CUBENODE

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CubeNode ETH

The CubeNode ETH provides networking capabilities to Cube Flight Controllers without Ethernet support. By enabling the PPP protocol on one of the serial ports (preferably with flow control) of The Cube, you can achieve up to 12Mbit/s networking link and transport multiple protocols (CAN, MAVLink) over the network without chewing multiple serial ports. CubeOrange+ and CubeRed running ArduPilot 4.5 or above release firmwares support the PPP protocol out of the box. CubeOrange and older Cubes built with networking enabled in the custom ardupilot build can support PPP protocol as well.

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Specifications

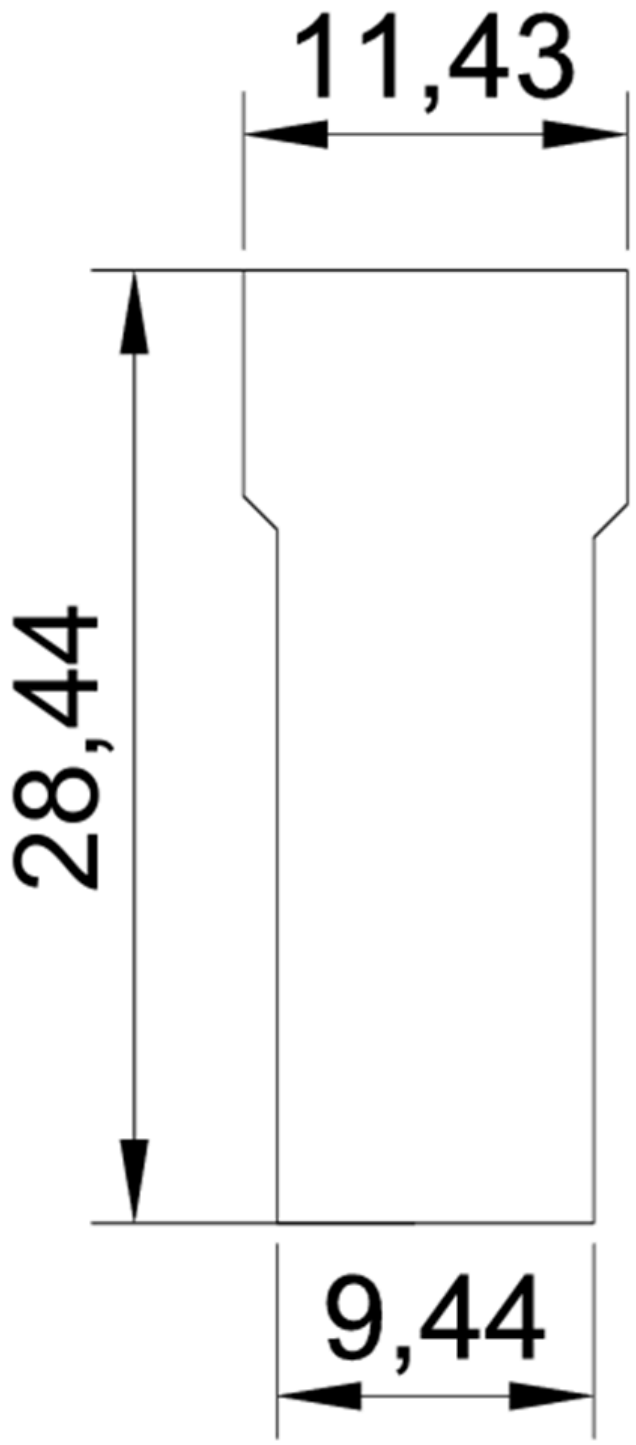
Recommended Operating Conditions

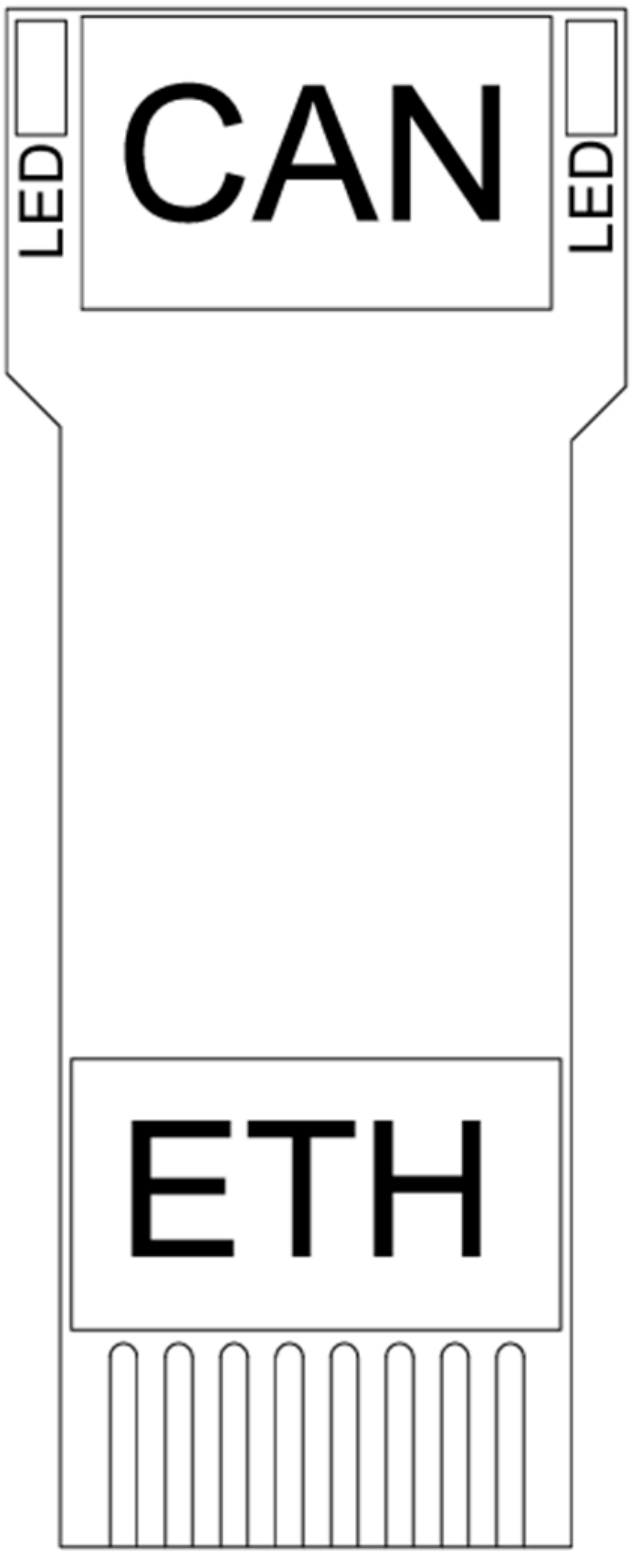
Parameter	Min	Max	Unit
Vin	5	5.5	V

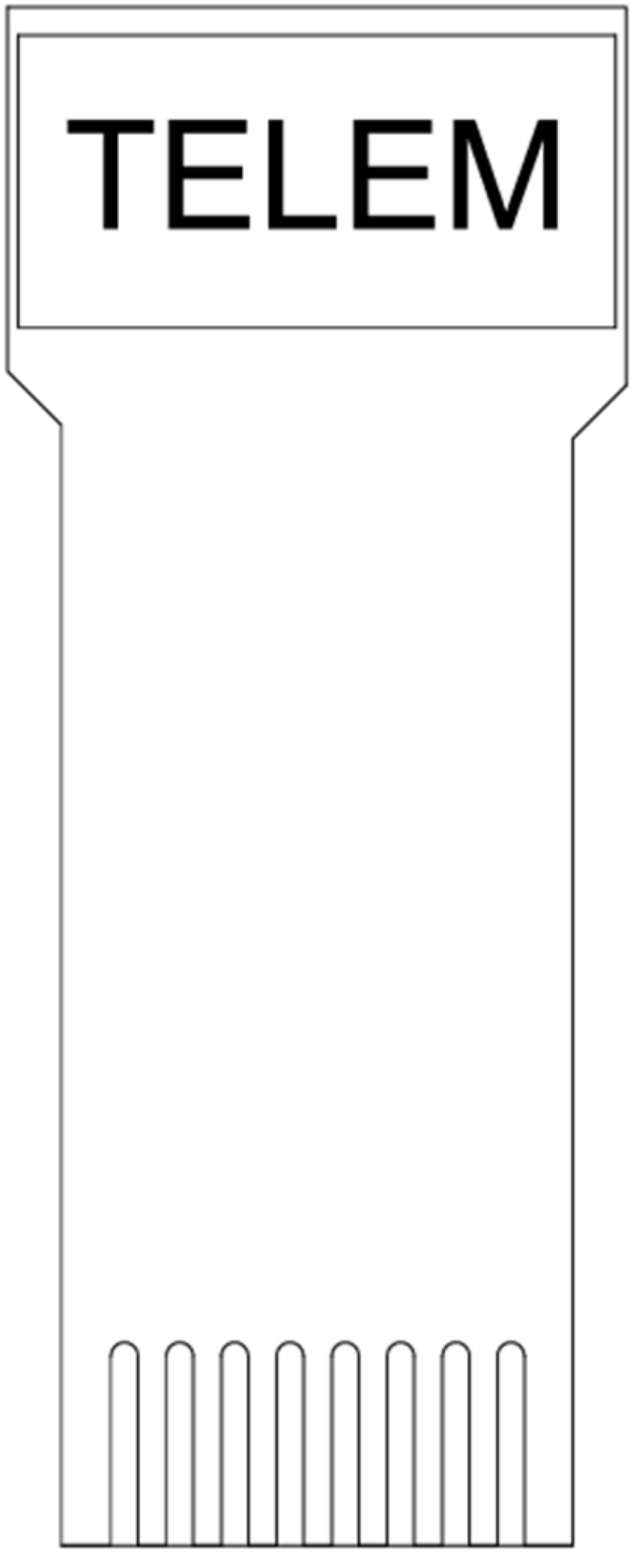
Electrical Specifications

Dimensions	11.43 x 28.44mm
Speed	10/100M
Connector Type (CAN)	JST SM04B-GHS
Connector Type (Serial)	JST SM06B-GHS
Connector Type (Ethernet)	JST SM05B-GHS
Auto MDI-MDIX Function	Supported
LAN Transformer	Included

