HESTIA

CANSAT Guidebook

Contents

Preparation

In this part you can only doing it only one time per PC and you must do this before go to setup part. Before you go to do you must extract the folder.

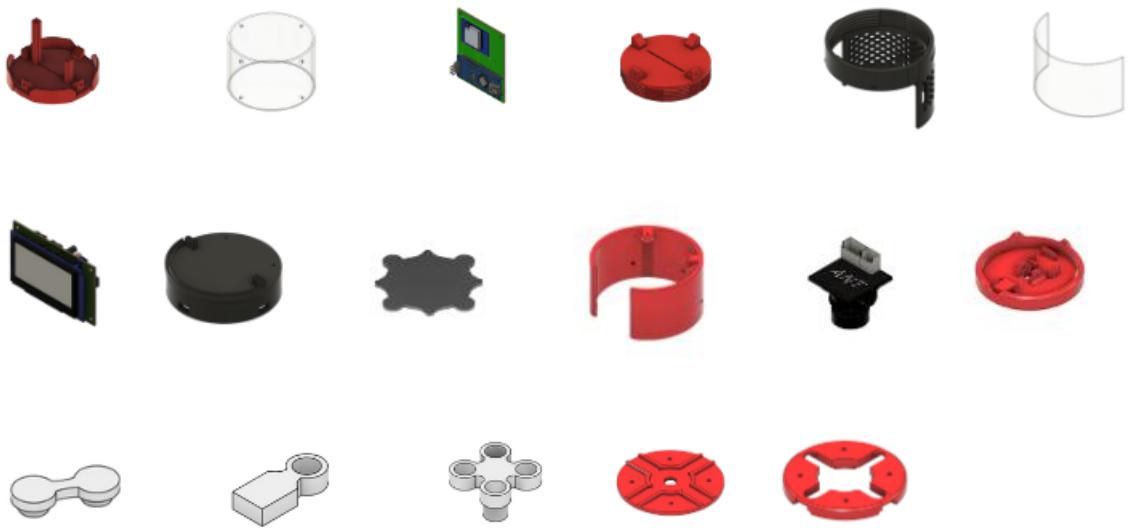
Our CANSAT model we have 3 layers

1. LoRa Communication Layer
2. Sensor Layer
3. FPV Layer

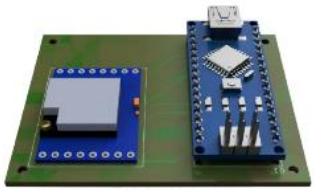
Hardware Preparation

Count and check the component before you go to setup part.

CANSAT Components



Ground Station Components

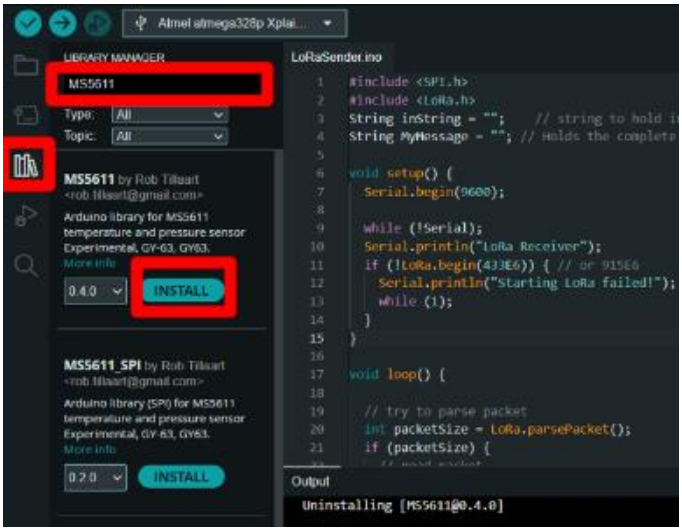


Software Preparation

Before you go to another process you need to download every file from github and extract it.

