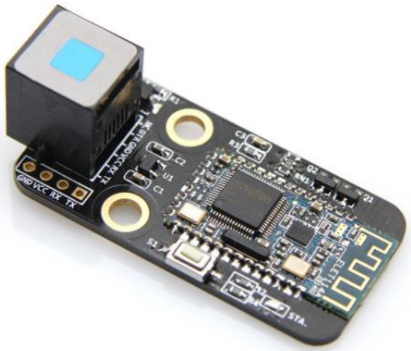
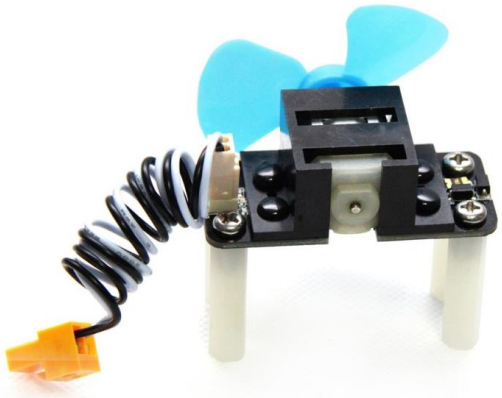
Human Inputting Devices for DC Motor Control

Class 5: Bluetooth-Touch Screen Controls





July 28, 2017

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Presented by:

DesignNews CEC CONTINUING EDUCATION CENTER

Digi-Key ELECTRONICS ROHDE&SCHWARZ

Bluetooth-Touch Screen Controls

Agenda

- Me-Bluetooth Module (Dual Mode)
- Exploring the Me-Bluetooth Module
- Hands-On Project: A Smartphone Touch Screen Controller – DC Motor Control

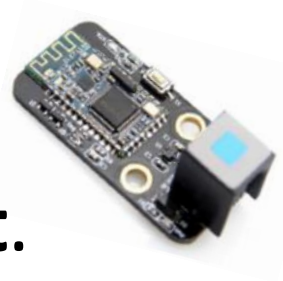
Me-Bluetooth Module (Dual Mode)

- Designed to communicate with devices with bluetooth function.
- Can communicate over short distances(approximately 32ft).
- Supports Bluetooth versions 1.0, 2.0, 3.0, and 4.0 specifications.
- Compatible with Android and Apple(iOS) devices.
- Can communicate with Bluetooth Terminals

Sources:

http://learn.makeblock.com/me-bluetooth-moduledual-mode/

Me-Bluetooth Module (Dual Mode)…



- **Dual Mode provides the following support**.

  a) Low Energy (LE)

  b) BR (Basic Rate)/EDR (Enhanced Data Rate)

- **BR/EDR** is typically used for relatively short-range, continuous wireless connection such as streaming audio to headsets.

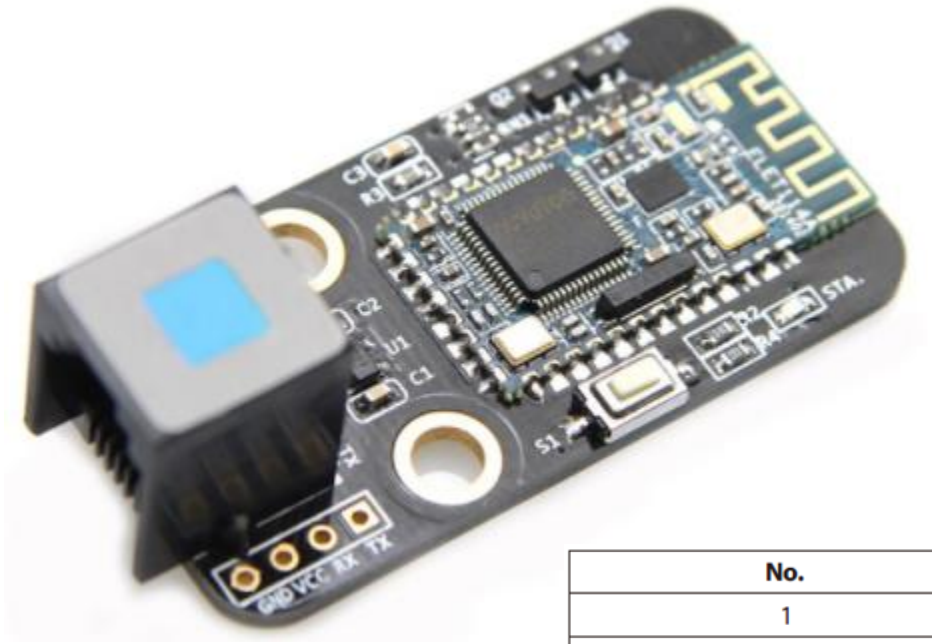
Me-Bluetooth Module (Dual Mode)…

- **LE** is designed to use short bursts of longer-range radio connection,
  a) ideal for Internet of Things (IoT)
  b) applications that don't require continuous connection.
  c) Apps can often run on just one coin cell and still have a relatively long battery life.

Question 1

What is Bluetooth BR/EDR?

Me-Bluetooth Module (Dual Mode)…



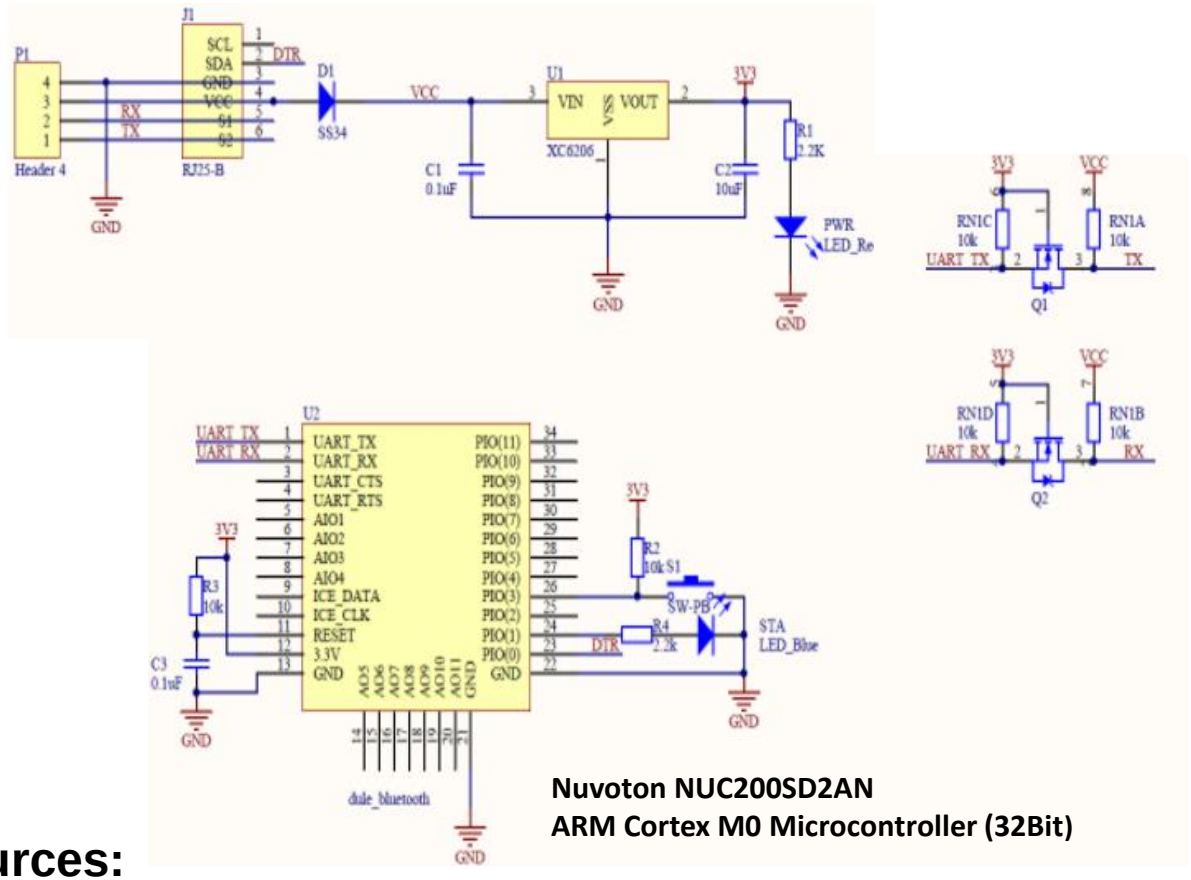
Pin definition:

