VISLINK
At the heart of the action

Quantum Receiver
User Manual

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NOTE: Notes show to convey additional information.

⚠ CAUTION: Cautions show where potential equipment damage could occur.

⚠ WARNING: Warnings show where there is potential for personal danger or risk of death. Read all warnings and understand them before carrying out work on any equipment. This includes peripherals and any related equipment in use. The danger is real and not reading and understanding the warning could lead to injury, harm or potential death.

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Register for support:	
Worldwide:	https://vislink.com/support-beyond-expectation/
Call for support:	
Worldwide:	+44 1442 431410
USA:	+1 978 330 9292

When contacting Technical Support, please include the model and serial number of the unit (located on a label on the bottom of each unit) and the approximate date of purchase.

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Document History

Version	Date	Modification	Firmware Version
1.00	13/10/2021	First release of document.	QANT-0100-00-07
1.01	20/10/2021	Add - default login, Add - LAN/WAN display identification.	QANT-0100-00-07

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1. General Information

1.1. General Safety Information

To ensure awareness of potential hazards, all personnel concerned with the operation or maintenance of the equipment must study the information that follows, together with local site regulations.

⚠ WARNING: RF Power Hazard: High levels of RF power are present in the unit. Exposure to RF or microwave power can cause burns and may be harmful to health. Switch off supplies before removing covers or disconnecting any RF cables, and before inspecting damaged cables or antennas.

⚠ WARNING: Avoid standing in front of high gain antennas (such as a dish) and never look into the open end of a waveguide or cable where RF power may be present.

⚠ CAUTION: We strongly recommended that you return any equipment requiring RF servicing to Vislink.

⚠ WARNING: GaAs / BeO Hazard: Certain components inside the equipment contain Gallium Arsenide and Beryllium Oxide that are toxic substances. Whilst safe to handle under normal circumstances, individual components must not be cut, broken apart, incinerated or chemically processed. In the case of Beryllium Oxide, a white ceramic material, the principal hazard is from the dust or fumes, which are carcinogenic if ingested, inhaled or entering damaged skin.

Please consult your local authority before disposing of these components.

⚠ CAUTION: Tantalum Capacitors: When subjected to reverse or excess forward voltage, ripple current or temperature these components may rupture and could potentially cause personal injury.

⚠ CAUTION: This system contains MOS devices. Electro-Static Discharge (ESD) precautions should be employed to prevent accidental damage.

1.2. Disposal Instructions

⚠ WARNING: DO NOT incinerate batteries. Exposing batteries to naked flames or extreme heat sources can cause them to rupture or explode.

DO NOT dispose of any of the supplied equipment as household waste. The supplied equipment is not biodegradable in landfill sites. For safe disposal of the supplied equipment, take it to your local (council/authority) environmental waste site. For details, contact your local authority/recycling center.

NOTE: In Europe dispose of all equipment in accordance with the European Environmental directive.

1.3. Environmental

⚠ CAUTION: The unit is IPxx rated and must be protected from dripping or splashing water/fluids. When used outdoors, protect the unit using a rain cover.

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1.4. Health & Safety

Exposure to Non-Ionizing (RF) Radiation/Safe Working Distances

The safe working distance from a transmitting antenna may be calculated from the relationship:

$$D = \frac{P_T . G_R}{4\pi . w}$$

in which D = safe working distance (meters)

PT = transmitter or combiner power output (watts)

GR = antenna gain ratio = anti log (gain dBi ÷10)

w = Maximum allowed power density (watts/square meter)

The RF power density value is determined by reference to safety guidelines for exposure of the human body to non-ionizing radiation. It is important to note that the guidelines adopted differ throughout the world and are from time-to-time re-issued with revised guidelines. For Vislink use, when calculating minimum safe working distances, apply a maximum power density limit (w) of 1w/m². Appendix A refers.

⚠ WARNING: Any transmitting equipment, radiating power at frequencies of 100 kHz and higher, has the potential to produce thermal and athermal effects upon the human body.

To be safe:

a. Operators should not stand or walk in front of any antenna, nor should they allow anyone else to do so.
b. Operators should not operate any RF transmitter or power amplifier with any of its covers removed, nor should they allow anyone else to do so.

Worked examples:

Antenna			Transmitter Power			
Type	**Gain (dBi)**	**Gain Ratio**	**2W**	**4W**	**10W**	**30W**
OMNI	4	2.5	1	1	1.5	2.5
HELIX	20	100	4	5.6	9	15.5
PARABOLIC DISH	35	3,162	22.5	32	50	87
			MINIMUM SAFE DISTANCE (METERS)			

Table 1-1 Minimum Safe Distance Overview Table

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1.5. Maximum RF Power Density Limits

The RF Radiation Power Density limit figure recommended by Vislink is based upon guideline levels published in:

a. IEEE standard C95.1 1999 - IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
b. Guidelines for Limiting Exposure to Time-varying Electric, Magnetic & Electromagnetic Fields (up to 300 GHz) published in 1998 by the Secretariat of the International Commission on Non-Ionising Radiation Protection (ICNIRP).

Both documents define guideline RF power density limits for "Controlled" and "Uncontrolled" environments. An uncontrolled environment is defined as one in which the person subjected to the RF radiation may be unaware of and has no control over the radiation energy received. The uncontrolled environment conditions can arise, even in the best regulated operations and for this reason the limits defined for the uncontrolled environment have been assumed for the Vislink recommended limit.

Documents a) and b) also show the RF power density guidelines to be frequency dependent. Different power density / frequency characteristics are presented in the two documents. To avoid complexity and to avoid areas of uncertainty, Vislink recommends the use of a single power density limit across the frequency range 100 kHz to 300 GHz. The $1w/m^2$ power density limit we recommend satisfies the most stringent of the guidelines published to date.

NOTE: The IICNIRP document is freely available for download from the internet at www.icnirp.de/emfgdl (PDF file) the IEEE standard is available on loan from Essex County Library on payment of a search fee.

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2. Introduction

2.1. IP-Native Wireless Camera Receiver

The Vislink Quantum Receiver is designed to receive one wireless camera transmitter output using up to 16 RF inputs employing Maximum Ratio Combining (MRC) and packet switching diversity technology. It then demodulates the received signals using LMS-T or DVB-T, providing low-latency HEVC and MPEG-4 video decoding that supports all major video formats (4K UHD and HD) including High Frame Rate (HFR) and High Dynamic Range (HDR).

The Quantum Receiver delivers content directly over IP fiber networks cutting out the requirement for additional video compression stages. IP connectivity enables production teams to work wirelessly and remotely over IP fiber networks or the unmanaged internet, facilitating efficient live video production workflows.

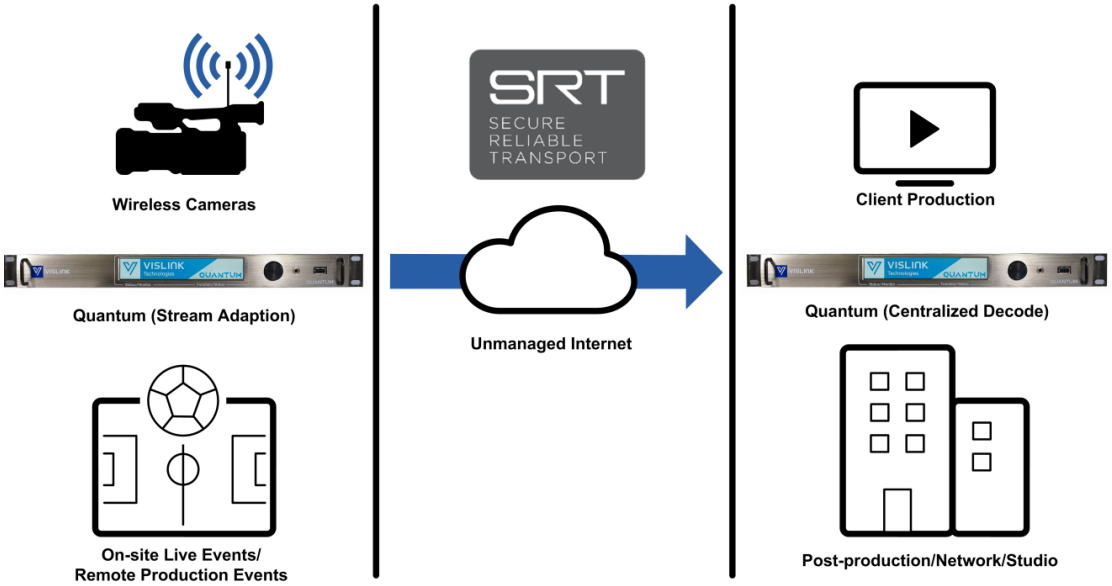

Figure 2-1 Quantum Receiver Overview

The Quantum Receiver incorporates a touch-screen interface, APIs and a web browser application to allow integration into system control and orchestration tools.

