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How to connect Ranger with mBlock 3

There are three main PC software version: mBlock 3, which supports most robots; mBlock 4, which is an experimental version; mBlock 5 which is still in beta stage.

For now, we suggest to use mBlock 3 for windows or Mac OS. To connect mBlock 3 to Ranger, we have below methods.

I. USB

Usb connection is the easiest, we just connect usb one end to PC and the other end to Starter. With USB connection, we can run online program, also we can upload program to the main board.

II. Bluetooth

For some version, you may pair the Ranger with mBlock with PC built-in Bluetooth. On windows device, go to connect>Bluetooth to search signal; on Mac OS, go to the Bluetooth preferences on Mac to pair the **makeblock** with OS X, then open mBlock software, and select **/dev/tty.Makeblock-ELETSP** from the Serial Port submenu under the **Connect** menu.

But please notice that we can only run online program. We have to use USB connection if we want to upload a program. By the way, if the Ranger is not using upgrading firmware, we have to connect USB to do upgrade firmware, and then connect Bluetooth to run online program.

III. 2.4G wireless connection

This refers to FAQ9

Usually we suggest to use USB connection and below is the steps.

Step 1

If you haven't installed mBlock 3 yet, please download the latest mBlock (3.4.11) software here: <http://learn.makeblock.com/en/software/>

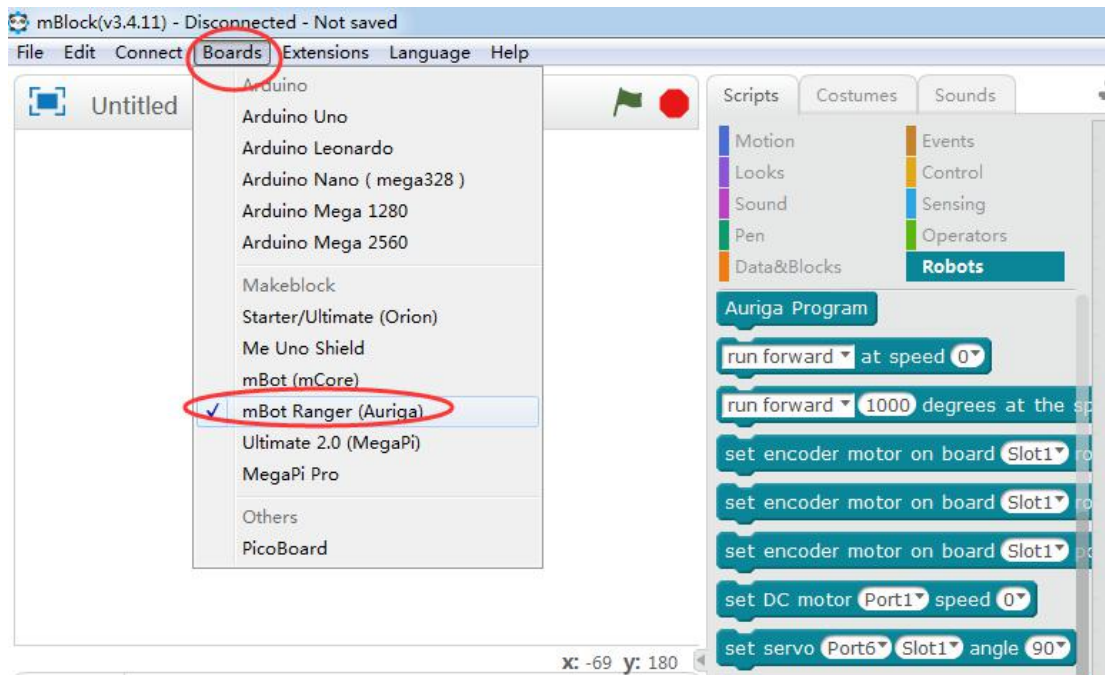
Decompress the file and install mBlock software on PC (here we use windows as an example).

Step 2

Connect Ranger to PC with USB cable and **turn on** the Ranger.

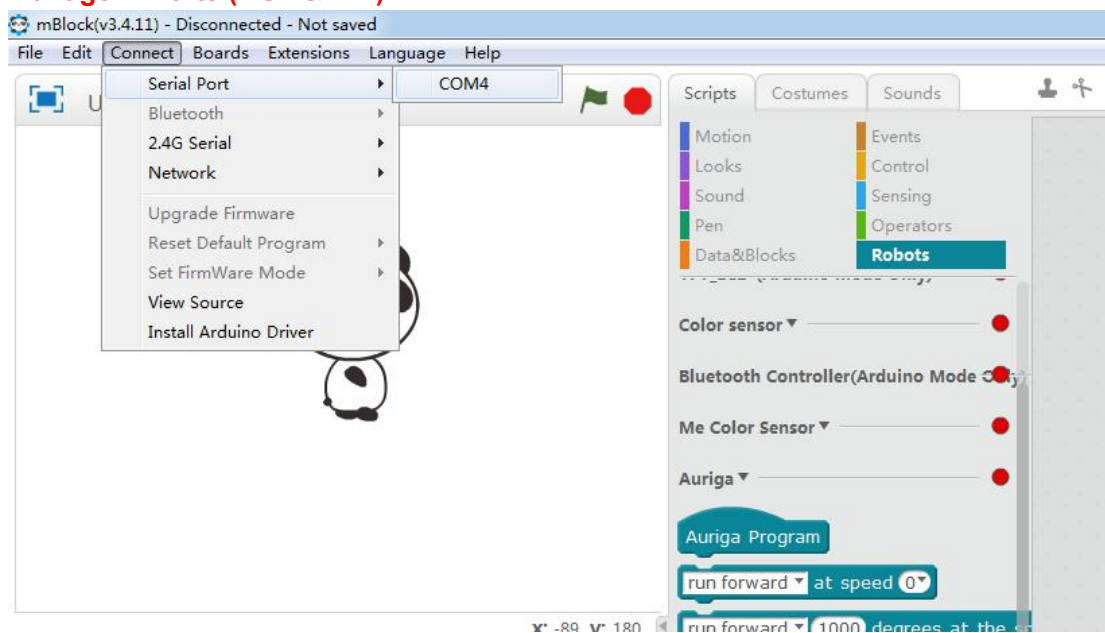
Step 3

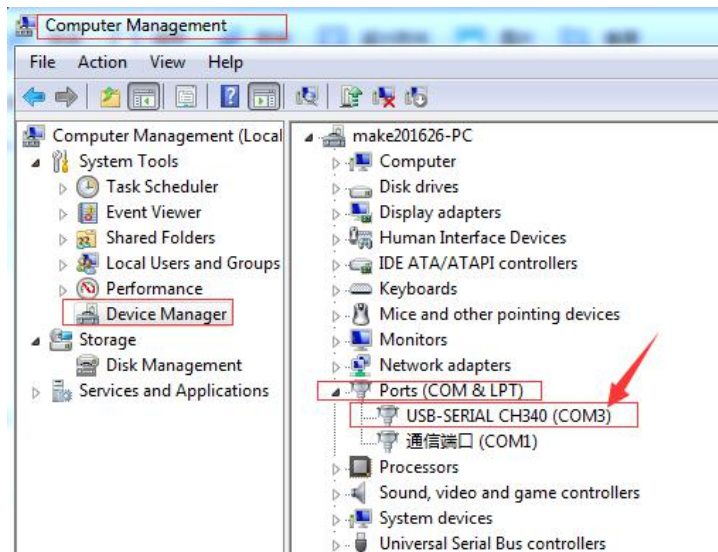
Open mBlock software, choose **mBot Ranger (Auriga)** under **Boards**.



