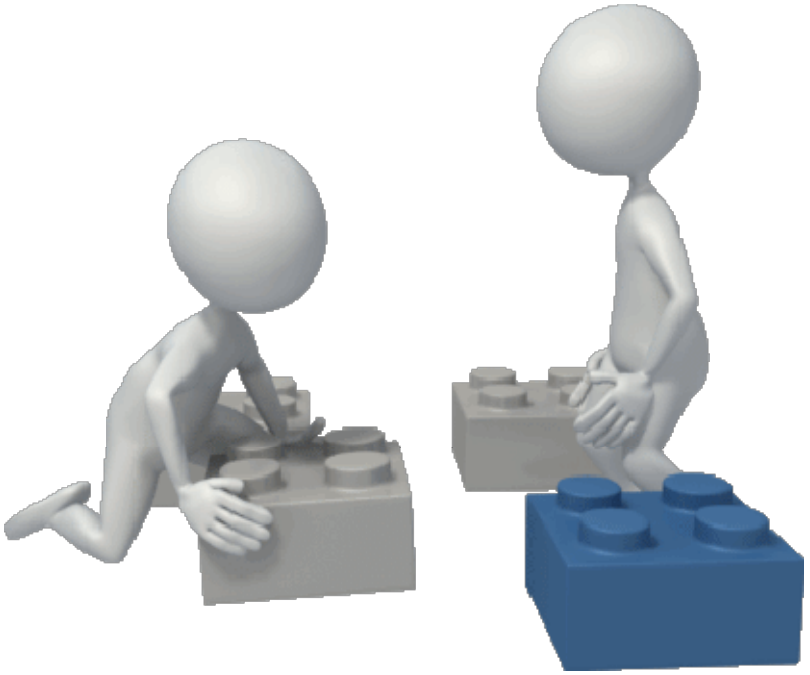
2017 FTC Kick-Off

Bringing it all together

Frog Tech University, FRC Team 503
September 1, 2017

Course 103

Today's Goal…..

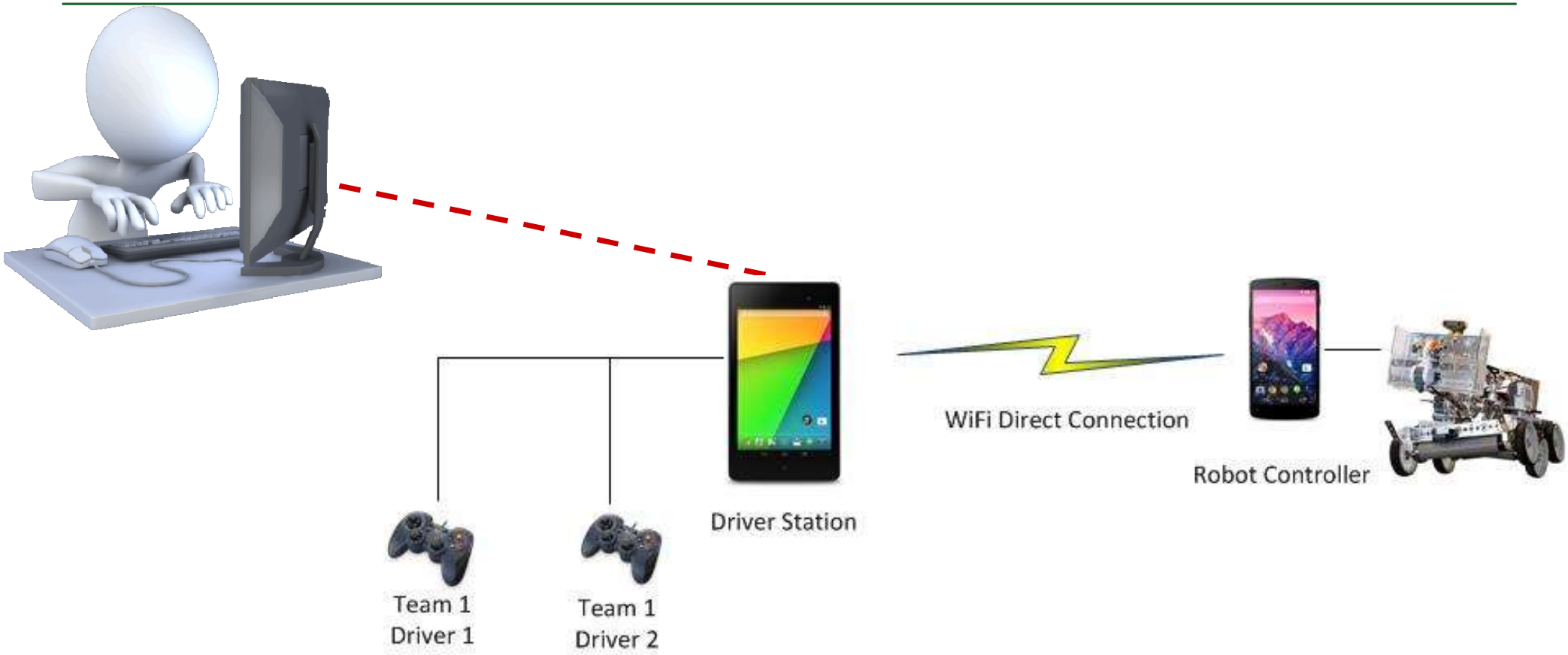


The goal of todays session is bring your developer workstation and your Android cell phones together to control a robot

FROG FORCE 503 A LEAP AHEAD

New Point to Point Communication System

Pair of Android phones provide ‘Wi-Fi Direct’ Communication



FROG FORCE 503 A LEAP AHEAD

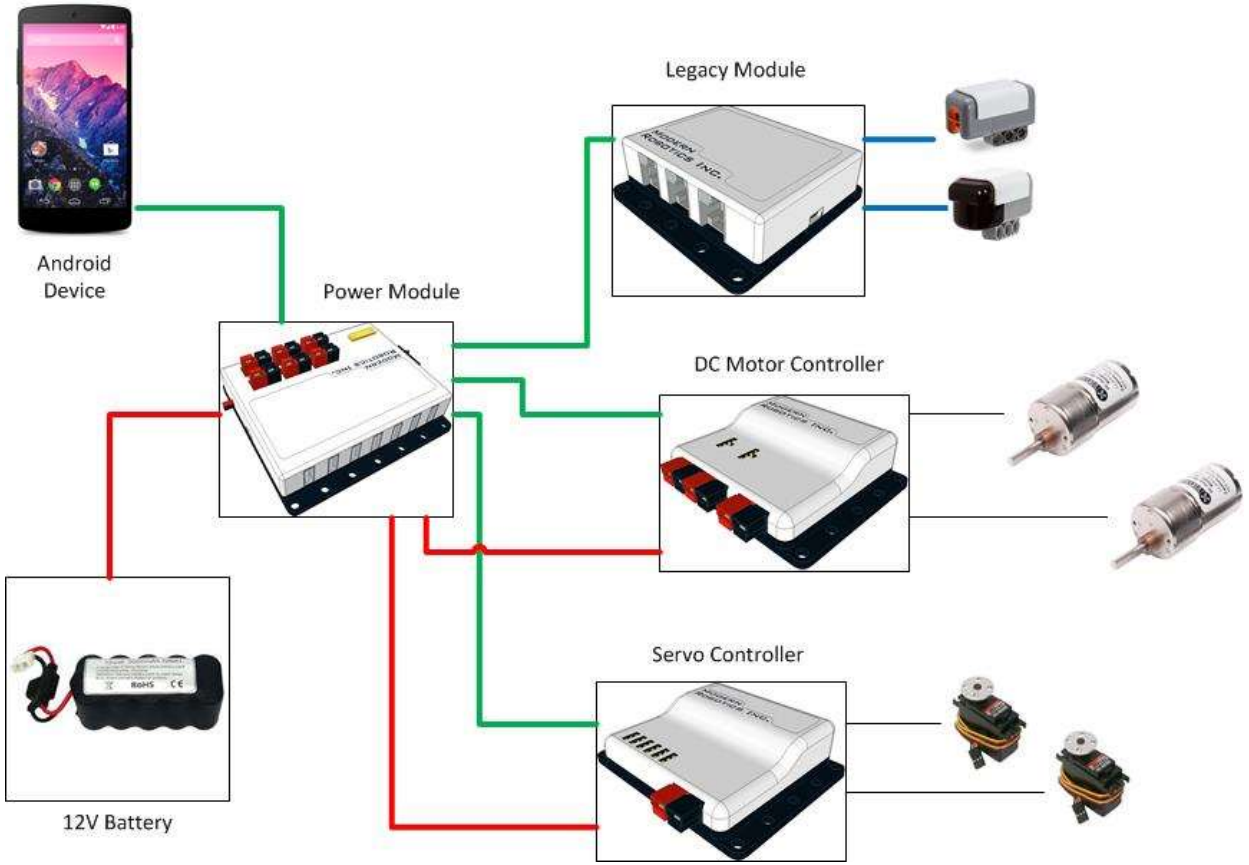
Driver Station Wiring
Game Controller connect to USB mini hub