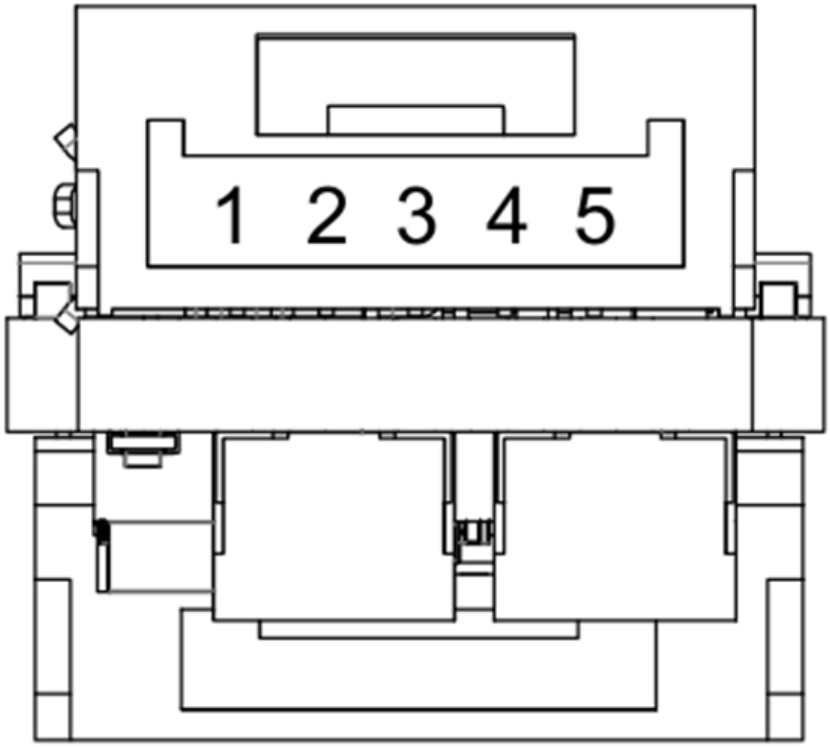
Mechanical Specifications



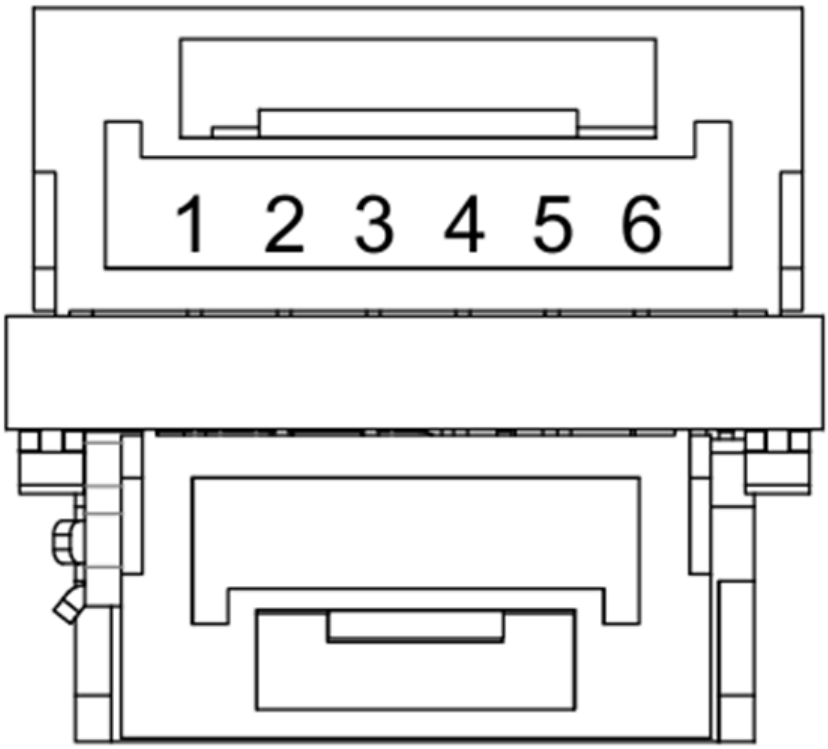

LED
CAN
LED
ETH


TELEM

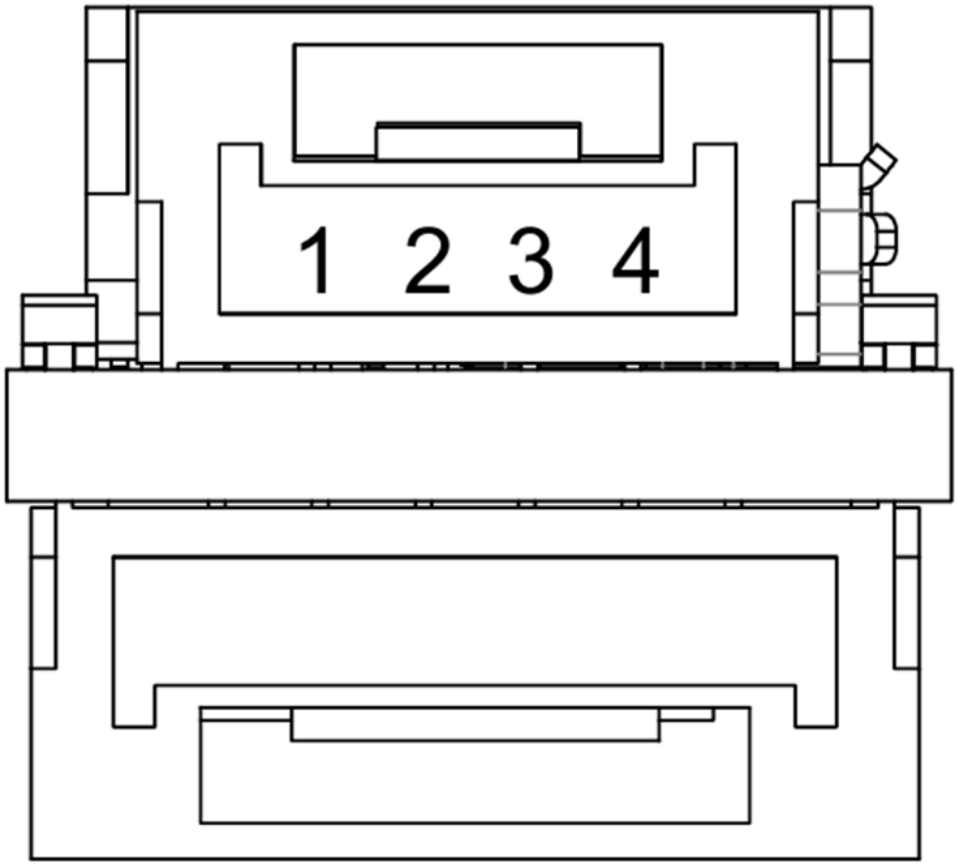
Pinout Definition



Pin Number	Definition
1	Ethernet RX+
2	Ethernet RX-
3	Ground
4	Ethernet TX+
5	Ethernet TX-



Pin Number	Definition
1	5V Input