Step 4

Choose the correct Serial Port for Ranger under **Connect->Serial Port**. (Here my serial port is COM4, and you can check your robot serial port under your computer's **Device Manager->Ports (COM&LPT)**).





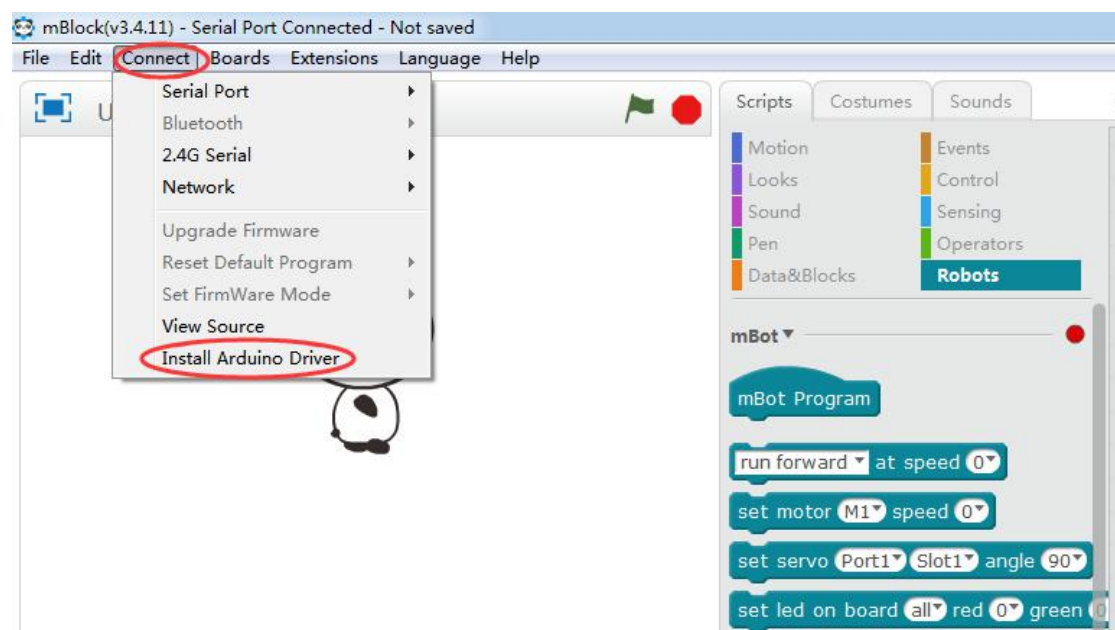
Notes:

1. If you cannot detect any serial port, it may be caused by the following reasons.

a. Failing to install Arduino driver.

Normally when we install mBlock software, Arduino driver will be installed automatically at the same time. But sometimes we may need to install Arduino driver manually.

Usually, we can select “**Install Arduino Driver**” under “connect” and install it easily.



For **Mac OS users**, you can also download and install correct driver as below says:

Below Mac OS sierra users, download [this driver](#);

Mac OS sierra users, download [this driver](#);

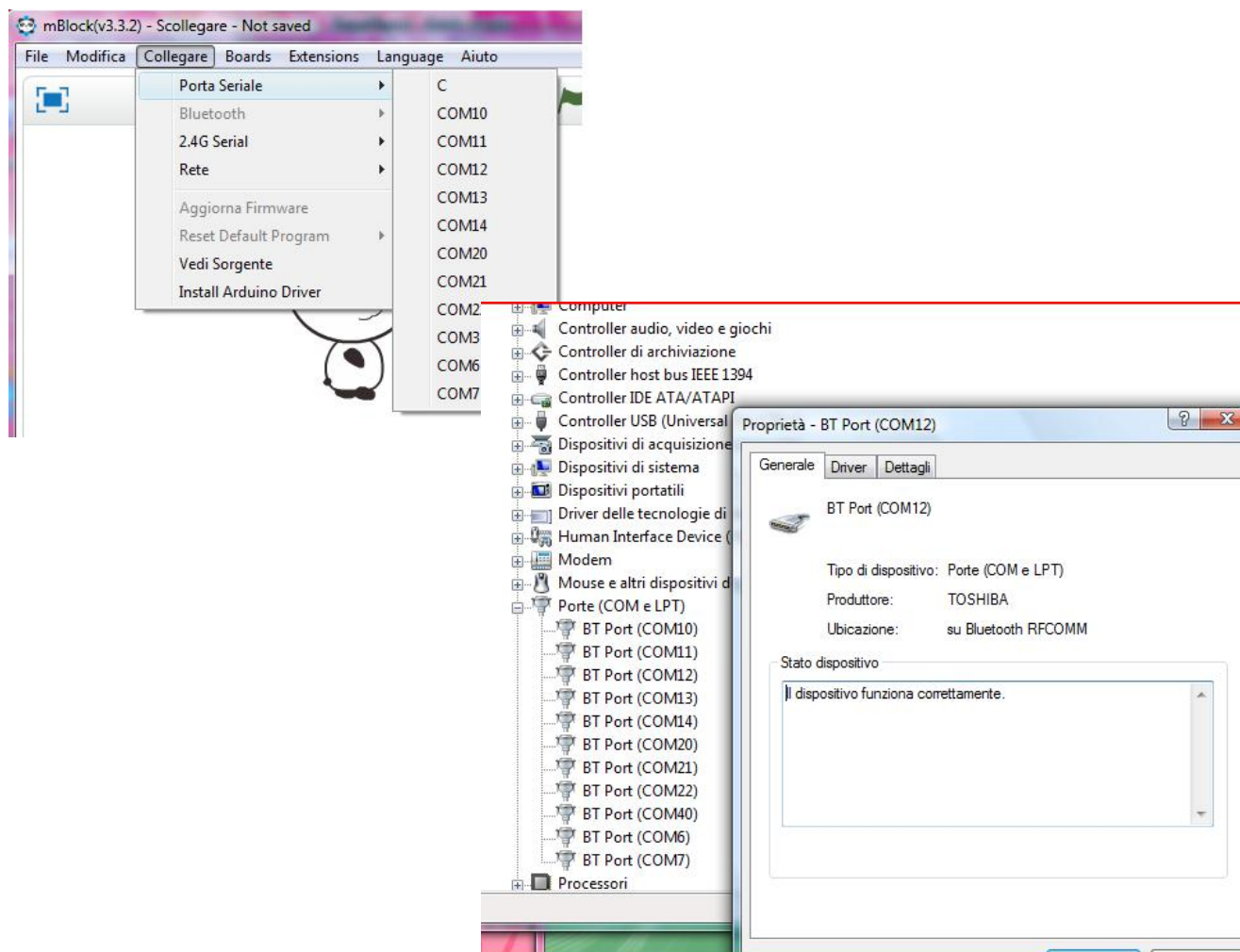
Mac OS **high** sierra users, download [this driver](#).