2.2. Firmware Version

This user manual describes the features and functions relating to the firmware version at the time of writing: QANT-0100-00-07.

To verify the installed version, see either:

- Front Panel: see *Section 5.4 Info*
- Web Browser: see *Section 6.5 Info*

See the Vislink Support website for more details about the Quantum Receiver and the latest firmware revision.

https://www.vislink.com/support-beyond-expectation/

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2.3. Functional Description

The relationship between the functions of the receiver and the connectors is shown in the block diagram below.

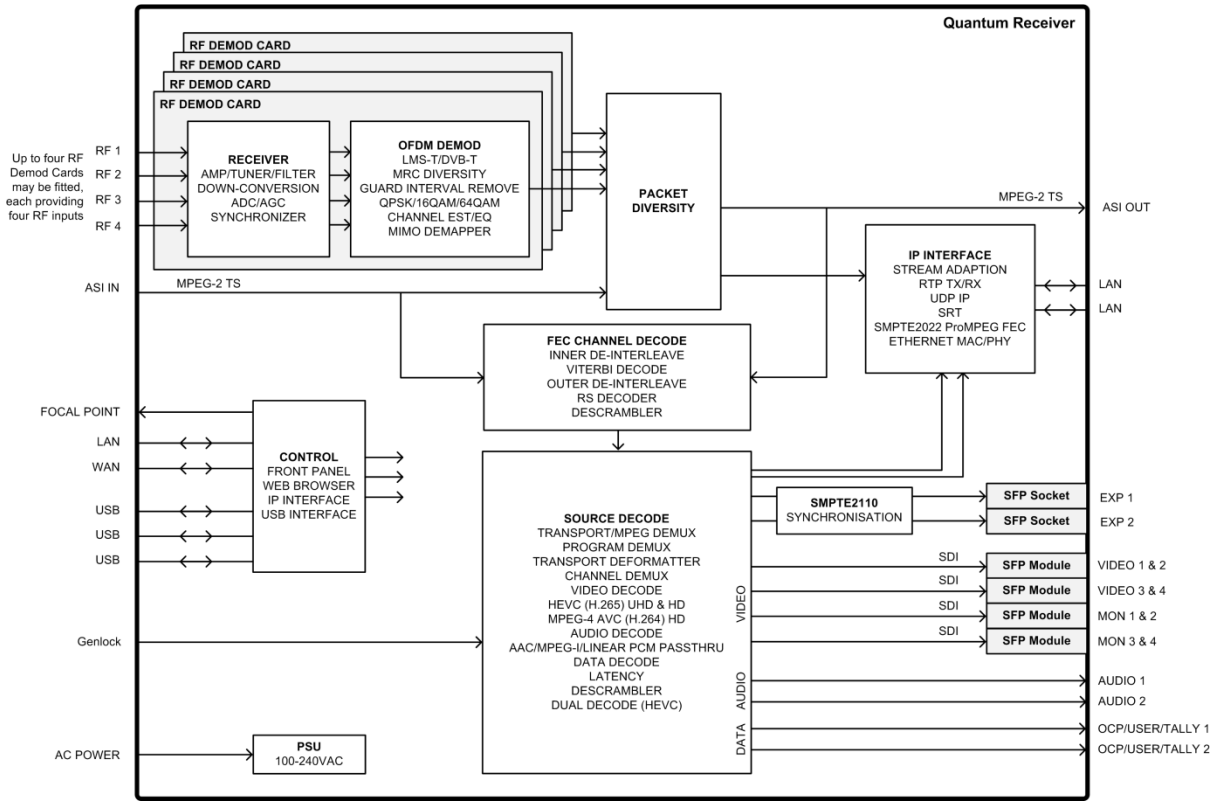

Figure 2-2 Functional Block Diagram

The receiver connectors are detailed in *Section* 4 *Rear Panel Connectors.*

Multiple units can be cascaded using ASI input and outputs. The use of both MRC (Maximum Ratio Combining) of the received COFDM signals and the ASI packet diversity, the combining of two ASI streams to produce a stream with fewer errors than either input; provides a flexible and extendable receiver system.

When 'External ASI & Diversity' is configured as the unit input, Demod 4 is switched to external ASI, so the 16-way RF input is reduced to 12-way plus external ASI and the external ASI cannot be packet switched. Packet switching is only possible if the external ASI is supplied from a separate Quantum with a single Demod only.

2.4. Key Features

The following key features are available for this unit:

- Up to 16-way diversity LMS-T or DVB-T demodulation
- Low-latency HEVC and MPEG-4 video decode compression technology
- 4K UHD and HD decoding with HDR support
- Dual service HEVC HD Decode
- IP-native Transport Stream connectivity
- SRT support
- SMPTE2110-ready

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2.5. Licensed Options

Various licenses are available to add functionality to the base configuration.

Licensed options are:

- QANT-LICE-0001 H.264
- QANT-LICE-0002 HEVC
- QANT-LICE-0003 4K UHD
- QANT-LICE-0004 Dual HEVC
- QANT-LICE-0005 ISDB-T Demod

For further information about licenses and how they can be purchased, delivered, installed and enabled; see *Section* 8 *Licenses & Upgrades.*

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3. Specification

3.1. Physical & Environmental

Feature	Description
Dimensions	44mm (H) x 430mm (W) x 368mm (L) (1.7" (H) x 17" (W) x 14.5" (L))
Weight	4.3kg with 2 Demod Cards fitted (build dependent)
Temperature	0°C to 50°C (32°F to 122°F)
Humidity	95% long term
Power Connector	3-pin IEC
Power Supply	100 – 240VAC
Power Consumption	230W (approx., depending on configuration)

Table 3-1 Physical & Environmental Specification

3.2. RF Parameters

Feature	Description
RF Inputs	4x RF inputs implementing MRC Diversity reception per demod card Up to 4x demod cards per unit Packet switching diversity between demod cards
Frequency Band	100MHz -1000MHz** Use in conjunction with the L3025-series down converters.
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval	1/32, 1/16, 1/8, 1/4
Frequency Selection	Up to 64 pre-set channels, or tuning in 1MHz steps via front panel control
Demodulation	DVB-T LMS-T
Demodulation Modes	QPSK, 16QAM, 64QAM
Bandwidth	DVB-T bandwidths of 6/7/8 MHz LMS-T bandwidths of 3/4/5/6/7/8/10/ 12/14/16/20 or 24 MHz with dual pedestal
Receiver Threshold	Receiver threshold: -92dBm to BER 10-5 (nom. QPSK)

Table 3-2 RF Parameters Specification

3.3. IP Transport Stream Processing

Feature	Description
IP Inputs	RTP/UDP IP input Up to 100Mbit/s SMPTE2022-2 ProMPEG FEC SRT
IP Outputs	RTP/UDP IP input Up to 100Mbit/s SMPTE2022-2 ProMPEG FEC SRT

Table 3-3 IP Transport Stream Processing Specification

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3.4. Video & Audio Parameters

Feature	Description
Video Encoder Profiles	HEVC (H.265) UHD & HD: Profile: Main 4:2:2 10 @ L5.1 Sampling: 8bit & 10bit Video rate: 1.0-40Mbps Video format: up to 2160p 60 MPEG-4 AVC (H.264) HD: Profile: 422HP @ L4.2 Sampling: 8bit & 10bit Video rate: 1.0-40Mbps Video format: up to 1080p 60
Video Outputs	3G-SDI SMPTE-424M (UHD) HD-SDI SMPTE-424M (HD) 6G-SDI SMPTE-2081 12G-SDI SMPTE-2082
Video Formats	480i @ 29.97 576i @ 25 720p @ 50, 59.94 & 60 1080i @ 50, 59.94 & 60 1080p @ 23.98, 24, 25, 29.97, 30, 50, 59.94 & 60 2160p @ 23.98, 24, 25, 29.97, 30, 50, 59.94 & 60
Audio Decoder Profiles	AAC** (AAC-LC & HE-AAC) MPEG-1 (Layer 1 & Layer 2) Linear PCM Passthrough
Audio Outputs	Digital: Up to 8x stereo pair Embedded audio over SDI Analogue: 2x stereo pair
Genlock	CVBS Black & Burst Tri-level sync
Latency	Single frame latency*
De-scrambling	Biss-1, Biss-E, AES-128, AES-256, Bcrypt-128, Bcrypt-256
Dual Decode	HEVC Only

Table 3-4 Video & Audio Parameters Specification

* In combination with Vislink HCAM transmitter in HEVC mode and in combination with Vislink L1700 and Clip On-4 transmitters

** Check availability

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4. Rear Panel Connectors

The unit is designed for rack-mounted use and provides input, output, monitoring, control and power connectors at the rear panel for connection to other equipment via cable looms.