Guide

- The black USB On the go (OTG) cable connects to the driver station cell phone
- The USB mini hub connects to the OTG cable.
- Both game controllers connect to the mini hub

New USB Enabled Controllers

All of these fit on the robot…



New USB-enabled modules from Modern Robotics

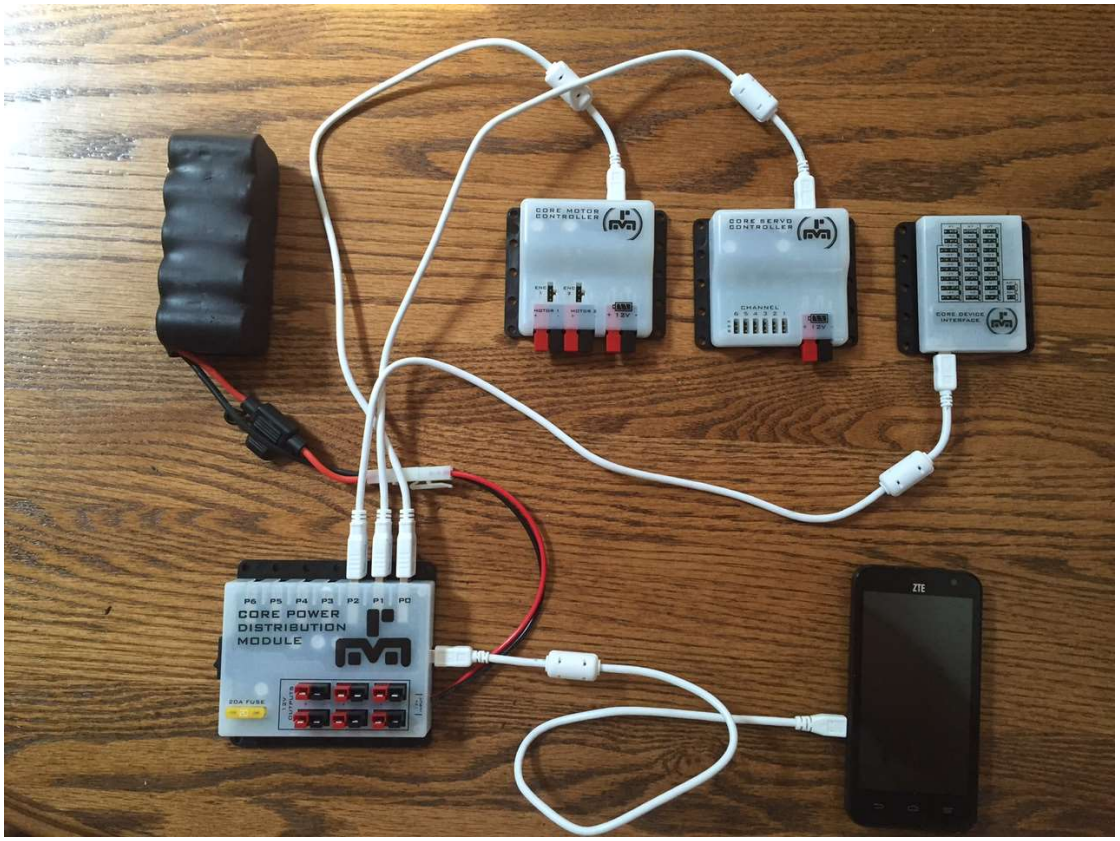
- Power Module
- Legacy Module
- DC Motor
- Servo
- Core Device Interface (Advanced Sensor Module)

USB Communication

Power Cable

FROG FORCE 503 A LEAP AHEAD

Robot Controller Wiring
USB Cables used for Communications (white)



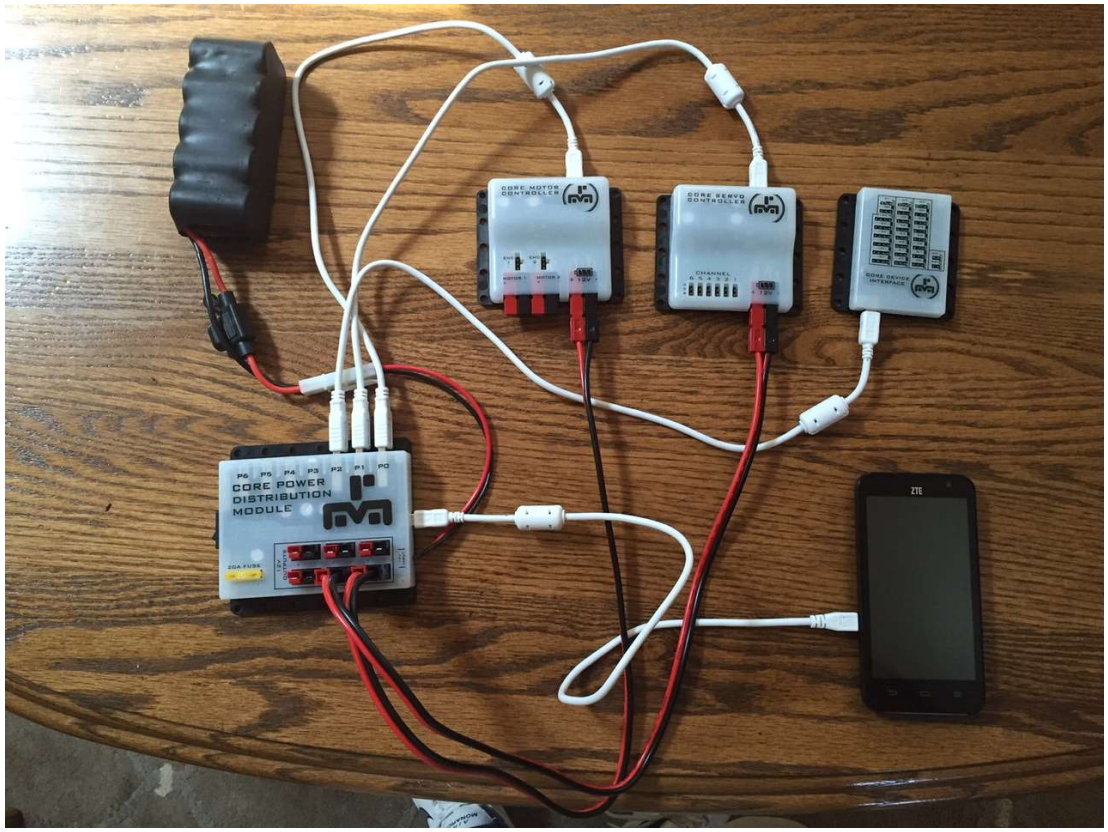
Guide

- Battery is connected using existing quick connect connectors to Core Power distribution module
- Robot Conbtroller cell phone is connected to Core Power Distribution Module
- Core Motor Controller is connected to Power Core Power Distribution module P0-P6 slots
- Core Servo Controller is connected to Power Core Power Distribution module P0-P6 slots
- Core Device Interface is connected to Power Core Power Distribution module P0-P6 slots

FROG FORCE 503 A LEAP AHEAD

Robot Controller Wiring

Power Cables used to distribute power (red & black)



Guide

- Once USB cables are connected, connect red & black power cables from the Core Power Distribution Module to the:
  - Core Motor Controller
  - Core Servo Controller
- The Core Device Interface does not need a separate power connection
- All that remains is to connect the motors to the motor controller and the servos to the servo controller

