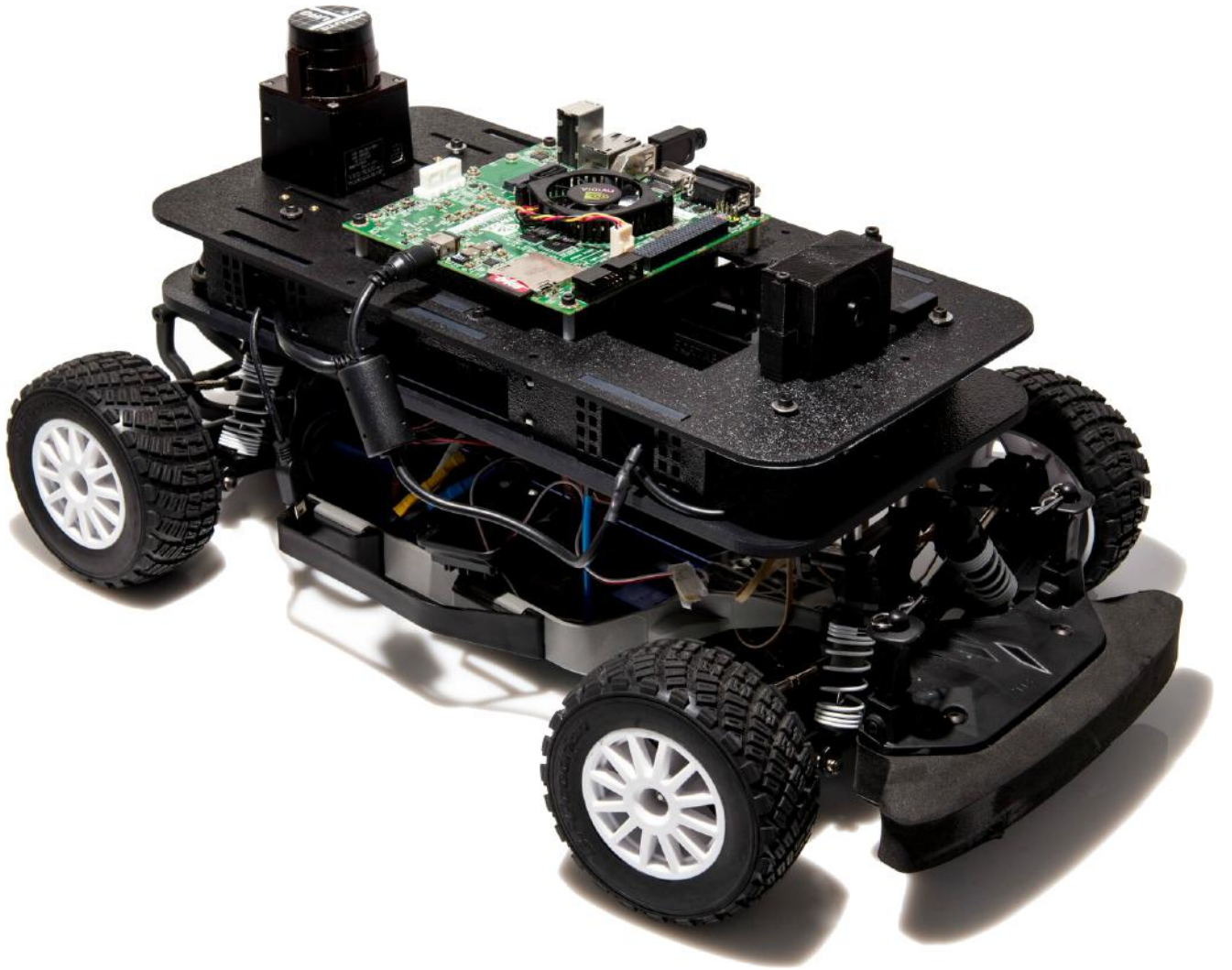


Building the F1/10 Platform

Version 1.0



F1/10

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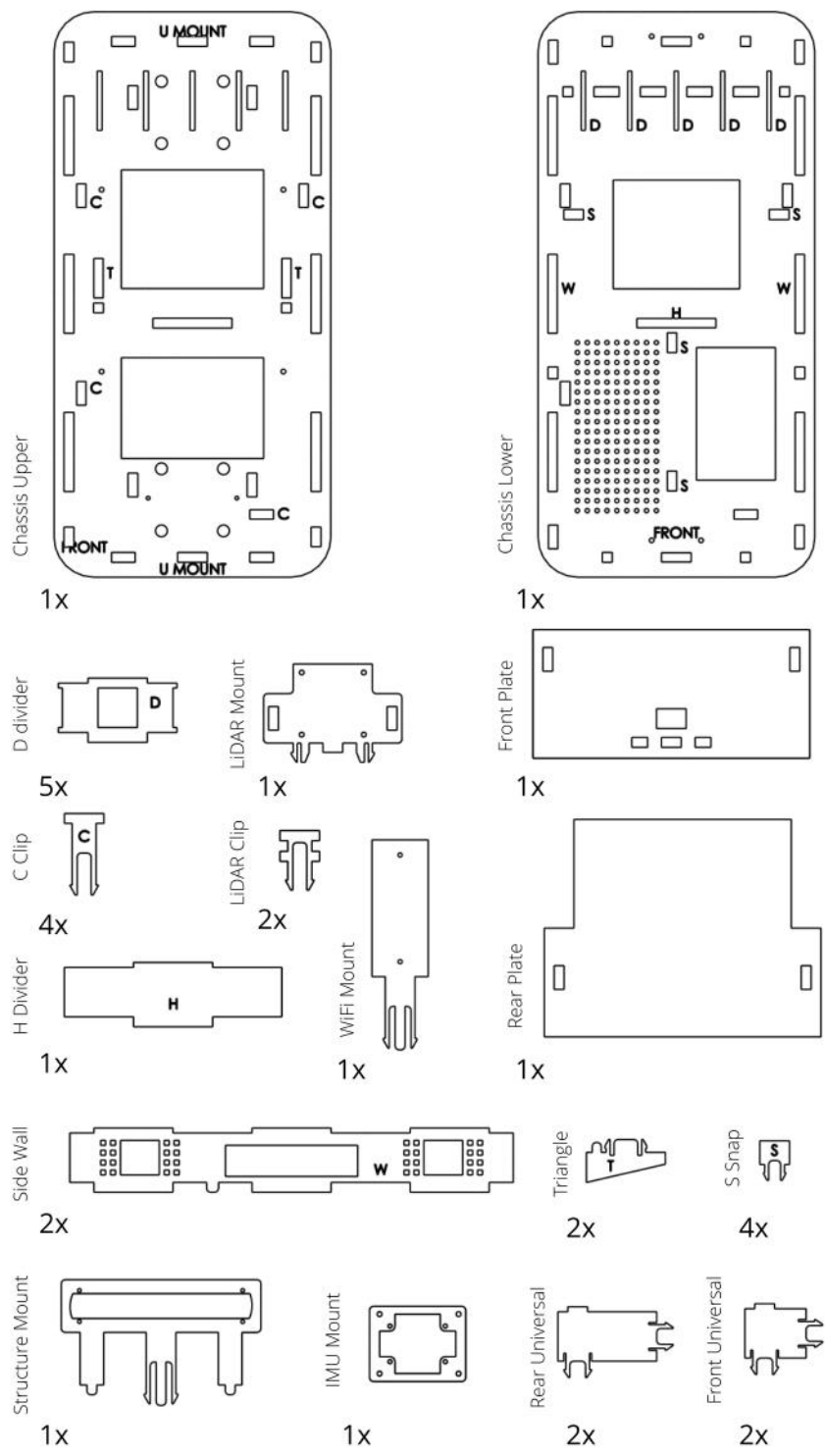
Introduction

This document is a step-by-step instruction set to assemble your own 10th scale formula 1 race car (F1/10 car). The build is easy and will take you through all the necessary tasks to get the car up and running. The estimated build time is about 45-60mins. There are 18 easy to follow sections that will take you from car prep, to assembly, to labeling, to wiring. This build is 1/10th the size and 10 times the fun, Enjoy!

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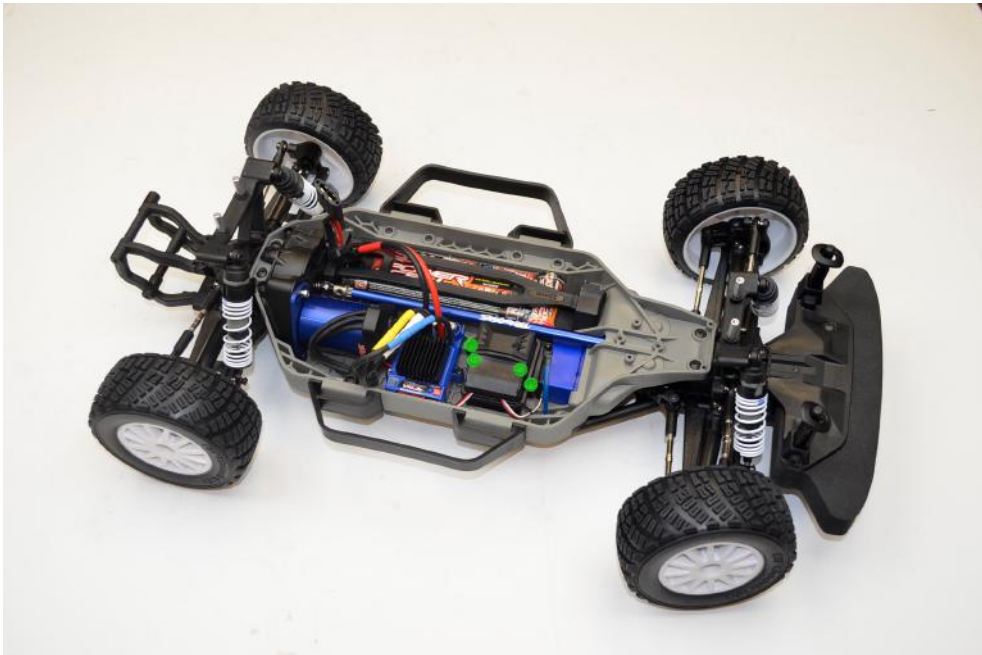
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Parts List

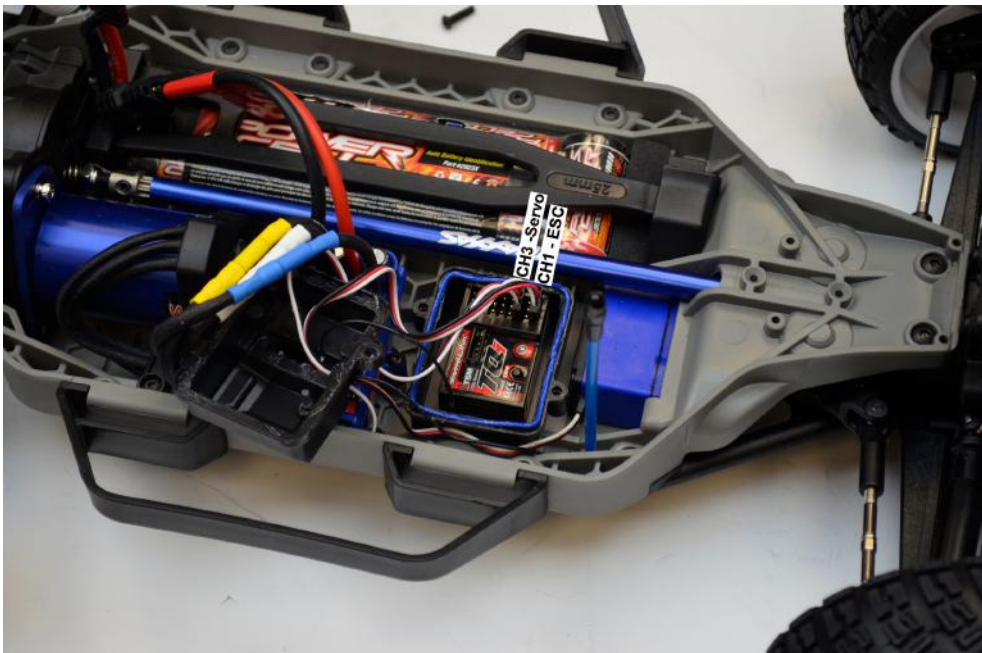


Connecting the Teensy

The *Teensy* microcontroller sends PWM signals to the Servo and ESC in order to actuate the vehicle. In order to install the *Teensy* it is necessary to provide the proper connections to the *Traxxas Radio*.

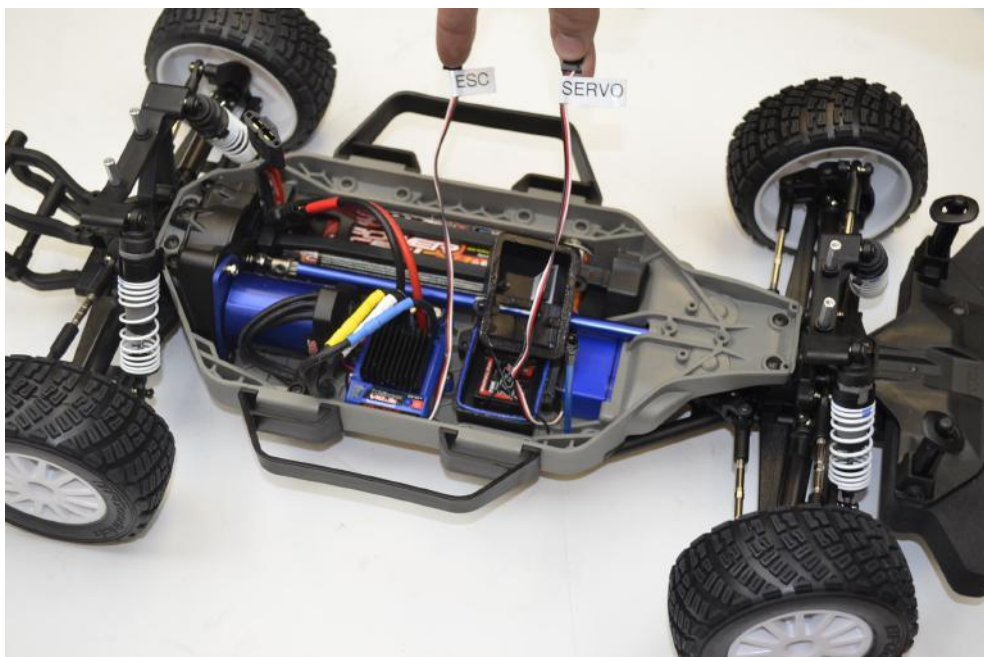
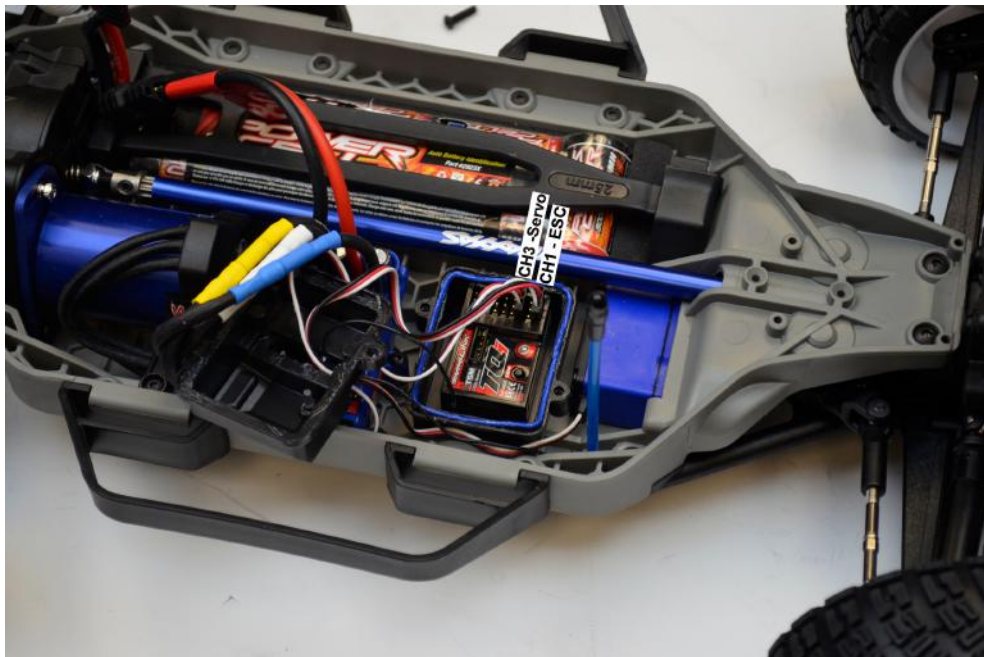


Step 1: Unscrew the the four phillips screws to the radio box using the appropriate driver and remove the top piece.



