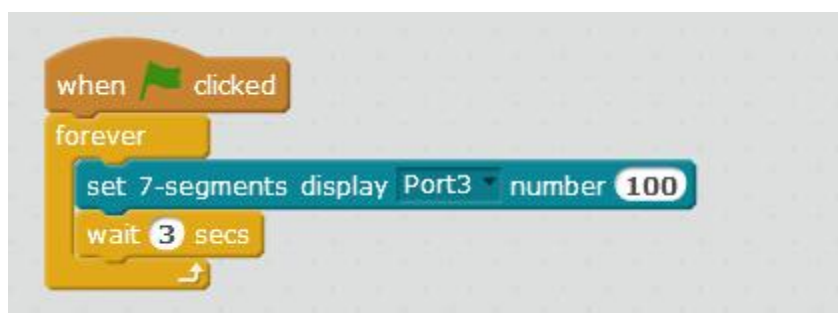
6. Control LEDs

Me RGB LED contains four full-color LEDs. you can connect it to Port3, 4, 5, 6, 7, 8 of Me Baseboard directly and control each LED individually. There are three parameters you need to set: LED index(1-4), Red value(0-255), Blue value(0-255),, Green value(0-255),.

7. Read the value of the ultrasonic sensor

Ultrasonic sensor is usually used to measure the distance between the sensor and obstacles. You can connect it to the Port 3, 4, 5, 6, 7, 8 of Me Baseboard directly.
Picture below shows that the ultrasonic sensor is connected to Port3 of Me Baseboard directly.

8. Read the value of the light sensor

The light and grayscale sensor is usually used to measure the intensity of light in the surrounding environment. You can connect it to the port 3,4,5,6,7,8 of Me Baseboard directly.
Picture below shows that the light and grayscale sensor is connected to Port6 of Me Baseboard directly.

9. Read the value of the sound sensor

The sound sensor is designed to measure the intensity of the sound in the surrounding environment. You can connect it to the Port 3,4,,5,6,7,8 of Me Baseboard directly.
Picture below shows that the sound sensor is connected to Port6 of Me Baseboard directly.

10. Turn the light sensor into grayscale sensor

Me light and grayscale sensor is designed to not only measure the intensity of the sound, but also used as grayscale sensor to identify different colors. When you need to use it as a grayscale sensor, just light up the on-board led. Me light and grayscale sensor can be connected to the Port 3,4,5,6,7,8 of Me Baseboard directly.

Picture below shows that Me light and grayscale sensor is connected to Port6 of Me Baseboard directly and turn the light sensor into grayscale sensor by light up the on-board led.
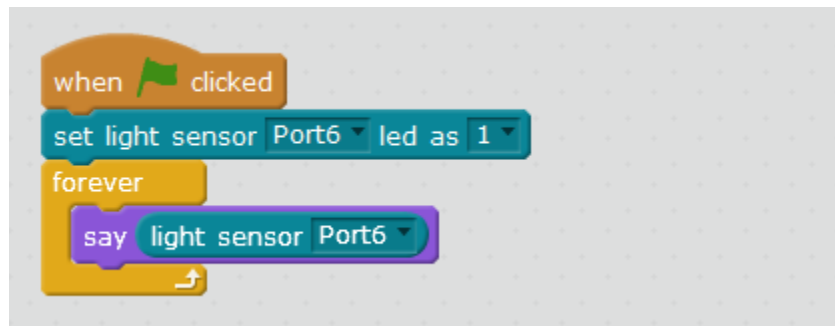
11. Read the value of line follower

Me Line Follower is used to give your robot the ability to detect lines or nearby objects. You can connect it to the Port 3,4,5,6,7,8 of Me Baseboard directly.

Picture below shows that Me Line Follower is connected to Port3 of Me Baseboard directly.

12. Read the value of the potentiometer

Me potentiometer is a electronic module that outputs a continous changing value depending on the rotationg of the pot. You can connect it to the Port 3,4,5,6,7,8 of Me Baseboard directly.
Picture below shows that Me potentiometer is connected to Port7 of Me Baseboard directly.

Note: output value: from 0 to 1023.

