

Mobile Data Collection Backpack Setup Information

Parts List for One Mobile Data Collection Backpack

- Jetson TX2 Development Kit: <https://www.amazon.com/NVIDIA-Jetson-TX2-Development-Kit/dp/B06XPFH939>
- SD Card: <https://www.amazon.com/SanDisk-256GB-Extreme-UHS-I-SDSDXXY-256G-GN4IN/dp/B07H9VX76D/>
- RealSense D435i Depth Camera: <https://www.intelrealsense.com/depth-camera-d435i/>
- Logitech USB Webcam: <https://www.amazon.com/Logitech-C930e-1080P-Video-Webcam/dp/B00CRJWW2G>
- Backpack: <https://www.amazon.com/Backpack-Breathable-Ventilation-Features-Traveling/dp/B07RQQYRQM/>
- Battery Pack: <https://www.amazon.com/dp/B01337QXMA>
- USB Hub: <https://www.amazon.com/RSHTech-Splitter-Portable-Aluminum-Individual/dp/B07HMZSRS7>
- 5V USB-to-Barrel-Jack Cable: <https://www.amazon.com/CCYC-Barrel-Wireless-Router-Speakers/dp/B079K2DS3H>
- Chest and Head mounts: <https://www.amazon.com/VVHOoy-Universal-Compatible-Crosstour-Accessories/dp/B07L4T25JY>
- Camera Screw Adapters: <https://www.amazon.com/Sametop-Universal-Conversion-Adapter-Compatible/dp/B06ZYKXYQK>
- Thalmic Labs Myo Band (Discontinued as of 2018)
- Zip Ties

Mobile Data Collection Backpack Setup Instructions

- Follow *Jetson TX2 Setup Instructions* (below). Once all of the software is installed, shut down the system, remove everything but the USB hub, and mount the TX2 against the back of the backpack with zip ties.
- Place the battery pack in the side pocket of the backpack and connect the 12V output to the TX2 and the 5V output to the USB hub.
- Secure the USB hub and any loose cables with zip ties.

Jetson TX2 Setup Instructions

- Connect the WiFi antennas and the USB hub to the TX2.
- Connect a monitor to the HDMI port on the TX2. Connect a keyboard and mouse to the TX2.
- Attach the power adapter to the barrel jack on the TX2 and press the power button (first button from the center) to boot up the TX2.
- Follow the on-screen instructions for running the provided OS installer, then reboot.
- Connect the TX2 to a host computer via the micro USB cable.

- Open the Nvidia SDK Manager on the host computer and install Jetpack 4.2.2.
 - Step 1:
 - Set the Hardware configuration to Host Machine and Jetson TX2.
 - Set the target operating system to Linux Jetpack 4.2.2.
 - Step 2
 - Select Jetson OS and Jetson SDK Components (Additional SDKs are optional but not necessary)
 - Step 3
 - Follow the instructions for the manual flash process.
 - You will have to put the TX2 in Force Recovery mode [power off, then hit the power button, hold the recovery button (2nd button from center), hit the reset button, and then release the recovery button].
 - The screen will prompt you to fill out some setup options on the TX2 (using the monitor, mouse, and keyboard connected to the TX2).
 - Choose a username, computer name, and password.
 - Choose automatic login.
 - Return to the host PC to complete the SDK install.
- Set up the TX2 to boot from the external SD card.
 - Insert SD card into slot
 - Follow the instructions here: <https://www.jetsonhacks.com/2017/01/26/run-jetson-tx1-sd-card/>
- Other setup
 - Add the username you specified earlier to the dialout group
 - `sudo usermod -a -G dialout [username]`
 - Create logs directory (bagfiles will automatically be created there)
 - `mkdir ~/logs`
- Install software.
 - Git
 - `sudo apt-get install git`
 - ROS melodic (<http://wiki.ros.org/melodic/Installation/Ubuntu>)
 - After installing ROS, navigate to home directory and create a catkin workspace, e.g.
 - `mkdir -p ~/catkin_ws/src; cd ~/catkin_ws`
 - `catkin_make`
 - ROS usb_cam package
 - `sudo apt-get install ros-melodic-usb-cam`
 - ZED SDK
 - Download SDK for Jetpack 4.2 from developers' site: <https://www.stereolabs.com/developers/release/2.8/>
 - Use `chmod +x` to make executable and run
 - ZED ROS interface

- Navigate to catkin_ws/src and follow instructions here:
<https://github.com/stereolabs/zed-ros-wrapper>
- RealSense SDK
 - Follow the instructions here:
https://github.com/IntelRealSense/librealsense/blob/development/doc/installation_jetson.md
- RealSense ROS interface
 - Install ROS dynamic reconfigure
 - sudo apt-get install ros-melodic-ddynamic-reconfigure
 - Navigate to catkin_ws/src and follow the instructions here:
<https://github.com/IntelRealSense/realsense-ros>
- Myo ROS interface
 - Navigate to catkin_ws /src and clone the repo at
https://github.com/intuitivecomputing/ros_myo
- Sensor backpack
 - Navigate to catkin_ws/src and copy the package at
https://github.com/intuitivecomputing/FACT/tree/main/mobile_data_collection_backpack_setup_and_software/sensor_backpack
- Build all ROS packages
 - cd ~/catkin_ws; catkin_make; source devel/setup.bash
- Test whether RealSense camera software setup works.
 - Connect the RealSense camera, USB webcam, and Myo band bluetooth receiver to the USB hub.
 - From the command line, run realsense-viewer (using connected monitor).
 - Verify that the RealSense camera shows up with USB3 input (make sure to keep the RealSense on the same port).
 - Perform any necessary firmware upgrades.
 - Verify that the data streams work (see README in https://github.com/intuitivecomputing/FACT/tree/main/mobile_data_collection_backpack_setup_and_software/sensor_backpack). Close the data streams and exit.