UDEV Rules for USB Hub

* Log into the Tractor
* Connect TTGO Board and GPS to first and second ports on USB hub
* Turn power off to the TTGO Board

| Store list of devices connected with power off; $ ls /dev/ > dev\_list\_1.txt |
| --- |
| Turn on power to the TTGO Board |
| Then run this after you plug it in; $ ls /dev/ | diff --suppress-common-lines -y - dev\_list\_1.txt   | al@al-HP-ProBook-645-G1:~$ ls /dev/ | diff --suppress-common-lines -y - dev\_list\_1.txt  serial <  ttyACM0 <  al@al-HP-ProBook-645-G1:~$ | | --- | |
| TTGO Data from: $ dmesg | grep "ttyACM0"   | al@al-HP-ProBook-645-G1:~$ dmesg | grep "ttyACM0"  [ 320.747619] cdc\_acm 8-1.4:1.0: ttyACM0: USB ACM device  al@al-HP-ProBook-645-G1:~$ | | --- | |
| $ dmesg | grep "8-1.4"   | al@al-HP-ProBook-645-G1:~$ dmesg | grep "8-1.4"  [ 320.527790] usb 8-1.4: new full-speed USB device number 5 using xhci\_hcd  [ 320.639556] usb 8-1.4: New USB device found, idVendor=1a86, idProduct=55d4, bcdDevice= 4.43  [ 320.639574] usb 8-1.4: New USB device strings: Mfr=0, Product=2, SerialNumber=3  [ 320.639581] usb 8-1.4: Product: USB Single Serial  [ 320.639587] usb 8-1.4: SerialNumber: 5185025965  [ 320.747619] cdc\_acm 8-1.4:1.0: ttyACM0: USB ACM device  al@al-HP-ProBook-645-G1:~$ | | --- | |

* Get details for GPS
* Run: $ ls /dev/ > dev\_list\_1.txt
* Turn on power to GPS

| al@al-HP-ProBook-645-G1:~$ ls /dev/ > dev\_list\_2.txt  al@al-HP-ProBook-645-G1:~$ ls /dev/ | diff --suppress-common-lines -y - dev\_list\_2.txt  gpiochip0 <  ttyUSB0 <  al@al-HP-ProBook-645-G1:~$ |
| --- |

* Now “ttyUSB0” appears for GPS

| TTGO Data from: $ dmesg | grep "ttyUSB0"   | al@al-HP-ProBook-645-G1:~$ dmesg | grep "ttyUSB0"  [ 723.283665] usb 8-1.3: FTDI USB Serial Device converter now attached to ttyUSB0  al@al-HP-ProBook-645-G1:~$ | | --- | |
| --- | --- |
| $ dmesg | grep "8-1.3"   | al@al-HP-ProBook-645-G1:~$ dmesg | grep "8-1.3"  [ 723.023008] usb 8-1.3: new full-speed USB device number 6 using xhci\_hcd  [ 723.141705] usb 8-1.3: New USB device found, idVendor=0403, idProduct=6001, bcdDevice= 6.00  [ 723.141719] usb 8-1.3: New USB device strings: Mfr=1, Product=2, SerialNumber=3  [ 723.141725] usb 8-1.3: Product: FT232R USB UART  [ 723.141730] usb 8-1.3: Manufacturer: FTDI  [ 723.141733] usb 8-1.3: SerialNumber: A907Z09E  [ 723.274412] ftdi\_sio 8-1.3:1.0: FTDI USB Serial Device converter detected  [ 723.280071] usb 8-1.3: Detected FT232RL  [ 723.283665] usb 8-1.3: FTDI USB Serial Device converter now attached to ttyUSB0  al@al-HP-ProBook-645-G1:~$ | | --- | |
| Create a file /etc/udev/rules.d/05-serial.rules |
| $ sudo edit /etc/udev/rules.d/05-serial.rules  Copy and paste the lines below  SUBSYSTEM=="tty", ATTRS{idVendor}=="1a86" , ATTRS{idProduct}=="55d4" , ATTRS{serial}=="5185025965", SYMLINK+="ttgo\_main"  SUBSYSTEM=="tty", ATTRS{idVendor}=="0403" , ATTRS{idProduct}=="6001" , MODE="0666" , SYMLINK+="gps" |