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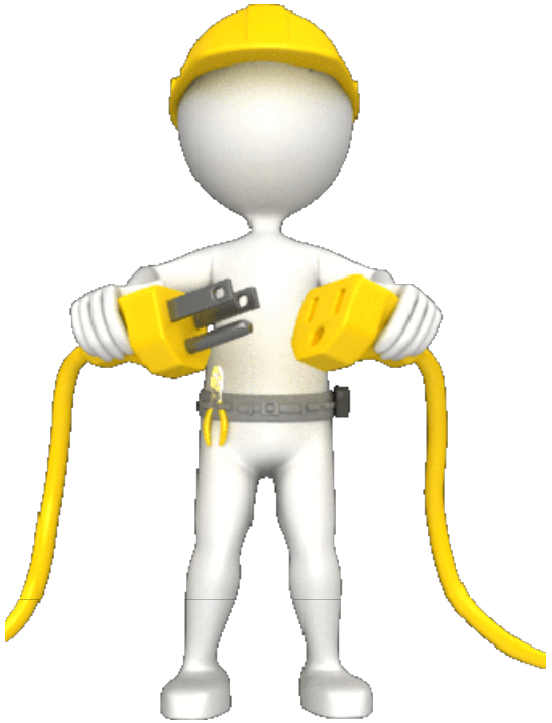
Developer Workstation Set-up
Last 3 Steps !!!!



1. Configuring the USB Devices
2. Assigning Gamepads
3. Pairing the Driver Station to the Robot Controller

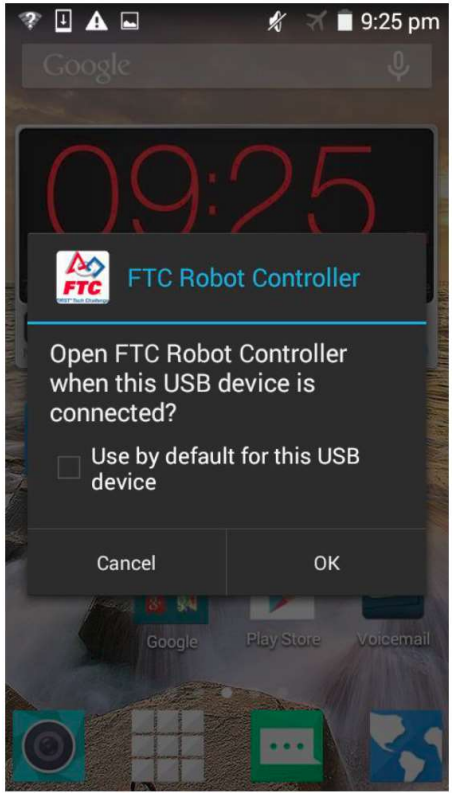
Configuring the USB Devices

1. Turn on the Core Power Distribution Module

Guide

- Make sure the Robot Controller Cell phone is connected via the USB cable to the Core Power Distribution Module
- Connect the robot battery to the Core distribution module
- Turn the Core Power Distribution module on
  - The switch is on the side away from the power cable

Configuring the USB Devices
2. Robot Controller App will auto-start

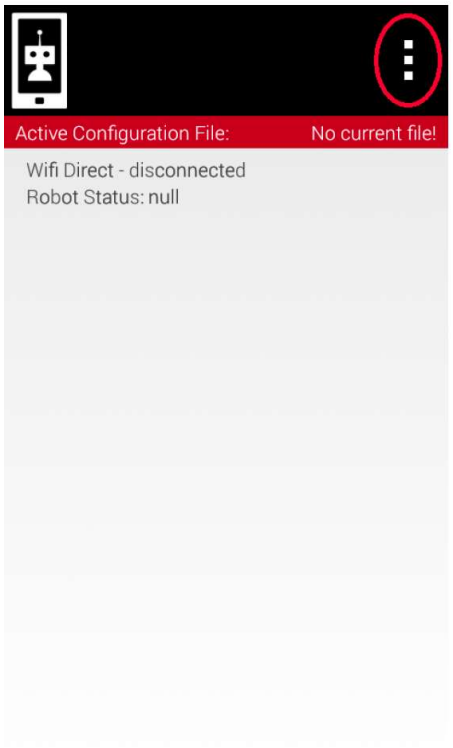


Guide

- When the Core Power Distribution Module is powered on, the Robot Controller application should auto-start
- The home screen will be replaced by the FTC Robot Controller activity page at left
- Check the “Use by default for this USB device”
- Click “OK”

- Note, if this page did not automatically display, do not worry, you will get another chance shortly.

Configuring the USB Devices
3. Build Configuration



Guide

- Touch the Overflow Settings Icon (three dots in the top right corner) to open the menu

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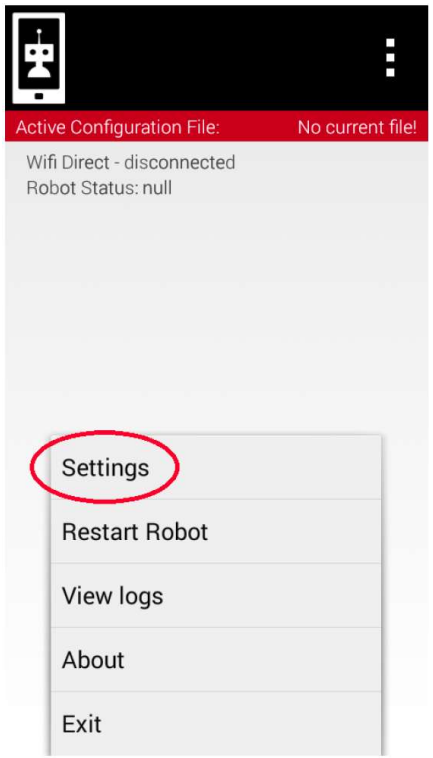
Configuring the USB Devices
4. Build Configuration



Guide

- Select “Settings”

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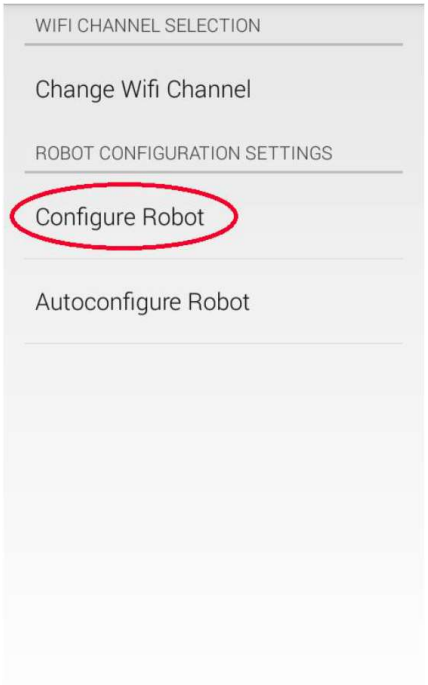
Configuring the USB Devices
5. Build Configuration



Guide

- Select “Configure Robot”

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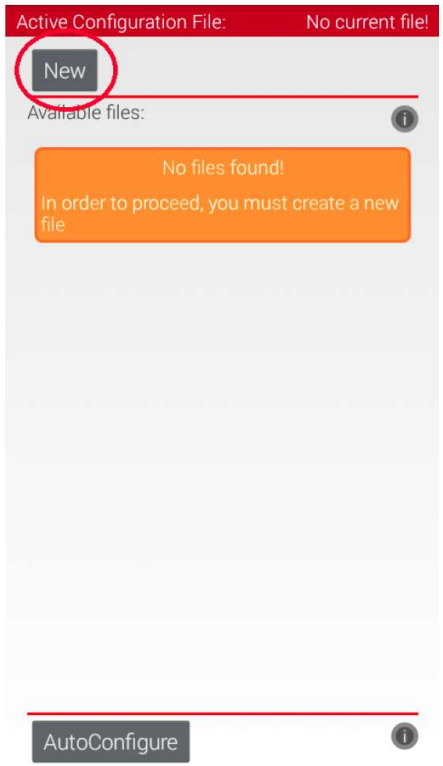
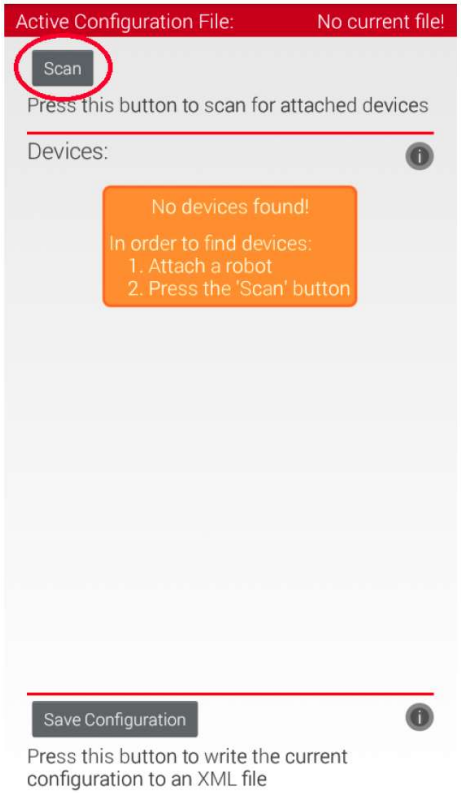
Configuring the USB Devices
6. Build Configuration