2	SERIAL_TX
3	SERIAL_RX
4	SERIAL_CTS
5	SERIAL_RTS
6	Ground



Pin Number	Definition
1	5V Input
2	CAN_H
3	CAN_L
4	Ground

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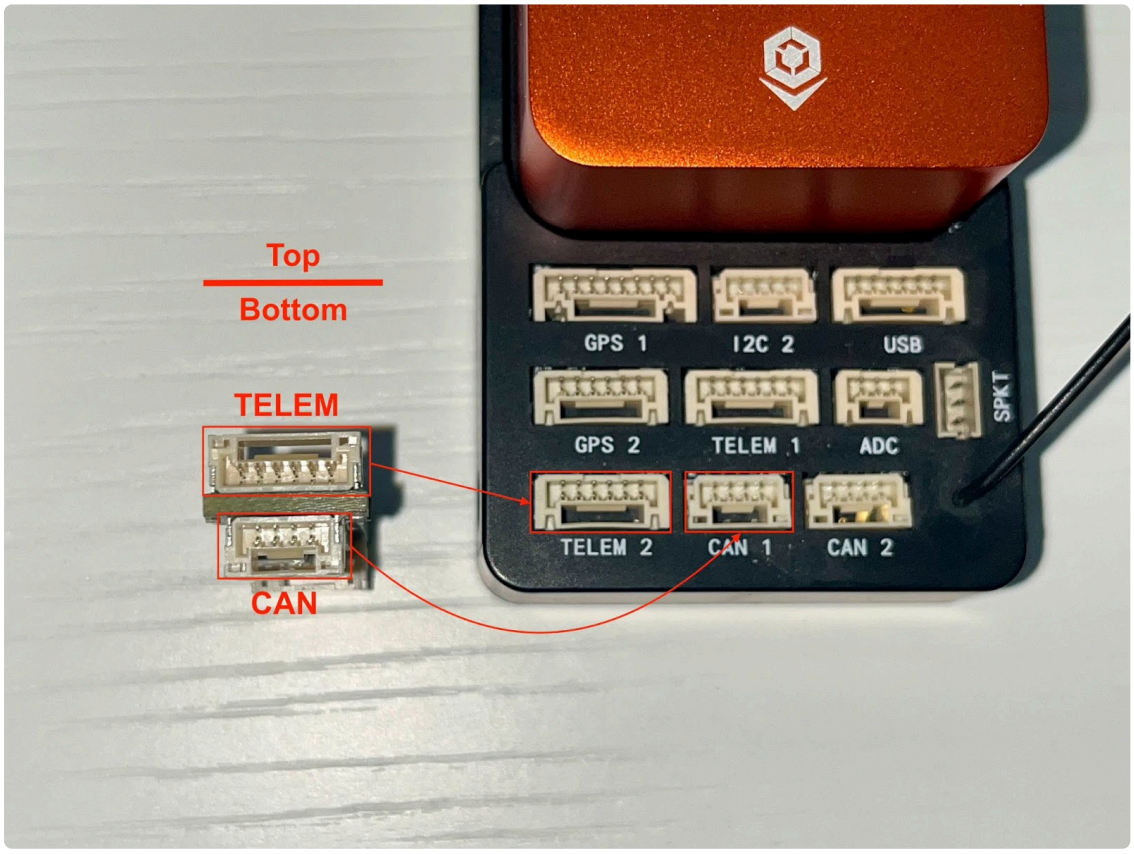
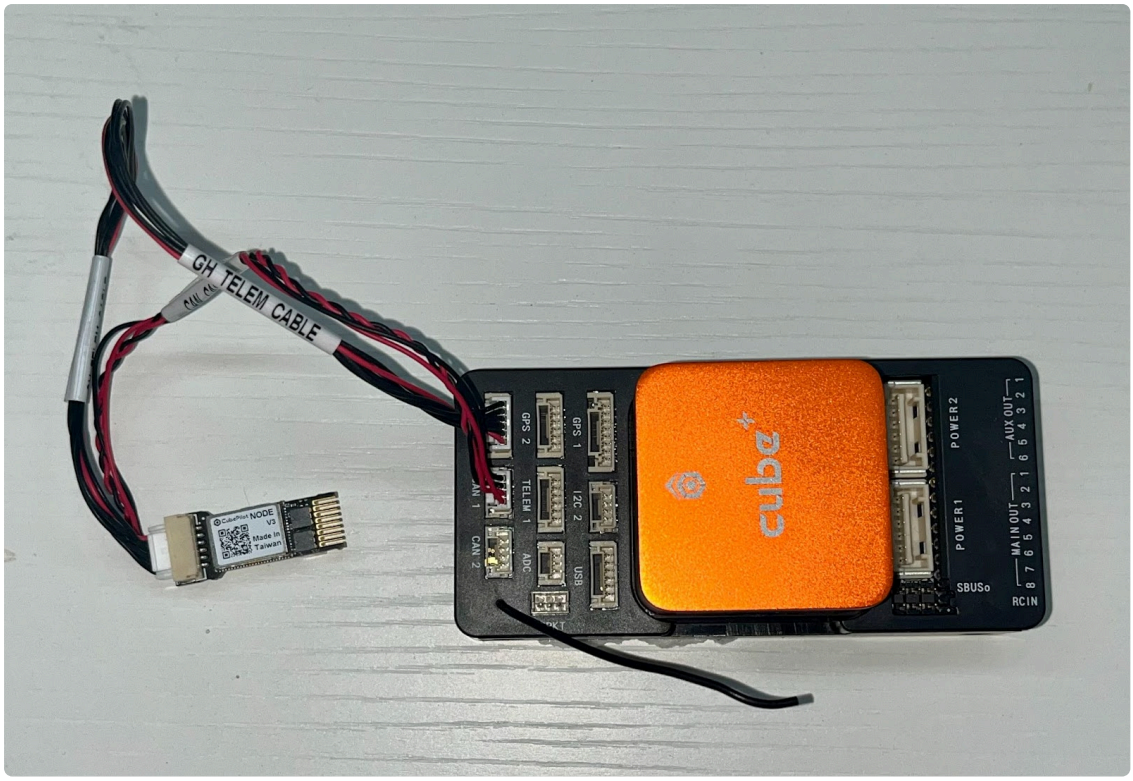
Setting Up the Physical Connection between the Cube, CubeNode, and laptop/PC

