Resource Identifier: 100340

Revision 1.0

For the moments that matter

DBS Nano IP Setup Guide

Commercial in Confidence

0. Preface

0.1 About this Document

This document contains relevant information required to identify, install and control the equipment or system.

Since the available functions can be licensed and depend on the specific implementation, not all the functions and or applications contained in this document may be relevant or applicable to the system you will be working with.

The actual presentation may differ from those in this document due to hardware or software changes.

0.2 Notice about this Publication

While every attempt is made to maintain the accuracy of the information in this product manual, it is subject to change without notice.

Performance specifications are included for guidance. All particulars are given in good faith, actual performance may vary.

0.3 Copyright

0.4 Document History

This is a controlled document, written and produced by the DTC Technical Publications team. Changes are recorded in the table below.

Revision	Date	Summary of Changes
1.0	08/11/2024	First release

CONTENTS

1. Product Overview

1.1 Description

Domo Broadcast Systems' high efficiency IP Mesh module covering 1.2GHz to 5.5GHz in banded options.

Domo Broadcast Systems' Nano IP is a revolutionary IP Mesh module that ensures you bring IP control to your broadcast workflow, making your job easier while ensuring high quality performance.

The Nano IP's easy to use front panel lets broadcast engineers configure remotely and see the network's status. With auto find mode your Nano IP can search and discover your current IP Mesh setup; this removes the need for manual setup.

Based around DTC's game-changing SOL8SDR architecture and offering up to 2x100mW output power, the Nano IP provides access to a wide range of COFDM waveforms, including the latest high data rate Mesh Ultra™ platform.

1.2 Basic Specifications

DC Input	9-18VDC
Power consumption	≤ 650mA
Temperature range	-10°C to +50°C
Dimensions	86mm x 87mm x 23mm
Weight	243g

Note: Detailed technical specifications are given in the product datasheet. Please contact DBS for latest specifications.

1.3 Approval Notices

1.3.1 EMC/Safety and CE Marking

The equipment has been designed to meet and has been tested against harmonized EMC and safety standards. The CE mark is indicated on all product labels.

The CE Declaration of Conformity as well as the technical file are available on request.

2. Product Package

2.1 Overview

Carefully open the packaging and verify that all the parts have been included, as ordered. Retain the packing materials for storage.

Note: If you do not have all the parts or are not happy with the condition of your delivered product, please contact DBS. See *Section 8.2*.

2.2 Variants

This part number will identify the product; it is also on the label.

Part Number	Description
NANOIP-114150	Nano IP Radio 2x100mW 1.14GHz to 1.50GHz
NANOIP-167235	Nano IP Radio 2x100mW 1.67GHz to 2.35GHz
NANOIP-198270	Nano IP Radio 2x100mW 1.98GHz to 2.70GHz
NANOIP-440500	Nano IP Radio 2x100mW 4.40GHz to 5.00GHz
NANOIP-550600	Nano IP Radio 2x100mW 5.50GHz to 6.00GHz

2.3 Parts List

These items will be in the package.

Part Number	Description
Primary unit	Top level assembly, see variant above.
CA4368	4-way Lemo (m) to 4-way XLR (m), power adaptor cable.
CA4362	7-way Lemo (m) to RJ45 plug, Ethernet cable

2.4 Accessory Options

If you have purchased any of these items, they will also be in the package.

Part Number	Description
CA3463	4-way Lemo (m) to D-tap (m) cable
CA4432	7-way Lemo (m) to RJ45 plug and 9-way D-sub, Ethernet and RS-232 serial cable

2.5 Licensing

Product functions are enabled by licenses which can be verified in the web user interface.

Part Number	Description
Base license included	IP Mesh radio includes: (Multi Mesh, SIMO/MIMO Mesh, Ultra-Low Bandwidth, Streaming, Recording, Telemetry, DES Encryption)

3. Hardware

3.1 Introduction

This chapter will help identify all the connections and interfaces of the product needed to install, control and monitor the device.

3.2 Interface Panel

No.	Item	Connection
1	4-way Lemo (f)	6-17VDC power input. Supplied CA4361 adapts to XLR or optional CA3463 D-Tap power from camera battery.
2	7-way Lemo (f)	Ethernet and RS-232 data. Supplied CA4362 provides an RJ45 connection for a PC/laptop.
3	RJ45 jack	Ethernet connection.
4	RJ45 jack	Ethernet connection.
5	USB-A jack	USB host port can be used for USB headsets, Wi-Fi or 4G dongles, see below. Can also be used for a variety of USB applications.
6	3.5mm jack	Stereo audio headset connection.

Supported USB Dongles

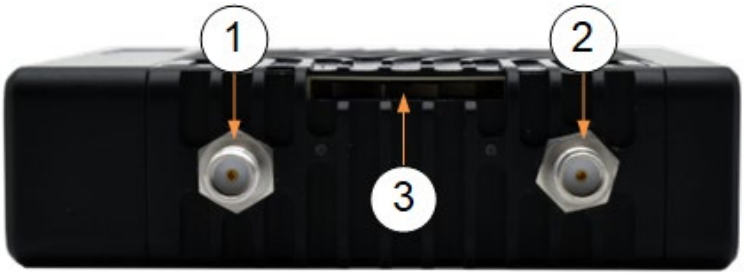
4G dongles that are currently supported:

- Verizon MiFi USB620L 4G (USA)
- E3372s-153 (pid 157d)
- E3372h-153 (pid 1f01)
- E3372-320

Wi-Fi dongles that are currently supported:

- TP-LINK AC600
- TP-LINK AC1200
- TP-LINK AC1300
- TP-LINK TL-WN823N

3.3 RF Panel



CAUTION: It is critical to attach suitable antennas before applying RF power.

Note: The LED adjacent to the RF connectors will illuminate green when RF transmit power is On.

No.	Item	Connection
1	SMA 50Ω (f)	This corresponds with RF port **A** in the WUI.
2	SMA 50Ω (f)	This corresponds with RF port **B** in the WUI.
3	Fan vent	An internal cooling fan helps ensure the device does not overheat. **WARNING**: Do not obstruct the fan vents. Damage to internal components may occur due to excessive heat.

3.4 OLED Panel

Note: Please read *Chapter 5* for OLED control.

No.	Item	Connection
1	3.5mm jack	Attach a push-to-talk switch to control audio input.
2	USB micro-B jack	For OLED software upgrades only, see *Section 5.4.3*.
3	OLED display	An OLED display showing key parameters. **WARNING**: If the temperature gauge turns red, damage to internal components may occur. Switch off the device, allow to cool and take action to reduce the operating temperature.
4	OLED control buttons	Please see *Section 5.3* for OLED button functions.

3.5 Mounting Panel

Three 1/4” BSW/UNC screw threads are provided for mounting options.

