

# User Guide

## CloudMesh Satellite – NS-02



## Important notice

This device, like any wireless device, operates using radio signals which cannot guarantee the transmission and reception of data in all conditions. While the delay or loss of signal is rare, you should not rely solely on any wireless device for emergency communications or otherwise use the device in situations where the interruption of data connectivity could lead to death, personal injury, property damage, data loss, or other loss. NetComm Wireless accepts no responsibility for any loss or damage resulting from errors or delays in transmission or reception, or the failure of the NetComm wireless devices to transmit or receive such data.

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NetComm Wireless Limited was acquired by Casa Systems in 2019.

 **Note** – This document is subject to change without notice.

## Document history

This document relates to the following product:

### NetComm CloudMesh Satellite

Ver.	Document description	Date
v1.00	First document release	14 July 2021

*Table 1. – Document revision history*

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# Product features/functionality

## Key features

- Automated Wi-Fi issue resolution with Wi-Fi Auto Pilot
- Seamless connection with a CloudMesh Gateway
- CloudMesh App for Wi-Fi Analytics and Troubleshooting
- LED light bar for indicating the optimal placement of each satellite
- Two Gigabit Ports for versatile connectivity
- Vertical PCB and Antenna design for increased Wi-Fi coverage and cooling
- Qualcomm-based chipset for powerful Wi-Fi
- Zero-touch setup, Cloud Orchestration and Seamless Wi-Fi Client Roaming for the best user experience

# Interfaces

## Front view



Figure 1 – Front view interface

No	Interface	Description
1	LED indicator	Provides a visual representation of the status of the CloudMesh Satellite. Refer to the LED indicator section on page 10.

Table 1 - Front view interfaces

## Rear view



Figure 2 – Rear view interfaces

No.	Interface	Description
1	Ethernet ports	Gigabit Ethernet LAN ports. Can be used to connect clients in bridge mode.
2	Power adapter port	Connect the included power adapter here.
3	WPS button	Push this button within 2 minutes of pushing the 5GHz WPS button on the CloudMesh Gateway to connect (pair) them. During the pairing process, the LED indicator on the front side of the CloudMesh Satellite will be flashing purple, see page 9.