When choose Serial port under **Connect->Serial Port**, please choose port **similar to /dev/tty.wchusbserial1410**.

b. The Bluetooth connection from the robot may occupied the serial port. So unplug the Bluetooth/IR module from the robot while using the USB cable.

c. The USB port or USB cable is faulty. Please try changing the USB port (you may change the PC have a check either), USB cable etc.

2. *Cannot find the serial port for my robot on mBlock as there are lots of BT port under the device manager like below.*



Cause: The Bluetooth module you paired before will be mapped into COM ports. Even if they are not present, they still appear in the “Serial Port” list. Uninstall those paired Bluetooth devices will resolve this issue.

Solution: disable or uninstall all the Bluetooth ports (COM ports) from the PC.

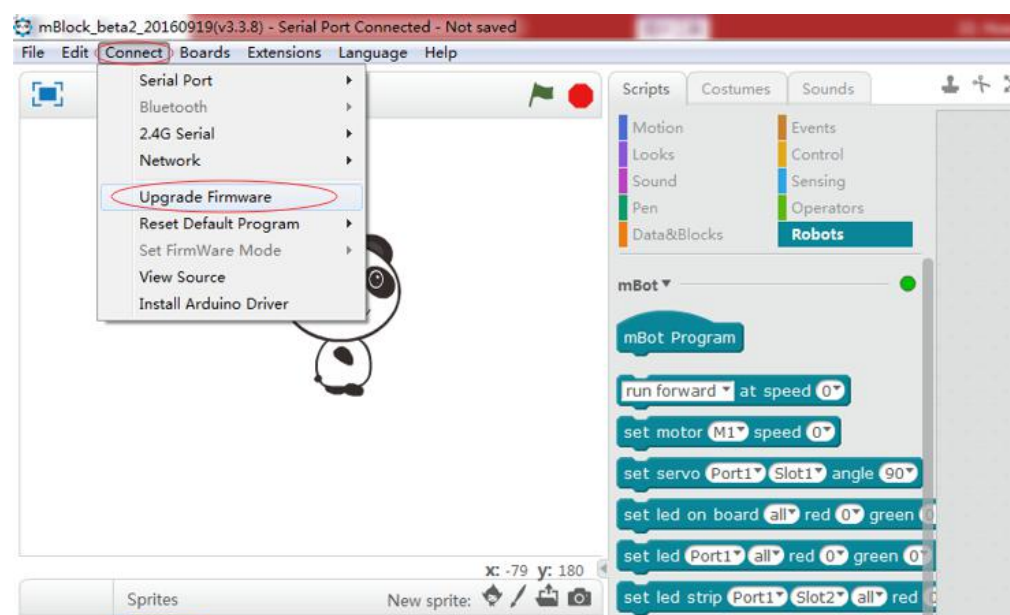
How to upgrade firmware for my Ranger with mBlock 3

Step 1

Refer to [FAQ1](#) to connect mBlock with Ranger.

Step 2

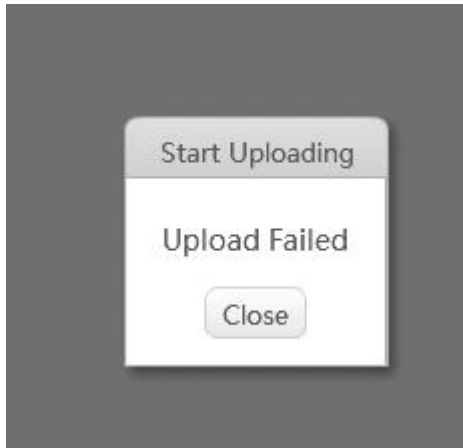
Go to **Connect->Upgrade Firmware**, wait until it says **Upload Finish**.



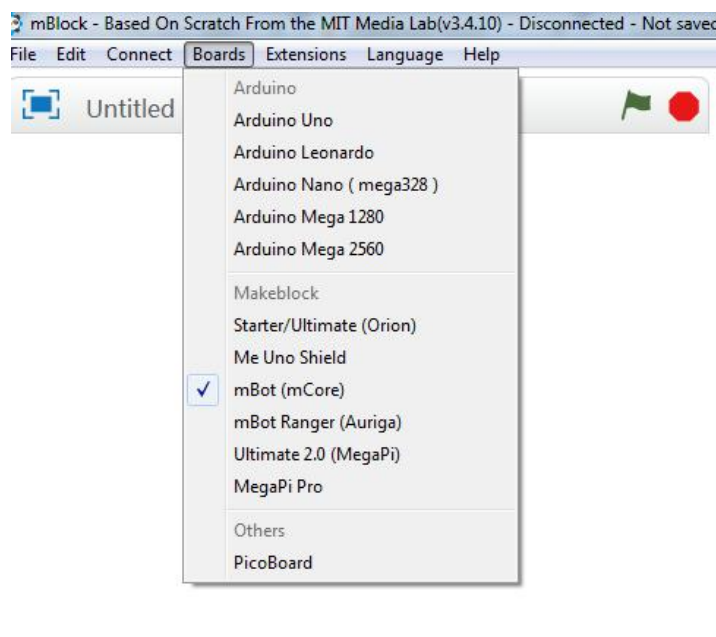
Ps: online debug only works after firmware update.

Why does the firmware upgrade failed

Situation: Ranger cannot successfully upgrade firmware.



1. Select the wrong board.



Please select the corresponding board then upgrade firmware or reset default program.

2. The upload failed issue might be caused by using defective modules, faulty serial port chip, or faulty main board.

- 1) Please remove all the modules from main board, including RJ 25 cables, then upgrade firmware again. If the firmware is upload finished, which shows the issue is caused by one of the module. We could find out which module is

faulty by test it on the board one by one.

- 2) If it is still the same issue, upload “Blink” program (<https://forum.makeblock.com/t/upload-issues-reset-firmware/10879>) on Arduino IDE environment. If the program upload failed, which shows that the main board lost bootloader.

PS: Only USB connection allows us to do firmware upgrade.