3.6 Pinout

3.6.1 Power

Mating part: 4-way Lemo FGG.0B.304.CLAD56Z

Pin	Function
1	VIN (6-17VDC)
2	VIN (6-17VDC)
3	GND
4	GND

3.6.2 Ethernet/Data

Mating part: 7-way Lemo FGG.0B.307.CLAD56Z

Pin	Function
1	ETH TX+
2	ETH TX-
3	ETH RX+
4	ETH RX-
5	GND
6	RS-232 TX
7	RS-232 RX

3.6.3 Audio Headset

Mating connector 3.5mm TRRS jack

Pin	Function
Tip	AUDIO OUT L
Ring 1	AUDIO OUT R
Ring 2	0V
Sleeve	MIC IN (1.9V mic. power)

3.6.4 PTT

Mating connector 3.5mm TRRS jack

Pin	Function
Tip	PTT OUT
Ring 1	0V
Ring 2	N/C
Sleeve	N/C

4. Getting Started

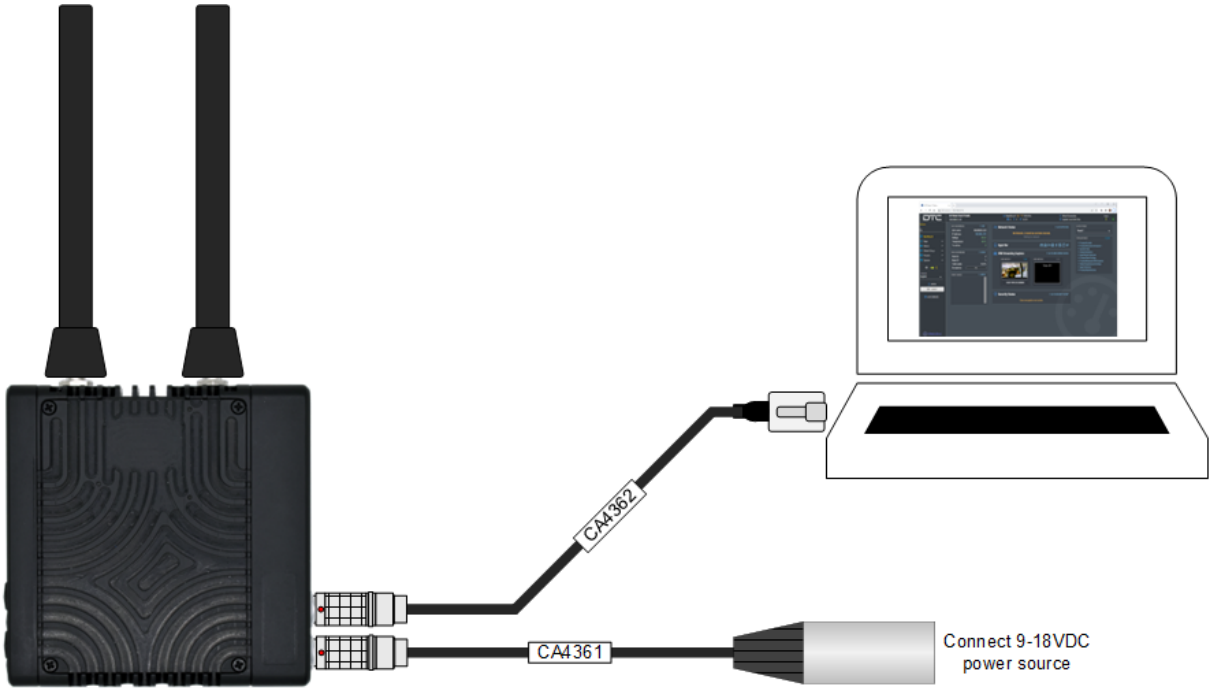
4.1 Introduction

This chapter will help the user power up and communicate with their product. It will explain software installation instructions for relevant applications.

4.2 Initial Setup Connections

Nano IP's do not have power switches, they will power up immediately the source is applied. Connect by Ethernet to a laptop/PC for initial setup using a web user interface (WUI), any of the Ethernet ports can be used.

CAUTION: It is critical to attach suitable antennas before applying RF power and good practice when configuring a radio.



4.3 Node Finder Application

4.3.1 Introduction

Our devices are shipped to you with the IP DHCP setting enabled. This means that if your Nano IP is connected to a network which is administered by a DHCP server, the IP address will be automatically assigned.

Node Finder can be used to identify a device IP address or disable DHCP if you are not connected through a DHCP server or using a standalone PC or laptop.

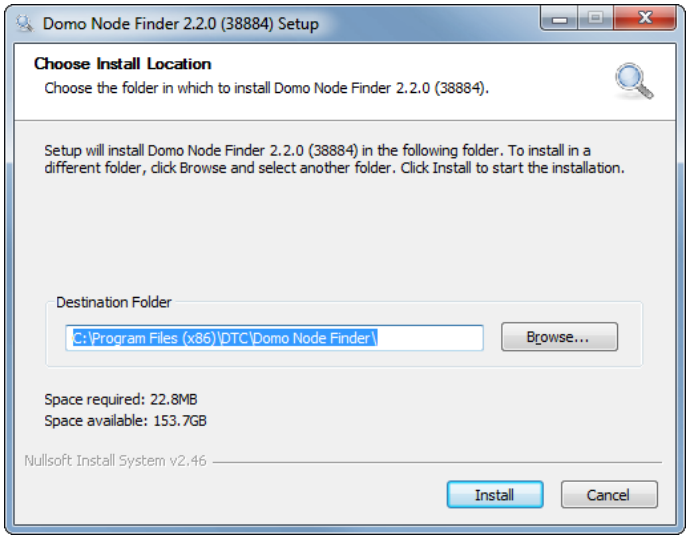
Node Finder can be downloaded from DBS's WatchDox facility, see *Section 8.1*.

Note: If you are using a standalone PC or laptop, you will also need to set the IP address of the PC. Refer to *Section 7.1* to find out how to do this.

If the device is connected to a network which does **not** have a DHCP server, contact your Network Administrator for an IP address you can use.

4.3.2 Install Node Finder

Double-click the **NodeFinder.exe** file on your PC; the **Node Finder Setup** window opens.



Browse to the location where you wish to install the software or leave the **Destination Folder** at default (recommended) and click **Install**.

On completion **Close** the installer. A Node Finder icon will appear on your desktop.

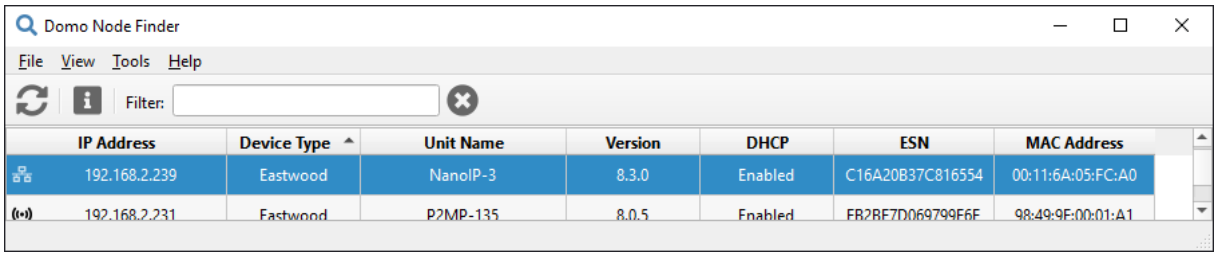
4.3.3 Establish IP Address using Node Finder

Power up the Nano IP and ensure there is an Ethernet connection to a PC or network.

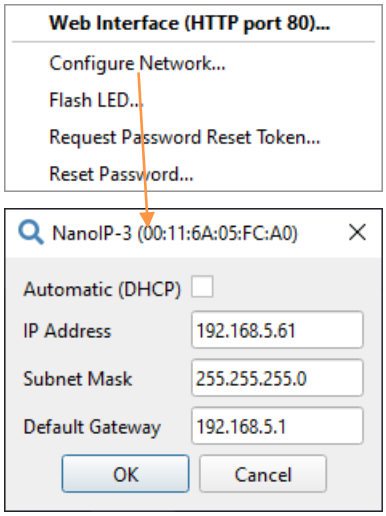
Double-click the Node Finder icon from your PC desktop.

Find the IP address from Node Finder; the device type will be *Eastwood*.

Note: If the device is not connected to a network with a DHCP server, the IP address may appear as 0.0.0.0.