Guide

- Select “New”

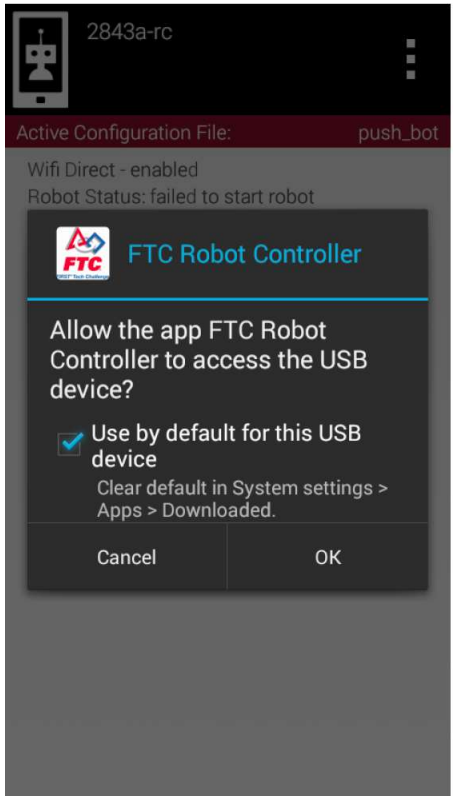
Configuring the USB Devices
7. Build Configuration



Guide

- Select “Scan”

Configuring the USB Devices
8. Build Configuration



Guide

- If this dialog is shown, then check the box to allow the application to access the USB device by default
- Select “OK”

- If this isn’t shown, proceed to the next step

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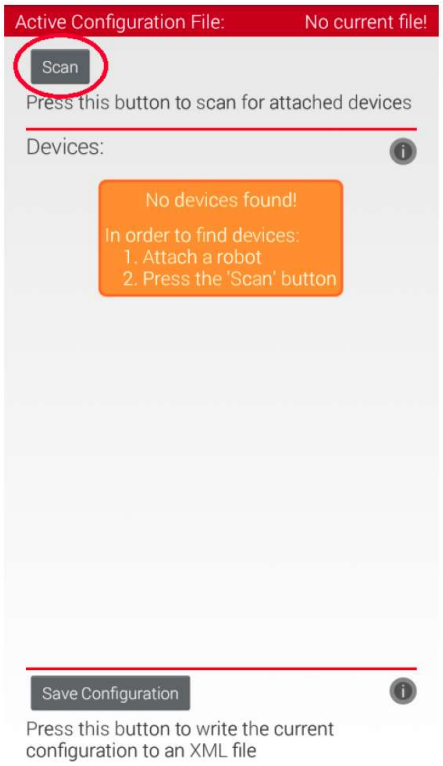
Configuring the USB Devices
9.Scan for Modules



Guide

- Select ‘Scan’
- The application will build a list of connected devices
- Multiple scans may be required until the two motor controllers and one servo controller appear in the list

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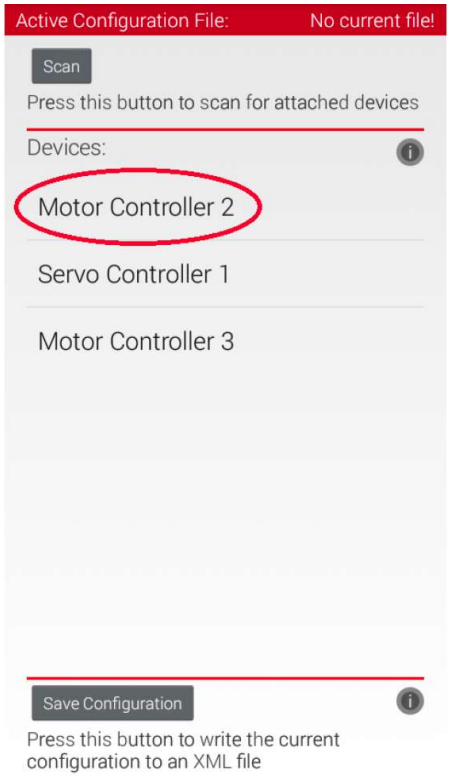
Configuring the USB Devices
10. List of Controllers found



Guide

- Select one of the motor controllers from the list, it doesn't matter which one

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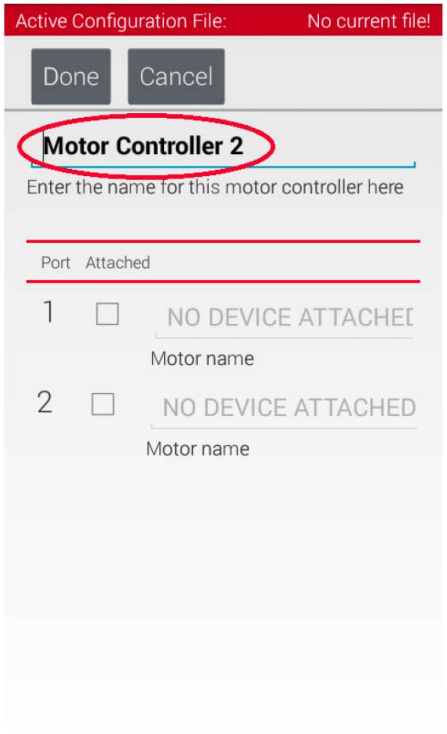
Configuring the USB Devices
11. Rename Controller

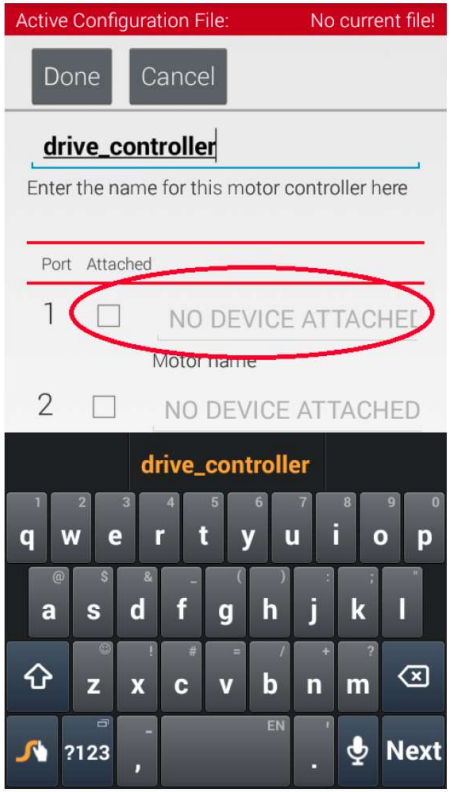


Guide

- Change the name from ‘Motor Controller 2’ to ‘drive_controller’
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller