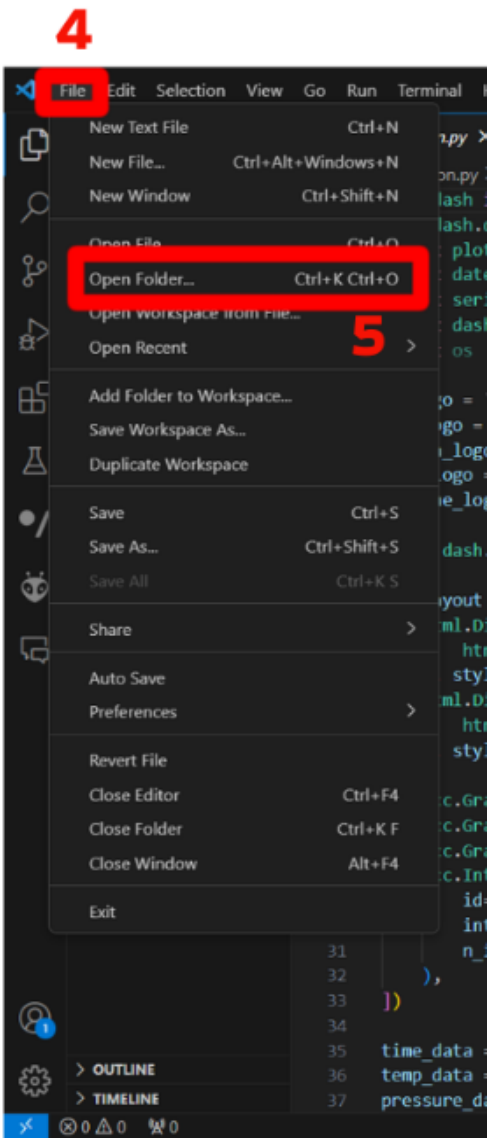
Sensor Part

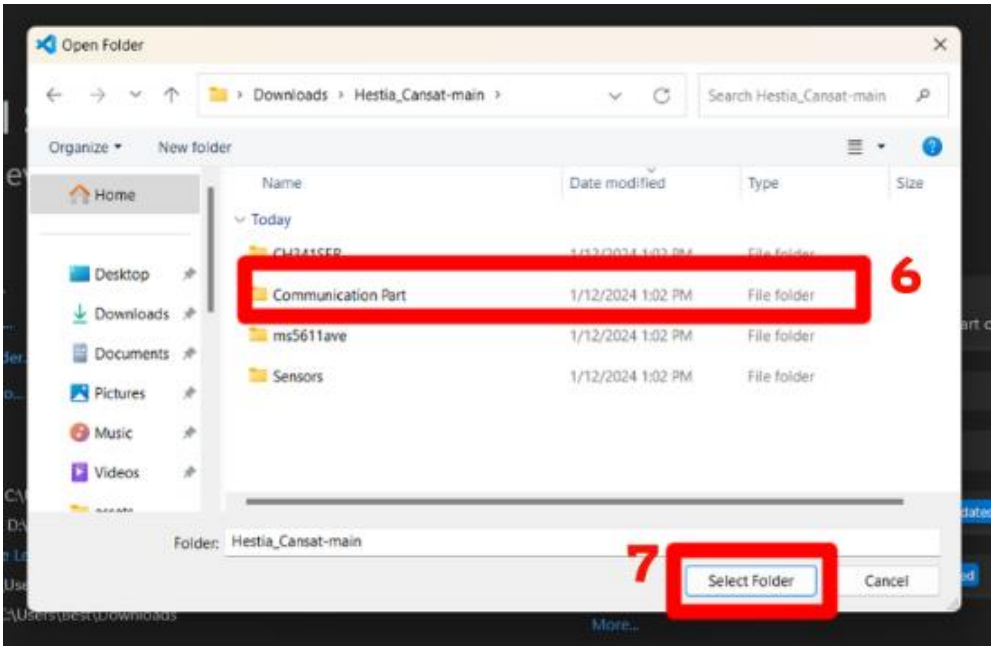
1. Install Arduino IDE
2. Open Arduino IDE
3. Search and Install libraries by selecting library manager on the left side
    - “MS5611 by Rob Tillaart rob.tillaart@gmail.com ”
    - “MPU6050 by Electronic Cats”
    - “Adafruit GFX Library by Adafruit”
    - “Adafruit SSD1306 by Adafruit”
    - “LoRa by Sandeep Mistry <Sandeep.mistry@gmail.com>”



