Resource Identifier: 100337

Revision 1.0

For the moments that matter

Nano HEVC Transmitter 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 Technical Publications team. Changes are recorded in the table below.

Revision	Date	Summary of Changes
1.0	03/07/2024	First release

CONTENTS

1. Product Overview

1.1 Description

Exceptional quality HEVC encoder with DVB-T COFDM transmitter, in a slimline lightweight package.

Ideal for mounting on smaller cameras or unmanned aerial vehicles. With 12G/3G input the DBS Nano transmitter can be connected direct to HD or UHD equipment. The DBS Nano HEVC transmitter has analogue audio inputs and up four pairs of embedded audio.

Automatic support for HD HDR is provided.

1.2 Basic Specifications

DC Input	9-36VDC reverse polarity protected
Power consumption	13W
Temperature range	-10°C to +50°C
Dimensions	75mm x 75mm x 30mm
Weight	270g

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

1.3 Approval Notices

This equipment has been designed to meet and has been tested against harmonized EMC and safety standards. The CE Declaration of Conformity as well as the technical file is available on request.

1.4 Related Documents

All documents can be downloaded from WatchDox, see *Section 9.1*.

Document	Description
MASH Serial Guide	Describes the serial control protocol
MASH REST API Guide	Describes the REST API control over IP
MASH Schemas Guide	Explains the contents of schemas from the unit. Schemas are used to generate all the status/config/command web pages, options, help text etc.

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 9.2*.

2.2 Variants

Part Number	Description
NanoHEVC-200290	DBS Nano HEVC Transmitter 2.00-2.90GHz
NanoHEVC-550600	DBS Nano HEVC Transmitter 5.50-6.00GHz

2.3 Parts List

These items will be in the package.

Part Number	Description
Primary unit	DBS Nano HEVC Transmitter (as per variant, see above)
CA4368	4-way Lemo (m) to 4-way XLR (m) power adaptor cable
CA4370	5-way Lemo (m) to 2x 3-way XLR (m) audio left/right cable
CA4371	6-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
CA4372	6-way Lemo (m) to RS-232 RX free ends

2.5 Licensing Options

Some product functions are enabled by licenses. The license for your product can be viewed in the control software.

Part Number	Description
LIC-4K-TX	Add 4K Encoding (12G only)

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 OLED Panel

No.	Item	Connection
1	OLED display	Integrated display screen for status and control of commonly used parameters. See *Chapter 6* for description of operation.
2	Control button	OLED display cancel/back button.
3	Control button	OLED display navigation/select/edit button.
4	SMA jack (female)	RF power output. Ensure RF power is disabled before attaching the antenna. **CAUTION**: Antenna should be finger tight only to avoid damage to the connector or internal components.

3.3 Interface Panel

For pinout, see *Section 3.6*.

No.	Item	Connection
1	BNC 75Ω (f)	SDI video input. May also be configured as an ASI remux input.
2	4-way Lemo (f)	Power input. CA4368 (supplied) adapts to XLR for connection to a 12VDC PSU or 9-36VDC power source.
3	5-way Lemo (f)	Analogue audio left/right input. CA4370 (supplied) adapts audio output to 2x XLR.
4	6-way Lemo (f)	Ethernet and RS-232 RX data. CA4371 (supplied) provides an RJ45 connection for a PC/laptop. CA4372 optional cable adapts to free ends for RS-232 receive only.

3.4 LED Indicator

On the panel adjacent to the video input connector is a video lock LED indicator.

- Red – no video lock
- Green – video lock

3.5 RF Module

The Nano HEVC transmitter RF module determines the frequency bandwidth of the variant, see *Section 2.2*.

The RF module can be changed at DBS for an alternative frequency bandwidth. See *Section 9.2* for contact details, if required.

3.6 Pinout

3.6.1 Power

Mating part: 4-way Lemo FGG.0B.304.CLAD52Z

Pin	Function
1	VIN (9-36VDC)
2	N/C
3	N/C
4	GND

3.6.2 Audio

Mating part: 5-way Lemo FGG.0B.305.CLAD52Z

Pin	Function
1	AUDIO LEFT+
2	AUDIO LEFT-
3	GND
4	AUDIO RIGHT+
5	AUDIO RIGHT-

3.6.3 Ethernet/Data

Mating part: 6-way Lemo FGG.0B.306.CLAD52Z

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

4. Getting Started

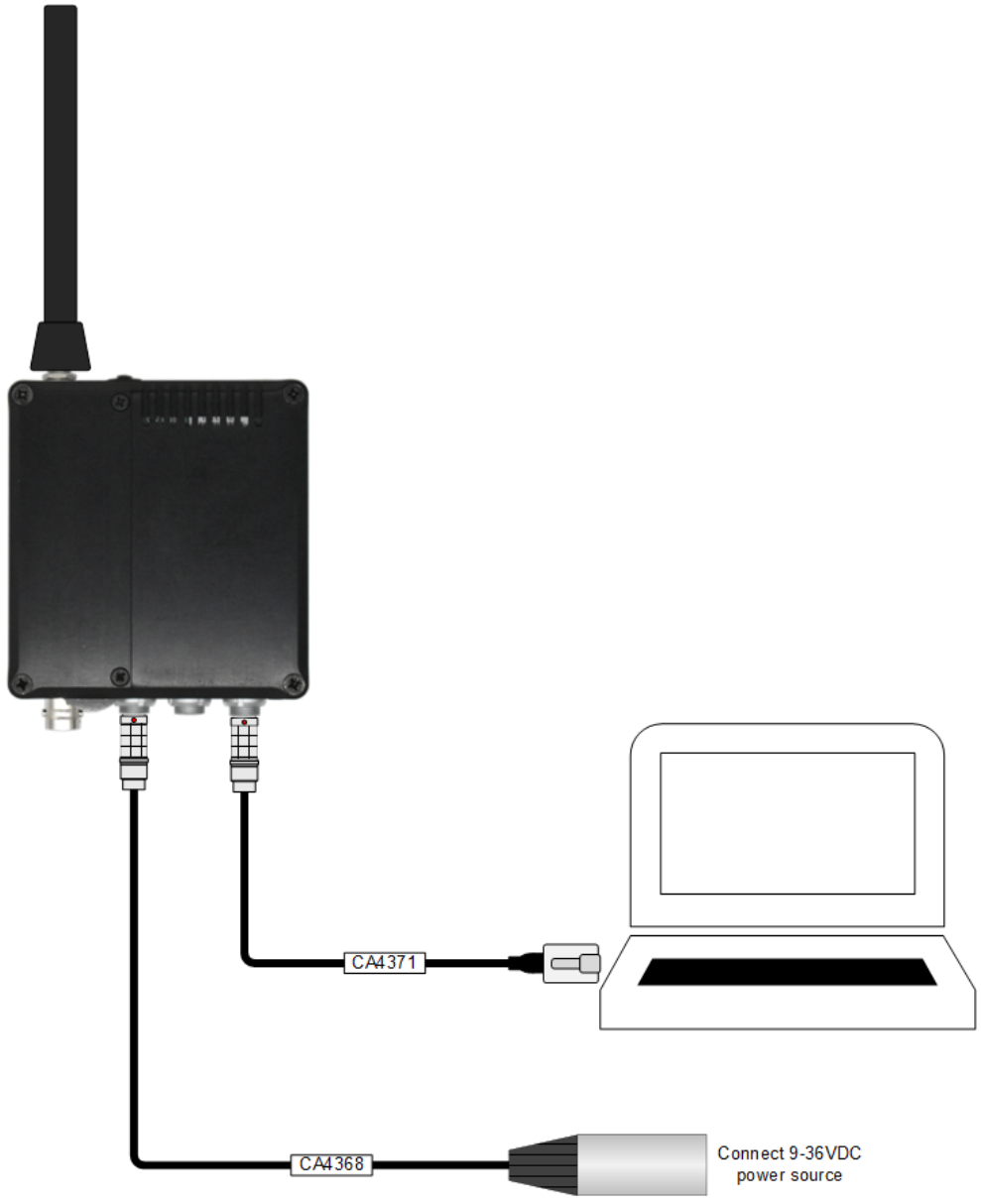
4.1 Introduction

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 HEVC transmitters 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).