FROG FORCE 503 A LEAP AHEAD

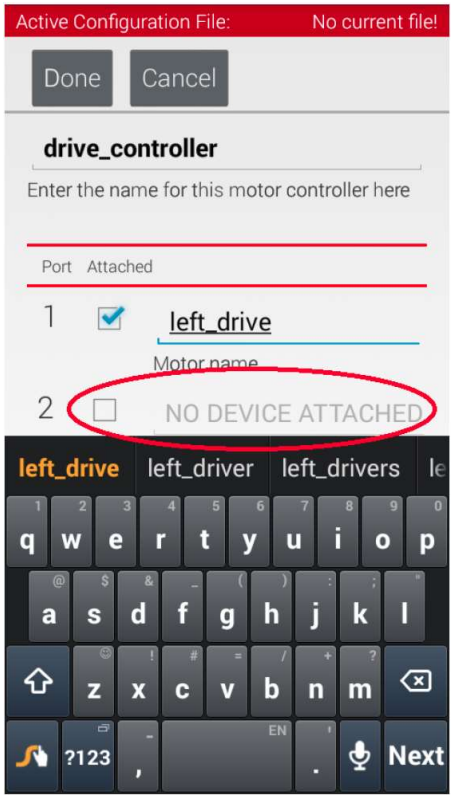
Configuring the USB Devices
12. Name Motors



Guide

- Check the box next to 1.
- Tap on the “NO DEVICE ATTACHED”
- Change “NO DEVICE ATTACHED TO “left_drive”
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller
- **Note this is the name that the Java program uses to control this motor. The name must match exactly to what is in the program or the motor will not work.**

Configuring the USB Devices
13. Name Motors



Guide

- Check the box next to 2.
- Tap on the “NO DEVICE ATTACHED”
- Change “NO DEVICE ATTACHED TO “right_drive”
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller
- **Note this is the name that the Java program uses to control this motor. The name must match exactly to what is in the program or the motor will not work.**

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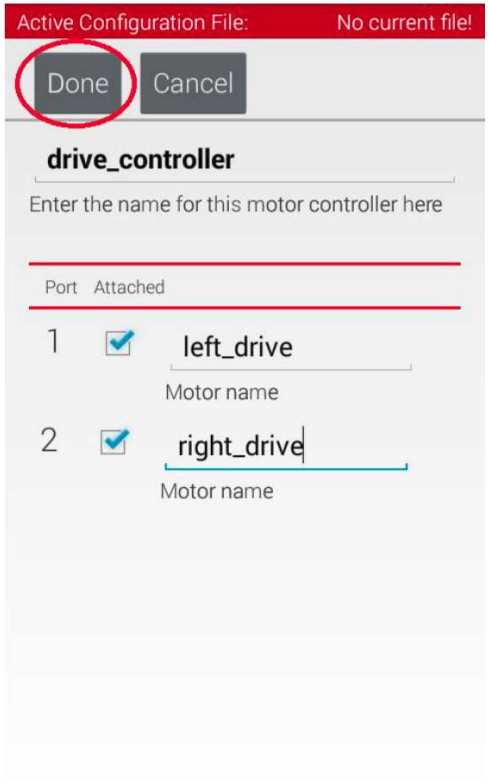
Configuring the USB Devices
14. Both Motors Renamed



Guide

- The screen should appear as displayed on the left.
- Click “Done”

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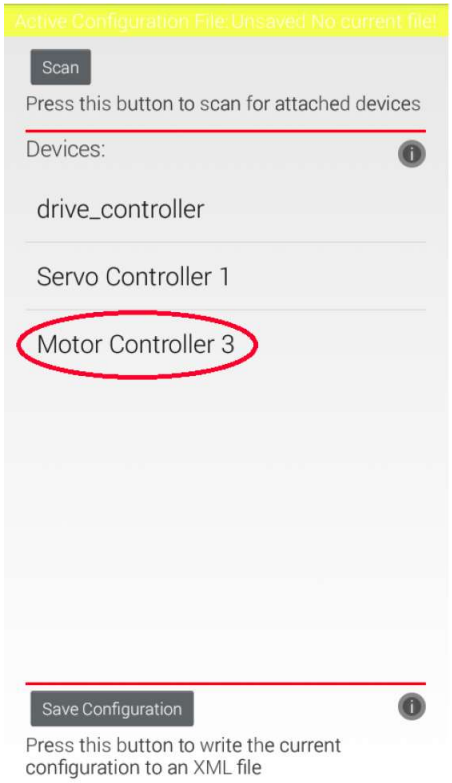
Configuring the USB Devices
15. Select Other Motor Controller

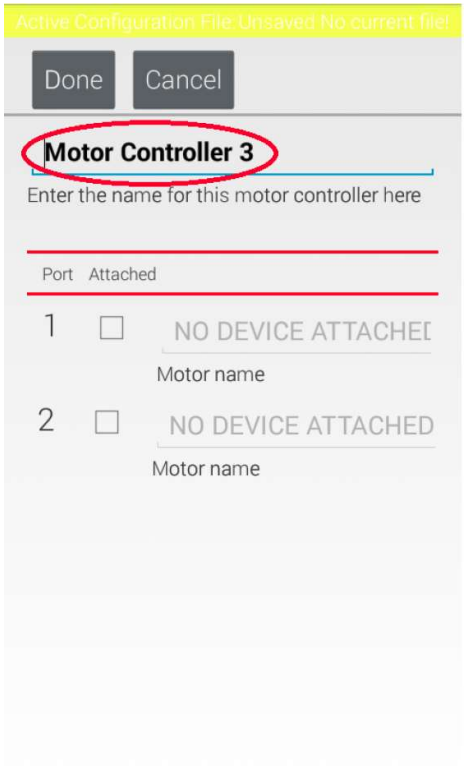


Guide

- Select the other motor controller

FROG FORCE 503 A LEAP AHEAD

Configuring the USB Devices
16. Rename Controller



Guide

- Tap the “Motor Controller 3”
- Change “NO DEVICE ATTACHED TO “left_arm”
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller
- **Note this is the name that the Java program uses to control this motor. The name must match exactly to what is in the program or the motor will not work.**
- Select “Done”

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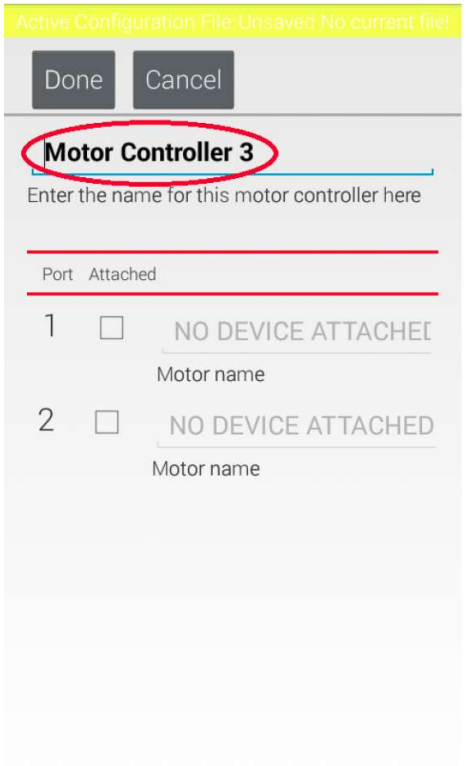
Configuring the USB Devices
17. Rename Motor



Guide

- Tap the “Motor Controller 3”
- Change “NO DEVICE ATTACHED TO “left_arm”
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller
- **Note this is the name that the Java program uses to control this motor. The name must match exactly to what is in the program or the motor will not work.**
- Select “Done”

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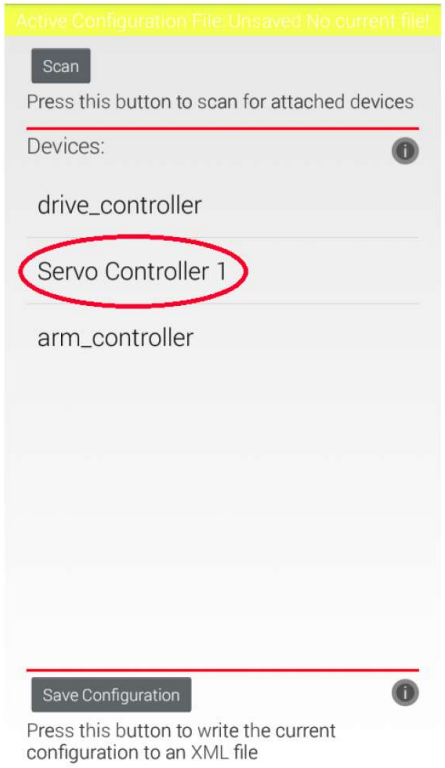
Configuring the USB Devices
18.Select Servo Controller



Guide

- Select “Servo Controller 1”