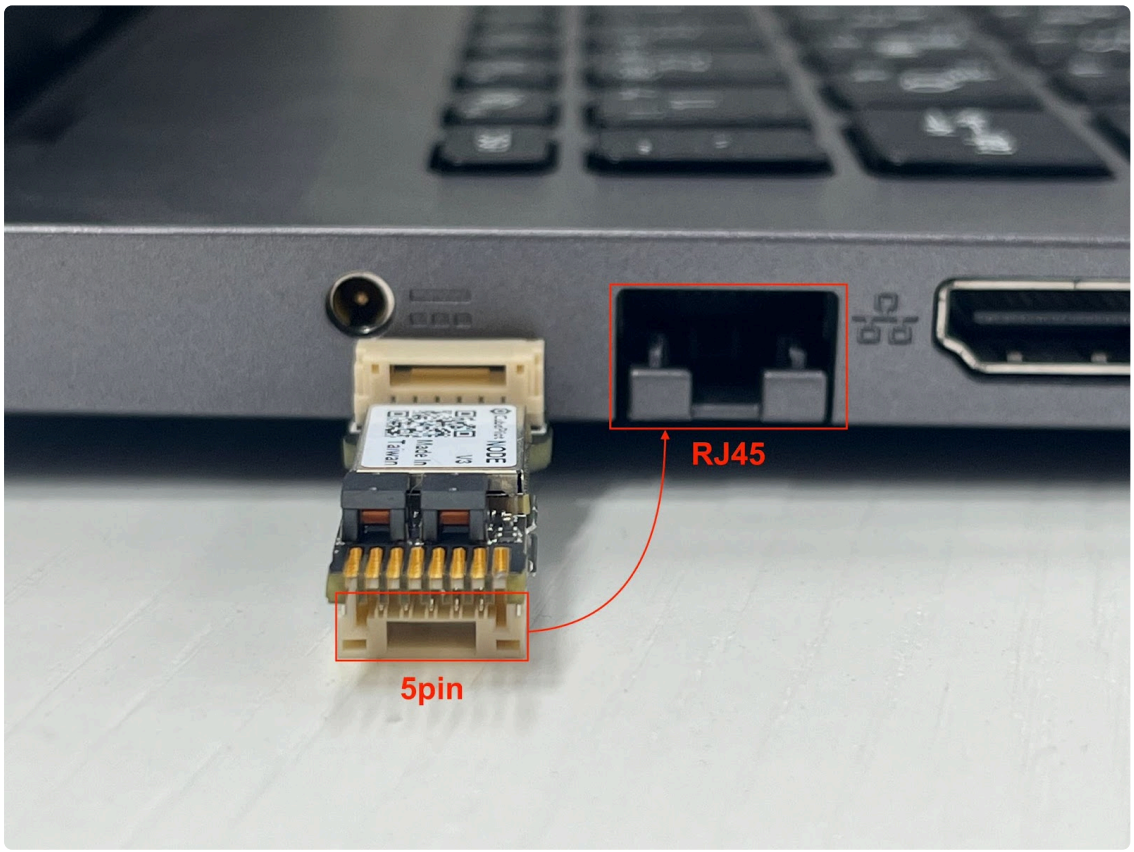
To set up the physical connection between The Cube, CubeNode, and laptop/PC, complete the following steps:

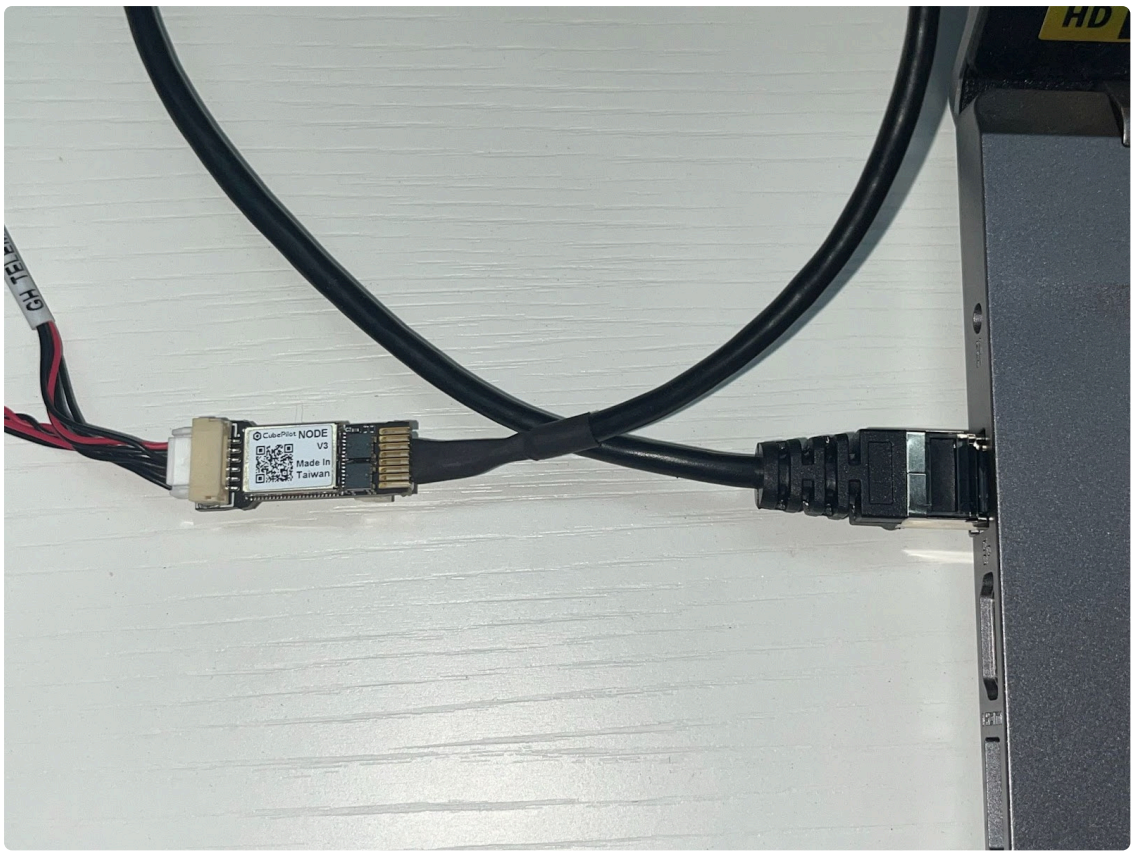
1. Connect The Cube to a laptop/desktop via USB.
2. Use a CAN and GH TELEM cable to connect the CubeNode to The Cube via the CAN1 and Telem2 ports.