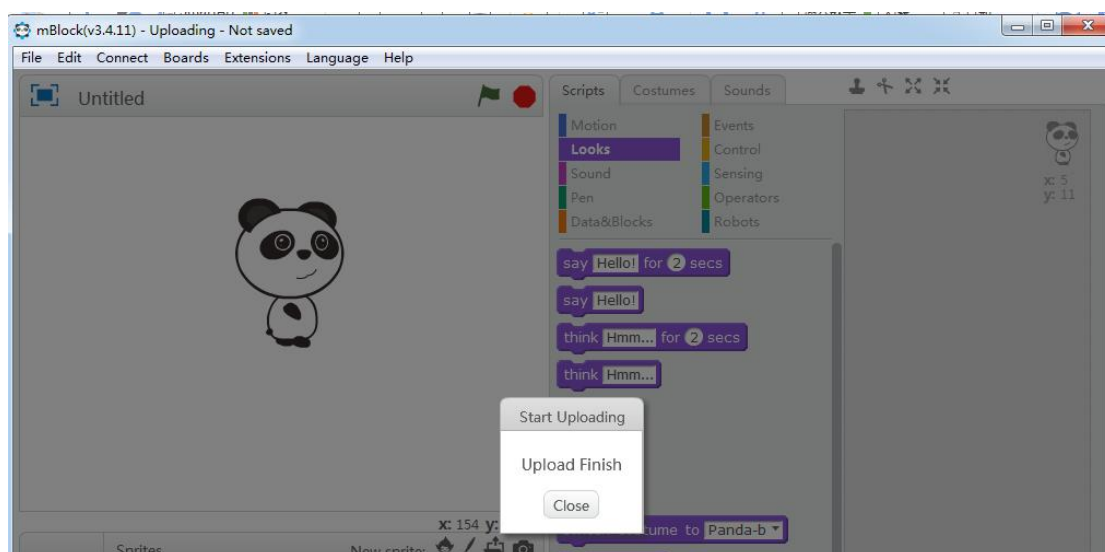
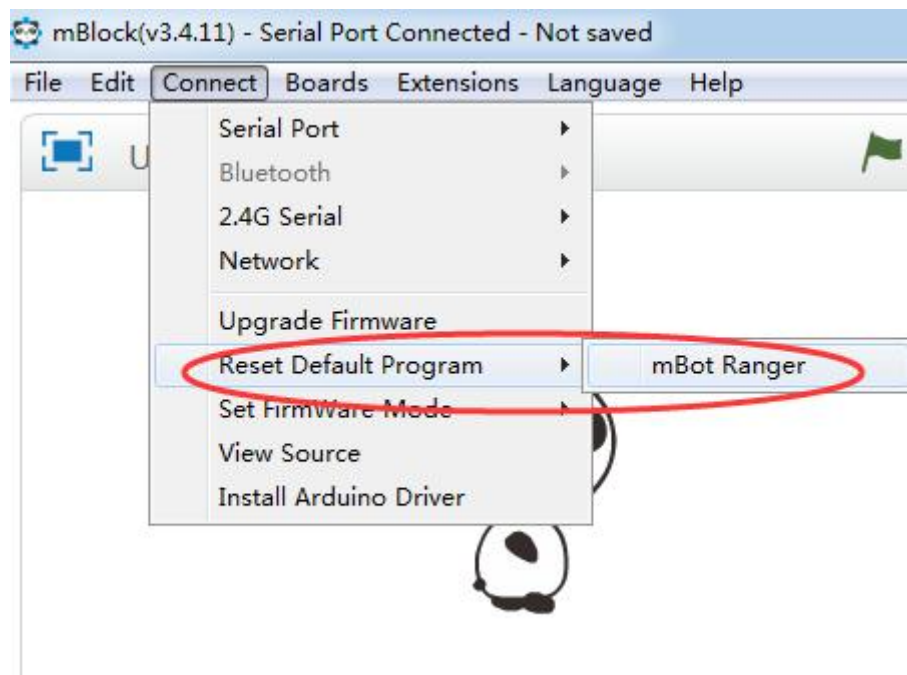
How to Reset Default Program Manually with mBlock 3

Step 1

Refer to [FAQ1](#) to connect Ranger with mBlock.

Step 2

Go to **Connect->Reset Default Program->Ranger**, wait until it says **Upload Finish**.



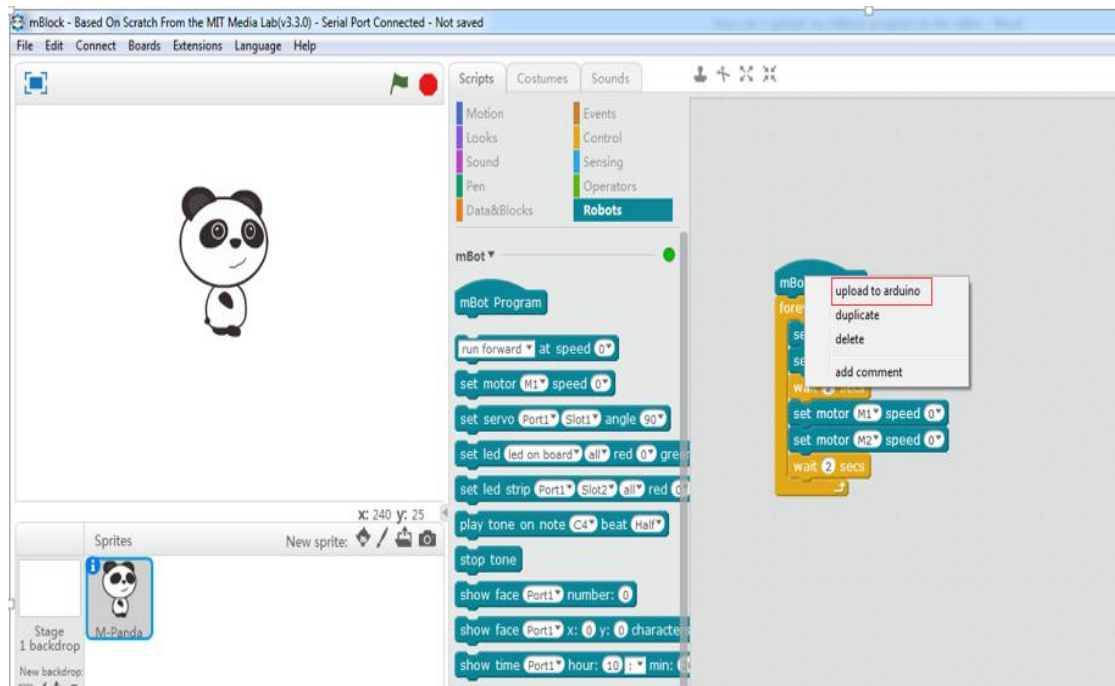
How to upload program to Ranger with mBlock 3

Step 1

Refer to [FAQ1](#) to connect Ranger with mBlock.