Note: Ensure antennas are fitted before enabling RF power.



4.3 IP Address Identification

4.3.1 Introduction

The Nano HEVC has a comprehensive web user interface (WUI) for detailed monitoring and control. The WUI is accessed via a web browser using the IP address.

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

Re-configuration of the IP settings can be achieved via the web interface (see *Section 5.6*), or via OLED control (see *Section 4.3.3*).

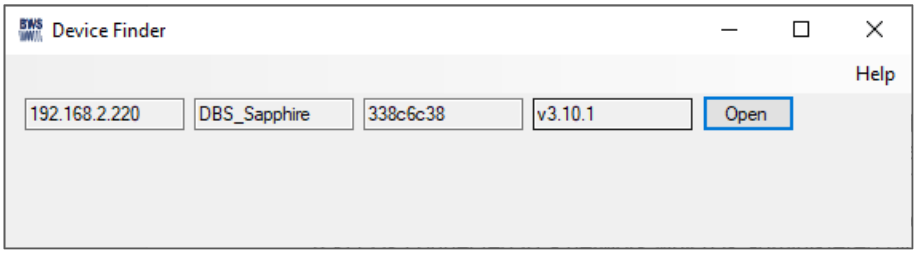
Note: If you are using a standalone PC or laptop, you will need to set the IP address of the PC to match the IP address range of the device. Refer to *Section 8.1* to find out how to do this.

4.3.2 Device Finder

Device Finder application can be used to identify DBS product IP addresses on a network.

Device Finder comes as a simple executable file which can be downloaded from DBS's WatchDox facility, see *Section 9.1*. This can be saved to the PC desktop.

Double-click the Device Finder executable to open the application. All DBS devices attached to the network will be detected. Click **Open** to initialise communications with your PC's default web browser.

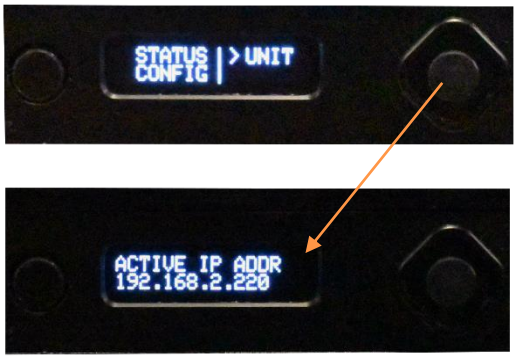


4.3.3 OLED

The IP address of the Nano HEVC can be found and edited, if required using OLED control. This can be useful if the device is not connected via a DHCP server, or the IP address does not match the subnet of the PC and the IP address settings need to be changed.

From the Status page, press the left button to enter the top-level Menu page.

Use the right button to scroll to **Unit** and press to open the unit menu. Scroll down to see the **Active IP Address**.

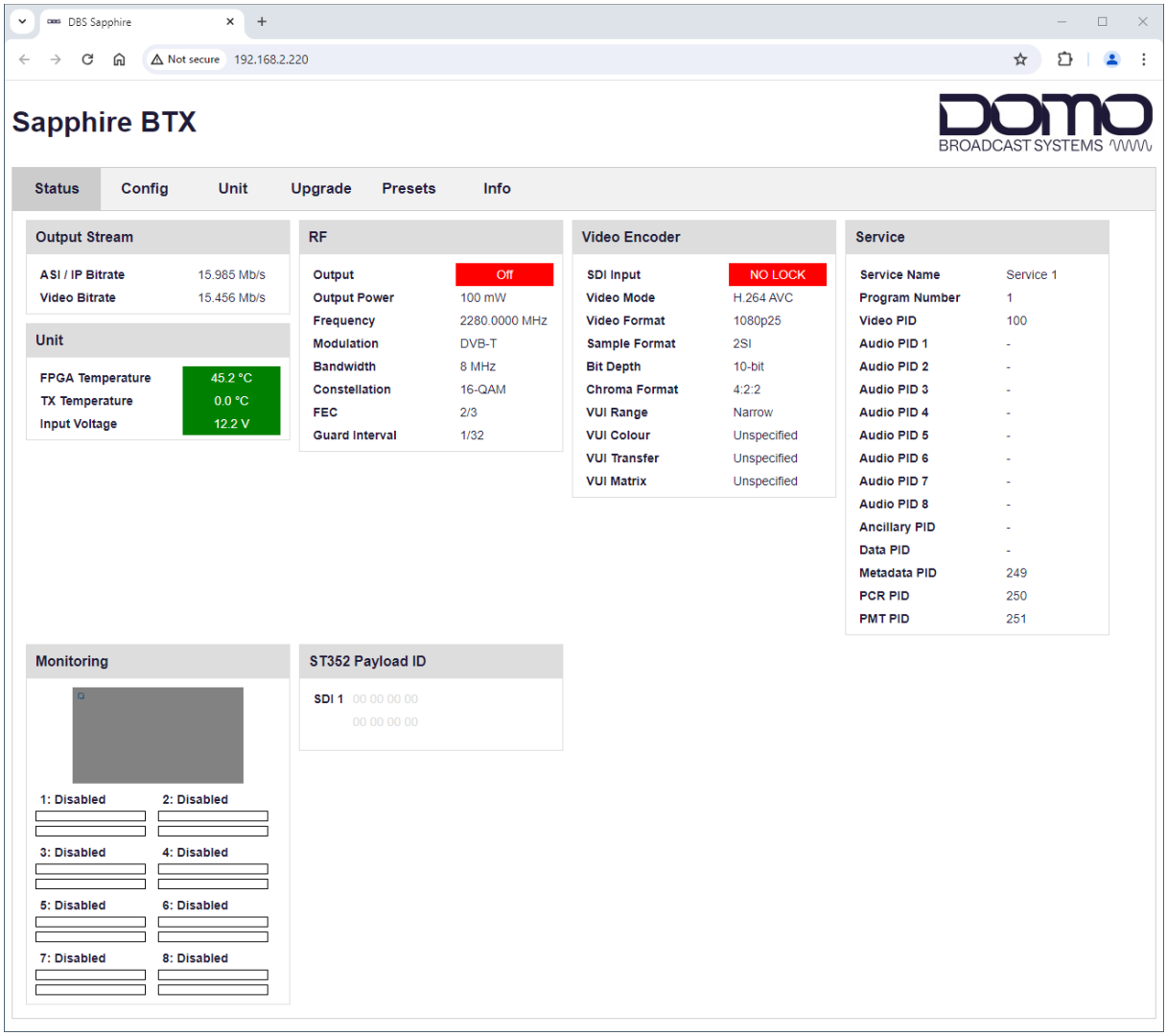


Change the **DHCP Mode** setting to **Off** if you want to enter the IP settings manually.