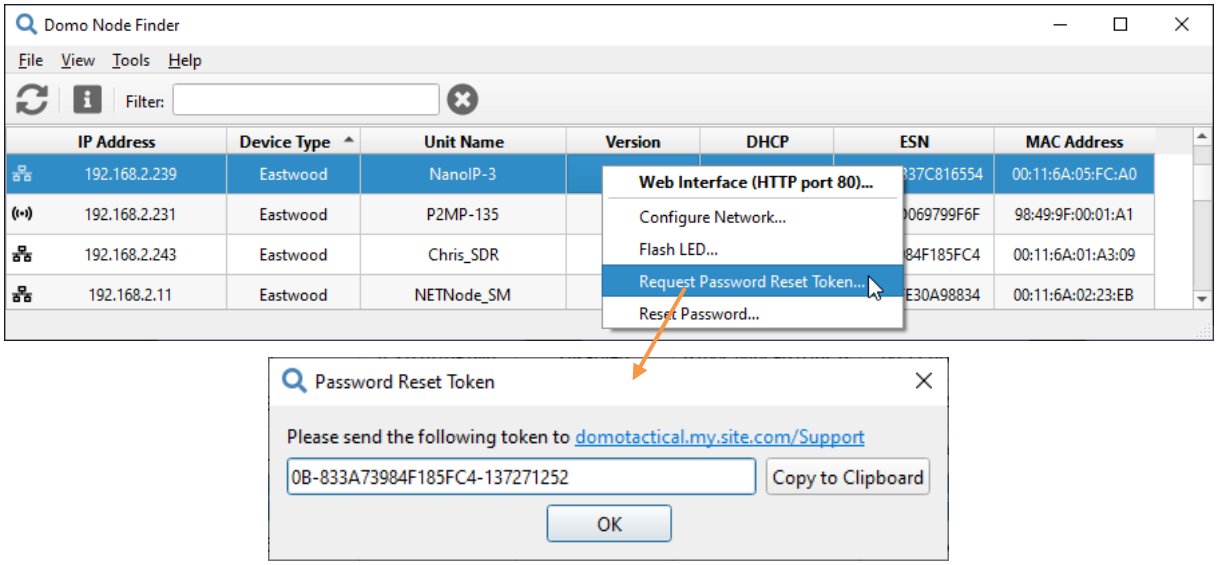
Right click on the Nano IP to configure network settings, if required.



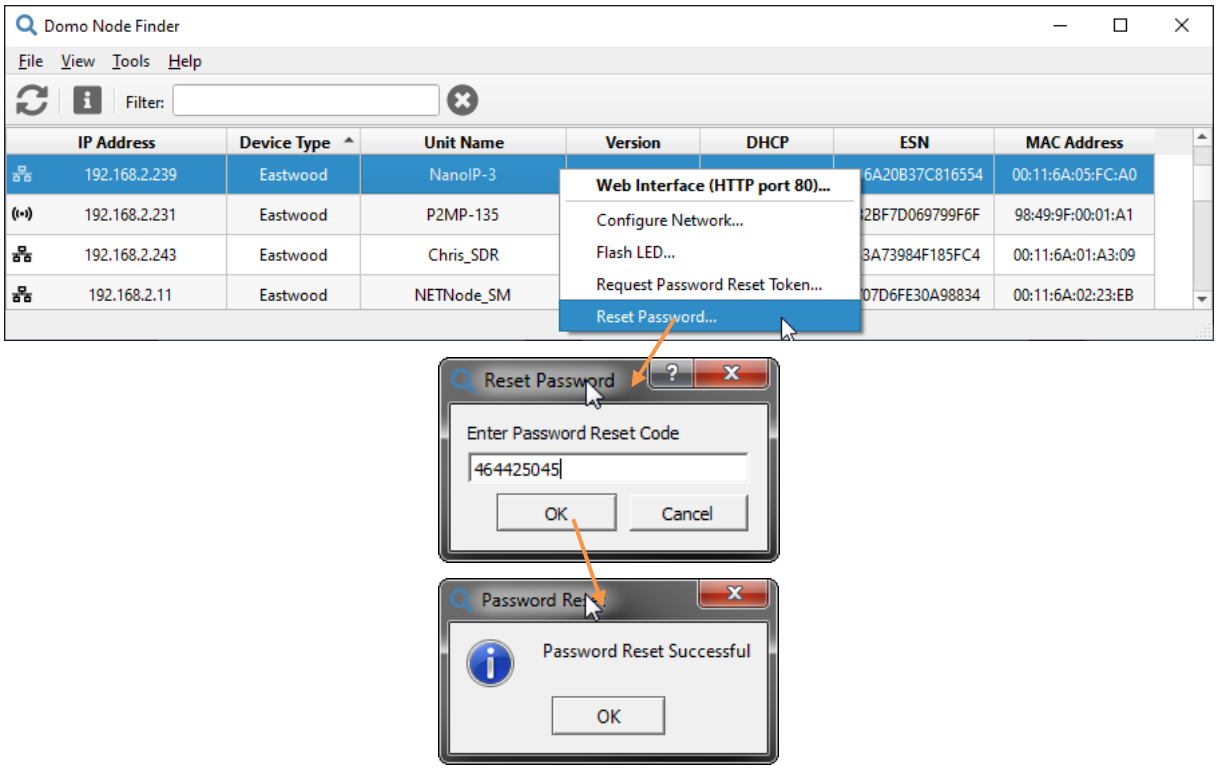
4.3.4 Password Reset

Users may set a password for web browser access security. If the password is forgotten and the user is locked out, Node Finder provides a means to reset the password.

Right-click on the Nano IP in Node Finder and select **Request Password Reset Token**.



Send the token to DTC's support portal using the link provided. A code will be returned which needs to be entered in Node Finder **Reset Password** dialogue box.



On successful reset, the web browser application will be unlocked to the default password (Eastwood).

Note: You can only enter an incorrect reset code five times before a new token will need to be generated.

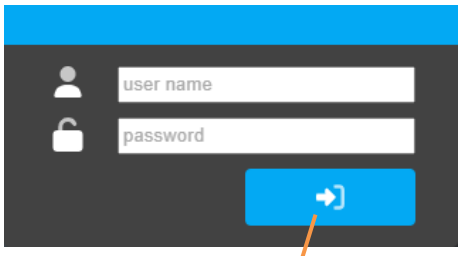
4.4 Open the Web User Interface

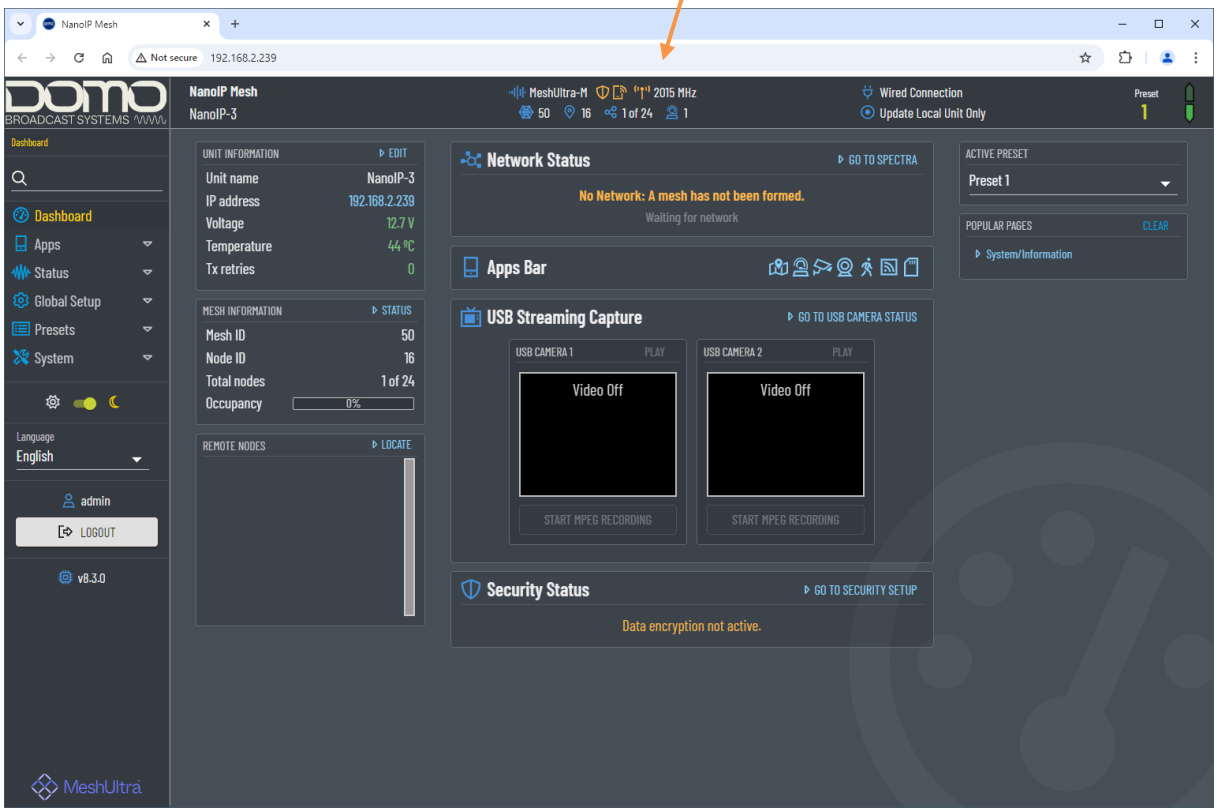
A web user interface (WUI) application is provided for effective configuration and monitoring. The WUI can be accessed by any web browser application.

