

Testing and tweaking notes for the BB1 mini sumo robot.

## Testing

After you have completely assembled your robot and downloaded the needed files to it (Adafruit\_vl5310x.mpy, base\_bot.py, code.py, settings.py, and original\_code.py) you are ready to do some testing and basic calibration.

Moving the power switch on the Maker Pi board to on should light up a small green LED next to PWR on the board, showing that the board has power. It should also light two larger LEDs (0 and 1) in red showing that the code.py program is running. If you don't have power check the battery connections and the correct insertion of the batteries into the holder. If you get the power LED but don't get the red LEDs the correct software has not been downloaded.

The small blue LEDs on the Maker Pi board indicate the presence of the sensors, but not if they have been connected entirely correctly. With power turned on, blue LEDs should be lit for GP2, GP3, GP4, GP6, GP16, and GP17.

To test movement, it is best to use a black surface with a white border. Probably the easiest thing to use is a black poster board with a white paper border of at least 2.5cm wide taped around it.

Place your bot on the black surface and turn it on. You should see a single green LED lit on each edge sensor. Move the bot to a white surface. You should see two green LEDs lit on each edge sensor. If you don't get the second green LED when the bot is on white you should adjust the small white dial on the edge sensor with a screwdriver until the second LED lights up.

A dummy opponent such as a block of wood or weighted box about the same size as the robot can be added to the black test surface. Clear an area of at least 60cm from the edges of your test surface.

With the robot on the black surface and powered up, press and hold the GP20 button on the Maker Pi board. The large LEDs should turn yellow-green, indicating the robot is ready to battle. When the GP20 button is released the LEDs should turn green and the robot should beep. If the robot doesn't beep, it is possible the mute switch on the Maker Pi board has been toggled to off.

The LEDs will flash as the robot counts 5 seconds. Make sure you and everything else is clear of your test area by at least 60cm at this time to avoid false targets.

After a 5 second pause the robot should start searching for an opponent. It should find your dummy opponent and attempt to push it out of the test area. When your robot reaches the white edge of the test area it should attempt to stop and turn back into the black area.

The robot should immediately charge forward if it faces a nearby opponent. If your robot moves in an unpredictable manner, such as backing up or spinning when you expect it to go forward, you most likely need to change the order the motor wires are connected to the terminals on the Maker Pi board. Use a screwdriver to switch one pair at a time.

### Tweaking and beyond

If you get this far you are ready to compete. However, you can fine tune the performance of your robot by changing values in the settings.py file. The default settings work ok but they are not optimized to win matches. You should experiment with your test set up and dummy opponent to find settings that you think are best.

You are also encouraged to decorate your robot and you will be required to have a name for it at events.

There are more advanced ways to customize your IBiB2040 mini sumo robot:

You can design your own chassis for the sumo bot. An easy way to start is to copy and modify the reference BB1 design on Tinkercad at:

<https://www.tinkercad.com/things/64lSNJw5qik-mini-sumo-ibib2040-bb1>

Parts to be 3D printed are light blue in that file, the manufactured parts are in gray.

If you are an experienced Python programmer you can edit the code.py and other files, although the start-up sequence has to be unchanged.

The rules for this class also allow some flexibility in component selection.

Read the complete rules document to guide you in customizing within what is allowed for the IBiB2040 class of mini sumo robots.