4.4 Open Web Interface

Once the IP address has been confirmed, open a web browser on a PC device and enter the IP address of the Nano HEVC in the address bar. Alternatively, if running Device Finder, click **Open** on the line of the device address.

The web interface will open to the Status page.

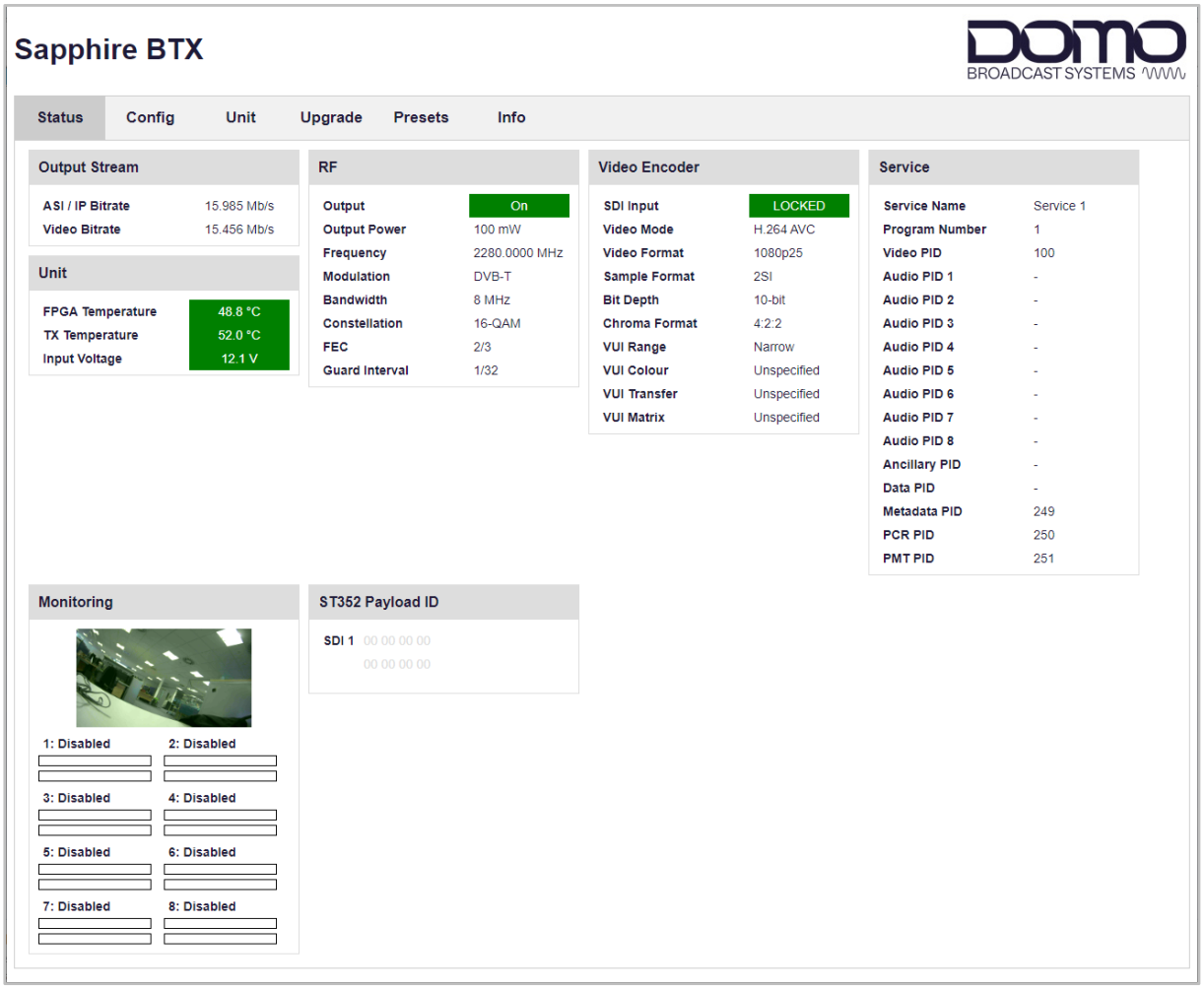


5. Web User Interface

5.1 Status Page

The Status page is a dashboard of information which provides monitoring of configuration and performance parameters.

Input voltage and temperatures are colour-coded to help identify excessive measurements. If the any temperature turns red, switch off the device and allow to cool. Action may need to be taken to reduce the operating temperature.

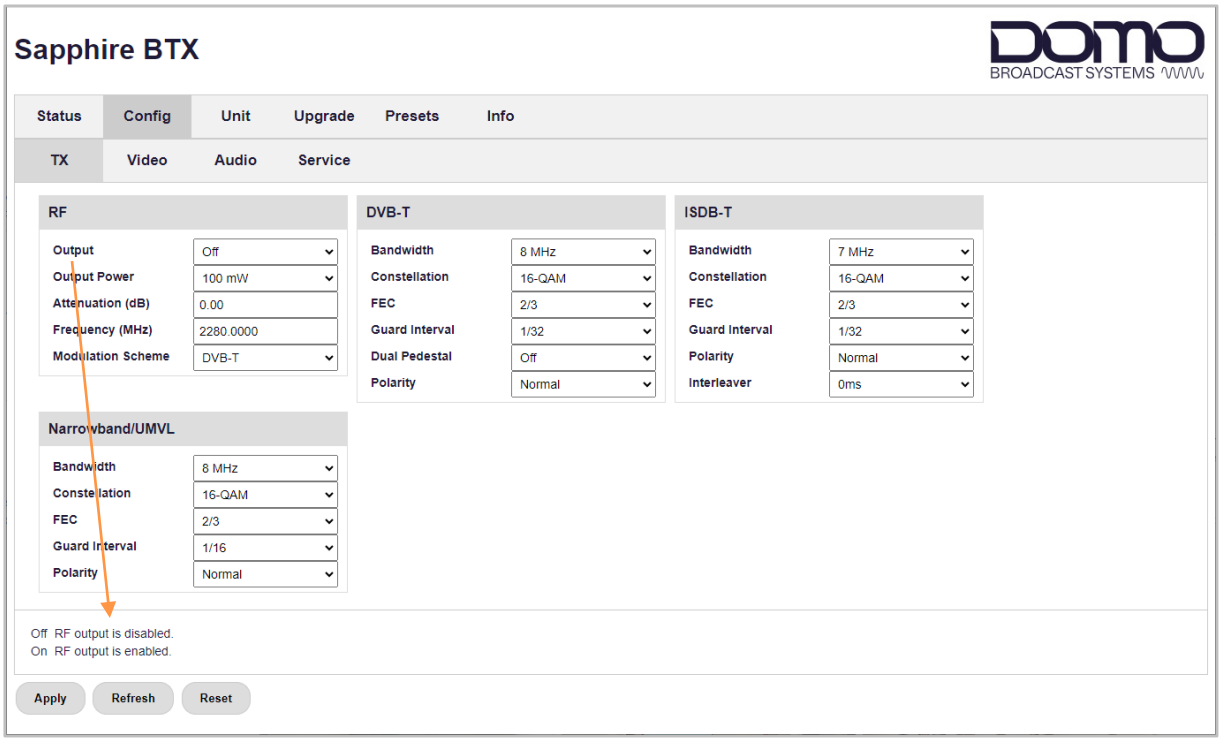


5.2 Config>TX Page

The TX page allows you to make changes to the transmitter RF and modulation settings.