No.	Pin	Function
1	GND	Grounding
2	VCC	Power supply
3	RX	Receive the serial data
4	TX	Send the serial data

Source:

http://learn.makeblock.com/me-bluetooth-moduledual-mode/

Me-Bluetooth Module (Dual Mode)…



Nuvoton NUC200SD2AN
ARM Cortex M0 Microcontroller (32Bit)

NUC200SD2AN
ARM Cortex M0 Microcontroller (32Bit). Image Taken with a ProScope.

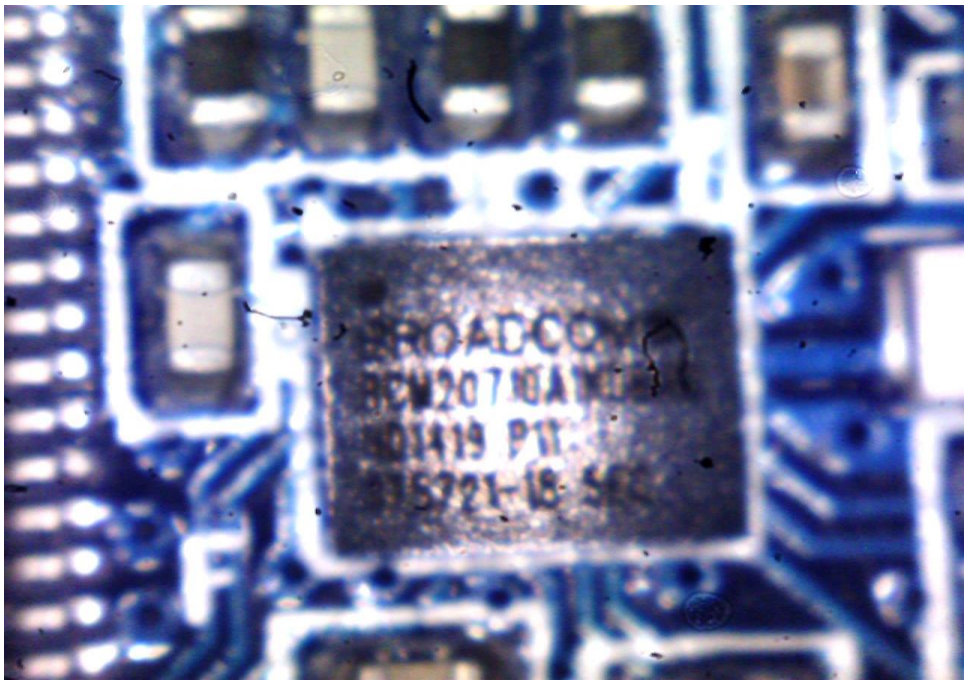
Sources:

http://learn.makeblock.com/me-bluetooth-moduledual-mode/

http://www.nuvoton.com/hq/products/microcontrollers/arm-cortex-m0-mcus/nuc100-200-advanced-series/nuc200sd2an/?__locale=en

Me-Bluetooth Module (Dual Mode)…

Broadcom BCM20710A Single Chip Bluetooth Transceiver. Image Taken with ProScope.



Source:
http://dl.linux-sunxi.org/users/turl/20710-DS103-RDS.pdf

Question 2

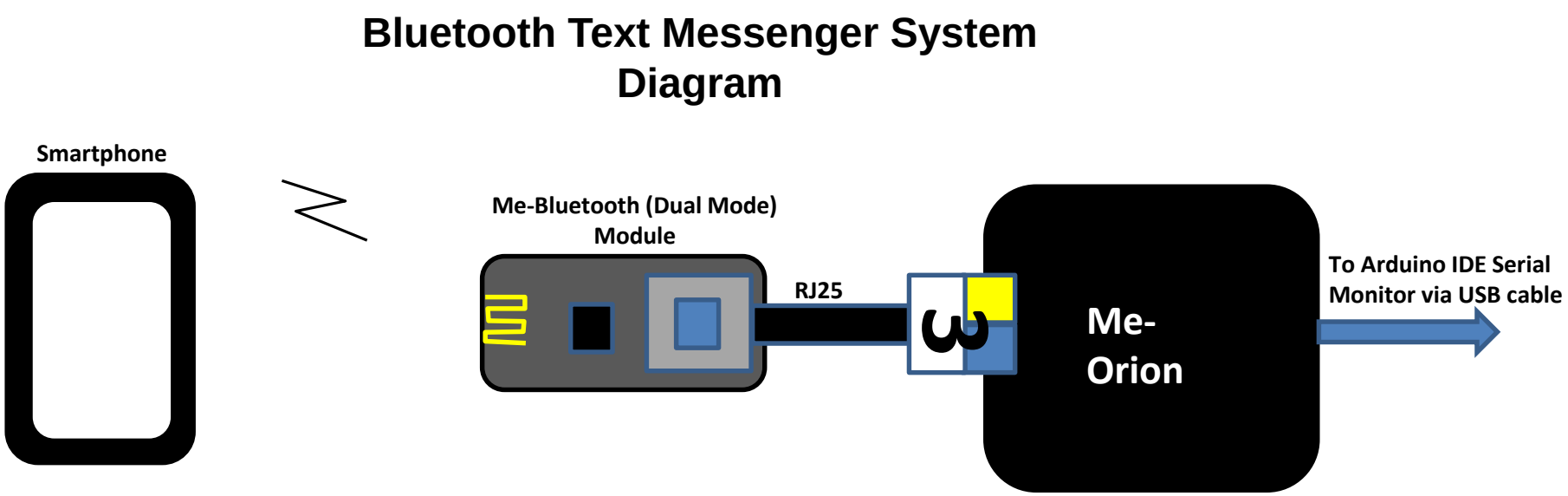
What is the typical transmission distance for Bluetooth communications?

Exploring the Me-Bluetooth Module (Dual Mode)

Exploration Objectives:

- Build and test a simple Bluetooth Text Messenger
- Text Message will be typed and sent using a Smartphone (Android)
- The Me-Orion will receive the text message and display it on the Arduino's IDE Serial Monitor.