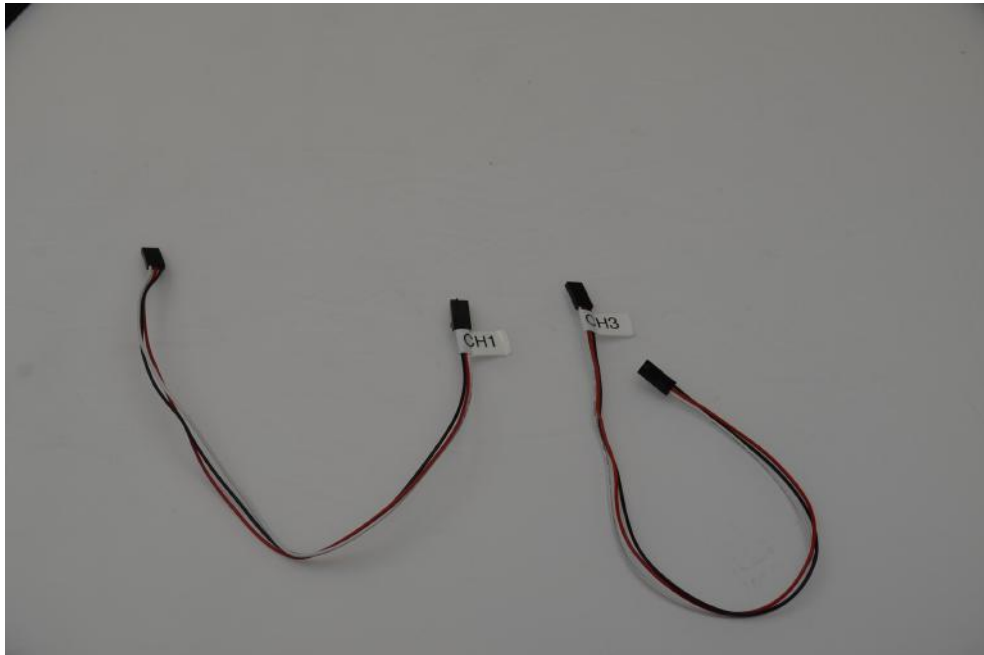
Step 2: Locate the two wires connected into the CH1 and CH3 location. CH1 located nearest the front of the car, and CH3 two positions twords the rear of the car.

Connecting the Teensy

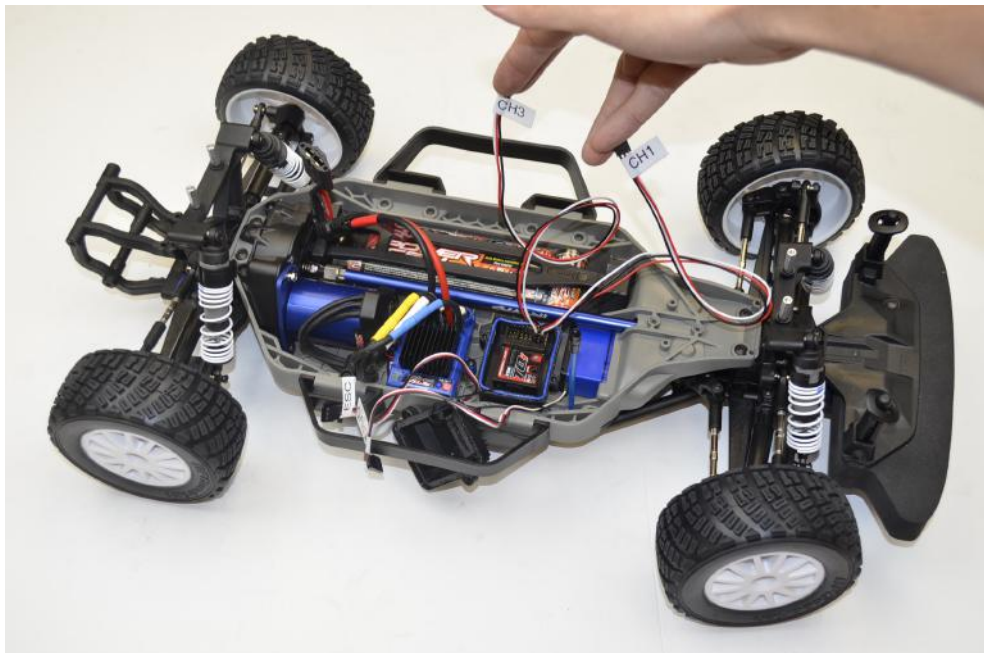


Step 3: Remove and label the two wires connected to CH1 and CH3 as ESC and Servo respectively.

Connecting the Teensy

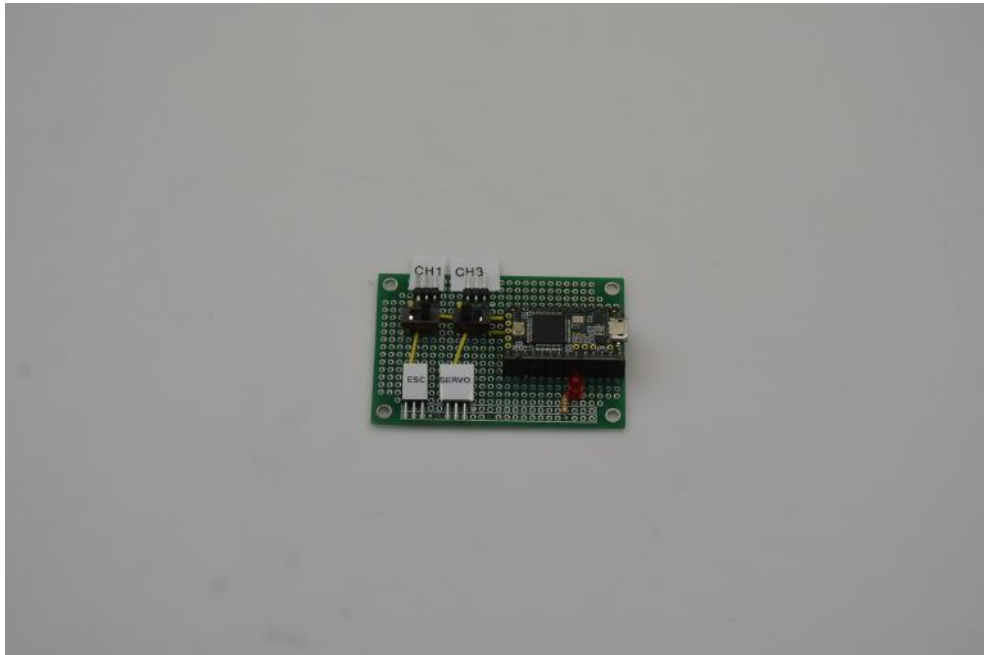


Step 4: Locate the two extension cables. Label one of the extension cables as ESC and the other as Servo.

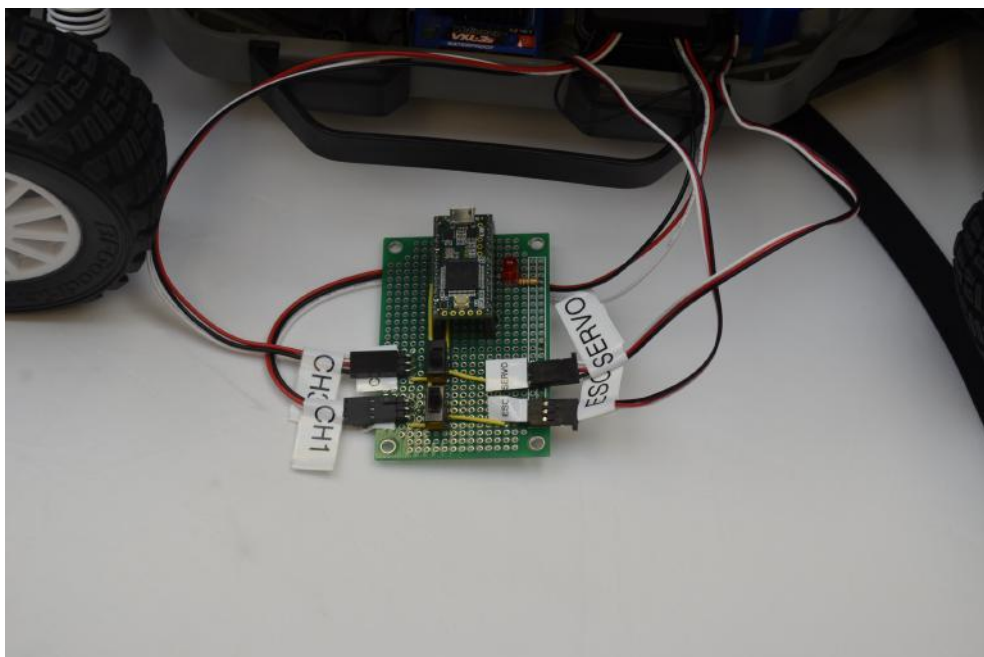


Step 5: Insert the the two wire extenders into the CH1 (ESC) and CH3 (Servo) spots in the radio box. Keep note of the orientation of the connector. Black towards drive shaft (middle of car) and white towards the red sticker on the radio box.

Connecting the Teensy



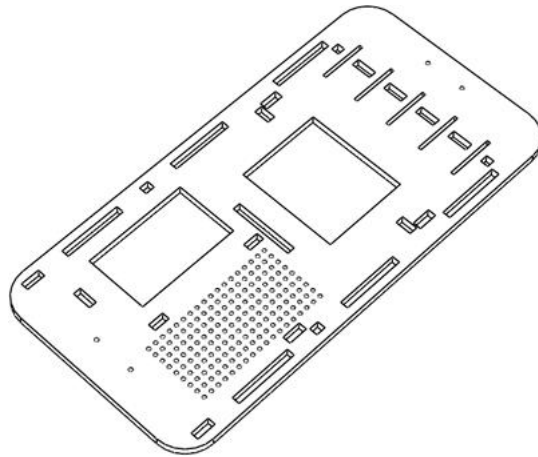
Step 6: Plug the other end of these two extension wires into the the Teensy board in the respective labeled connector (CH1, CH2).



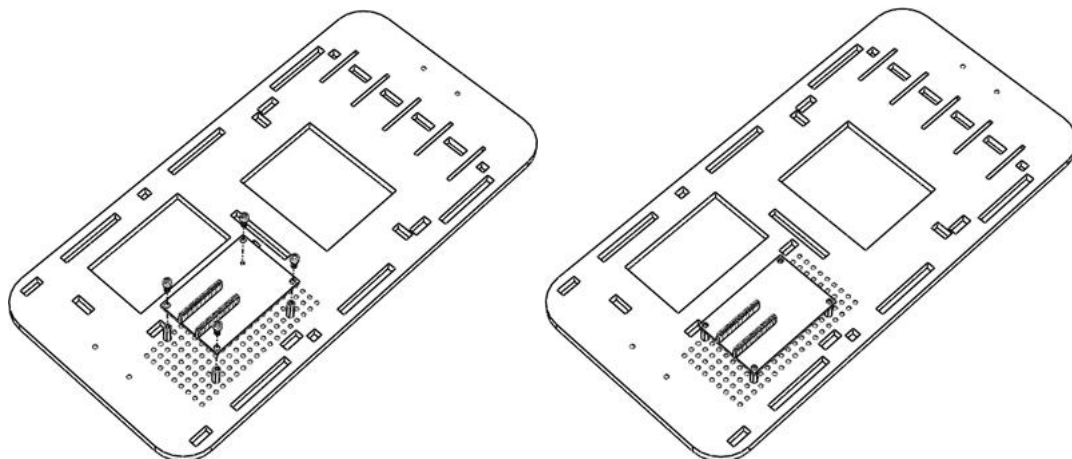
Step 7: Plug in the mini USB connector to the Teensy and plug it in to to a port on the USB hub. Wrap the wire around a wire wrap to consolidate the wire to an appropriate length.

Mounting the Teensy Board

Upon wiring the *Teensy* to the vehicle the build team must secure the *Teensy* to the *Chassis Base* with screws.



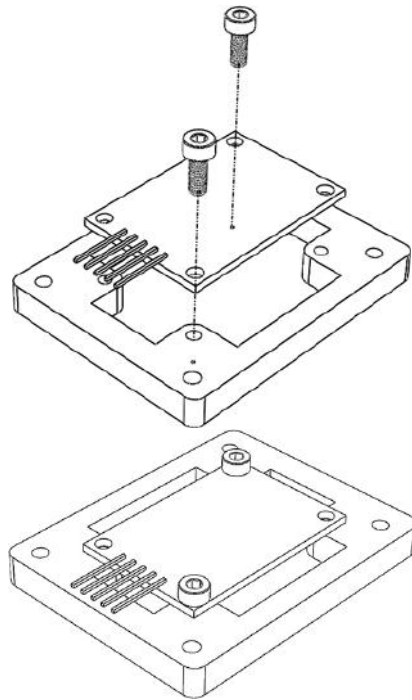
Step 1: Place the ¼" (thicker piece) chassis base on a flat surface with the front facing you. Flip the piece over so that the side with the lettering is facing down.



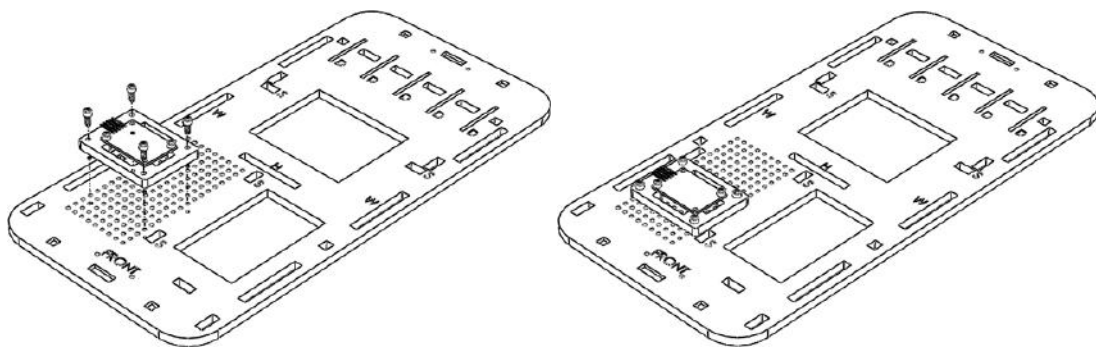
Step 2: With the *Chassis Base* front facing towards you, and the bottom facing up, mount the *Teensy* board to the *Chassis Base* with to the corresponding holes as shown. Use two M3 screws to secure the board threading them into the *Chassis* (no nut is required).

Mounting the IMU

Upon wiring the *IMU* to the vehicle the build team must secure the *IMU* to the *IMU Mount* and then secure the assembly to the *Chassis Base* via screws.



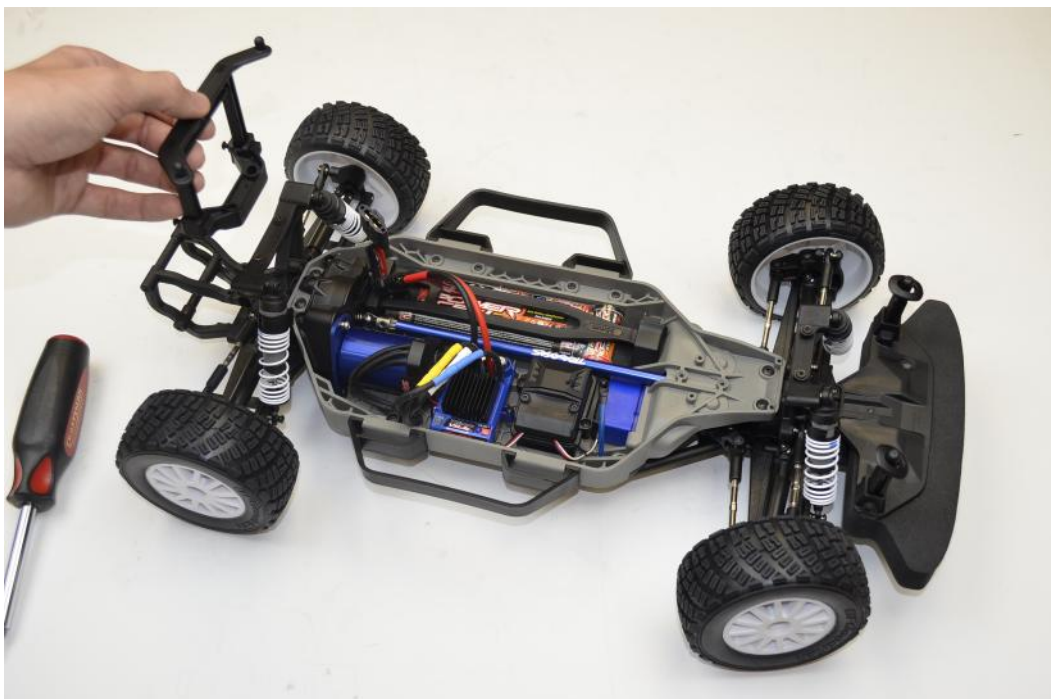
Step 1: Mount the *IMU* to the *IMU Mount* with two M3 screws. Threading the screws into the *IMU Mount* (no nut is required).



Step 2: Flip the *Chassis Base* over, so that the lettering *front* is visible. Mount the *IMU* to the *Chassis Base* to the corresponding holes as shown using two M3 screws. Threading the screws into the *IMU Mount* (no nut is required).