Note: The TX modulation settings must be matched at the receiver for a successful RF link.

If you click on a parameter, a useful help guide will be displayed at the bottom of the page.

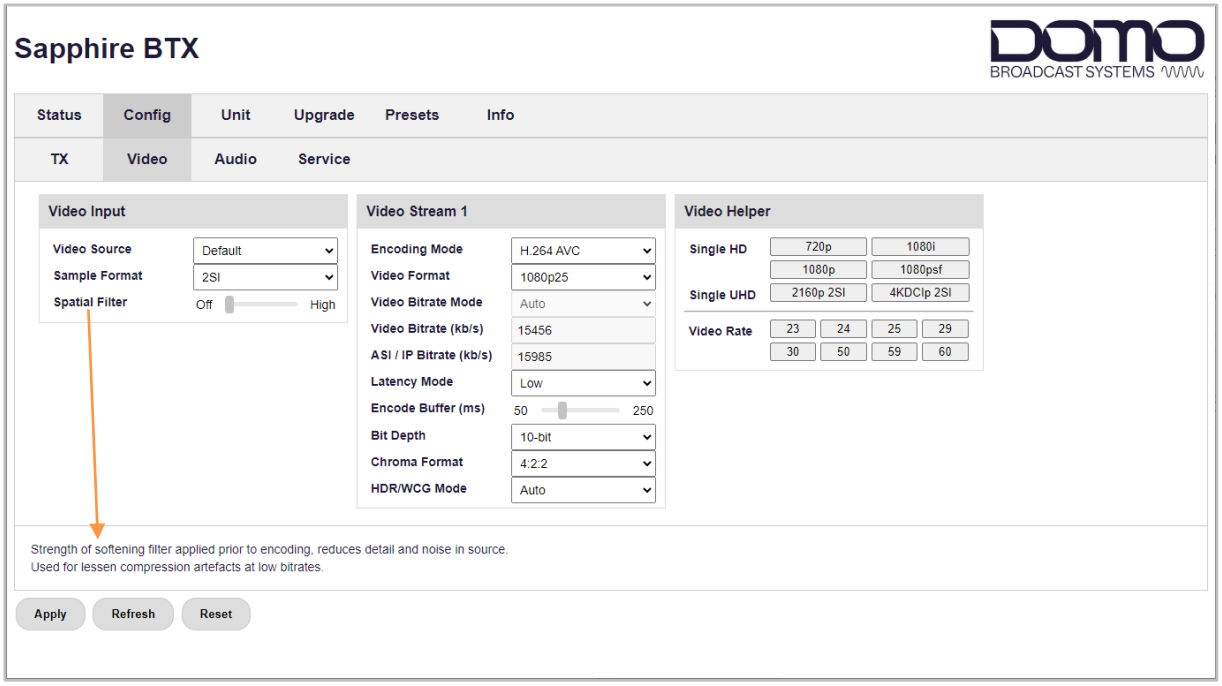


- **Apply**: click Apply to save changes and make them active.
- **Refresh**: Click Refresh to update the browser settings. If you make changes but do not click Save, click the Refresh button to return the current settings.
- **Reset**: the reset button will restart the software codec. During the reset, there will be a short pause in operation.

5.3 Config Video Page

The Config pages will open to the **Video** page. The video page allows you to make changes to the video input settings.

If you click on a parameter, a useful help guide will be displayed at the bottom of the page.



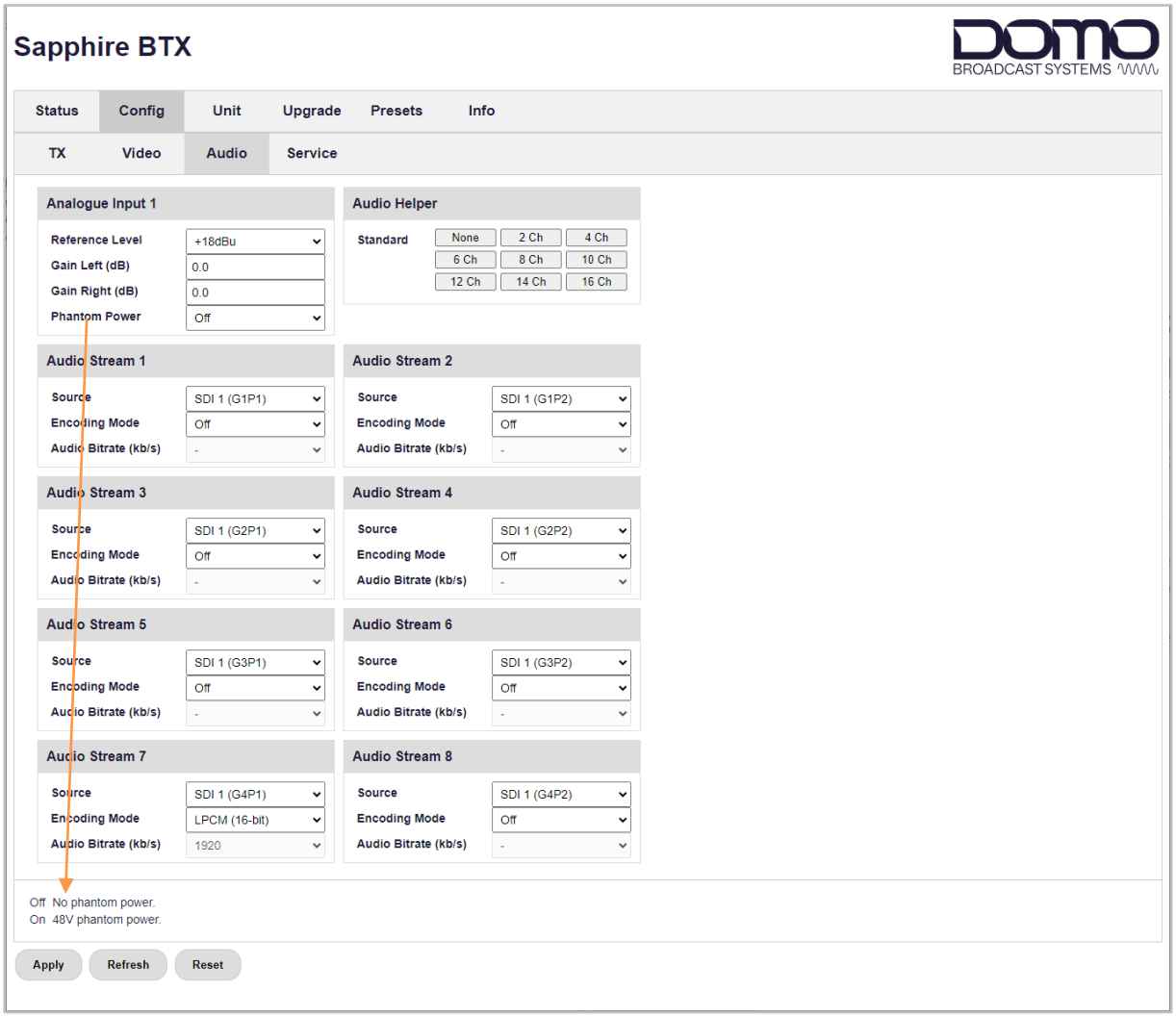
- **Apply**: click Apply to save changes and make them active.
- **Refresh**: Click Refresh to update the browser settings. If you make changes but do not click Save, click the Refresh button to return the current settings.
- **Reset**: the reset button will restart the software codec. During the reset, there will be a short pause in operation.