Figure 4-1 Quantum Receiver Rear Panel

4.1. RF Input Connectors (Demod Cards)

Up to four RF Demod plug-in cards may be fitted to the unit. Each of the cards provides four RF input coaxial connectors for receiving UHF input 70MHz to 860MHz.

NOTE: These inputs can have up to +24VDC output (enabled in Unit/LNB Power) to power the external down converter; limited to 400mA per connector, short circuit protected.

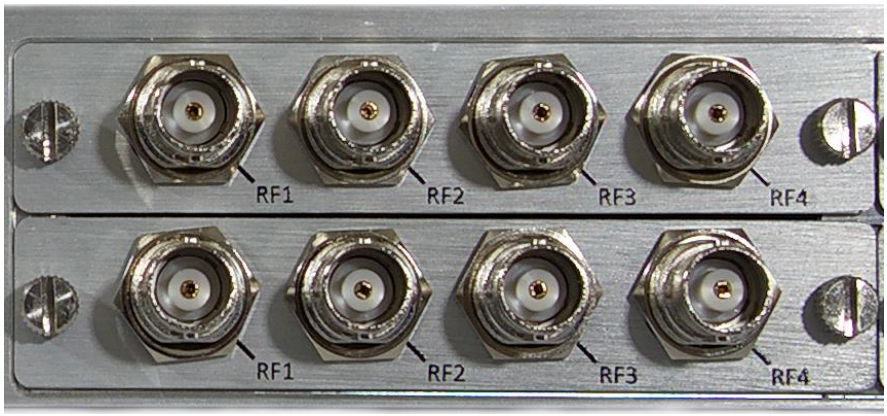

Figure 4-2 RF Input Connectors

Connector	Legend	Description
4x Plug-in Cards, each with 4x RF Connectors:	**RF1 – RF4**	75 Ω BNC (F)

Table 4-1 RF Input Pinout

4.2. ASI/Genlock Connectors

The Asynchronous Serial Interface (ASI) input and output use copper coaxial connectors to carry MPEG Transport Streams from/to end equipment. Complies with ISO/IEC 13818-2 – 188-byte mode. ASI input to the Decoder or packet diversity function for packet switching (Link Research algorithm).

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The ASI IN connector routes the received stream to the IP Transport Stream and to either the video decoder, packet diversity block or ASI OUT connector.

The ASI OUT connector delivers the output stream from either the IP Transport Stream, demodulator, packet diversity block or ASI input for decoding by an external decoder.

The Generator Locking (Genlock) pulse uses a coaxial connector to synchronize camera frame capture, accurately aligning video and audio sources.

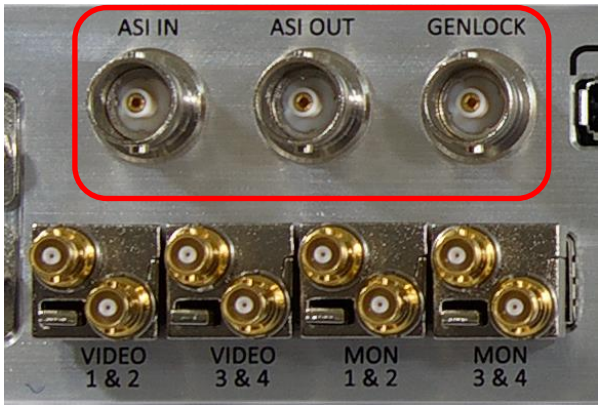

Figure 4-3 ASI/Genlock Connectors

Connector	Legend	Description
1x ASI Input Connector:	**ASI IN**	75 Ω BNC (F)
1x ASI Output Connector:	**ASI OUT**	75 Ω BNC (F)
1x Genlock Connector:	**GENLOCK**	75 Ω BNC (F)

Table 4-2 ASI/Genlock Pinout

4.3. Video/Monitoring Output Connectors

The unit provides four, small form-factor pluggable (SFP) transceiver modules used for transmitting Serial Data Interface (SDI) signals up to 2.97Gbps over 75Ω coaxial cables via HD-BNC connectors.

12G SFP option available.

All connectors are outputs (no RX)

Video & Monitor SFPs are non-MSA.

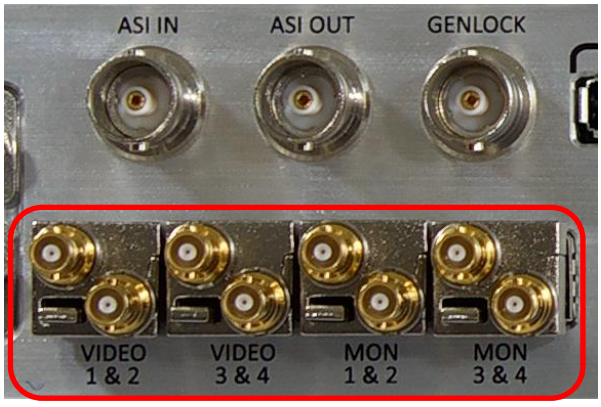

Figure 4-4 Video/Monitoring Output Connectors

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Connector	Legend	Description
2x SFP cages:	**VIDEO 1 & 2** **VIDEO 3 & 4**	4x 3G SDI out 4x 6G SDI out 4x 12G SDI out
2x SFP cages:	**MON 1 & 2** **MON 3 & 4**	4x 3G SDI out

Table 4-3 Video/Monitoring Output Pinout

4.4. Audio Output Connectors

Two, 5-pin Lemo connectors with a audio pair per connector (2 x pairs, 4 x channels).

- 48kHz sampling
- Clip level: 18dB
- THD: < 0.1%
- 20Hz to 18kHz ±0.25dB
- Crosstalk: >60dB minimum
- Signal to noise ratio: >66dB RMS
- Standard cable assembly part number: L0079

Figure 4-5 Audio Connectors

Connector	Legend	Description	
2x 5-Pin Lemo Socket:	**AUDIO1** **AUDIO2**	Pin 1	Left Line + (Line)
		Pin 2	Left Line - (Return)
		Pin 3	GND
		Pin 4	Right Line + (Line)
		Pin 5	Right Line - (Return)

Table 4-4 Audio Pinout

4.5. EXP Connectors

Two, small form-factor pluggable (SFP) expansion sockets (MSA SFP 25GbE) are provided for future expansion of the unit.

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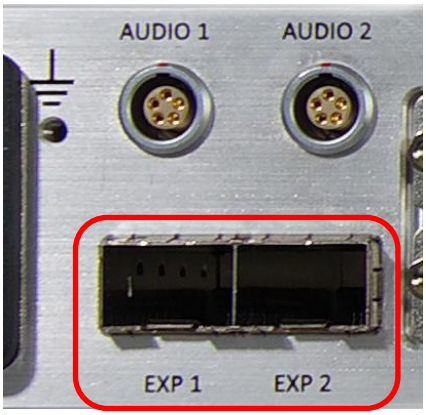

Figure 4-6 EXP Connectors

Connector	Legend	Description
2x SFP cages:	**EXP 1** **EXP 2**	Empty

Table 4-5 EXP Pinout

4.6. Focal Point Connector

One connector is provided for connection to the FocalPoint wireless camera control (FocalPoint ODU Tx Head).

Serial data from the 'Paint' Controller is converted to RS485 then passed to the transmitter via this connector.

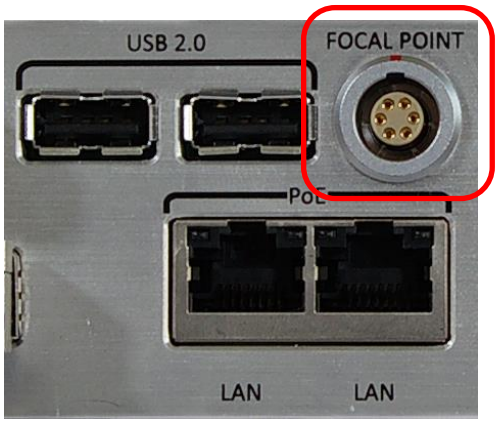

Figure 4-7 Focal Point Connector

Connector	Legend	Description	
1x 6-Pin Lemo Socket:	**FOCAL POINT**	Pin 1	0V
		Pin 2	N/C
		Pin 3	N/C
		Pin 4	D+
		Pin 5	D-
		Pin 6	Switched +12V

Table 4-6 Focal Point Pinout

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4.7. Return/User Data Connector

Two return data connectors are provided which can be used for OCP (Sony/Grass Valley/OCP5), user data (RS232/RS485/TTL) or Tally (Red/Green Wet/Dry).