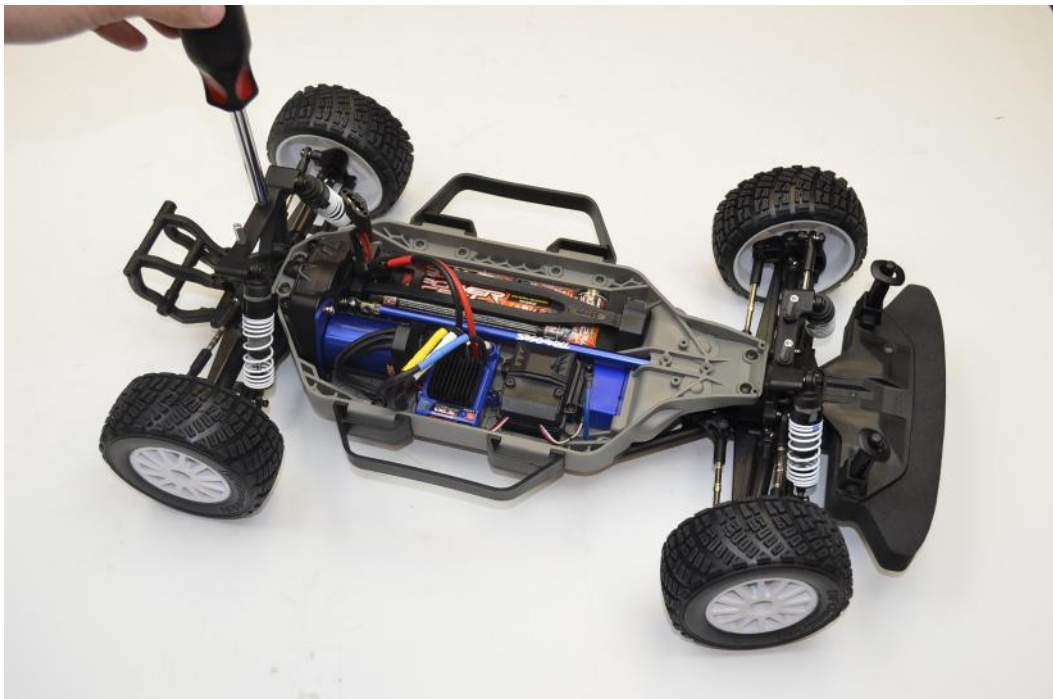
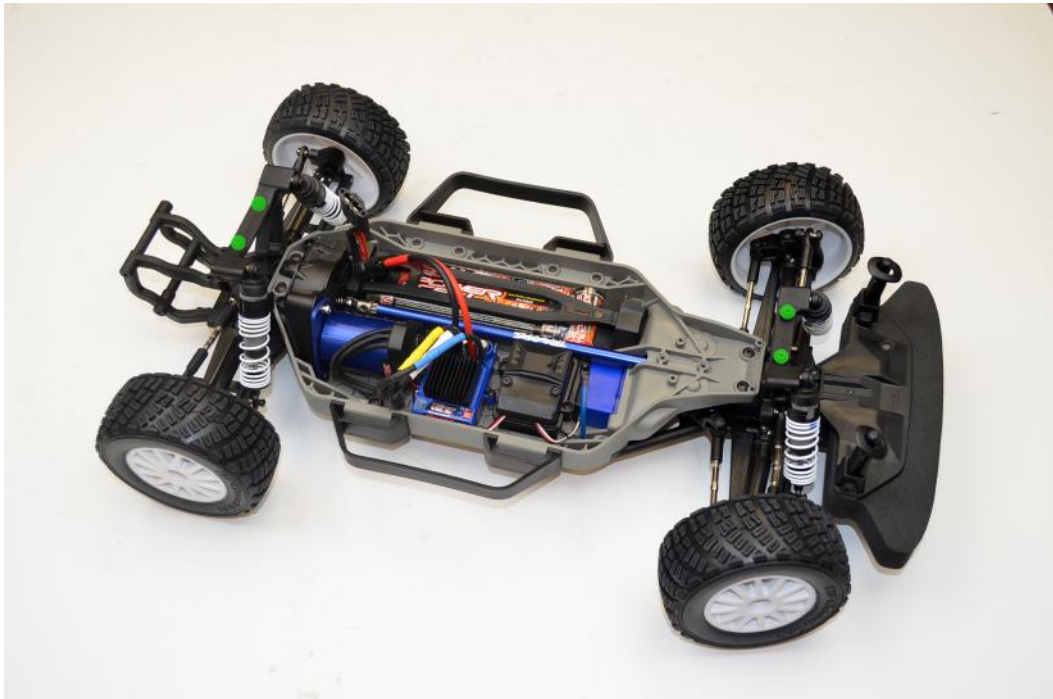
Mounting the Chassis

This section walks you through the steps to mount the *Chassis Base* to the car using standoffs and screws. The *Chassis Base* is the foundation that houses all the components.



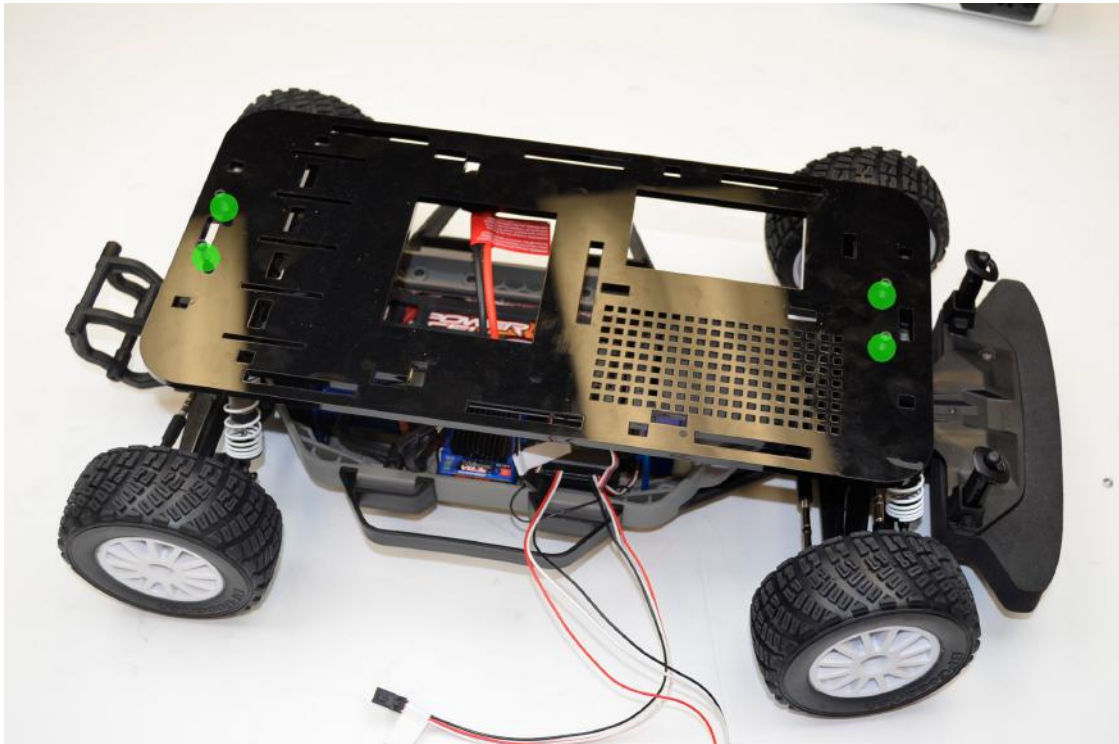
Step 1: Remove the mount highlighted in green by removing the screws highlighted in yellow. This piece is not used in the F1/10 build.

Mounting the Chassis



Step 2: Screw in four stand-offs into the four holes in the car using four M3 standoffs. The holes are highlighted in green.

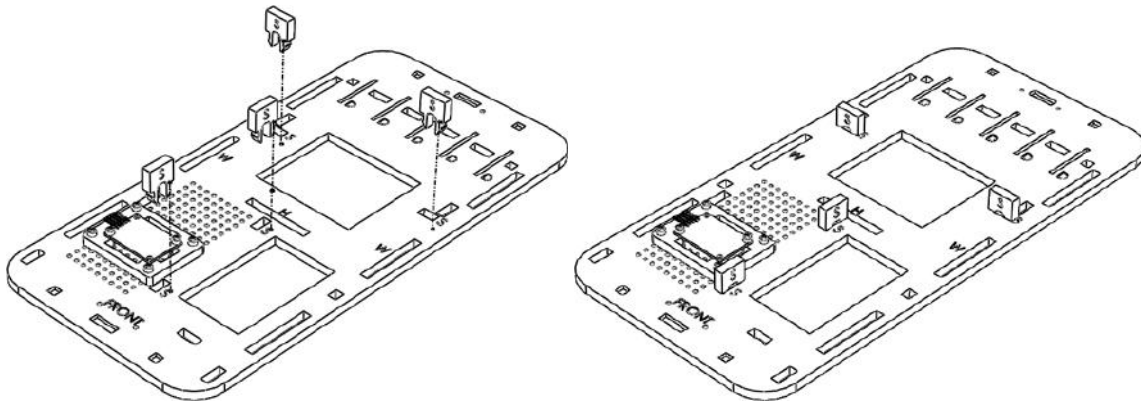
Mounting the Chassis



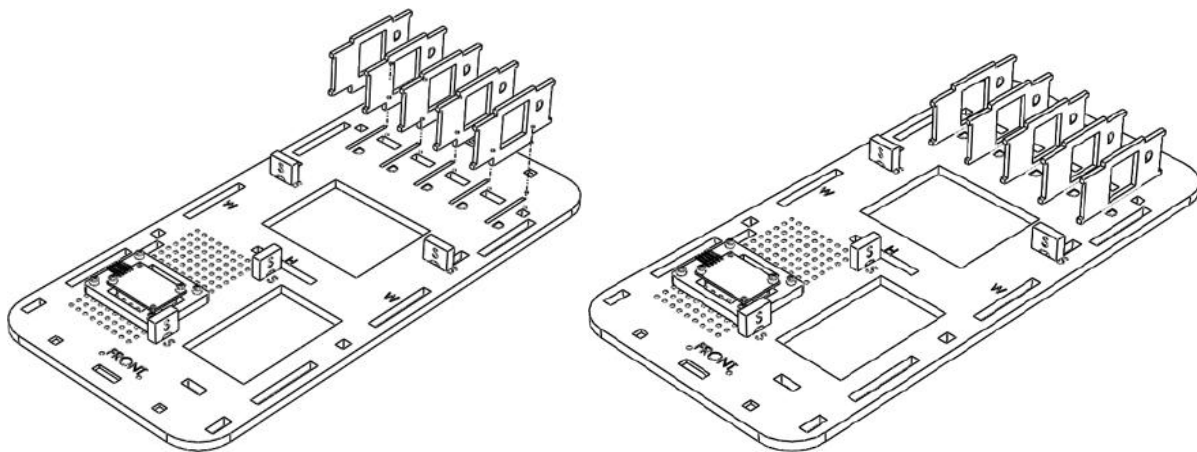
Step 3: Mount the *Chassis Base* to car with the “front” text facing up and forward. Use 4 M3 screws to mount the chassis to the 4 stand offs previously installed.

Assemble the Chassis

The **Chassis** itself consists of many laser cut pieces and also houses many components. This step walks you through the assembly and insertion of the **USB Hub** and **Energizer Battery Pack**.

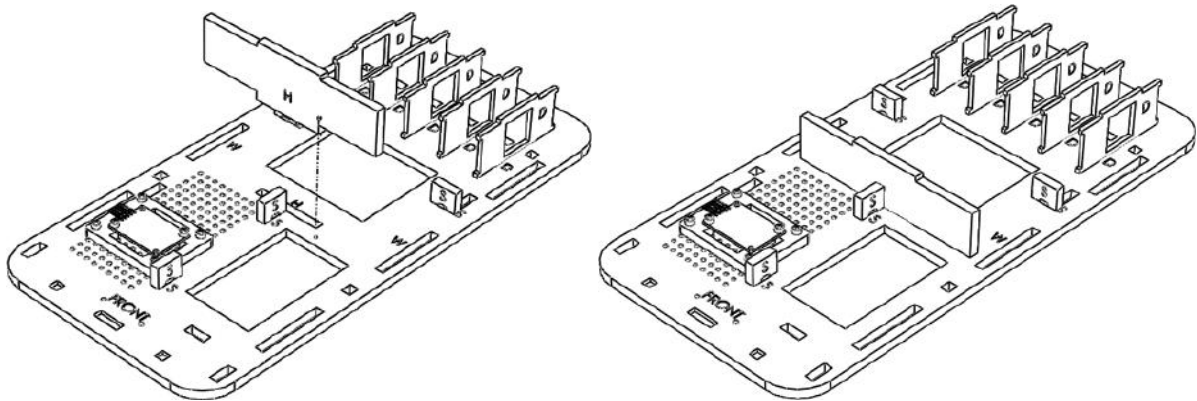


Step 1: Snap all the **S Clips** (4 total) into the **S Slots** with the prongs facing downwards. Two are located on the front middle, and two are located in the back.

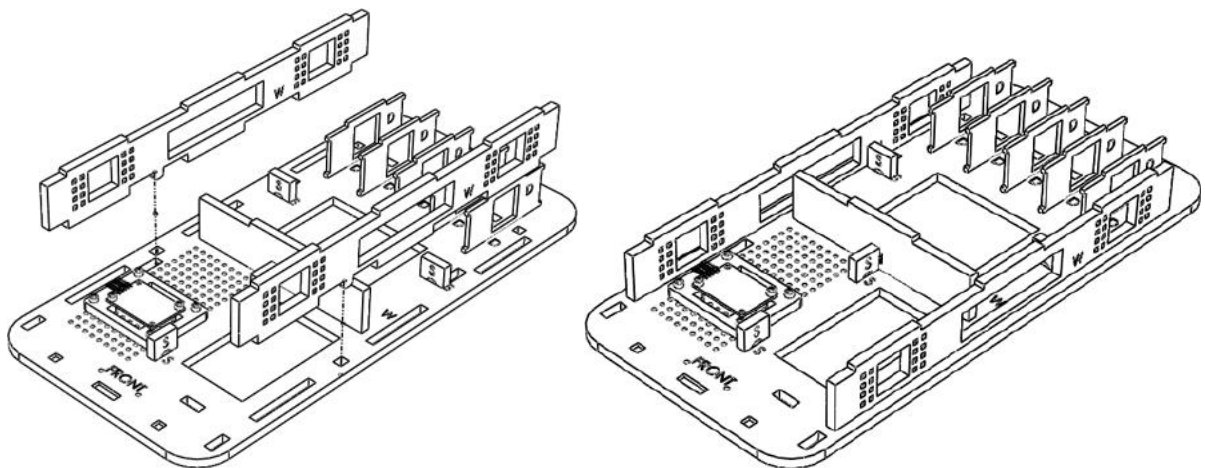


Step 2: One at a time press in all the **D Dividers** (5 total) in the slots on the back end of the **Chassis**. Assure they are pressed fully into their slots.

Assemble the Chassis

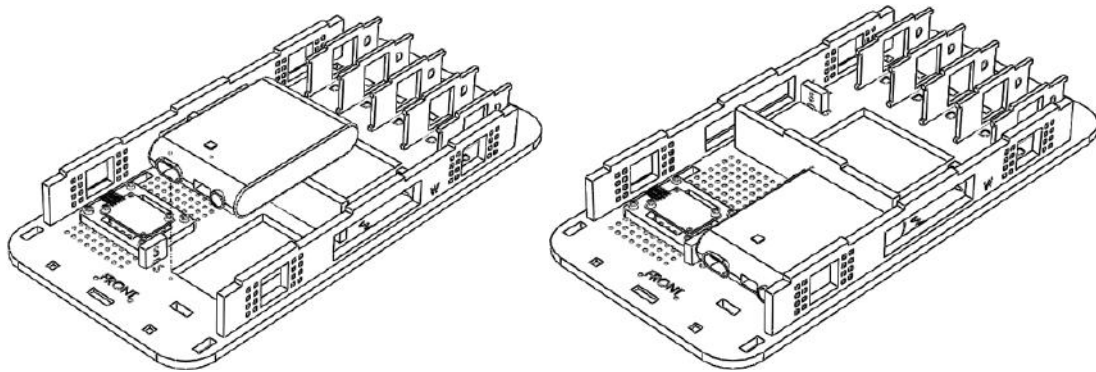


Step 3: Insert the *H Divider* into the corresponding H slot on the middle of the *Chassis*.

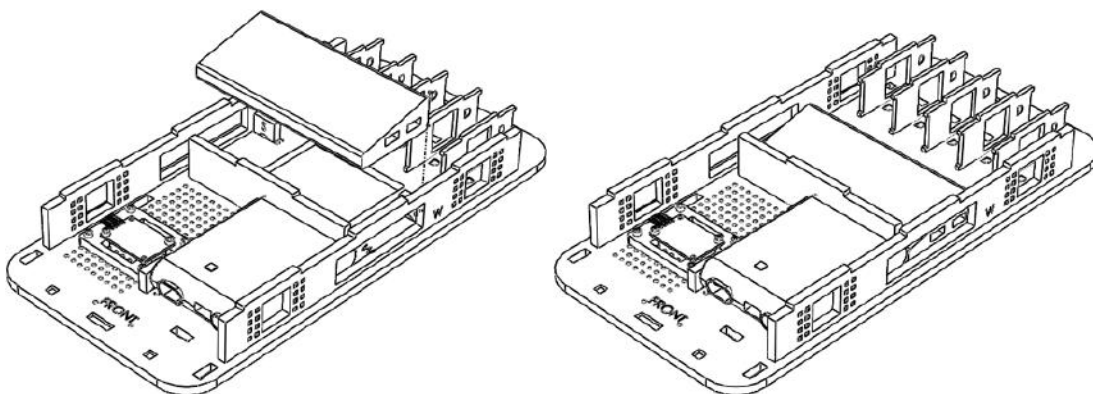


Step 4: Insert the *W Side Walls* (2 total), with the letters facing the same direction to allow the small alignment nub and the three rails to align with their respective slots.

Assemble the Chassis

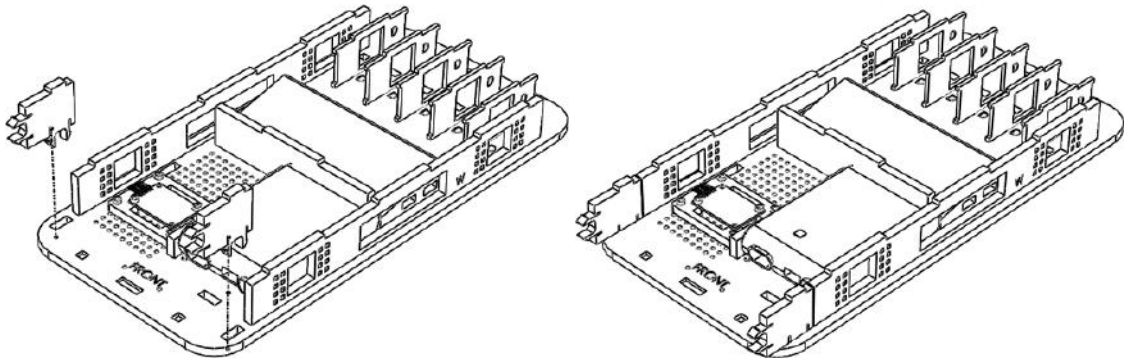


Step 5: Insert the *Energizer Battery Pack* into the pack location in the front of the chassis with the Energizer logo facing up and the connector ports facing the front.