3. Use a 5-pin to RJ45 cable to connect the CubeNode to the laptop or desktop.

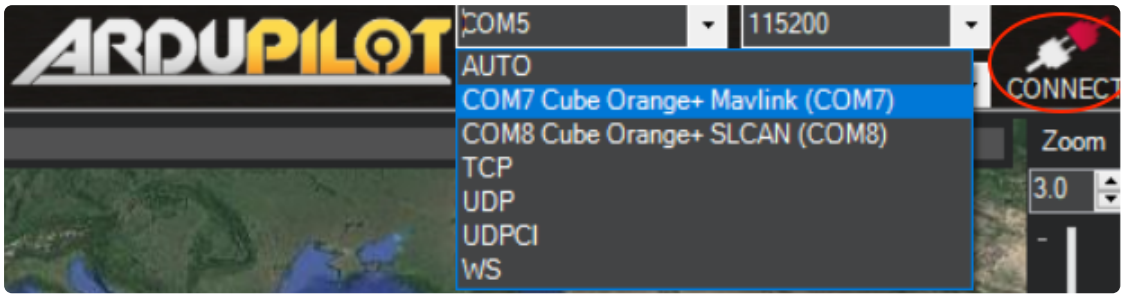




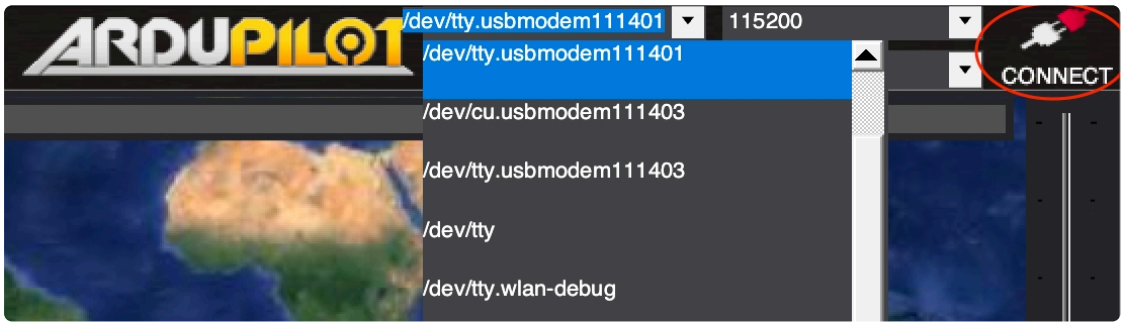
Setting up the Cube Orange+ (Cube)

To set up the Cube Orange+ (Cube), complete the following steps:

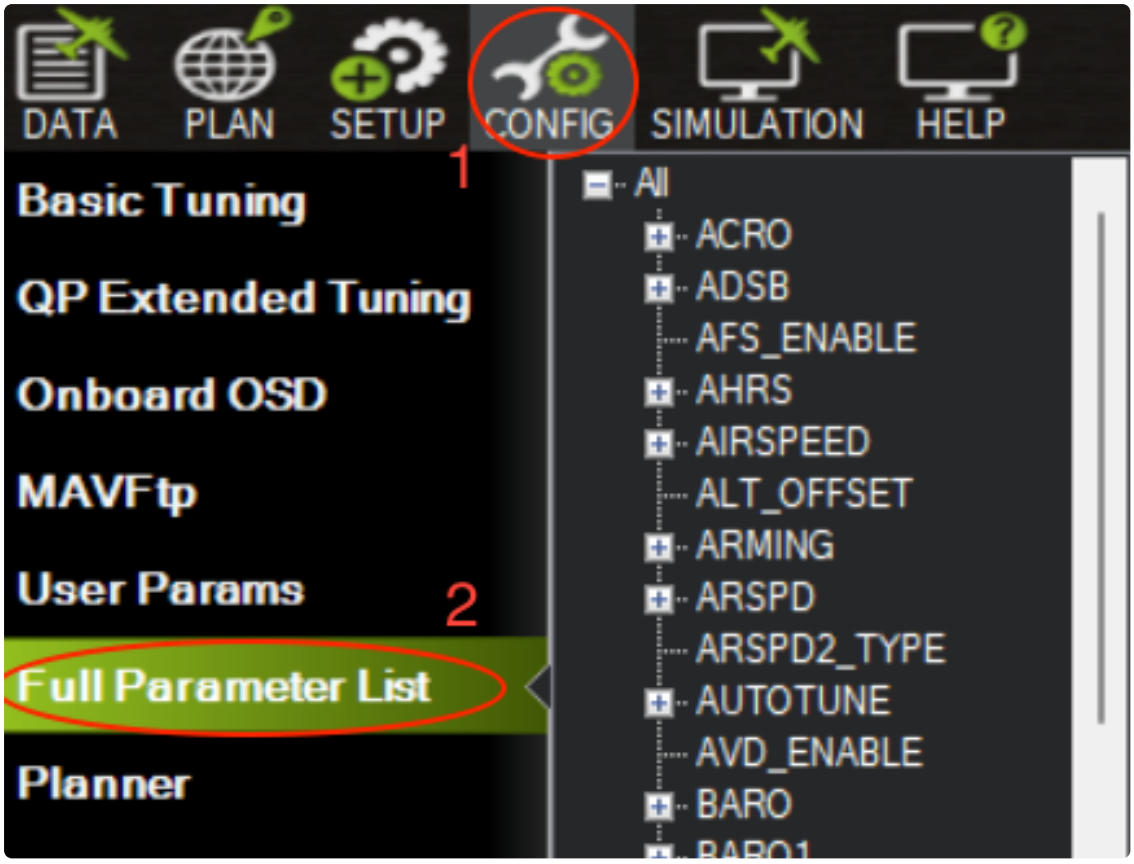
1. Connect the Cube to the Mission Planner:
    - **Windows**: On the ArduPilot user interface, select **COM7 Cube Orange+Mavlink (COMX)** and click **Connect**.