The WUI application is used across the entire software defined radio platform and, therefore, not all settings will apply to the Nano IP.

The WUI can be opened from Node Finder by double-clicking on the IP address. The web protocol default is HTTP (port 80). Alternatively, just enter the IP address into a web browser.

When authentication is required, the user name should be left blank, and the password is **Eastwood**.





4.5 Supporting Documentation

Supporting documentation can be found on DBS's WatchDox facility, see *Section 8.1* for details.

4.5.1 Software Guide

Please refer to *IP Mesh Radio Software User Guide* for detailed web user interface operation.

4.5.2 JSON Integration Document

To support the web interface, an HTTP protocol has been implemented for use by third party software.

The HTTP interface uses its own JSON based protocol for reading data from the unit. Due to the large amount of data available, much of the status information is only available via the HTTP interface.

For full details please refer to the *IP Mesh Radio JSON Integration Guide*.

5. OLED Display

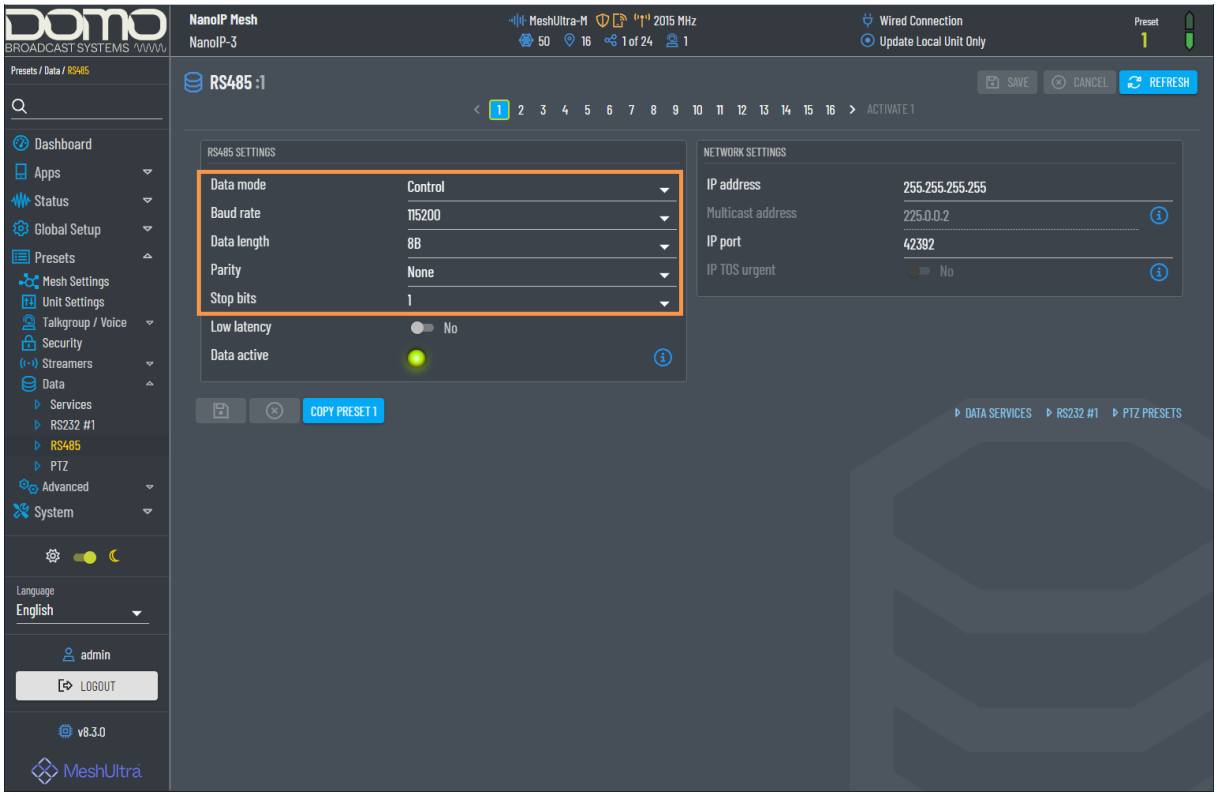
5.1 Introduction

The Nano IP Pro has an OLED display and control buttons which can be used to monitor and configure the device without the need to connect to a PC.

5.2 WUI Setup for OLED Control

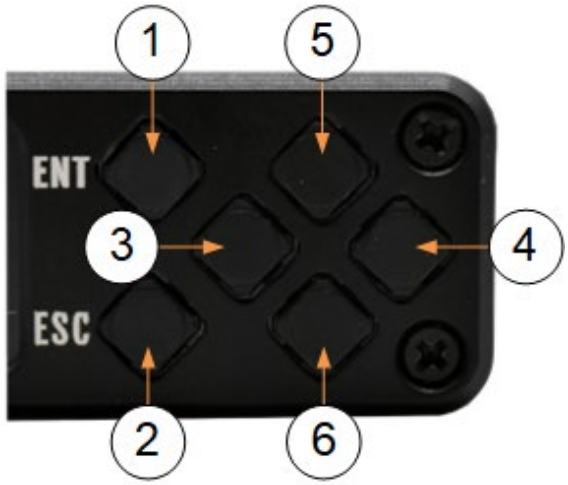
For the OLED display to function, some WUI parameters must be configured. If a restore to defaults has been applied, or if the OLED displays empty values, please connect the Nano IP to a PC and check the following settings.

Go to the **Presets>Data>RS485** page and configure the settings as highlighted below.



5.3 Control Buttons

The OLED display is controlled using the buttons at the right of the display.



No.	Description
1	Press the Enter button to open the display menu. The Enter button can be used to select a chosen menu or parameter, and to confirm an edited setting.
2	The Esc button will return to the previous menu or cancel changes to a setting.
3/4	The left/right buttons will scroll through the menus or select digits and change values when editing.
5/6	Use the up/down buttons to change the value of digits when editing. These will also adjust the volume for units with headsets.

5.4 OLED Display Menu

5.4.1 Default Display

When the Nano IP has booted up, the OLED will display the status of some key parameters.

Note: If the OLED displays empty values, please ensure the WUI is setup correctly, see *Section 5.2*.

When the parameters are greyed out, this means it is not enabled or locked.

