

Getting Started Part I

Starting the PC and Setting Up Your Physical Workstation

To start the PC and connected ADAS components, the power cord must be plugged in and the main battery and ADAS battery switches must be switched on.

1. Plug the 120V 20A power cord into the car.
 - a. The outlet is on the rear bumper of the driver's side.



Figure 1: Our power cable plugged into the vehicle

2. Turn the main battery switch on.
 - a. Open the trunk and turn the main battery switch on. The main battery switch is in the trunk, on the driver's side, behind the trunk carpeting. Turn it clockwise to turn it on.

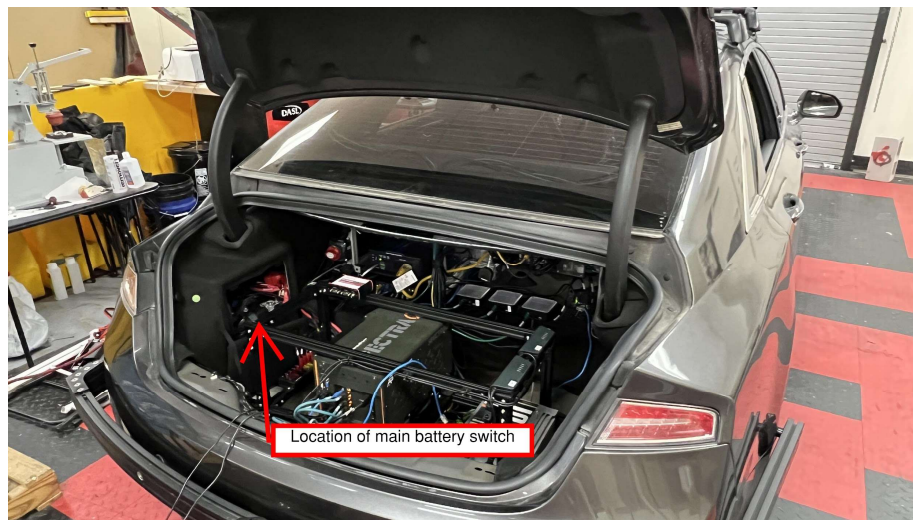


Figure 2: Location of the main battery switch

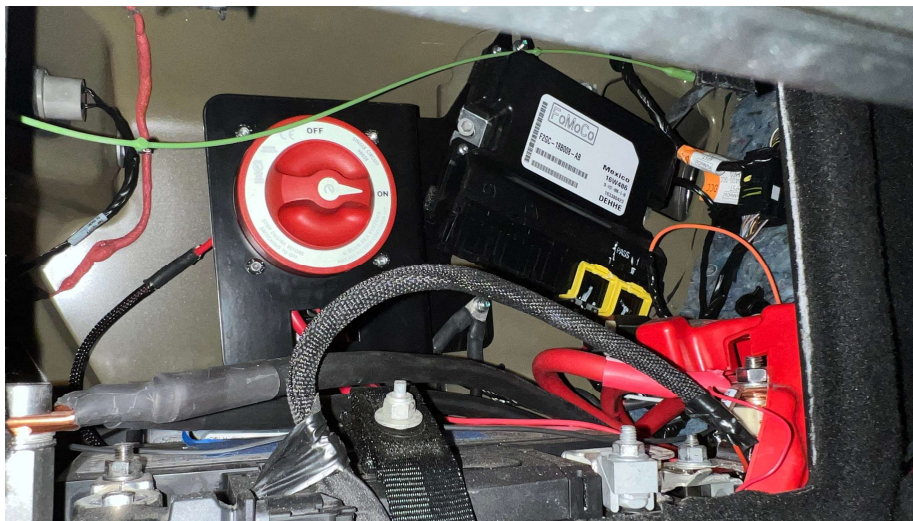


Figure 3: Closeup of the main battery switch called out in Figure 2

3. Turn the ADAS battery switch on.
 - a. Turn the ADAS battery switch on to turn the PC and ADAS components on.



Figure 4: The ADAS component battery switch

4. Create a new user on Ubuntu
 - a. After approximately 15 seconds, you should hear the electrical components running and the PC should boot up. You should see the screens in the rear seat turn on and land on the Ubuntu login screen.
 - b. There is a mouse and keyboard in the rear seats. If for some reason there aren't any peripherals, there is a USB hub in the front center console that you can plug your mouse and keyboard into.



Figure 5: USB hub in the center console in the front cabin

- c. If there is no OS installed or you would like to start with a fresh install of Ubuntu, skip to step 5.

- d. Follow the splash screen's create new user setup and create a new user for yourself.
5. **(Optional/Situational)** Install Linux Ubuntu 22.04.5 Jammy Jellyfish on the MKZ's PC
 - a. Follow the instructions given by Ubuntu for installing and setting up a profile.
[How to install Ubuntu. \(Non Virtual Machine\)](#)
6. **(Optional/Highly Recommended)** Set up workspace outside of the car (monitor and peripherals).
 - a. The car has an HDMI outlet hub in the rear that is visible once you fold the rear seats down. Connect your monitor to this hub.
 - b. Peripherals can be connected to the USB hub in the center console or the rear I/O of the PC, whichever is convenient.