Sensors Communication

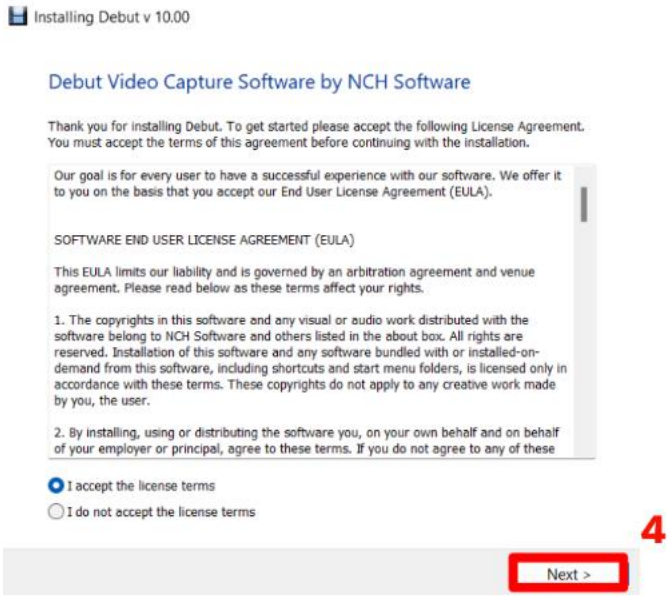
1. Install [Visual Studio Code]
2. Install [Python]
3. Open Visual Studio Code
4. Click “file” at the left corner
5. Select “open folder” or you can open by use “Ctrl + Shift + O”
6. Navigate file “Communication Part” to the workspace
7. Click “Select”
8. Open the terminal bar in the app
9. Install library by type command “pip install -r requirements.txt”



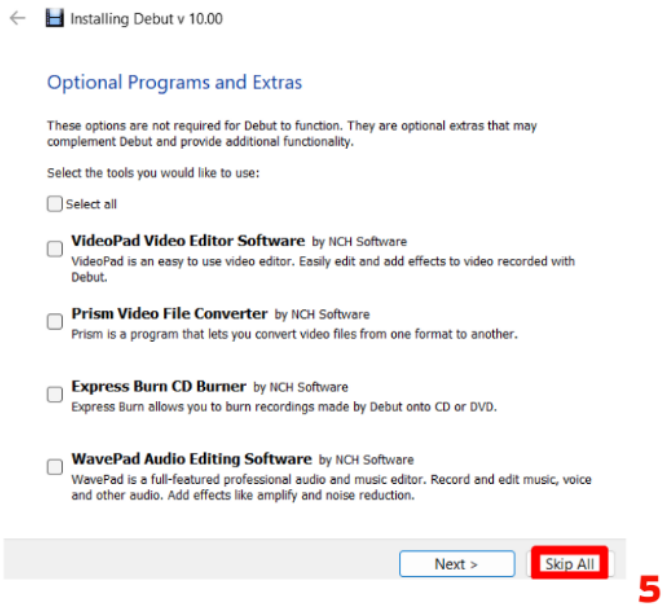


FPV Camera Part

1. Go to FPV Software
2. Click “Download Now”
3. Select “DebutVideoCaptureSoftware.exe”
4. Click “Next”



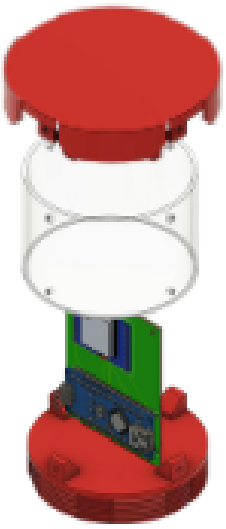
5. Click “Skip all”



