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Control More Than One Robot

How to control more than one robot in a single EZ-Builder project. This tutorial uses Revolution robots that depend on the Auto Position control, but the similar approach can be used for any robot styles.

Last Updated: 9/4/2018

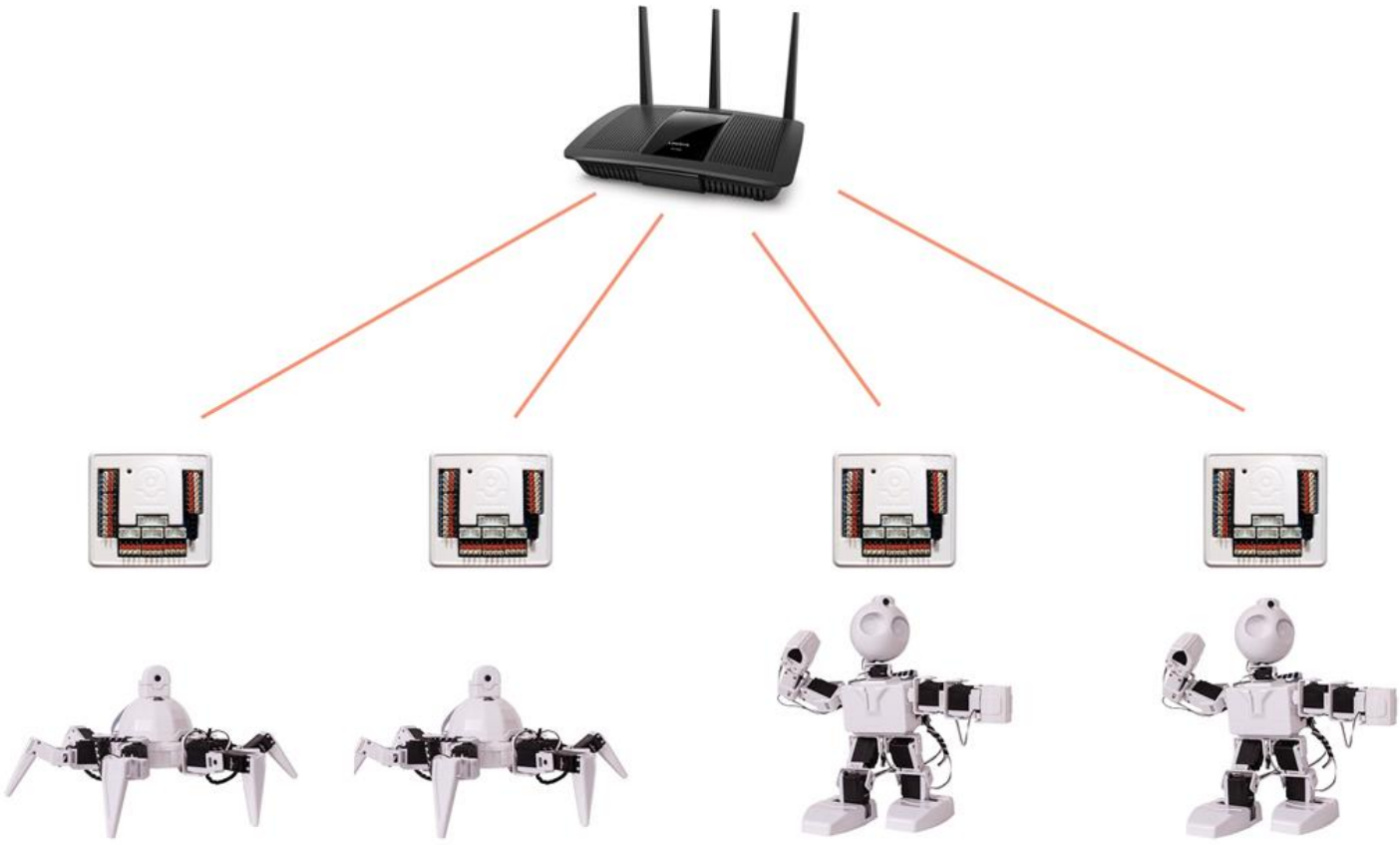
Configure EZ-B's

This tutorial will help you achieve something similar to how ez-robot created this video...

*Note: This tutorial uses the EZ-B v4.x/2 (Comm 2). Although the process can be achieved with the earlier Comm 1, there will be differences. It is recommended to upgrade to the EZ-B v4/2 Comm Upgrade or replace entirely with a EZ-B v4/2 Wi-Fi Robot Controller to utilize these advanced features.

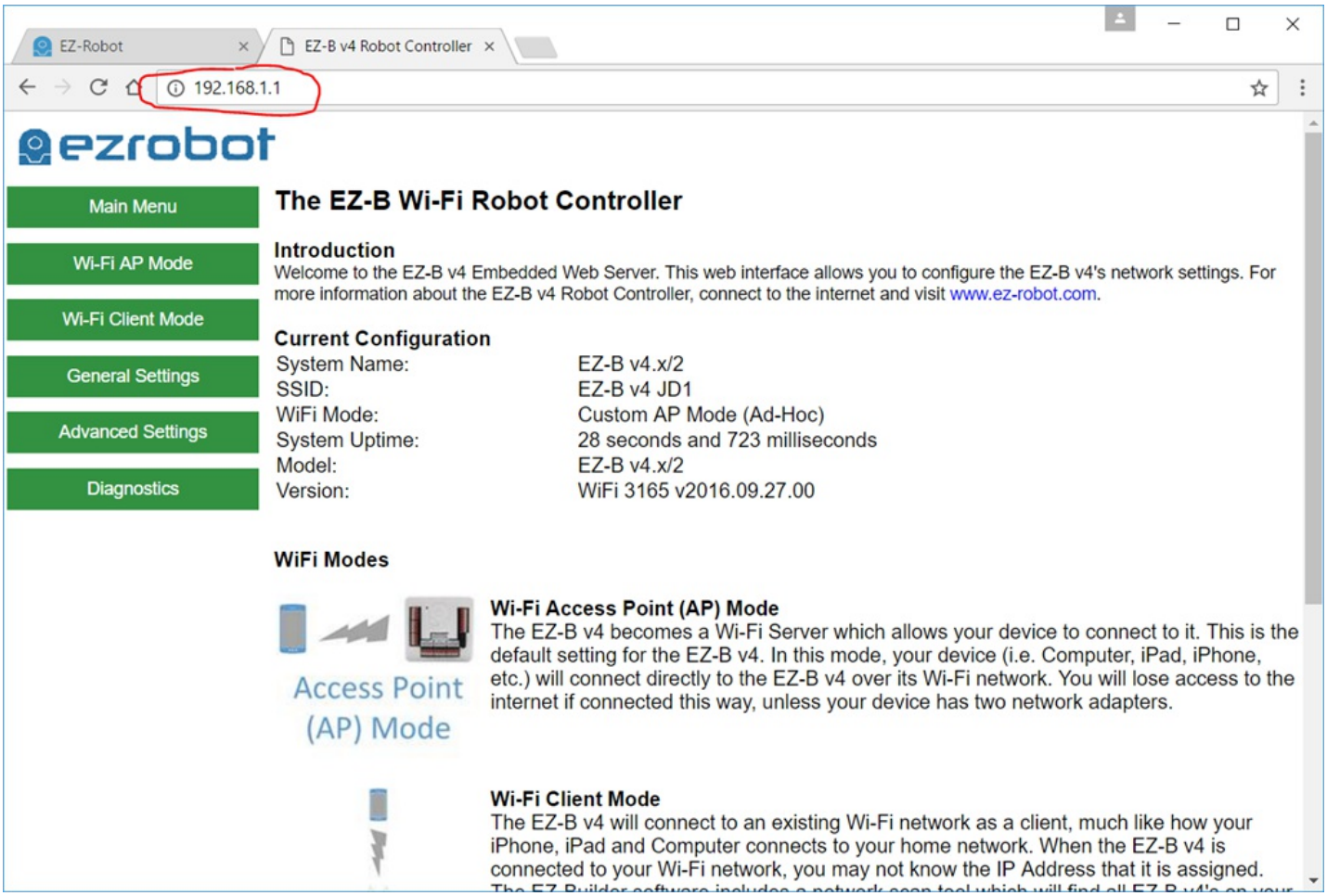
WiFi Mode The EZ-B of each robot is most likely in default AP mode. That means "Access Point", which you already have learned in the EZ-B Tutorials of the learn section. The AP mode limits the connection between PC and single EZ-B, only. In this step, each EZ-B will need to be configured to connect to a WiFi router in Client Mode.

In this example, we will use 2 Six's and 2 JD's...

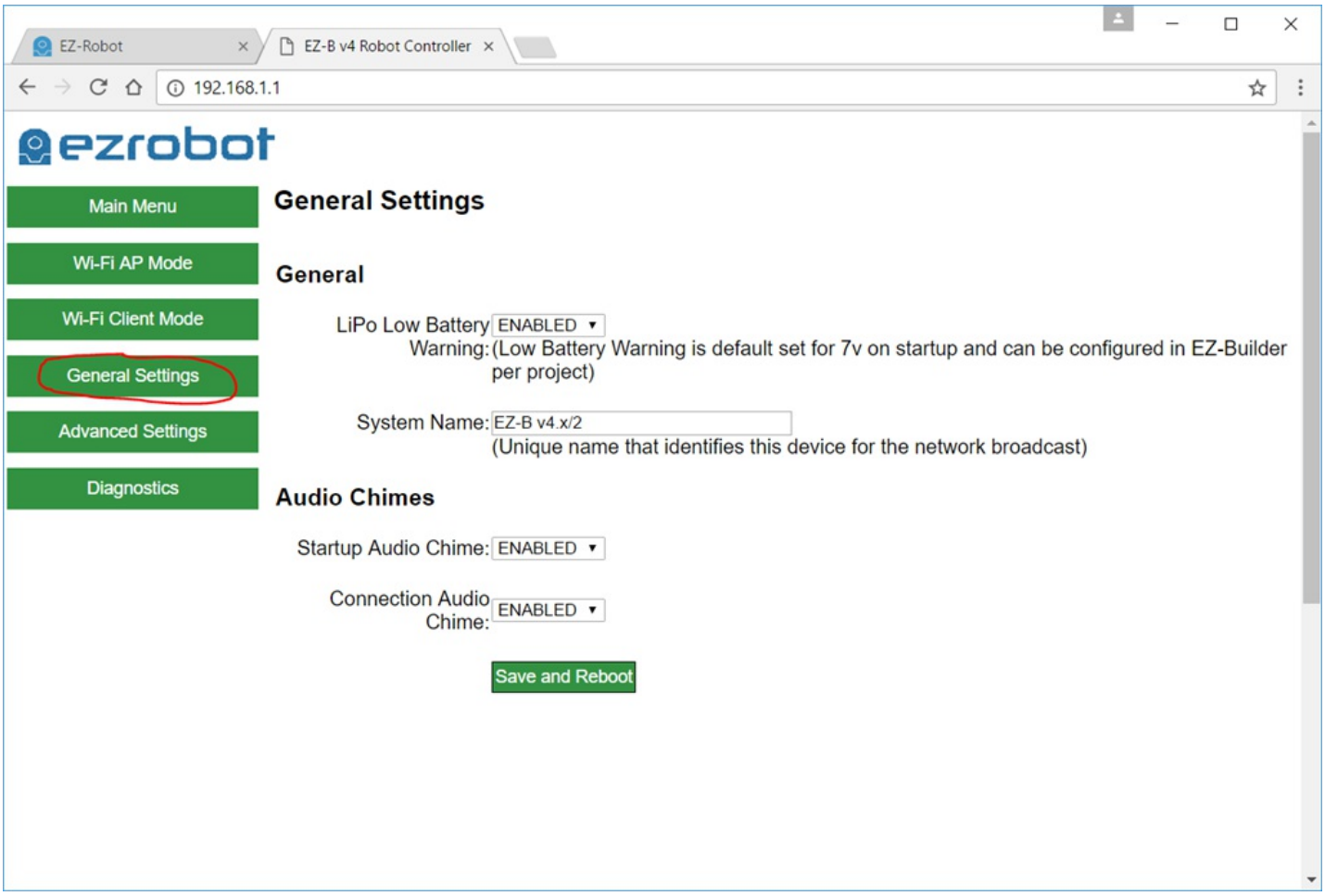


Web Config What you will need is a configured WiFi router. Keep note of the WiFi SSID Network name and the password. These two pieces of information will be entered into each EZ-B's web configuration tool.