5.4 Config>Audio Page

The audio page allows you to make changes to the audio settings.

Note: Only enable audio channels that are required. Extra audio data will reduce the video bitrate and hence the video quality.

If you click on a parameter, a useful help guide will be displayed at the bottom of the page.

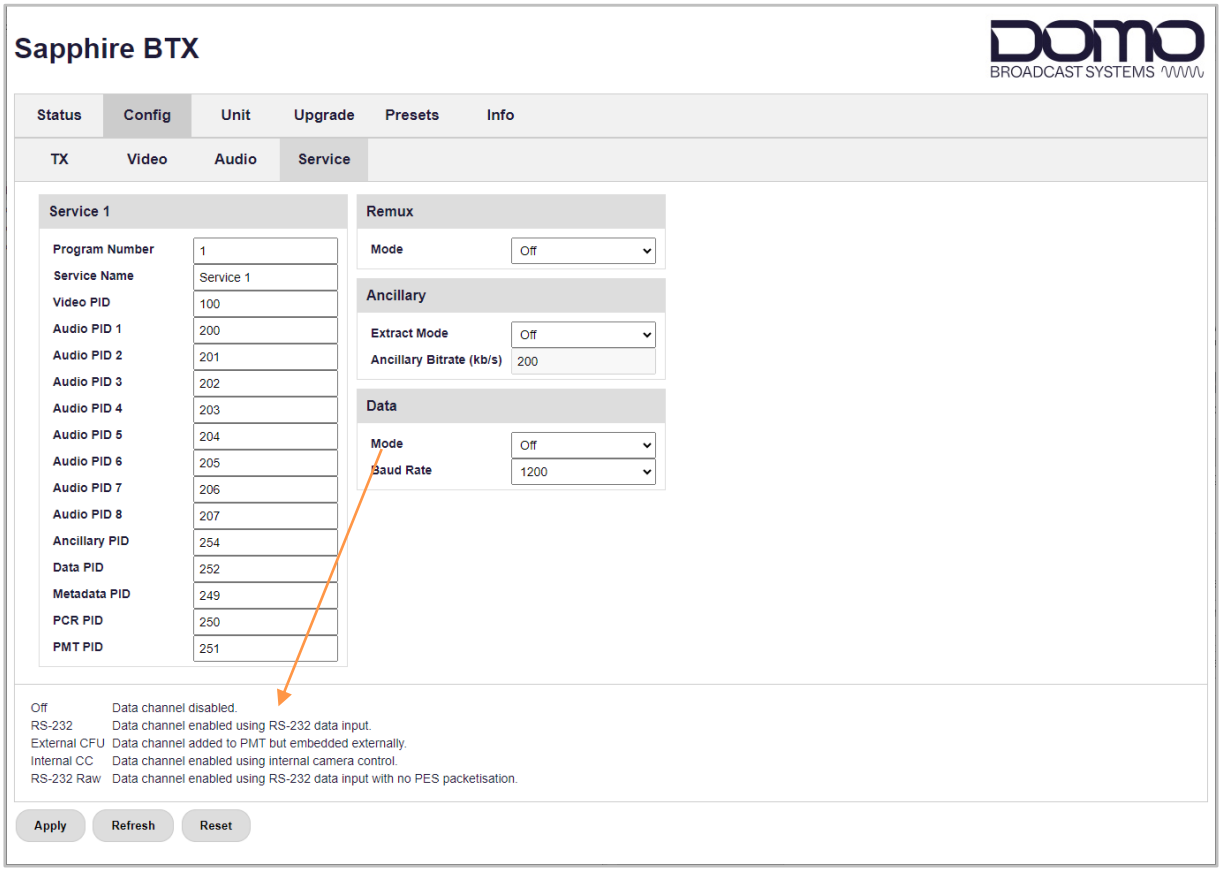


- **Apply**: click Apply to save changes and make them active.
- **Refresh**: Click Refresh to update the browser settings. If you make changes but do not click Save, click the Refresh button to return the current settings.
- **Reset**: the reset button will restart the software codec. During the reset, there will be a short pause in operation.

5.5 Config>Service Page

The Service page allows you to make changes to the transport stream service settings.

If you click on a parameter, a useful help guide will be displayed at the bottom of the page.

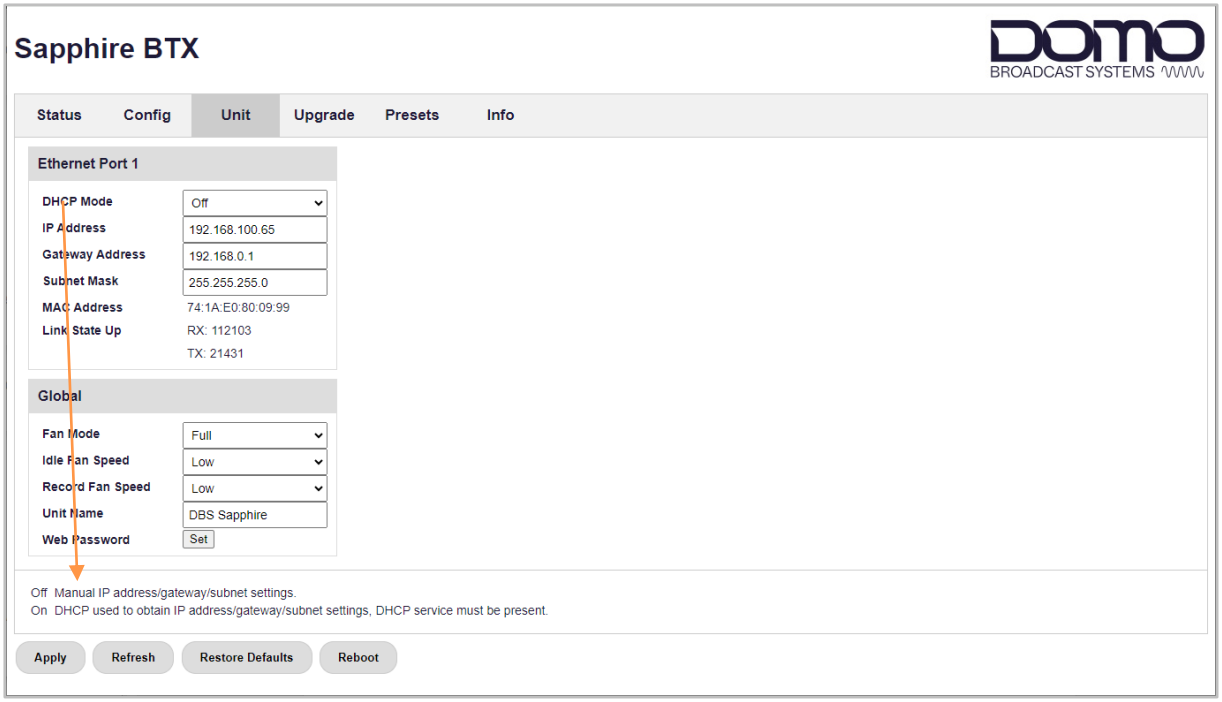


- **Apply**: click Apply to save changes and make them active.
- **Refresh**: Click Refresh to update the browser settings. If you make changes but do not click Save, click the Refresh button to return the current settings.
- **Reset**: the reset button will restart the software codec. During the reset, there will be a short pause in operation.

