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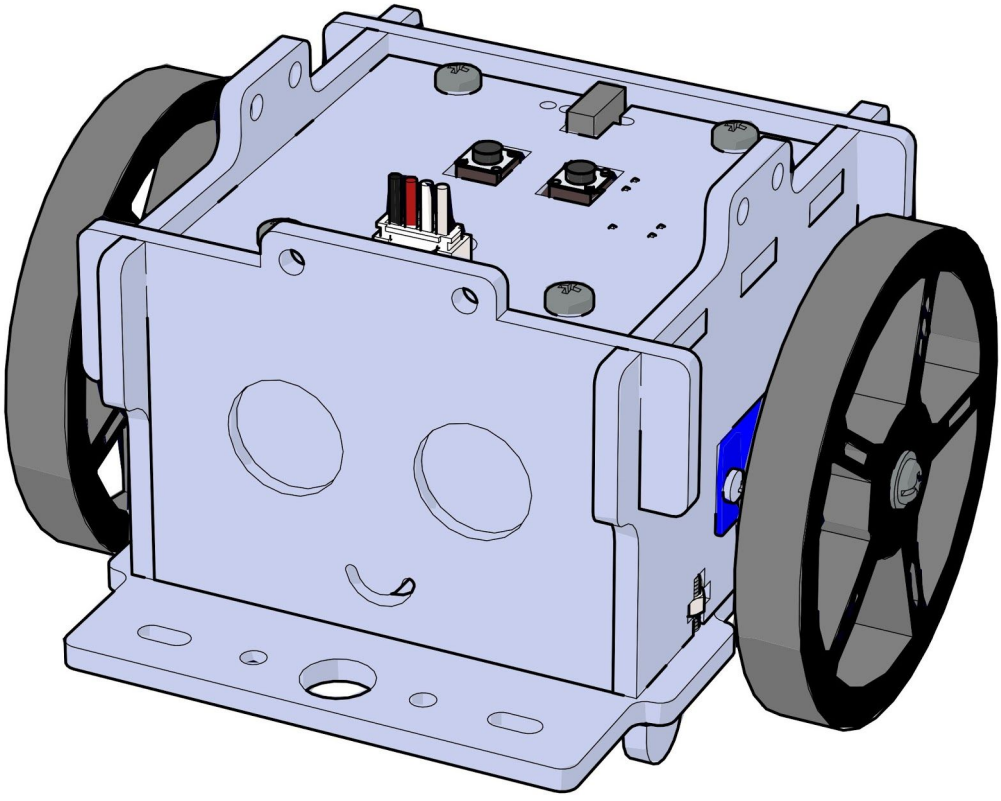
solutions

MiiRo Bot

Robot and App Getting Started Guide



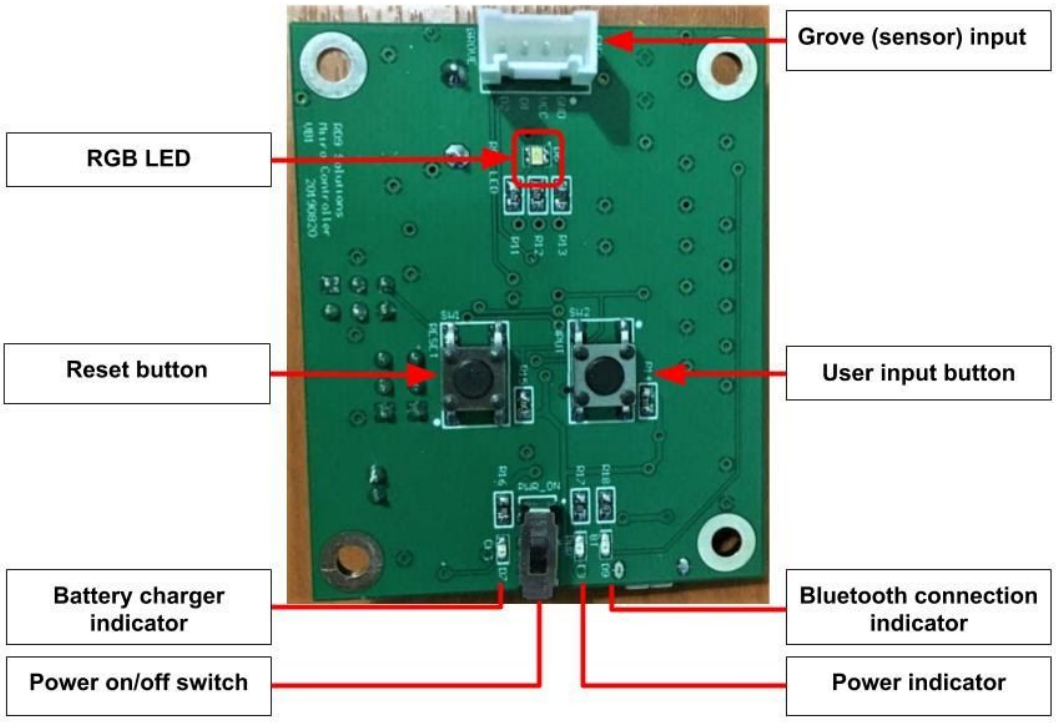
Hello! And congratulations on taking the first step in **future-proofing yourself** for the Fourth Industrial Revolution (4IR)! This document will take you through everything you need to know about getting started on your journey! So without further ado, let's dive in! :)