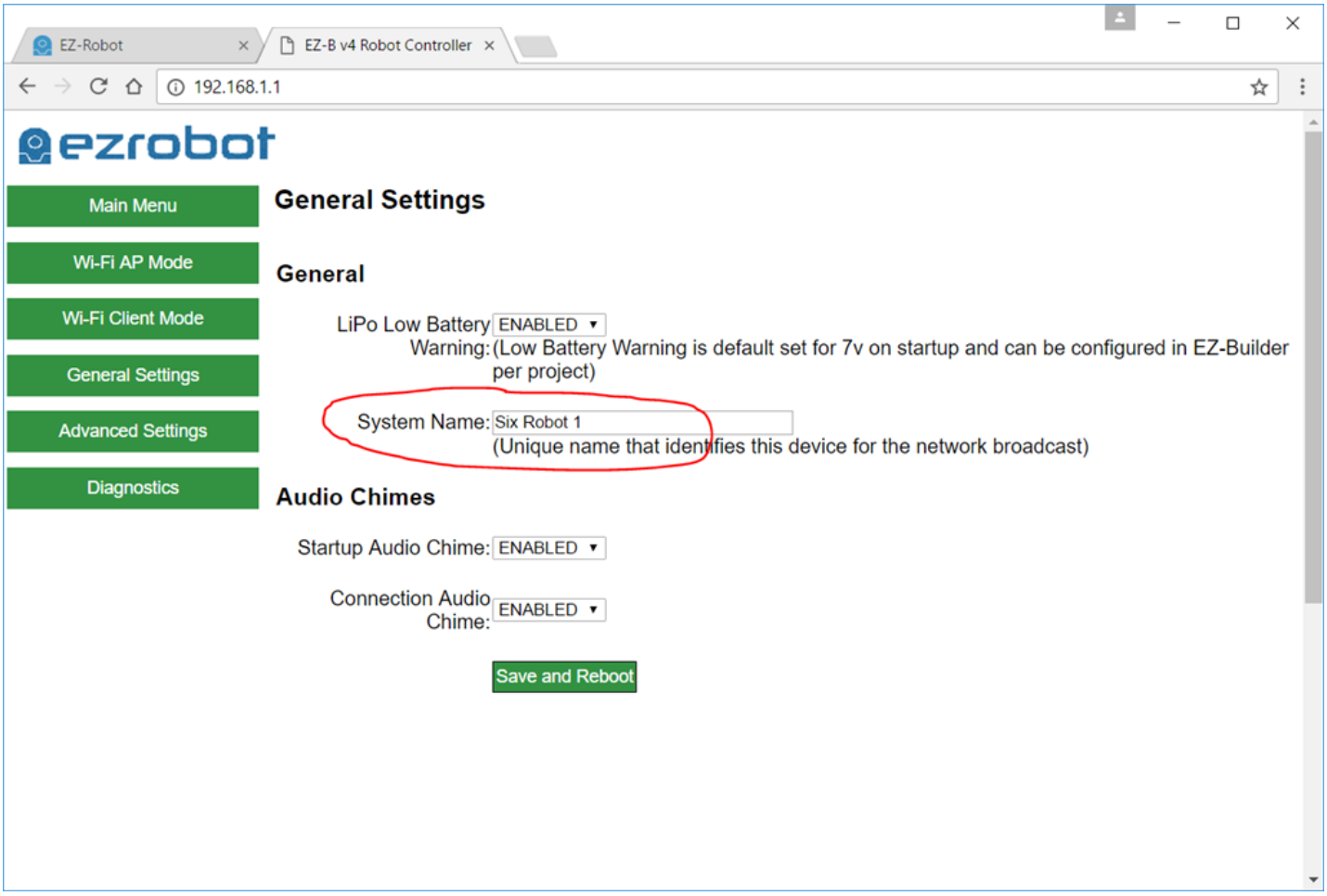
Step 1 Connect to the first robot's EZ-B WiFi network. Visit the default configuration in your web browser: http://192.168.1.1



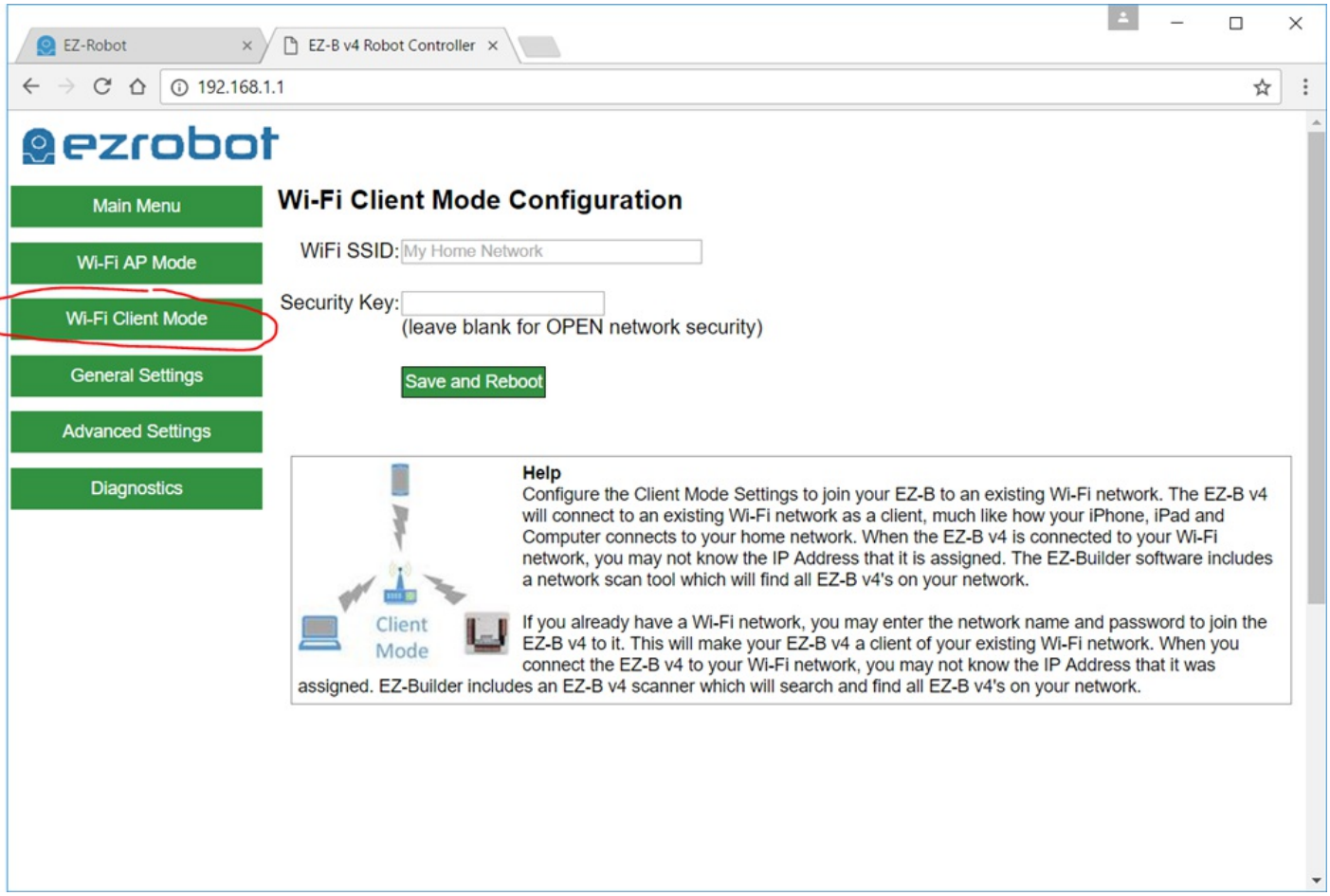
Step 2 We are going to give this EZ-B a specific System Name, which will be helpful to identify what robot it is during the Client Scan Mode later on in this tutorial. Press the General Settings menu option



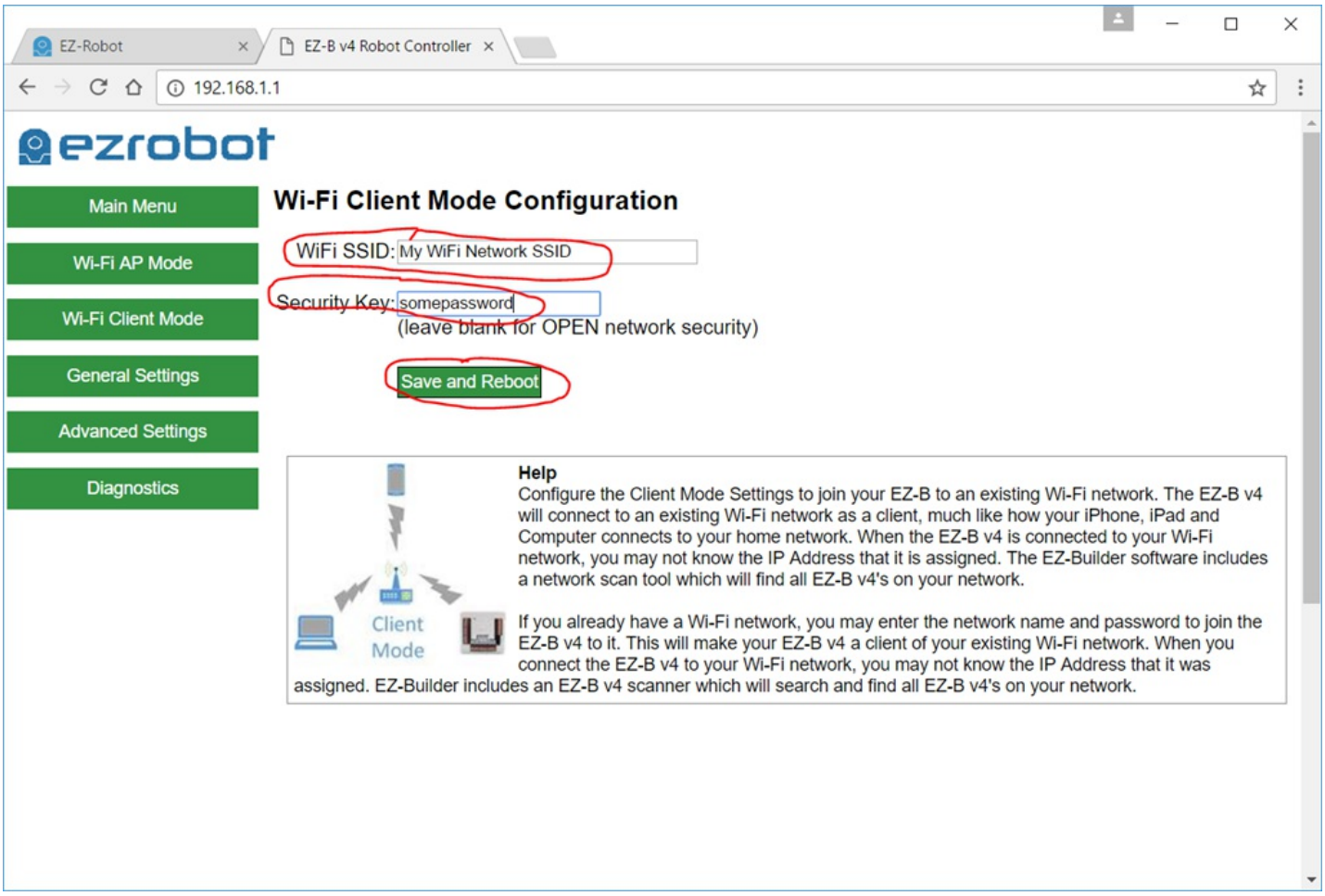
Step 3 Give this robot a specific System Name that defines what robot it is. In this case, I'm assigning this robot the System Name of Six Robot 1. This name will be broadcasted and used during the Client Scan Mode within EZ-Builder later in this tutorial. Press SAVE AND REBOOT



Step 4 The EZ-B will have rebooted. You may need to reconnect to the WiFi, although in most cases it happens so quickly that your PC will still maintain a connection. Either way, we wish to now visit the Wi-Fi Client Mode menu item.