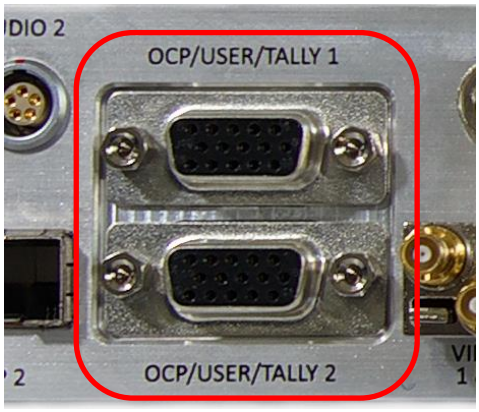

Figure 4-8 Return Data Connectors

Connector	Legend	Description	
2x 15-Pin D (F):	**OCP/USER/ TALLY 1/2**	Pin 1	+12V DC
		Pin 2	RS422 TX+/RS485+
		Pin 3	RS422 TX-/RS485-/ RS232 TX
		Pin 4	RS422 RX+/RS232 RX
		Pin 5	RS422 RX-
		Pin 6	TTL RXD
		Pin 7	TTL TXD
		Pin 8	G TALLY DRY
		Pin 9	G TALLY WET A
		Pin 10	G TALLY WET B
		Pin 11	GND
		Pin 12	GND
		Pin 13	R TALLY DRY
		Pin 14	R TALLY WET A
		Pin 15	R TALLY WET B

Table 4-7 Return Data Pinout

4.8. Ethernet Transport Stream & Control Connectors

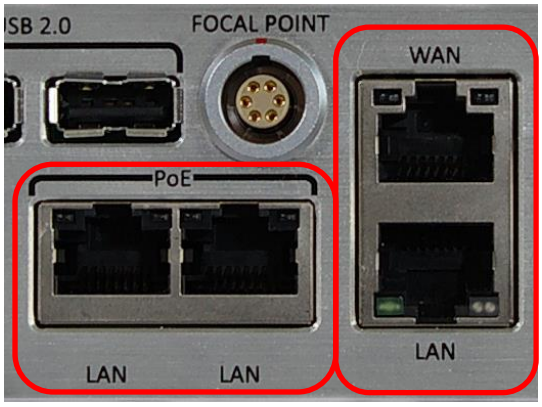

Figure 4-9 Ethernet LAN/WAN Connectors

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Connector	Legend	Display Ident	Description
1 x WAN port:	**WAN**	Network 2	Standard Ethernet RJ45 10/100/1000
3 x LAN port (2 with 802.3at Type 2 "PoE+")**:	**LAN**	Network 1	Standard Ethernet RJ45 10/100/1000

Table 4-8 Ethernet Pinout

WAN/LAN - Control

Standard 10/100/1000 Ethernet connections are provided for control of the unit using Web Browser (HTTP) and Application Programming Interface (RESTful API).

If required, use the internal web browser link to download a copy of the units REST API User Guide. To ensure that the version relevant to the current code release is used, always use the REST API Guide as the reference for any API application.

To configure the unit via the web page, see *Section 7.5 Accessing the Web GUI* for instructions on how to connect to the receiver and use the web browser.

LAN/LAN (PoE) – Video Over IP

Standard 10/100/1000 Ethernet connection for streaming encapsulated Transport Streams into and out of the unit. Only UDP encapsulation is supported.

LAN ports may also be used for control of the unit using the Web Browser (HTTP) and Application Programming Interface (RESTful API).

**Check Availability. Power over Internet (PoE) ports is a technology for wired Ethernet local area networks (LANs) that allows the electrical current necessary for the operation of each device to be carried by the data cables rather than by power cords.

4.9. USB Port Connectors

Two USB ports on the rear panel, and one port on the front panel allow a USB memory stick to be inserted for code updates.

NOTE: These USB ports are NOT for remote control or for charging mobile devices.

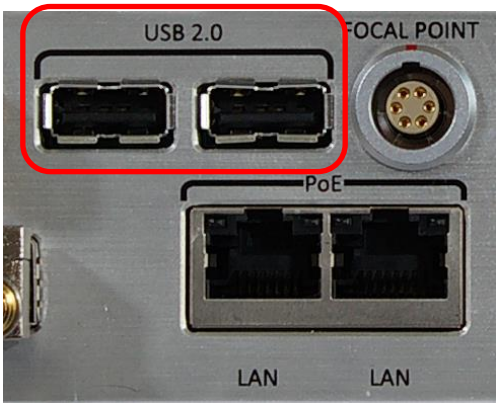

Figure 4-10 USB Port Connectors

Connector	Legend	Description
2x USB 2.0 Interfaces:	**USB 2.0**	Standard USB 2.0

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Table 4-9 USB Pinout

4.10. AC Power Connector

A standard IEC 3-way connector is provided for the 100-240V AC power supply.

A 1.5A fuse is fitted integrally to the socket.

Figure 4-11 AC Power Connector

Connector	Legend	Description
1x IEC Connector:	**100-240V AC 50-60Hz**	Live
		Neutral
		Earth

Table 4-10 AC Power Pinout

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5. Front Panel Display

5.1. Front Panel Controls

The unit provides a front panel touch-screen display and a rotary control to scroll through the display screen. Select values/options by push-clicking the rotary control, and modify them by rotating the control to increment/ decrement.

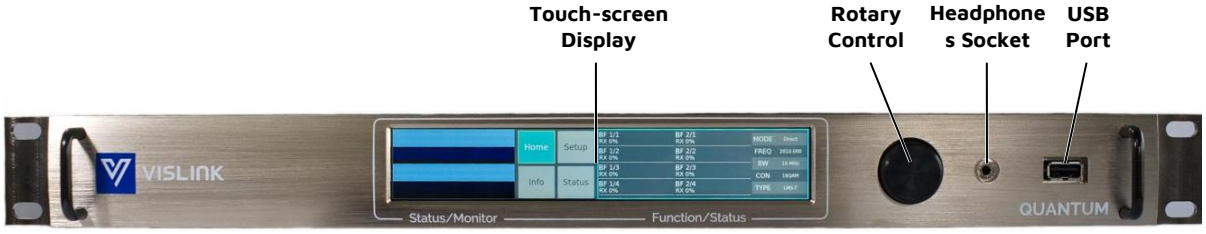

Figure 5-1 Quantum Receiver Front Panel

5.1.1.Rotary Control

The Rotary Control enables scrolling through the menus, cursor movement or increment/decrement of values/options. The knob may also be used as a push-button to select highlighted screen functions.

5.1.2. Headphones Socket

The headphones socket is for future use.

5.1.3. USB Port

The USB Port is for future use and should not be used.

5.1.4. Touch-screen Display

The screen displays status messages on the extreme left and provides touch-screen buttons of **Home**, **Setup**, **Info** and **Status** in the centre**.**

The detail settings associated with these functions are displayed on the right-hand side of the screen. The rotary control is used to scroll through the screens and modify options as required.

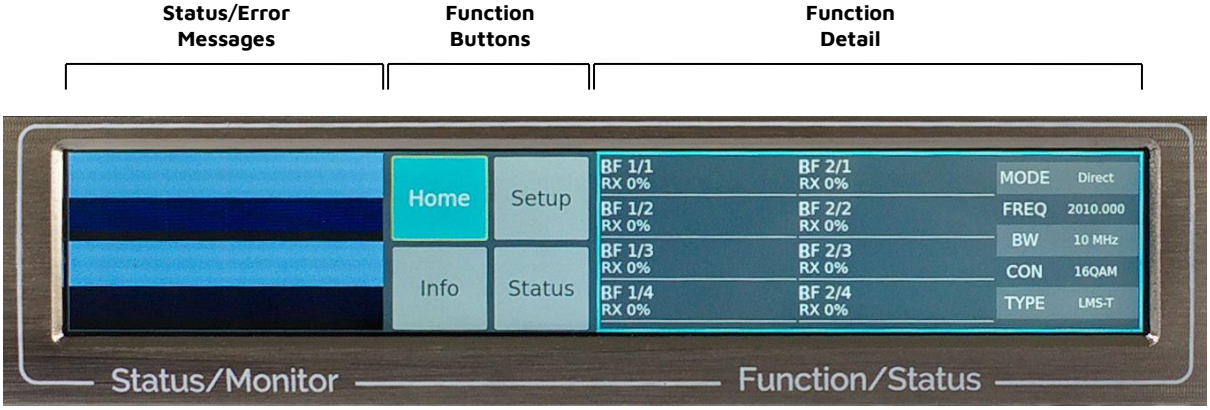

Figure 5-2 Touch-screen Display

The front panel touch-screen display enables local configuring and monitoring of the receiver. This section provides an overview of the menus and screens for

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controlling the unit. These are the same settings and parameters that can also be configured remotely by the web GUI. For details of these settings and parameters, see *Section* 6 *Web GUI Screens*.