Assembling your Robot

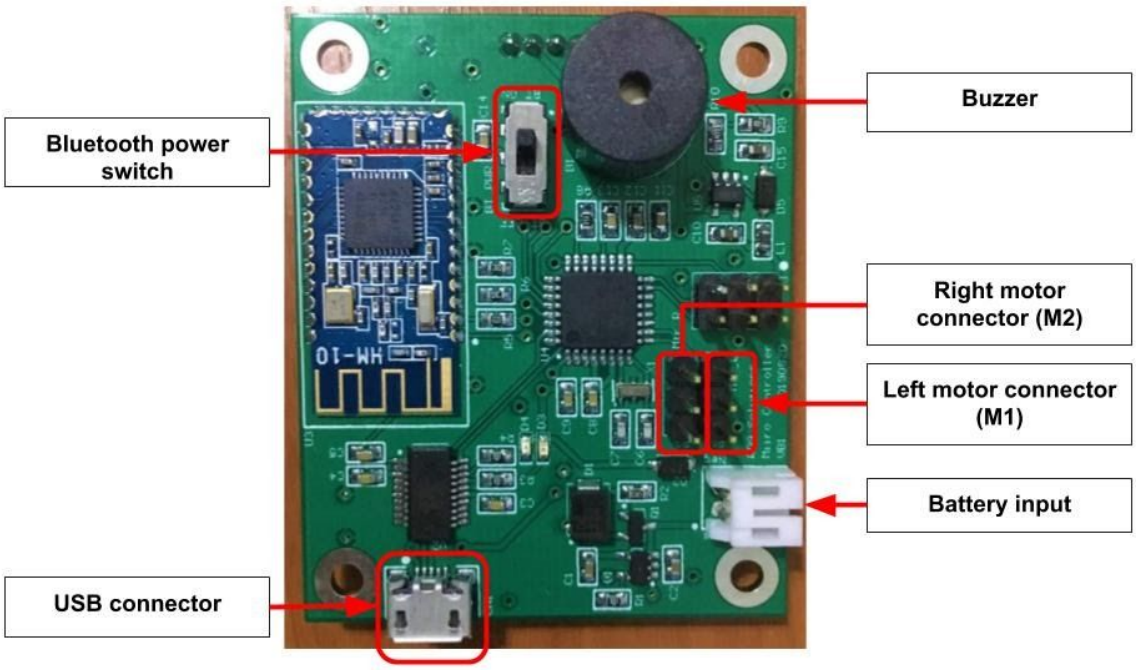
As you may have noticed, your robot comes disassembled. Therefore, the first step is building your robot. You can find the assembly instruction manuals in the Robot Support tab in the MiiCode mobile app. Download and follow the easy step-by-step instructions to get started!

MiiRo Bot Control Board

Now that your robot is assembled, let's dive in and have a closer look at your MiiRo Bot Control Board. This section outlines all the different components on the control board and how they function.



MiiRo Control board Top View



MiiRo Bot Control board Bottom View

Bluetooth Module

Power Switch

The Bluetooth Module power switch is used to turn Bluetooth functionality on and off. During normal operation, when using your MiiRo Robot with the MiiCode mobile app, this switch should always be set to the ‘On’ position.

The Bluetooth module should only be turned off when uploading new firmware onto the control board.