5.6 Unit Page

The Unit page allows you to change the IP address settings for the unit. It also provides settings for fan speed, unit name and password, if required.

If you click on a parameter, a useful help guide will be displayed at the bottom of the page.

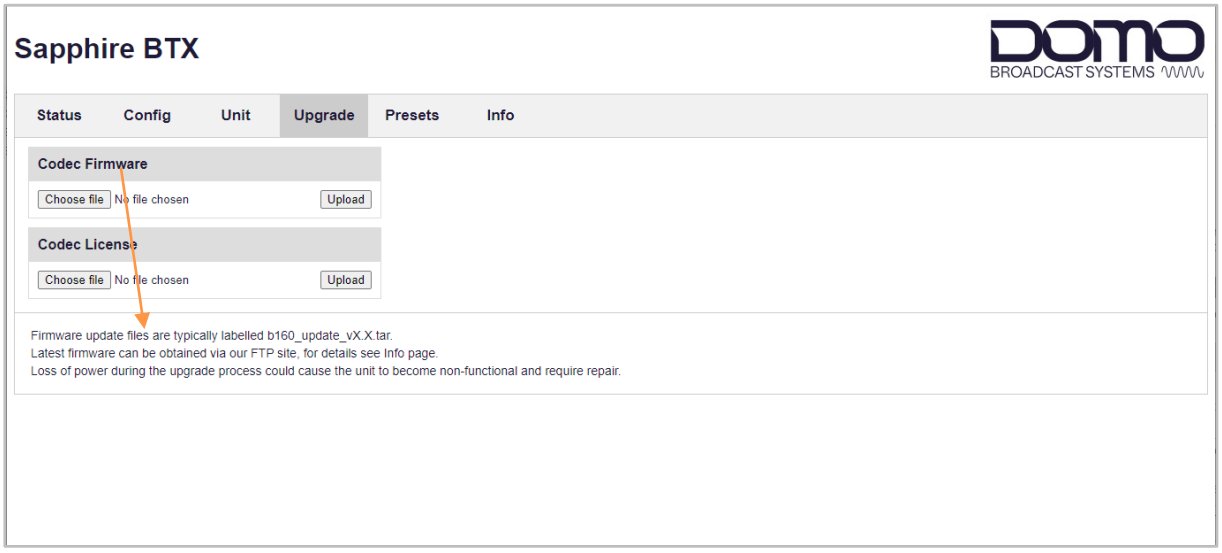


- **Apply**: click Apply to save changes and make them active.
- **Refresh**: Click Refresh to update the browser settings. If you make changes but do not click Save, click the Refresh button to return the current settings.
- **Restore Defaults** – this button will return the unit to the factory settings. That is the condition that the device was originally delivered in.
- **Reboot** – this will perform a full unit reboot. During the reboot, there will be a pause in operation.

5.7 Upgrade Page

The Upgrade page provides the recommended method to upgrade software and licenses.

If you click on a parameter, a useful help guide will be displayed at the bottom of the page.



Click **Choose file** to browse to the location of the upgrade file and **Upload** to start the process. Software upgrades can take up to 10mins and power must not be interrupted during the process.

License upgrades require the device to be rebooted to enable the license.

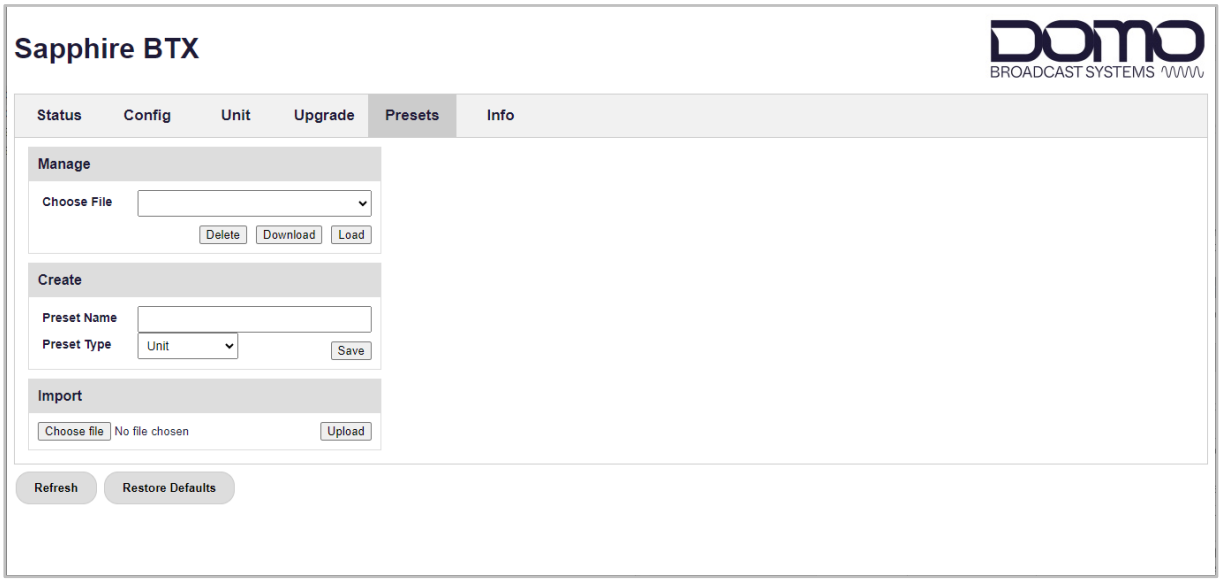
When firmware updates are required, DBS will make them available on WatchDox, see *Section 9.1*.

5.8 Presets Page

The **Manage** settings allow you to load imported files to the Nano HEVC or download saved files to a PC.

The **Create** settings allow you to save the current settings to a named file.

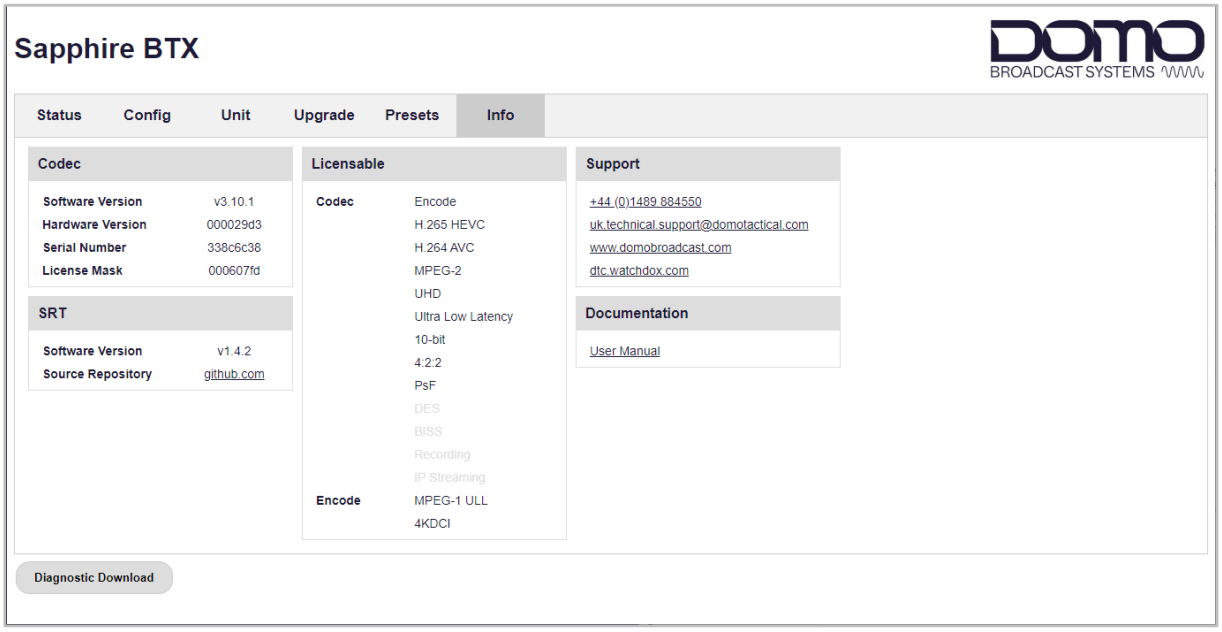
The **Import** setting allows you to import pre-saved files.