5.2. Home

Touching the **Home** button displays the status and quality (in %) of the RF inputs as a colored bar. On the extreme right-hand-side of the display the associated mode, frequency, bandwidth, constellation and type are displayed. Settings cannot be edited from this screen; to edit use the **Setup** screen.

Figure 5-3 Front Panel Home Screen

5.3. Setup

Touching the **Setup** button displays detailed settings on the right-hand-side of the display:

- Demod
- Rx
- Decoder
- Streams
- Network
- Analog

Touch or use the rotary control knob to select the relevant button and navigate and modify the settings.

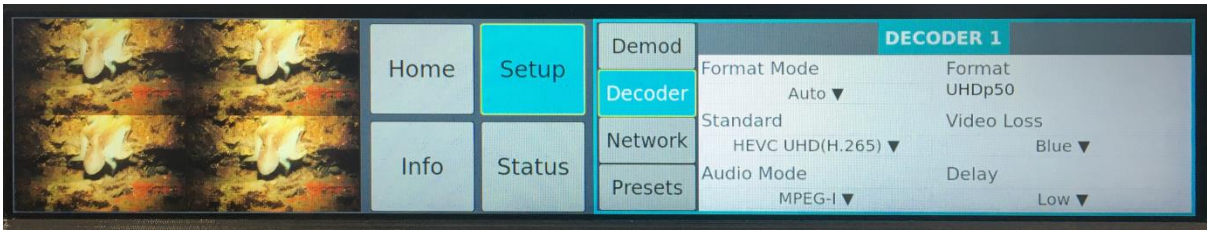

Figure 5-4 Front Panel Setup Screen

5.4. Info

Touching the **Info** button displays the settings for the receiver on the right-hand-side of the display. Settings cannot be edited from this screen.

Figure 5-5 Front Panel Info Screen

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5.5. Status

Touching the **Status** button displays detailed settings on the right-hand-side of the display:

- Demod
- Rx
- Decoder
- Streams
- Network
- Analog

Settings cannot be edited from this screen; to edit use the **Setup** screen.

Figure 5-6 Front Panel Status Screen

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6. Web GUI Screens

6.1. Login

The Quantum is supplied with a default User Name & Password,

User Name: root
Password: root

The default User Name can be edited in **Accounts** after logging in.
If the default User Account has been edited and the user is unable to login, contact Vislink Support for assistance:

https://www.vislink.com/support-beyond-expectation/

Figure 6-1 Login

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6.2. Overview

The Quantum Receiver is designed to be configured and monitored remotely by the web-based Graphical User Interface (GUI). This section describes, in sequence, all the menus and screens for controlling the unit.

For details of the web-based GUI for configuring and monitoring locally using the front panel touch-screen display, see *Section* 5 *Front Panel Display*.

The main components of the web GUI display are shown below.

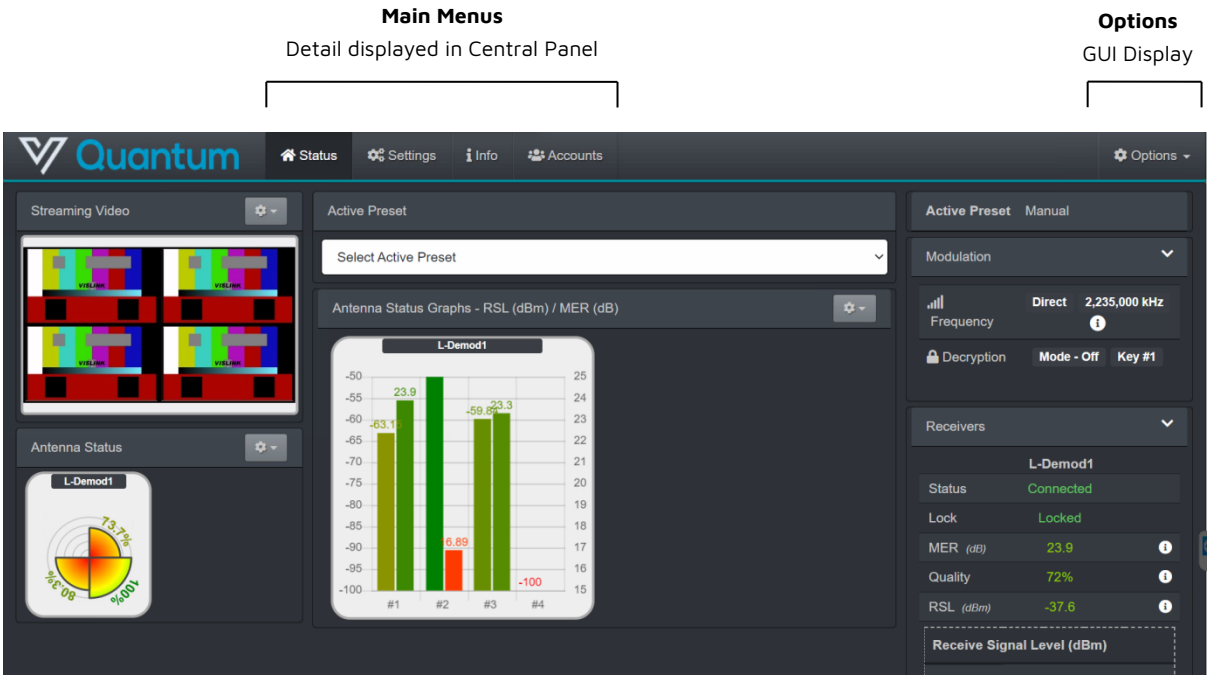

Figure 6-2 Web GUI Overview

6.2.1. Menus

By selecting each of the main menus, the central panel will display further relevant detail, while the sidebars will continue to display the selected options.

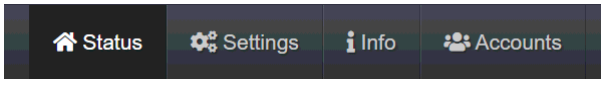

Figure 6-3 Main Menus

Four main menus are available:

- **Status** – enables selection of status information to be displayed in the left- and right-hand sidebars (see *Section 6.3*).
- **Settings** – enables selection and display of detailed settings for RF, Decoder, Stream, Presets, Network, Global and Admin functions (see *Section 6.4*).
- **Info** – enables selection and display of unit and license details (see *Section 6.5*).

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- **Accounts** – enables users of the unit to be edited/added (see *Section 6.6*).

These menu options and the associated screens are described in detail below.

6.2.2. Options

Clicking on **Options**, in the top right-hand corner of the screen, displays a drop-down menu with options for display and control of the web GUI.

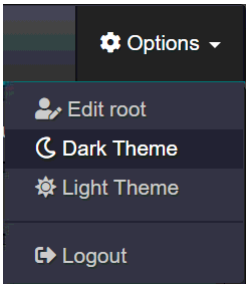

Figure 6-4 Options Menu

The **Options** menu options are:

- **Edit root** – enables you to specify a location for storage of system configuration files and exported data/history files.
- **Dark Theme** – enables a dark background and mainly white text to be displayed.
- **Light Theme** – enables a light white background version and mainly black/grey text to be displayed.
- **Logout** – enables the user to log out from their account. A new user will be required to log in or create an account.

6.3. Status

Clicking on the **Status** menu enables further status-related detail to be displayed in the central panel of the screen. Status panels in the left- and right-hand sidebars may be selected at the central panel.

6.3.1. Streaming Video (LH Sidebar)

The **Streaming Video** panel, displayed in the left-hand sidebar, displays the video received and decoded at the four input channels (#1, #2, #3 and #4).