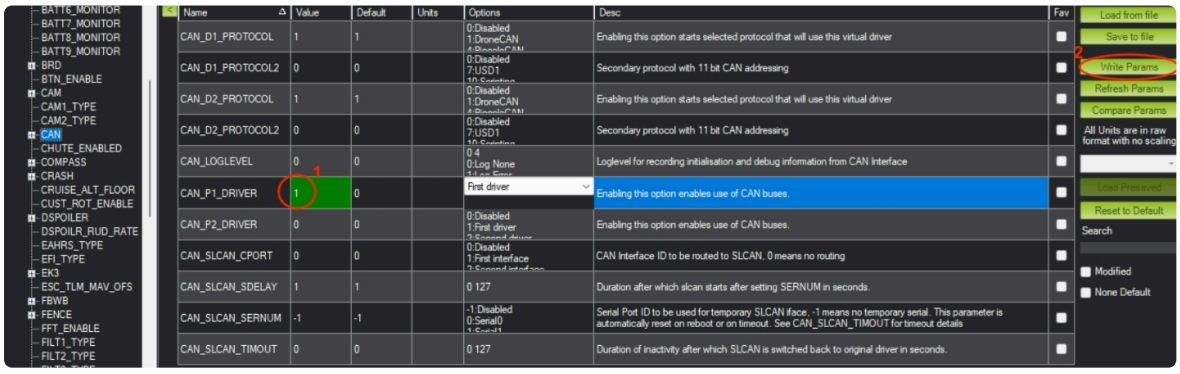
    - **MacOS**: On the ArduPilot user interface, select **/dev/tty.usbmodemXXX01** and click **Connect**.



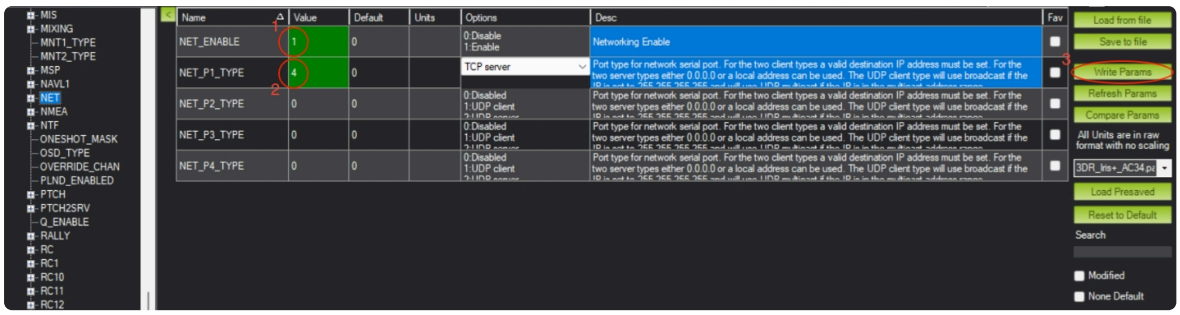
2. Open Mission Planner.
3. Click **Config** -> **Full Parameter List**.



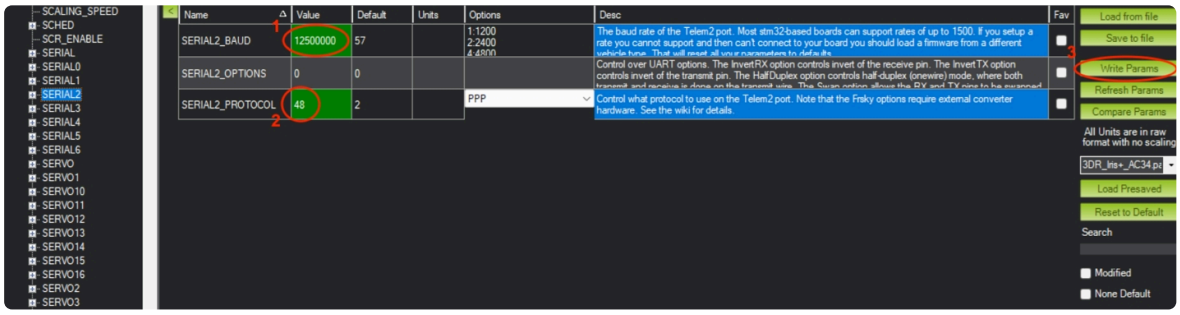
3. Enable CAN:
    - Set **CAN_P1_DRIVER 1 (First Driver)**.
    - Click **Write Params** and restart The Cube by unplugging the cable and plugging it back into The Cube.



4. Enable NET:
    - Set **NET_ENABLE 1 (Enable)**.
    - Set **NET_P1_TYPE 4 (TCP Server) (Port 1)**.
    - Click **Write Params**. If it doesn't refresh, click **Refresh Params**.



5. Modify the Serial port through the Telem port:
    - Choose **SERIAL2** for the Telem2 port (or **SERIAL1** for Telem1).
    - Set **SERIAL2_BAUD 12500000 (12.5M)**.
    - Set **SERIAL2_PROTOCOL 48 (PPP)**.
    - Click **Write Params** and restart The Cube by unplugging the cable and plugging it back into The Cube.