- **Refresh**: Click Refresh to update the browser settings. If you make changes but do not click Save, click the Refresh button to return the current settings.
- **Restore Defaults** – this button will return the unit to the factory settings. That is the condition that the device was originally delivered in.

5.9 Info Page

The information page provides details that may be useful during a service call, including software and hardware versions, and currently loaded licenses.



6. OLED Display

6.1 Introduction

The Nano HEVC TX 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.

When the Nano HEVC TX has booted up, the OLED will display the status information.

6.2 Control Buttons

The OLED display is controlled using the buttons situated either side of the display. Either button can be used to wake up the screen if it is in sleep mode (display off).

Left Button

The left button is the cancel/back button. Press this button to return to the previous menu or cancel changes to a setting.

The left button will also open the top-level menu from the status page.

Right Button

The right button is the navigate/select/edit button.

- To navigate the display, push the button up or down through the menu.

Note: A good tip is to use a fingernail to control navigation.

- Press the button to select a chosen menu or parameter.
- To edit a parameter, use the up/down and left/right buttons to change the setting as applicable. Press to enter the changed value.

6.3 OLED Display Menus

6.3.1 Status

When the unit has finished boot-up, it will display the video format and lock which are the first **Status** parameters. Push the right button up/down to scroll through the **Status** menu.

From the Status menu, press the left button to access the top-level menu and the right button to scroll through the options.

- **Status**: press the right button to take you back to the Status menu.
- **Config**: see *Section 6.3.2*.
- **Unit**: see *Section 6.3.3*.

6.3.2 Config Menu

From the Status menu, select Config and press the **right** button to open the configuration menu.

- **Video**: The video menu is a subset of the WUI settings, see *Section 5.3*.
- **Audio**: The audio menu is a subset of the WUI settings, see *Section 5.4*.
- **Service**: The service menu is a subset of the WUI settings, see *Section 5.5*.
- **TX**: The transmitter menu is a subset of the WUI settings, see *Section 5.2*.

6.3.3 Unit

From the Status menu, select Unit and press the **right** button to open the unit menu.

The unit menu is a subset of the WUI settings, see *Section 5.6*.

7. Basic Operation

7.1 Introduction

This chapter explains how to make basic RF and video settings.

Only the settings for the Nano HEVC are explained. The receiving device must be configured accordingly to achieve a successful radio link.

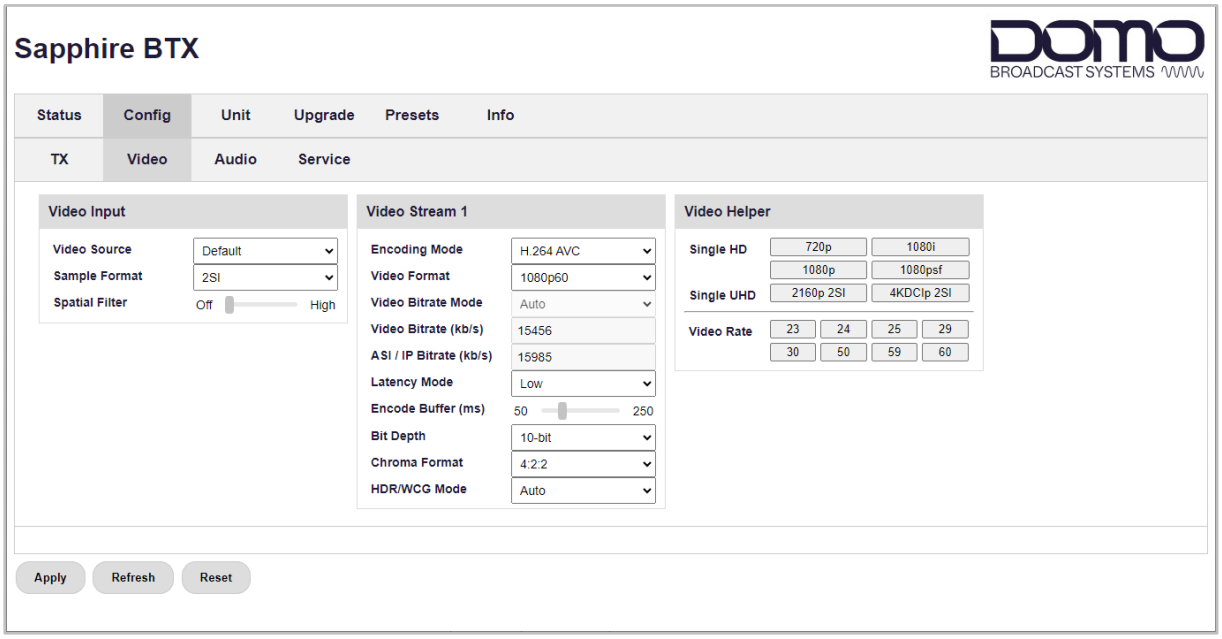
All settings are described using the web interface, but video and RF settings can also be configured from the LED display control via the **Config** menu, see *Section 6.3.2*.

7.2 Video Setup

Ensure the Nano HEVC has a video source connected to the input BNC.

Open the web interface and go to the **Config>Video** page. Set the Video Source to Default and, using the **Video Helper** tool, select the video input resolution and video rate of the source.

Click **Apply** to make the settings active.



Video lock can be verified in the **Status** page and/or by verifying the video LED on the side panel has turned green, see *Section 3.4*.