Step 5 Enter the name of your router's WiFi network SSID and its password. Save the settings. The EZ-B will reboot and connect to the WiFi router SSID with the credentials entered. The EZ-B will speak and verbally let you know if it was able to connect. If the EZ-B gives a verbal error message, then manually pressing the RESET button on the EZ-B will be necessary and repeating these steps, but entering the correct SSID and Password of your router next time.

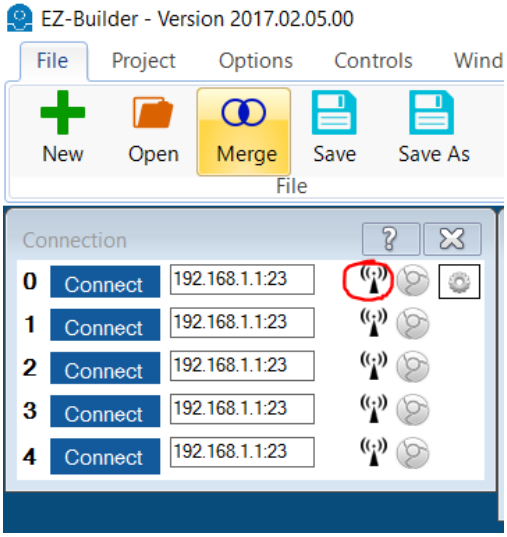


Almost There! Now that you have each robot connected to the WiFi network, you can move to the next step of this tutorial.

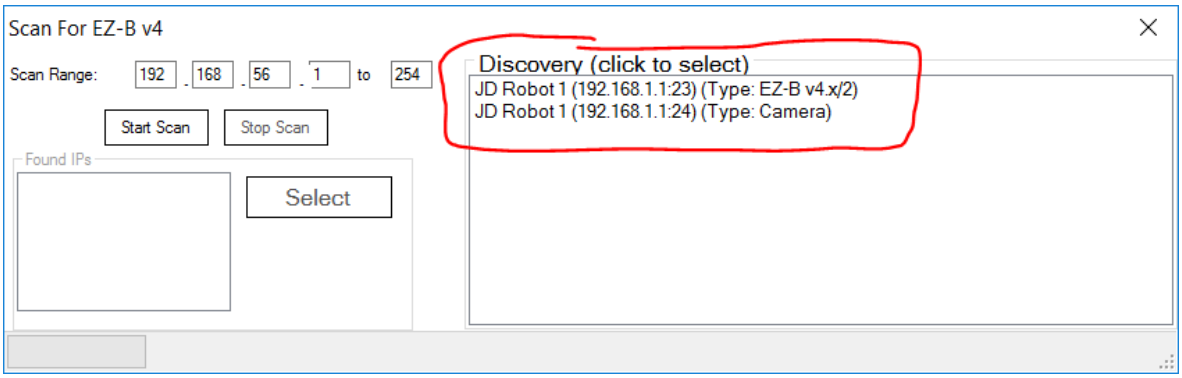
Connecting EZ-Builder

EZ-Builder will now need to know the IP Address of each EZ-B of the robots connected to the WiFi network. Ensure your laptop is connected to the WiFi network as well.

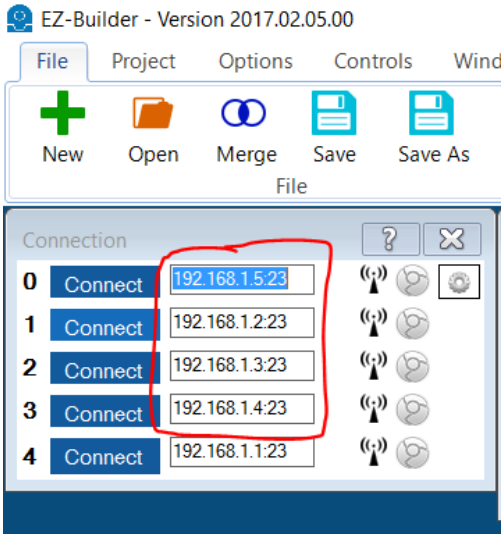
Step 1 Load EZ-Builder. Locate the Client Scan Tool icon in the Connection Control. Press the icon for the first EZ-B index.



Step 2 Each EZ-B will be displayed as the broadcasts are received. The EZ-B's will broadcast their system name, which was entered for each robot in the previous step of this tutorial. This helps you identify all of the robots.

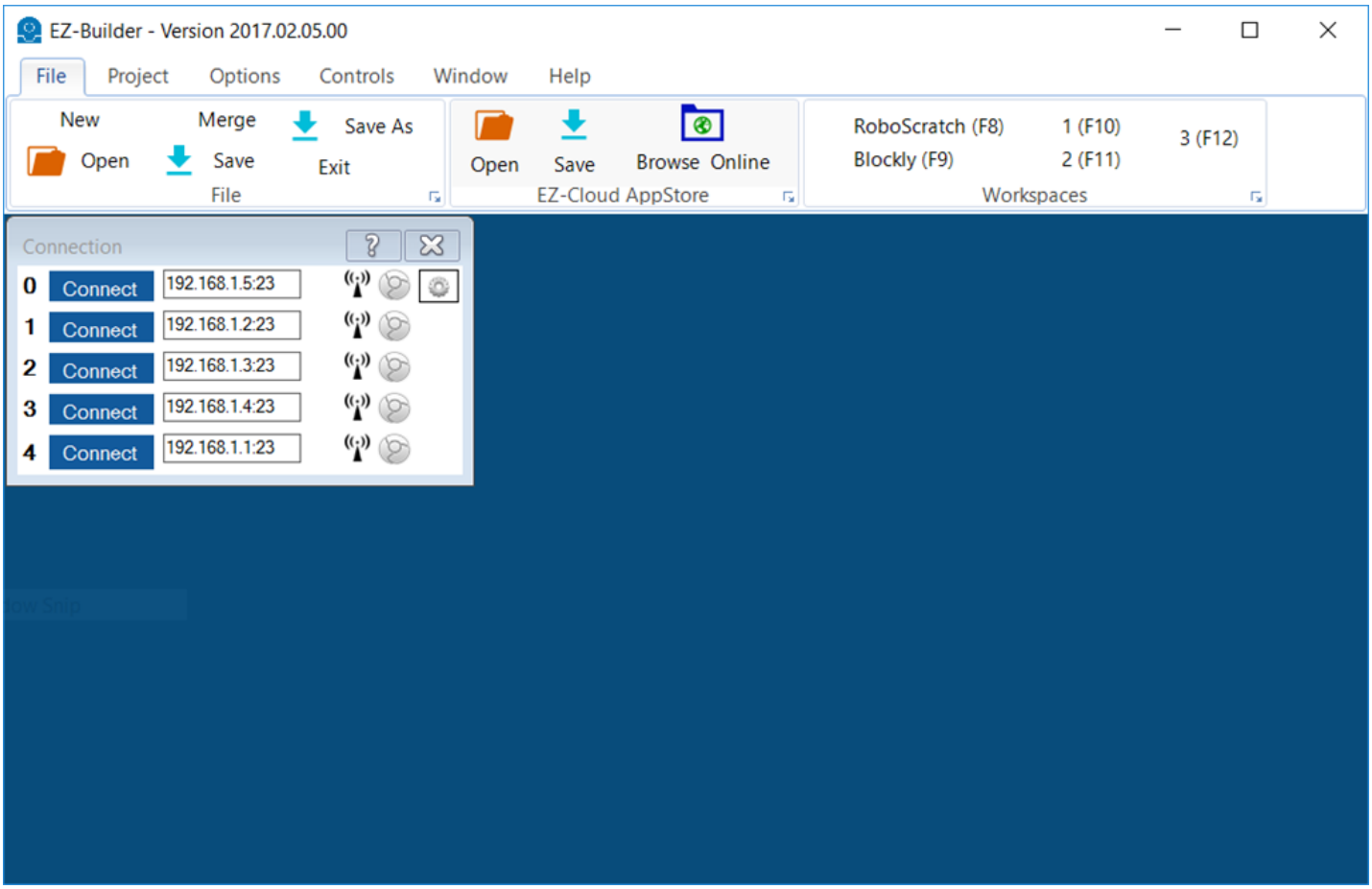


Repeat For Each Robot Repeat this process for each robot. We will add the SIX robots to index 0 and 1, and JD robots to index 2 and 3. When complete, each index of your connection control for 0, 1, 2 & 3 will have unique IP addresses.


EZ-Builder - Version 2017.02.05.00
File
Project
Options
Controls
Wind
New
Open
Merge
Save
Save As
File
Connection
0
Connect
192.168.1.5:23
1
Connect
192.168.1.2:23
2
Connect
192.168.1.3:23
3
Connect
192.168.1.4:23
4
Connect
192.168.1.1:23

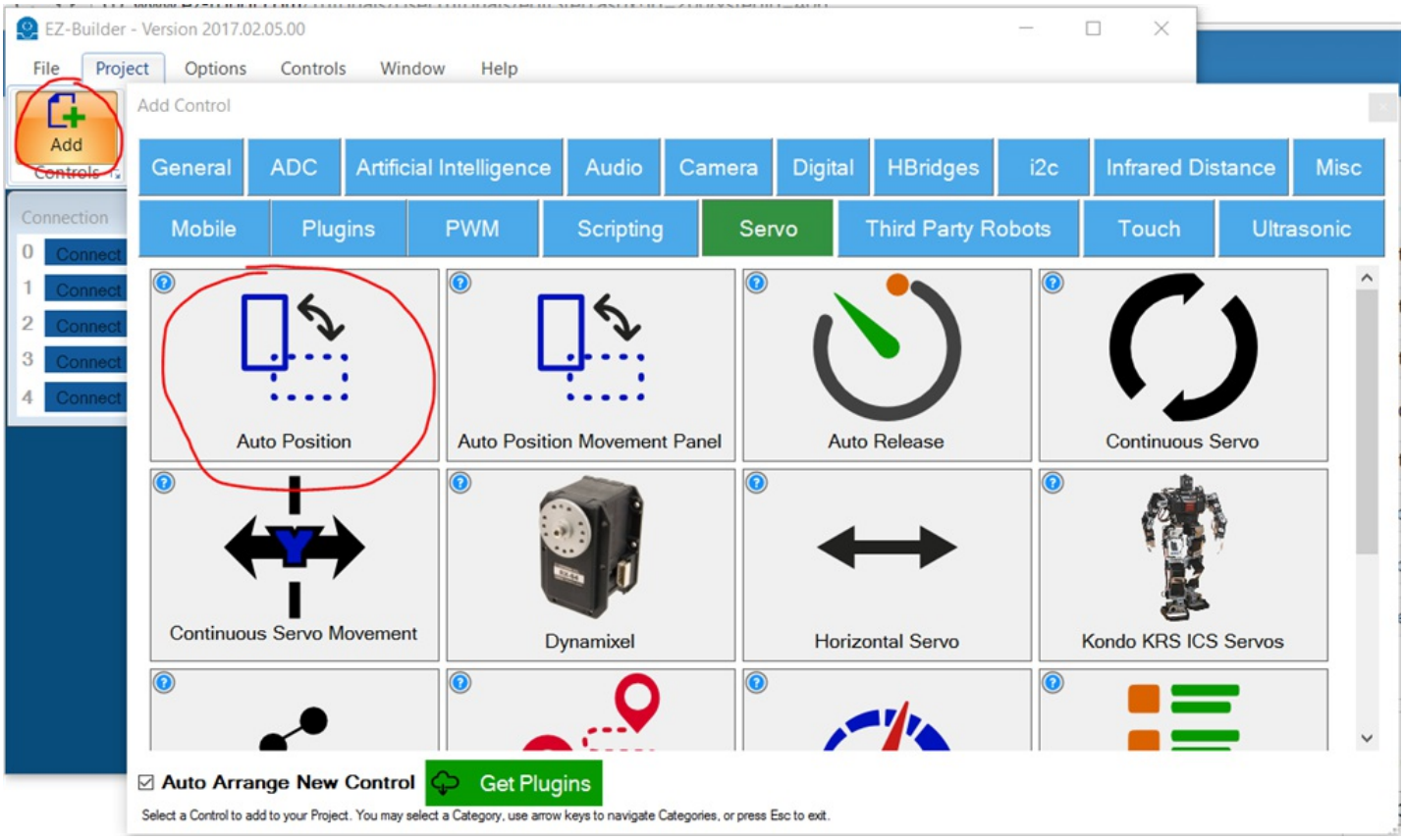
Auto Positions

The E-Builder project should be empty, except for the connection control, which has IP addresses entered for each robot.