Setup

In this part you need to do everytime before start to use it

Mechanical Part



CANSAT Part

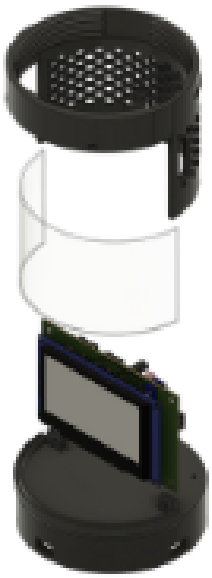
Top layer

1.Put a PCB in a middle of the object

2.Put an acrylic around it

3.Put the top part over the object

4.Use a screw to lock all of the component



Middle Layer

1.Put a sensor board with a LCD screen in the gap and lock it with a screw

2.Put the acrylic in front of the LCD screen

3.Use a lit to cover it all and lock it

Bottom Layer

Rotate to the right to activate the lock system with a middle part

1.Put the grey component on top of the lit

2.Assemble the grey component like the picture

3.Put a camera into the bottom lit and use a screw

4.Use a screw to connected all the components

Ground Station Part

1.Put a PCB in a middle of the object

2.Put the top part over the object

3.Use a screw to lock all of the components

Programming Part

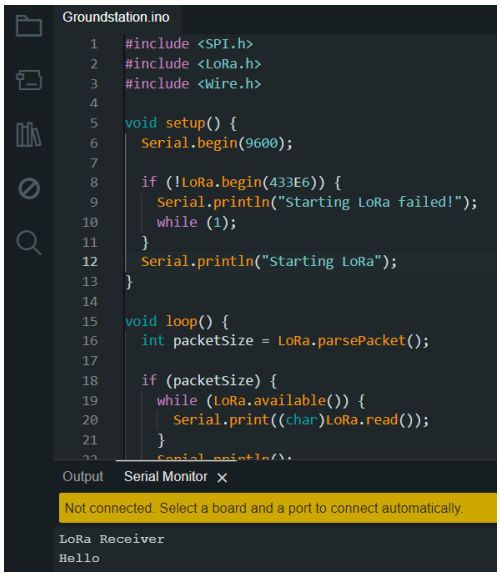
LoRa Layer

LoRa in CANSAT

1. Open “Main.cpp” by Arduino
2. Change the word in line 7 whatever you want but leave “...”
3. Select port and Upload your code to CANSAT

LoRa Communication

1. Go to “LoRa Layer” folder
2. Open “Groundstation.ino” by Arduino app
3. Upload code to LoRa communication board
4. Open serial monitor by press “Ctrl + Shift + M” to watch message

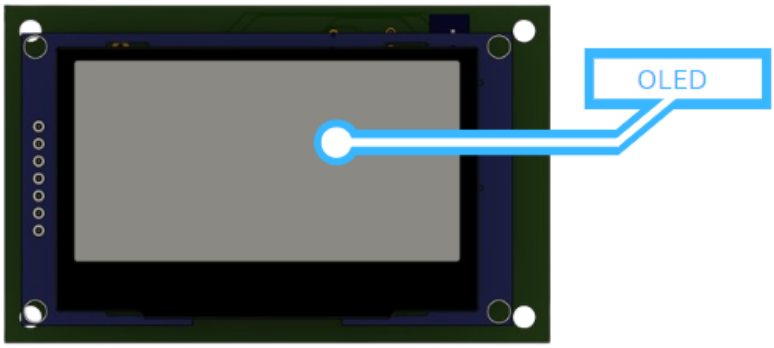


Sensors Layer

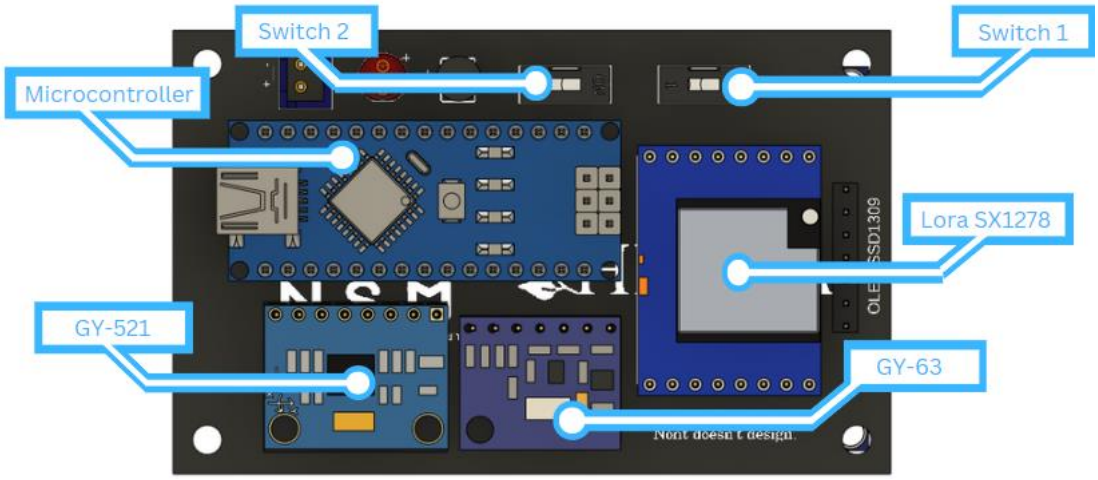
Sensors in CANSAT

Hardware

FRONT



BEHIND



Microcontroller (MCU) - embedded inside of a system to control a singular function in a device.

GY-63 (barometer) - used to measure atmospheric pressure.

GY-521 (accelerometer/gyro) - used to detect the acceleration of object and detects angular velocity of objects.

Lora SX1278 (HF transceiver) - enabling data communication over a long range.

Switch 1 - turn on to supply power to the sensor.

