Project 4.2.12a Fly-By-Wire Autopilot

Construction Guide

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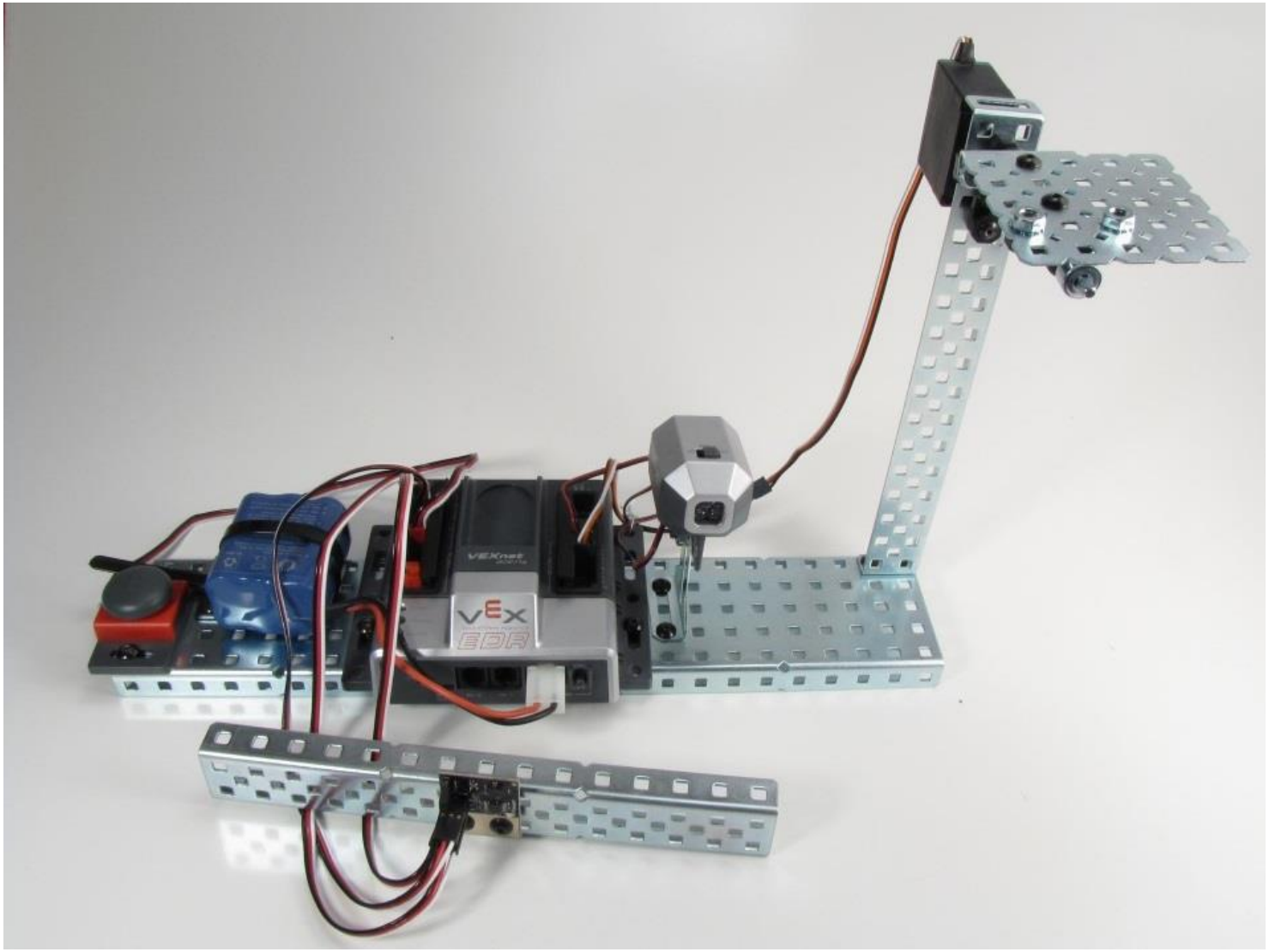
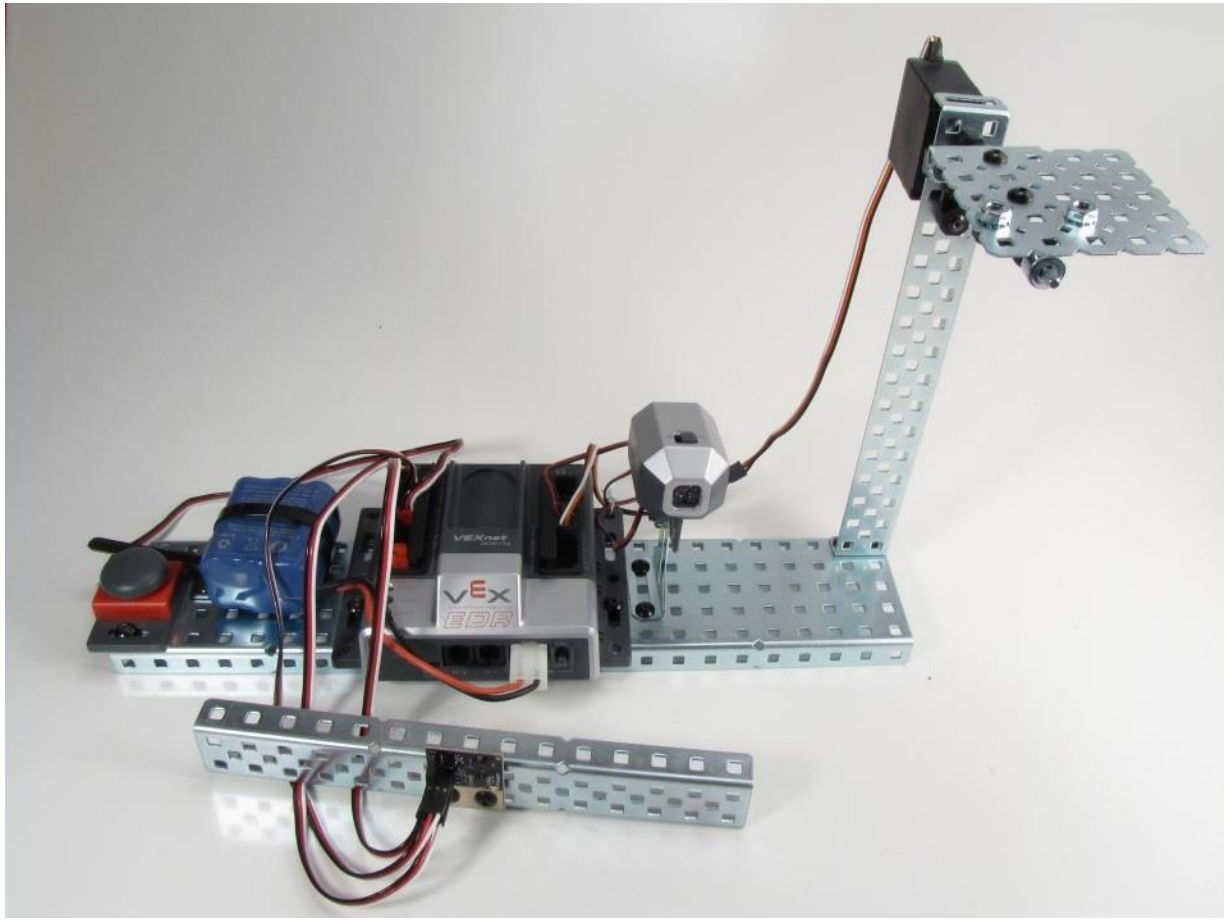
Completed Fly-By-Wire Model