No.	Description
1	Transmit RF frequency.
2	Audio volume meter. Use the up/down buttons to change the volume.
3	Active preset (up to 16 presets can be configured in the WUI).
4	Temperature gauge. **WARNING**: If the temperature gauge turns red, damage to internal components may occur. Switch off the device, allow to cool and take action to reduce the operating temperature.
5	Input voltage status. Red indicates low voltage.
6	Press the right button to scroll through the status pages.
7	Press the left button to show additional detail, not applicable for all pages.

5.4.2 Config Menus

Please refer to *Section 5.3* for descriptions of the button functions.

Press Enter from the default display to enter the Config menu. Switch between **Config>SOL8SDR** and **Config>Unit** by pressing the left/right buttons.

5.4.3 Config>SOL8SDR Menu

The SOL8SDR menu allows you to edit many of the key Nano IP settings.

The following tables are a representation of the menu structure.

Sub-menu	Notes
Preset	Up to 16 preset configurations can be configured in the WUI and changed as needed from the OLED display.

Sub-menu 1	Sub-menu 2	Notes
Network	DHCP	If set to **On**, the IP settings are automatically allocated by a DHCP server. If set to **Off**, the fixed IP settings below will apply.
	IP Address	Edits the fixed IP address.
	Netmask	Edits the network mask.
	Gateway	Edits the gateway for access to another network.
	MAC	Displays the MAC address of the network interface.

Sub-menu 1	Sub-menu 2	Notes
Mesh Setup	Transmit	Turns RF output power On or Off.
	Frequency	Edits the RF frequency.
	Channel BW	Edits the RF bandwidth.
	Node ID	The node ID must be unique for each unit in a network.

Sub-menu 1	Sub-menu 2	Notes
Intercom	Enable	Select the headset connection.
	Mic Volume	Use the up/down buttons to adjust the volume and press enter to apply.
	Headset Volume	Use the up/down buttons to adjust the volume and press enter to apply. Alternatively, adjust from the Status screen.

Sub-menu 1	Sub-menu 2	Sub-menu 3	Notes
Data	Service-1	Source	Select the data type.
		Mode	Select the data mode.
		Baud	Select the baud rate.
		Format	Select the data and parity bits.

Sub-menu 1	Sub-menu 2	Notes
Scan Mode	Find Mesh	Select **Yes** to load scan data parameters below.
	Freq Top	Set the top frequency for the scan.
	Freq Bottom	Set the bottom frequency for the scan.
	BW Steps	Set the bandwidth steps for the scan.
	Process Search	**Start** scan process or **Exit** to cancel. If the scan detects a frequency with the correct Mesh parameters, the unit will join the network.

Sub-menu 1	Sub-menu 2	Sub-menu 3	Notes
Advanced (the default pin is 000)	Restore Default		Restores the unit to default settings.
	Mesh Defaults	Mesh Mode	Select the Mesh waveform.
		Mesh ID	The Mesh ID identifies the Mesh network.
		Mesh Range	Larger ranges are at the expense of bitrate.
		Mesh Atten	Attenuation will reduce the RF power.
		Mesh PA Lin	**High** linearity optimises the COFDM waveform and **Low** linearity is for power critical applications.
	Change Pin		Change the Advanced menu PIN number.

5.4.4 Config>Unit Menu

The Unit menu reports information that may be required during a service call. These parameters cannot be edited.

The following tables are a representation of the menu structure.

Sub-menu	Notes
Name	This is a name to identify the device. **Note**: This can be edited in the WUI.

Sub-menu	Notes
Software	The currently installed PCB software version.

Sub-menu	Notes
Board Type	The internal PCB hardware.

Sub-menu	Notes
Serial	The electronic serial number (ESN) of the PCB.

Sub-menu	Notes
MAC	The MAC address identifies the physical network interface of the Nano IP.

Sub-menu	Notes
Bluetooth	The OLED Bluetooth feature is for future development.

Sub-menu	Notes
WC Version	The currently installed OLED software version. **Note**: See *Section 5.5* for upgrade details.

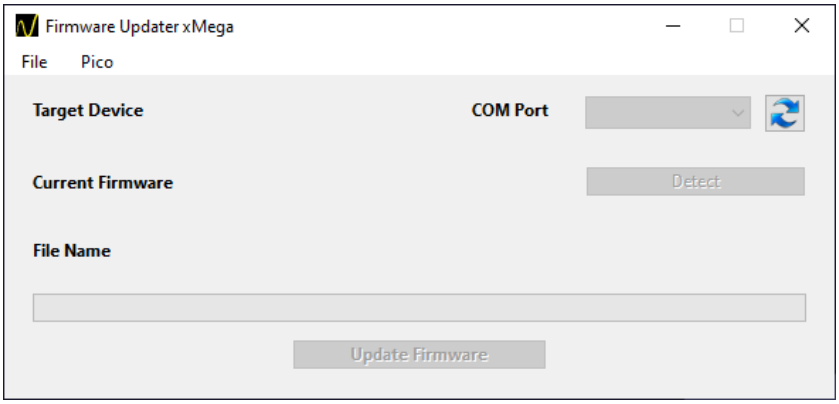
5.5 OLED Upgrade

A micro-USB port adjacent to the OLED is for upgrades to the OLED control software, see *Section 3.4*.

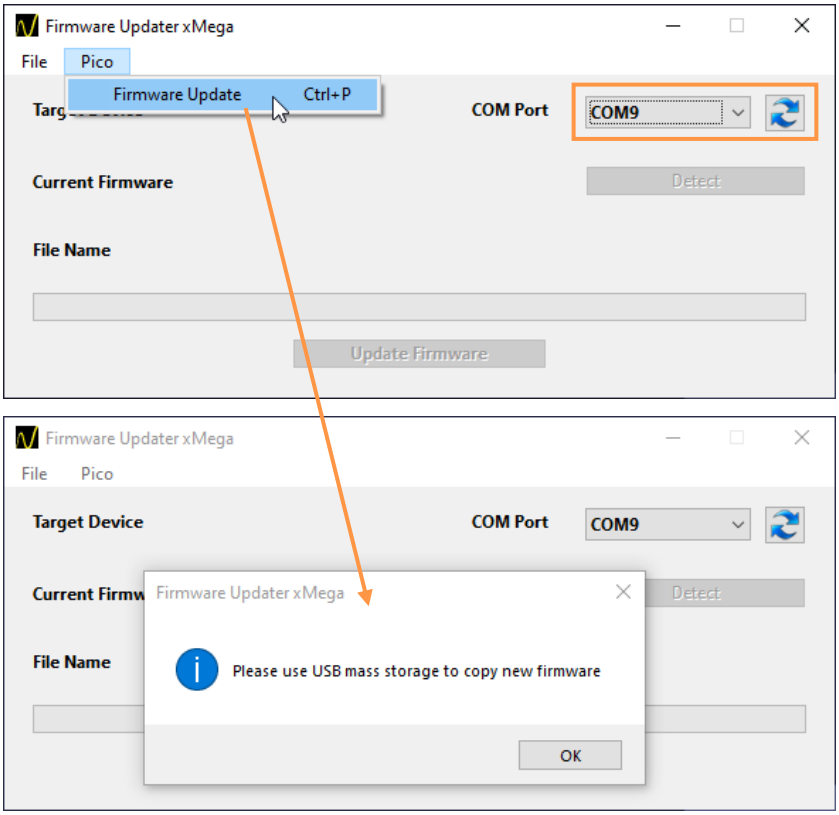
When new software is available, it can be downloaded from DBS's WatchDox facility, see *Section 8.1*. The updater application will also be included.

Attach a micro-USB cable from the Nano IP to a PC/laptop USB port.