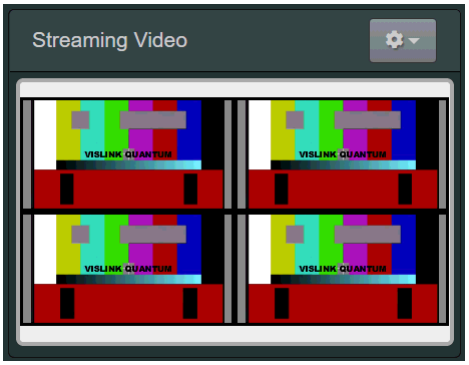

Figure 6-5 Streaming Video

By right-clicking in one of the picture segments a picture-in-picture option is displayed in the right-click menu.

By clicking on the options drop-down menu in the top right-hand corner of this panel, you can select various options for display of four channels.

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The Streaming Video options are:

- Single HEVC/H.264/MPEG2 service is duplicated x 4
- Single UHD HEVC service, Output Format Quad Split
- Single UHD HEVC service, Output Format 2SI
- Dual HD, first decoder #1 & #3, second decoder #2 & #4
- Preview Disabled

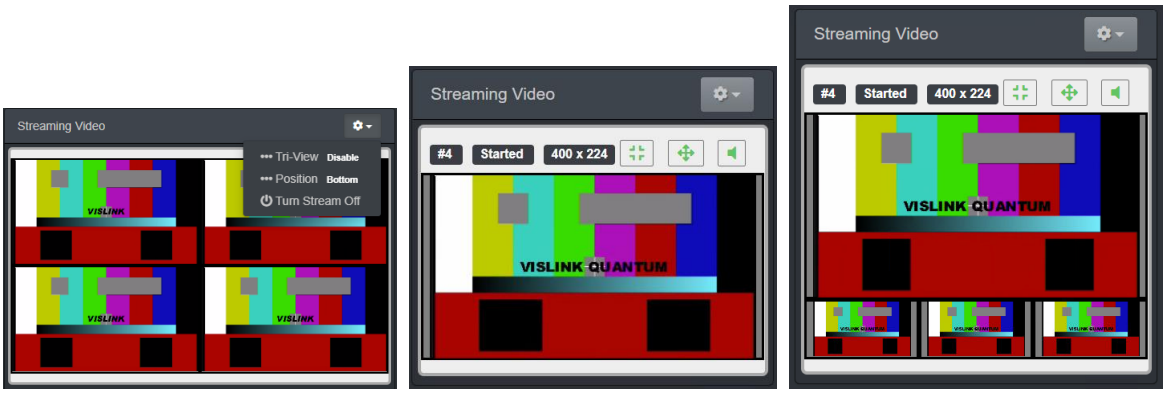

Figure 6-6 Streaming Video – Options

A row of control/status buttons is displayed at the top of the panel when a main (larger screen) option is selected.

Figure 6-7 Streaming Video Panel – Control/Status

The Control/Status buttons are:

- **Channel Number (#2)** – identifies the channel being viewed.
- **Status (Started)** – displays the status of the channel, usually **Started** when being viewed/played.
- **Resolution (400 x 224)** – displays the resolution of the channel being viewed.
- **Minimize** – enables the selected main (larger) channel to be minimized.
- **Maximize/Full-Screen** – enables the selected channel to be maximized to full-panel width.
- **Audio/Mute** – enables the audio accompanying the main video channel to be played or muted.

6.3.2. Antenna Status (LH Sidebar)

The **Antenna Status** panel, left-hand sidebar, displays the Quality (%), RSL (dBm) or MER (dB) of the signal received, with each quadrant of the radar view referring to RF channels #1 to #4 on each RF Demod Card.

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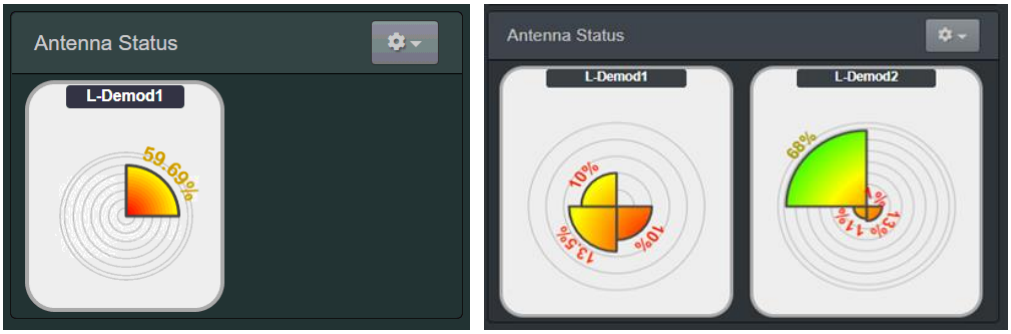

Figure 6-8 Antenna Status (Radar View)

By clicking on the options drop-down menu in the top right-hand corner of this panel, you can select various different options for display of antenna status.

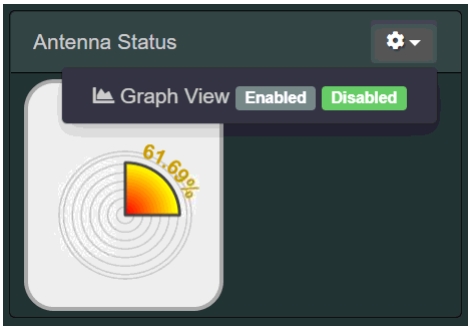

Figure 6-9 Antenna Status – Options

The Antenna Status options are:

- **Graph View** – enables/disables a detailed graph showing either Quality (%), RSL (dBm) or MER (dB) in the central panel for each of the four channels.
- **Source** – enables/disables display a graph of either Quality (%), RSL (dBm) or MER (dB) for each of the four RF channels.
- **Radar View** – enables/disables the radar view, displaying just the graph view.

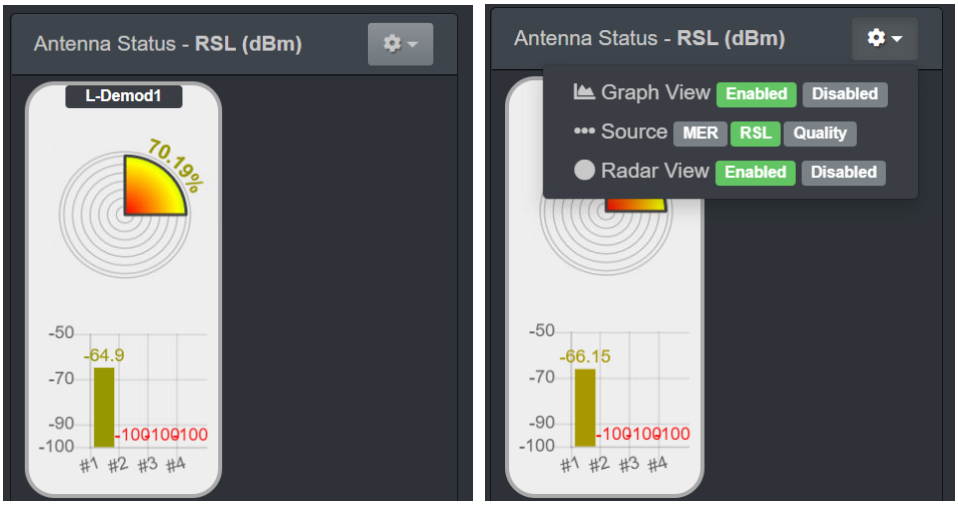

Figure 6-10 Antenna Status (Graph View)

6.3.3. Antenna Status Graphs

The **Status>Antenna Status Graphs** panel, displayed in the central panel, displays either Quality (%), RSL (dBm) or MER (dB) of the signal being received

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and processed, with each column of the graph referring to a different RF input channel (#1,#2, #3 and #4).