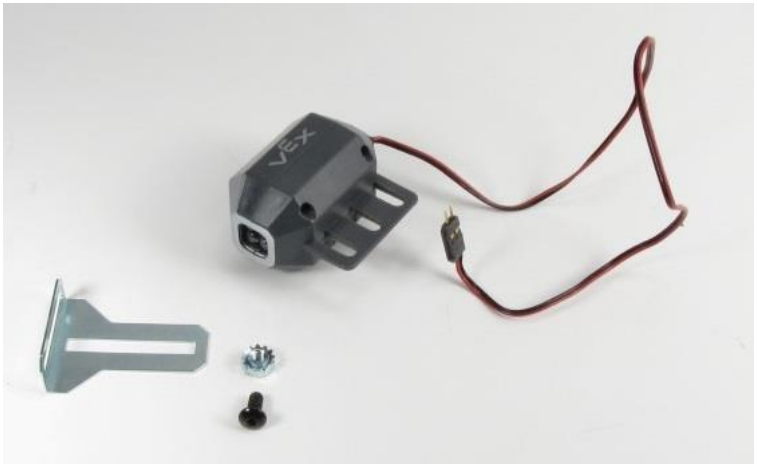


Completed Fly-By-Wire Model

Equipment

(1) C-Channel 1x5x1x25 (or similar)
(1) C-Channel 1x2x1x15 (or similar)
(1) Chassis Rail (16-hole)
(1) Plate 5x5 holes, 275-2023 (or similar)
(2) Gusset, Angle, 275-1062
(2) Screw 8-32 x 0.25 in., 275-1002
(13) Screw 8-32 x 0.375 in., 275-1003
(4) Screw 8-32 x 0.5 in., 275-1004
(19) Nut 8-32 Keps, 275-1026
(4) Washer, Steel, 275-1024
(1) Bearing Flat, Delrin, 276-1209
(1) Pillow Block Bearing
(1) Lock Bar, 276-2016
(1) Bearing Flat, Delrin, 276-1209
(3) Spacer, 4.6mm, 276-2018
(1) 3-Wire Servo, 276-2166
(2) Screw 6-32 x 0.5, 275-1169
(1) Drive Shaft 4 in., 276-1149
(2) Shaft Collar, 276-2010
(1) Flashlight
(1) Red LED
(1) Bumper Switch, 276-2159
(1) Analog Accelerometer, 276-2332
(3) 3-Wire Extension Cables, 12 in., 276-1424
(1) 3-Wire Extension Cables, 6 in., 276-1424
(1) VEX Cortex Microcontroller, 276-2194
(1) 7.2V Robot Battery, 276-1456
(1) Battery Strap, 276-2219



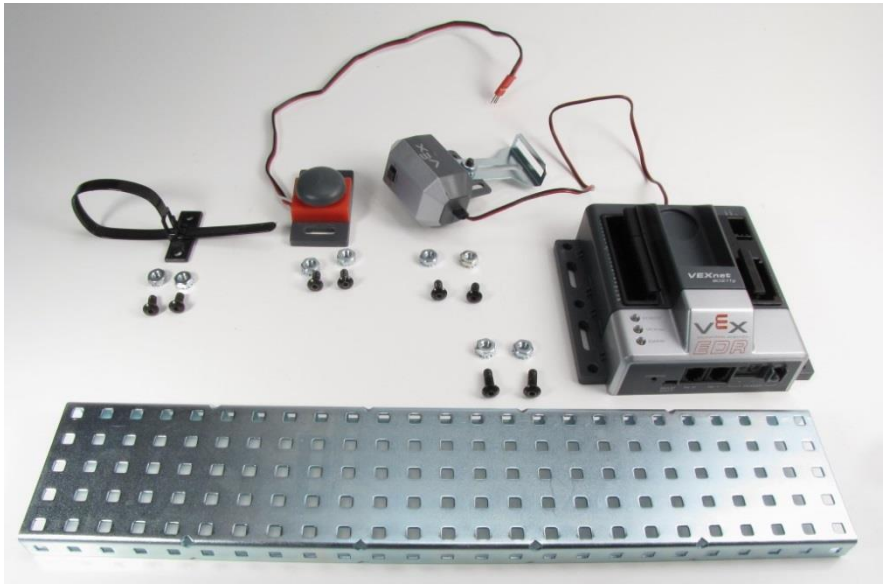


(1) Gusset, Angle, 275-1062
(1) Screw 8-32 x 0.375 in., 275-1003
(1) Nut 8-32 Keps, 275-1026
(1) Flashlight