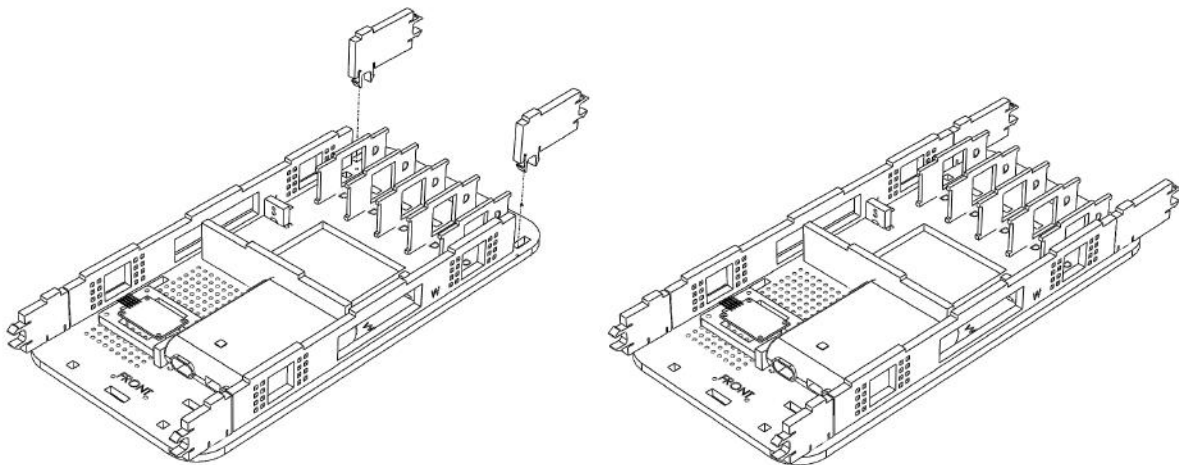


Step 6: Insert the *USB Hub* in the USB hub location so that the USB ports are facing the back and the Amazon logo is on the lower right corner.

Assemble the Chassis



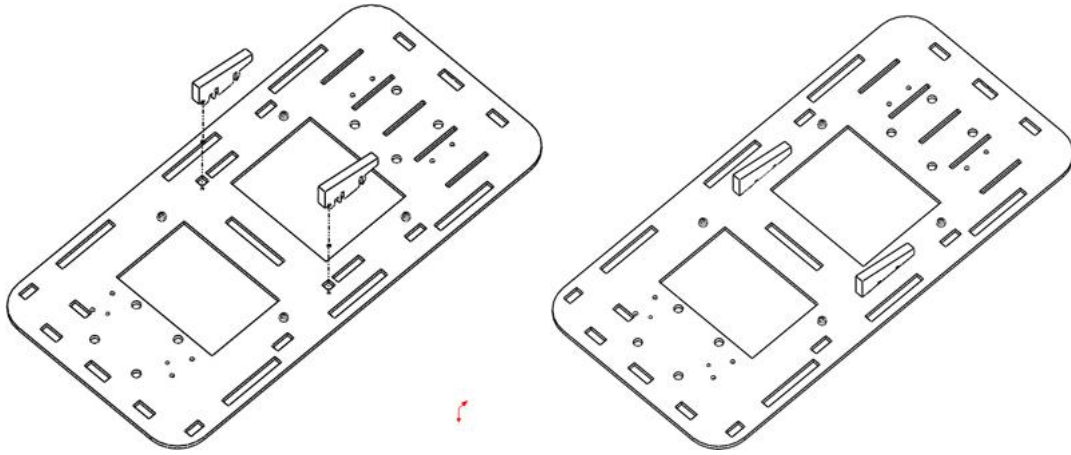
Step 7: Snap in the the two *Universal Mount Clips* into their corresponding slots at the front of the *Chassis Base*.



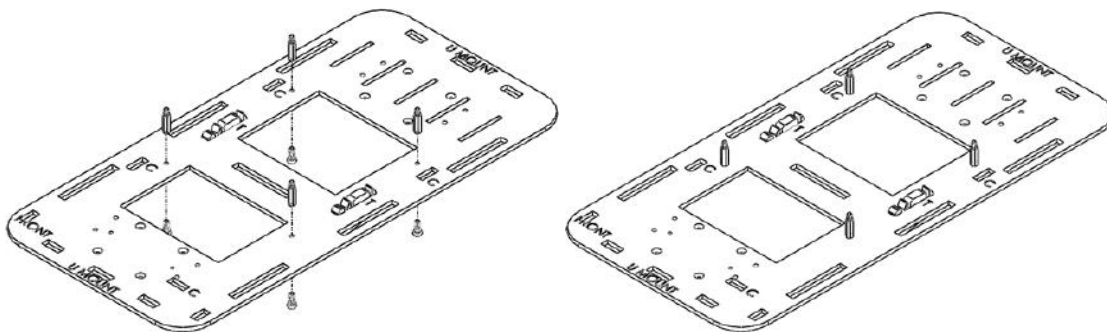
Step 7: Snap in the the two *Universal Mount Clips* into their corresponding slots at the back of the *Chassis Base*.

Assemble the Chassis Top

To complete the assembly of the *Chassis* four *C Clips* must be properly inserted to secure the *Chassis Top* and *Chassis Bottom*. Finally the *Nvidia* is mounted to the *Chassis Top*. The *Nvidia* is the main processing unit on the car where the computation takes place.

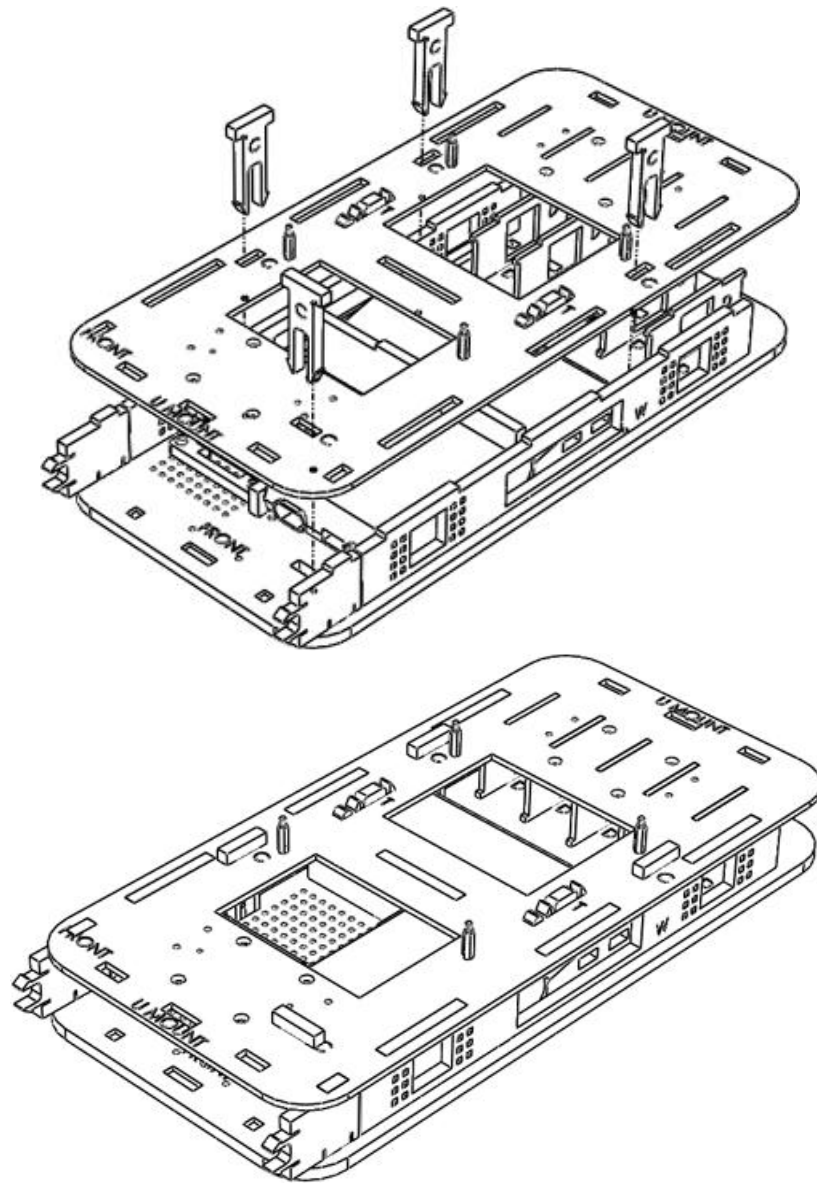


Step 1: Place the *Chassis Top* on a flat surface with the top facing down, and the front facing towards you. Snap in both *T Triangle* pieces into the corresponding slots in the middle of the *Chassis Top* aligning the small nub to ensure the correct orientation.



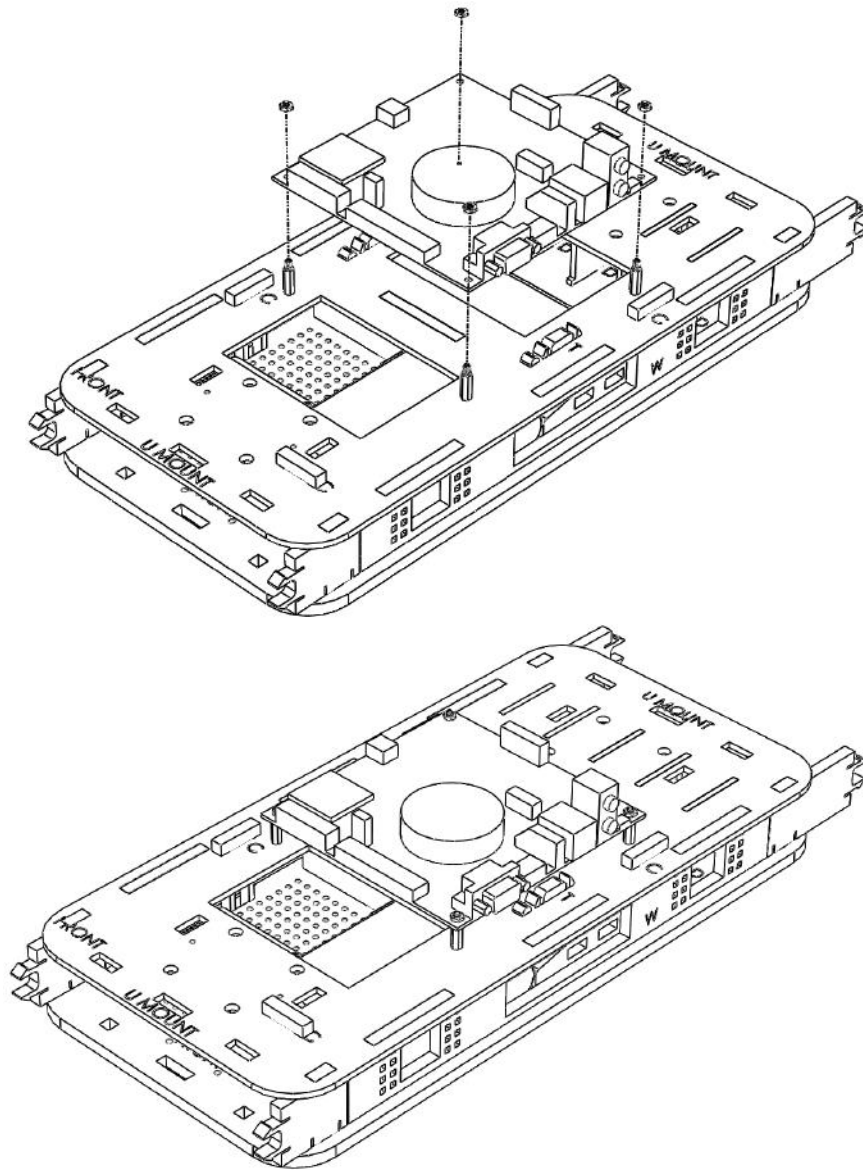
Step 2: Pick up and flip the *Chassis Top* over so the *T Triangle* snaps are facing down and the front is facing towards you. Mount 4 stand offs to the top of the chassis, securing the standoffs with 4 M3 screws inserted from the bottom.

Assemble the Chassis Top



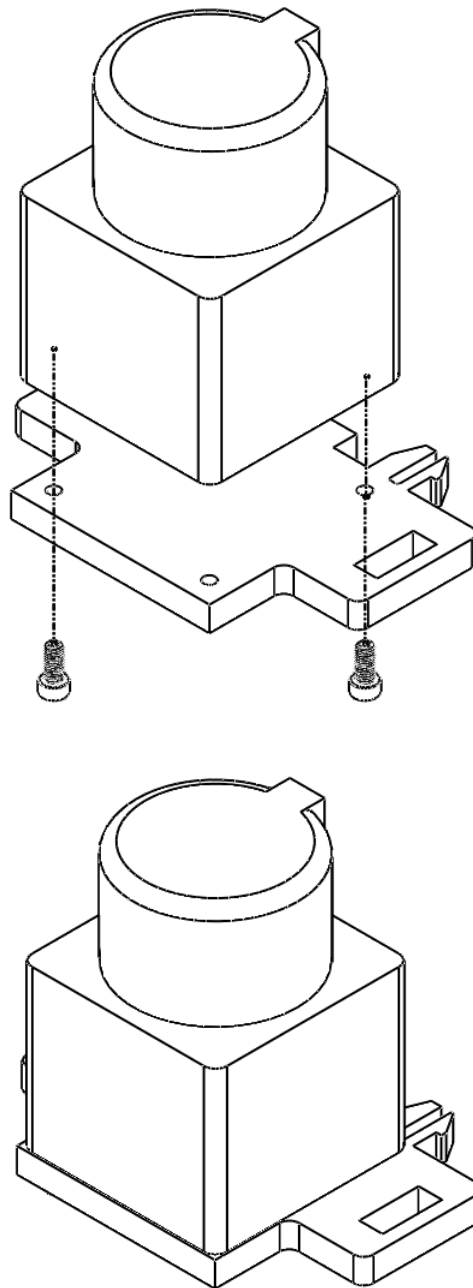
Step 3: Pick up and place the *Chassis Top* piece onto the assembled *Chassis Base*. Taking care that all the bottom pieces align in their corresponding slots. Once the top piece is properly seated on the assembled bottom. Feed the 4 *C Clips* through their corresponding slots on the *Chassis Top* and snap them into the *Chassis Base* to secure the assembly. Pull up on the inserted clips to ensure they are properly secured into the *Chassis Base*.

Assemble the Chassis Top



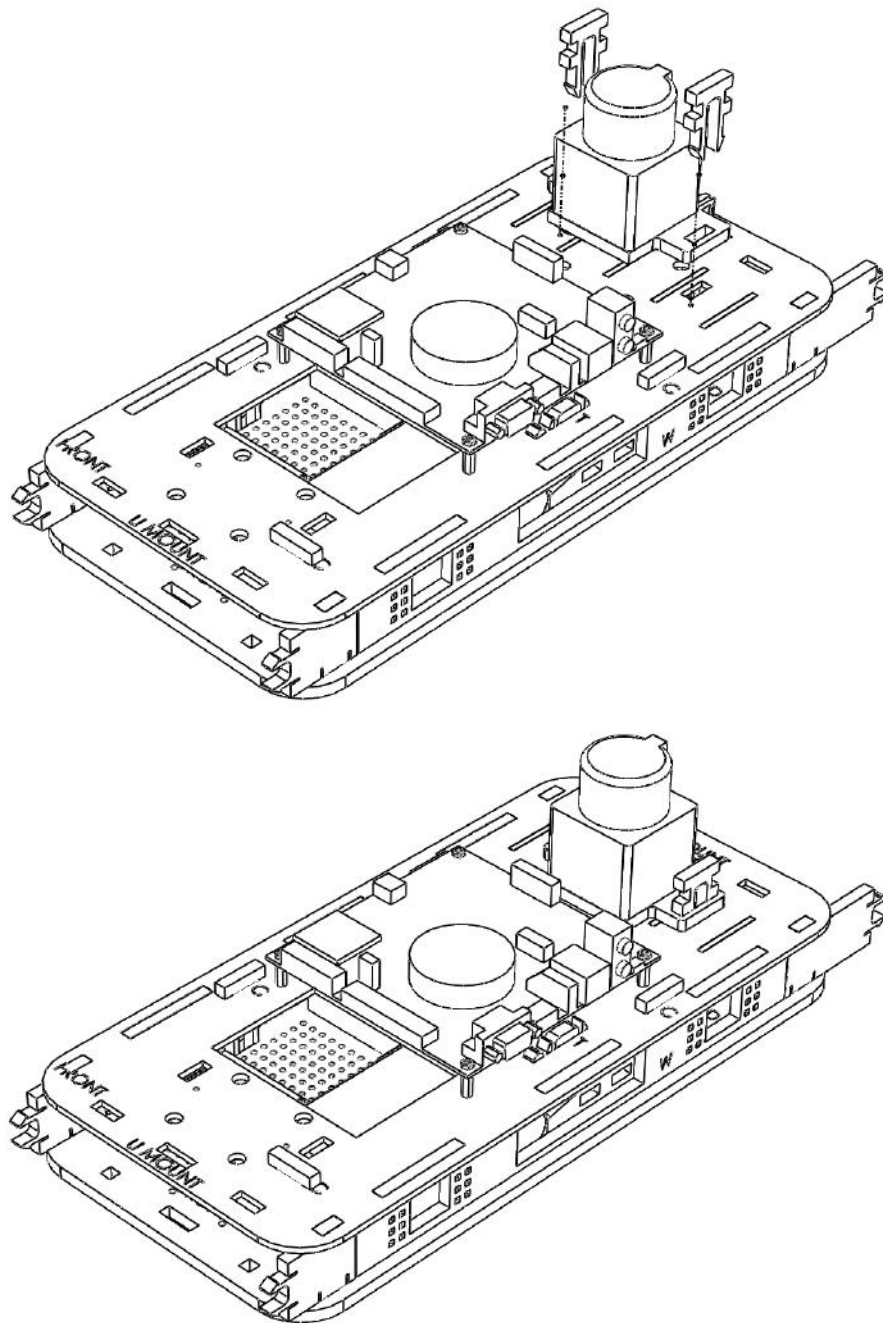
Step 4: Place the *Nvidia* board on the standoffs so the 4 mounting holes align with the standoffs. Screw 4 M3 screws through the mounting holes into the standoffs to secure the *Nvidia* board.