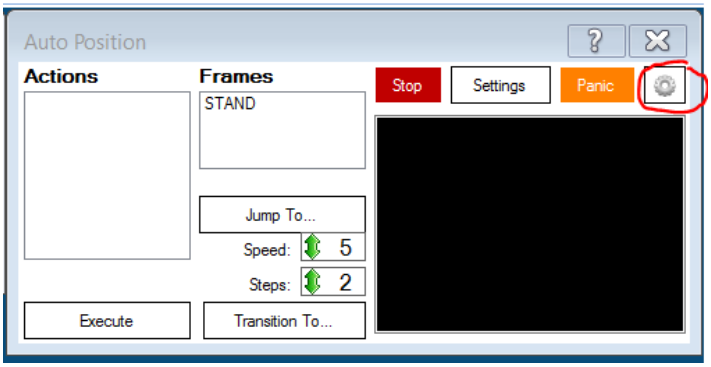


We will now add an auto position for each robot. Remember, we connected... EZ-B Index 0 -> Six EZ-B Index 1 -> Six EZ-B Index 2 -> JD EZ-B Index 3 -> JD

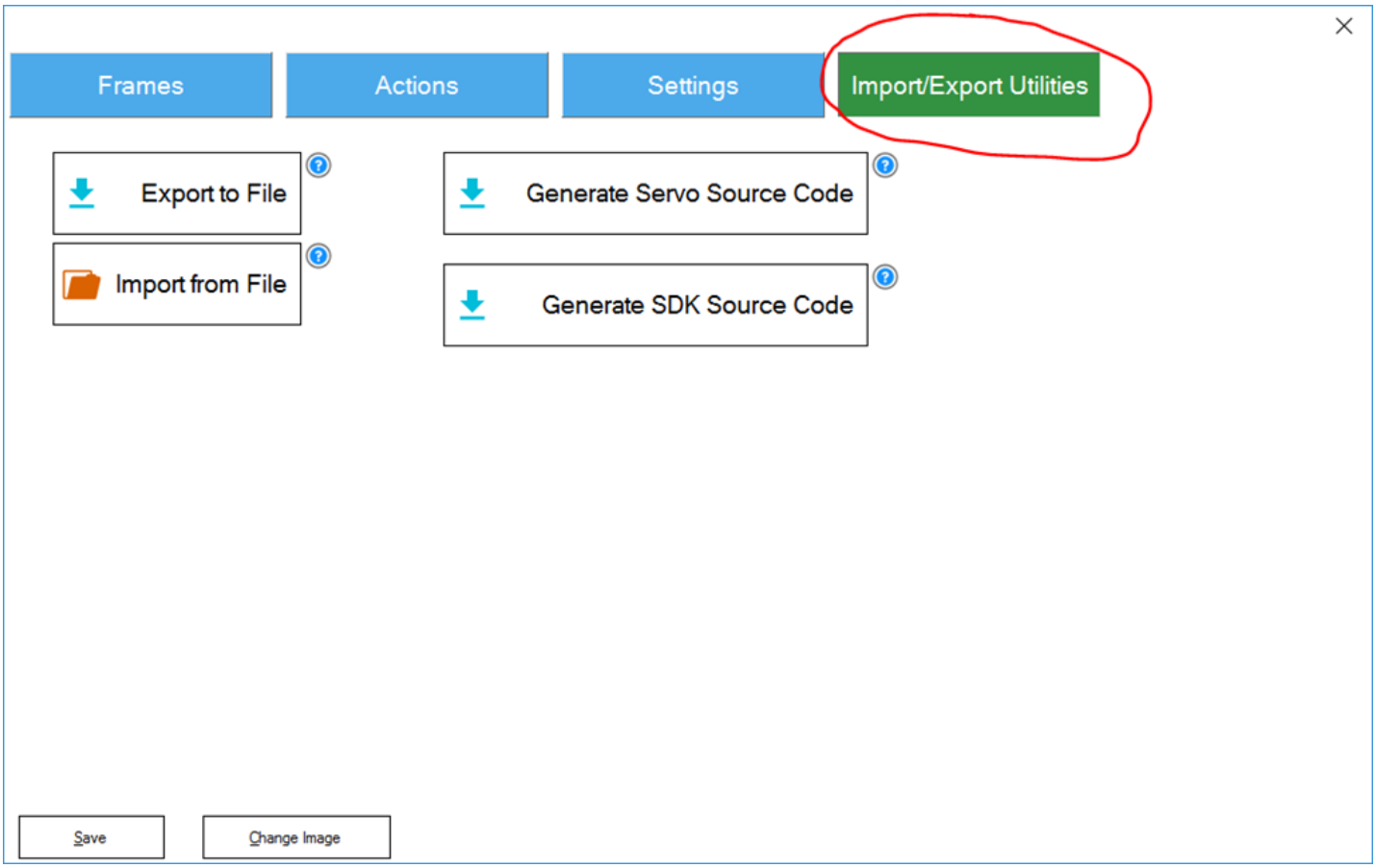
Step 1 Add an Auto Position for the first SIX robot. Press Add Control->Servos->Auto Position



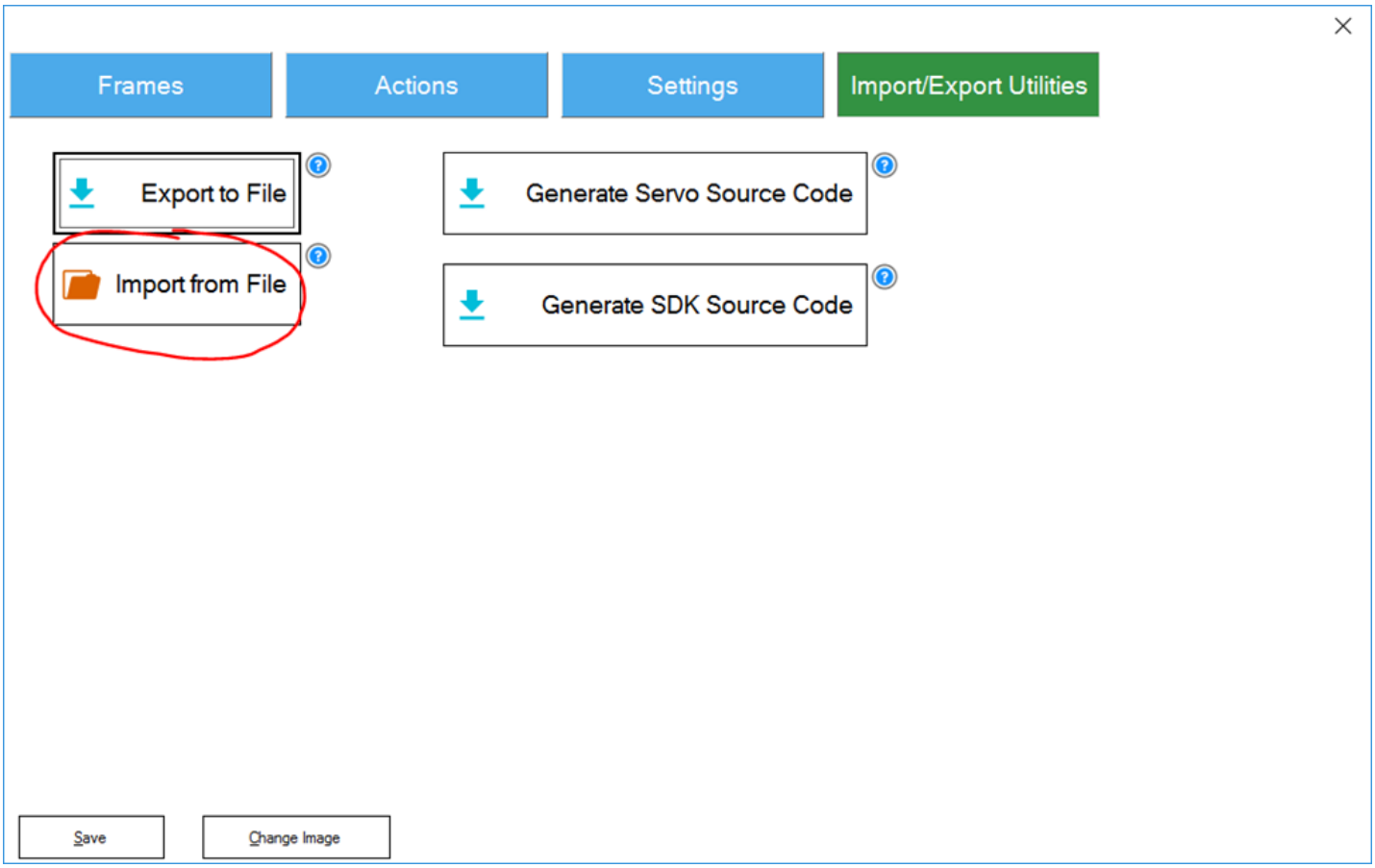
Step 2 Press the Config button on the Auto Position.