Connection Indicator

The Bluetooth Connection Indicator is a green light. It shows the connection status of the Bluetooth Module. A flashing connection indicator means the Bluetooth Module, and therefore your robot, is not connected to any device. A steady connection indicator means that the Bluetooth Module, and your robot, is successfully paired with a device!

Power

On/off Switch

The Power On/Off Switch is used to turn your robot on. It should be noted that the switch **must** be in the off position when charging the robot.

Power Indicator

The Power Indicator light shows whether the robot is turned on or not. When the robot is powered on, and the Power On/off switch is in the on position, this light will be steadily on. When the robot is powered down, either when the Power On/off switch is in the off position or when the battery has been fully depleted, this light will be off.

Charging

Battery Input

The Battery Input Connector is used to connect the rechargeable Lithium Polymer (LiPo) battery to the robot control board. The LiPo battery must remain connected during operation and charging.

USB Connector

The USB Connecter allows you to plug in a Micro USB cable (typical Smartphone Cable). With a Micro USB cable, the USB Connector allows for two different functions:

- Charging the rechargeable battery - Connect a Micro USB cable to the USB Connector and use a Smartphone Charger or Computer/Laptop USB port to charge the battery. Note that the LiPo battery should remain connected to the Battery Input during charging.
- Uploading new firmware - Connect a Micro USB cable to the USB Connector and connect the robot to a Computer/Laptop. Using the Arduino IDE, new firmware may be uploaded to the robot's control board. This is covered further in an additional guide.

Battery Charge Indicator

The Battery Charge Indicator light indicates when the battery is being charged. While the battery is charging, the charging indicator will be fully on. When the battery is nearing its full capacity, the charging indicator will flash. When the charging indicator is fully off, your robot's battery is fully charged.

Input

User Input Button

This button accepts user input, by pressing the button, and can be programmed and used for different things within the MiiCode mobile app.

Reset Button

This button is used to reset the program running on the board. Resetting the board puts the robot in a default, known-state.

Grove (sensor) Input

This connector is used to connect a variety of different sensors as supported by the MiiCode mobile app. For example, an Ultrasonic Distance Sensor (sold separately to the MiiRo Bot kit) can be connected to the Grove Input connector.

Output

Buzzer

The Buzzer can be used to create sounds of varying tones. It is controlled via the MiiCode mobile app.

RGB LED

The Red, Green, Blue Light Emitting Diode (RGB LED) is a small light situated on the robot control board that is capable of displaying various colours. The colour displayed is controlled by adjusting how much ‘red’, ‘blue’ and ‘green’ light is activated in the diode. This is controlled via the MiiCode mobile app.

DC Motor Connectors

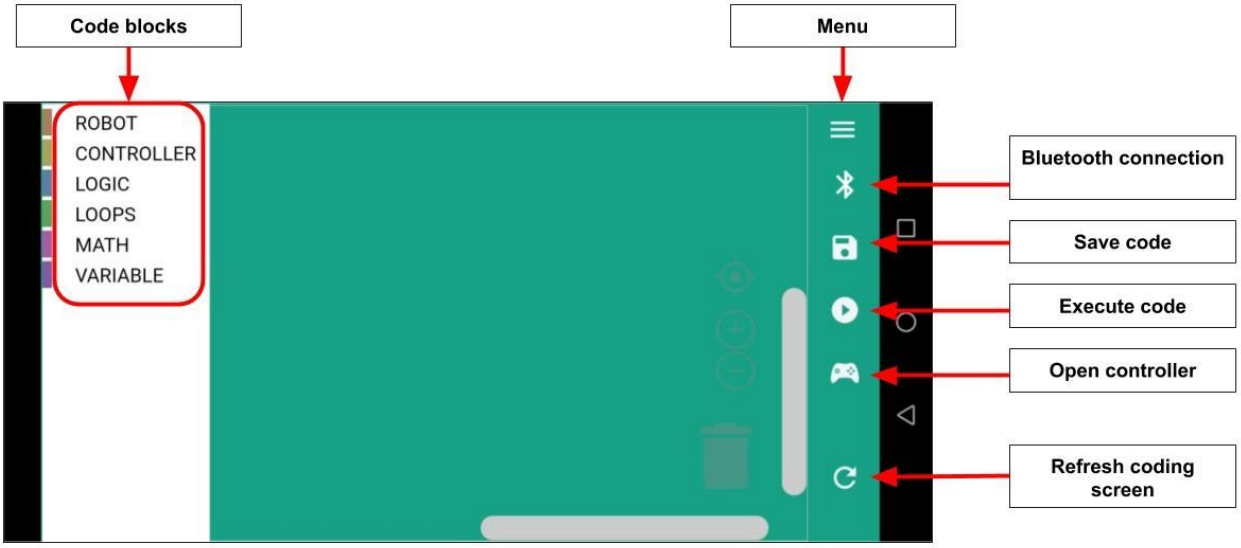
Direct Current Motors, or DC Motors, are used to drive your MiiRo Bot. The DC Motor Connectors are the points to which the two DC motors must be connected. Ensure that you follow the MiiRo Bot Assembly Instructions such that the Left and Right motors are connected correctly!