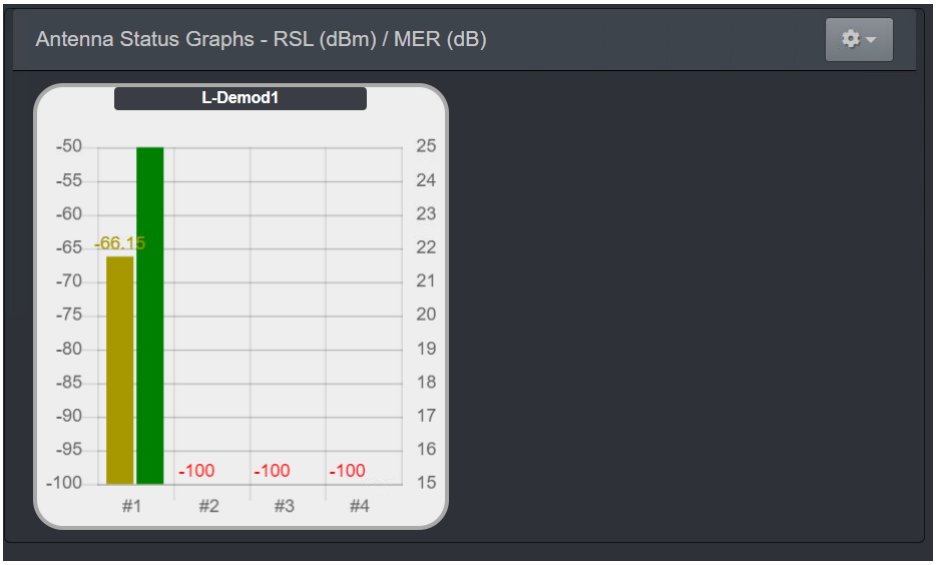

Figure 6-11 Status>Antenna Status Graphs

By clicking on the options drop-down menu in the top right-hand corner of this panel, you can select various different options for antenna status graphs.

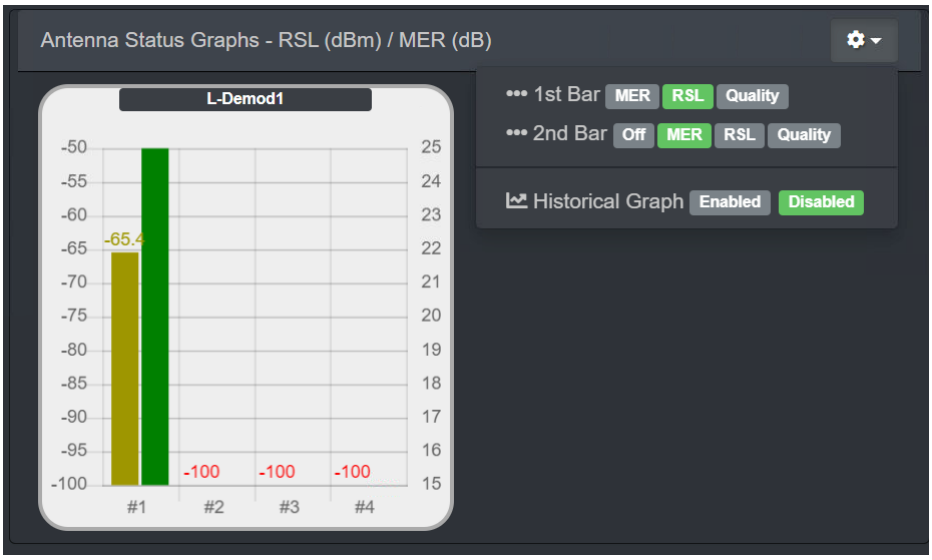

Figure 6-12 Status>Antenna Status Graphs - Options

The Antenna Status Graphs options are (options can be set individually for each of the displayed bars in the graph):

- **Off** – enables the second (other) bar to be removed from the display.
- **MER (dB)** – displays a real-time bar chart of the Modulation Error Ratio (MER) for each of the four channels (range: 15-25dB).
- **RSL (dBm)** – displays a real-time bar chart of the Receive Signal Level (RSL) for each of the four channels, measured at the receiver input (range: -100 to -50dBm).
- **Quality (%)** – displays a real-time bar chart of the signal quality for each of the four channels (range: 0-100%).

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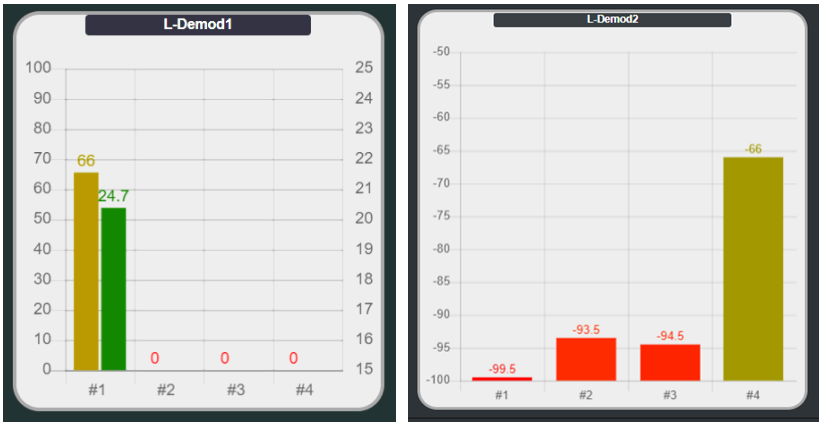

Figure 6-13 Status>Antenna Status Graphs – Quality/MER and RSL

- **Historical Graph** – displays a historical graph of the data being measured for monitoring/analysis over a period of time. The data displayed starts at the time the option is selected, or when the **Reset** button is clicked with each channel being shown as a different colored line. This graph may be output as a file by clicking the **Export** button and selecting the storage location. The graph may be filtered to display either just the most recent (**Last Minutes**) or all the data (**View All**).

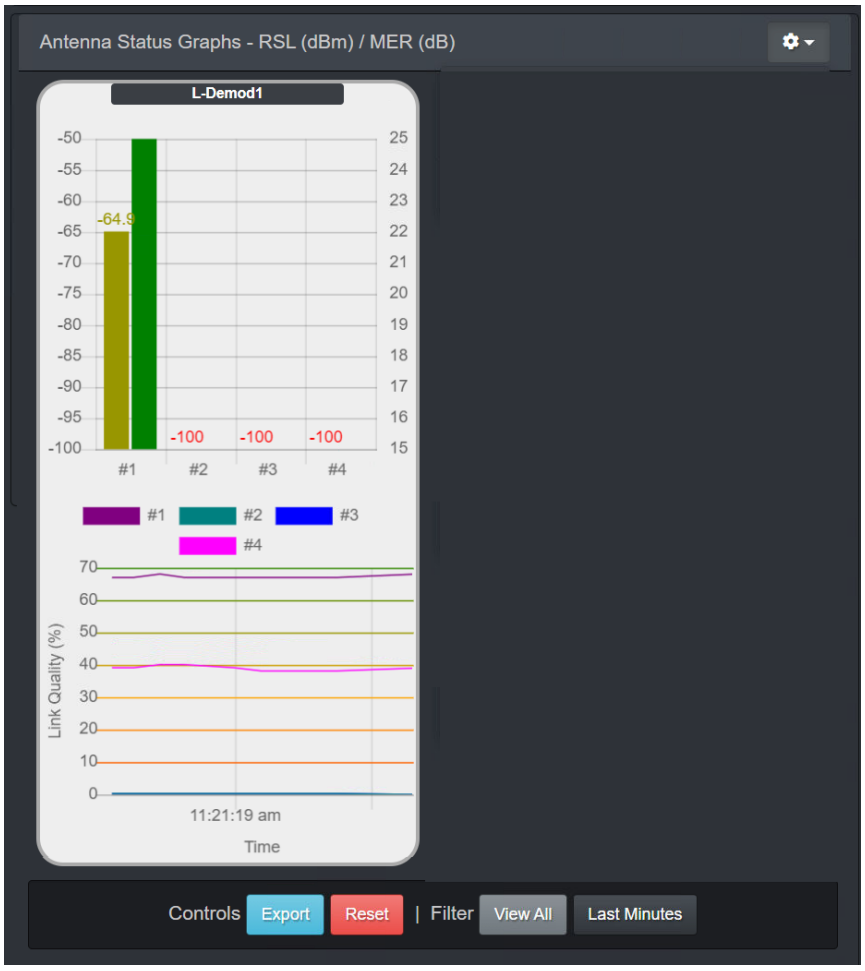

Figure 6-14 Status>Antenna Status Graphs – Historical Graph

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6.3.4. Active Preset – Selection

The **Status>Active Preset** panel, displayed in the central panel, displays the selected configuration preset for the receiver that will be used to process the received input signals. The settings that have been saved as a configuration preset are displayed in the right-hand sidebar (see *Section 6.3.5*)

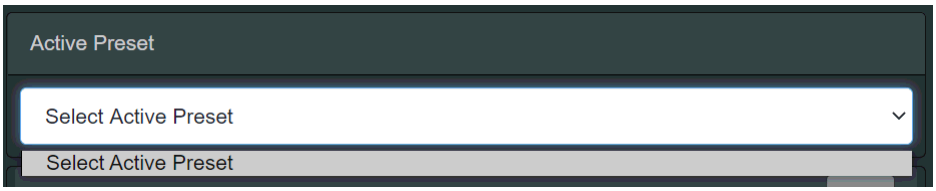

Figure 6-15 Status>Active Preset - Selection

By clicking on the drop-down menu, you can select any of the configuration presets that have been previously saved.