Table 2 – Rear view interfaces

## Bottom view

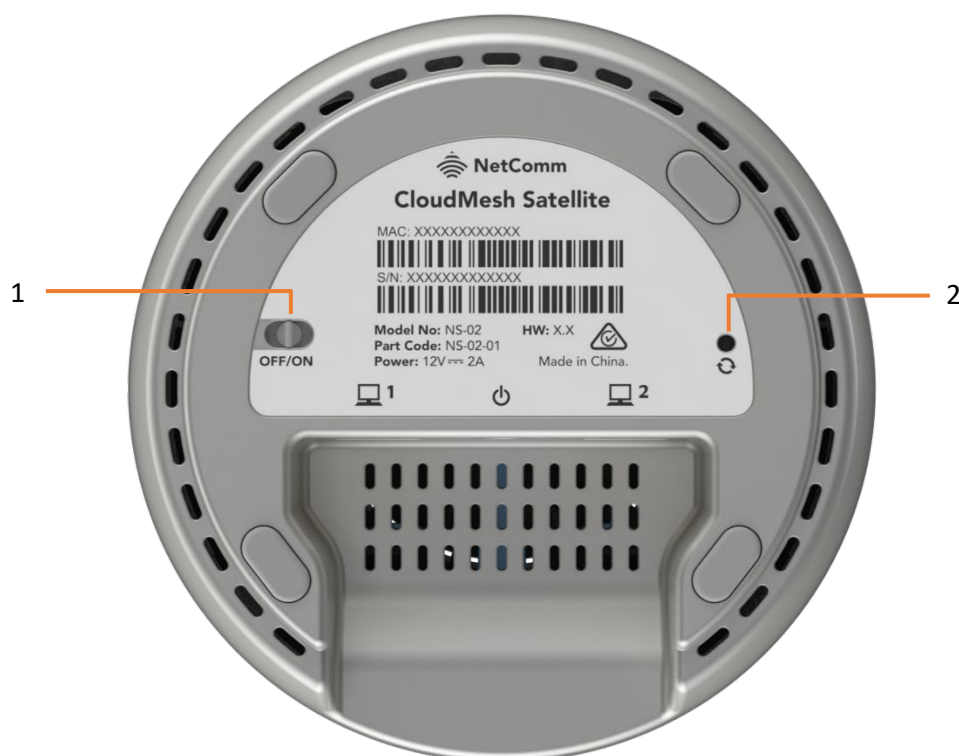


Figure 3 – Bottom view interfaces


No	Interface	Description
1	ON/OFF button	Turns the CloudMesh Satellite on or off.
2	Reset button	To reset the CloudMesh Satellite, insert a straightened paper clip or similarly shaped object into the small hole marked with the reset icon  and hold for ten (10) seconds.

Table 3 - Bottom view interface

## Physical dimensions and weight

The table below lists the physical dimensions and weight of the CloudMesh Satellite.

### Dimensions

Width	113 mm
Height	145 mm
Depth	110 mm
Weight	320 grams

Table 4 - Physical dimensions and weight

## CloudMesh Satellite location

Your CloudMesh Satellite works best when it is placed in a central location to the area you want to cover. Ideally, it should be located no more than two rooms away from the CloudMesh Gateway. To increase the size of your mesh network, you can add multiple CloudMesh Satellites.



Figure 4 - Wi-Fi coverage diagram

## Common location considerations

If you have concerns about your network's performance that might be related to range or obstruction factors, try moving the device to a position between three to five metres from the CloudMesh Satellite or CloudMesh Gateway to see if distance is the problem.

**Note** – While some of the items listed below can affect network performance, they will not prohibit your wireless network from functioning; if you are concerned that your network is not operating at its maximum effectiveness, this check list may help.

Try not to place the CloudMesh Satellite near a cordless telephone that operates at the same radio frequency as the CloudMesh Satellite (2.4GHz/5GHz).

## Avoiding obstacles and interference

Avoid placing your CloudMesh Satellite near devices that may emit radio "noise," such as microwave ovens.

If your wireless signal seems weak in some spots, make sure that objects such as those listed below are not blocking the signal's path between your devices and the CloudMesh Satellite.

Dense objects that can inhibit wireless communication include:

- Refrigerators
- Washers and/or dryers
- Metal cabinets
- Metallic-based, UV-tinted windows

# Pairing the CloudMesh Satellite with your CloudMesh Gateway

## Pre-configured (already paired)

If the CloudMesh Satellite and the CloudMesh Gateway have been pre-configured by your Internet Service Provider, the devices will already have been paired together and you can turn on both devices and begin using them.

To set up your CloudMesh Gateway and CloudMesh Satellite:

- 1 Turn on your CloudMesh Gateway (refer the **CloudMesh Gateway User Guide**) and connect to the Internet.
- 2 Position the CloudMesh Satellite near the CloudMesh Gateway (refer to *CloudMesh Satellite location* section of this guide, above).
- 3 Connect the power adapter to the CloudMesh Satellite. The LED flashes green then starts to flash blue after a minute or so.
- 4 Wait for up to 10 minutes as the CloudMesh Satellite attempts to pair with the CloudMesh Gateway. The LED flashes blue. When the Satellite has been paired with the Gateway, the LED will display as solid white, blue, or red, depending on the signal strength.



**Important**

If the LED is solid red, this means the signal is poor.  
Reposition the Satellite closer to the Gateway.  
Refer to *CloudMesh Satellite location* section of this guide, above.

The CloudMesh Satellite is now ready to use.

## Pairing via WPS push button

If the CloudMesh Satellite and the CloudMesh Gateway have not been set up by your Internet Service Provider, you will need to pair them yourself. The CloudMesh Satellite can pair with a CloudMesh Gateway using the WPS (Wi-Fi Protected Setup™) functionality.

- 1 Place the CloudMesh Satellite next to your CloudMesh Gateway.
- 2 Connect power to both devices, switch them on and wait for them to power on. If the CloudMesh Satellite LED light is still flashing blue after 20 minutes, you will need to pair it with the CloudMesh Gateway manually.
- 3 Ensure that the CloudMesh Gateway is connected to the Internet.
- 4 Press and release the **WPS** button on the rear of the CloudMesh Satellite. The LED on the CloudMesh Satellite flashes purple to indicate that the WPS pairing window has started and will last for two minutes.
- 5 Press and release the **WPS** button on the CloudMesh Gateway while the CloudMesh Satellite LED is still flashing purple. The pairing process can take up to five minutes.