Before

After

Step 1: Attach Flashlight



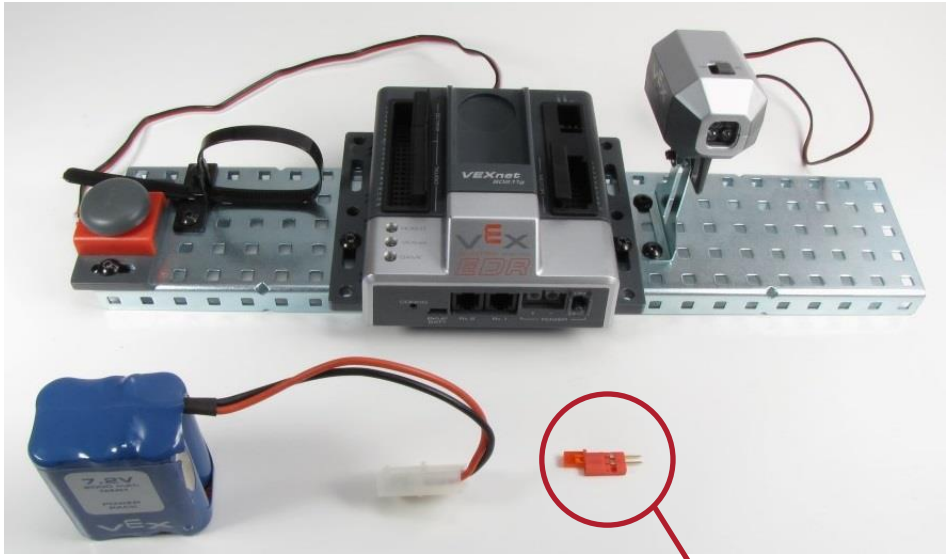
(1) C-Channel 1x5x1x25 (or similar)
(6) Screw 8-32 x 0.375 in., 275-1003
(2) Screw 8-32 x 0.5 in., 275-1004
(8) Nut 8-32 Keps, 275-1026
(1) Bumper Switch, 276-2159
(1) VEX Cortex Microcontroller, 276-2194
(1) Battery Strap, 276-2219

Before

After

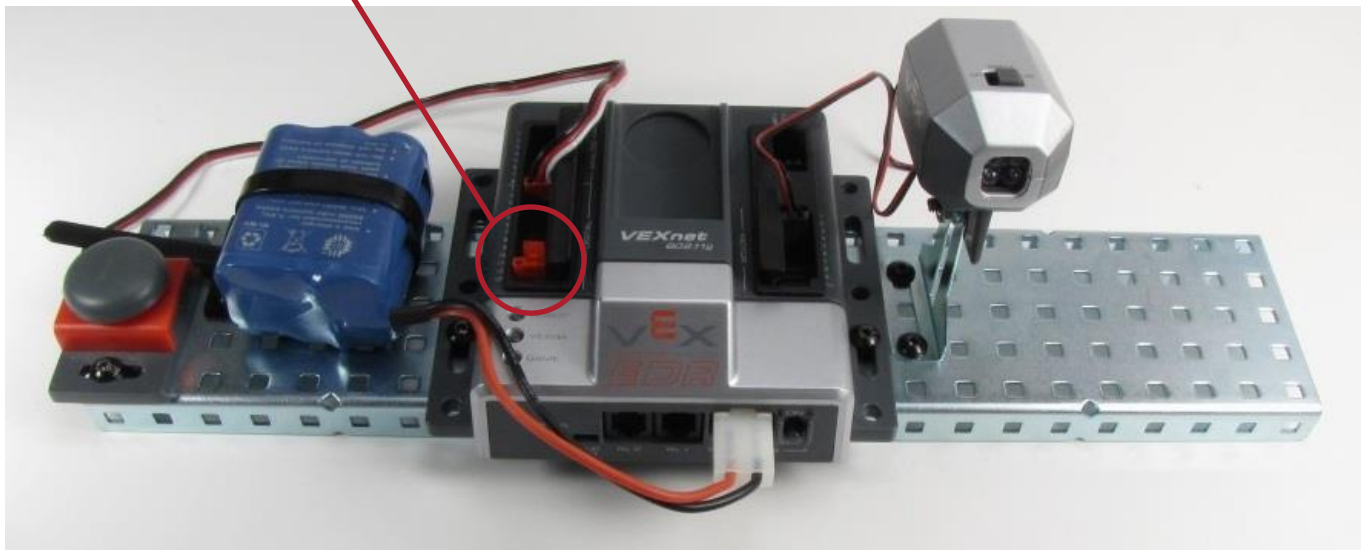
Step 2: Assemble Inputs and Output Devices

(1) Red LED
(1) 7.2V Robot Battery, 276-145



Before

Port 12



After

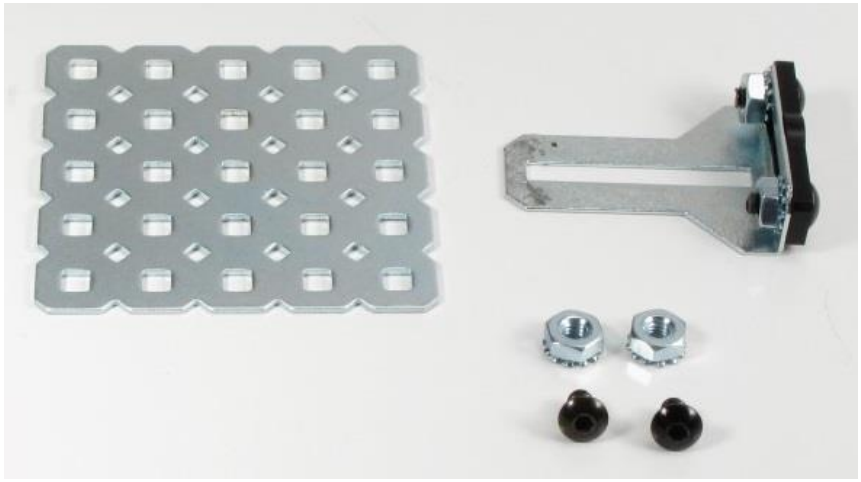
Step 3: Install Battery and LED

(1) Gusset, Angle, 275-1062
(2) Screw 8-32 x 0.375 in., 275-1003
(2) Nut 8-32 Keps, 275-1026
(1) Lock Bar, 276-2016