Exploring the Me-Bluetooth Module (Dual Mode)…



Exploring the Me-Bluetooth Module (Dual Mode)…

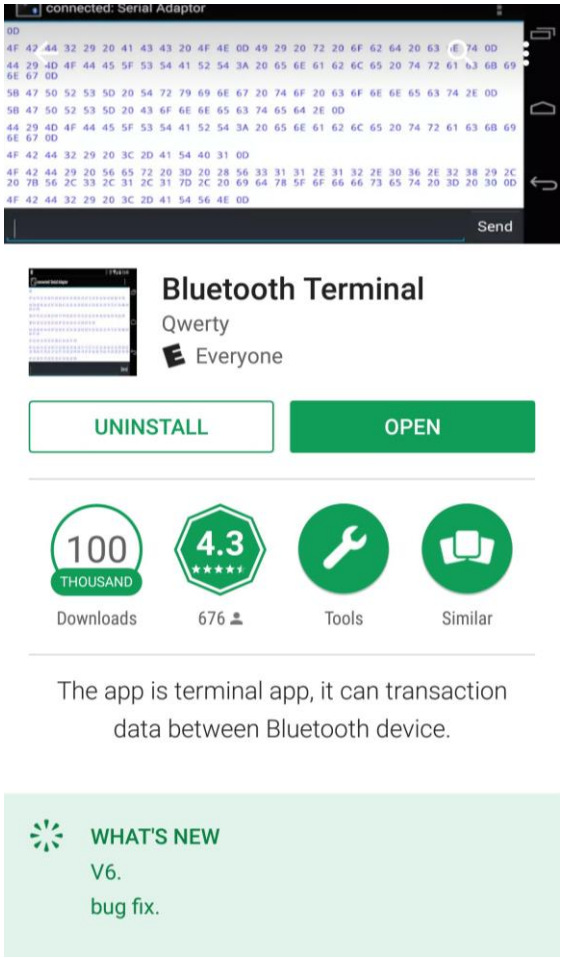
```
#include <Arduino.h>
#include <SoftwareSerial.h>
#include <Wire.h>
char inDat;
char outDat;

MeBluetooth bluetooth(PORT_3);

void setup() {
  Serial.begin(115200);
  bluetooth.begin(115200);
  Serial.println("Bluetooth Start!");
  }

void loop() {

 if(bluetooth.available())
 {
    inDat=bluetooth.read();
    Serial.print(inDat);
 }
  if(Serial.available())
  {
    outDat=bluetooth.read();
    bluetooth.write(outDat);
 }

}
```

Bluetooth Text Messenger Arduino Code
Upload the code to the Me-Orion Controller.

Remember to save the code prior to uploading it to the Me-Orion Controller!

Exploring the Me-Bluetooth Module (Dual Mode)…

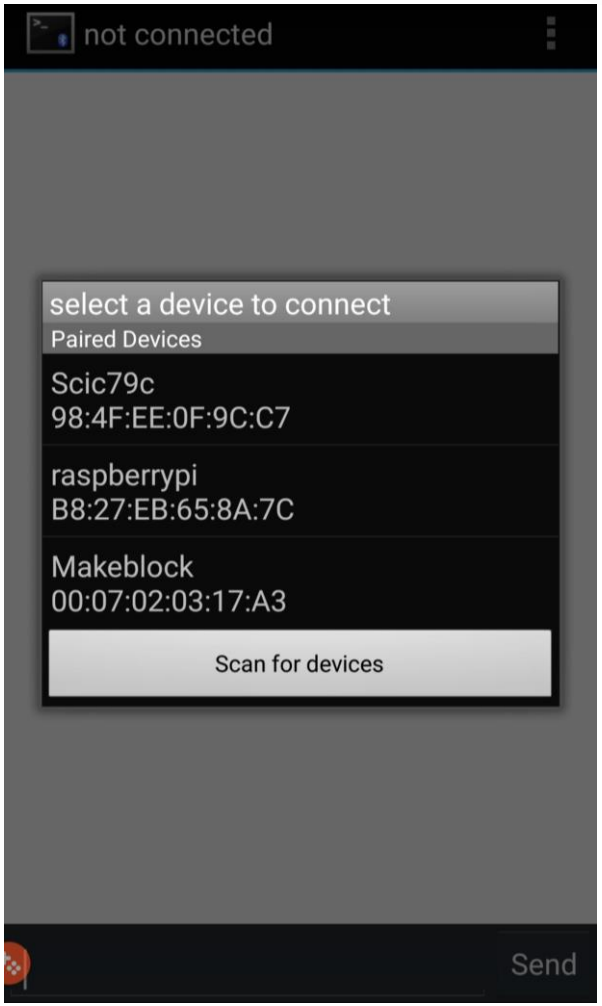
Download and install a Bluetooth Terminal onto your smartphone.



Exploring the Me-Bluetooth Module (Dual Mode)…

Open Bluetooth Terminal and pair with the Me-Orion (Makeblock) controller.

Note: smartphone's Bluetooth must be turned on prior to paring the devices together.



Question 3

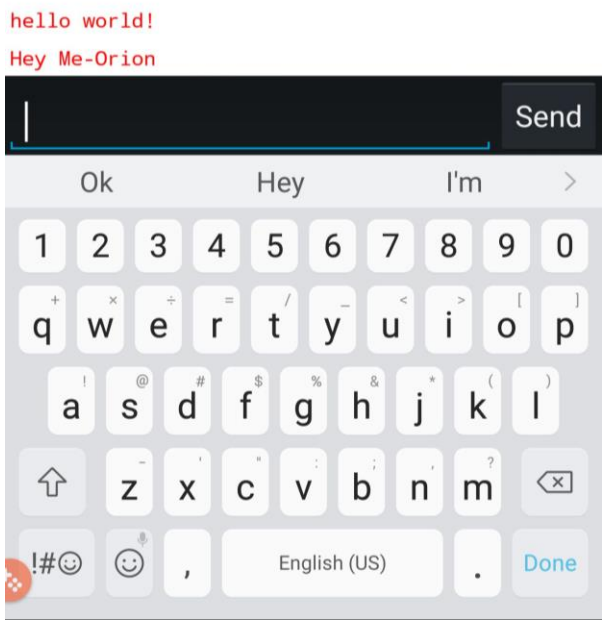
The Makeblock LE is the name of the Bluetooth device that will be displayed for pairing.

a) True

b) False

Exploring the Me-Bluetooth Module (Dual Mode)…

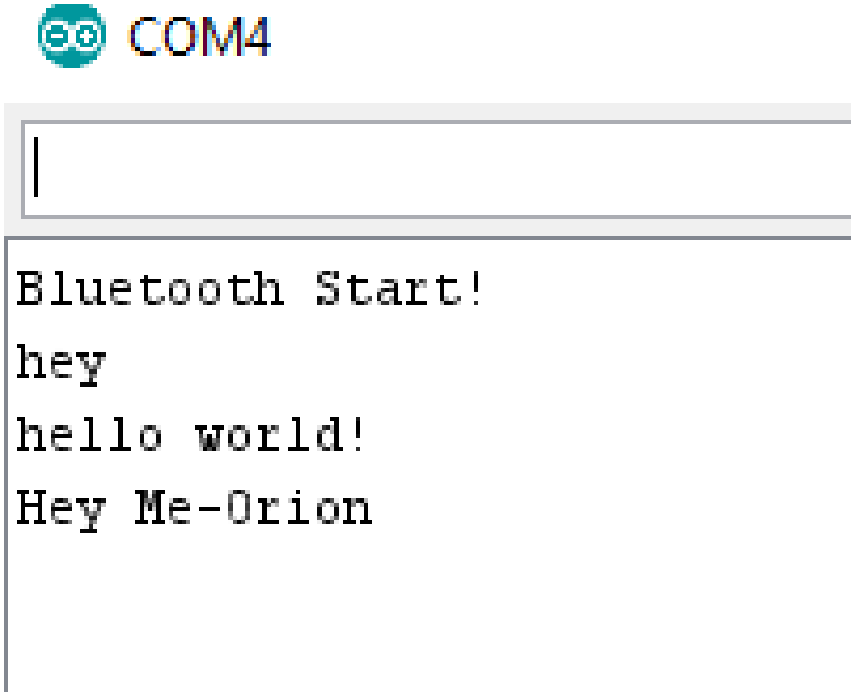
Type messages on the Bluetooth Terminal pressing the Send key after each entry.