- 6 When the pairing process is complete, the CloudMesh Satellite's LED light will indicate signal strength. See the **LED indicators** section below.
- 7 Position the CloudMesh Satellite in the desired location in your premises and begin using your new mesh Wi-Fi network. You should refer to the LED signal strength table on the next page to determine the optimal location to achieve the best signal strength.

## Pairing via Ethernet cable

An alternative pairing method to using WPS (see page 9) is to use the Ethernet cable (supplied with the satellite) connected to the Ethernet port of each device to pair the CloudMesh Satellite with a CloudMesh Gateway.

- 1 Place the CloudMesh Satellite next to your CloudMesh Gateway.
- 2 Connect power to both devices, switch them on and wait for them to power on. If the CloudMesh Satellite LED light is still flashing blue after ten minutes, continue to step 3 to pair it with the CloudMesh Gateway manually.
- 3 Ensure that the CloudMesh Gateway is connected to the Internet.
- 4 Connect the Ethernet cable (supplied with the CloudMesh Satellite) into any of the LAN ports on the back of each device.
- 5 Allow up to ten minutes for the CloudMesh Satellite to download information from CloudMesh Gateway. The LED turns solid green, indicating that it has paired with the gateway.
- 6 Disconnect the Ethernet cable from both devices and wait 10 minutes. As the CloudMesh Satellite attempts to pair with the CloudMesh Gateway, the LED will flash pink.
- 7 Position the CloudMesh Satellite in the desired location in your premises and begin using your new mesh Wi-Fi network. You should refer to the LED signal strength table on the next page to determine the optimal location to achieve the best signal strength.

## LED indicators

Your CloudMesh Satellite LED follows this sequence when first turned on.





Sequence	LED	LED activity	Meaning
1			Blinking green Powering up
2			Blinking blue Ready for pairing

Table 5 – LED sequence on power up

When connected to the CloudMesh Gateway, the LED shows the signal strength as follows:











LED	LED activity	Meaning
		Solid white Good signal
		Solid blue Medium signal
		Solid red Poor signal
		Blinking blue No signal / too far from gateway / not connected to mesh network
		Blinking purple WPS pairing activated

Figure 5 - LED signal strength statuses

The LED may also display the following statuses.









LED	LED activity	Meaning
		Solid pink Paired but no Internet connection
		Blinking purple WPS pairing activated
		Blinking pink Pairing in progress
		Solid green Wired connection to the gateway.

Figure 6 - Additional LED statuses

## Connecting client devices

You can connect any number of Wi-Fi enabled client devices to the internet via the CloudMesh Satellite using the WPS (Wi-Fi Protected Setup™) functionality of each device.

In addition, you can connect two peripheral client devices using the Ethernet ports on the back of the CloudMesh Satellite.

## Connect a client via WPS

The CloudMesh Satellite provides three methods to establish a connection with client devices:

- WPS (Wi-Fi Protected Setup™) functionality.
- Connection via Ethernet.
- Entering the Wi-Fi credentials into your client's wireless configuration options.

### Connect a device using the WPS button (default setting)

- 1 Bring a WPS enabled device within Wi-Fi range and press the **WPS** button on the back of the CloudMesh Satellite.
- 2 The LED on the front of the CloudMesh Satellite flashes purple for up to two minutes.
- 3 When the device is connected, the WPS LED displays the signal strength (between the satellite and the gateway) listed in Figure 5.

## Connect a client via Ethernet cable

Alternatively, you can directly connect a device, for example a printer, to the CloudMesh Satellite using an Ethernet cable.

- 1 Connect the Ethernet cable provided to one of the yellow Ethernet ports on the bottom of the CloudMesh Satellite.
- 2 Connect the other end of the Ethernet cable to your client device.