Before

After

Step 4: Construct Elevator Actuator

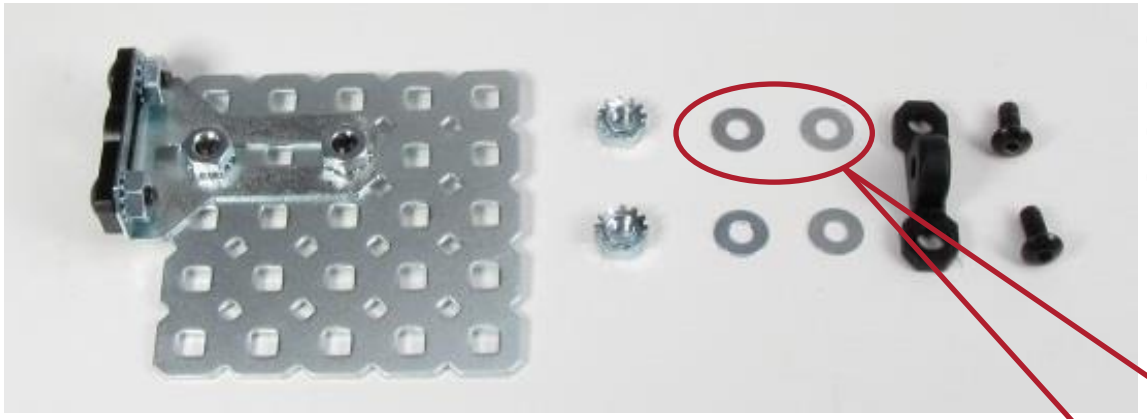


(1) Plate 5x5 holes, 275-2023 (or similar)
(2) Screw 8-32 x 0.25 in., 275-1002
(2) Nut 8-32 Keps, 275-1026

Before

After

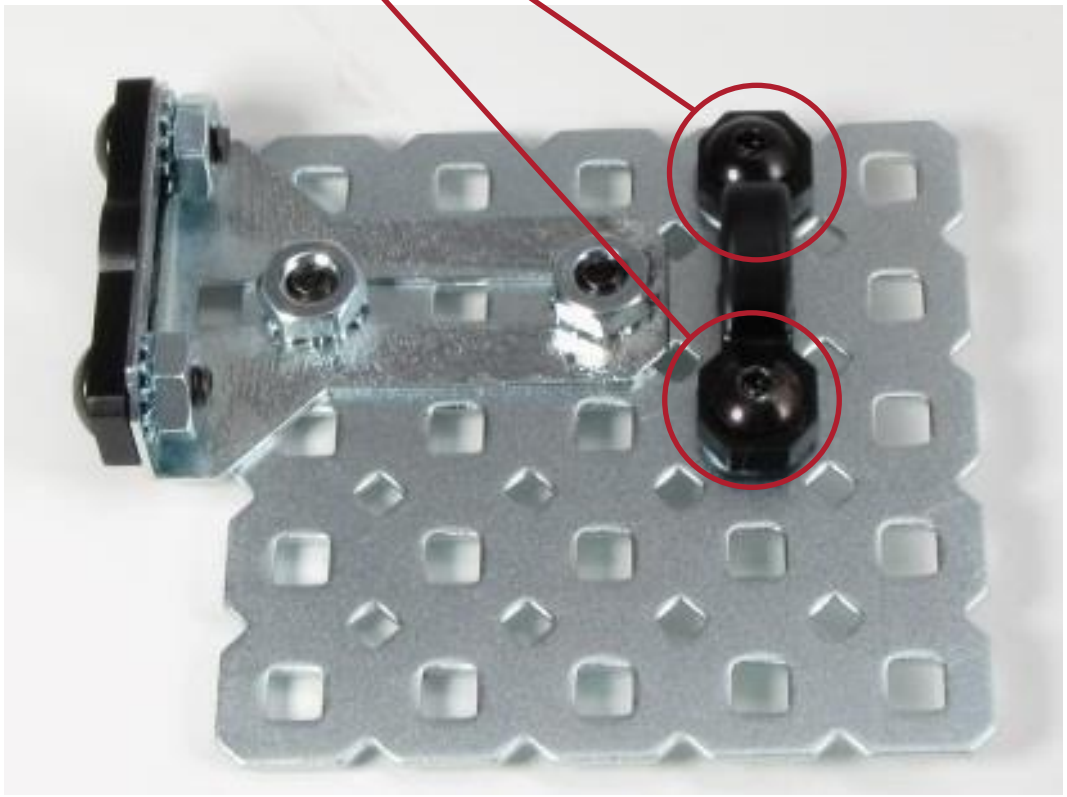
Step 5: Attach Elevator Actuator



(2) Screw 8-32 x 0.375 in., 275-1003
(2) Nut 8-32 Keps, 275-1026
(4) Washer, Steel, 275-1024
(1) Pillow Block Bearing