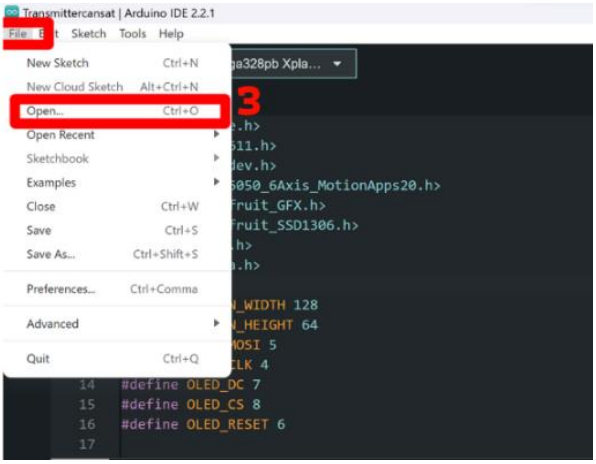
Switch 2 - turn on to enable power from outside battery.

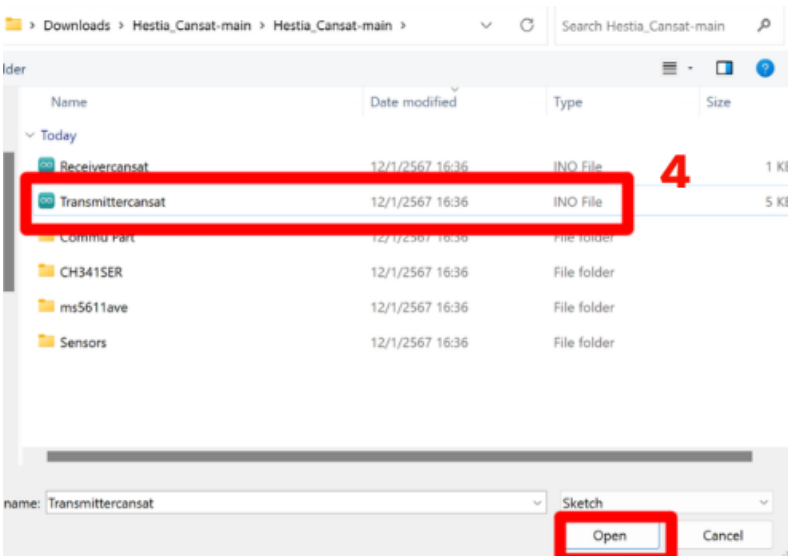
OLED (organic light-emitting diode) - used to create digital displays in devices.

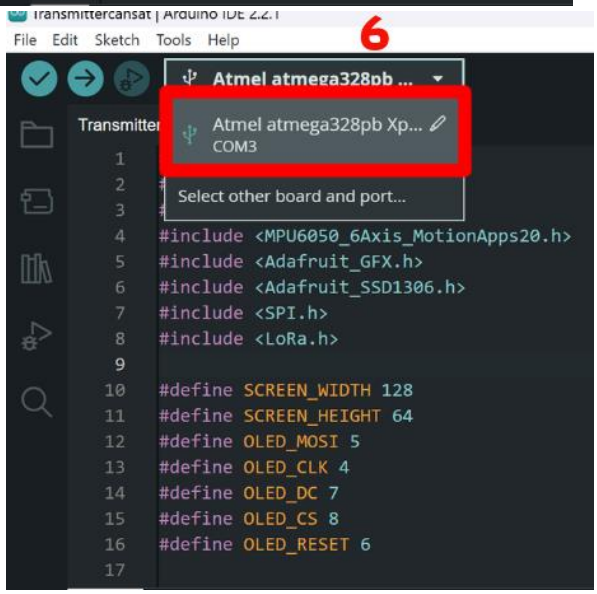
Software

1. Open Arduino IDE
2. Click file at the top left corner
3. Select “open” or Press ctrl + O
4. Select “Transmittercansat.ino”
5. Connect the USB Cable to the board and Computer
6. Select “Atmel atmega328pb Xplained mini” board and port (depends on the computer COM Port)
7. Verify code
8. Upload code