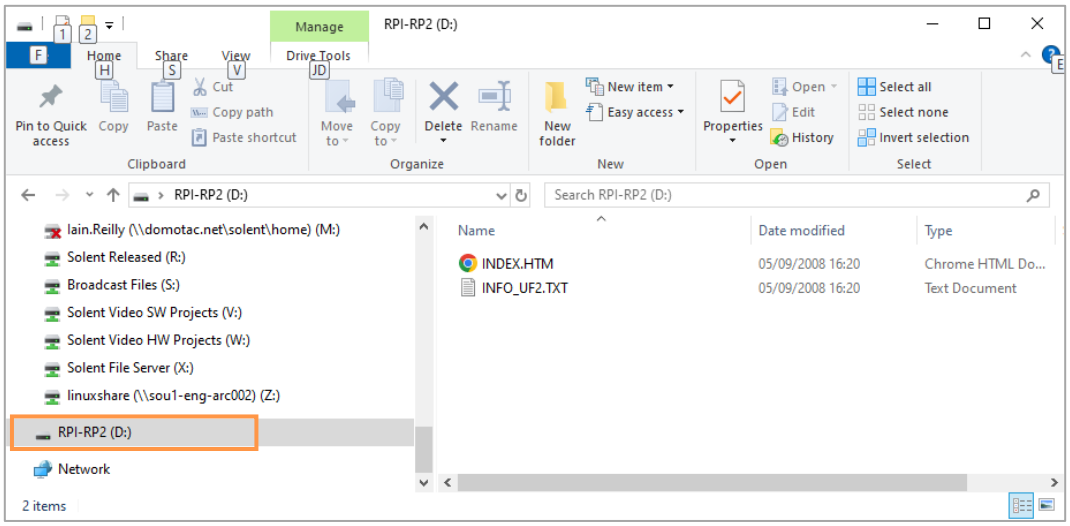
Open the Mega Firmware Updater application.



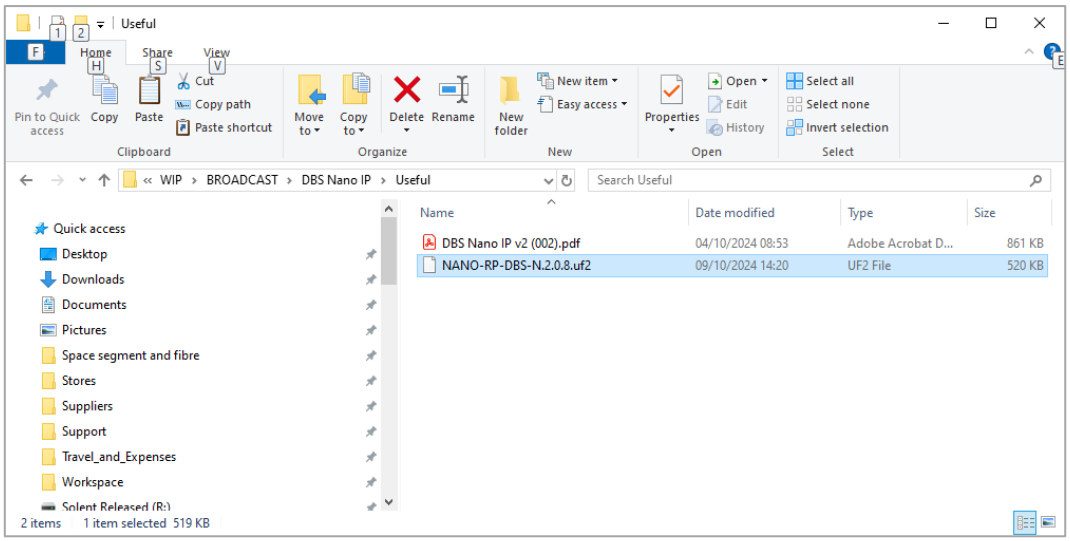
Refresh the Com ports and select the port for the OLED USB device, then select **Firmware Update** from the Pico menu.



This will create a mass storage device on your PC.



Drag and drop the upgrade file into the mass storage device to start the process. The file extension will be *uf2*.



The device will reboot when the upgrade is complete. The software version can be verified in the OLED **Unit>WC Version** page.

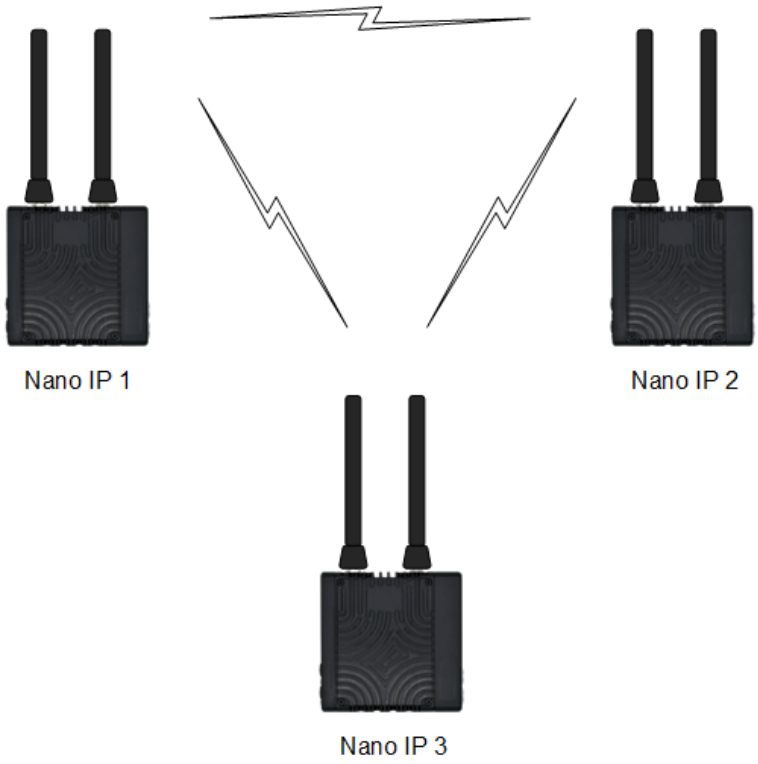
6. Quick Start

6.1 Overview

The following quick start guide details how to configure a Nano IP to join an IP Mesh network.

The illustration below shows a basic system scenario. Key parameters can be configured pre-deployment via the WUI using the connections shown in *Section 4.2*, or using OLED control.