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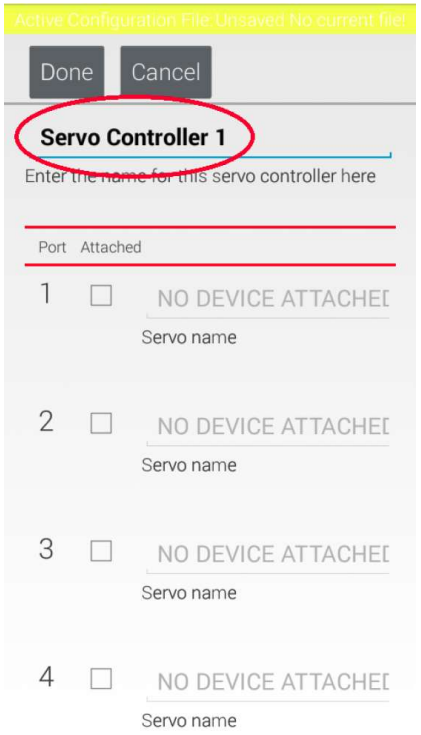
Configuring the USB Devices
19. Rename Servo Controller



Guide

- Tap on “Server Controller 1”
- Change the name from “Servo Controller 1” to “servo_controller”

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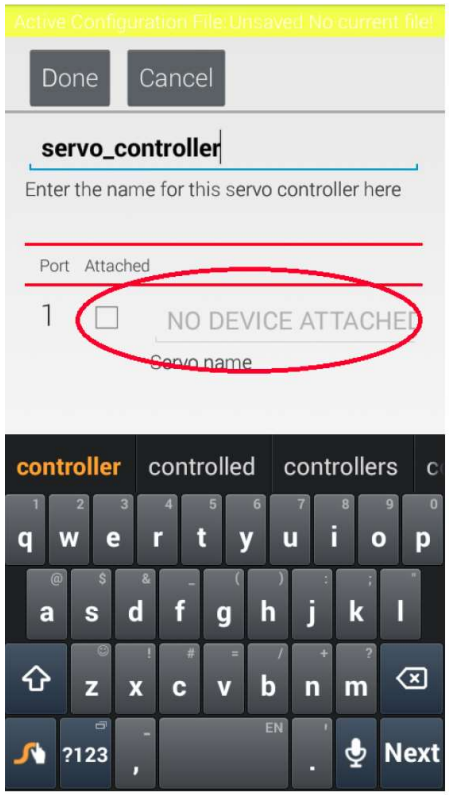
Configuring the USB Devices
20. Rename Servo device



Guide

- Check the box next to 1.
- Tap on the “NO DEVICE ATTACHED”
- Change “NO DEVICE ATTACHED TO “left_hand”
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller
- Check the box next to 2.
- Tap on the “NO DEVICE ATTACHED”
- Change “NO DEVICE ATTACHED TO “right_hand”
  - Note: Long holding the ‘f’ character will insert the underscore between drive and controller

- **Note this is the name that the Java program uses to control this motor. The name must match exactly to what is in the program or the motor will not work.**

FROG FORCE 503 A LEAP AHEAD

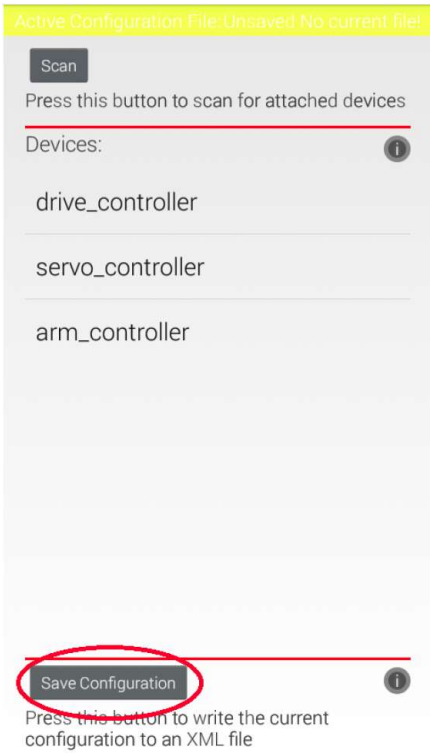
Configuring the USB Devices
21.Done with naming

Guide

- Click “Done”

FROG FORCE 503 A LEAP AHEAD

Configuring the USB Devices
21.Save the Configuration



Guide

- Click “Save Configuration”

- **Note all the devices now have new names.**

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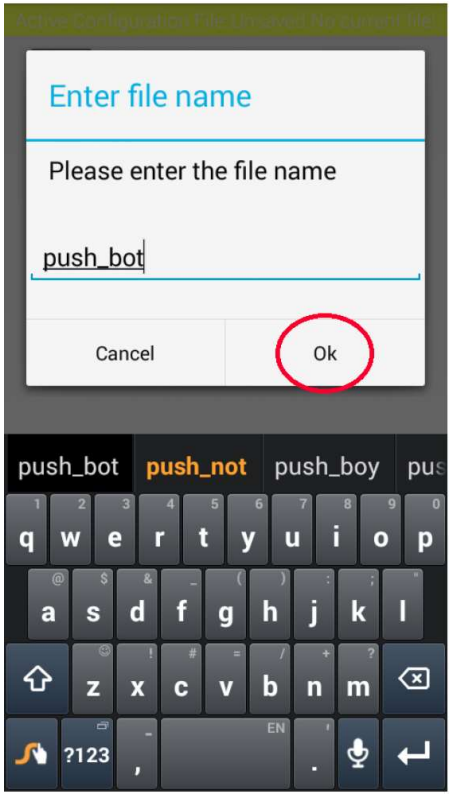
Configuring the USB Devices
22. Enter Configuration File Name



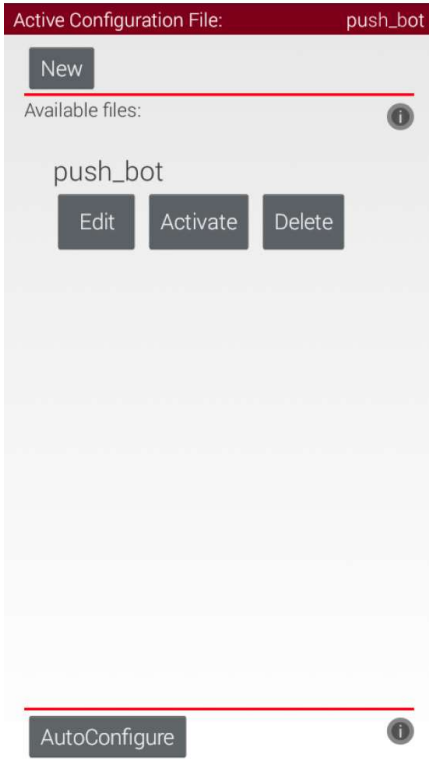
Guide

- A pop-up similar to the page on the left will be displayed.
- Enter “push_bot”
- Click “Ok”

- **Note your configuration has been save to the file names push_bot**

FROG FORCE 503 A LEAP AHEAD

Configuring the USB Devices
23. Configuration Complete



Guide

- Use the phone's back button to return to the page shown on the left
- **Note that you configuration file named "push_bot" is now displayed as an available file**

Congratulations you have a working robot controller!!!