Connecting Lidar to Mount



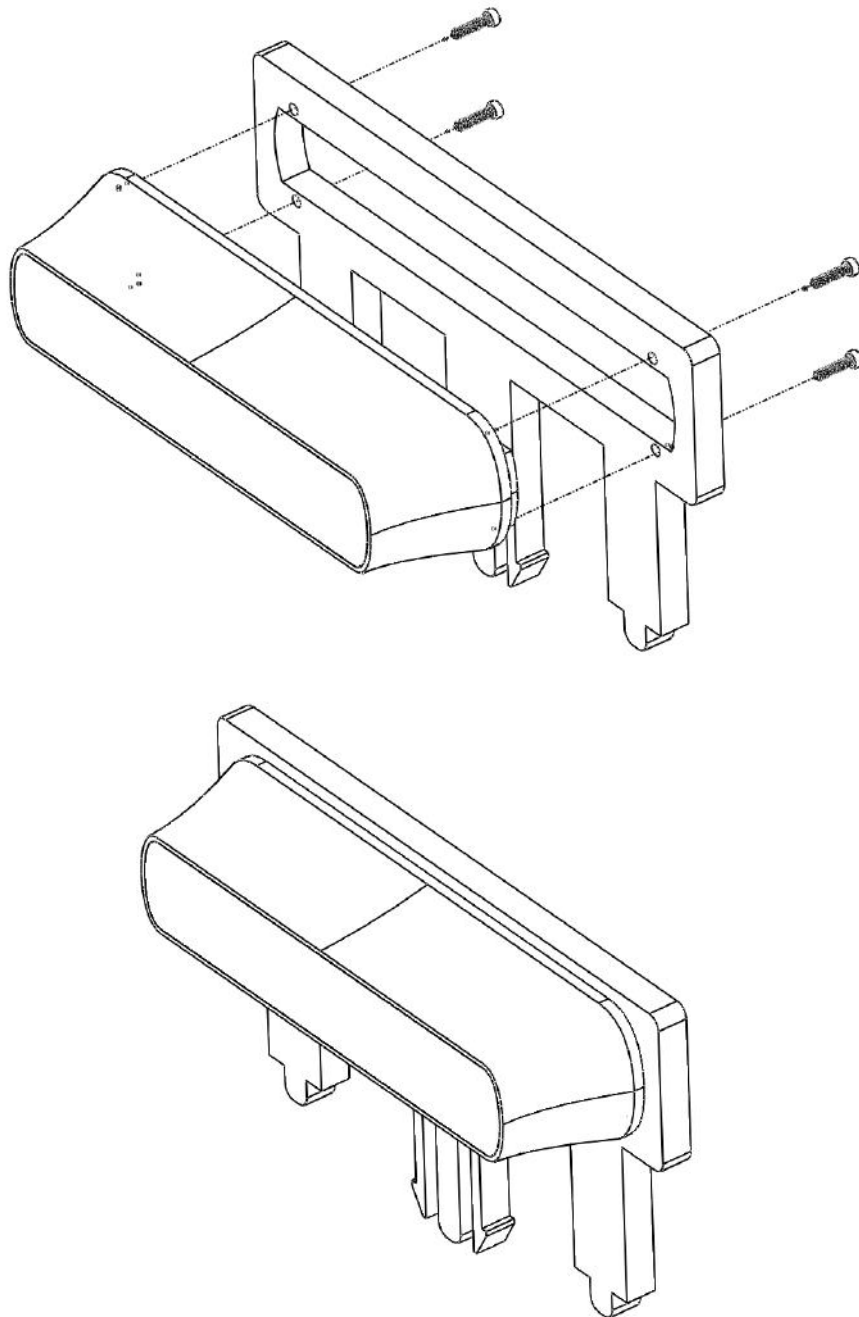
Step 1: Use two M3 screws to secure the *Lidar* mounting plate to the bottom of the *Lidar*. Place the two screw in a diagonal bolt pattern. The cables of the *Lidar* (rear) should be on the side of the mount with the clips.

Mounting Lidar to Chassis



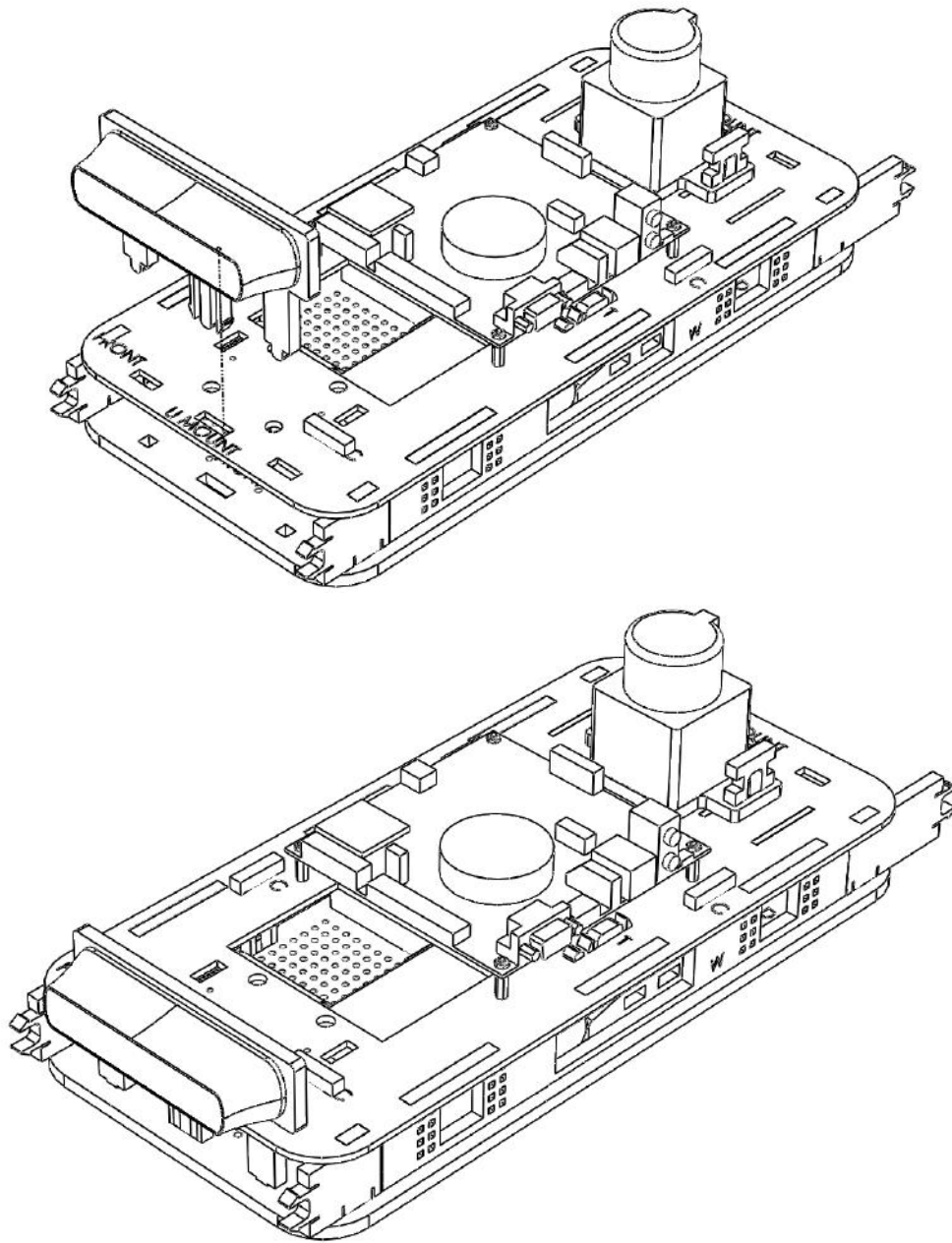
Step 1: Place the *Lidar Assembly* on the assembled *Chassis*. Align the mount with the mounting slots. Snap in two *Lidar Clips* on either side to secure the *Lidar Assembly* to the *Chassis*. To remove, pinch the *Lidar clips* on the tabs and pull out.

Mounting Structure Cam to Mount



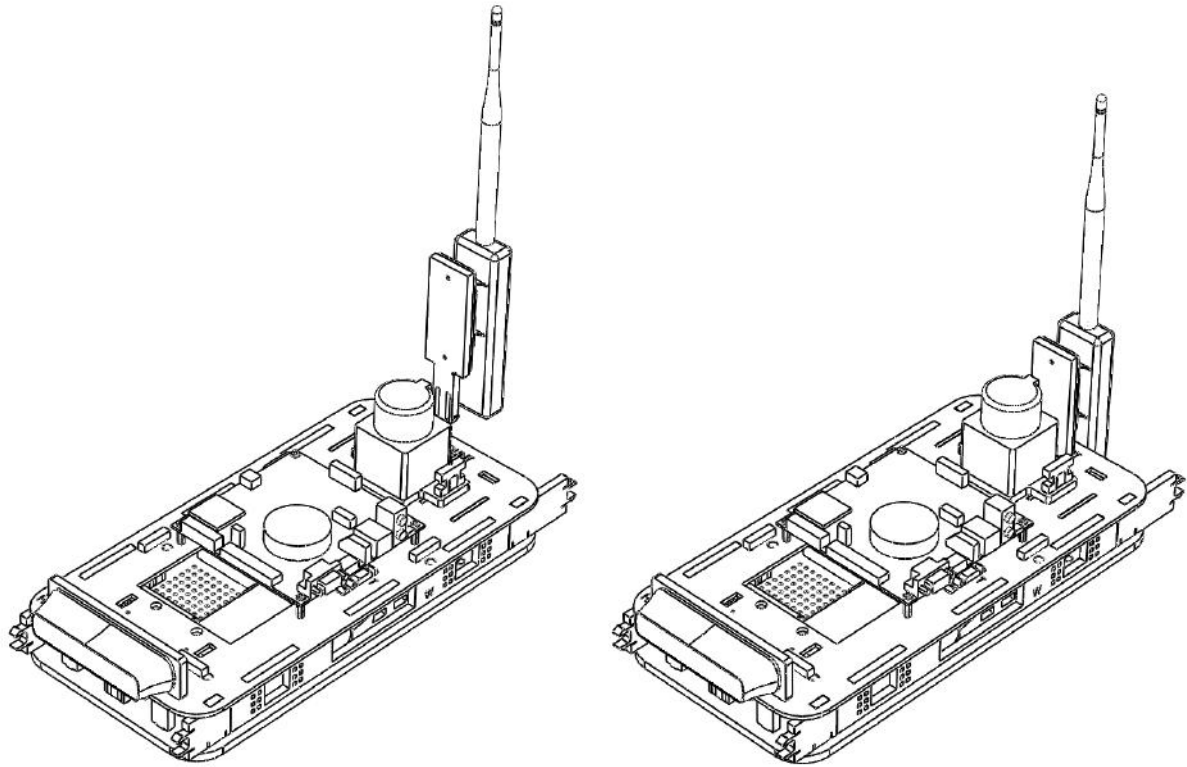
Step 1: Press the *Structure Cam* into the mount so that the top is facing up. Insert four M1.6x8mm screws into the mount to secure the camera.

Mounting Structure Cam to Chassis



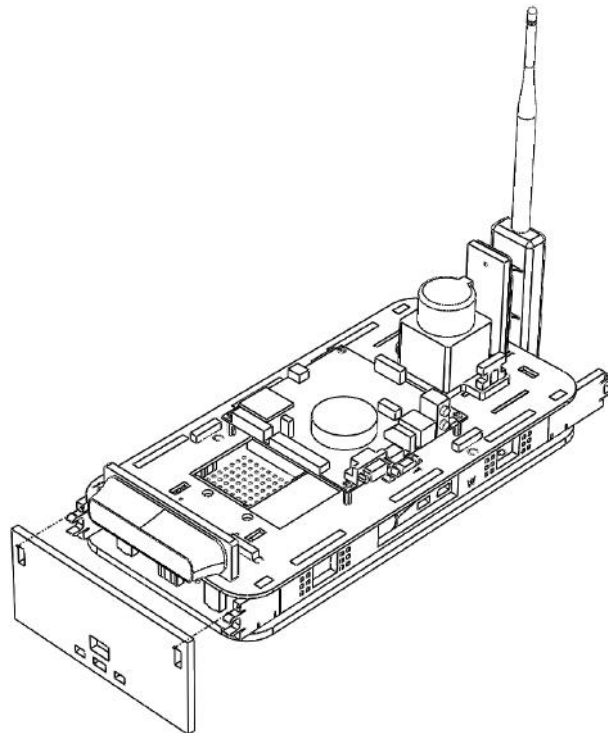
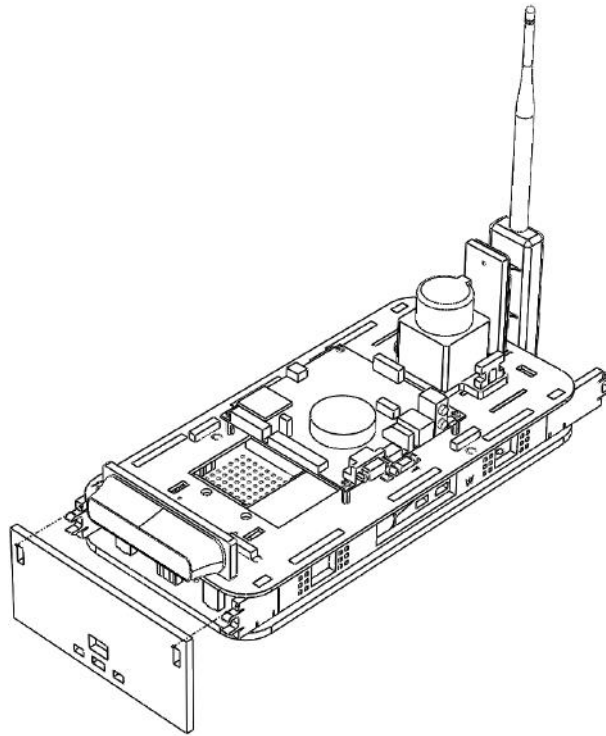
Step 1: Align the *Structure Cam Assembly* with the three slots on either the front or rear of the *Chassis*. Press the clip through the top and bottom layers of the *Chassis* until the clip snaps into place securing the *Structure Cam*.

Mounting Wifi to Chassis



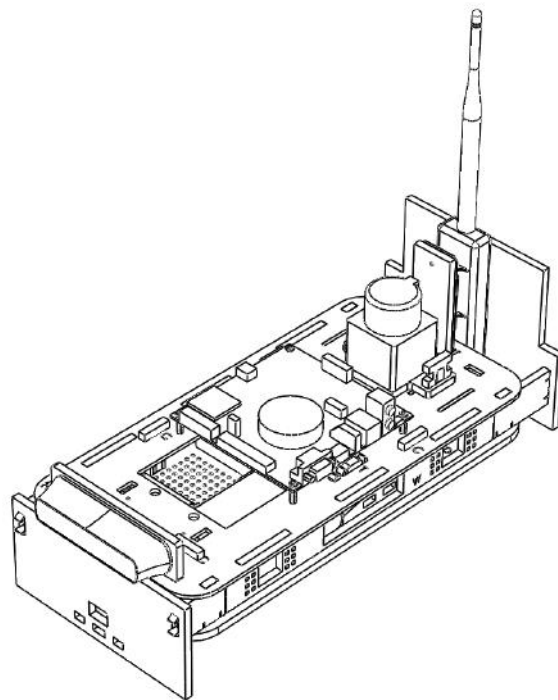
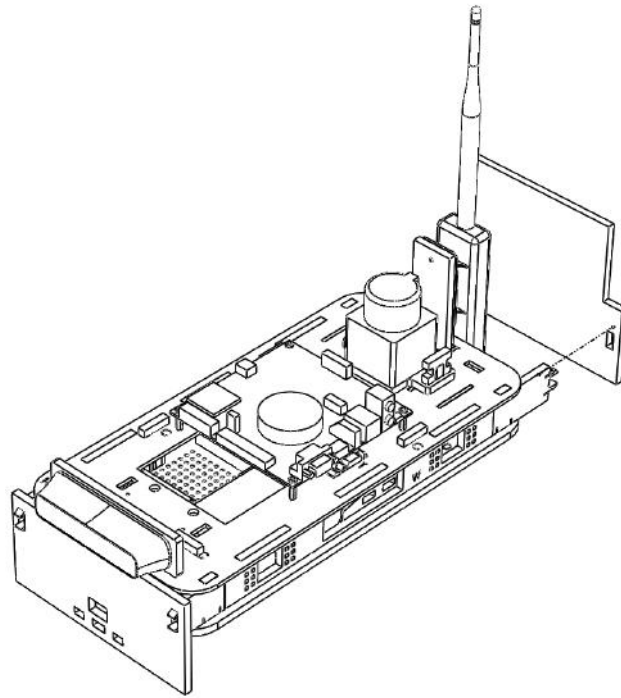
Step 1: Align the *Wifi Assembly* with the center slot on either the front or rear of the *Chassis*. Press the clip through the top and bottom layers of the *Chassis* until the clip snaps into place securing the *Wifi Assembly*.