Example Nano IP System

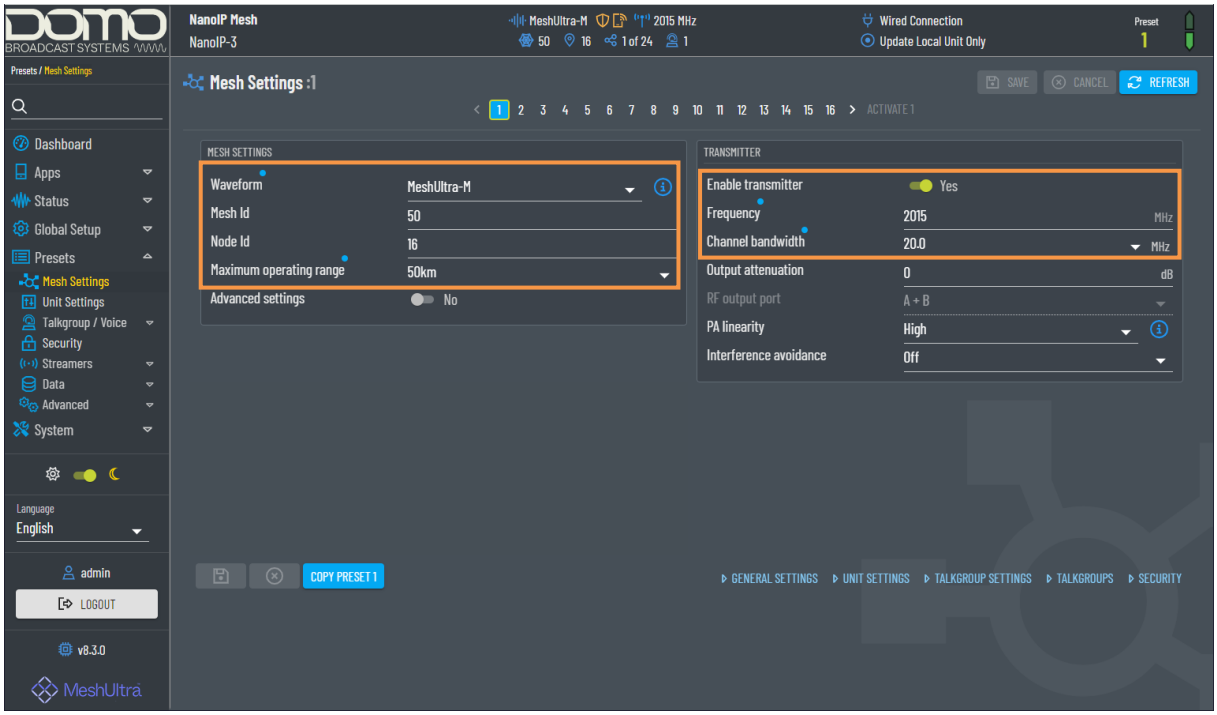


6.2 Mesh Settings

Mesh settings will be determined by the system requirements.

Go to the WUI **Presets>Mesh Settings** page.

Note: The corresponding OLED menu is **Config>SOL8SDR>Mesh Setup**, it may be necessary to enter the **Advanced** menu to configure some settings.



The **Mesh ID** identifies the network and the settings which are shown with a dot must match for all units in the Mesh network. The **Node ID**, however, is unique and will help identify the device along with the Unit Name.

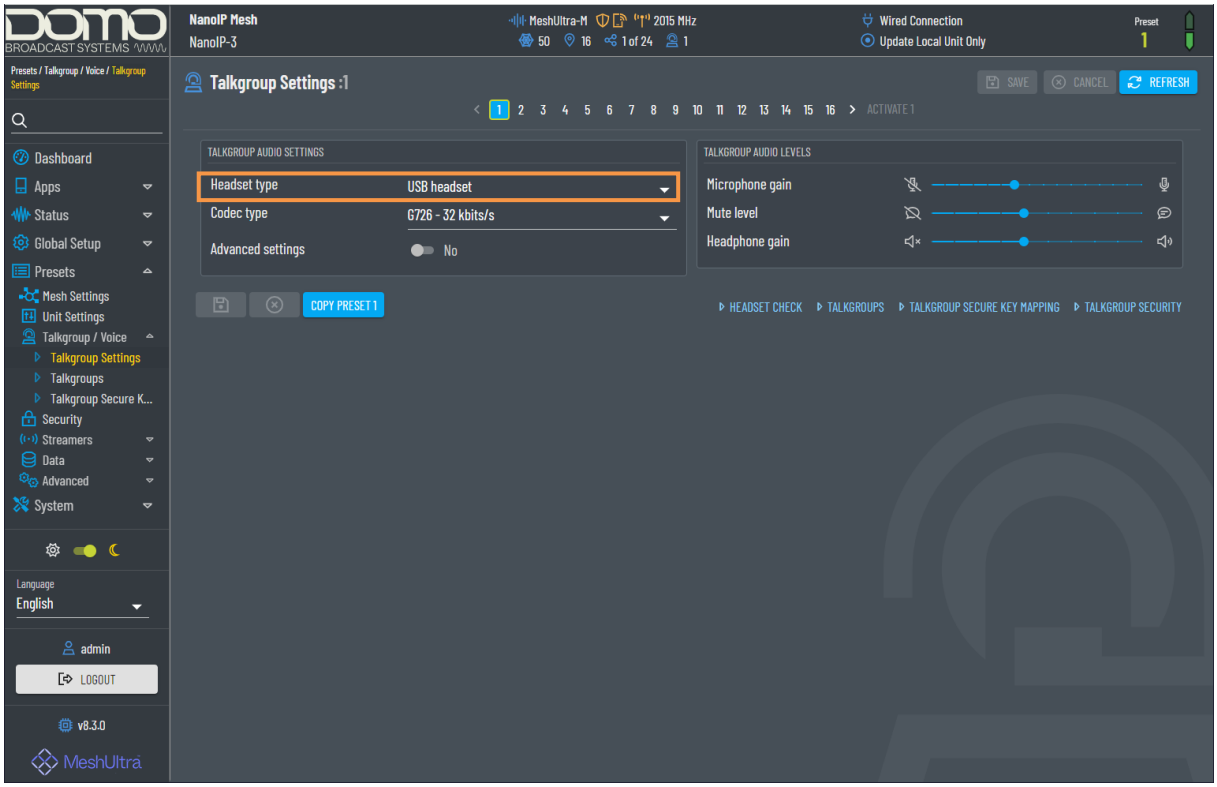
Set **Enable Transmitter** to **Yes** to apply RF power on; the Nano IP should join the Mesh network.

The Mesh network can be verified in the Dashboard page in several places. The Mesh node count can be seen in the information bar at the top of the display from any page.

6.3 Intercom Settings

Go to the **Presets>Talkgroup Settings** page.

Note: The corresponding OLED menu is **Config>SOL8SDR>Intercom**.



Select the **Headset Type** for the audio headset you are using.

Headset volume can be adjusted from the OLED up/down control buttons.

7. Appendix A: Reference Material

7.1 How to Configure a PC IP Address

The following guide will tell you how to configure a PC or laptop IP address so that it matches the IP address range of the unit you are connected to. This is important because if they don't match, you will not be able to communicate with your device.

The IP address range given in this example is a good one to use if you are unsure.

