**Electronics System Outside**

1. **Power**
   1. **Lipo battery**
      1. Feature
         1. Multiple cells connected in series.
         2. Current Requirements
            1. Continuous: [Enter value]
            2. Peak: [Enter value] +150mA (motor)
            3. Battery Operating Time: [Enter value]
      2. Resources
         1. [Purchase](https://nassaunationalcable.com/collections/grepow-lipo-round-shaped-batteries/products/grepow-580mah-3-7v-lipo-round-shaped-battery-5535035)
         2. Datasheet
   2. **Voltage Converter**
      1. Feature
         1. An IC convert voltage from 7.4V to 3.7V
   3. **Protection Circuit**
      1. Feature
         1. Reverse Polarity Protection
         2. Decoupling Capactiros
         3. EMI/ESD Protection
2. **Micros + Sensor Peripheral**
   1. ESP32-S3 (XIAO Seeed Studio)
      1. Resource
         1. [Dev Board Purchase](https://www.amazon.com/Seeed-Studio-XIAO-ESP32C3-Microcontroller/dp/B0B94JZ2YF/ref=sr_1_1_sspa?crid=3U5XVCDYL21NN&dib=eyJ2IjoiMSJ9.yqVz3dCdekRhWZxQcMEFs3F2tmMZribfjLxUmnSV6oT0LcxtOrtuNZw20-ZpZezO87cWQItTosr3EPF5zjCGe7goaZdVx6WkawJDauOCW0G3wdDeZCM_zd0Q8GRLWzk5qrCEqo0ur97yyIGXjMkVc5Z58Dnl8NYRwvoVlJ-ex6Qp5Z7U6IJFWtBISNsjTnYVkE9QavVirbPtQXBR6oCzXTGohvYg_wOjFBE5DSQqNf8.HtdpEoVWJF3C28y51gq2iq2gRbyN-U9WJw12i1PBEzA&dib_tag=se&keywords=seed+studio+xiao+esp32+s3&qid=1728076414&sprefix=XIAO+seed+s%2Caps%2C254&sr=8-1-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9hdGY&psc=1)
         2. [Schematic](https://github.com/yimengq/Small_VineRobot_Electronics/tree/main/Example_Schematics/XIAO%20Seeed%20Studio)
         3. [Github](https://github.com/yimengq/Small_VineRobot_Electronics/tree/main/Example_Schematics/XIAO%20Seeed%20Studio)
         4. [Official Website](https://wiki.seeedstudio.com/xiao_esp32s3_getting_started/)
   2. OV2640
   3. BNO055
      1. Feature: This is 9-axis IMU reused from Adafruit product
      2. Resource
         1. [Dev Board Purchase](https://www.adafruit.com/product/2472)
         2. [Schematic](https://learn.adafruit.com/adafruit-bno055-absolute-orientation-sensor/downloads)
         3. [Github](https://github.com/yimengq/Small_VineRobot_Electronics/tree/main/Example_Schematics/BNO055)

**Electronics System Inside**

1. **Power**
   1. ESP-PoE
      1. Feature
         1. 48V/30W,60W,90W
         2. Ethernet for data communication
      2. Resources
         1. [Dev Board Purchase](https://www.olimex.com/Products/IoT/ESP32/ESP32-POE/open-source-hardware)
         2. [Schematic](https://github.com/yimengq/Small_VineRobot_Electronics/blob/main/Example_Schematics/ESP32_POE/Oilmex%20Board/ESP32-PoE_Rev_L1.pdf)
         3. [Github](https://github.com/yimengq/Small_VineRobot_Electronics/tree/main/Example_Schematics/ESP32_POE/Oilmex%20Board)
2. **Micros**
   1. ESP32-WROOM