2 Washers under each side

Before

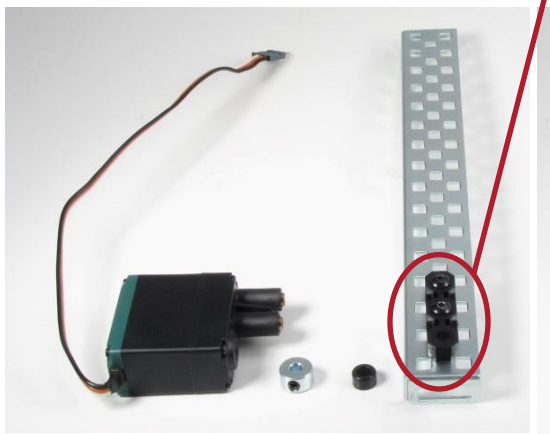


After

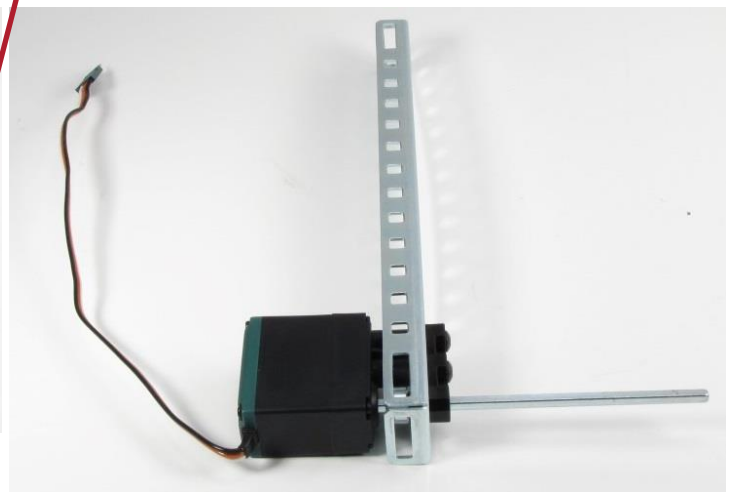
Step 6: Attach Elevator Bearing

Before

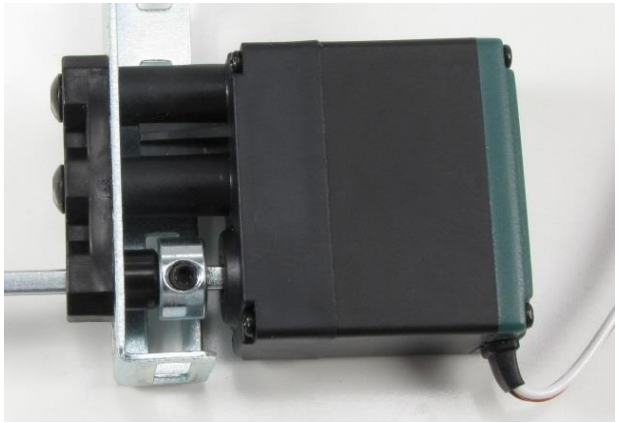
(1) Chassis Rail (16-hole)
(1) 3-Wire Servo, 276-2166
(1) Bearing Flat, Delrin, 276-1209
(2) Screw 6-32 x 0.5, 275-1169
(1) Drive Shaft 4 in., 276-1149
(1) Shaft Collar, 276-2010
(1) Spacer, 4.6mm, 276-2018