Mounting Front Plate to Chassis



Step 1: Align the *Front Plate* with the *Universal Clips* extending from the front of the *Chassis*. Press the *Front Plate* until the *Universal Clips* snap securing the plate to the *Chassis*.

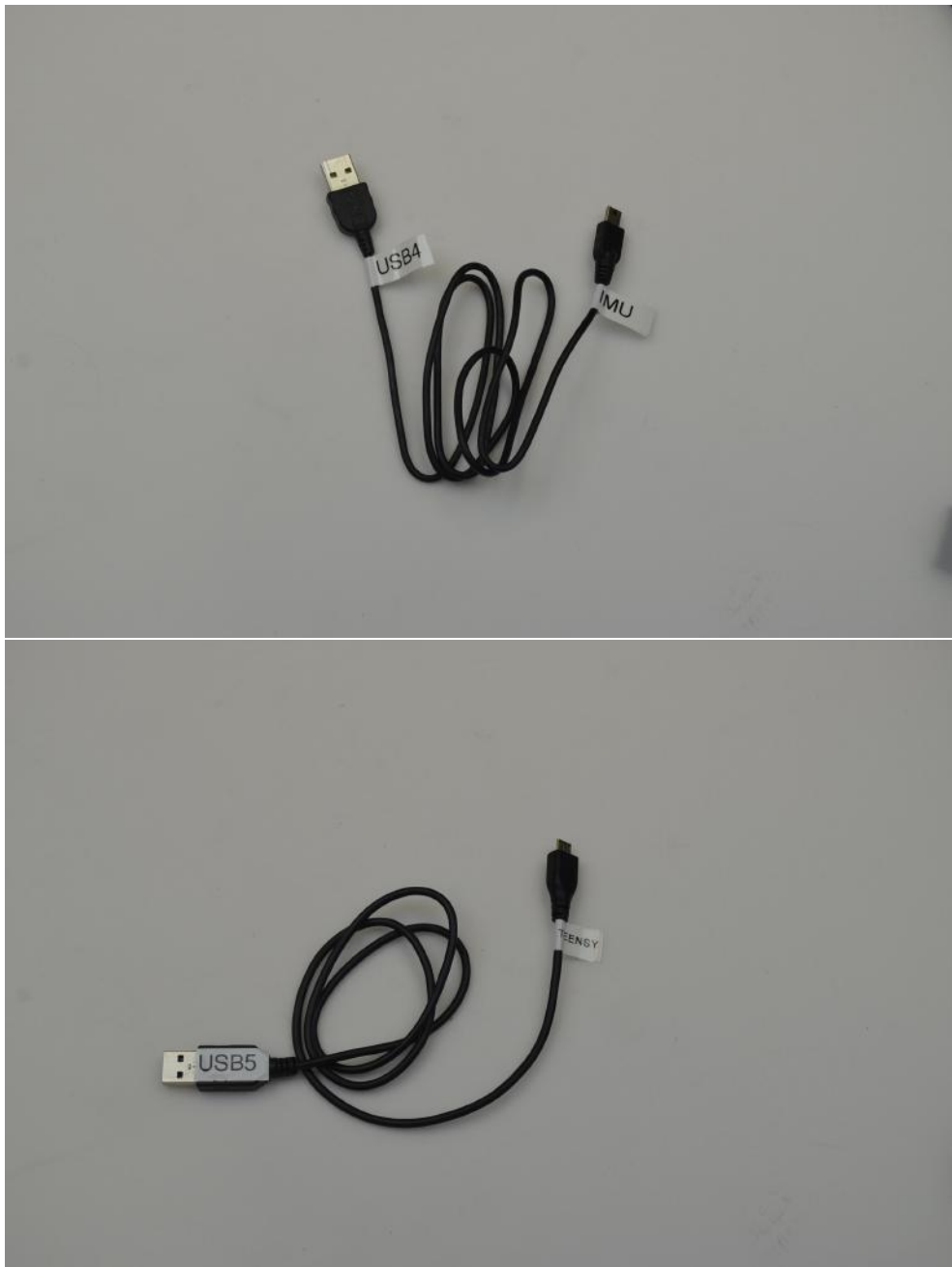
Mounting Rear Plate to Chassis



Step 1: Align the *Rear Plate* with the *Universal Clips* extending from the rear of the *Chassis*. Press the *Rear Plate* until the *Universal Clips* snap securing the plate to the *Chassis*.

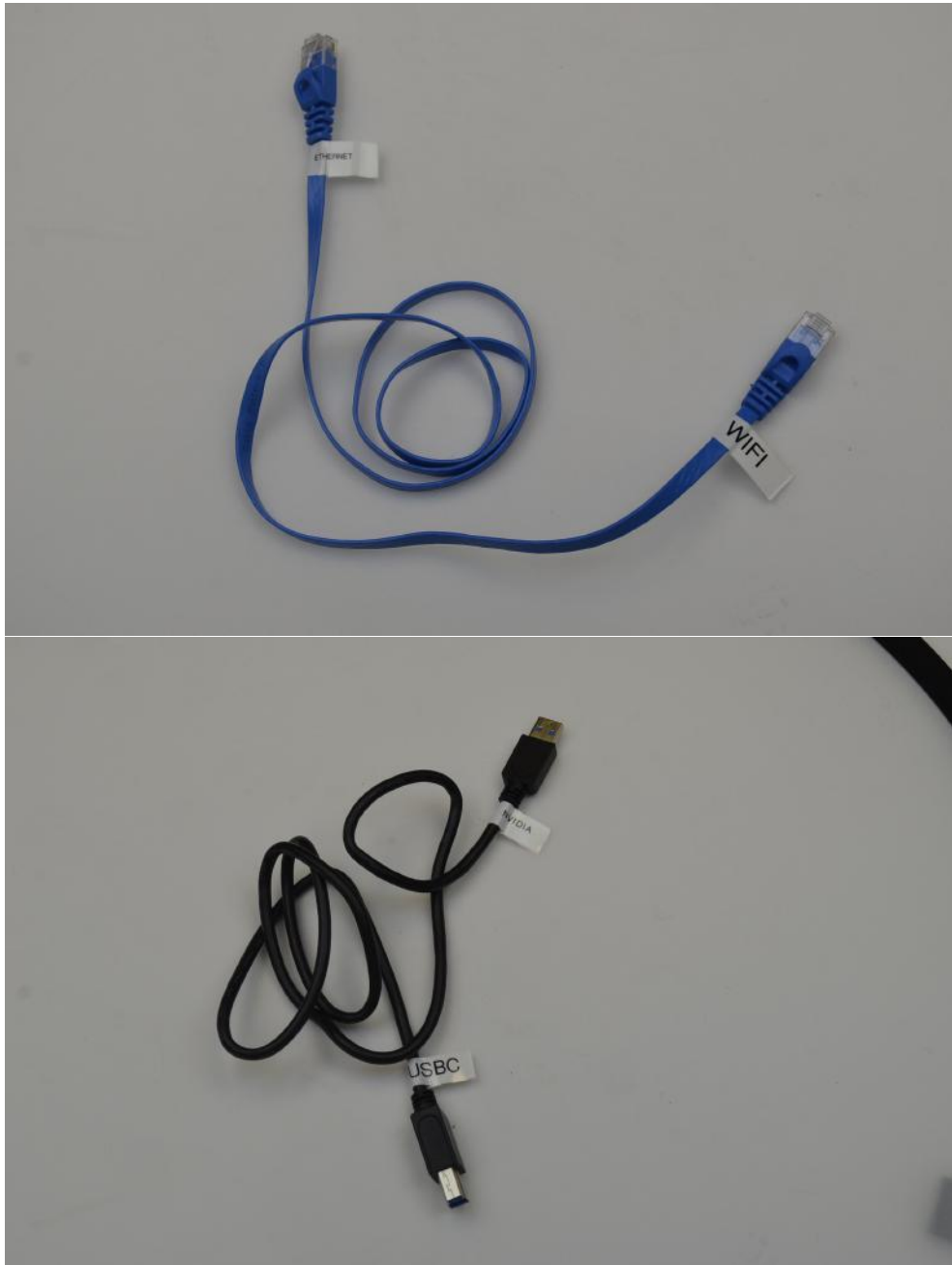
Label Wires

The wiring harness consists of a few wires to supply power and to communicate data. This section will walk you through on labeling the wires and will make it easy to connect everything on the next step.



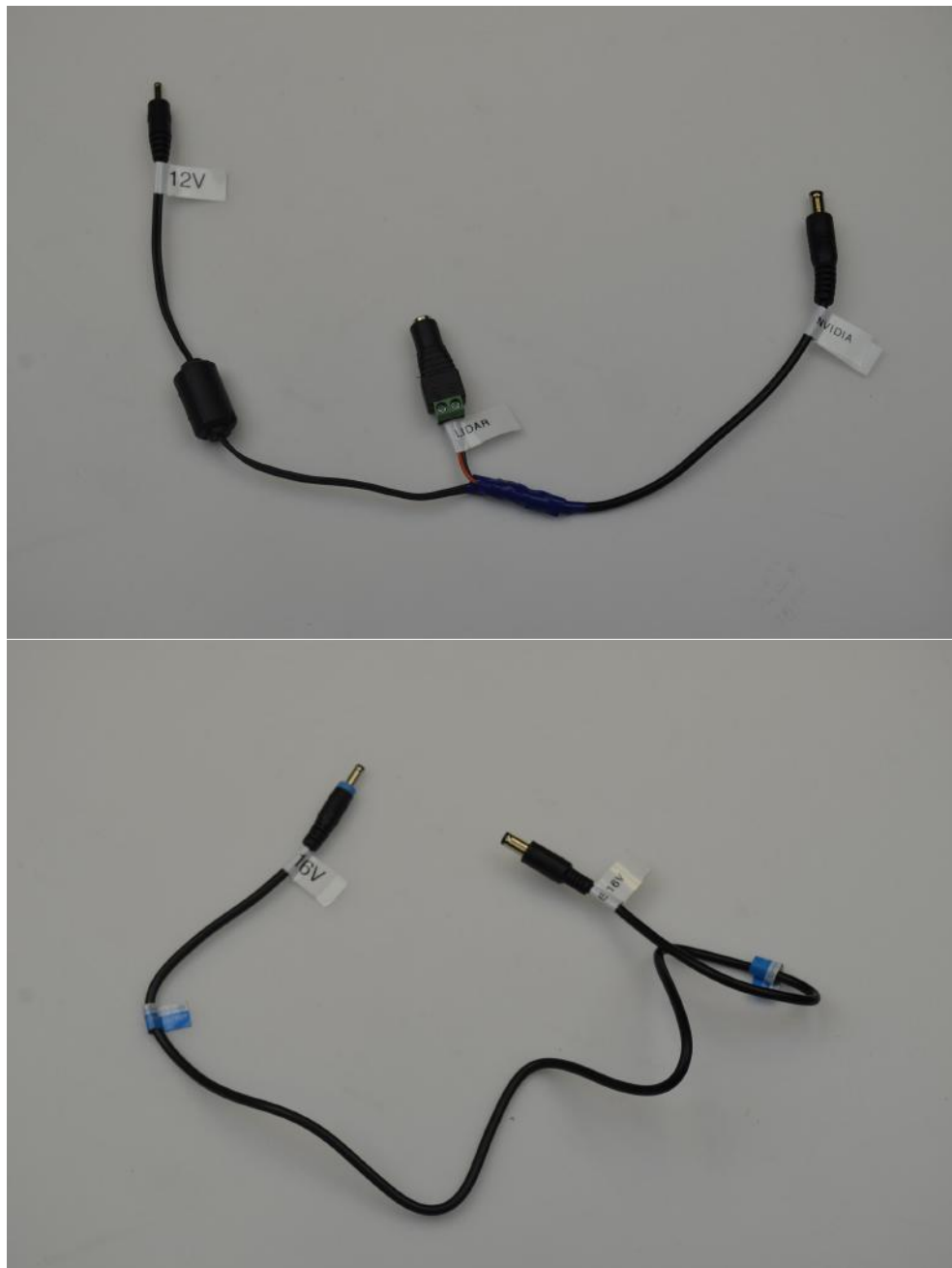
Step 1: Locate the USB wire for the *IMU board*. Label the one side as *USB4* and the other as *IMU*. Locate the USB wire for the *Teensy*. Label the one side as *USB5* and the other as *Teensy*.

Label Wires



Step 2: Locate the *blue ethernet wire*, label one side as *Wifi* and the other as *ethernet*. Locate the USB wire for the *Nvidia* board. Label the one side as *Nvidia* and the other as *USBC*.

Label Wires



Step 3: Locate the *spliced 12v power cable*. Label the small coax side as *12v*, label the middle female jack as *Lidar*, and finally label the larger coax as *Nvidia*. Locate the *16v power cable*. Label the smaller coax as *16v* and label the larger coax *E 16v*.

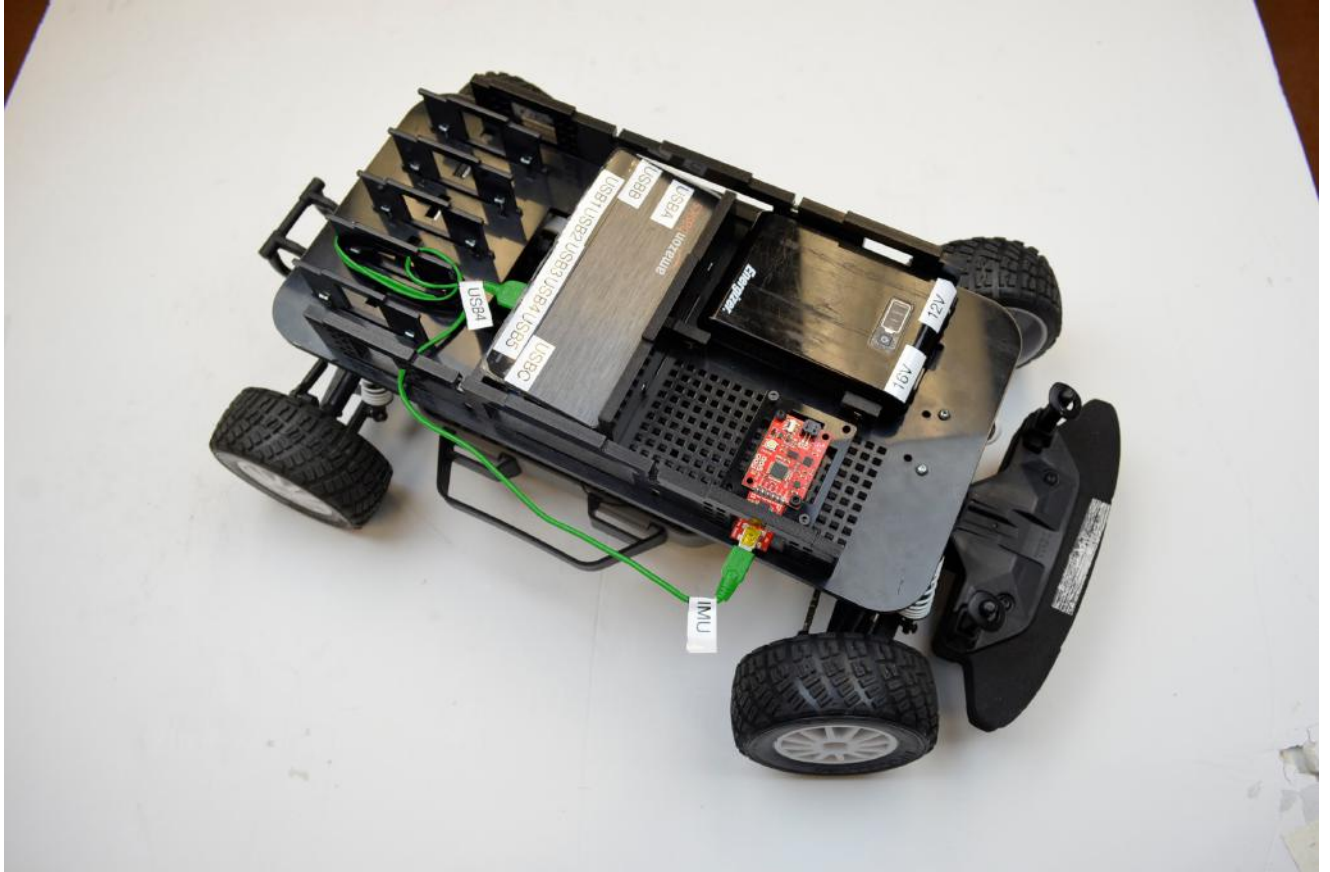
Label Wires



Step 4: Locate the *powered ethernet wire*. Label the female jack as *E 16v*, label the female ethernet port as *Ethernet*, label the male ethernet plug as *Nvidia*. Locate the *USB Hub* and the *Energizer power pack*. Label both components as pictured.