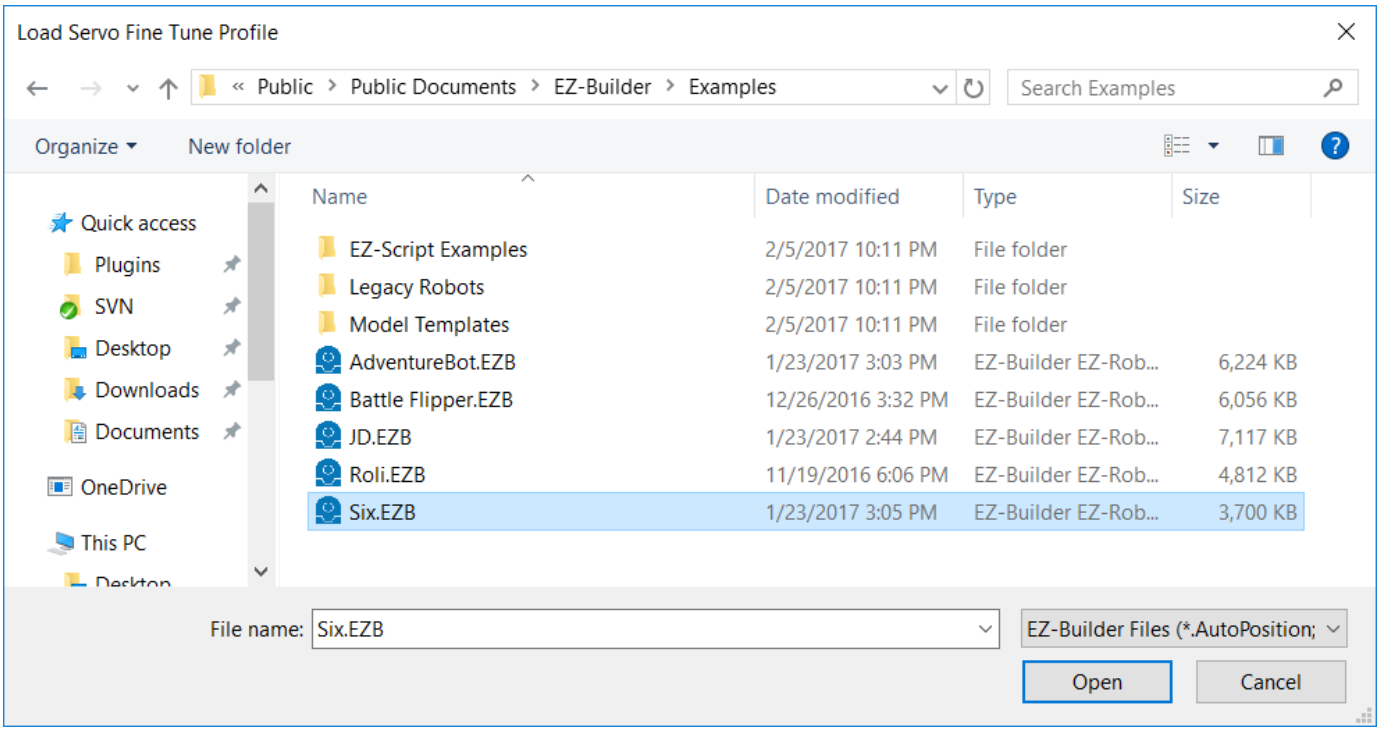
Step 3 Select the IMPORT/EXPORT tab



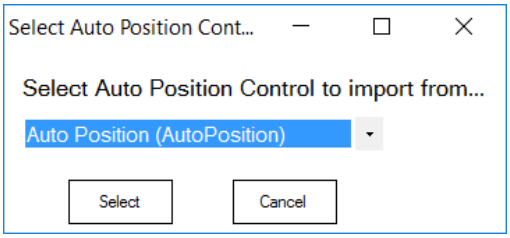
Step 4 Select IMPORT FROM FILE button



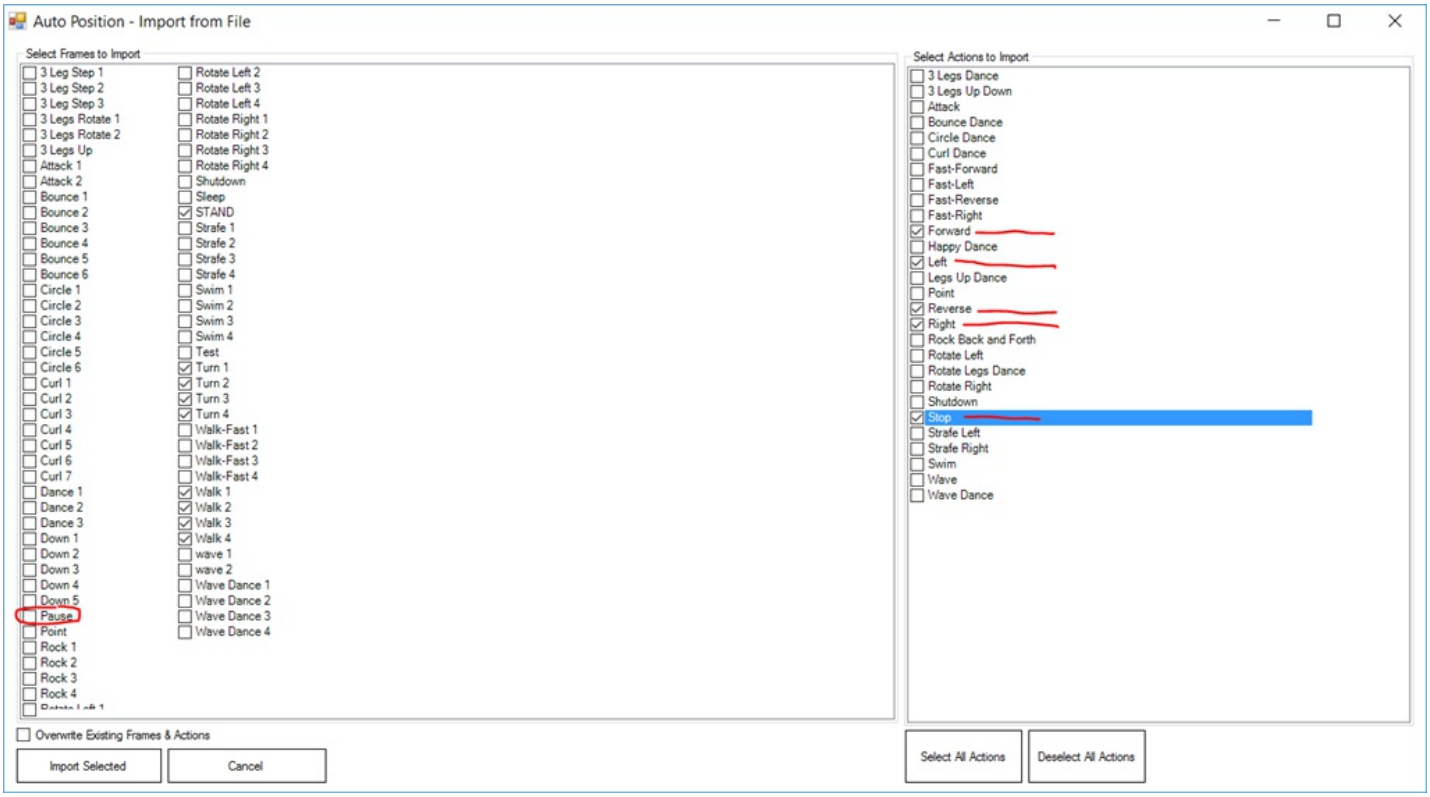
Step 5 Navigate to the appropriate project and select it. If using the public Six and JD projects, they will be located in C:\Users\Public\Documents\EZ-Builder\Examples. Again, remember that in this example we are adding SIX for EZ-B index 0 & 1. JD is for EZ-B index 2 & 3. So this first time we will be loading a SIX project.



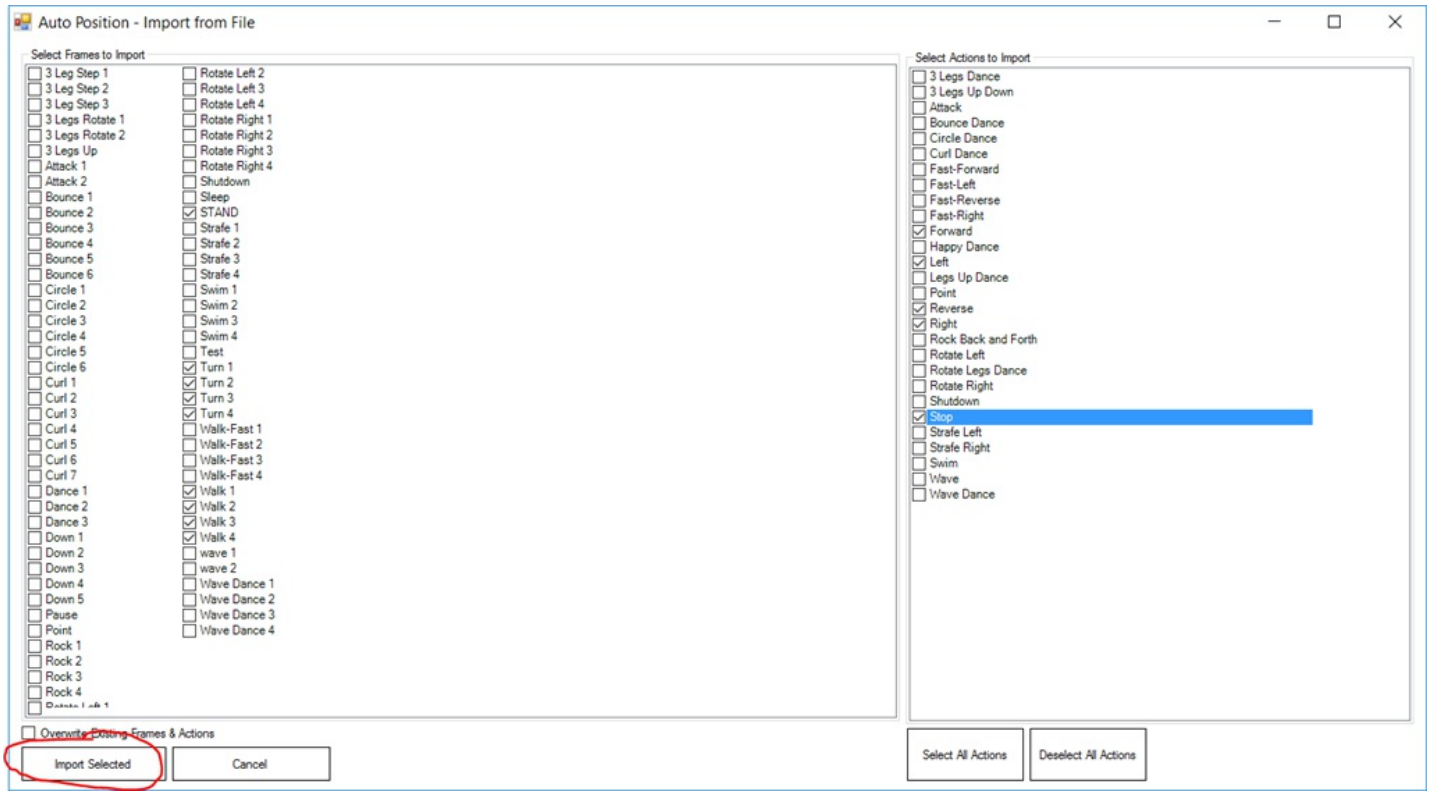
Step 6 A dialog will display prompting which Auto Position control to import the settings from. There will be only one control in the default SIX and JD projects, so simply press SELECT.



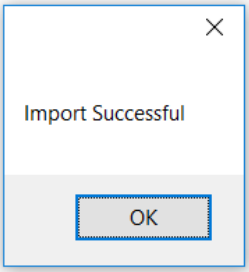
Step 7 A window will be displayed with all ACTIONS and FRAMES of the auto position control. Select the FORWARD, LEFT, RIGHT, REVERSE, and STOP actions. Ensure the PAUSE is UNCHECKED in the FRAMES list. This is because PAUSE is a default frame and cannot be imported.