MiiCode Mobile App

The MiiCode Mobile App is used to not only interact with your MiiRo Bot, but also contains a wealth of useful information and plenty of features that will aid you on your journey through the wonderful world of robotics!

Main Screen and Menu Items

This section details the Main Screen of the Mobile App and explores the various Menu Item options available.



Code Blocks

The MiiCode App uses a block-based programming language. This means that you construct programs for your robot by connecting different blocks together. All the available code blocks are contained in these sections. Simply drag the desired blocks from the Code Blocks menus onto the Work Area. Using these blocks, you can build interesting programs that will make your MiiRo Bot perform some amazing actions.

Bluetooth Connection

Tap this icon to navigate to the Bluetooth Connection page. The Bluetooth Connection icon will turn blue when your robot is successfully paired with your smart mobile device.

Save Code

Tapping this icon will allow you to save any code you are currently busy assembling. You will be prompted to give your project a name. Tapping on this icon again after already first saving your code will save any changes you made since the last save.

Execute Code / Play Button

After you've assembled a program with code blocks in the Work Area, you can run your code on your robot by tapping the Play Button. After tapping the Play Button, your code is sent to your robot continuously, in real-time! This means that you can make changes and see the results instantly.

After tapping the Play Button, it changes to a Stop Button. Tapping this will stop the sending of your code to your robot.

Open Controller

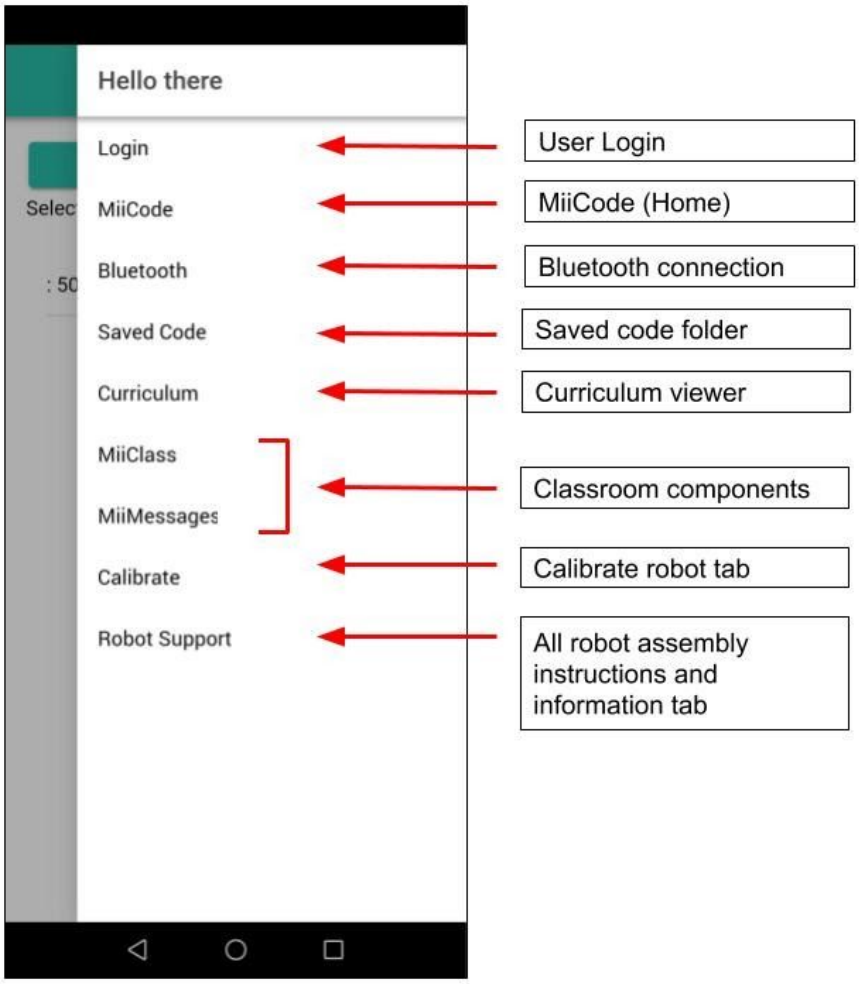
Tapping the controller icon will open the Controller Screen. This screen contains a controller with various buttons that you can program to achieve different results. You can program these buttons but using blocks from the "Controller" code blocks section.