When you upload the code You can connect with powerbank or other power supply





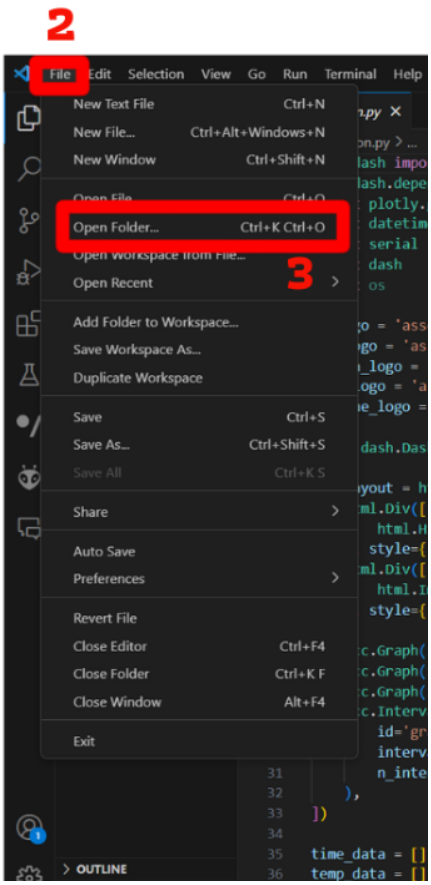


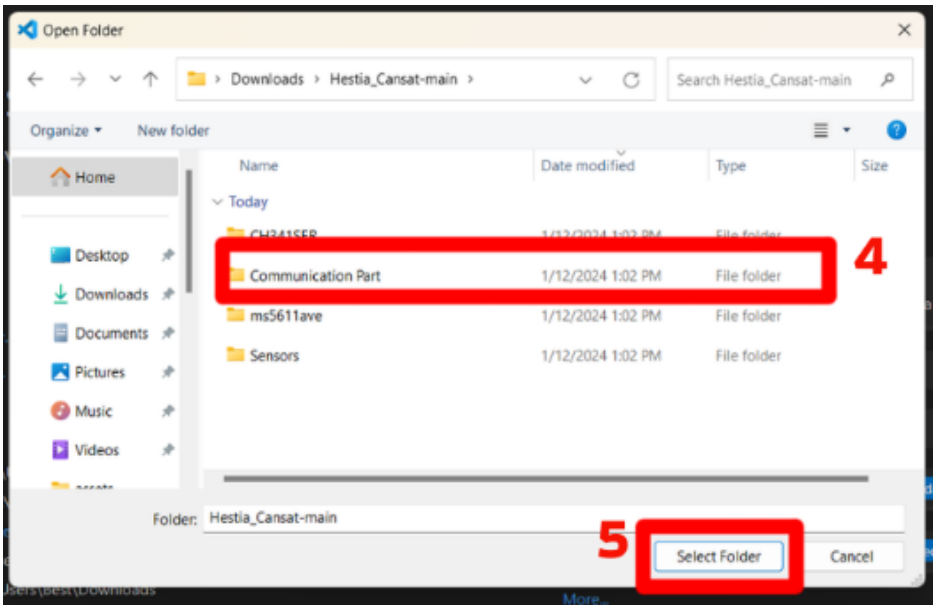
Sensors Communication

1. Open the program ”Visual Studio code”
2. Click “file” at the left corner
3. Select “open folder” or you can open by use “Ctrl + Shift + O”
4. Navigate file “Sensors Communication” to the workspace
5. Click “Select”
6. Select file “Ground Station.py”
7. Open Terminal
8. Find the “Setting port and Baud rate”
9. Edit setting port and baud rate (You can check by open Arduino and check)
10. Run the file
11. Open the link in the terminal
12. Wait for 10 second for calibrate

Every time you use and want to open it again disconnect and reconnect the receiver

You need to connect to run the Programming part before run the Communication part