## Connect a client by entering wireless credentials

The Wi-Fi Security Card that ships with the CloudMesh Gateway includes your unique network name and password. Type the information into your wireless device when connecting or scan the QR code that is printed on the card. If you have changed the wireless network name (SSID) or password, select the wireless network from your client and enter the chosen password instead of the details listed on the Wi-Fi Security Card.



Figure 7 – Wi-Fi Security card

## Turning off the LED light

In some locations, for example a bedroom, the LED light may become an unwanted distraction.

To control the display of the CloudMesh Satellite's LED light, press and hold the **WPS** button for six (6) seconds to switch the light's display between **ON** or **OFF**.



Figure 8 – Turn off LED display

## Web interface

The CloudMesh Satellite features a web interface for advanced configuration, though it is not required for everyday operation of the device.

## Firmware upgrade

If a firmware update is released, you can apply it to the satellite by accessing the web interface. In situations where your gateway and satellite were provided to you pre-configured by your Internet Service Provider, the firmware upgrade is remotely managed by the provider.

There are two ways of accessing the web interface of the satellite. The method to use depends on whether the CloudMesh Satellite is paired with the Gateway.

If the CloudMesh Satellite is paired to a CloudMesh Gateway, you can access the web interface by typing its unique hostname into the address bar of a web browser.

The unique hostname for each CloudMesh Satellite is defined in the following format:

<http://NS-02-XXXX.local>

Where **XXXX** is the last four digits of the Satellite's unique serial number.

The CloudMesh Satellite's serial number can be found on the label affixed to the bottom:



Figure 9 – Last four digits of the serial number

If the device is not paired, please first follow *Appendix B – Set CloudMesh Satellite IP to access web interface* to set up a static IP for the Satellite and then continue from step 3b of this section, below.

To access the Satellite's web interface:

- 1 Connect the supplied power adapter to the power port on the CloudMesh Satellite and plug the power adapter into a power point. Turn on the power at the wall and allow 60 – 90 seconds for the satellite to power up.
- 2 Connect the supplied Ethernet cable from one of the two yellow LAN ports on the bottom of the CloudMesh Satellite to an Ethernet port on your computer.



Figure 10 – Ethernet cable connecting PC with CloudMesh Satellite

- 3 Open a web browser and type in the address of your Satellite:
  - a If your CloudMesh Satellite is paired to a CloudMesh Gateway, type the unique hostname as described earlier in this section.
  - b If your CloudMesh Satellite is not paired to a CloudMesh Gateway, type the static IP address that you defined using the instructions in *Appendix B – Set CloudMesh Satellite IP to access web interface*.
- 4 At the Authorization Required screen:

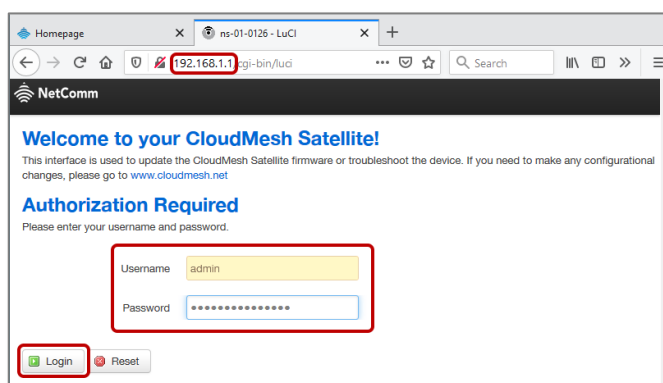


Figure 11 – Log in to NS-02 user interface

- a Type **admin** into the Username field,
  - b Enter the serial number (**Serial No**) printed on the label on the bottom of the satellite into the **Password** field, and
  - c Click the **Login** button. The status page is displayed.
- 5 Select **System > Backup/Flash Firmware** from the menu in the toolbar of the screen:

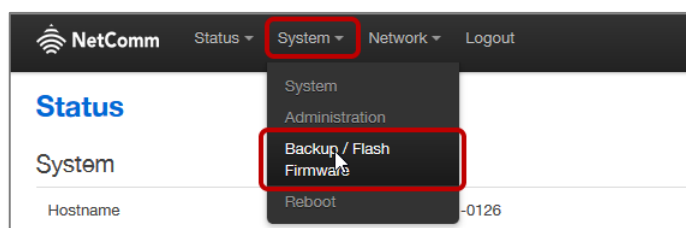


Figure 12 – Check current firmware version

- 6 From the **Flash Operations** screen, select the **Actions** tab and in the **Flash new firmware image** section make the following settings:
  - a Deselect the **Keep settings**  option.
  - b Click the **Browse** button to locate and upload the firmware upgrade file.