Step 7.1



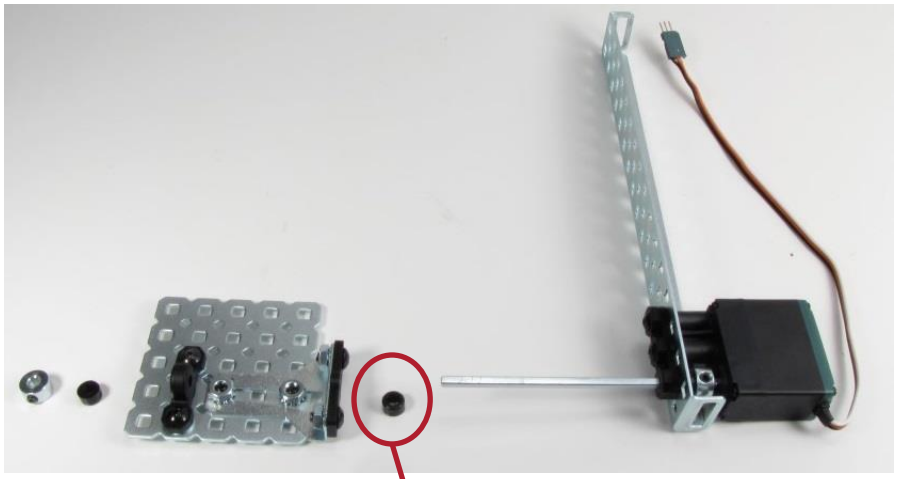
After



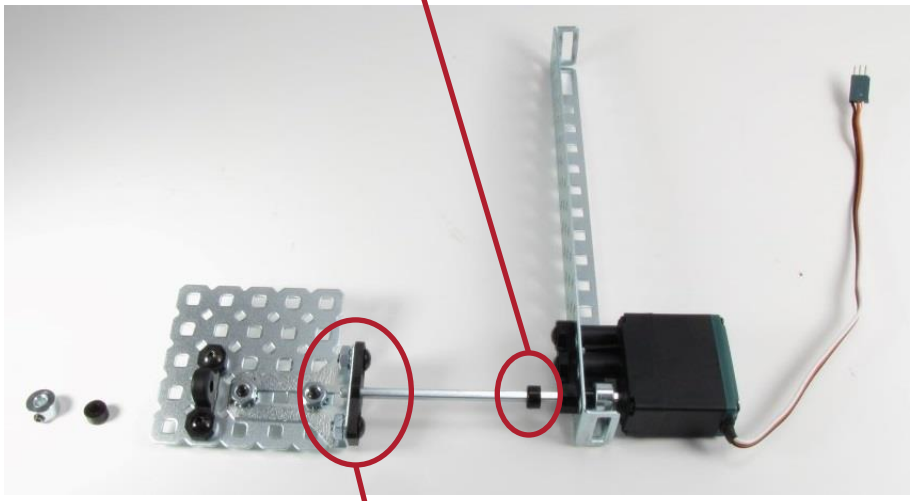
Assembly Turned Over
To See Detail

Step 7: Attach Servo Motor

(2) Spacer, 4.6mm, 276-2018
(1) Shaft Collar, 276-2010

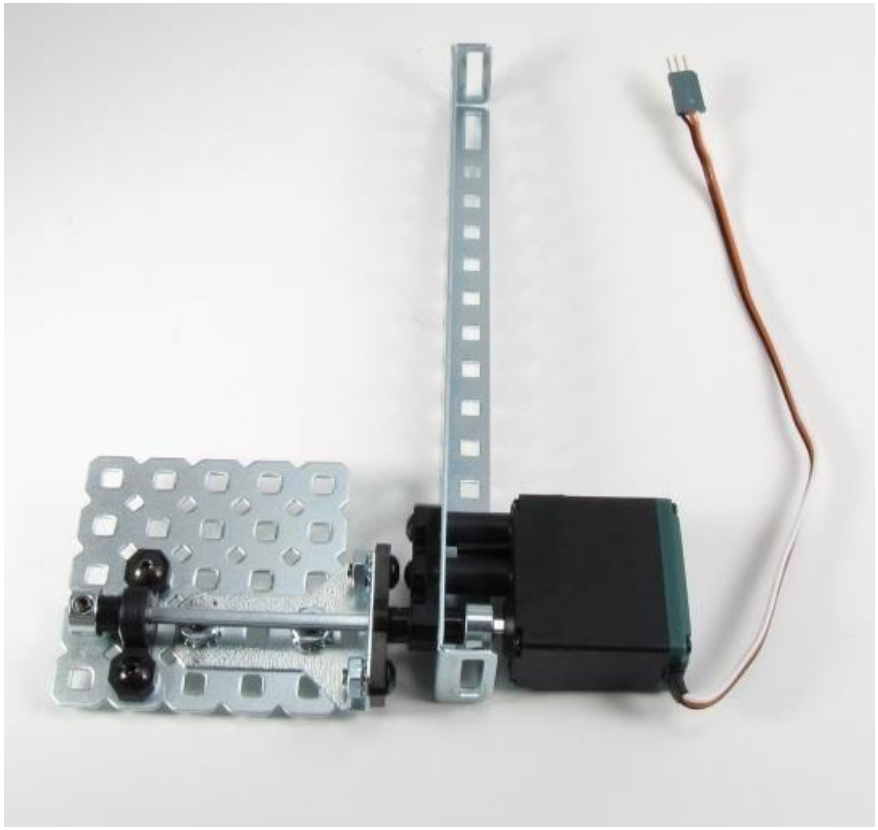


Before



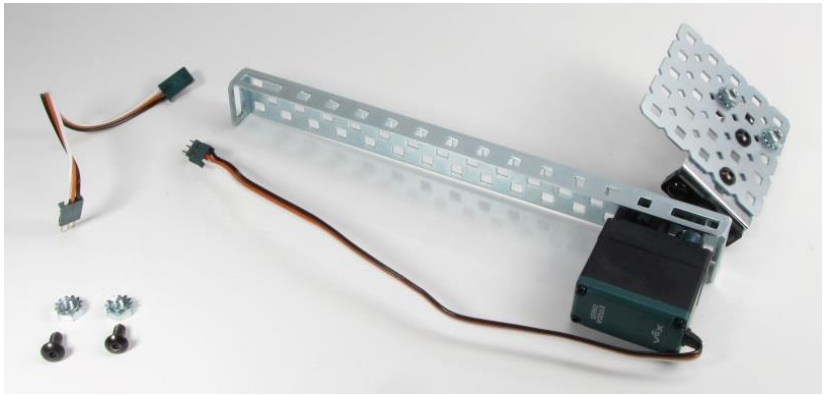
Step 8.1

Insert shaft into Lock Bar
Slowly rotate elevator until elevator in the orientation shown
Warning: DO NOT TURN SERVO EXCESSIVELY



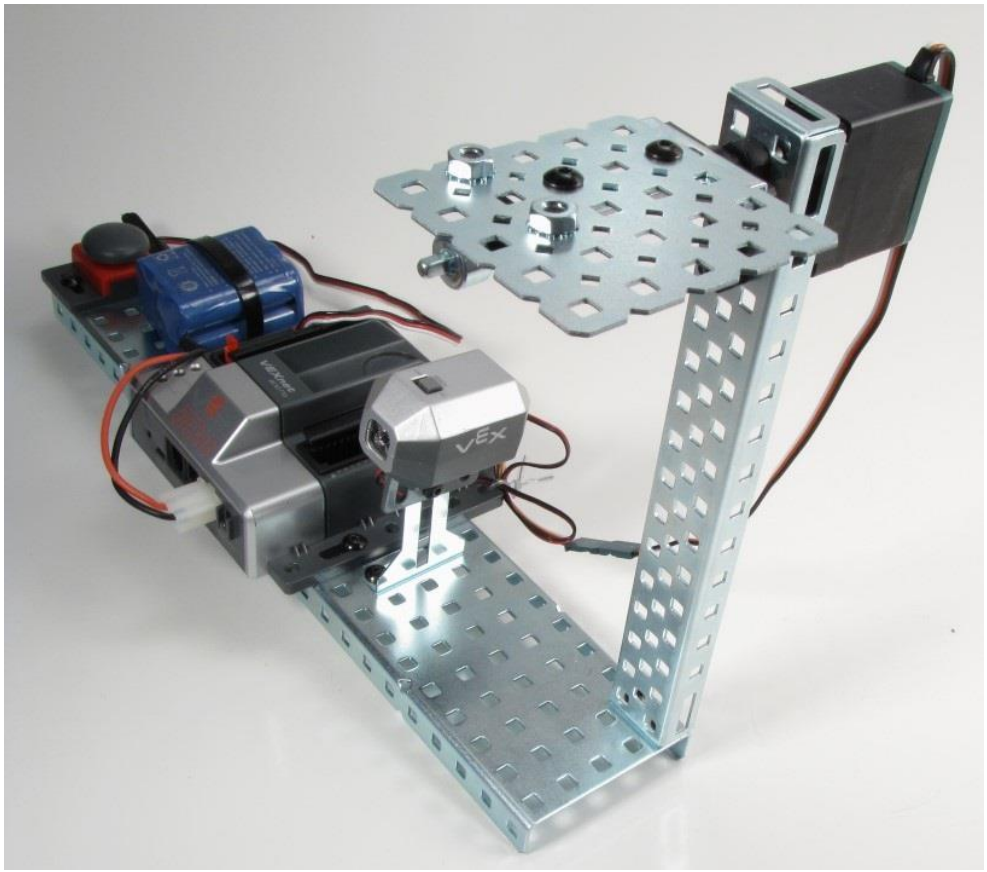
After

Step 8: Attach Elevator



Before

(2) Screw 8-32 x 0.375 in., 275-1003
(2) Nut 8-32 Keps, 275-1026
(1) 3-Wire Extension Cables, 6 in., 276-1424