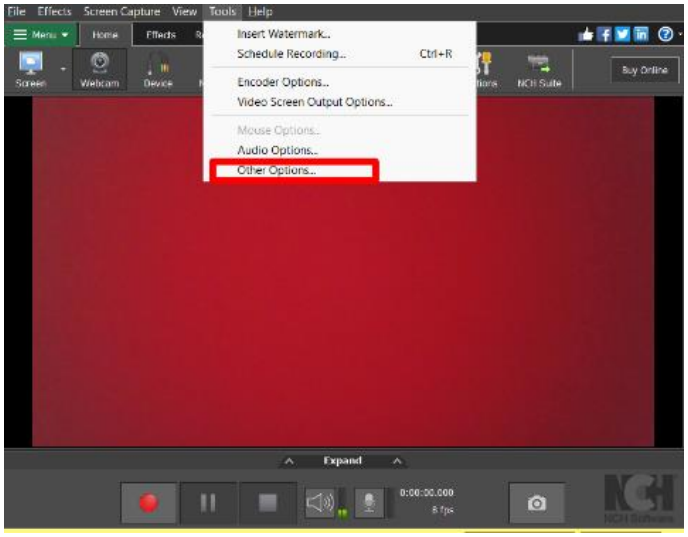
FPV Camera Layer

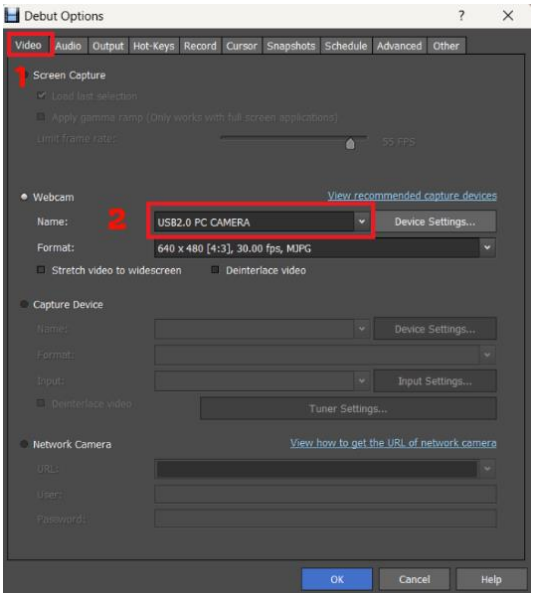
FPV Camera in CANSAT

1. Connect the antenna to the CANSAT with your power supply
2. Connect port USB with your power supply

FPV Camera Communication

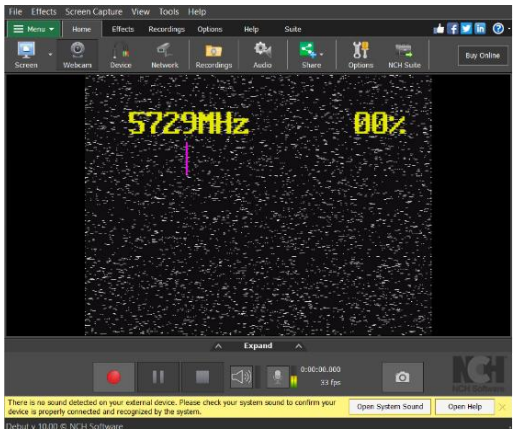
1. Connect the antenna to the receiver
2. Connect your receiver to computer by USB
3. Open “Debut by NCH Software”
4. Select “Tools” and select “Other Options”
5. Press at USB button on the receiver until the image appears





6. Choose “Receiver device name” in device option in setting and click “ok”.

7. You will see the radio wave video like in the picture. Please wait for 15 second for calibrating



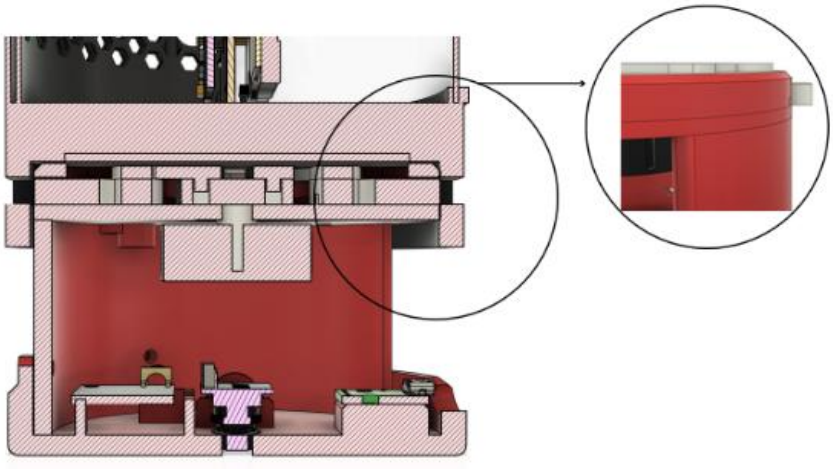
Troubleshoot

Mechanical Part

Simply remove all of the components then re-assemble again with a new component set