Refresh Coding Screen

There may be times when you'd like nothing more than a fresh start. Tapping this icon will refresh the entire app. However, with great power, comes great responsibility: tapping this icon will cause everything to be reset to the default state. This means that you'll lose any unsaved code still present in the Work Area and you'll also lose connection to your robot. Ensure that you saved any code you wish to keep before using this button.

App Menu

Tapping the Menu Button will open up the App Menu. This menu provides access to a whole range of other features!



Login

The Login Page allows you to register and log into the MiiCode app to unlock the full potential of your MiiCoding experience. While much of the functionality is available without logging you, you won't be able to save any code that you've created.

MiiCode (Home)

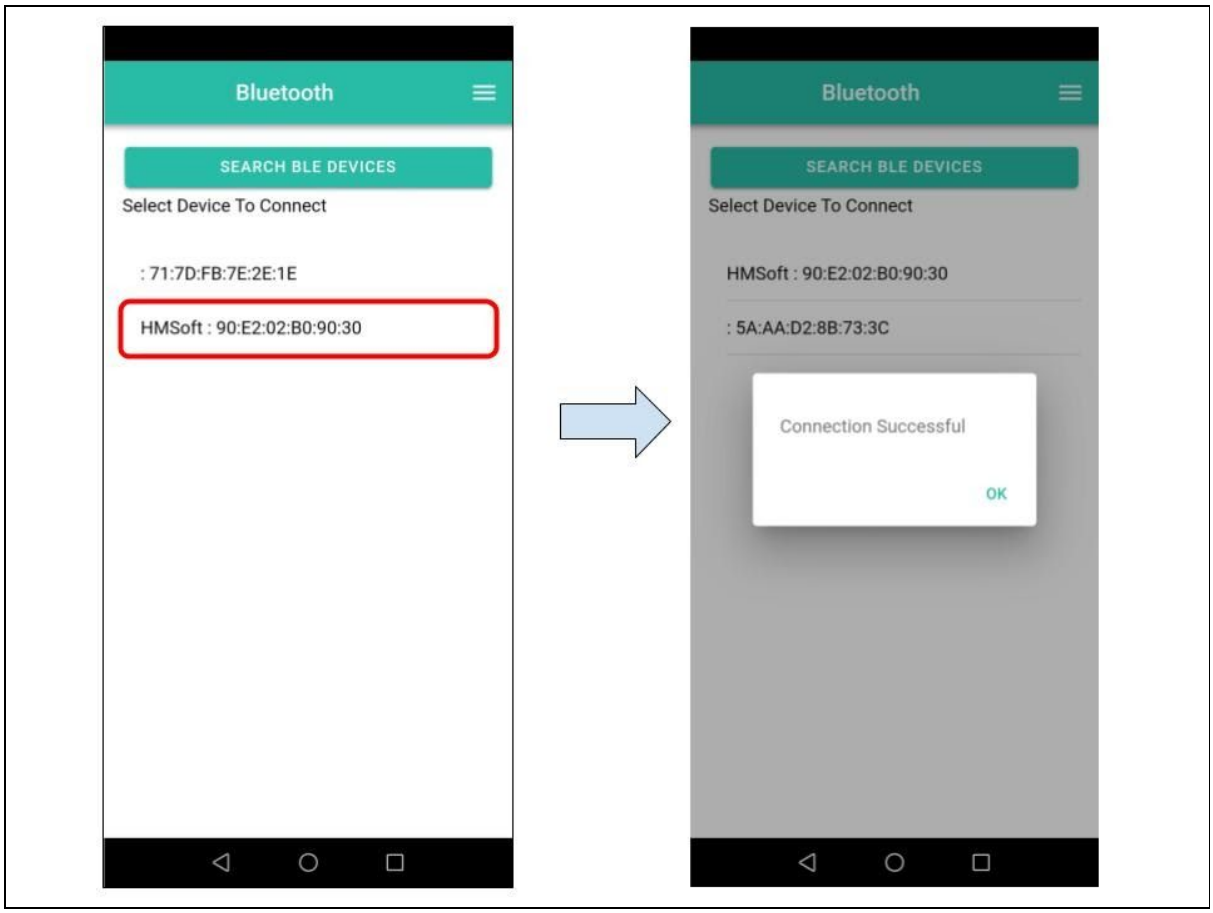
The MiiCode menu item will return you to the Main Screen and Work Area.