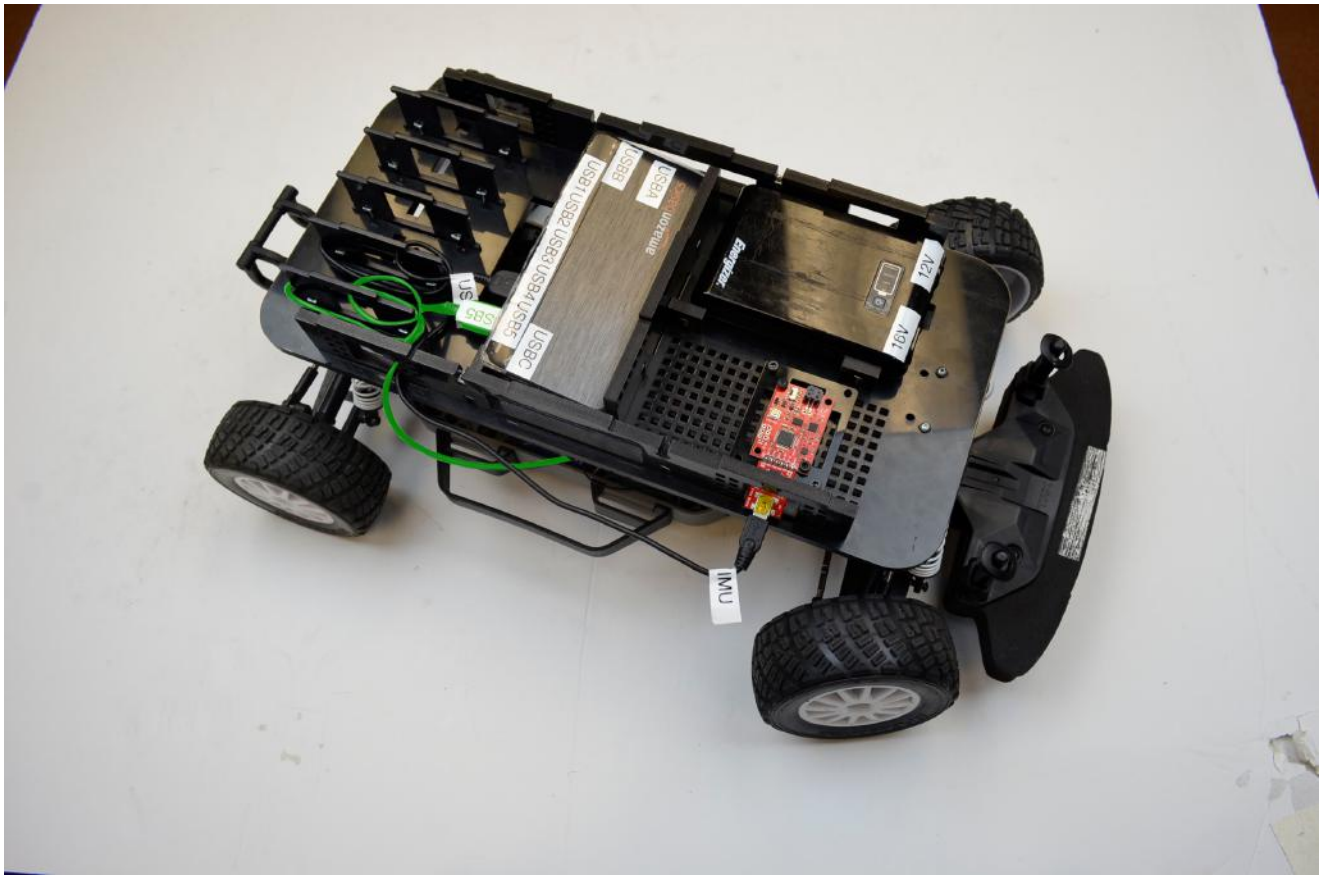
Wiring IMU

These next few sections will walk you through the steps of connecting power and data wires to all the components on the car. Some components require multiple wires and some require only one. The labeling in the last step will make connecting everything a piece of cake.



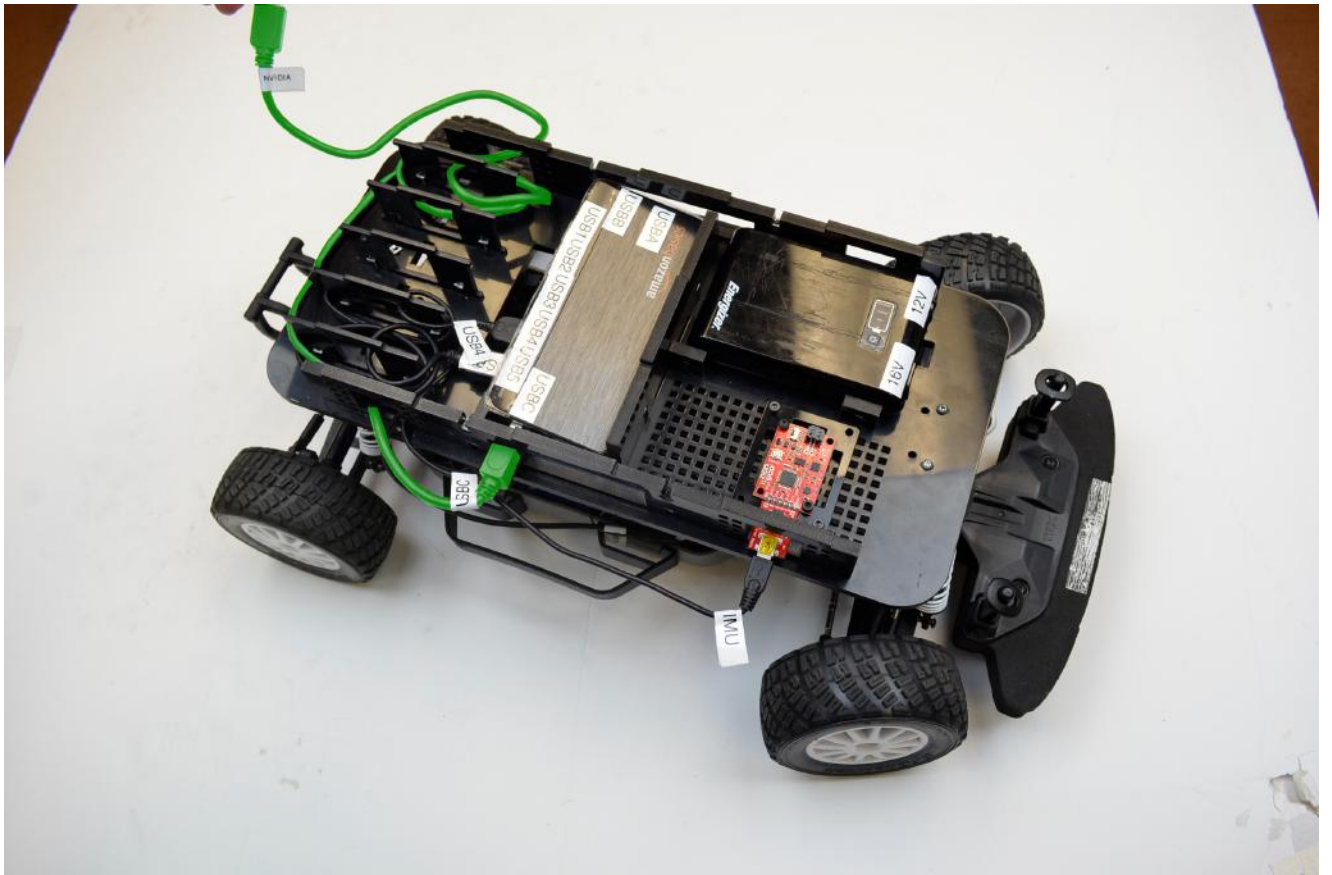
Step 1: Connect the *USB* to the *IMU board*. Connect the other end to the *USB Hub Port 4*. Wrap the wire around the *Wire Wrap* to shorten the wire as needed.

Wiring Teensy



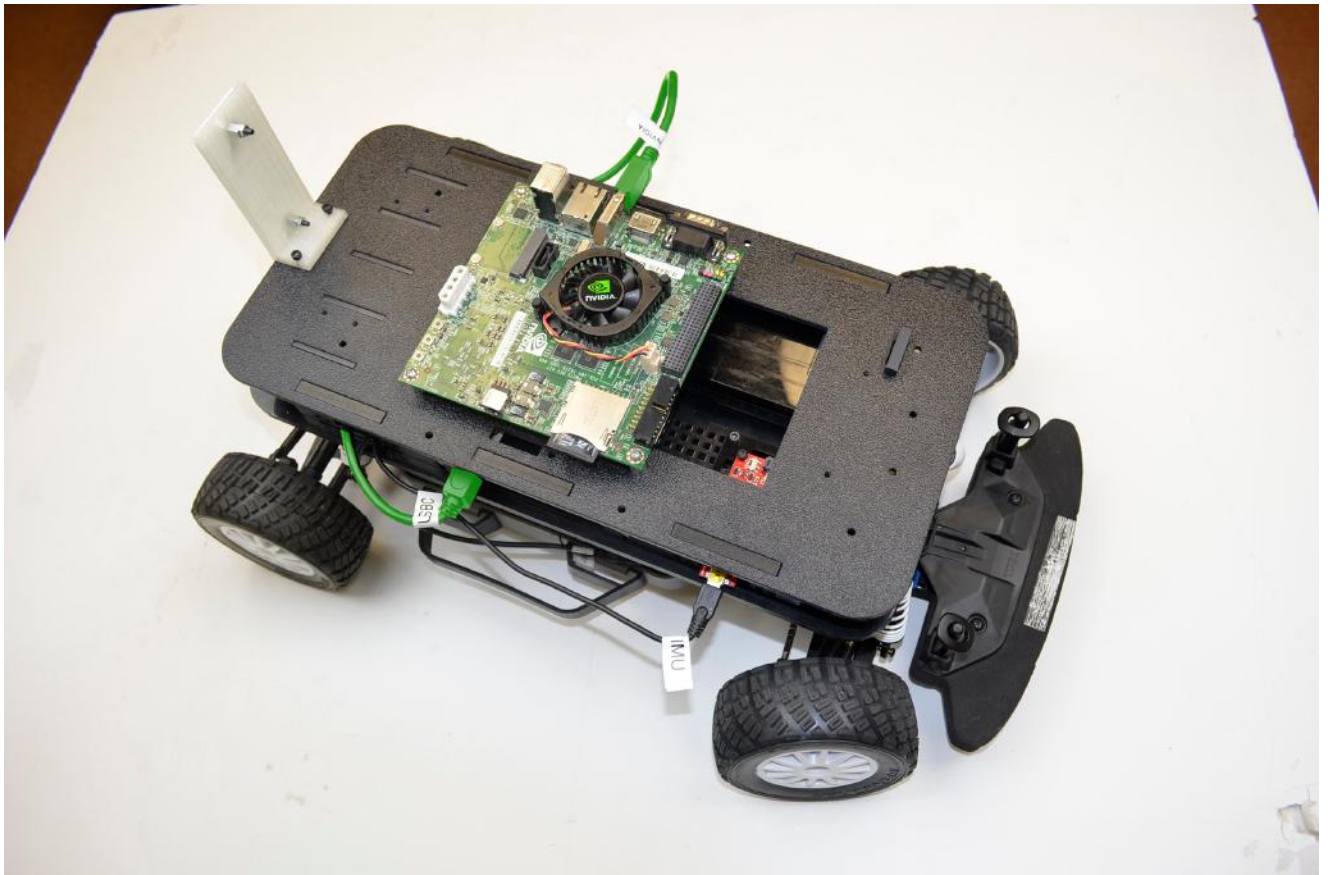
Step 1: Connect the *USB Micro-B* to the *Teensy* board. Connect the other end to the *USB Hub Port 5*. Wrap the wire around the *Wire Wrap* to shorten the wire as needed.

Wiring Nvidia



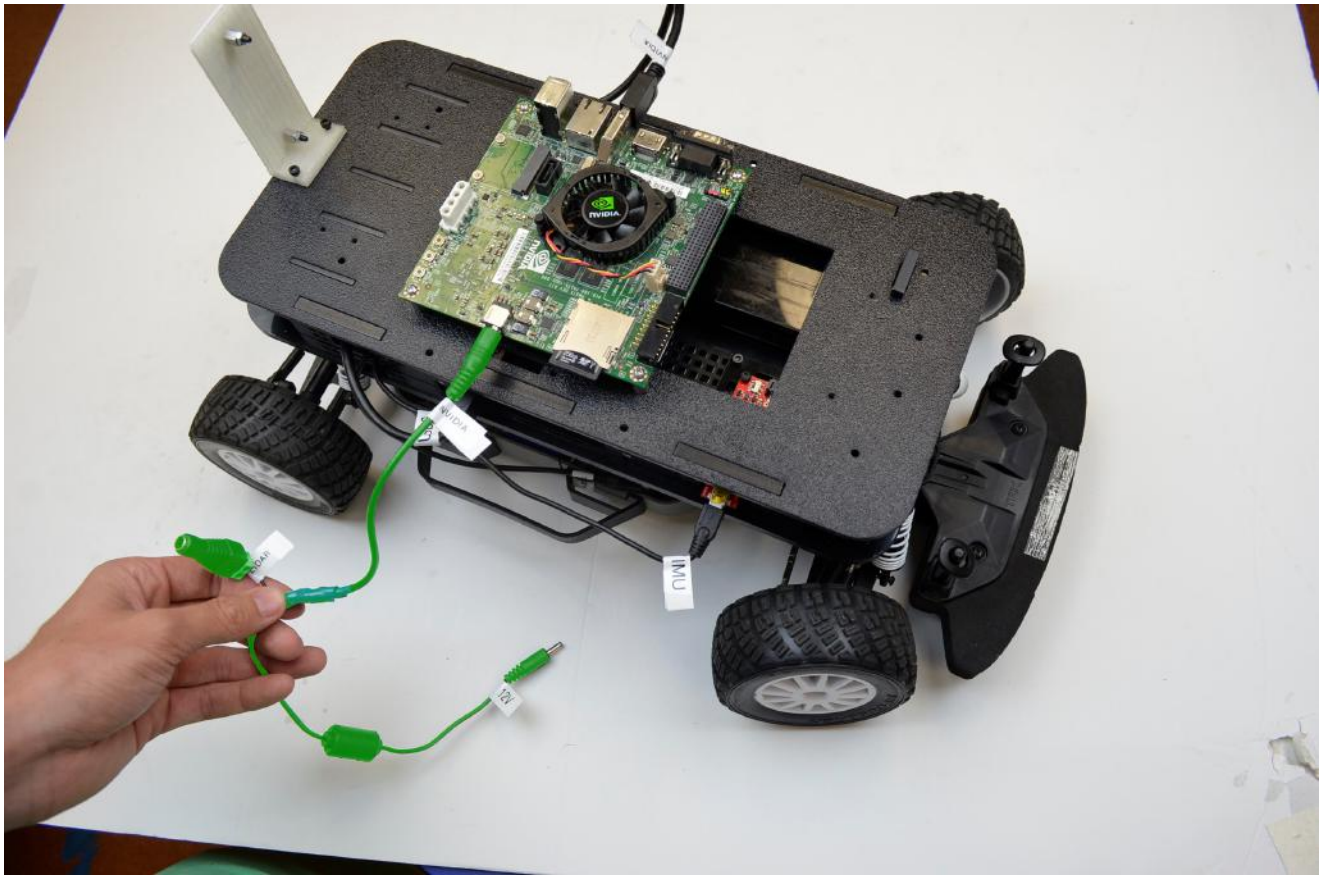
Step 1: Connect the *USB* to the *USB Hub Port C*. Rout the wire across the back of the *chassis*. Wrap the wire around the *Wire Wrap* to shorten the wire as needed.

Wiring Nvidia



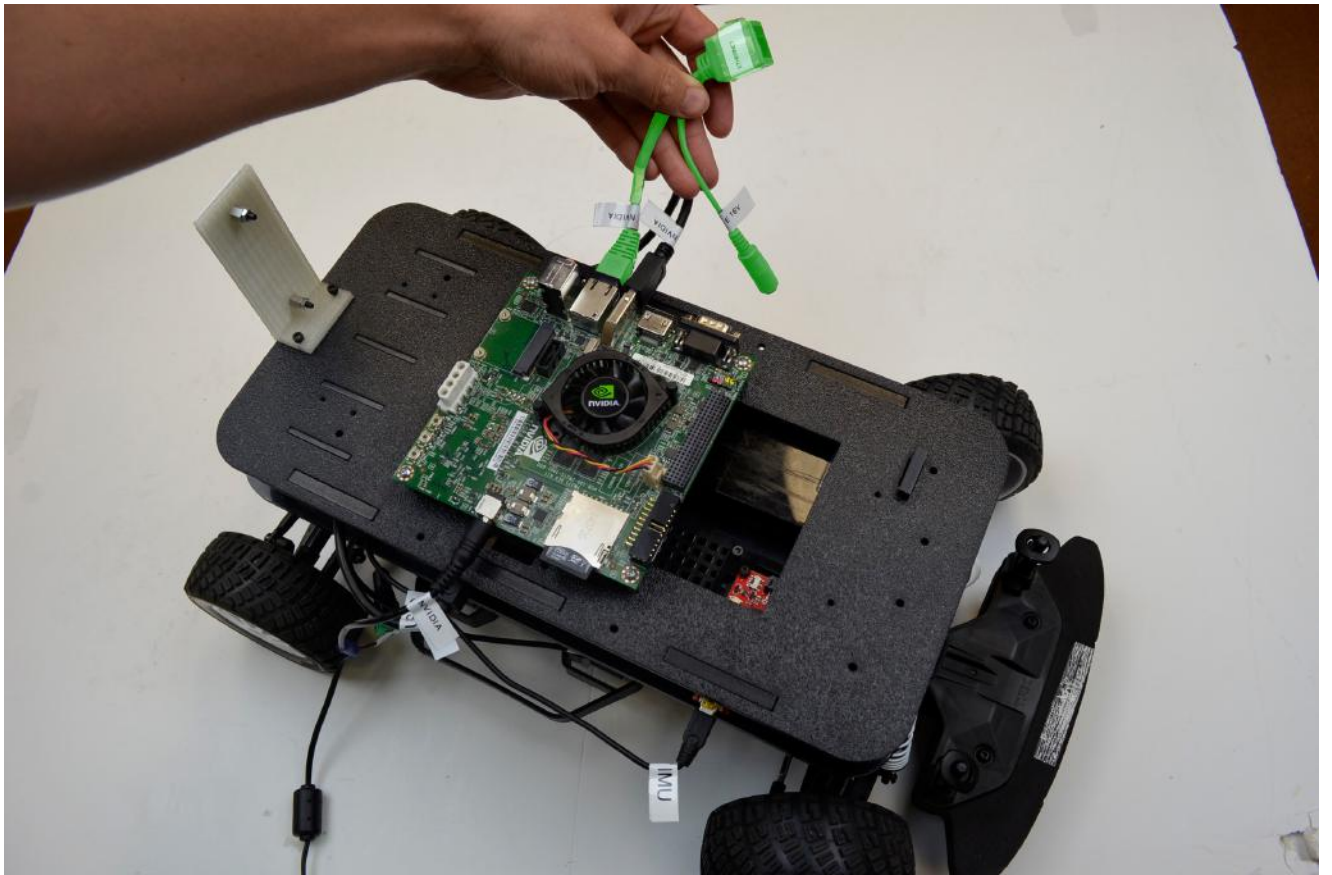
Step 2: Place the *Chassis Top* on the assembly and plug in the *USB* into the *Nvidia USB Port*. This connection is highlighted on green.