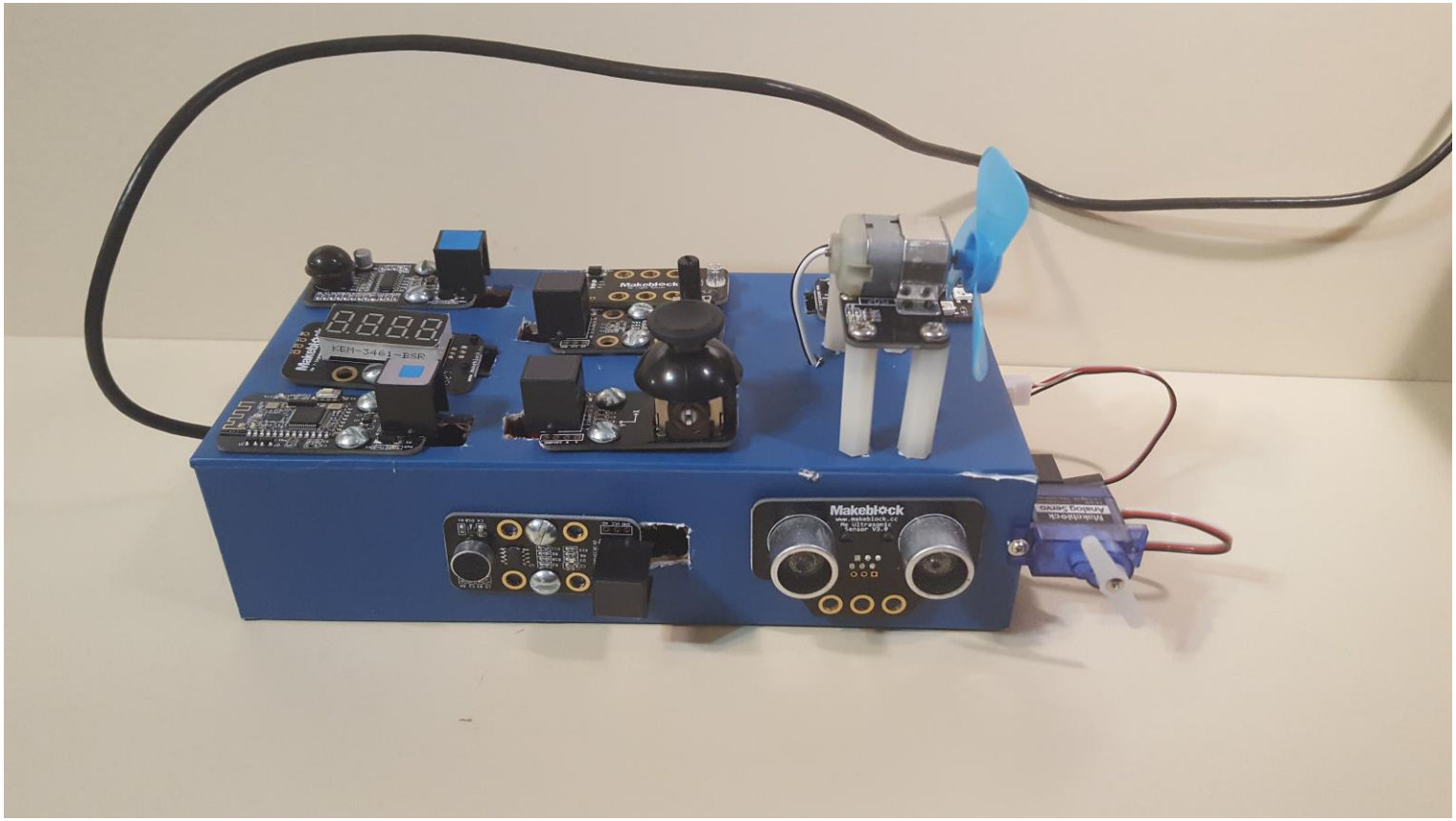
Presented by:

Exploring the Me-Bluetooth Module (Dual Mode)…

Typed messages on the Bluetooth Terminal are received by the Arduino IDE's Serial Monitor!



Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control



Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Project Objectives:

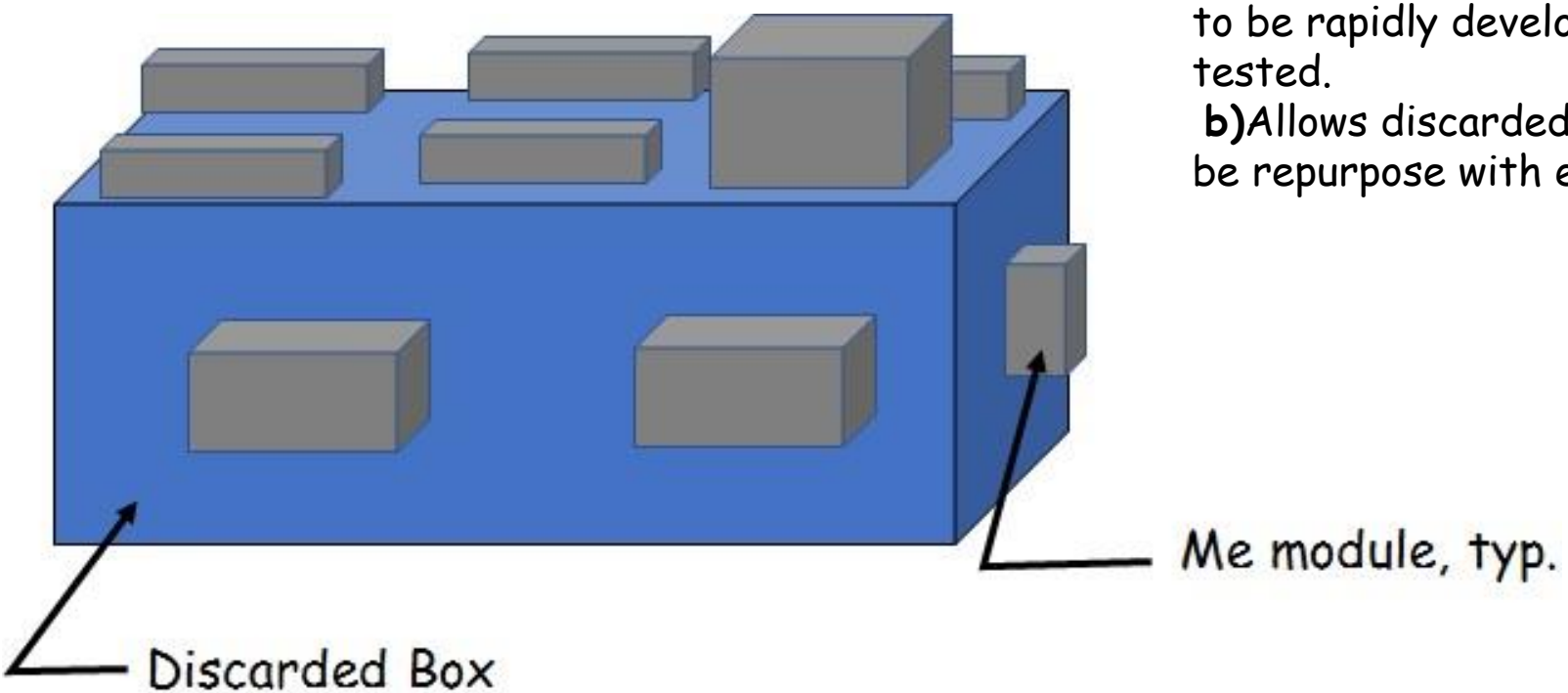
a) Build a prototyping technology trainer for testing Human Inputting Devices concepts.

b) Design a smart phone touch control device to operate the speed of a DC motor attached to slot M1 on a ME-Orion Controller.

c) Prototype the smartphone touch control device that performs Design Feature b.

Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Human Inputting Device Technology Box: Concept Drawing



The BIG IDEAs:

a)Technology Box allows Human Input Control Designs to be rapidly developed and tested.

b)Allows discarded items to be repurpose with electronics.

Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control

Download and install Makeblock onto your smartphone.

Makeblock

More than a robotic controller, Makeblock is a powerful tool for users to realize their creative ideas rapidly.

Available : mBot、Ranger、Starter/Ultimate、Ultimate2.0

iOS

Required : iPhone4S/iPad 3, iOS 9.0 and above

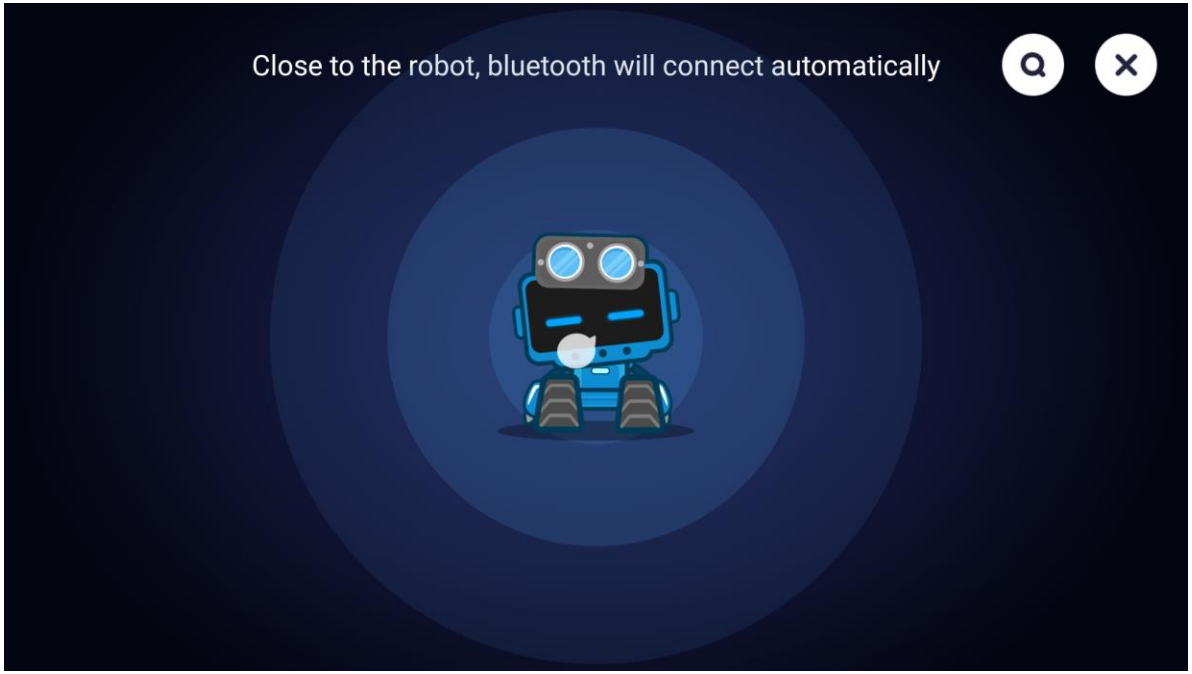
Android

Required : Android 4.3 and above

Source:
http://learn.makeblock.com/en/software/

Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Connecting Makeblock mobile app with Me-Orion Controller. Note: The Me-Bluetooth Module shall be connected to Port 5 for proper operation.



Question 4

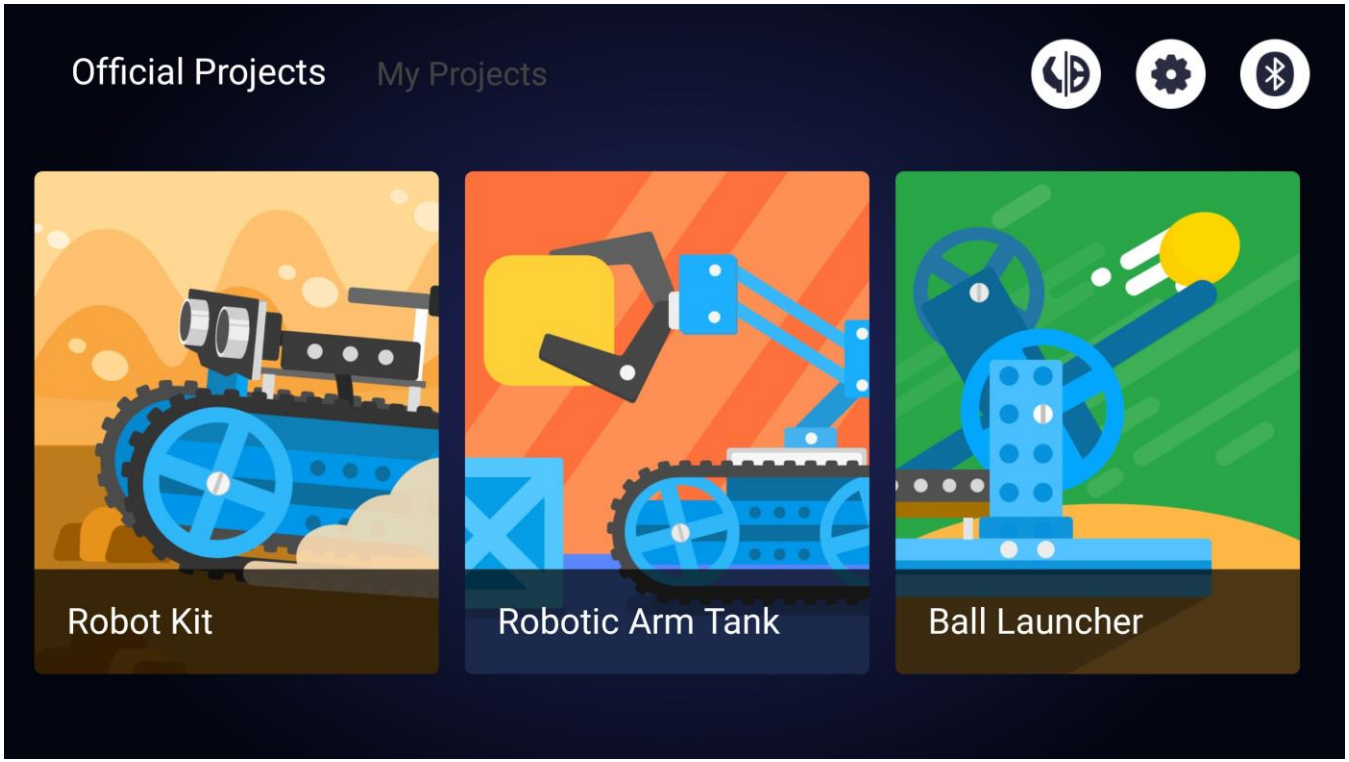
In order for the Me-Bluetooth Module to communicate with mobile device, Port 3 should be used.