* Ctrl+O; Ctrl+X
* Reboot to apply rules

| KERNELS=="8-1.4:1.0", SYMLINK+="ttgo\_main" - ttyACM1 (ttgo lora)  KERNELS=="8-1.3:1.0", SYMLINK+="gps" - ttyUSB0  KERNELS=="8-1.2:1.0", SYMLINK+="odom\_left" - ttyACM0 (Teensyduino)  KERNELS=="8-1.1.4:1.0", SYMLINK+="odom\_right" - ttyACM2 (Arduino Nano Every)  KERNELS=="8-1.1.3", SYMLINK+="rosimu" - ttyUSB1 |
| --- |

Old Notes

Step 7 - Install IMU and visualize the results (2021 version using BNO085/Nano)

Set up udev rule for two Nano’s

* PuTTy into RPi (tractor)
* Store list of devices connected before plugging in the Teensy
* $ ls /dev/ > dev\_list\_1.txt
* Then run this after you plug it in
* $ ls /dev/ | diff --suppress-common-lines -y - dev\_list\_1.txt

| ubuntu@ubiquityrobot:~$ ls /dev/ | diff --suppress-common-lines -y - dev\_list\_1.txt  ttyUSB2 <  ubuntu@ubiquityrobot:~$ |
| --- |

* $ dmesg | grep "ttyUSB2"

| ubuntu@ubiquityrobot:~$ dmesg | grep "ttyUSB2"  [ 2218.636831] usb 1-1.4: ch341-uart converter now attached to ttyUSB2  ubuntu@ubiquityrobot:~$ |
| --- |

* $ dmesg | grep "1-1.4"

| ubuntu@ubiquityrobot:~$ dmesg | grep "1-1.4"  [ 2217.378209] usb 1-1.4: new full-speed USB device number 11 using dwc\_otg  [ 2217.511332] usb 1-1.4: New USB device found, idVendor=1a86, idProduct=7523, bcdDevice= 2.64  [ 2217.511353] usb 1-1.4: New USB device strings: Mfr=0, Product=2, SerialNumber=0  [ 2217.511367] usb 1-1.4: Product: USB Serial  [ 2218.634121] ch341 1-1.4:1.0: ch341-uart converter detected  [ 2218.636831] usb 1-1.4: ch341-uart converter now attached to ttyUSB2  ubuntu@ubiquityrobot:~$ |
| --- |
| ubuntu@ubiquityrobot:~$ dmesg | grep "1-1.2"  [ 6048.930245] usb 1-1.2: new full-speed USB device number 12 using dwc\_otg  [ 6049.073467] usb 1-1.2: New USB device found, idVendor=1a86, idProduct=7523, bcdDevice= 2.64  [ 6049.073489] usb 1-1.2: New USB device strings: Mfr=0, Product=2, SerialNumber=0  [ 6049.073503] usb 1-1.2: Product: USB Serial  [ 6049.074713] ch341 1-1.2:1.0: ch341-uart converter detected  [ 6049.077894] usb 1-1.2: ch341-uart converter now attached to ttyUSB2  ubuntu@ubiquityrobot:~$ |

* Note there is no serial number for cheap Nano’s. We must use the USB tree to tell them apart. It is important that if I move USB ports this udev rule will have to be updated. [Ref](https://arduino.stackexchange.com/questions/6617/setting-serial-number-on-ch340-usb-serial-device), [Ref2](https://stackoverflow.com/questions/27017203/udev-rule-with-few-parent-device-attributes)
* Use FileZilla; Edit /etc/udev/rules.d/05-serial.rules

| # the lines below are for two Nano's that have the CH341 chip which does not provide a unique serial number  # this is the best/worst workaround see https://stackoverflow.com/questions/27017203/udev-rule-with-few-parent-device-attributes  #  KERNEL=="ttyUSB[0-9]\*", SUBSYSTEM=="tty", ATTRS{idVendor}=="1a86", ATTRS{idProduct}=="7523", ENV{USB\_HUB\_TYPE}="1a86:7523"  ENV{USB\_HUB\_TYPE}=="1a86:7523", KERNEL=="ttyUSB[0-9]\*",SUBSYSTEM=="tty", KERNELS=="1-1.4:1.0", SYMLINK+="ttyIMUNano"  ENV{USB\_HUB\_TYPE}=="1a86:7523", KERNEL=="ttyUSB[0-9]\*",SUBSYSTEM=="tty", KERNELS=="1-1.2:1.0", SYMLINK+="ttyNano2" |
| --- |

* If interested, $ udevadm info --query=all --name=/dev/ttyUSB2 --attribute-walk
* $ sudo reboot # to check the rules
* $ ls /dev # look for Nano references