13. Read the value of Me 3-Axis Accelerometer and Gyro Sensor

Me 3-Axis Accelerometer and Gyro Sensor is a low-power three-axis angular rate sensor. Based on I2C communication, you can connect it to the Port1,2,3,4,5,6,7,8 of Me Board directly. You can choose to read values of X axis, Y axis, Z axis.
Note: After you have connected the sensor to Me Baseboard by RJ25

cable, you may need to wait 10 senconds to initialize the sensor.

15. Read the value of Infrared receiver

Me infrared receiver is usually designed for receiving infrared signals and controlling the robotics from the infrared remote control . You can connect it to the Port 3,4,5,6,7,8 of Me Baseboard directly.
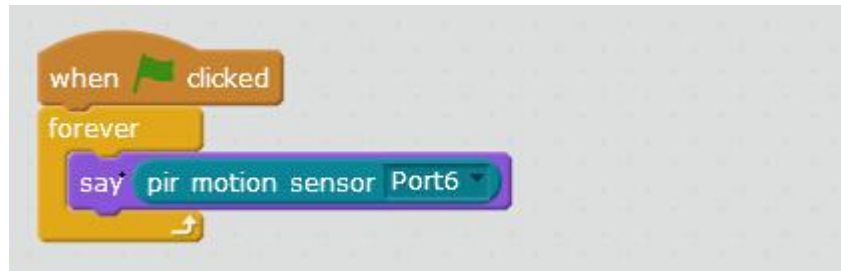
Picture below shows that Me infrared receiver is connected to Port6 of Me Baseboard directly.

15. Read the value of PIR motion sensor

Me PIR motion sensor is usually used to detect motion from animals/ humans from about 6m away.
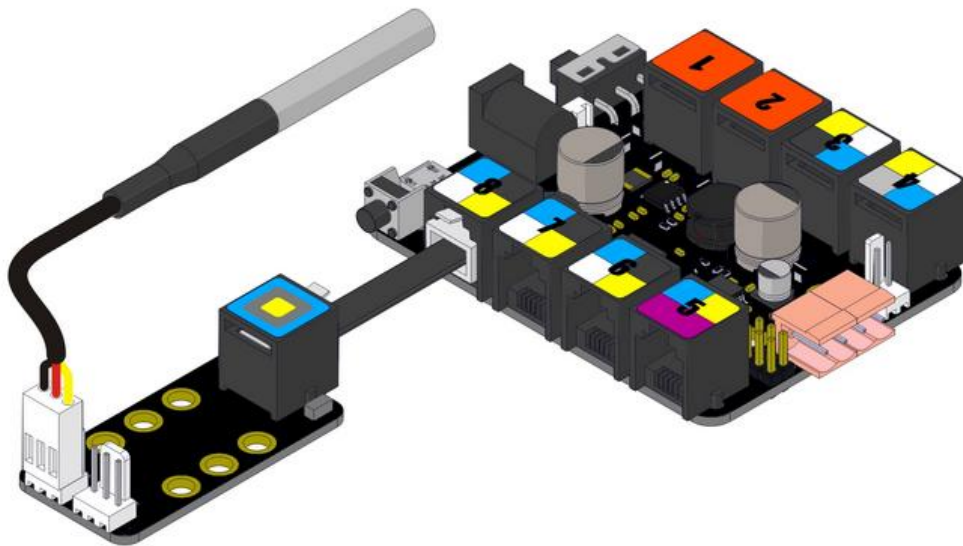
You can connect it to the Port 3,4,5,6,7,8 of Me Baseboard directly.

16. Read the value of tempeture sensor.

Me tempeture sensor is perfect for immersive temperature detectionor detectingg something far away. It is not allowed to connect to Me Baseboard directly, you will need a Me RJ25 Aapter to connect it to Me Baseboard. You can connect it to the Port 3,4,5,6,7,8 of Me Baseboard.

wiring demo

Scratch demo

17. Read the value of Me Joystick

Me Joystick is a electronic module that can turn directional movements into analog values(0-1023). You can connect it to the Port 3,4,5,6,7,8 of Me Baseboard directly.
Picture below shows that Me Joystick is connected to Port6 of Me Baseboard directly.