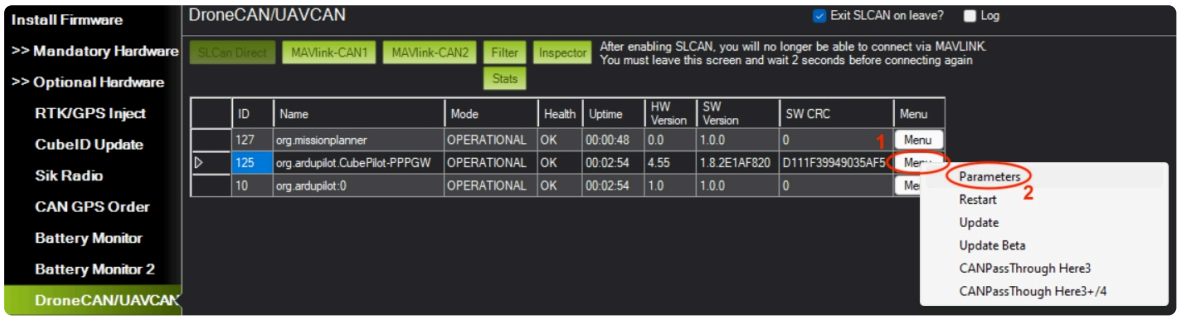


Setting Up the CubeNode

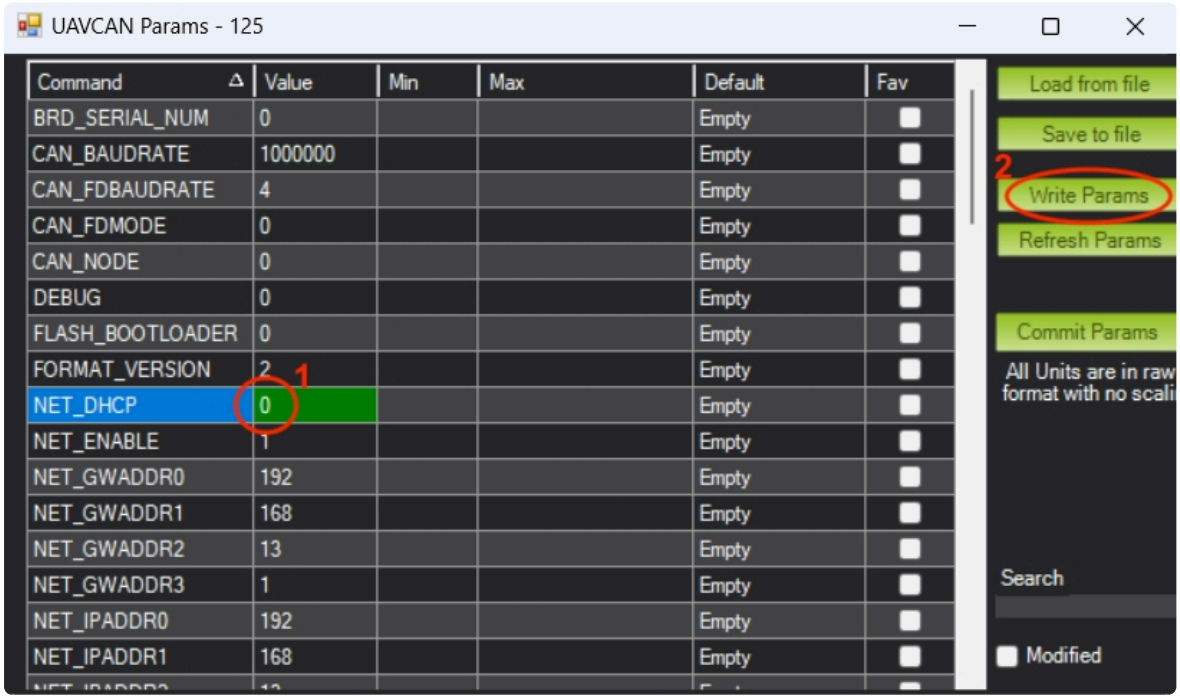
To set up the CubeNode, complete the following steps:

1. Open Mission Planner.
2. Obtain the required parameters:
    - Click **Setup** -> **Optional Hardware** -> **DroneCAN/UAVCAN** -> **MAVlink-CAN1**.

- Select **CubeNode (CubePilot-PPPGW)** and click **Menu** -> **Parameters**.



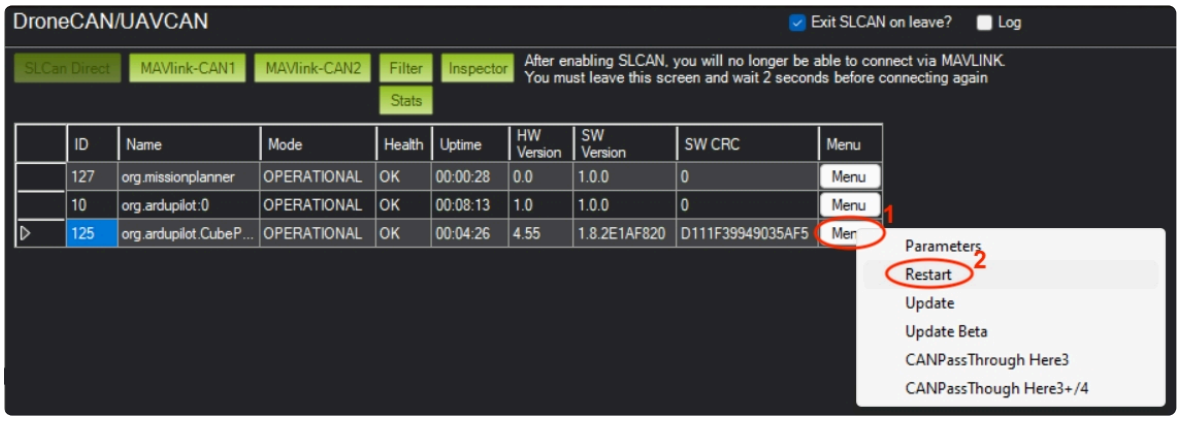
2. Configure the network:
    - Set **NET_DHCP** to 0 (Manual IP). The default IP should be 192.168.13.14/24 on port 1 (NET_PPP_PORT 1).
    - Click **Write Params**.



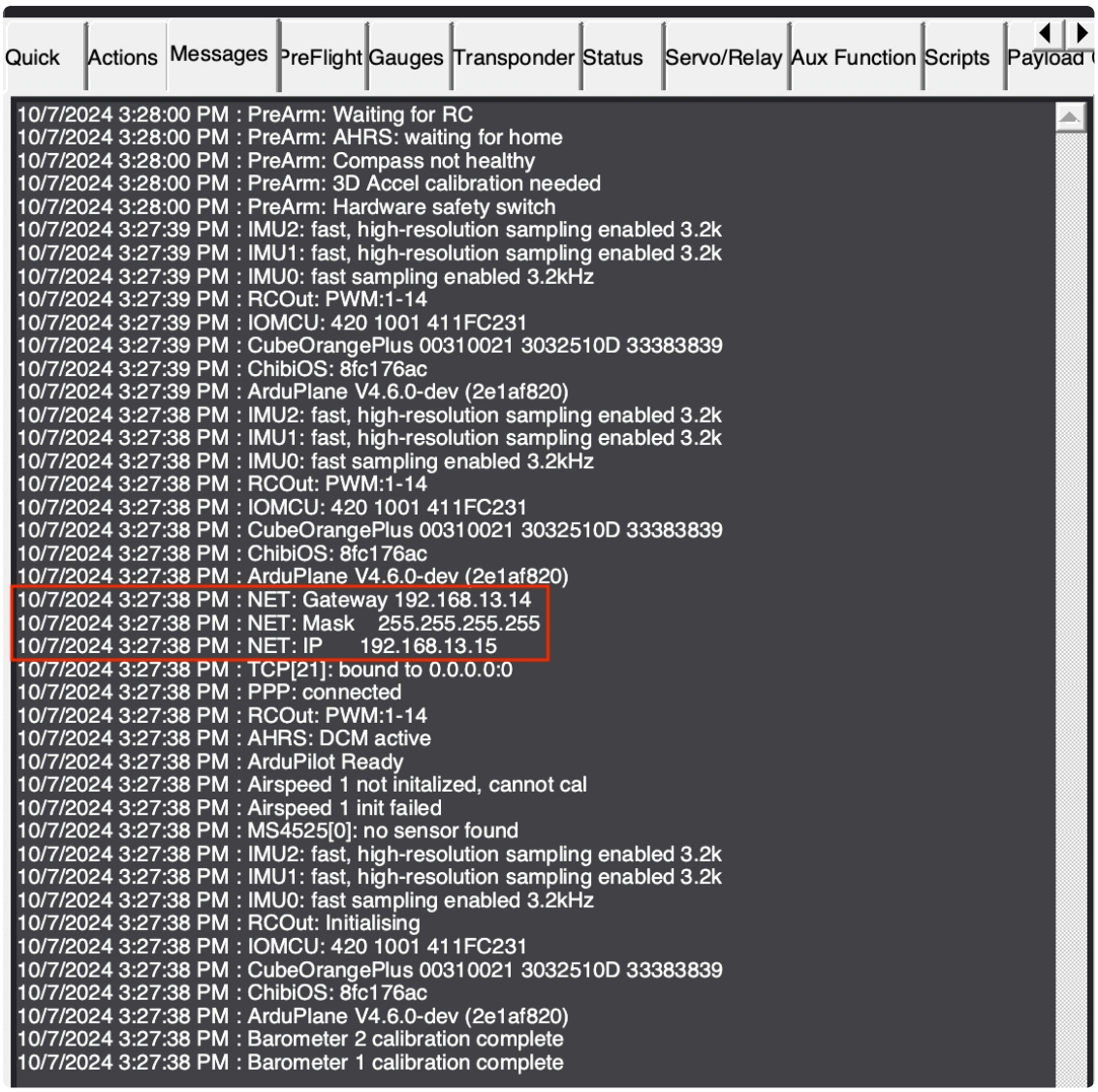
- For Manual IP, modify the gateway address and the IP address. For example, set the parameters as shown below for 172.31.13.14/16.