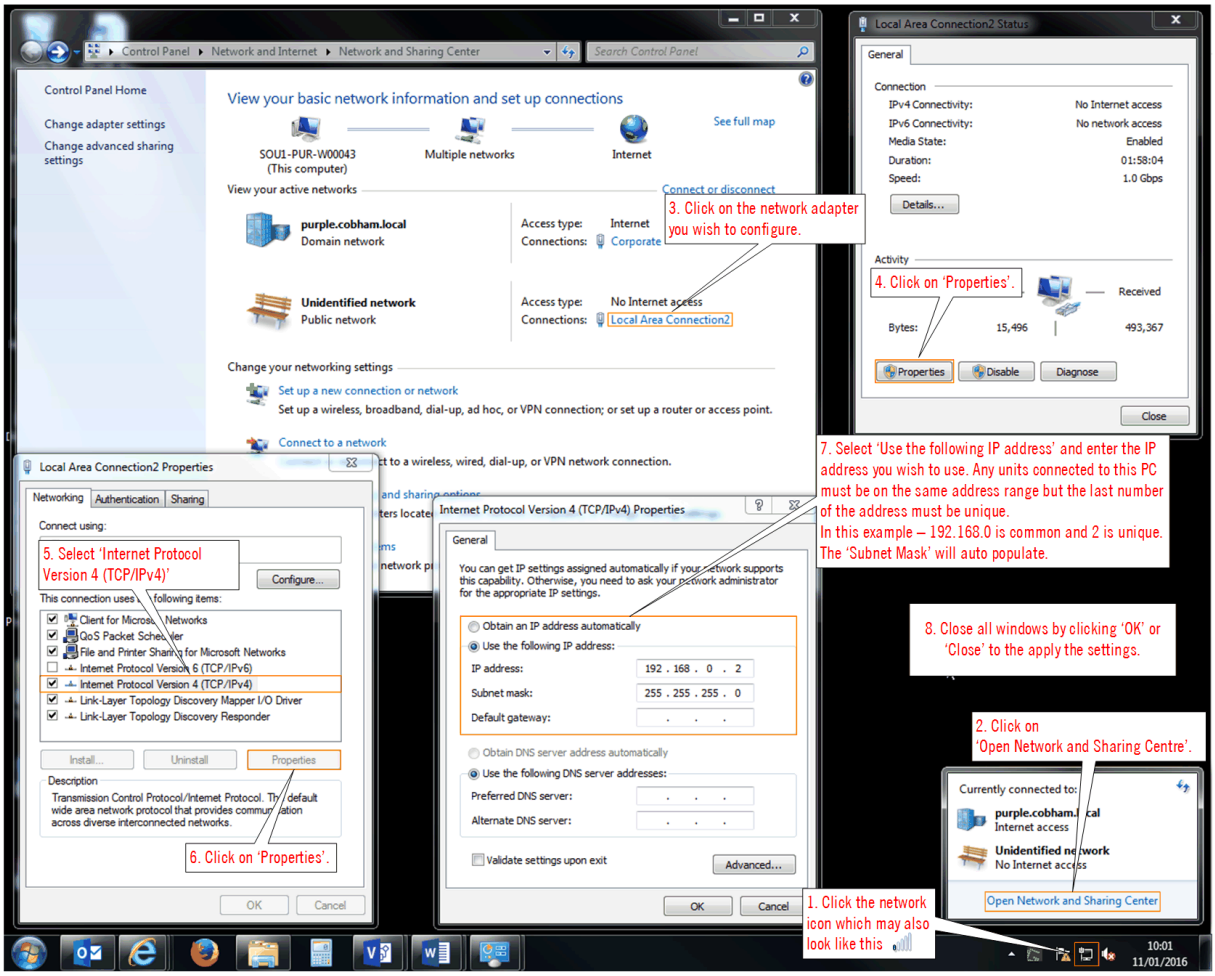


Figure 7-1 How to configure a PC IP address

8. Appendix B: After Sales Support

8.1 Documentation and Software

It is DBS's practise to make the majority of our latest user guides and software available to customers online, by using our WatchDox facility. To access this site, please contact your Account Manager or send a request to support@domobroadcast.com.

You will be sent a link where you can log in and create your own password followed by a confirmation email. Once you have done this, you can then log in to your account.

8.2 Contact Technical Support

The Technical Support team can be accessed by one of the following:

- **Phone**: +44 1489 566 750
- **Email**: support@domobroadcast.com (no restricted content)

8.3 Using the DBS RMA Service

8.3.1 Contact DBS

If there is a problem and our technical support team have been unable to resolve the issue, email support@domobroadcast.com to request a Return Material Authorisation (RMA) form.

8.3.2 Complete and Return the RMA Form

Complete and return the RMA form including a detailed description of the problem.

When the hub receives the completed form, an RMA number and shipping instructions will be sent.

8.3.3 Pack the Device

Note: Before packing, remove all personal non-DBS kit or media from the device.

Use the original shipping container and packing materials, if possible.

If the original packing materials are not available, wrap the equipment with soft material (e.g., PU/PE form) then put the wrapped equipment into a hard cardboard shipping box.

8.3.4 Mark the Box and Send to DBS

Clearly mark the outside of the shipping box with the RMA number and send the box using your normal process.

9. Appendix C: Safety and Maintenance

Note: The following guidelines may or may not be applicable to your product. However, we would ask that you read them to assess their relevance.

9.1 Cautions and Warnings

Area	Note
Aircraft safety	Use of this equipment on board aircraft is strictly forbidden without the required testing and qualification for aircraft type. Use of radio transmitter equipment in an aircraft can endanger navigation and other systems without appropriate testing, or carry-on certification by a competent certified body.
Cables	Connecting cables should not be positioned where they are likely to become damaged or where they may present a trip hazard.
Electrostatic discharge	ESD guidelines must be followed for this electrostatic sensitive device.
Enclosures	Do not remove any factory installed screws or fastenings as this may void any warranties. There are no functions that require the user to gain access to the interior of the product. There are no user serviceable parts inside.
Environment	The equipment should not be used in hazardous or corrosive atmospheres. Users are reminded of the necessity of complying with restrictions regarding the use of radio devices in fuel depots, chemical plants and locations where explosives are stored and/or used.
Lightning strike	There is a risk of lightning strike to antennas. The equipment should not be assembled in an area at the time of lightning activity. Antennas should be adequately protected from lightning strikes.
Power supply	Ensure that the power supply arrangements are adequate to meet the stated requirements of each product. Observe all electrical safety precautions.
Risk of eye injury	Care should be taken to avoid eye contact with the antennas.
RF emissions	When using this device please ensure 20cm is maintained between your device and your body while the device is transmitting.
Thermal control system	If you operate this device in an enclosed space, you must ensure it has adequate airflow to keep it cool. If worn close to the body, care must be taken to protect the operator from excessive temperatures.
Working at height	Observe caution when locating the device at height, for example on a mast. Ensure the unit is well secured to prevent it falling and injuring personnel.

9.2 Repairs and Alterations

Attempted repairs, alterations, improper installations or connections may invalidate the warranty.

Please contact Technical Support if you suspect a faulty or defective component. See *Section 8.2*.

9.3 Caring for your Equipment

- Do not subject the unit to physical abuse, excessive shock or vibration
- Do not drop, jar or throw the unit
- Do not carry the unit by the antenna
- Avoid exposure to excessive moisture or liquids
- Do not submerse the unit unless it is designed to be submersible
- Do not expose the unit to corrosives, solvents, cleaners or mineral spirits
- Avoid exposure to excessive cold and heat
- Avoid prolonged exposure to direct sunlight
- Do not place or leave units on surfaces that are unstable
- Only use accessories intended for the specific make and model of your unit, especially batteries, chargers and power adapters.

9.4 Charging

- Use approved batteries, chargers and adapters designed specifically for your make and model unit
- Do not attempt to charge a wet unit or battery pack
- Do not charge the unit or battery pack near anything flammable
- Stabilize the battery pack to room temperature (22°C) before charging
- Do not charge units and/or battery packs on wet or unstable surfaces
- Do not leave units and/or batteries in chargers for excessive periods

9.5 Working with Lithium Batteries

- Charge only with the approved charging cable
- Batteries are to be used only for the specified purpose. Incorrect use will invalidate the warranty and may make the battery become dangerous.
- Charge in a clean, dry environment ideally at 10°C (0 to 45°C is permissible).
- Do not store or operate in direct sunlight for extended periods. Battery can be damaged by over-heating, for example if placed on the rear parcel shelf of a motor vehicle.
- Store in a cool dry environment. Storage at elevated temperatures can cause permanent loss of capacity.
- For short term storage (less than six months), store in a fully charged state.
- For extended periods of storage (more than one year), charge before storage and recharge every six to nine months.
- Always fully recharge the battery after any storage period greater than one month before use.
- Do not store the battery with the charge depleted as this can cause failure of the battery and invalidate warranty.
- Do not short circuit
- Do not immerse in water
- Do not incinerate. Cells are likely to explode if placed in a fire.
- Dispose of batteries in accordance with the regulations in place for the country of use. Batteries are normally considered separate waste and should not be allowed to enter the normal waste stream. Either return to the seller or deliver to an approved re-cycling facility.

9.6 Cleaning

- Turn off the unit and remove batteries (if applicable) before maintenance
- Use a clean, soft, damp cloth to clean the unit. A microfiber cloth is recommended.
- Do not use alcohol or cleaning solutions to clean the unit
- Do not immerse the unit in water to clean it
- If the unit becomes wet, immediately dry it with a microfiber or other lint-free cloth

9.7 Storage

- Turn off the unit and remove batteries before storage
- Store units and battery packs in a cool, dry area at room temperature (22°C)
- Do not store units and/or batteries in active chargers