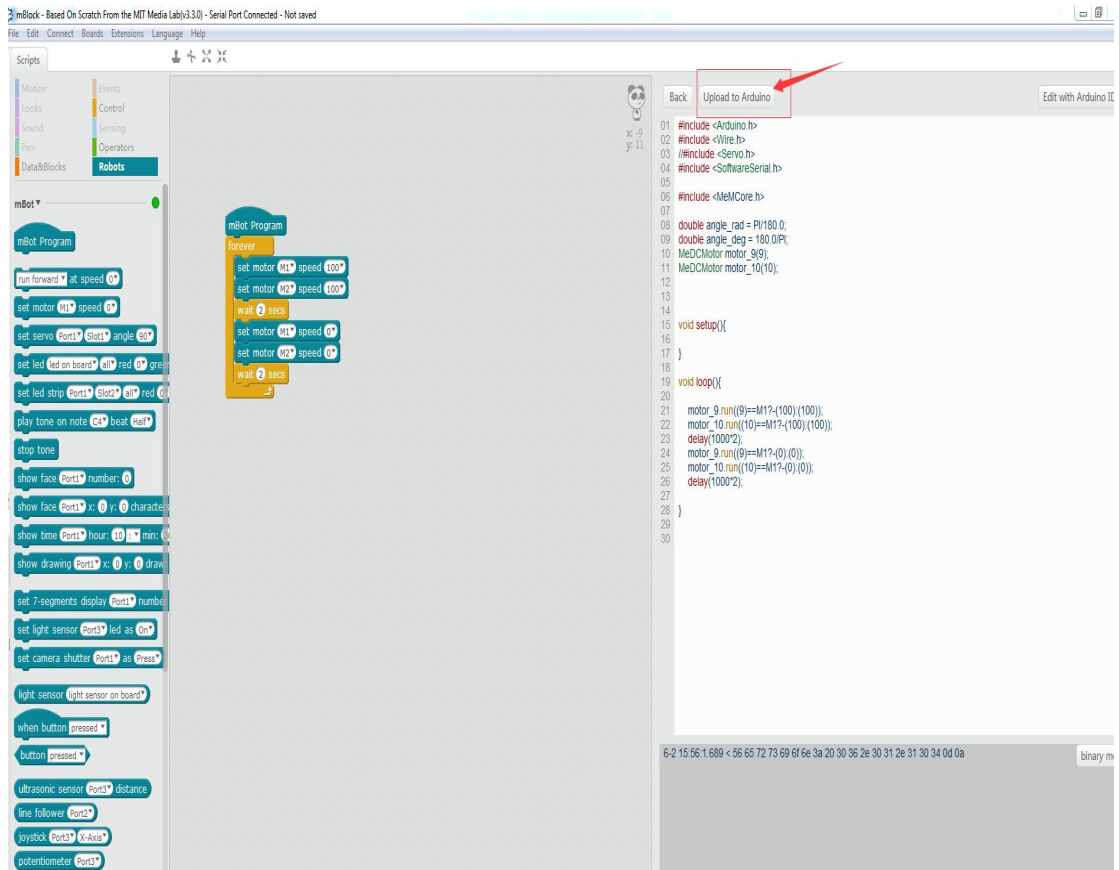
Step 2

Edit your program, then right click on the program and select **upload to Arduino**.



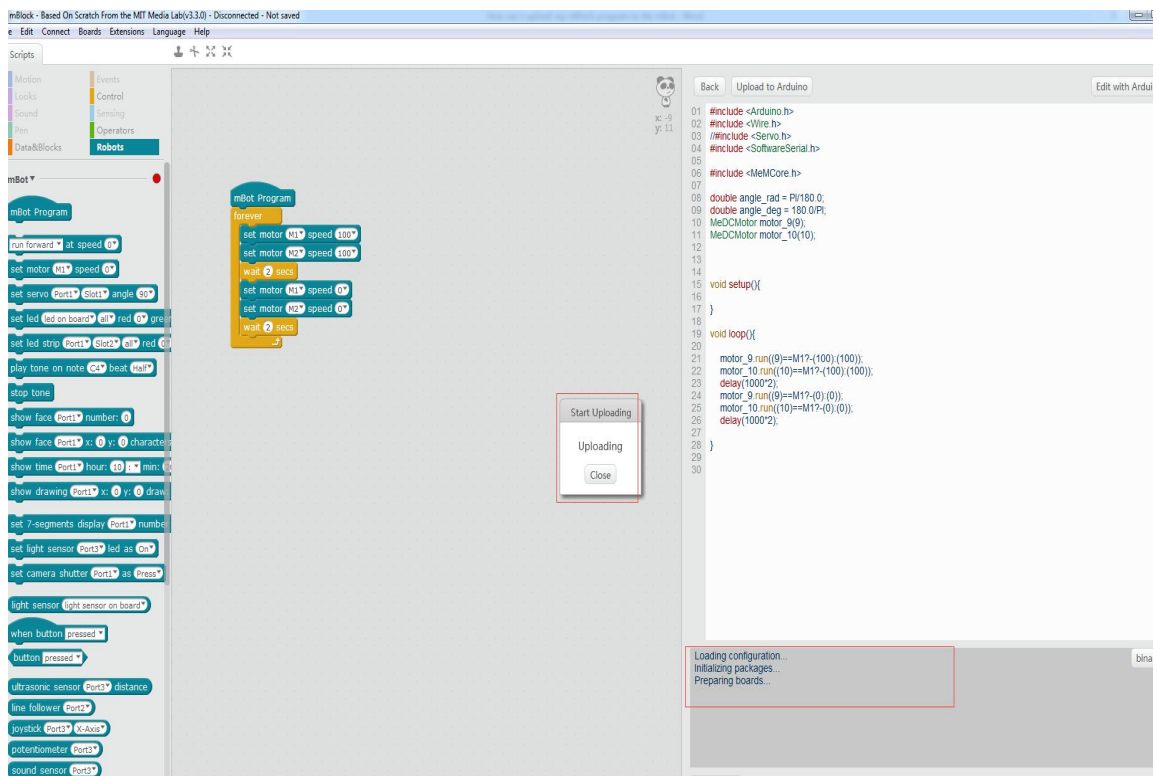
Step 3

You can see following page and click on **Upload to Arduino**.



Step4

Then the program will start uploading, wait until it shows **Upload Finish**.



What is the troubleshooting when failed to upload program to Ranger with mBlock

I. If it says "upload failed":

- a. Make sure you upload the program in correct steps (make sure connected with USB cable, choose correct serial port and Board).
- b. Remove the Bluetooth/2.4G module from the main board, then upload program again to have a check.
- c. If it says upload finish while upgrade firmware but fails when upload the program, please check if there is any other Arduino software installed in the system. Close it if there is.
- d. If both the Upgrade firmware and upload program fail, try to change the USB cable, USB port or a PC have a check.

II. If the uploaded firmware doesn't take effect:

- a. Please reset default program again.
- b. If it shows upload finish but the default program doesn't work and still function the previous program, then the board may lost its bootloader. Please double check it refer to [this document](#).

III. If the uploaded firmware only works with USB cable connected:

- a. The program may not be uploaded to the robot properly. Please upload program again in correct steps.

Note: it is suggested to remove the Bluetooth module/2.4G module from the main board while uploading program.

- b. If you can see the message upload finish, but the robot still doesn't work when remove the USB cable, then I suspect the Ranger may not get enough power from the battery. Please change the battery for the robot.