a) True

b) False

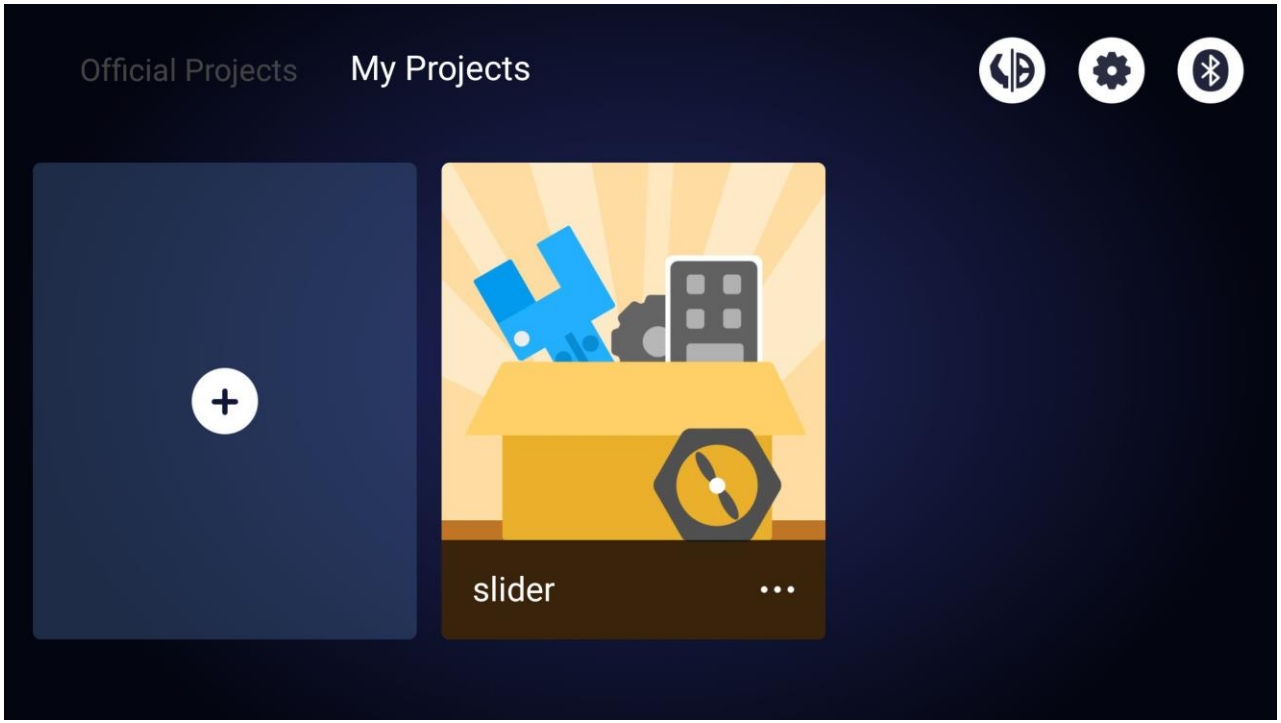
Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Variety of robotic projects to select within Makeblock mobile app. Select My projects.



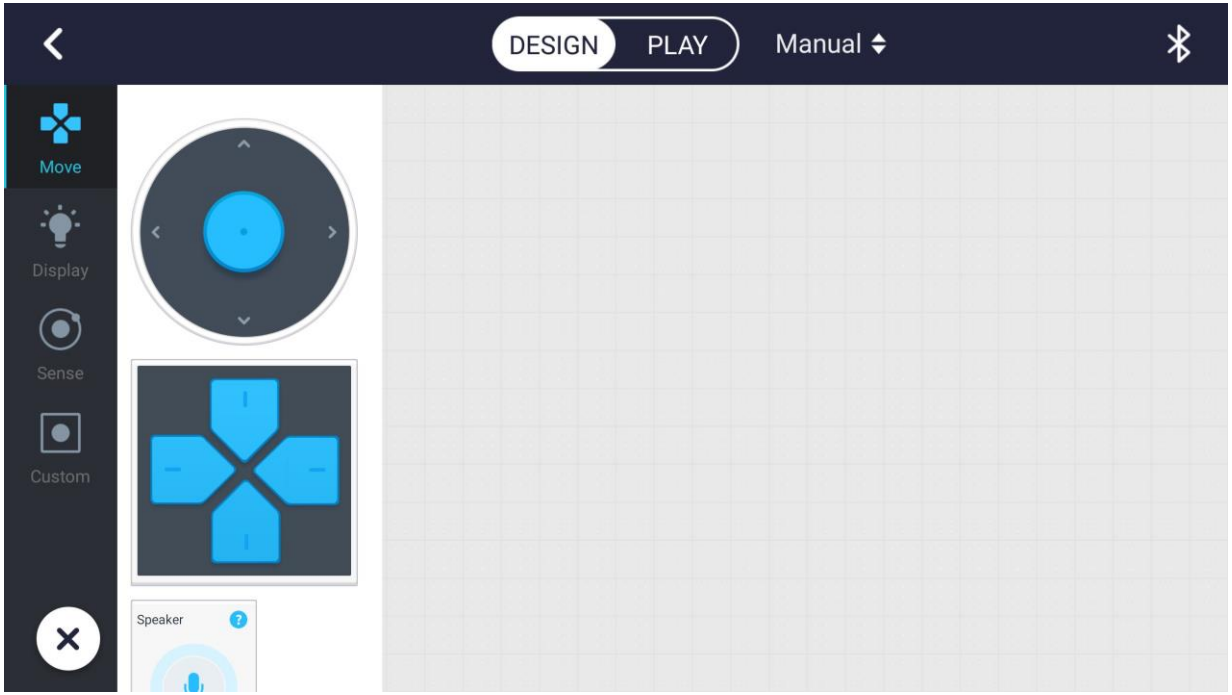
Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Select the“+” icon.