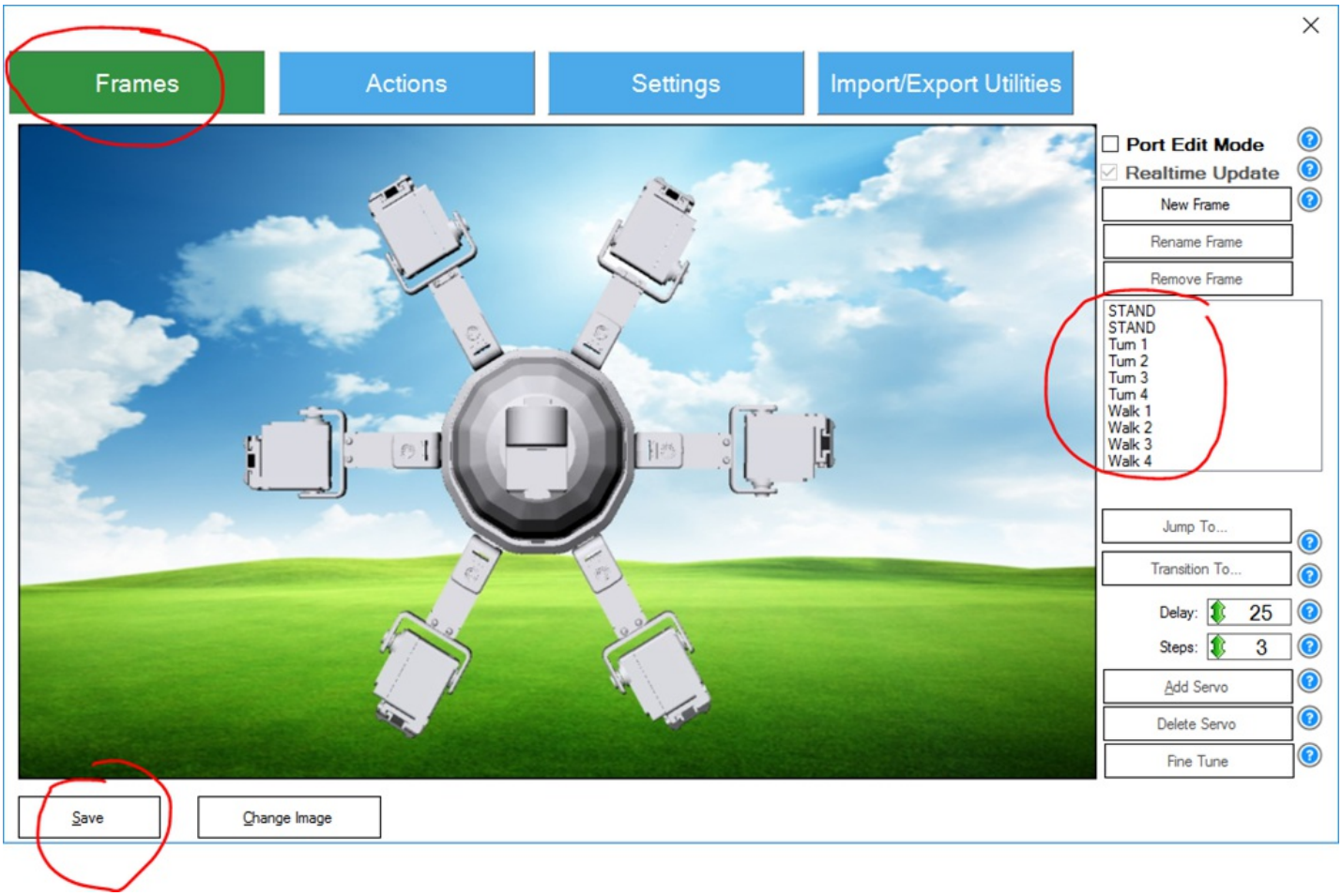
Step 8 Press IMPORT SELECTED



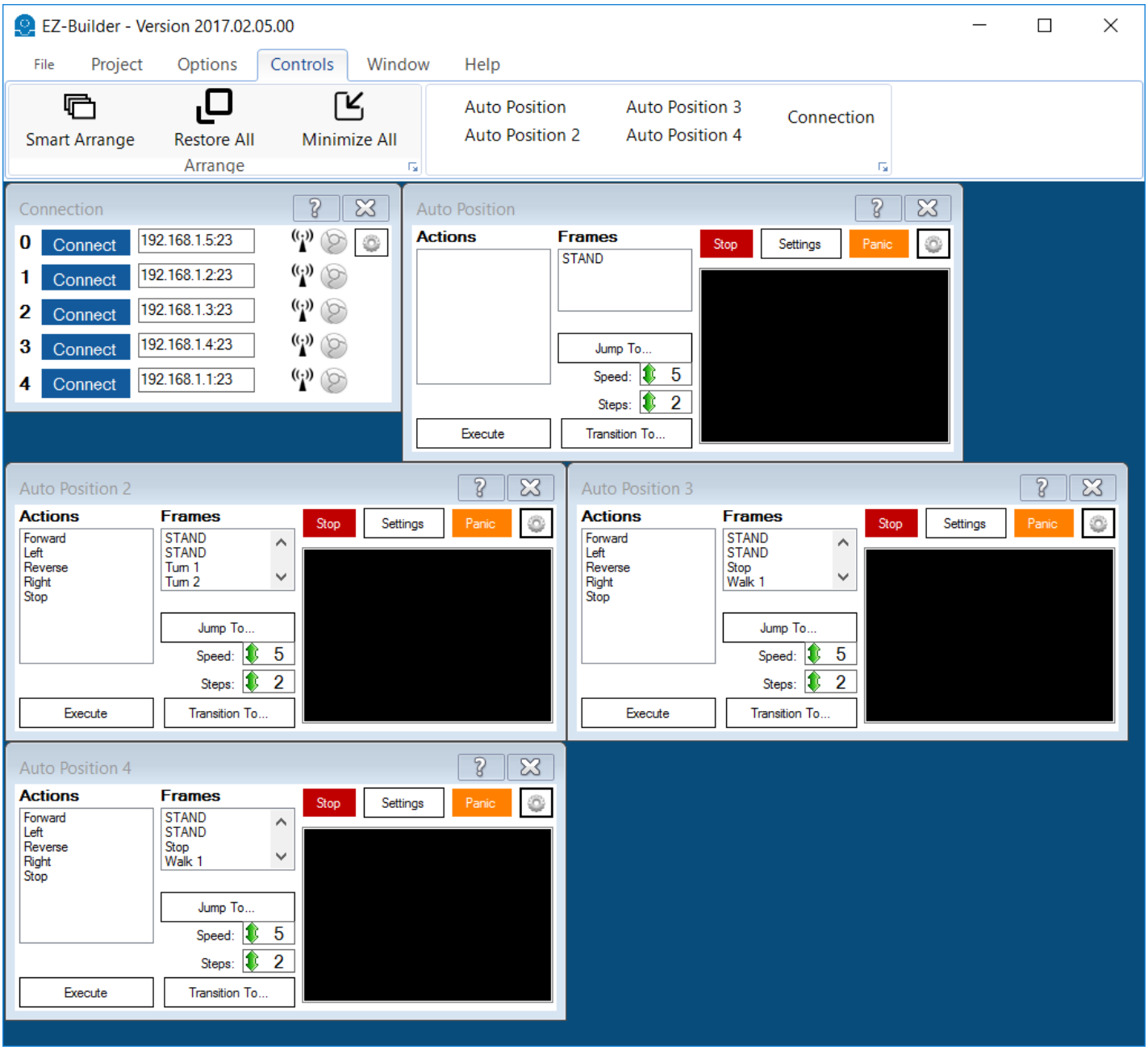
Step 9 Import should now be successful



Step 10 You may now press FRAMES tab to view that all frames have been loaded. And press SAVE to save this configuration.



REPEAT Repeat these steps for each robot, remembering that Index 0 & 1 is SIX, and index 2 & 3 is JD. When complete, your project should look like...


EZ-Builder - Version 2017.02.05.00
File
Project
Options
Controls
Window
Help
Smart Arrange
Restore All
Minimize All
Arrange
Auto Position
Auto Position 2
Auto Position 3
Auto Position 4
Connection
Connection
0 Connect 192.168.1.5:23
1 Connect 192.168.1.2:23
2 Connect 192.168.1.3:23
3 Connect 192.168.1.4:23
4 Connect 192.168.1.1:23
Auto Position
Actions
Frames
STAND
Stop
Settings
Panic
Jump To...
Speed: 5
Steps: 2
Execute
Transition To...
Auto Position 2
Actions
Forward
Left
Reverse
Right
Stop
Frames
STAND
STAND
Turn 1
Turn 2
Stop
Settings
Panic
Jump To...
Speed: 5
Steps: 2
Execute
Transition To...
Auto Position 3
Actions
Forward
Left
Reverse
Right
Stop
Frames
STAND
STAND
Stop
Walk 1
Stop
Settings
Panic
Jump To...
Speed: 5
Steps: 2
Execute
Transition To...
Auto Position 4
Actions
Forward
Left
Reverse
Right
Stop
Frames
STAND
STAND
Stop
Walk 1
Stop
Settings
Panic
Jump To...
Speed: 5
Steps: 2
Execute
Transition To...

Movement Panel

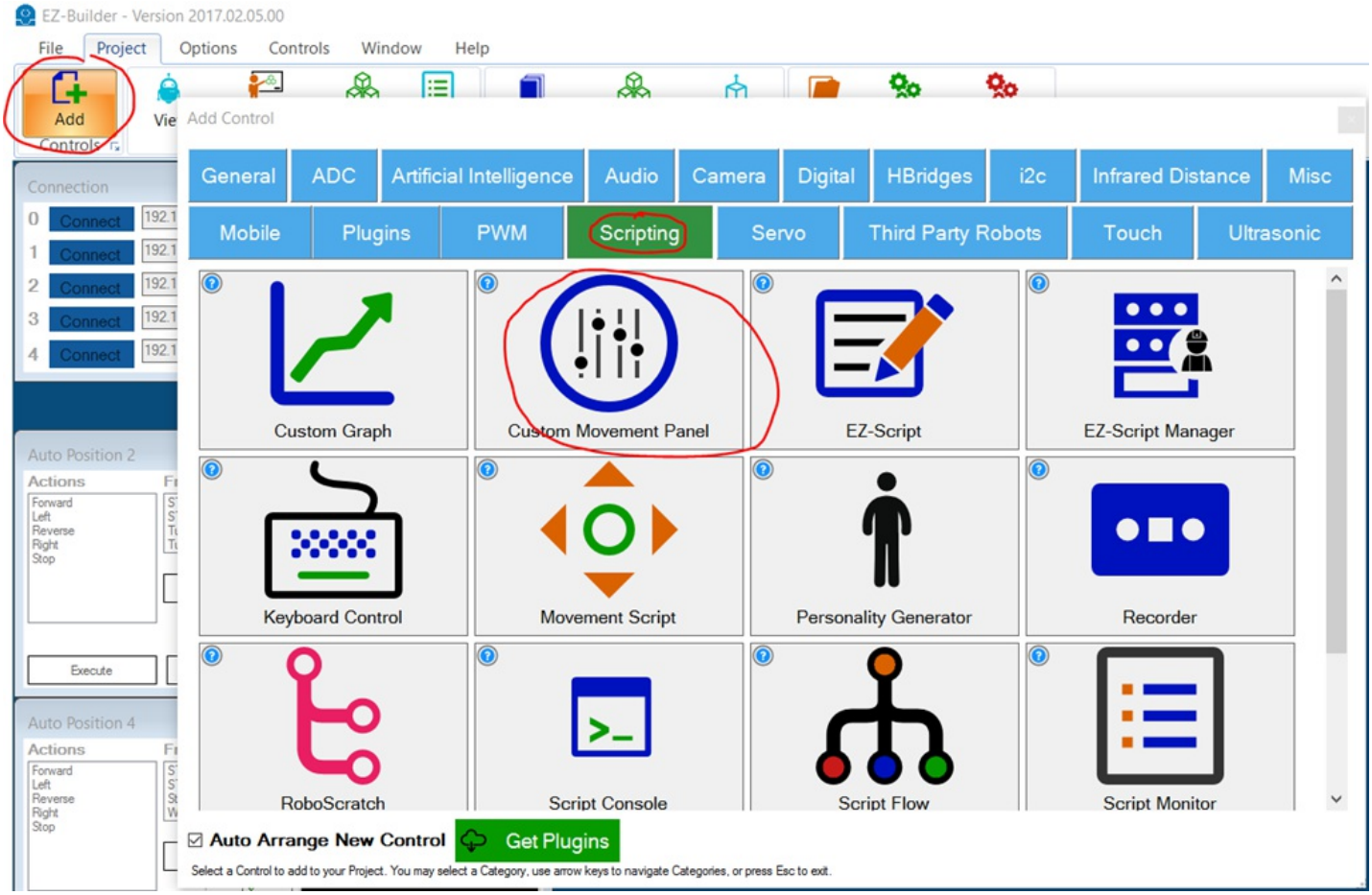
We're now going to add a movement panel which will control all of the robots at the same time. The movement panel that we will use is a Custom Movement Panel, which allows custom ez-script to be added. Each Auto Position will be instructed to execute movement actions using the ControlCommand().