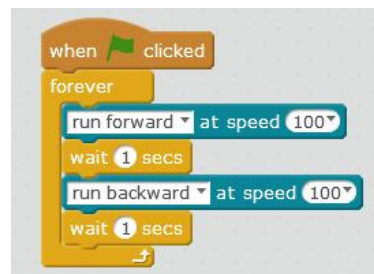
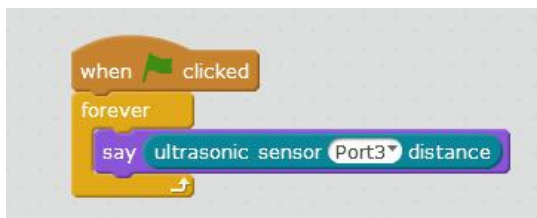
According to our test and research, it is suggested to use rechargeable Li-ion battery or rechargeable nickel-metal hydride, nickel-cadmium which can be bought from amazon or local shop. Or Alkaline battery with good quality like Energizer, DURACELL.

What is the Difference Between Upgrade firmware and Reset to Default Program

Upgrading firmware

It is the built-in program supporting online programming. If you want to use all the mBlock program blocks corresponding to variety of Makeblock mainboards, it is recommended to select "upgrade firmware" to update the main control board built-in program.

You need to upgrade firmware first if you want to do the online program testing with Green flag head show on pictures below:



You may find it won't work when you click the green flag, this may result from that you haven't upgraded the firmware for the robot to clear the pre-loaded program on the main board. Remember to Upgrade Firmware for the robot every time before you test the online program.

Reset default program

It is the preset factory procedures (such as manual control mode, obstacle avoidance mode, line inspection mode of mBot) for the robot in order to increase the robot's playability.

Below are several situations you need to reset default program for the robot:

Situation one: it is not working according to the default modes when you just assemble it.

Situation two: you edited your own program and uploaded it to the robot. Now, you want to play the robot with its default modes and you can't control the robot with mobile APP. In this case, you need to reset the default program for the robot to clear your own program.

What should I do if my Ranger motors are not working properly

Situation 1 Motor(s) is not turning at all.

Please check:

- Make sure the wheels are installed correctly as there are wheels in different sizes.
- Cable from motor to the main board is connected properly and make sure the cables are working.
- If the Makeblock App cannot let it move, try to write an online program or upload a program in mBlock like below to test:



Remember to upgrade firmware before running an online program.

- Check if there is anything get stuck in the wheels, like cables. You can turn the wheels in clockwise or anti-clockwise order to test.
- Try some new batteries.
- It may not move if the speed is too slow like 20 or 30. So try speed at 200.

Situation 2 Ranger cannot move straightly (two motors have different speed)

Due to the motors' installation difference, it is normal that two motors don't have exactly same speed. If they differ a lot, please check:

- If there is anything get in the left or right wheel, like cables.
- Speed is set too slow that one side moves a little while the other side doesn't move. So try a larger speed like 100.
- Motors cannot get enough power energy. Try to change the battery or charge the battery.

If the speed of both sides still differ a lot, you may try to adjust the speed to with different power, like setting left speed as 100, while right 110. Several tests are necessary to get expected result.

Can I use 2.4G wireless module to control my Ranger

I. Is it possible to replace the Bluetooth connection with a 2.4G wireless module?

Yes. As the module connection interface is the same.

II. How to use 2.4G wireless connection?

There are three steps: Upgrade firmware for Ranger with USB cable; Connect with 2.4G wireless serial; Program for Ranger and run it online.

Upgrade firmware for Ranger refers to previous guidance

Connect with 2.4G wireless serial: Remove the USB cable, plug the 2.4G wireless dongle into your computer, the light on the 2.4G module will stop blinking and be steady on. Go to the **Connect -> 2.4G Serial -> Connect** (Check that the ✓ mark stays on, if there is no check mark after you clicked on 'Connect', that means the 2.4G is still disconnected. In this case, please restart the mBlock software have a try).

Program for Ranger and run it online: With 2.4G wireless serial connected, you will now find that you can control the Ranger "on-line". That is, starting the command sequence with a choice from the Events category of commands: "When green flag clicked", "When SPACE key pressed", etc.

There is also a video to show these steps, you may have a look in this link:

<https://www.youtube.com/watch?v=kiO8VYpIGsw>

Why the Ranger cannot avoid objects in object avoidance mode

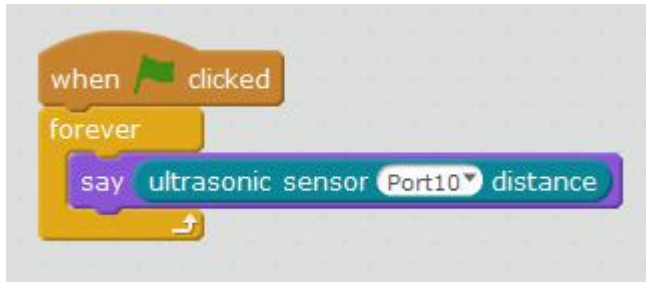
Question: Why the Ranger cannot avoid objects in object avoidance mode?

Answer:

1. Check wiring. The default setting for Ranger object avoidance mode is that the ultrasonic sensor connects to Port 10 on Auriga port.
2. Download and install the latest version mBlock software, then reset default program for Ranger.
3. Test if the Ultrasonic sensor is defective.

How to test if the ultrasonic sensor is defective?

1. Download and install the latest version of Makeblock software on your PC. If you have a Mac, then you also need to install a driver.
2. Connect Ranger with PC via USB.
3. Make sure the ultrasonic module is connected to Port 10 (required). You should feel a slight click when the RJ 25 cable is properly inserted.
4. Check whether the red indicator of the ultrasonic module is on. If not, the problem is caused by wiring.
5. Upgrade firmware. Please refer to FAQ: How to Upgrade Firmware for Ranger”.
6. Try to run this program, and move your hand in front of the ultrasonic sensor.



7. If the panda doesn't say an ever-changing number, try to change another RJ 25 cable to connect the ultrasonic sensor and the Port 9. Then try to repeat the above instruction 3-6.
8. If the step 8 doesn't work for you either, attach the RJ25 cable with the ultrasonic sensor with port 8. Then try to run the program example, but choose "ultrasonic sensor Port 8 distance" this time.
9. If the panda does say ever-changing number, please reset default program for Ranger, then try the obstacle avoidance mode again.

If the ultrasonic sensor doesn't work on the above program, please contact support@makeblock.com

What should I do if the Nervous Bird could not keep balanced?

When you find the Nervous Bird cannot keep balanced, please refer to below steps to check:

1. Make sure you did **follow the guidance strictly** to assemble it.
2. Make sure **power is enough** as self-balancing robot requires to be working with full power. If you are sure assembling is perfect but it still fails to be balanced, please do insert 6 totally new batteries in. This is very important.
3. Make sure the **Gyro module** is working properly. You can write a simple program to test the module.