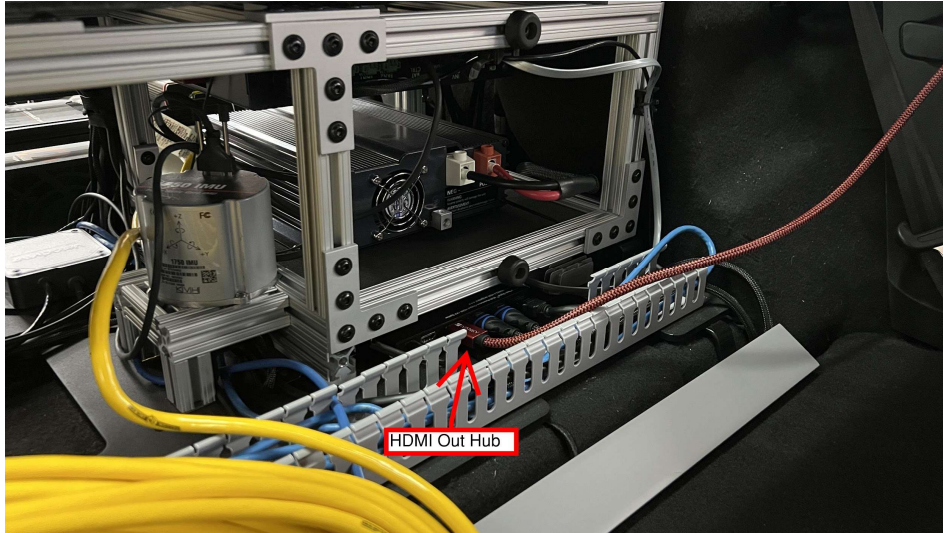


Figure 6: An HDMI output hub for PC graphics output



Figure 7: Rear I/O of the PC with USB, Ethernet, and graphics ports

7. Use the PC and explore.
 - a. Now that we are powered up and set up with Ubuntu, you can use the PC in the same manner as you did during the ROS2 Pre-Requisite warmup.
 - b. The ADAS hardware communicates with the PC via Ethernet and USB. You can check what is connected via Ethernet in Network settings and via usb by opening a new terminal and running “lsusb” without parentheses. These are just basic checks that the PC is recognizing at least *some* of the Ethernet and USB components. We will look further into connection and integration later when we work with ROS2.

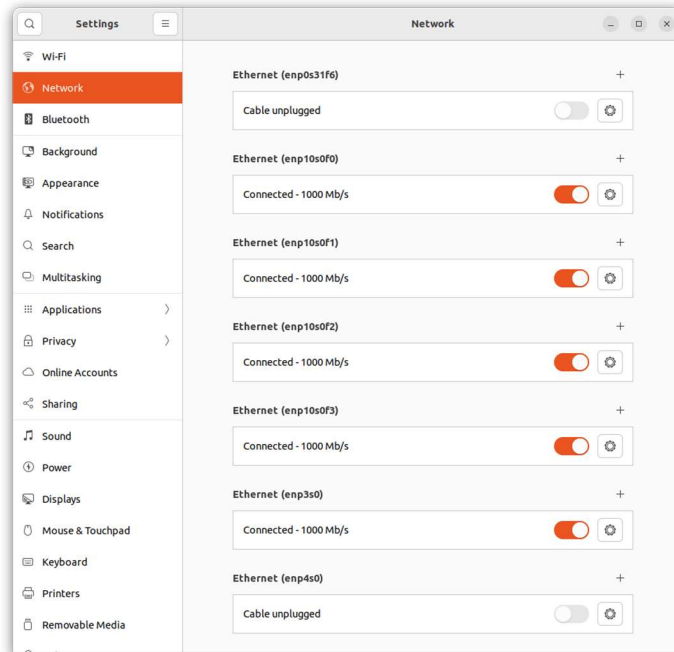


Figure 8: Connected devices in network settings

```

jeffoh@trc: ~
jeffoh@trc: ~ 80x24
jeffoh@trc:~$ lsusb
Bus 002 Device 002: ID 0bda:0411 Realtek Semiconductor Corp. Hub
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 009: ID 046d:c018 Logitech, Inc. Optical Wheel Mouse
Bus 001 Device 008: ID 04f3:0103 Elan Microelectronics Corp. ActiveJet K-2024 Multimedia Keyboard
Bus 001 Device 007: ID 2357:011e TP-Link AC600 wireless Realtek RTL8811AU [Archer T2U Nano]
Bus 001 Device 005: ID 6923:0112 Dataspeed Inc. USB CAN Tool
Bus 001 Device 003: ID 09d7:0100 Hexagon NovAtel Inc. GPS/GNSS/SPAN sensor
Bus 001 Device 010: ID 046d:c00c Logitech, Inc. Optical Wheel Mouse
Bus 001 Device 006: ID 046d:082d Logitech, Inc. HD Pro Webcam C920
Bus 001 Device 004: ID 046d:c52b Logitech, Inc. Unifying Receiver
Bus 001 Device 002: ID 0bda:5411 Realtek Semiconductor Corp. RTS5411 Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
jeffoh@trc:~$

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Figure 9: Output of “lsusb” in terminal

8. Shutdown Procedure

Now that we've set up Linux and our physical workspace, we will learn the shutdown procedure.

- a. Save your work and shut down your PC gracefully using the Linux interface. The power button is on the top right corner. Wait until the PC is completely shut down before proceeding.
- b. Turn the ADAS battery switch counterclockwise to disable power to the PC and ADAS components. (Refer to figure 4)
- c. Turn the main battery switch counterclockwise to disable the main power switch then close the trunk. (Refer to Figure 3)
- d. Unplug the 120V 20A power cord and store in a safe place. We've been storing the power cable in the rear cabin.

9. Good Practices

- a. Keep the car unlocked and stored in a safe place. This way, if the battery drains, you can still access the 120V 20A power cable which will let you charge the battery enough to start the car.
- b. Take care of any tripping hazards if you're setting up a permanent workstation.



Figure 10: Long term workspace set up with TV, desk, and peripherals