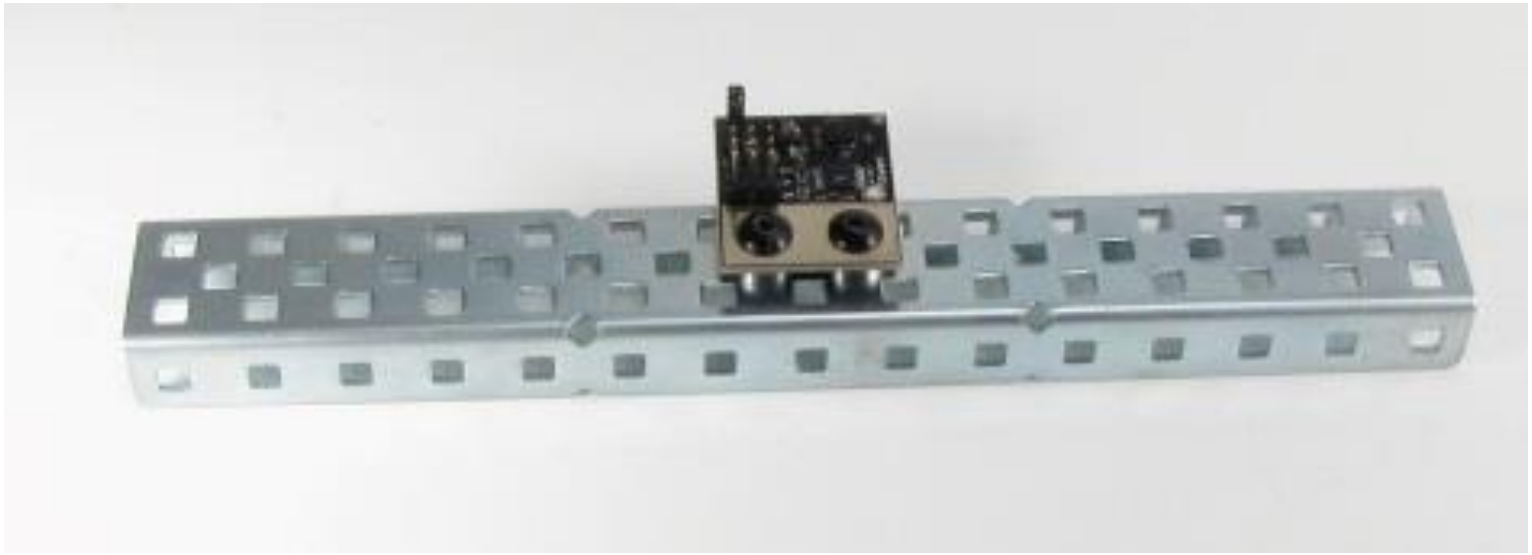


After

Step 9: Attach Elevator

(1) C-Channel 1x2x1x15 (or similar)
(2) Screw 8-32 x 0.5 in., 275-1004
(2) Nut 8-32 Keps, 275-1026
(1) Analog Accelerometer, 276-2332

