mcr

11. Calibrate a Sixi robot

Make sure the robot reports the correct angles that match the robot's pose.
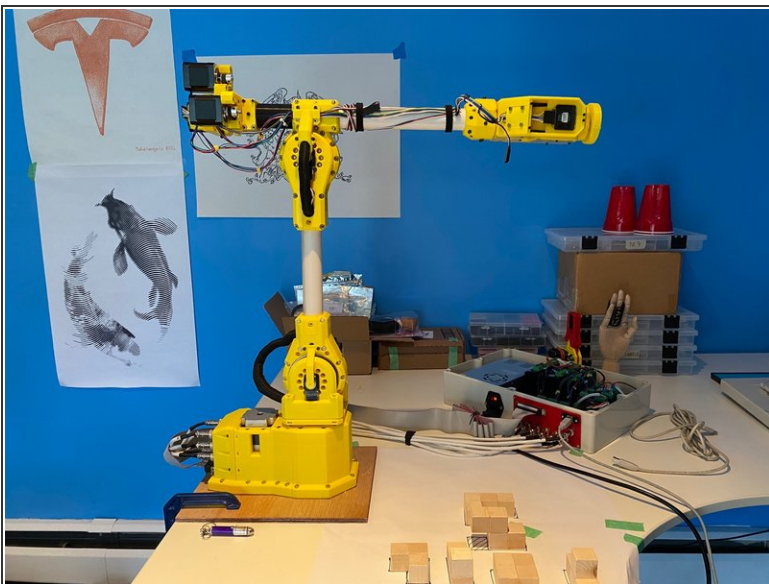
Written By: Dan Royer

Step 1 — Turn off main power

- Make sure the arm is not holding anything or the added weight could cause the arm to drop downwards.

- If taking the weight off is difficult, hold the robot hand before turning off power.

- Turn off power at the red switch on the control box.

Step 2 — Move the arm to home position

- Move the arm into "home" position, where all sensors would nominally report x=0, y=-90, z=0, u=0, v=0, and w=0.

- turn power on. robot will hold in this position.

This document was generated on 2021-12-27 02:18:51 AM (MST).

Step 3 — Save the offset adjustment

- Use the Arduino software from [step 10](#) to connect to your Sixi robot.

- In the text field at the top of the serial window, type **D19 P0** (P + number zero) and click *Send*. (D19=toggle D17 stream) Confirm the D17s have paused.

- type **D23** and click *Send*. (D23=Calibrate Sixi) This copies the current angle values to the live home position. D17 will now report **D17 0 -90 0 0 0 0 -**

- type **M503** and click *Send*. (M503=report settings.) The reply should match the last D17 value before D23, because the home position is subtracted from the raw values to get the adjusted position.

- Type **M500** and click *Send*. This saves the new home position. If you do not M500 and reboot, the home position will not be changed.

⚠ We need a much better way to accurately align the robot. Close is OK We want better.

This document was generated on 2021-12-27 02:18:51 AM (MST).

© 2021

mcr.dozuki.com/

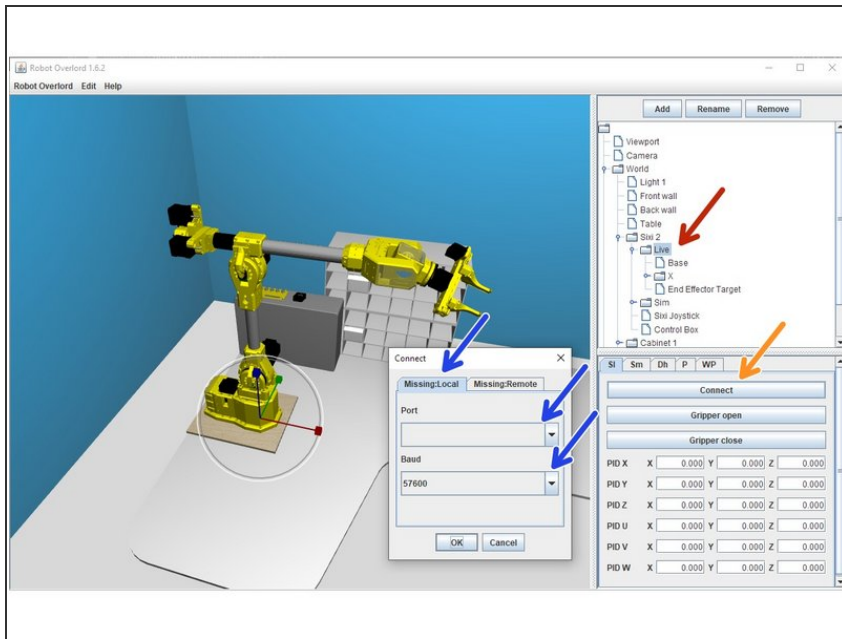Page 3 of 6

Step 4 — Make small moves

- send **G0 F5 A1**. This sets the feedrate to 5 degrees/s and acceleration to 1 degree/s. Be prepared to turn off the main power if a move makes you nervous for any reason. Better safe than sorry!