FROG FORCE 503 A LEAP AHEAD

Assigning Gamepads
1.Gamepads wired to Driver Station

Guide

- Two Logitech F310 gamepads will be connected to the Driver Station Cell phone.
- These gamepads will be used by students to control the robot during the competition.
- The driver station app must configure the gamepads before they can be used

Assigning Gamepads
2. Identify Driver 1 Gamepad

Guide

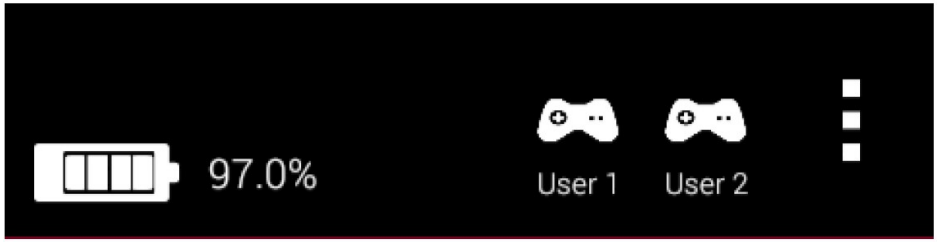
- Set the switch on the bottom of both gamepads to the “X” position
- Select the gamepad that will be used by Driver 1.
- Push the **START** key on the gamepad while simultaneously pressing the **A** button

Assigning Gamepads
3. Identify Driver 2 Gamepad

Guide

- Select the other gamepad that will be used by driver 2.
- Push the **START** key on the gamepad while simultaneously pressing the **B** button

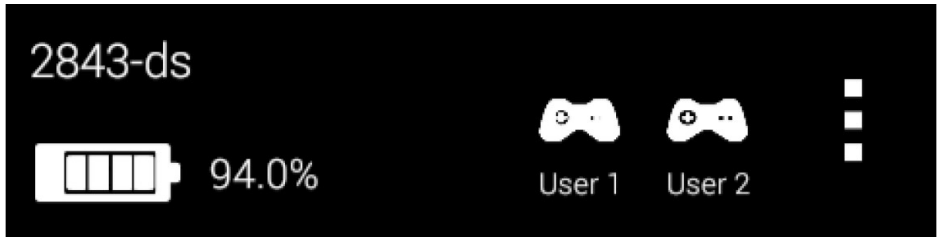
Assigning Gamepads
4. Driver Station Indicators



Guide

- Observe the Driver station controller.
- The icons in the upper right hand corner represent the two gamepad controllers.
- These icons indicate that neither gamepad is assigned

Assigning Gamepads
5. Driver Station Active Icons

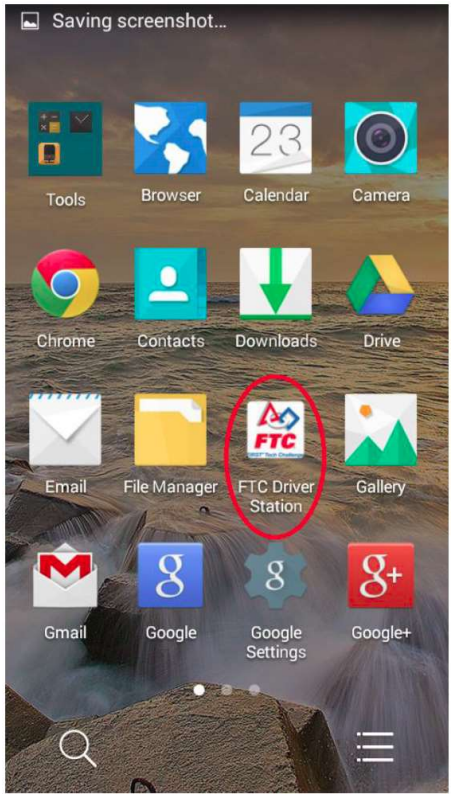


Guide

- When the gamepad for driver 1 is active the icon will change to show the gamepad is active.

Pairing the Driver Station to the Robot Controller

1. On the Driver Station phone

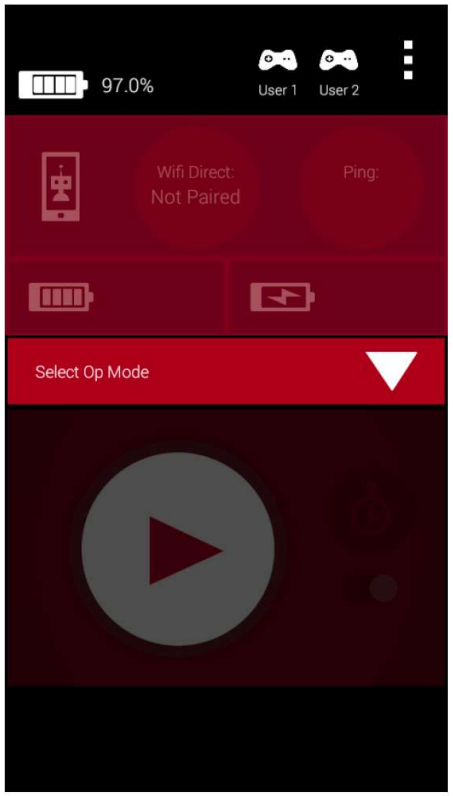


Guide

- The driver station must first “pair” to the Robot controller to provide communications between the robot and the gamepads
- Power on both cell phones
- Start the FTC Driver Station App on the Driver Station Cell phone

Pairing the Driver Station to the Robot Controller

2. On the Driver Station phone

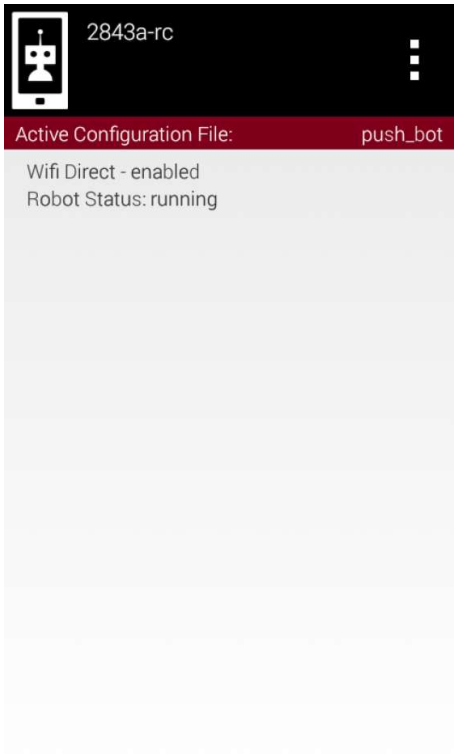


Guide

- Once the app is started the screen will change similar to the one shown on the left

Pairing the Driver Station to the Robot Controller

3. On the Robot Controller

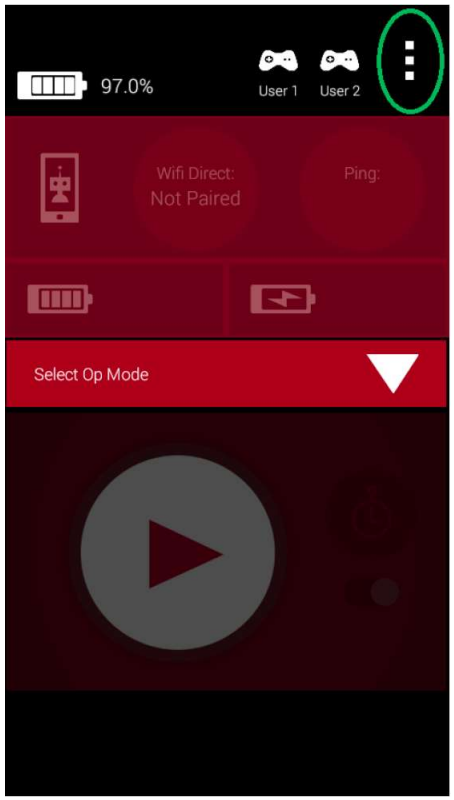


Guide

- Make sure that the Robot Controller app is running on the Robot Controller cell phone
- The screen should be similar to the one shown on the left

Pairing the Driver Station to the Robot Controller

4. On the Driver Station phone

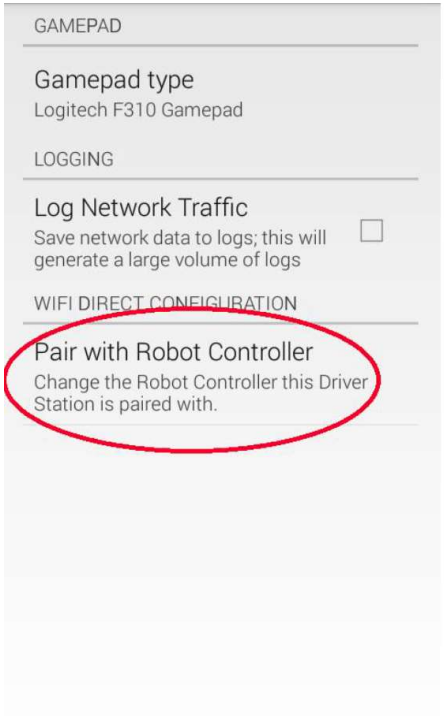


Guide

- On the Driver Station app, touch the three vertical dots on the upper right hand corner
- Select “Settings” from the pop-up menu