If you check all and still fail, please contact Makeblock Technical Support at support@makeblock.com

Questions related to Bluetooth connection on Mobile devices

I. What Apps do you have for Ranger?

For mobile devices, there are mBlock and Makeblock App that support Ranger. Makeblock App requires Android 4.3+ and iPhone 4S/iPad 3 +, iOS 9+. mBlock requires Android 5.0 + and iOS 9+

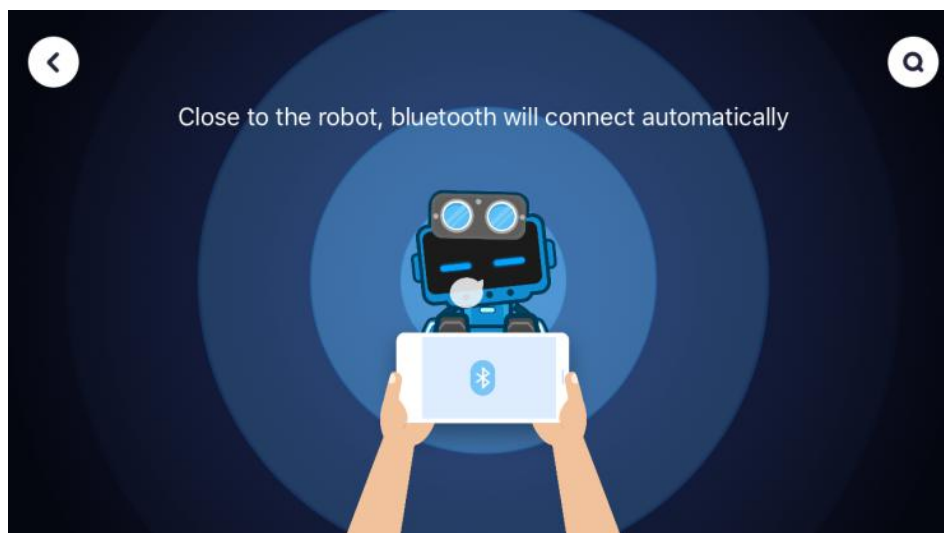
This is download link for all Makeblock Apps:<http://learn.makeblock.com/en/software/>
And search mBlock in Google play or App Store.

II. How to connect Ranger to Makeblock App?

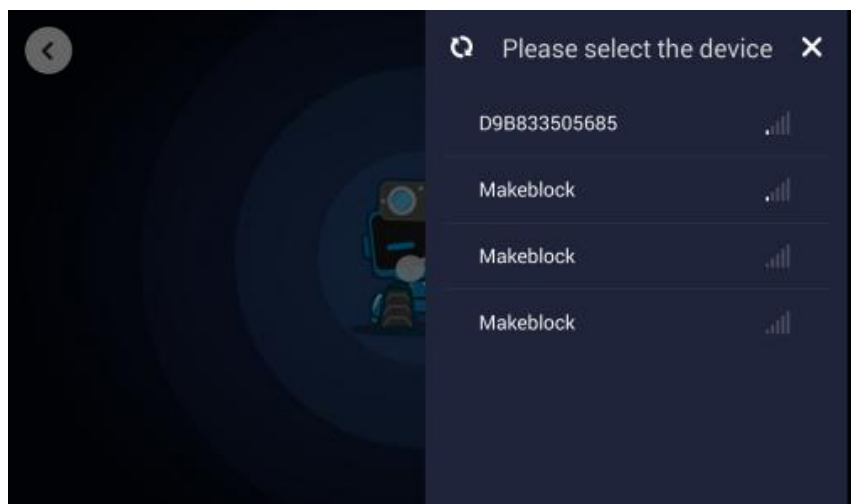
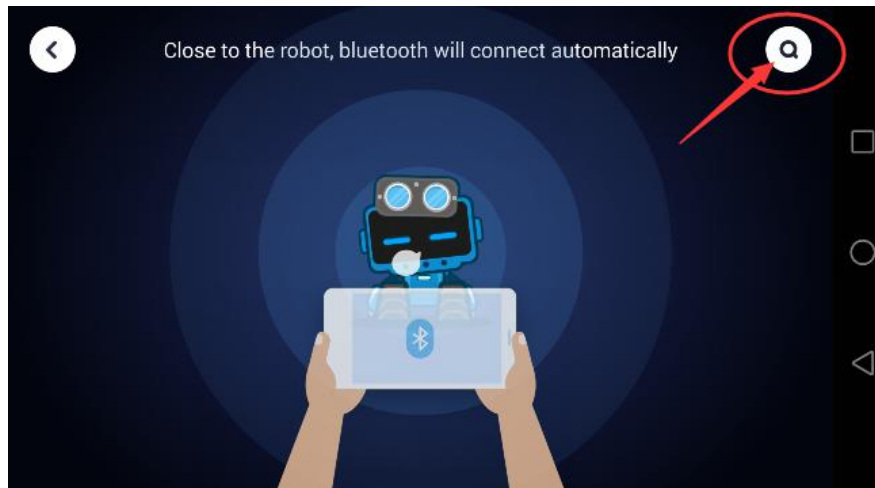
As Makeblock App connects to Ranger via Bluetooth, make sure Bluetooth module is plugged properly. Download and install the latest Makeblock App and refer to below steps to connect Ranger:

1. Power on Ranger and there is a blue LED keeping slow flashing on the Bluetooth module.
2. Open the Makeblock APP on mobile device and move the mobile device close to the Bluetooth module, normally it will connect automatically.

Note: if you use iOS mobile device, you need open Bluetooth function on mobile device first.



3. If the Bluetooth can't be connected automatically, please go to Search icon on the upper right corner, check if you can find the Ranger Bluetooth in the detected list. If there is, please connect to it from the list.