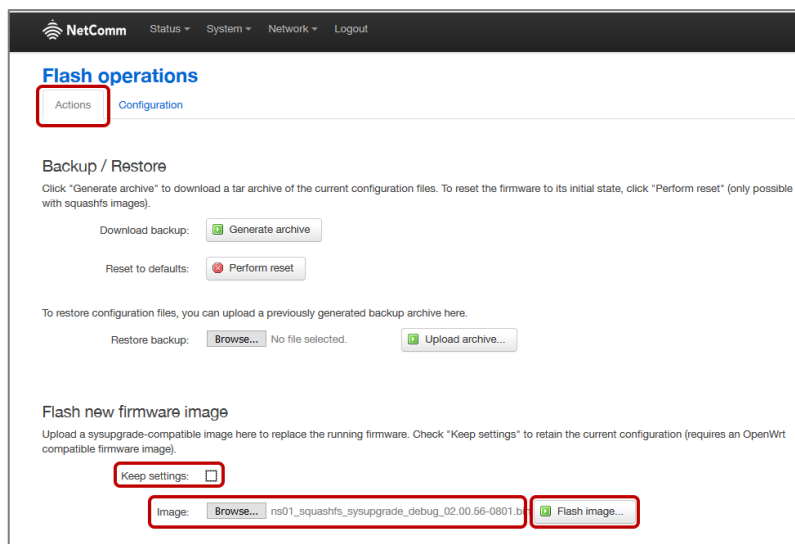


Figure 13 – Update firmware interface

- c When the file has been uploaded, its filename will appear immediately to the right of the **Browse** button.
- 7 Click the **Flash image** button to proceed. The system will read the file and ask you to **Verify** its details:

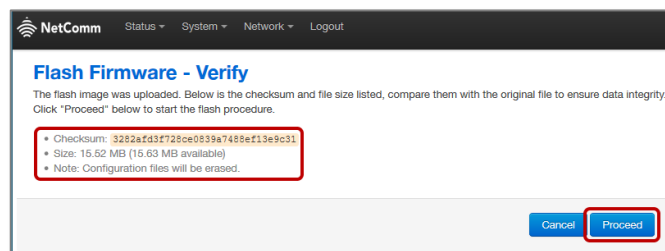


Figure 14 – Uploading in progress message

- 8 Click the **Proceed** button to finalise the upgrade process. A progress message page appears:

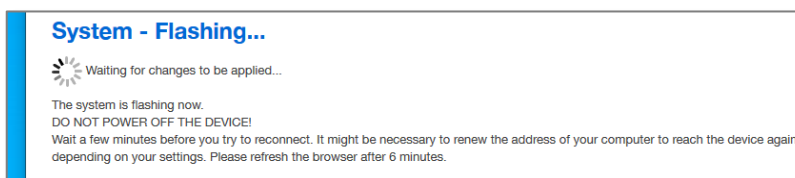


Figure 15 – Uploading in progress message

- 9 Wait four to six minutes and then refresh the page. The **Authorization Required** screen is displayed. The upgrade is complete.

## Viewing the log

The CloudMesh Satellite compiles a chronological log of all recent events.

In the web interface, click **Status** in the main menu and select **System Log** from its drop-down menu.

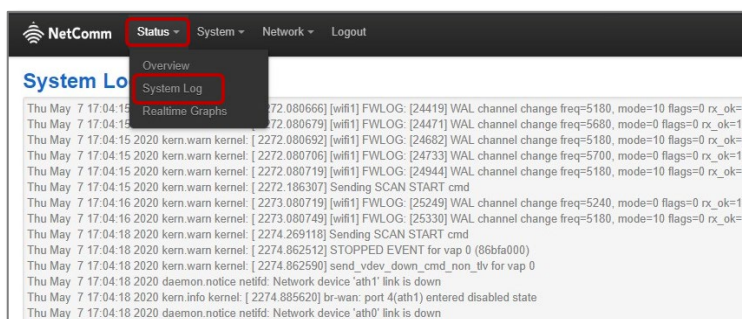


Figure 16 – System Log

Each log entry has a date and timestamp and a short description of the event.