Wiring Nvidia



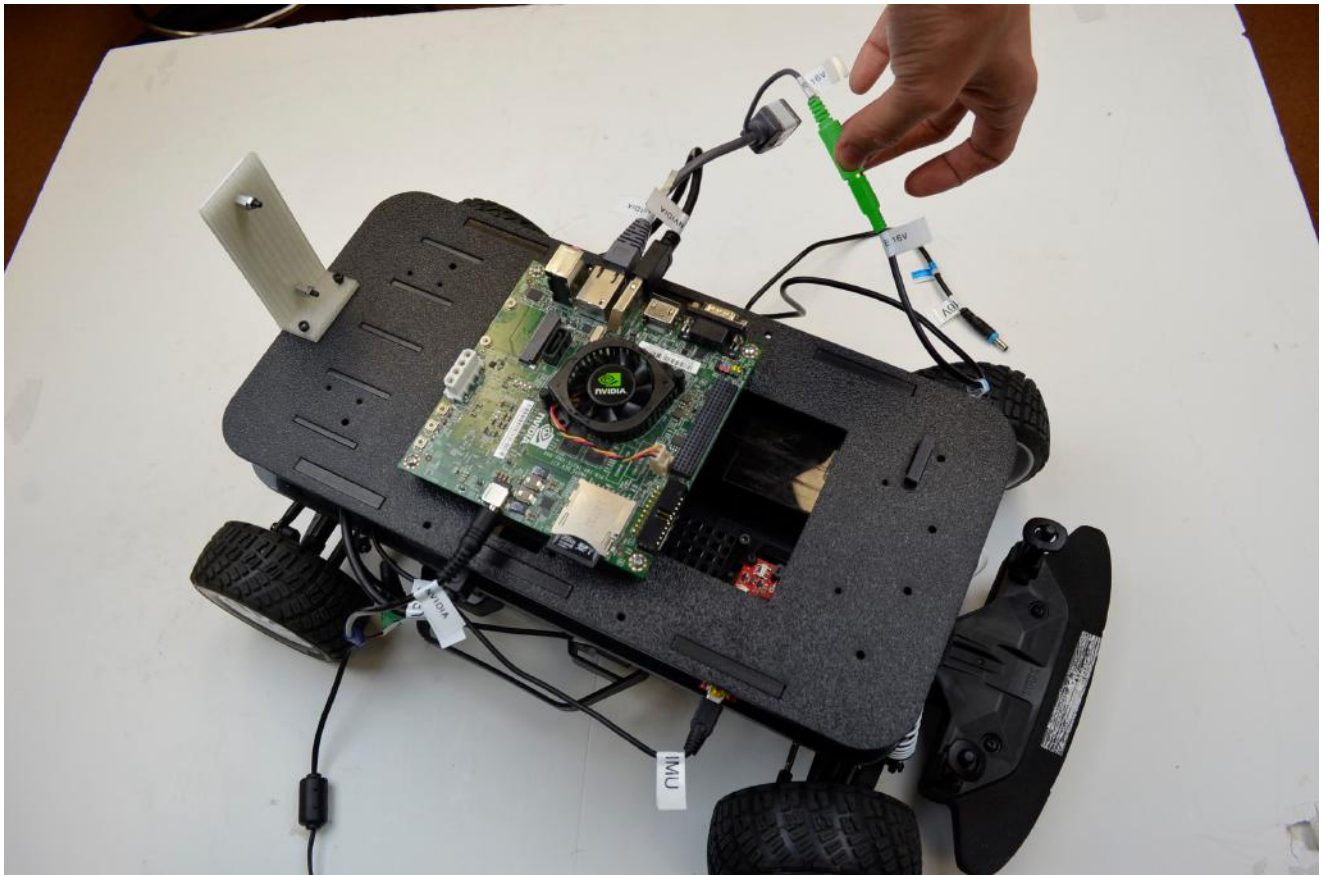
Step 3: Connect the *12v Spliced Power* cable into the *Nvidia 12v Power Port*.

Wiring Nvidia



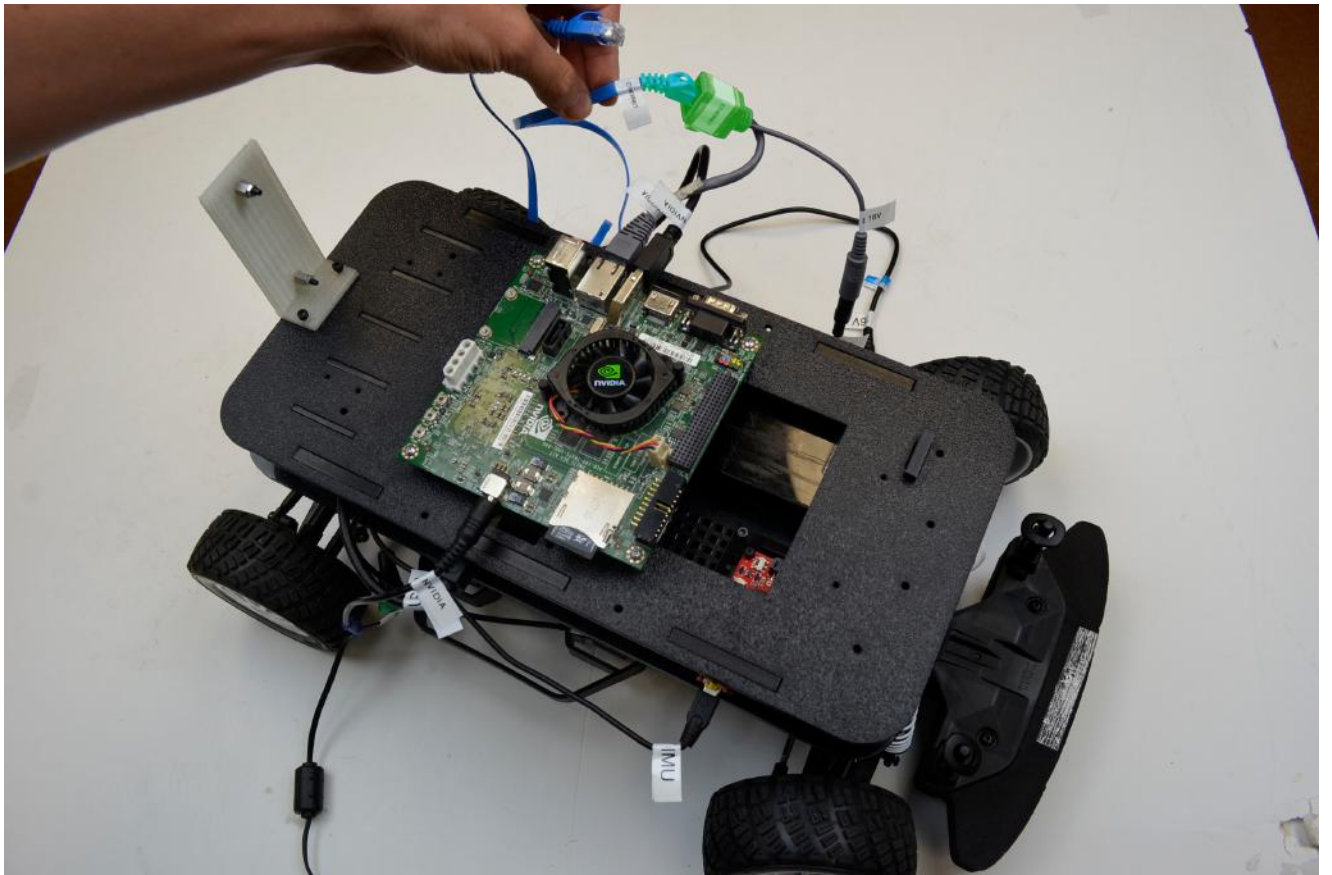
Step 4: Connect the *Powered Ethernet Cable* into the *Ethernet Port* on the *Nvidia*.

Wiring Nvidia



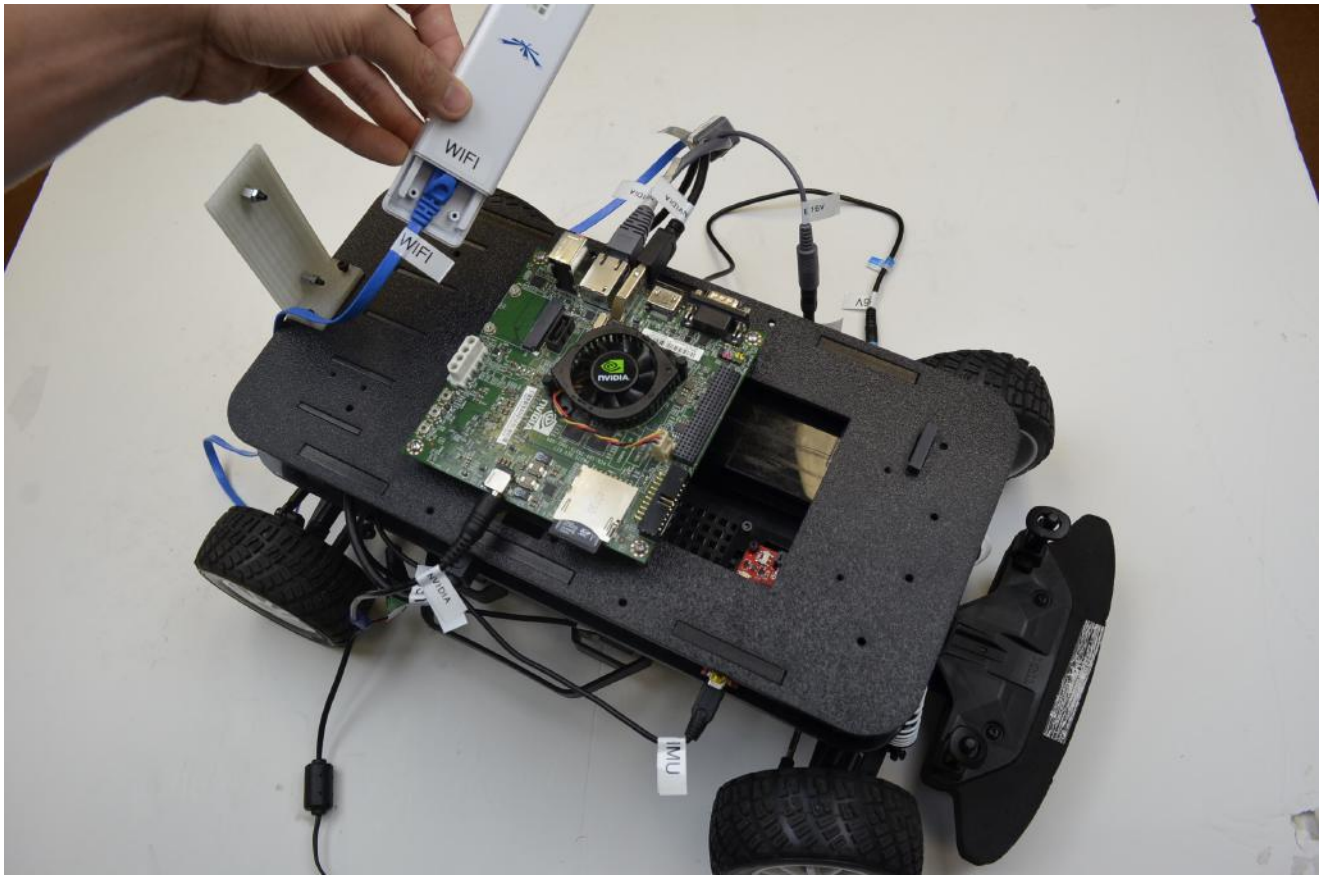
Step 5: Connect the *16v Power* cable into the *Ethernet Power Supply*. The connection is highlighted in green.

Wiring Nvidia



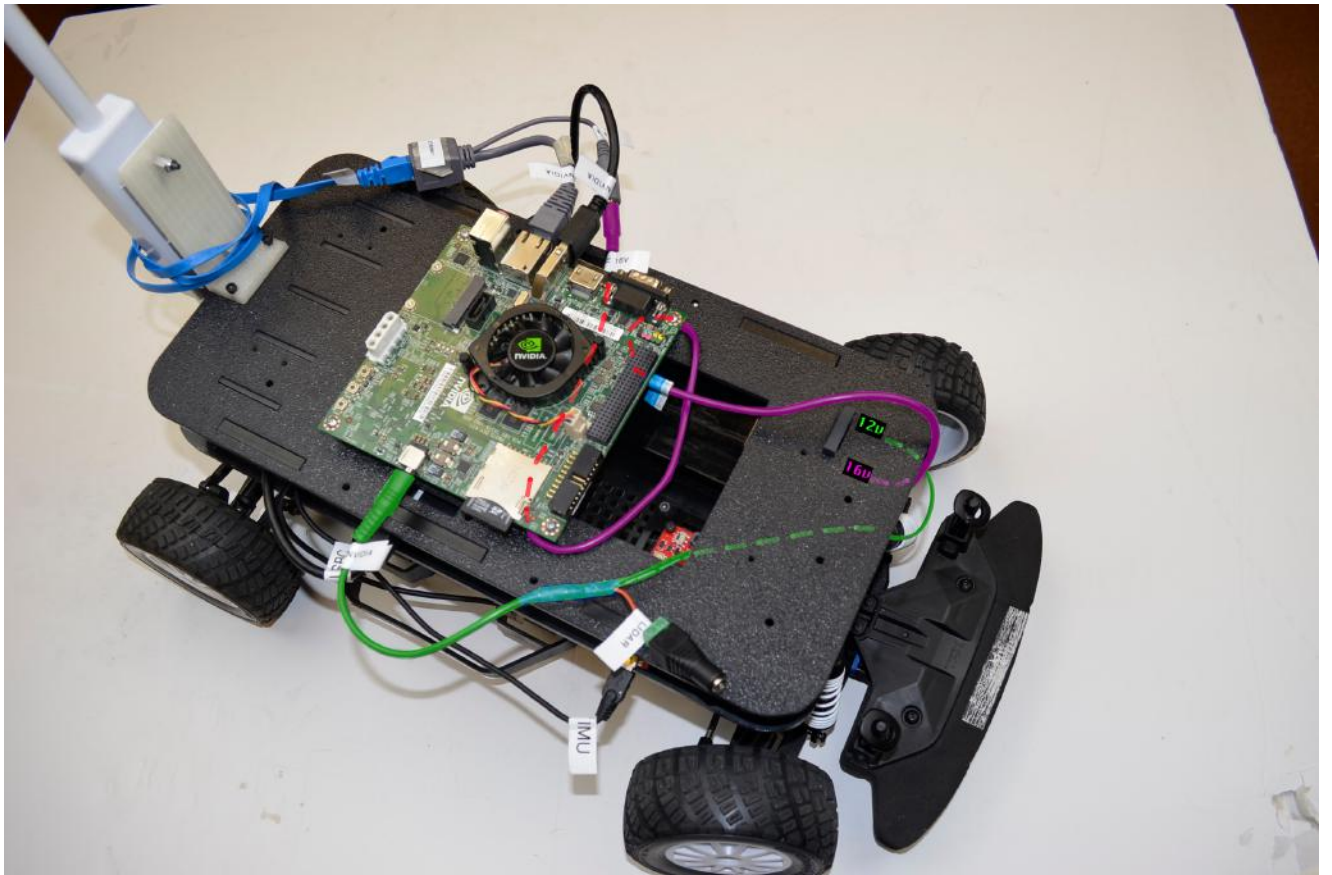
Step 6: Connect the *Blue Ethernet* cable into the *Ethernet Port*. The connection is highlighted in green.

Wiring Nvidia



Step 7: Connect the other end of the *Blue Ethernet Cable* into the *Wifi Module*.

Wiring Nvidia



Step 8: To power the car we must plug in the two power supply cables. Route the **16v Power Cable** highlighted in orange under the **Nvidia** board then into the **16v Port** on the **Energizer Battery Pack**. Plug the **12v Power Cable** highlighted in green into the **emph12v Port** on the **Energizer Battery Pack**.

Thanks for following along!
To get started driving please visit: f1tenth.org