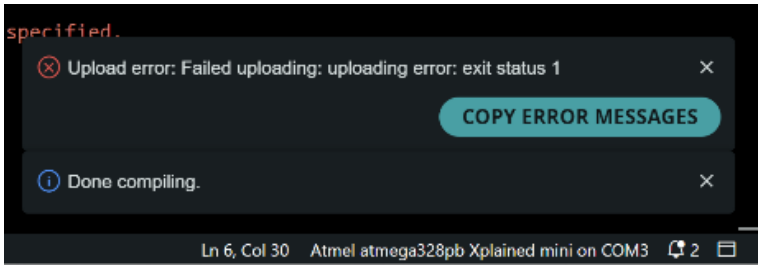
1. **Put it together then twist it**

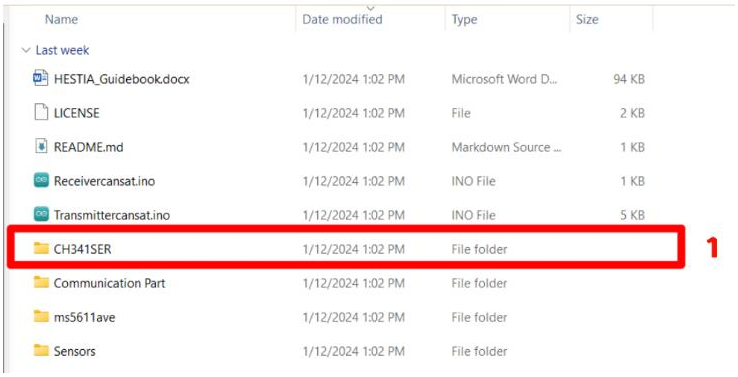
2. **Put the arm space next to the hole that already except for the gig of a lock system. Next rotate a black component to activate a lock system.**

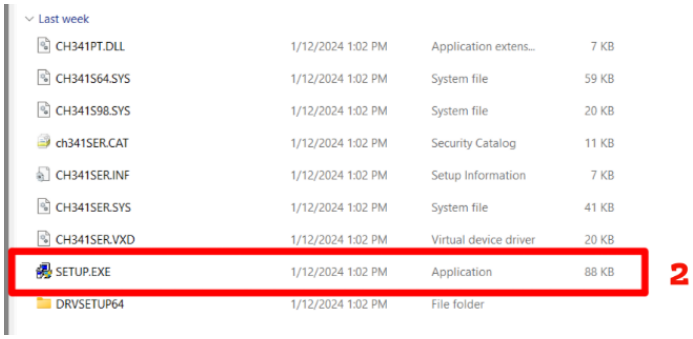


Programming Part

1. "Upload Error" Reinstall the driver of MCU by
    - Select the “CH341SER” folder
    - Select and Open “SETUP”
    - Select “UNINSTALL”
    - Select “INSTALL”
    - Pull out the USB Cable
    - Connect the USB Cable to the computer again







2. “Permission Error”
    - Disconnect receiver port and reconnect it
    - If it doesn’t display, Restart your device and setup again.

```
Traceback (most recent call last):
  File "c:\Users\Best\Downloads\Communication Part\Ground Station.py", line 42, in <module>
    ser = serial.Serial('COM3', 9600) # Setting port
          ^^^^^^^^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\Best\AppData\Local\Programs\Python\Python311\Lib\site-packages\serial\serialwin32.py", line 33, in __init__
    super(Serial, self).__init__(*args, **kwargs)
  File "C:\Users\Best\AppData\Local\Programs\Python\Python311\Lib\site-packages\serial\serialutil.py", line 244, in __init__
    self.open()
  File "C:\Users\Best\AppData\Local\Programs\Python\Python311\Lib\site-packages\serial\serialwin32.py", line 80, in open
    self._reconfigure_port()
  File "C:\Users\Best\AppData\Local\Programs\Python\Python311\Lib\site-packages\serial\serialwin32.py", line 222, in _reconfigure_port
    raise SerialException(
serial.serialutil.SerialException: Cannot configure port, something went wrong. Original message: PermissionError(13, 'A device attached to the system is not functioning.', None
, 31)
```

Obligation and Caution

Obligation

- You should follow the preparation and setup part step by step
- Turn off the switch and unplug when not in use.
- After use, store it in a bag and keep it dry.
- CANSAT should be connected to a stable power source and port USB because it will have huge impact in transmitting and receiving.
- If your communication part and programming part is damaged. try to delete and do preparation and set up again.

Caution

- If any issues another what is covered in the manual, please contact and send the item for repair to the service center.
- Do not use steam cleaners or high-pressure water sprayers to clean the equipment, as it may cause electric shock.
- Children under 15 years old should have receive advice from adult before use.
- Do not use make anything that make spark occur.
- Do not touch the transmitter and receiver with wet or dirty hands.

Specifications

Model Name	Hestia CANSAT
Dimension	Ø 90 mm.
Net Weight (Transmitter and 3D Model)	420 g.

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