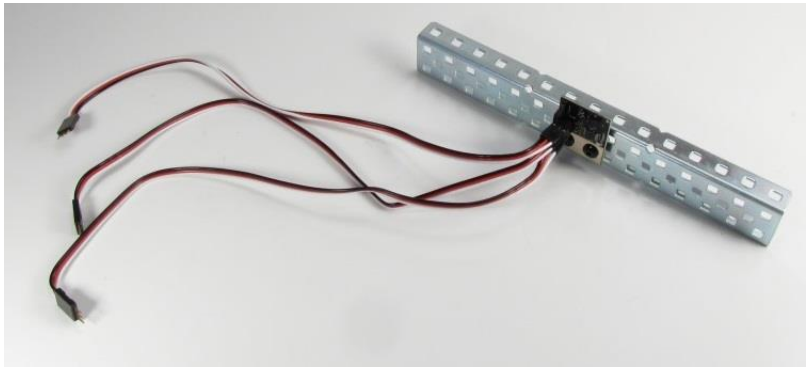
Before



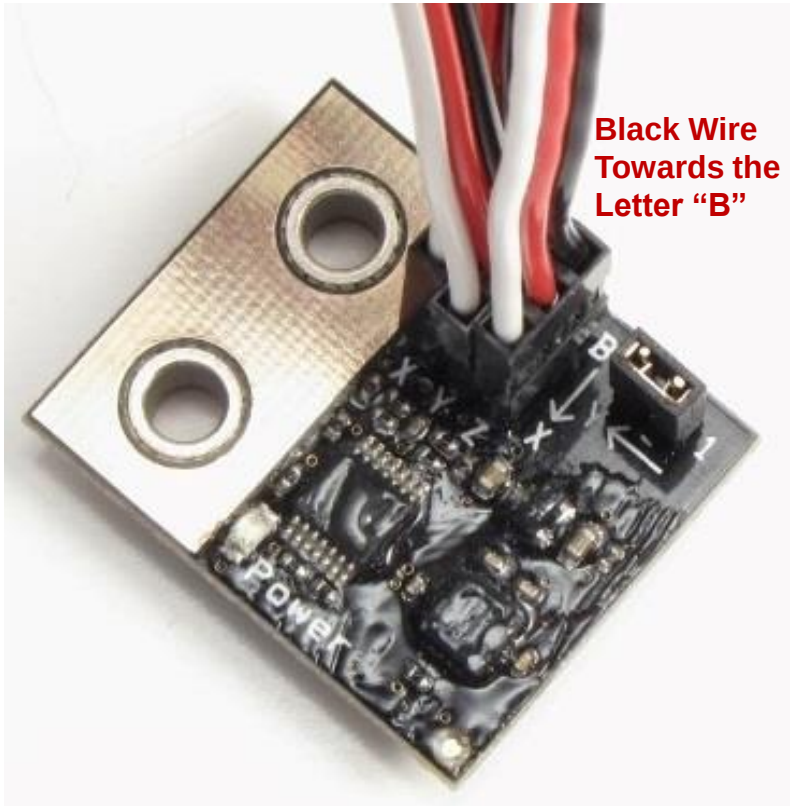
After

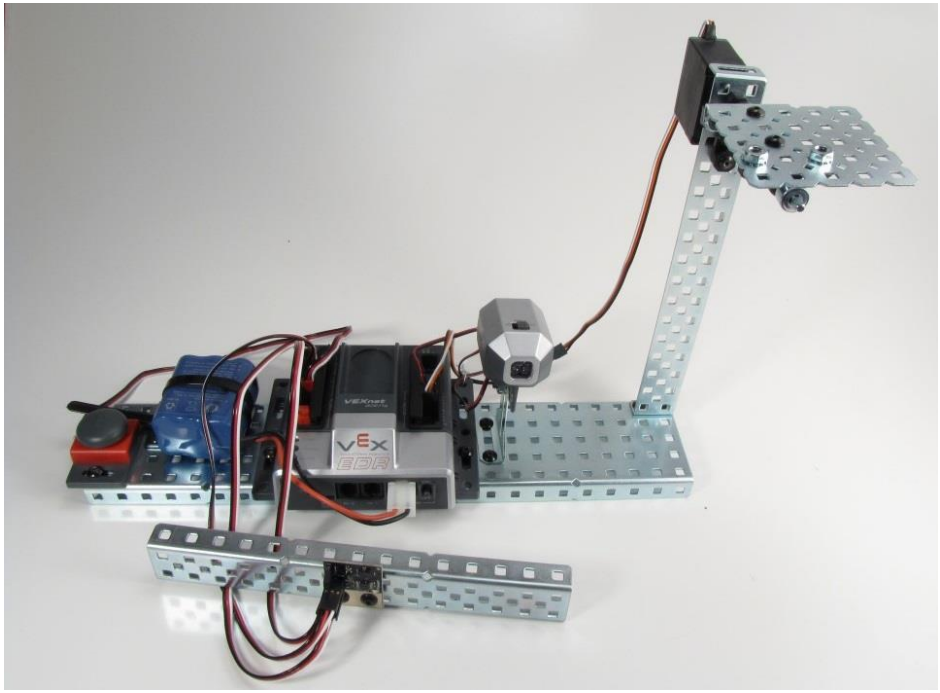
Step 10: Install Accelerometer

(3) 3-Wire Extension Cables, 12 in., 276-1424



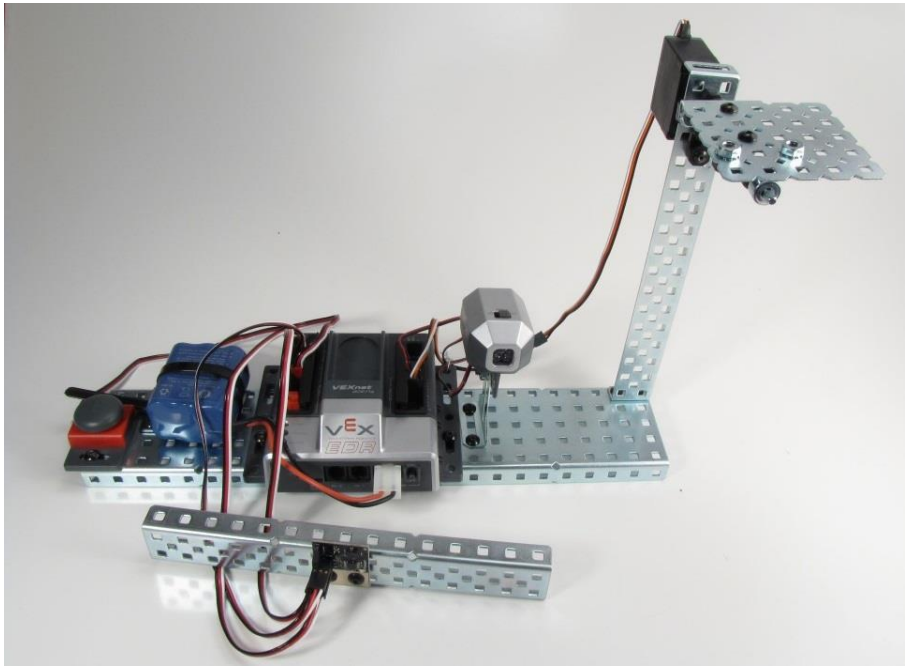
Before

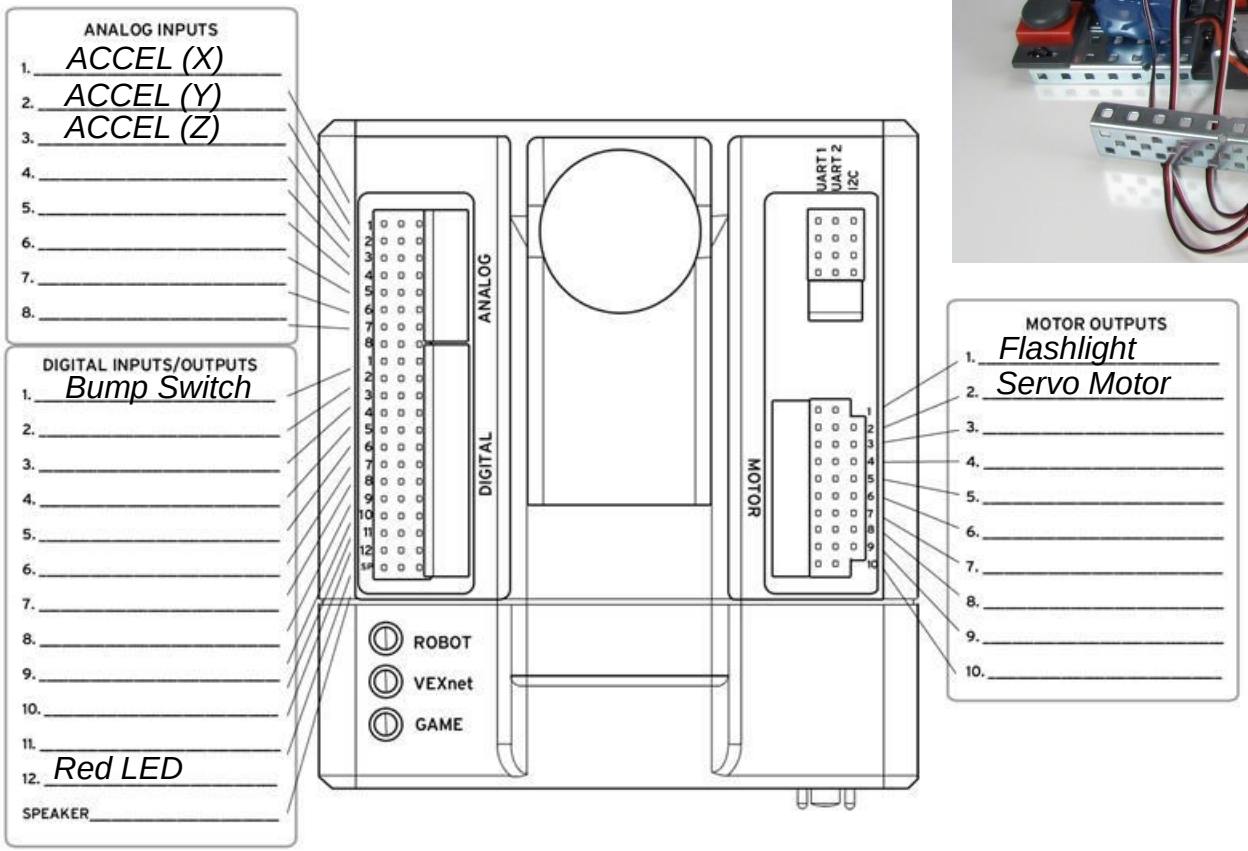




After

Step 11: Attach Accelerometer Cable





Step 12: Wire motors and sensors to Cortex