- Send **G0 X5**. This should turn the X motor (the bottom joint) 5 degrees clockwise (if the clock is facing up). Send **G0 X0** to return to home position.

- Send **G0 Y-95**. This should turn the Y motor (the bottom joint) 5 degrees clockwise. The elbow will retreat from the direction the hand is pointing. Send **G0 Y-90** to return to home position.

- ⚠ Caution! Do NOT send **G0 Y0**. Y0 is 90 degrees forward. There is a high chance your arm will drive down into a table or obstruction.

- **G0 Z5** will turn the elbow down toward the base.

- **G0 U5** will turn the wrist clockwise (the clock faces towards the elbow).

- **G0 V5** will turn the wrist down towards the base.

- **G0 W5** will turn the hand clockwise (the close faces towards the wrist).

This document was generated on 2021-12-27 02:18:51 AM (MST).

© 2021   mcr.dozuki.com/   Page 4 of 6

Step 5 — Connect with Robot Overlord

- Run the Robot Overlord app (https://github.com/marginallyclever/robo...)

- Select *World > Sixi 2 > Live* from the top right panel. The bottom right context panel will change. Make sure Arduino serial window is closed, as only one USB connection can exist at a time.

- Click *Connect* in the context menu.

- Choose Local, choose your USB port, and make sure the baud rate is 57600. Click *OK* to connect with those settings.

- If the software connects successfully, one of the simulations will "snap" to match the live position.

- ⚠ CAUTION! The live robot may immediately begin driving towards the simulated position. Best to have the simulated arm in a known safe position.

- If the real robot and the live version in the software do not match, return to a previous step and recalibrate the home angles.

This document was generated on 2021-12-27 02:18:51 AM (MST).

Step 6 — First Robot Overlord moves
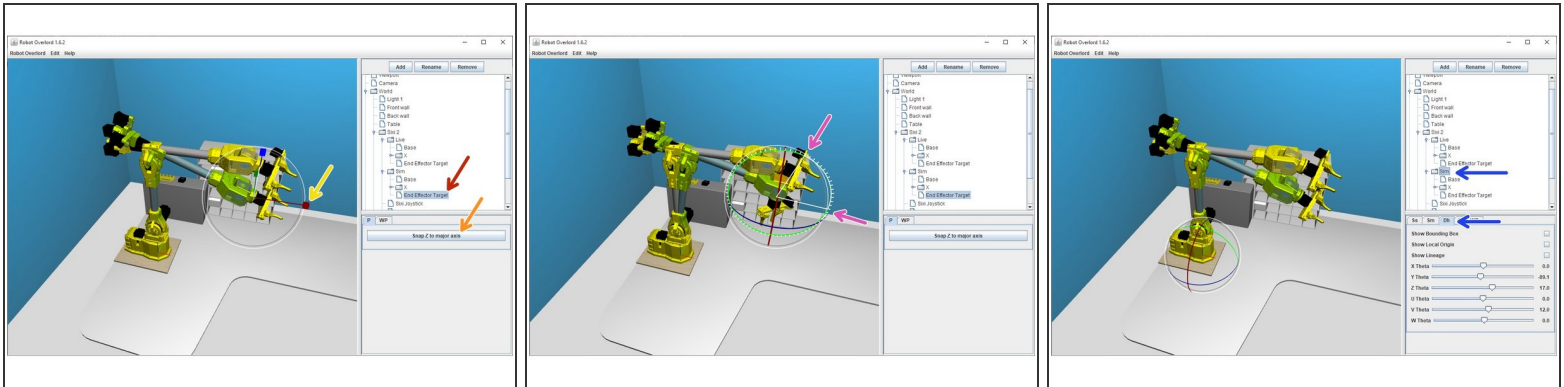
- Select *World > Sixi 2 > Sim> End Effector Target*. Handles will appear in the 3D scene at the hand.

- Gently drag the handles to move the target. The live robot will drive towards your simulated target at all times while connected.

- *Snap to world axis* will first turn the hand to face the nearest world axis, then the remaining two axies. Good for pointing straight sideways or up/down.

- Use SHIFT to switch to rotation mode.

- *World > Sixi 2 > Sim > Dh* will allow you to directly access joint angle values if you prefer this method of driving.

- Use F1, F2, and F3 to change the *frame of reference* to world, camera, and local, respectively. Try them out and see for yourself!