Bluetooth

Selecting the Bluetooth menu item opens that same page as tapping the Bluetooth Connection Icon in the Main Screen. This page allows you to search for and pair with your robot. Ensure your robot is turned on and that the Bluetooth Module is powered on. Then, select ‘Search BLE Devices’ and wait for your MiiRo’s unique name to pop up.

All MiiRo Bot names are in the form *miiroABCD* where *ABCD* is the unique serial number of your robot. This serial number can be found in the box or on the control board.

Once found, select your MiiRo Bot Bluetooth Device from the list to begin pairing A connection successful indicator will pop up once your robot is successfully connected to the MiiCode app!



Saved Code

This menu item takes you to a folder where all your previously saved projects are stored. Once registered, your saved projects are tied to your unique profile, so you can log in to MiiCode from another device and access your projects and continue working on them!

Curriculum Viewer

This menu item allows you to view all the learning material, fun projects and challenges associated with MiiRo Bot and MiiCode. The Curriculum comprises various modules focusing on different aspects of the MiiRo Bot. Everyone gets access to introductory content to get you started, and later when you decide you want a bit more, you can upgrade to a Premium Account to access more specialized content. This section is also constantly updated with new challenges and learning material, so check in regularly.

Classroom components

This is where things get interesting, These components are used to interact with your teacher in a classroom setting. With this feature, you will be able to receive assignments straight from your teacher, complete it and then send it back. You can also monitor any messages sent within your class, that way you will always be updated!

Calibration (Robot tuning)

As the name suggests, this is where you get the option of getting more control. Fine tune your robot to exactly the way you like it. You will be able to calibrate the different motors for the forward and reverse directions. Also, if you want to see exactly what is being sent back from your robot, I'd have a look at the bottom of this page.

Robot Support

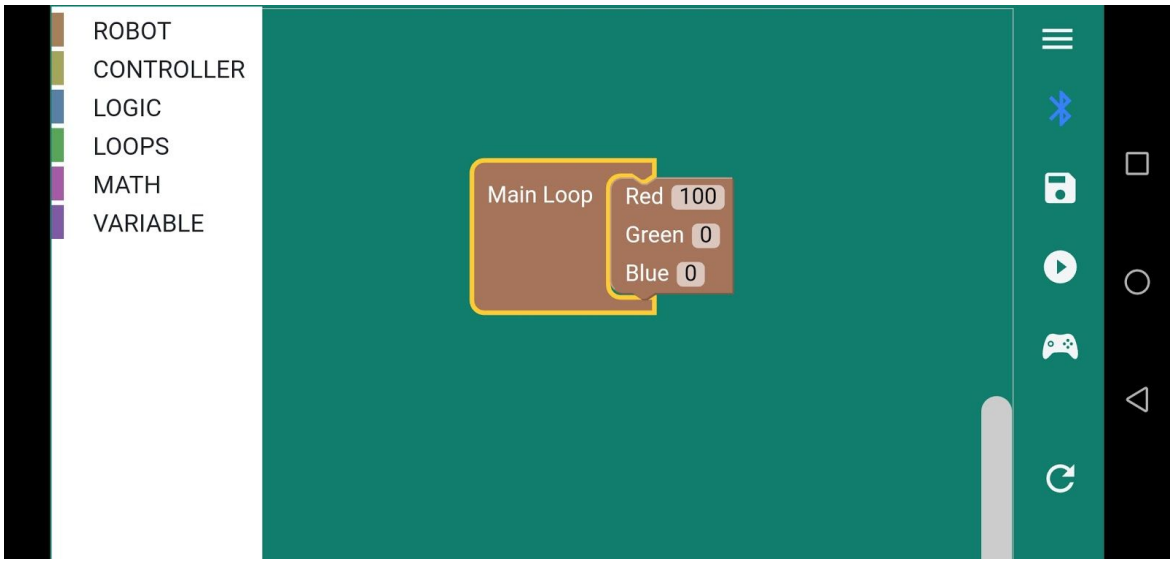
This section is where all robot support documents are stored. This included Instruction Manuals, Getting Started Guides, Calibration Sheets, and much more. If you're ever in need of help, check this section out!