Pairing the Driver Station to the Robot Controller

5. On the Driver Station phone

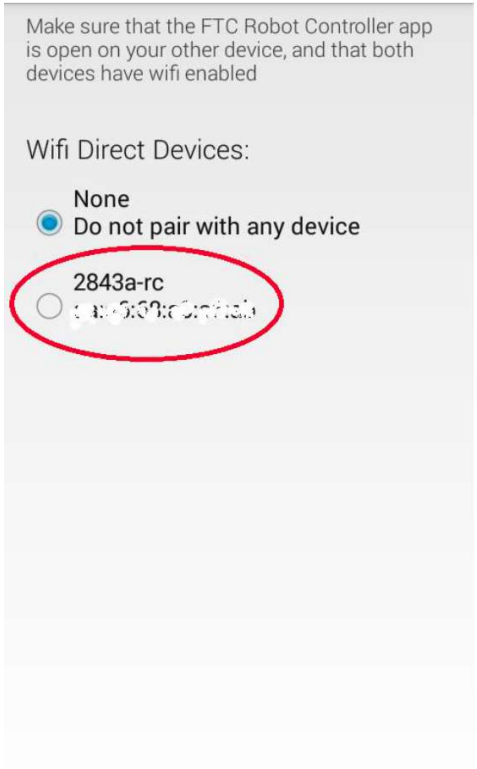


Guide

- Press the “pair with Robot Controller” to start the pairing process.

Pairing the Driver Station to the Robot Controller

6. On the Driver Station phone



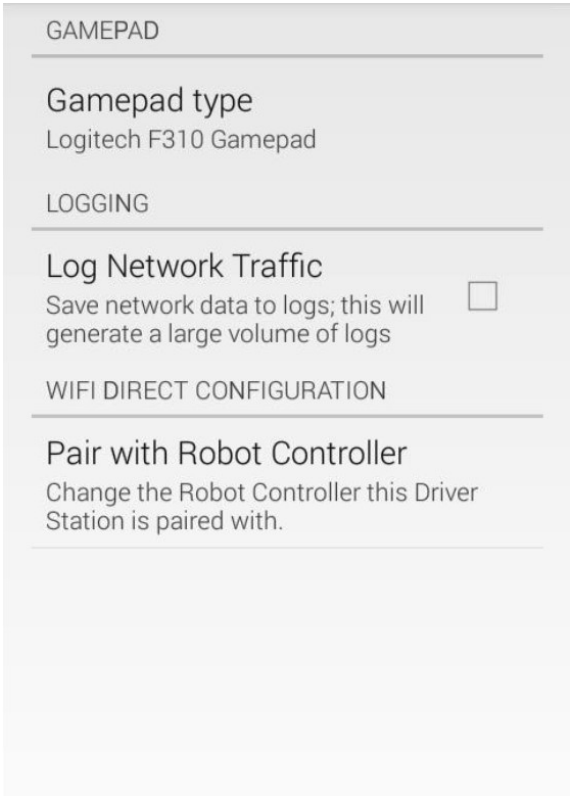
Guide

- After the previous step, the Driver station will display the screen shown on the left.
- Select the Robot controller device.
  - Hint-It should have your team name in it

FROG FORCE 503 A LEAP AHEAD

Pairing the Driver Station to the Robot Controller

7. On the Driver Station phone

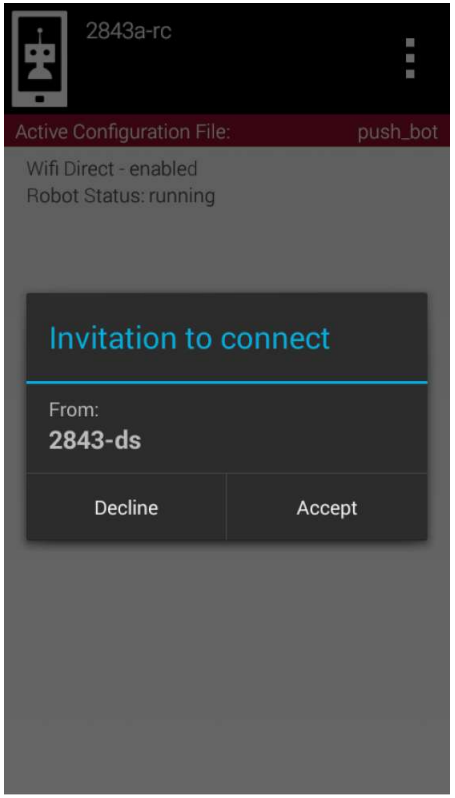


Guide

- Use the back button to send a connection request to the Robot Controller.
- Screen on the Driver Station will look similar to the one shown on the left

Pairing the Driver Station to the Robot Controller

8. On the Robot Controller

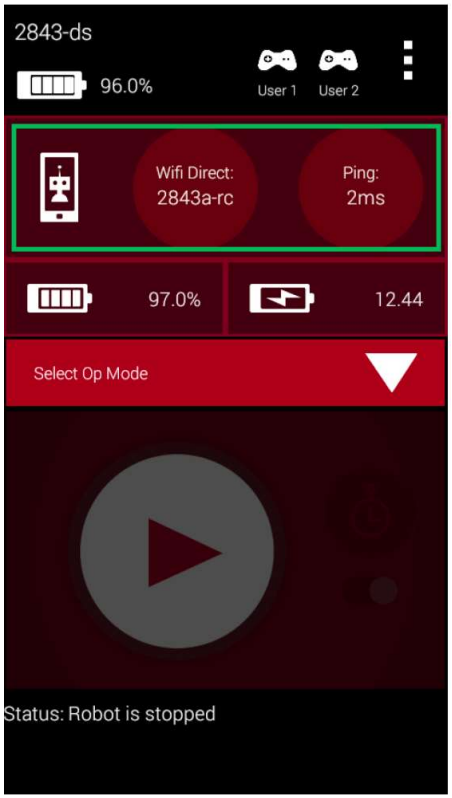


Guide

- If this is the first pairing attempt, the Robot Controller device might display a prompt asking it is OK to allow an Android device to establish a Wi-Fi Direct connection.
- Select “Accept”

Pairing the Driver Station to the Robot Controller

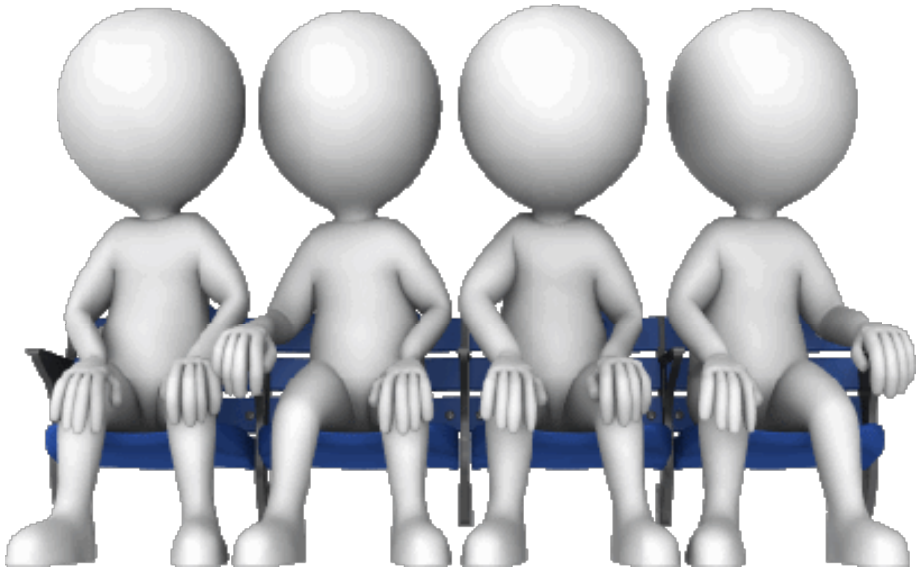
9. On the Driver Station phone



Guide

- Note that some of the controls on the display have changed indicating that the Driver Station is now connected to a Robot Controller. (see green rectangle)

Congratulations you have a working robot system!!!



Congratulations you are ready to build your robot!!!!!!

Questions?

What we are doing today will transform tomorrow's culture.

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