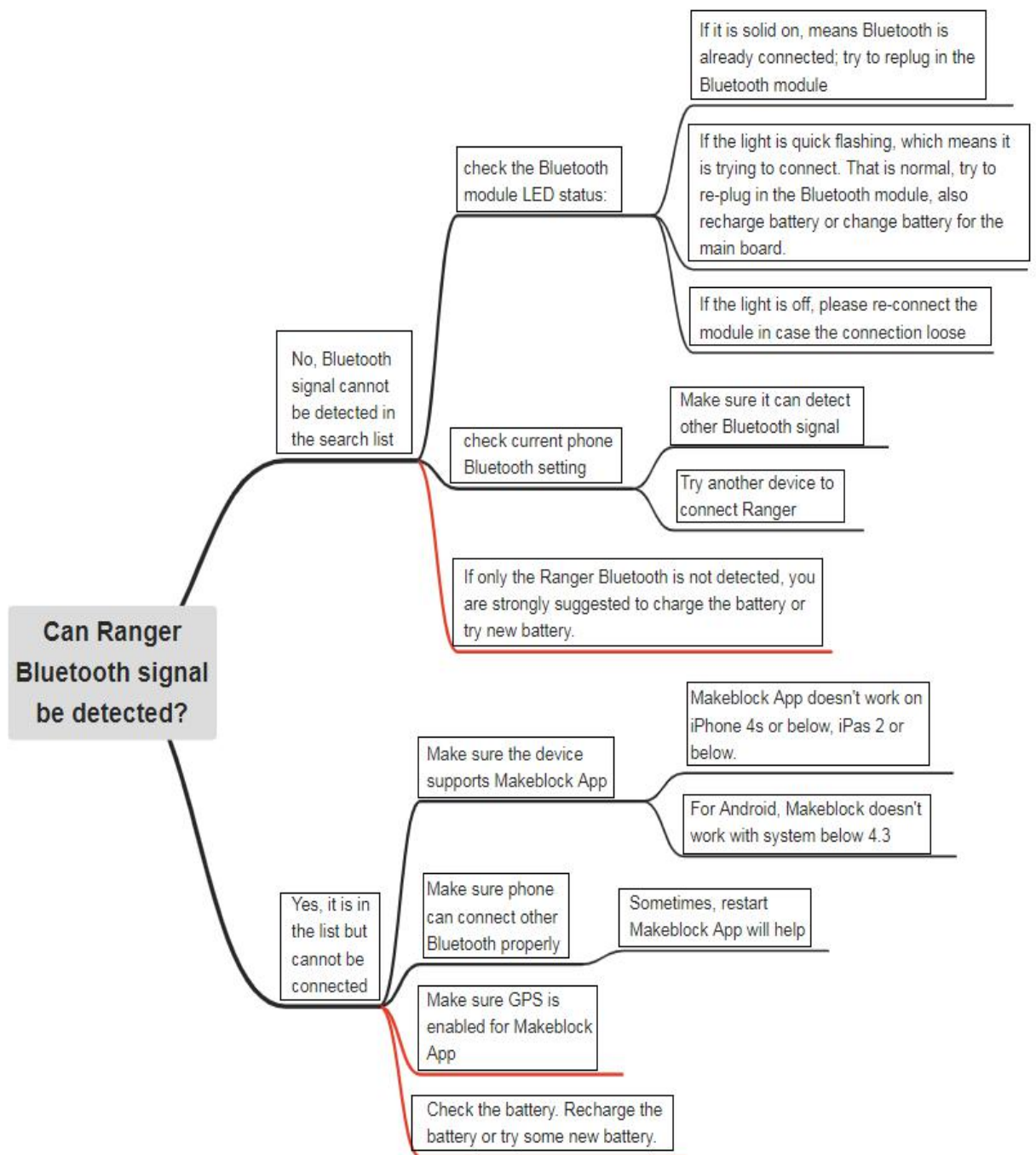


Note:

Sometimes you may see the screen says incompatible firmware, which means the Ultimate 2.0 current firmware is not compatible with Makeblock App, please connect it to mBlock 3 and reset default program.

III. What is the troubleshooting if my Ranger fails to connect Makeblock App through Bluetooth?

If you tried above steps to connect Bluetooth but failed, please follow below chart to check step by step.



Note: Battery is very important, for any abnormal phenomenon happens to the robot, you are strongly suggested to change new battery.

If you fail to connect in mBlock App, you can also refer to the above chart.

IV. Why iPad 2 and below doesn't support Bluetooth from Makeblock

The Bluetooth module on our product supports BLE protocol, while for Apple products, only the products published after the year 2011 support BLE protocol which can work with the Bluetooth on our product.

Since the iPad 2 doesn't support BLE protocol, so it cannot work with our APPs which need connect with Bluetooth.

The APPs of our product work with iPad 3 and above and the iOS should be iOS 9.0 and above.

V. The Bluetooth connection to the Ranger is unstable?

For the issue that the Bluetooth connection is unstable between Robot and Makeblock App, it may be caused by the power issue, or the Bluetooth module is not well plugged. So you may change the battery for the Ultimate 2.0 to have a try since it is easy to lead disconnect issue on Bluetooth when it lacks power.

According to our test and research, it is suggested to use rechargeable Li-ion battery or rechargeable nickel-metal hydride, nickel-cadmium which can be bought from amazon or local shop. Or alkaline battery with good quality like Energizer, DURACELL.

Besides, please check if the issue goes to the same when use other devices.

For any special situation that is not working after reading this article, please contact us with more details at support@makeblock.com.

Why the line follower doesn't work on Ranger?

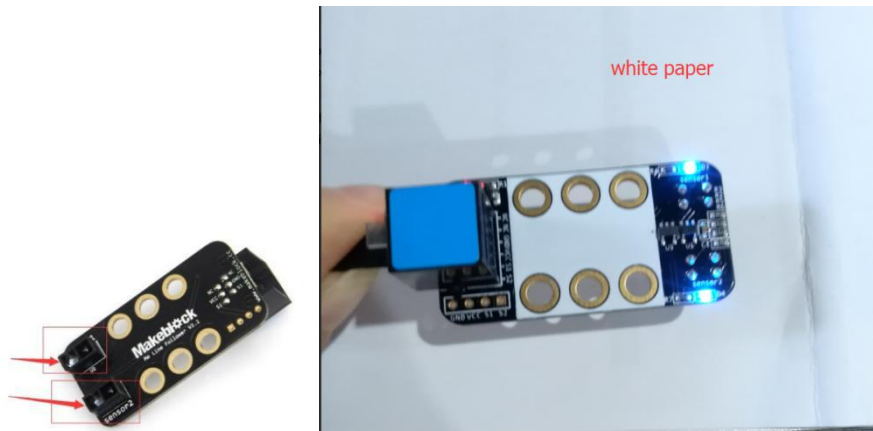
Question: I have already selected line follower mode, but why my Ranger cannot follow the line?

Answer:

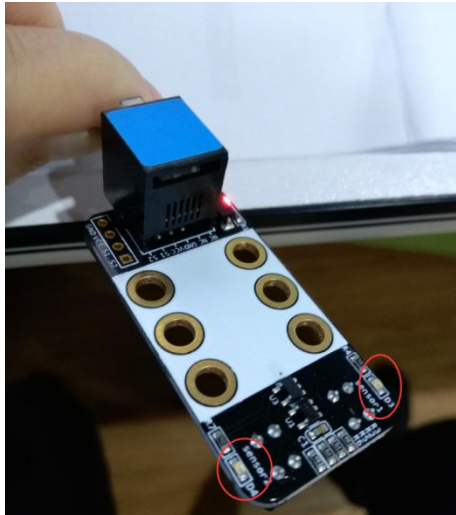
- 1) The line follower module doesn't connect to Port 9 on Auriga as requested.
- 2) The map is placed in a place where is surrounded by bright lights, such as under the sunlight, or very close to the lights in the room. Please move it to a darker place to do the test.
- 3) If the line follower module is connected to Port 9 but Ranger still cannot follow the line, please reset default program on mBlock software environment. It might be the line follower faulty or other hardware issues.

Please follow below steps to test the line follower module.

Step 1: Put the two sensors on the Me Line follower above (*Detection range: 1~2cm*) a white desk or white paper and check if the two LEDs corresponding to the two sensors lit up?



Step 2: Remove the line follower sensor from the white desk or white paper and check if the two LEDs corresponding to the two sensors turn off?



If the led corresponding to each sensor lit up when above a white paper/desk and turn off when remove from the white paper/desk, means the line follower sensor is ok. Otherwise, the sensor should be faulty.

If it is still the same issue, please e-mail support@makeblock.com with more details.