NET_GWADDR0	172
NET_GWADDR1	31
NET_GWADDR2	0
NET_GWADDR3	1
NET_IPADDR0	172
NET_IPADDR1	31
NET_IPADDR2	13
NET_IPADDR3	14
NET_NETMASK	16

- Click **Menu** -> **Restart**. The IP address 192.168.13.15 will be assigned to The Cube.



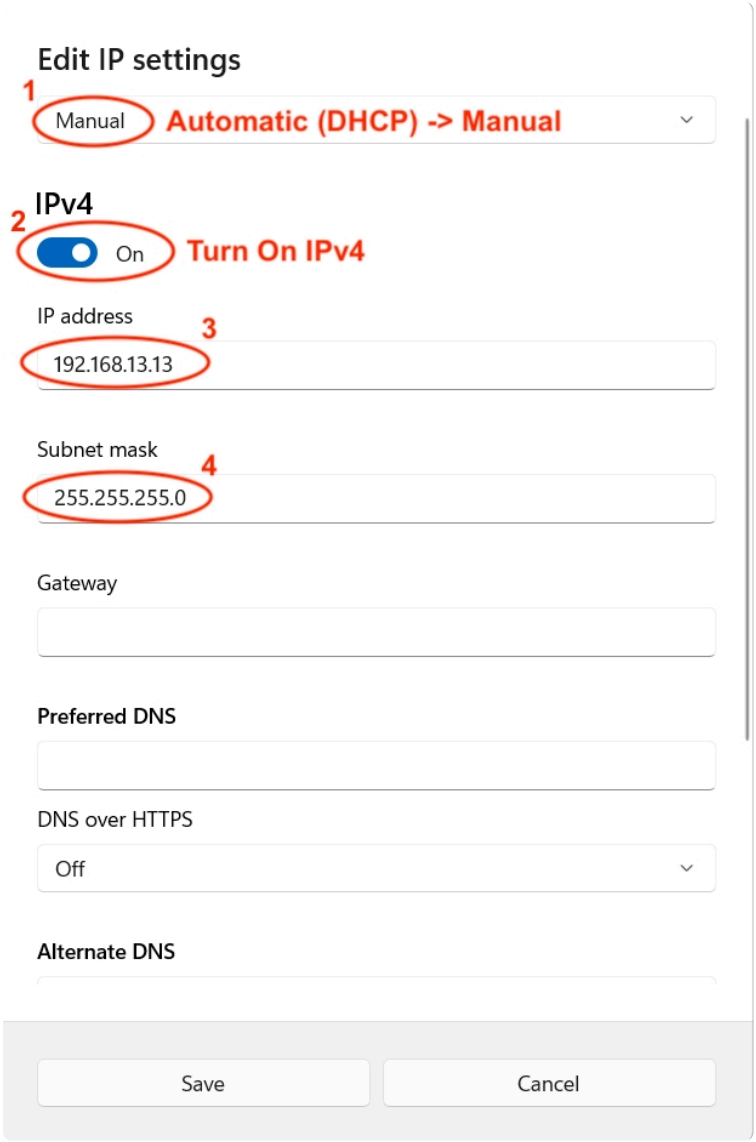
- If using DHCP, set **NET_DHCP** to 1. The IP address will be shown in The Cube's message. The netmask will always be 255.255.255.255 because the connection between The Cube and the CubeNode is through TCP (1 to 1). The IP address for the Cube will be automatically set to the CubeNode's IP address+1, which is 192.168.13.14+1 = 192.168.13.15.



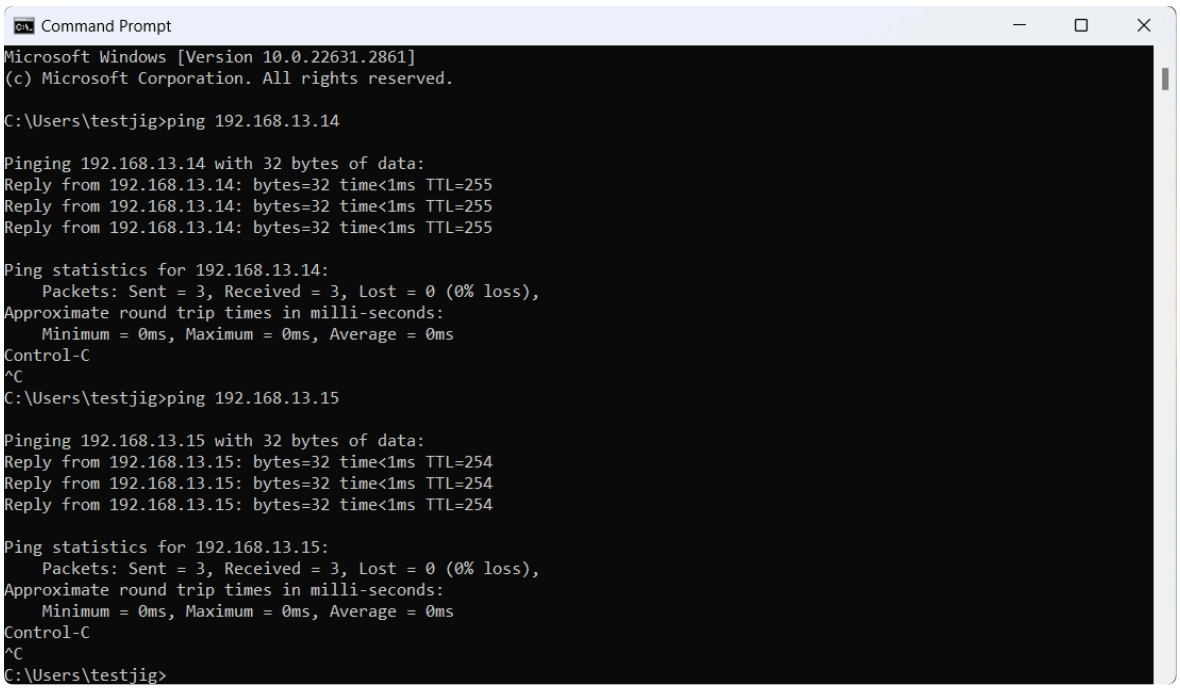
Setting Up the Laptop/Desktop

To set up the laptop/desktop, complete the following steps:

1. Configure the Manual IP address:
    - Go to **Settings** -> **Network & Internet** -> **Ethernet**.
    - Set IP assignment to **Manual**.
    - Turn on **IPv4**.
    - Set **IP address** to 192.168.13.13 (must be different from The Cube and CubeNode).
    - Set **Subnet Mask** to 255.255.255.0.



2. Check the connection:
    - Check if the IP address is 192.168.13.14/24 on port 1 (NET_PPP_PORT 1).
    - Open a command prompt (cmd) or any terminal.
    - Run the command `“ping 192.168.13.14”` for the CubeNode and `“ping 192.168.13.15”` for The Cube.



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