*For more information about ControlCommand(), view this tutorial here: http://www.ez-robot.com/Tutorials/Lesson/78?courseId=6

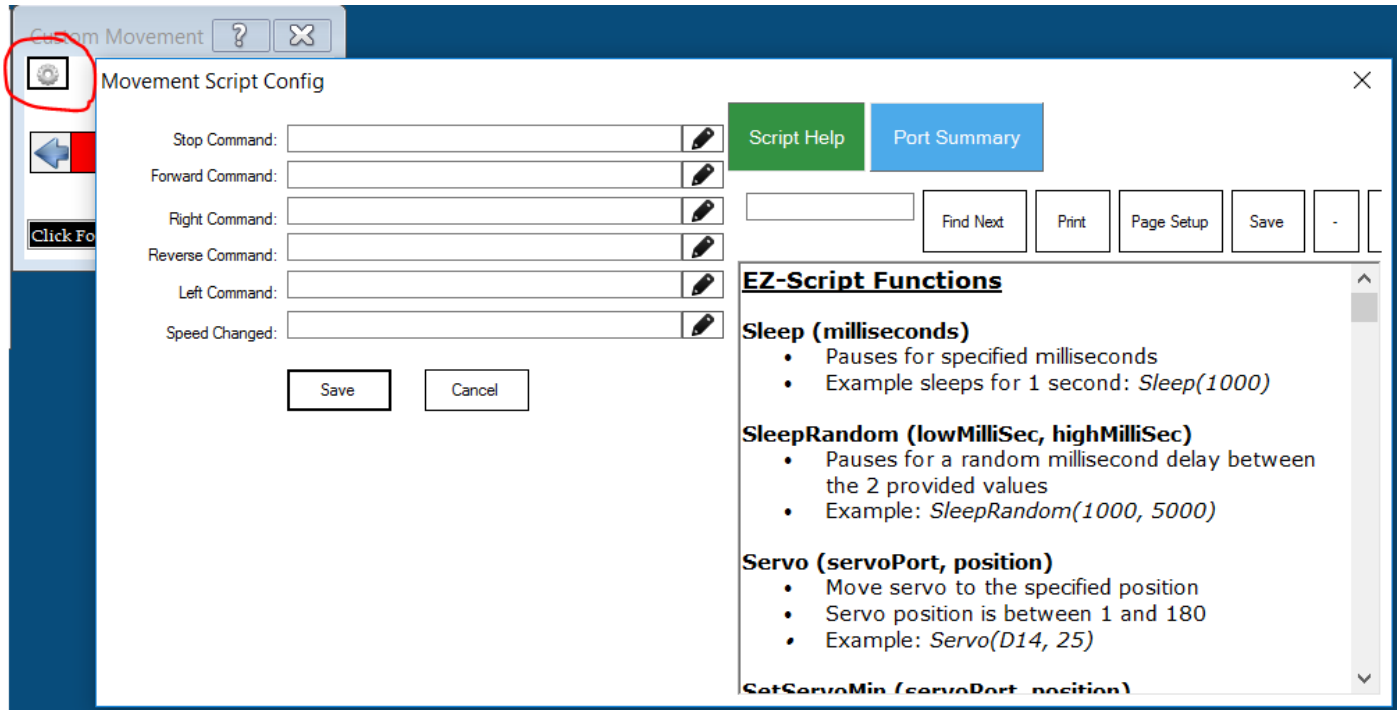
*For more information about Movement Panels, view this tutorial here: http://www.ez-robot.com/Tutorials/Lesson/77?courseId=6

Actually, you really should have already read the Activity Guide here: http://www.ez-robot.com/Tutorials/Course/6

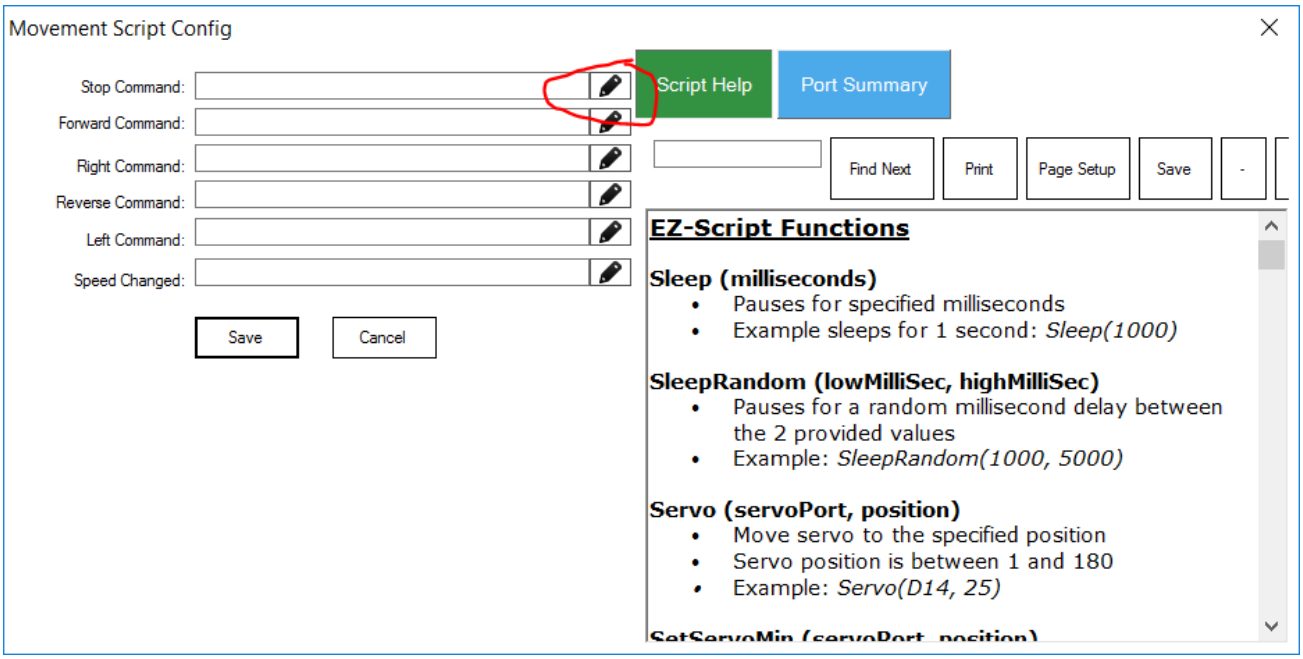
Step 1 Add Control->Scripting->Custom Movement Panel



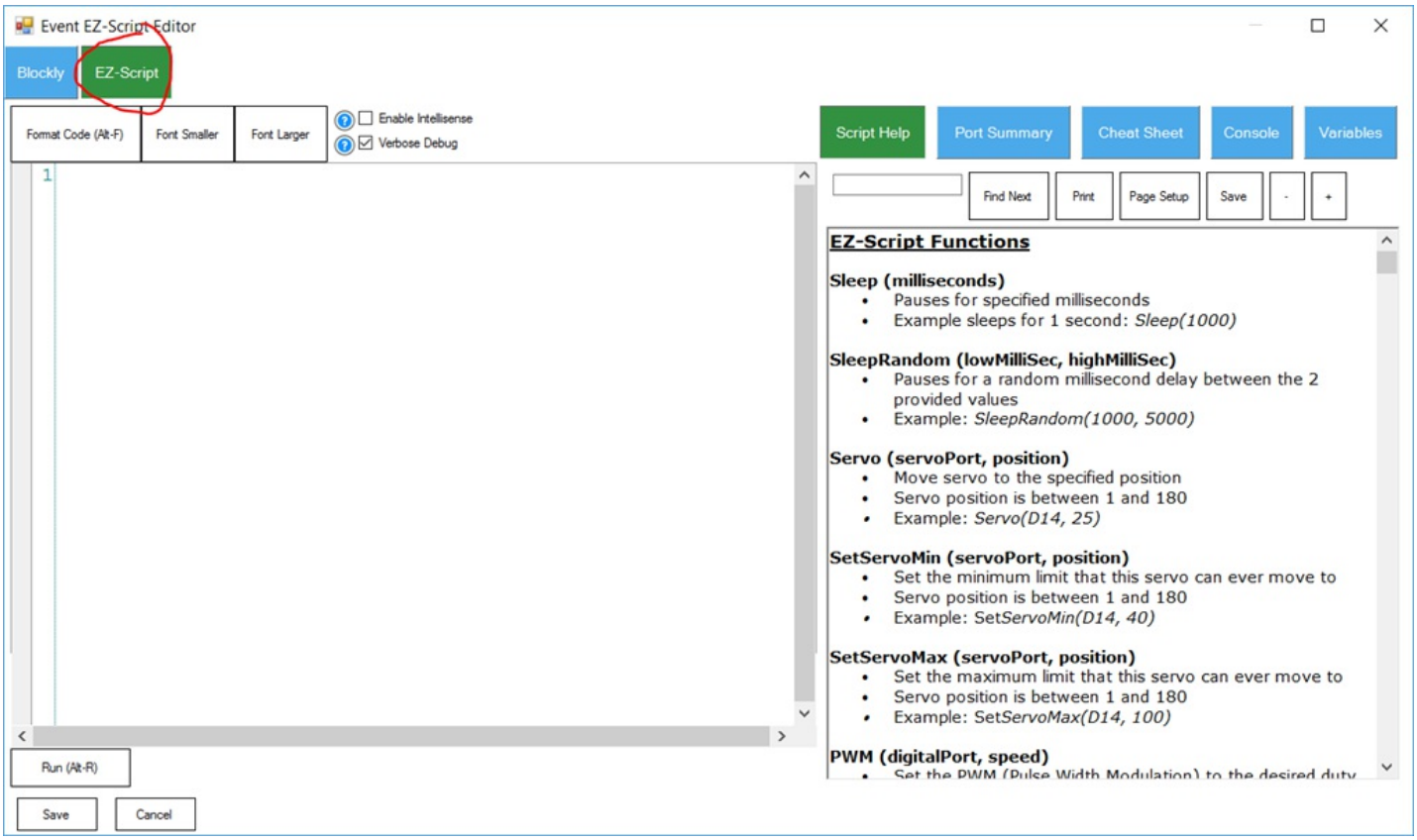
Step 2 We will now press configure on the movement panel. The window that opens is the configuration, which allows you to edit code that will be executed for each movement direction.



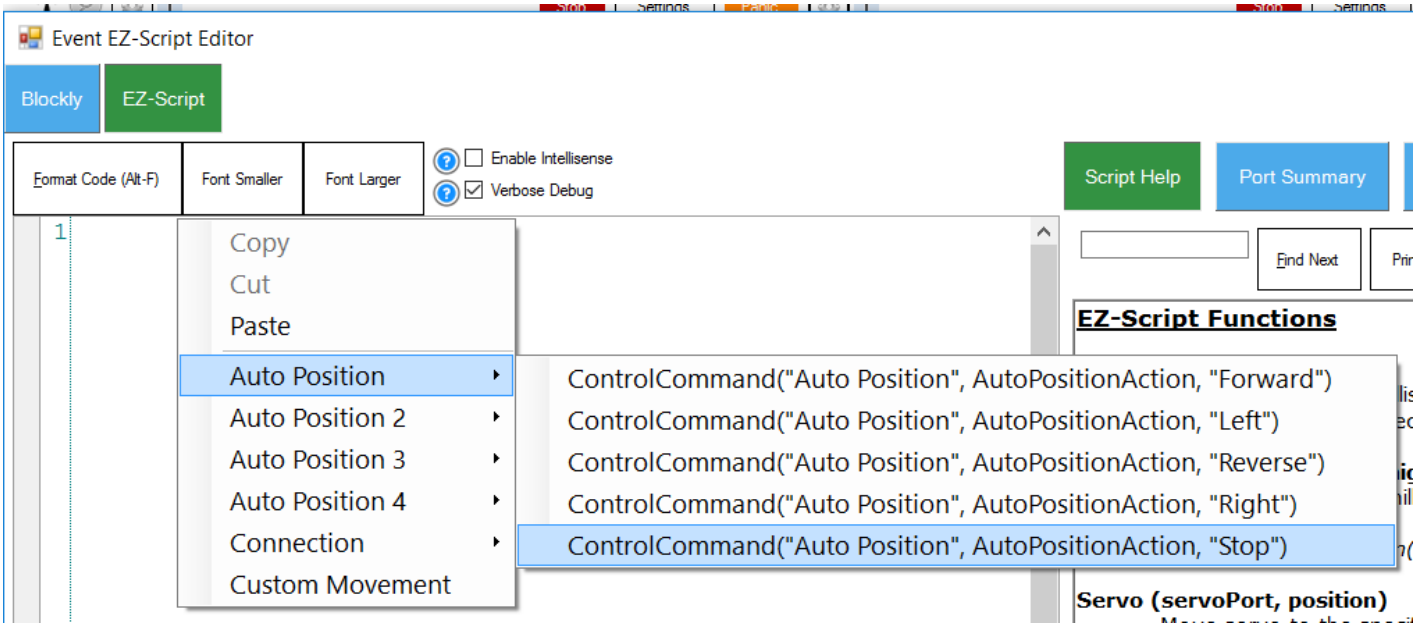
Step 3 Let's start by demonstrating how to add STOP commands for each Auto Position. Press the EDIT button on the STOP command.