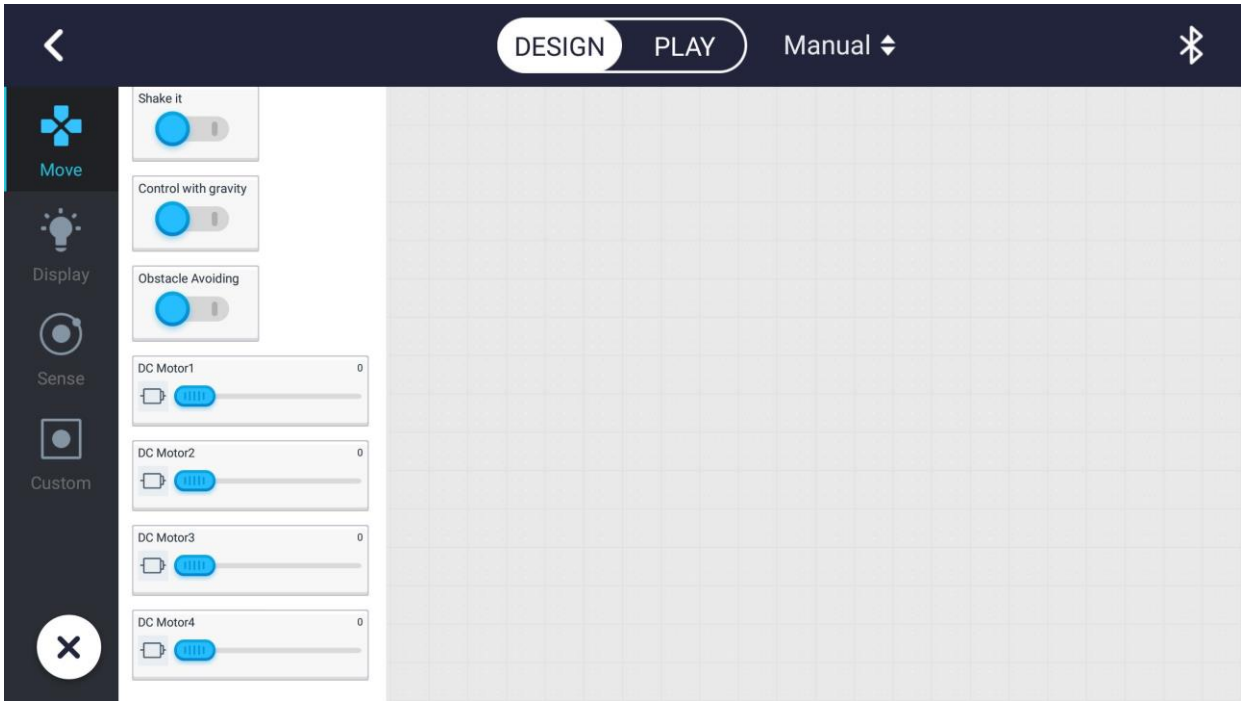
Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

A Design Panel with a variety of UI controls will be visible on your mobile phone.



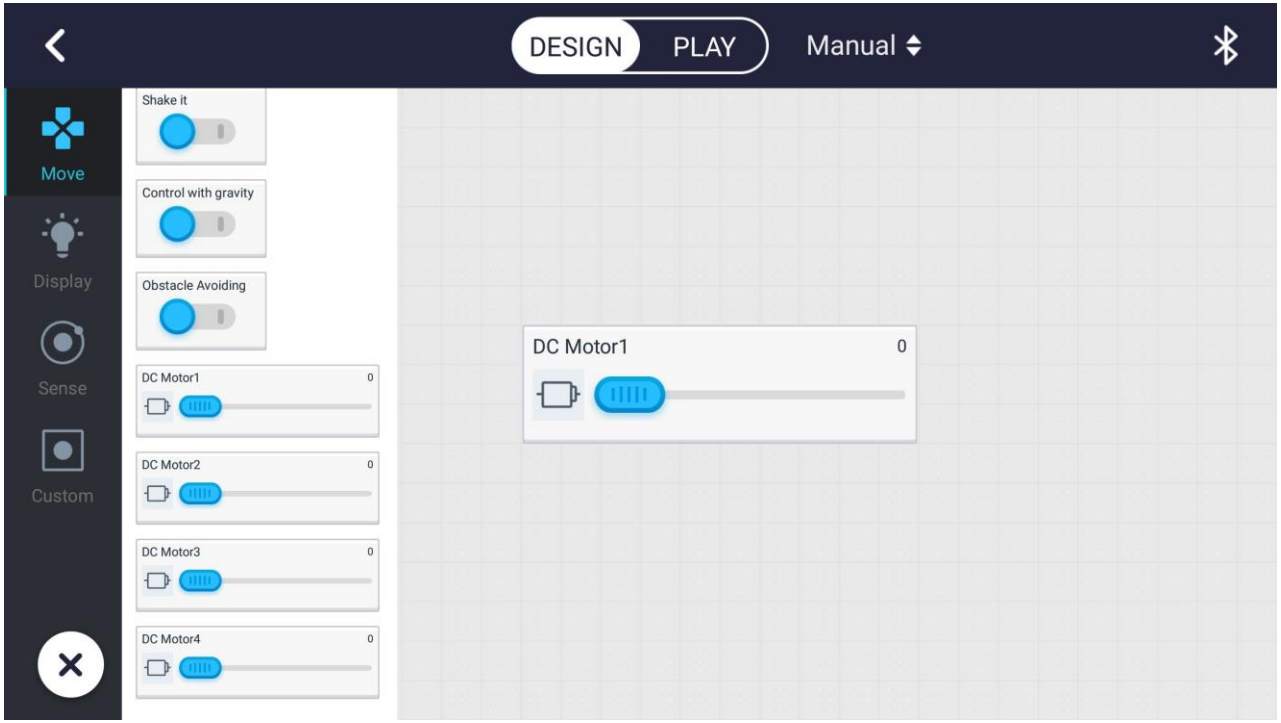
Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Scroll down to the DC Motor 1 slider control.



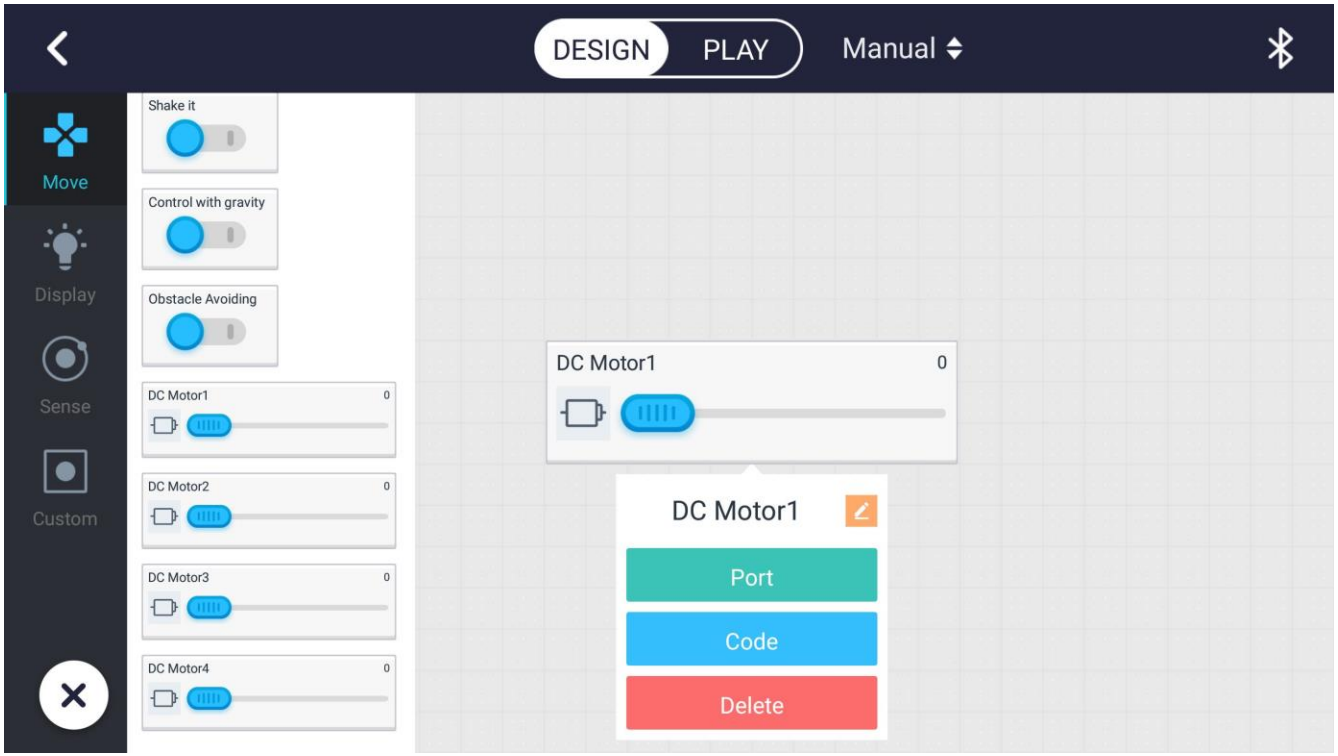
Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Select the DC Motor 1 slider control and drag it onto the Design Area.



Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Tap on the slider control. Tap the "Code" button to view the VPL code.

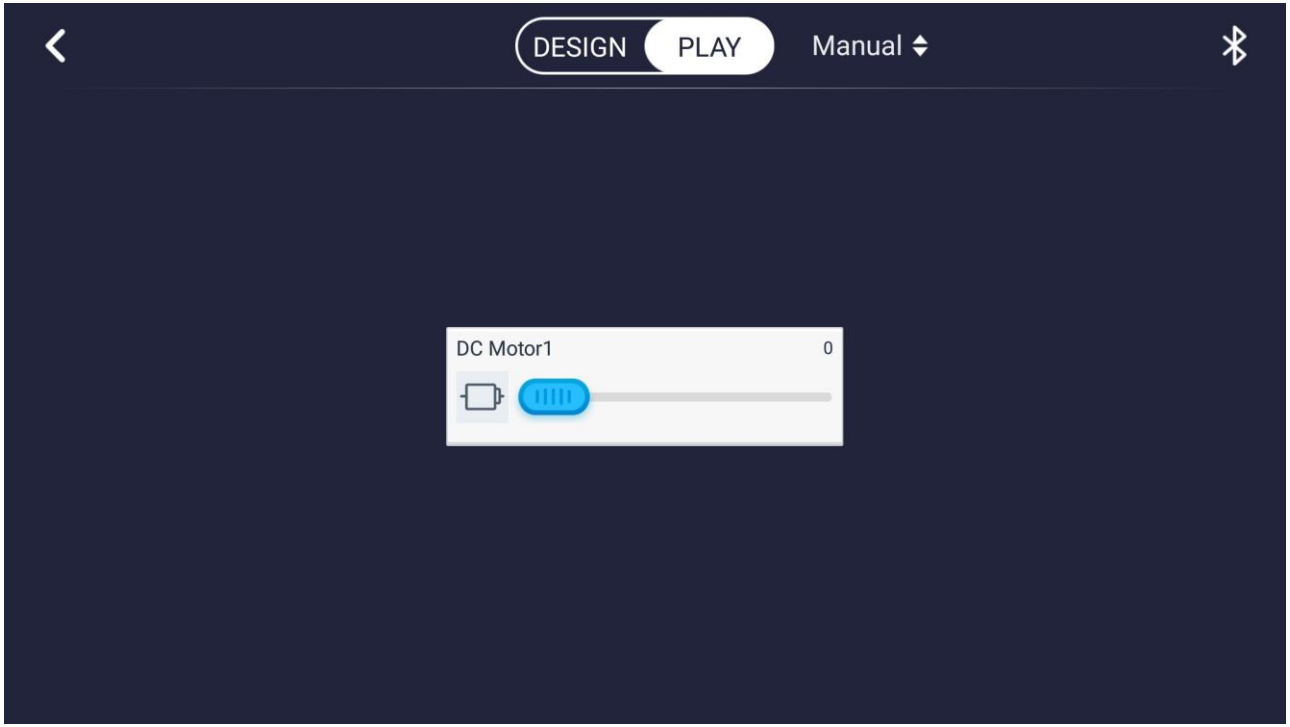


Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

The DC motor slider control VPL code.

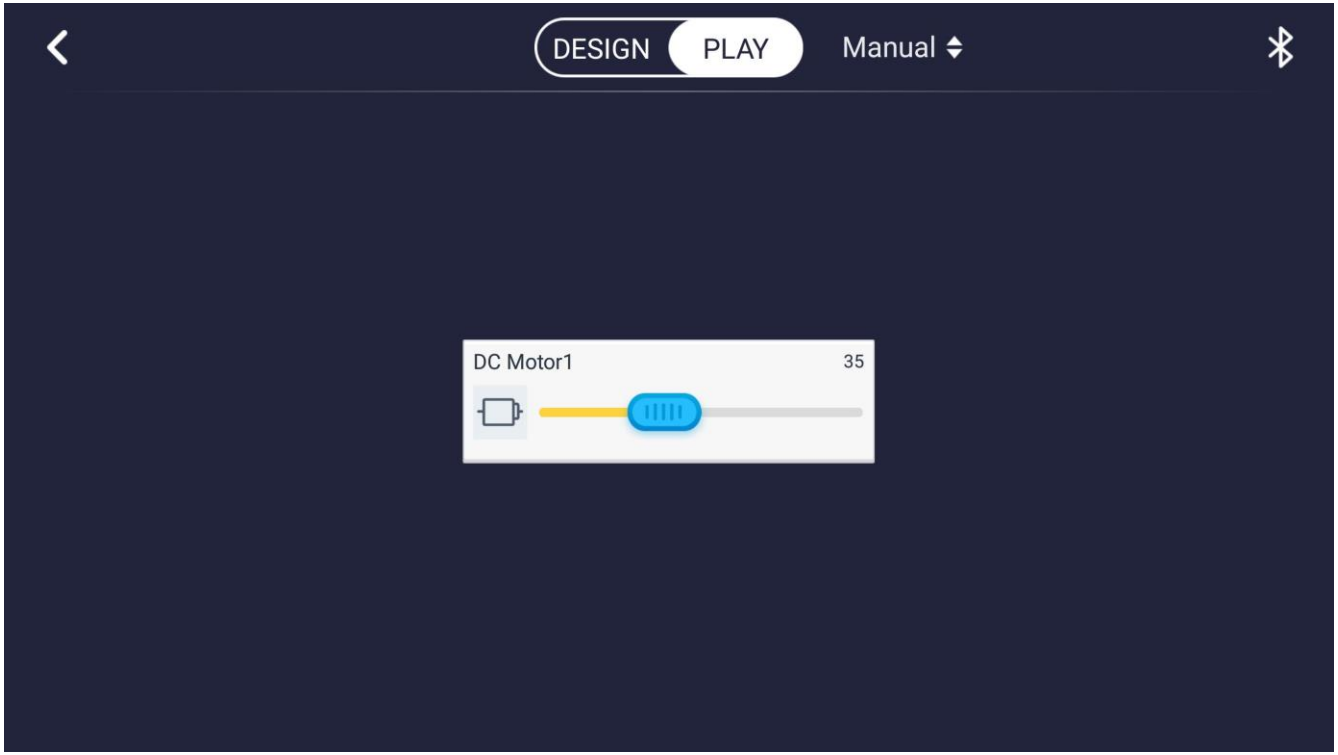
Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Tap the PLAY button to activate the slider control.



Hands-On Project: Smartphone Touch Screen Controller – DC Motor Control…

Adjust the speed of the DC motor using the slider control.



Question 5

Using the MakeBlock VPL code on slide 31, what math operation is performed to scale the display selected speed on the slider controller?

Hands-On Project…

Congratulations!