## Resetting the CloudMesh Satellite


To reset the CloudMesh Satellite, insert a straightened paper clip or similarly shaped object into the small hole on the bottom of the satellite marked with the reset icon .



Figure 17 – Location of reset button on bottom

Press and hold the reset button for ten (10) seconds to return the satellite to its factory default settings.



**Note** – The gateway and its satellite(s) will still be paired once connected to the Internet. You will not have to repeat the pairing process, just start both up, connect the gateway to the Internet and they will automatically pair (this pairing process may take a few minutes).

# Appendix A – Safety Information

Please read before use:



## LOCATION

This device is designed for indoor use only.



## AIRFLOW

Do not restrict airflow around the device.

The device is air cooled and may overheat where airflow has been restricted.

Always allow minimum clearance of 5cm around all sides and the top of the device.

Do not cover, do not put in an enclosed space, do not put under or behind large items of furniture.

Your device may become warm during normal use



## ENVIRONMENT

Do not place this device in direct sunlight or any hot areas. Safe operating temperature of this device is between 0° and 40°C

Do not allow this device to come in contact with any liquid or moisture. Do not place this device in any wet or humid areas such as kitchen, bathroom or laundry rooms.



## POWER SUPPLY

Always use only the power supply unit that came with the device. You should immediately stop using the power supply unit if the cable or power supply unit is damaged.



## SERVICE

There are no user-serviceable components in the device.

Do not attempt to disassemble, repair, or modify the device.



## SMALL CHILDREN

Do not leave your device and its accessories within the reach of small children or allow them to play with it. Your device contains small parts with sharp edges that may cause an injury or which could become detached and create a choking hazard.



## RF EXPOSURE

The device contains a transmitter and a receiver. When it is on, it receives and transmits RF energy. The device conforms with the radio frequency (RF)

exposure limits adopted by the Australian Communications and Media Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2014, when used at a distance of not less than 20 cm from the body.



## PRODUCT HANDLING

Always treat your device and its accessories with care and keep it in a clean and dust-free place.

Do not expose your device or its accessories to open flames.

Do not drop, throw or try to bend your device or its accessories.

Do not use harsh chemicals, cleaning solvents, or aerosols to clean the device or its accessories.

Do not paint your device or its accessories.

Please check local regulations for disposal of electronic products.

Arrange power and Ethernet cables in a manner such that they are not likely to be stepped on or have items placed on them.

## Appendix B – Set CloudMesh Satellite IP to access web interface

If your CloudMesh Satellite is not paired to a CloudMesh Gateway you can access the Satellite directly by setting a static IP address for your PC that is in the same subnet as the satellite.

As the CloudMesh Satellite does not have its own DHCP server, you must manually set the IP address of your PC to be in the 192.168.1.x subnet.

The static IP address cannot be 192.168.1.1 and must be any number in the range: 192.168.1.2 to 192.168.1.254

To set a static IP address on a Windows 10 system:

- 1 On the computer that you will use to connect to the Satellite, click the Windows **Start** button in the lower left:



Figure 18 – Windows Start button

- 2 Type **View Network Connections**.
- 3 Select **View Network Connections** when it appears in the search results box.

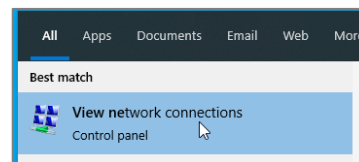


Figure 19 – Select View network connections

- 4 From the **Network connections** page, right click on the connection that you had used to connect to the Gateway.