7.3 RF Setup

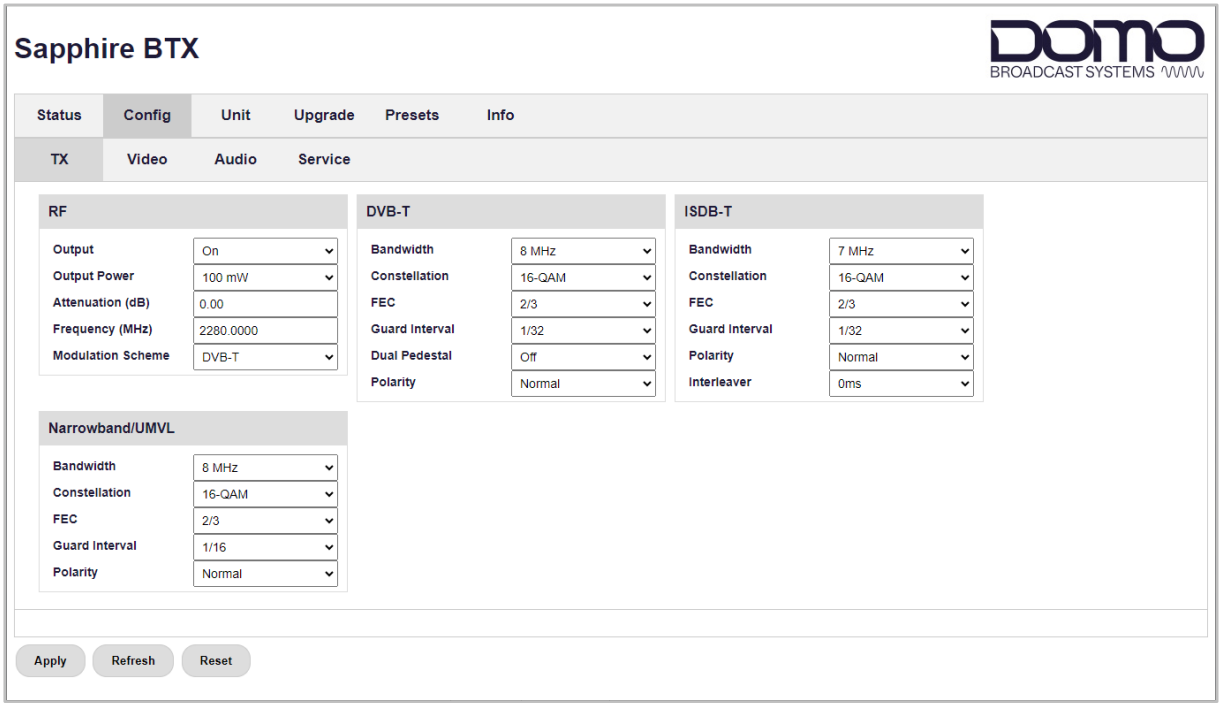
Ensure an RF antenna has been fitted to the SMA jack on the top panel. The antenna must be compatible with the transmit frequency of the Nano HEVC.

Open the web interface and go to the **Config>TX** page. Set the **Frequency** of operation and **Output Power**, as required for the deployment. The screenshot below is at full RF output power for the device with no Attenuation applied.

Note: Attenuation can be applied to lower the RF output power. Refer to *Section 8.2* for a dBm to Watts conversion table and example calculation.

Select a **Modulation Scheme** and configure the modulation settings accordingly for the scheme.

Click **Apply** to make the settings active.



Ensure the RF and modulation settings are matched in the receiver to achieve an RF lock.

8. Appendix A: Reference Material

8.1 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.

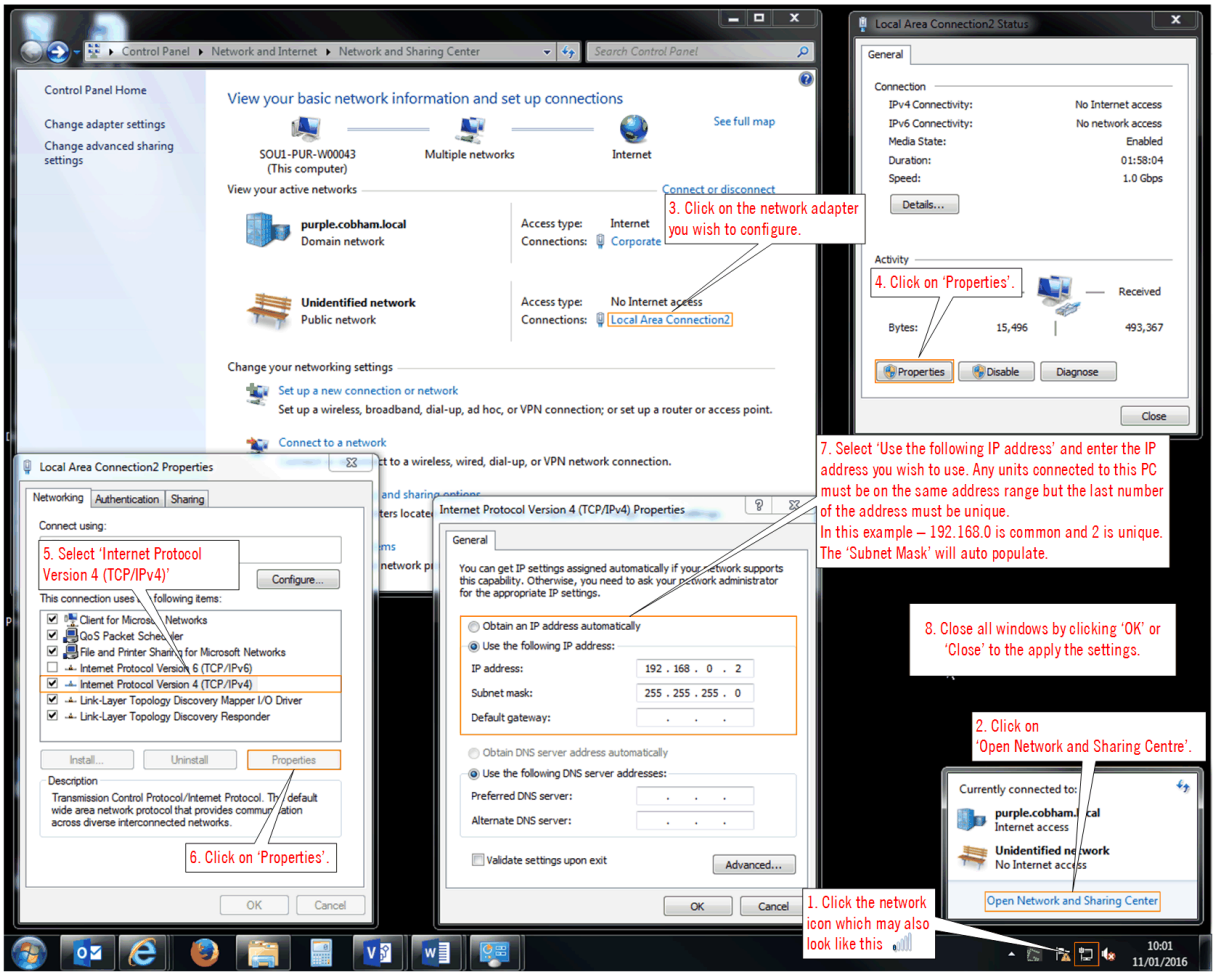


Figure 8-1 How to configure a PC IP address

8.2 dBm to Watts Conversion

It will be useful to know the equivalent dBm to watts power conversion when adding attenuation to the RF output.

When calculating, do the sum in dBm then convert to Watts:

i.e., 20dBm-3dBm = 17dBm (50mW)

dBm	Watts
0	1.0mW
1	1.3mW
2	1.6mW
3	2.0mW
4	2.5mW
5	3.2mW
6	4mW
7	5mW
8	6mW
9	8mW
10	10mW
11	13mW
12	16mW
13	20mW
14	25mW
15	32mW
16	40mW
17	50mW
18	63mW
19	79mW
20	100mW

9. Appendix B: After Sales Support

9.1 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.

9.2 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)

9.3 Using the DBS RMA Service

9.3.1 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.

9.3.2 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.

9.3.3 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.

9.3.4 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.

10. 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.

10.1 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.

10.2 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 9.2*.

10.3 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.

10.4 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

10.5 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.

10.6 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

10.7 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