Step 4 Depending on what your default editor is configured, either BLOCKLY or EZ-SCRIPT editor will be displayed. Press the EZ-SCRIPT tab, because we will be editing ez-script for this example.



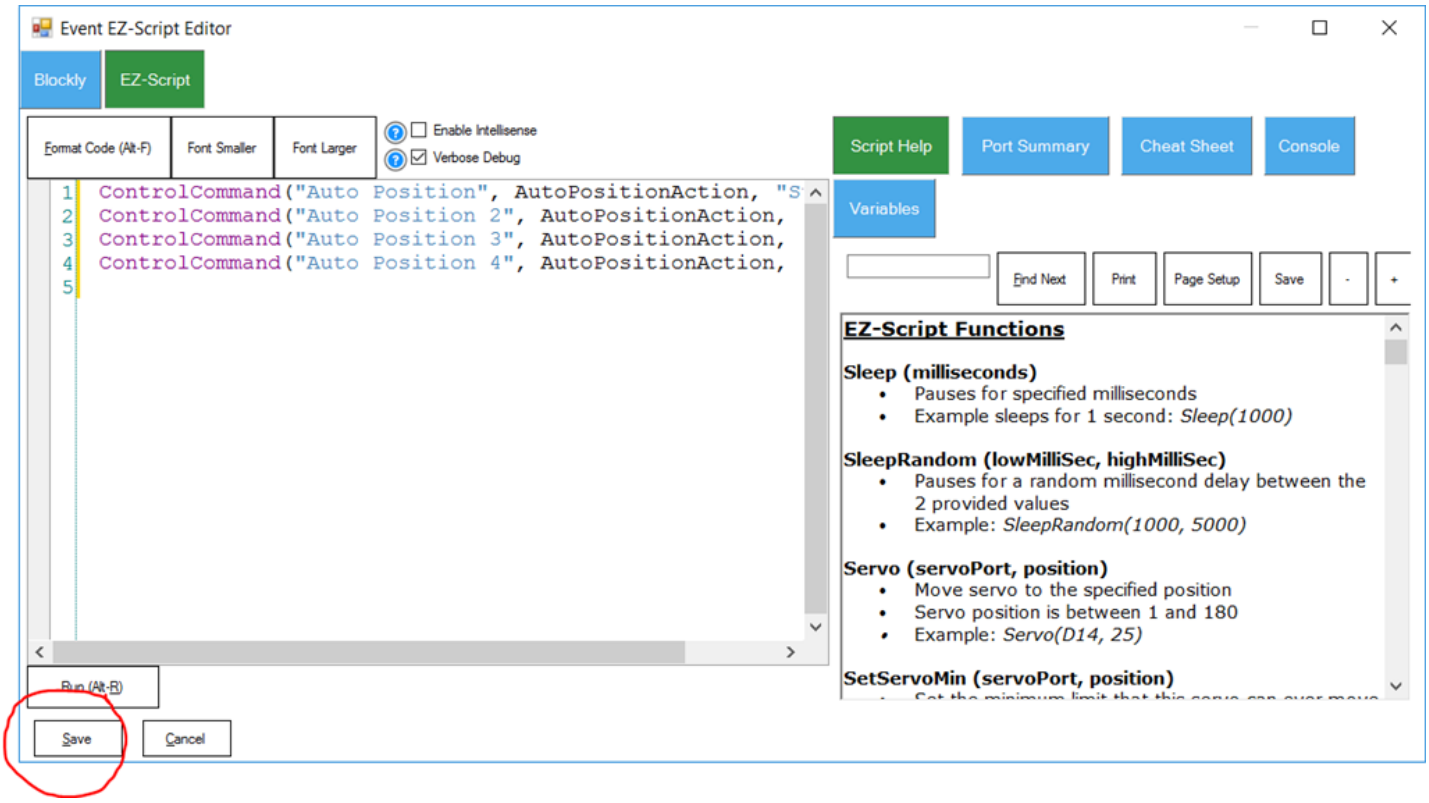
Step 5 Right-click in the editor window and locate the first Auto Position, and select the STOP option.



Step 6 Now repeat the same process for each of the Auto Position Controls, so your code will look like this...

```
1 ControlCommand("Auto Position", AutoPositionAction, "Stop")
2 ControlCommand("Auto Position 2", AutoPositionAction, "Stop")
3 ControlCommand("Auto Position 3", AutoPositionAction, "Stop")
4 ControlCommand("Auto Position 4", AutoPositionAction, "Stop")
5
```

Step 7 Save the script



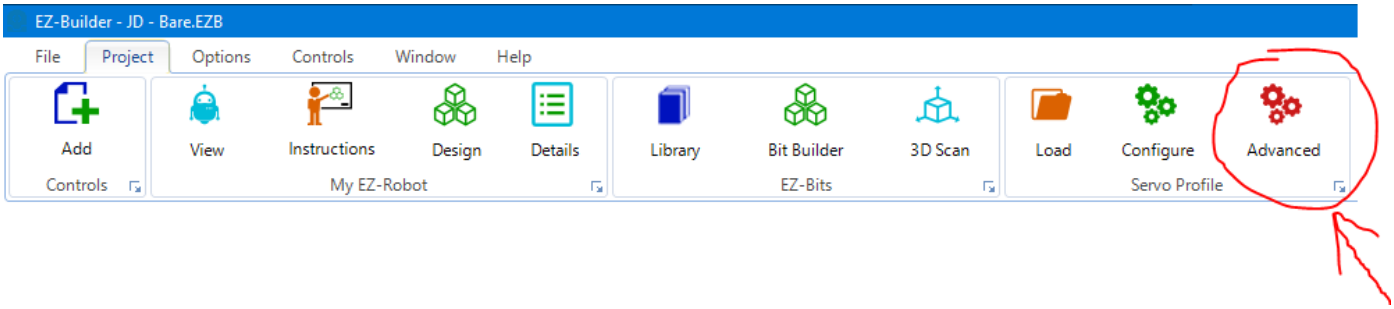
REPEAT You guessed right, this process must be repeated for each movement (forward, left, right, reverse, stop).

Servo Profile

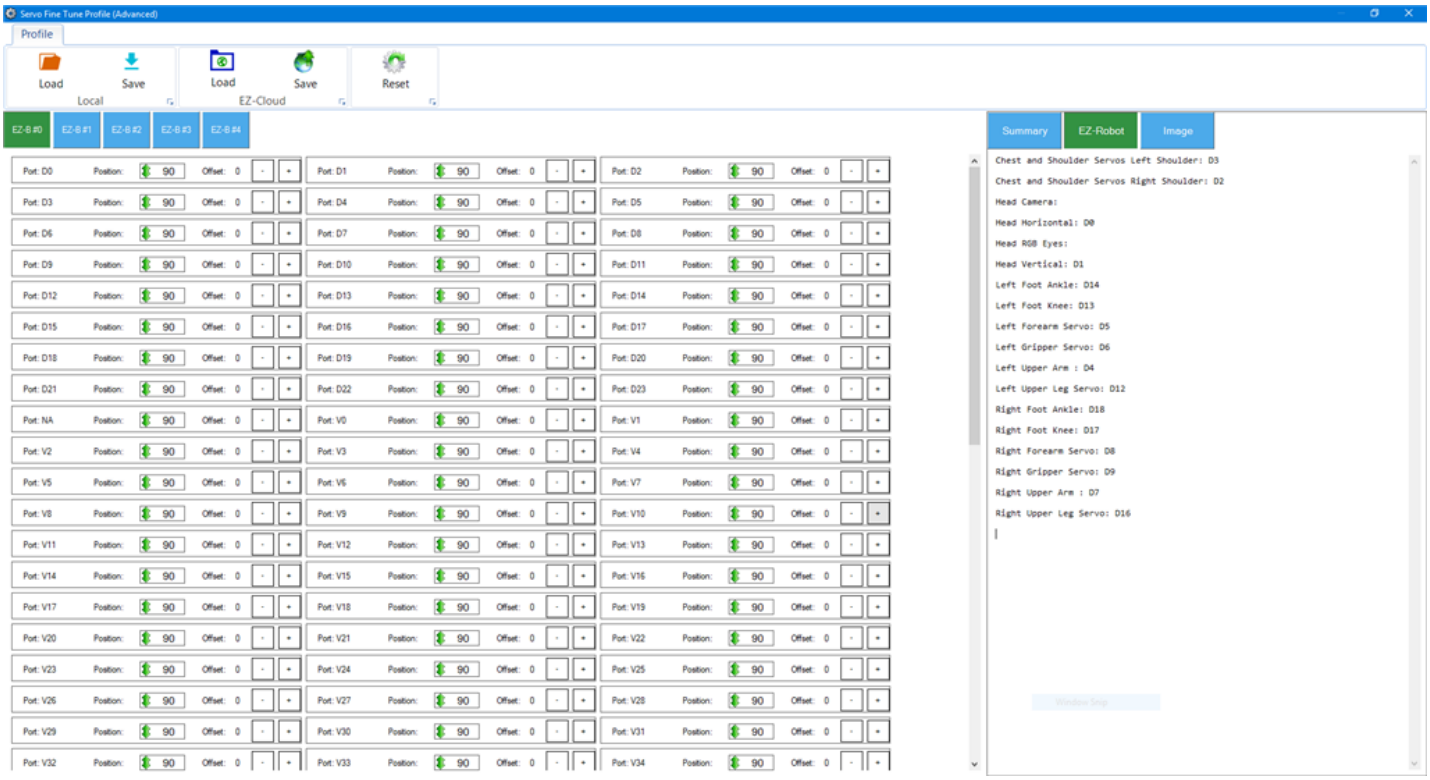
Each robot may require a servo profile to fine tune the servo resting position. The process of creating a servo profile for multiple EZ-B's at the same time can be achieved by using the "Advanced Servo Profile" editor.

Because only one 3D Robot design can be stored in a project, the Advanced Servo Profile editor does not display the graphical representation of the robots. This means you will need to know what servo ID (i.e. D0, D2, D8, etc.) maps to each joint for adjustment.

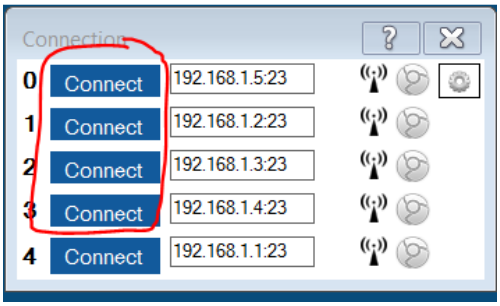
To access the Advanced Servo Profile editor, press the button from the top ribbon menu of EZ-Builder.



The Advanced Servo Profile editor contains a tab for each EZ-B and each servo port. See the image below...



Hey, you're done. All you have to do is press CONNECT on each EZ-B index of the Connection Control. Use the Custom Movement Panel and the robots will all respond to the commands.



If you want an example of this project, here it is: MultiRobotExample.EZB