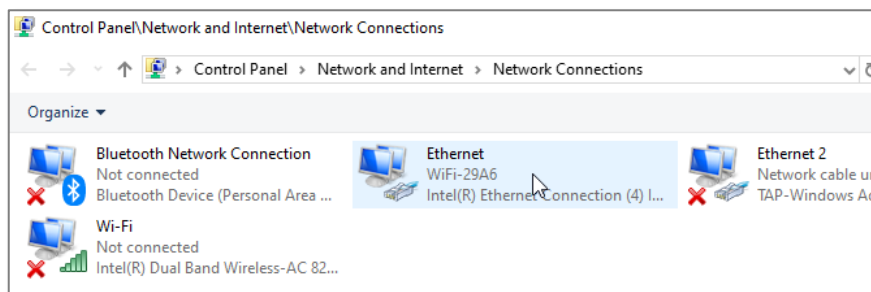


Figure 20 – List of Network Connections

- 5 Select **Properties** from the popup menu:

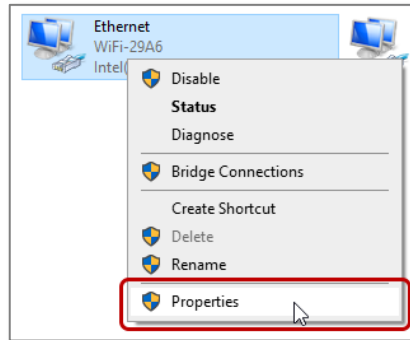


Figure 21 – Select Properties for current connection

- 6 In the Networking tab of the Ethernet Properties dialog box, go to the list of This connection uses the following items:
- 7  Internet Protocol Version (TCP/IPv4)

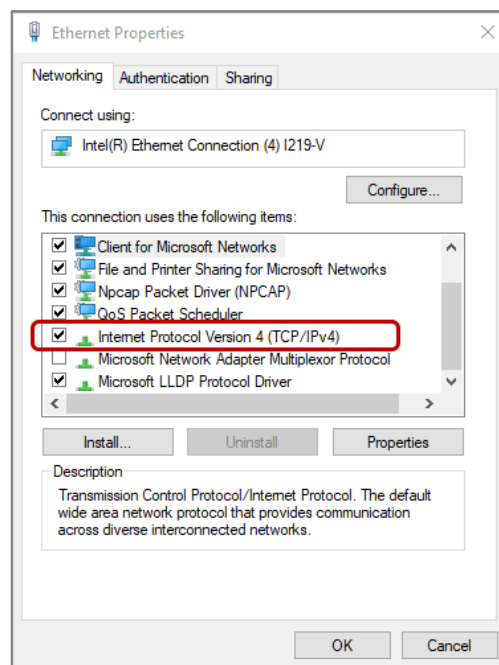


Figure 22 – Select  Internet Protocol Version (TCP/IPv4)

- 8 Double click on Internet Protocol Version (TCP/IPv4), see blue highlight above.
- 9 The Internet Protocol Version (TCP/IPv4) Properties page appears:

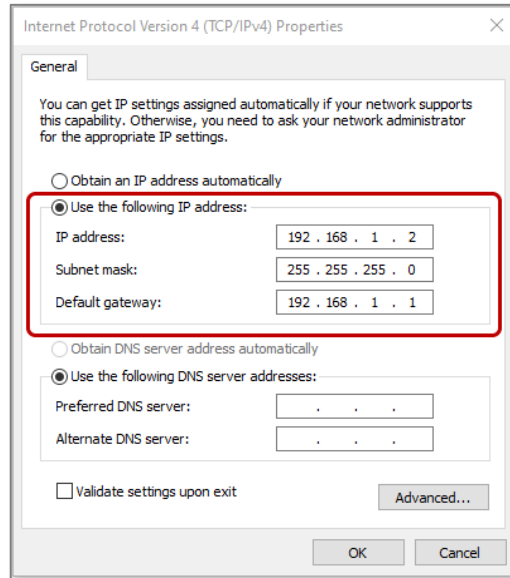


Figure 23 – Set the static IP address

- 10 Select  **Use the following IP address** to enter the details of the new static IP address for the NS-02 CloudMesh Satellite:
  - a In the **IP address** text box enter any IP address in the range: 192.168.1.2 to 192.168.1.254
  - b In the **Subnet mask** text box enter: 255.255.255.0
  - c In the **Default gateway** text box enter the IP address of the CloudMesh Satellite: 192.168.1.1
- 11 Click the **OK** button to close the **Internet the Ethernet Properties** dialog box.
- 12 Click the  close button to close the **Network connections** page.