Robot Calibration

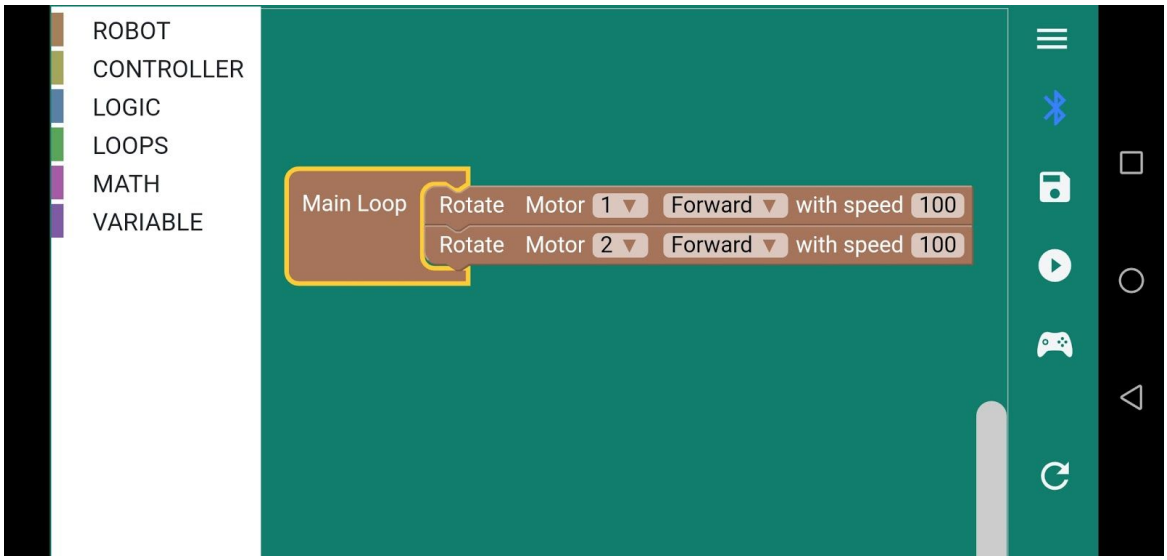
Just as individual humans are unique, no two motors are exactly alike and there are often variations between motors. These variations may cause your robot to move in ways that you'd not expect. To account for this, you're able to calibrate your robot's motors. Using the supplied Calibration Sheet, you're able to compensate for variations in your motors and get your robot calibrated. Once calibrated, your robot should be capable of following a straight line!

Sample Code

Now that you're all set up with your robot and are familiar with the MiiCode app, let's get into some coding! Below are some examples of code snippets that perform some of the more basic functions of the MiiRo Bot. The aim of these snippets is to introduce you to the blocks and give you a taste of what's possible.



The code above turns the Red LED on.



The code above moves both motors forward at a 100% power.

And that's it! You've officially Gotten Started with your MiiRo Bot and MiiCode. If you require additional information, consult the Robot Support section in the MiiCode app. Or if you're feeling social, connect with us on one of our platforms or drop us an email. We're always happy to help!

Contact information

Website: www.rd-9.co.za

Email: info@rd-9.co.za

Facebook: https://www.facebook.com/rd9solutions/

Twitter: @Rd9Solutions

Instagram: rd9_solutions

FAQs

1. What is Firmware?

Firmware is the program that runs on a Microcontroller device. In this case it's the code that runs on the Microcontroller that powers your MiiRo Bot. The original MiiRo Bot Firmware enables you to use MiiCode to program your robot.

2. I am not able to zoom in or out on the MiiCode Mobile App

When opening the MiiCode app and the zoom functions don't work, simply refresh the app by tapping the Refresh button at the bottom right of the screen. Remember though, you'll lose all unsaved code and your connection to your robot. So use with caution!

3. My wheels don't move

When plugging in the wheels of the MiiRo Bot make sure that the wire colours are connected as shown in the instruction manual. If the motor connectors are swapped around, the motors will not move.

4. The left wheel moves when the right wheel is chosen in the MiiCode app (and vice versa)

This happens when the opposite motor is connected to the specified motor connector. Swop these motors around and the issue should be fixed.