6.3.5. Active Preset – Configuration Settings (RH Sidebar)

The **Active Preset** panel, displayed in the right-hand sidebar, displays the selected configuration preset for the receiver that will be used to process the received input signals.

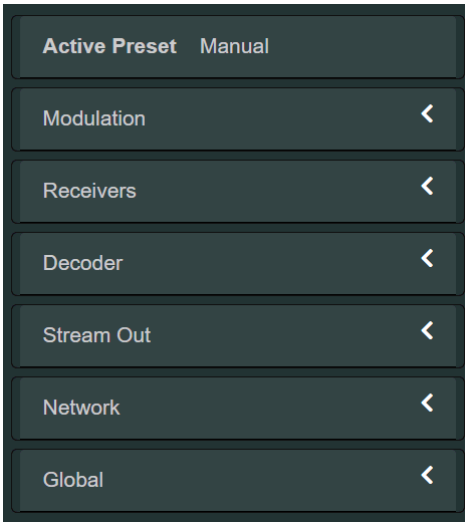

Figure 6-16 Status>Active Preset – Configuration Settings

By clicking on the right-hand arrows, the relevant accordion panel will open and display the detailed settings.

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6.3.5.1. Modulation

The **Modulation** accordion panel details the active modulation settings.

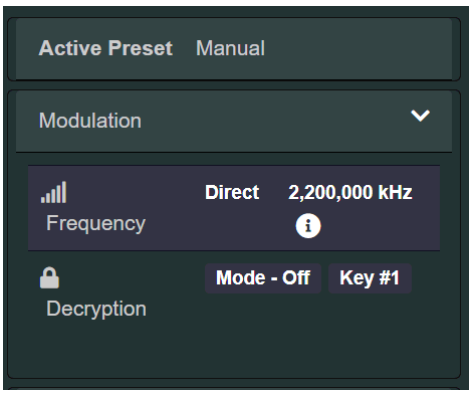

Figure 6-17 Status>Modulation

The **Modulation** panel displays the following settings:

- **Frequency** – displays the mode of frequency modulation, either **Direct** (manual set frequency) or **Channel Plan** (preset frequencies allocated a channel number), and the frequency of the frequency modulation scheme.
- **Encryption/Decryption** – display **On**/**Off** status and the **Key** number being used.

Clicking ⓘ displays further information about the modulation being used.

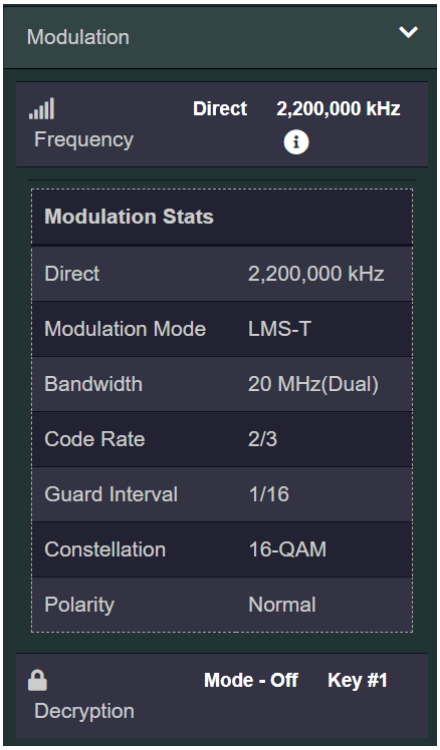

Figure 6-18 Status>Modulation – More Information

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6.3.5.2. Receivers

The **Receivers** accordion panel details the active receiver settings.

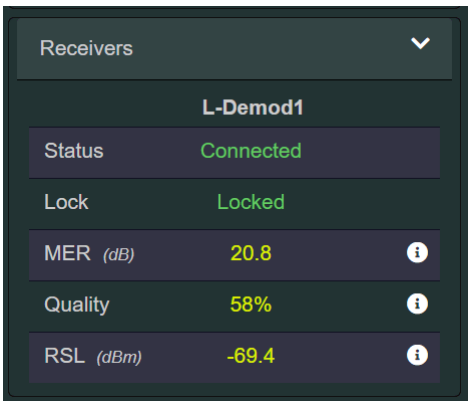

Figure 6-19 Status>Receivers

The **Receivers** panel displays the following settings:

- **Status** – displays the **Connected/Disconnected** status of the demodulator.
- **Lock** – displays the **Locked/Not Locked** status of the signal. The receiver can only down-convert and demodulate the RF input when carrier lock has been achieved.
- **MER (dB)** – displays the Modulation Error Ratio (MER) of the input signal.
- **Quality** – displays the quality value of the input signal.
- **RSL (dBm)** – displays the Receive Signal Level (RSL) of the input signal.

Clicking ⓘ displays further information about the input signal for each of the four RF input channels.

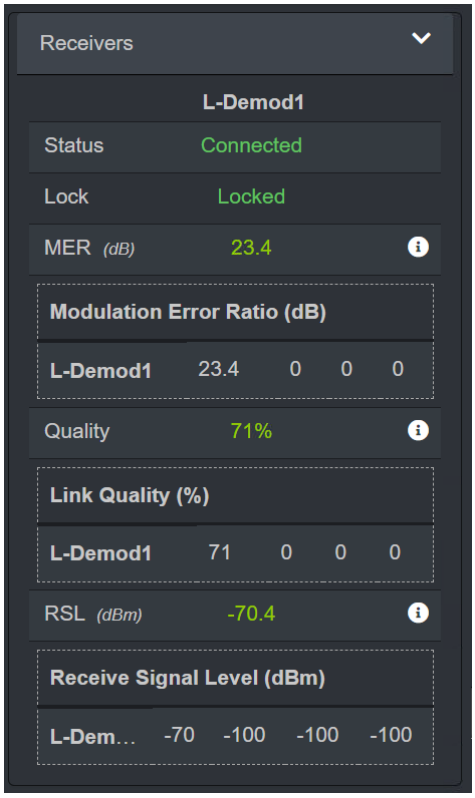

Figure 6-20 Status>Receivers – More Information

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6.3.5.3. Decoder

The **Decoder** accordion panel details the active decoder settings.

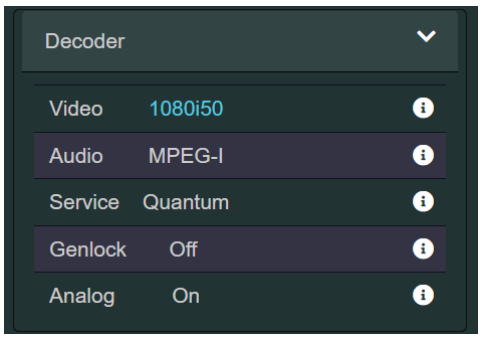
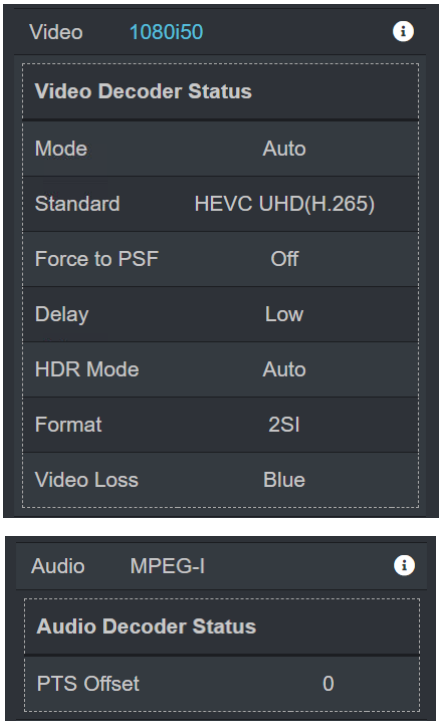


Figure 6-21 Status>Decoder

The **Decoder** panel displays the following settings:

- **Video** – displays the video profile being used.
- **Audio** – displays the audio coding standard being used.
- **Service** – displays the service decoder status.
- **Genlock** – display the generator locking status of the decoder.
- **Analog** – displays the analog audio output status.

Clicking ⓘ displays further information about each of these settings.



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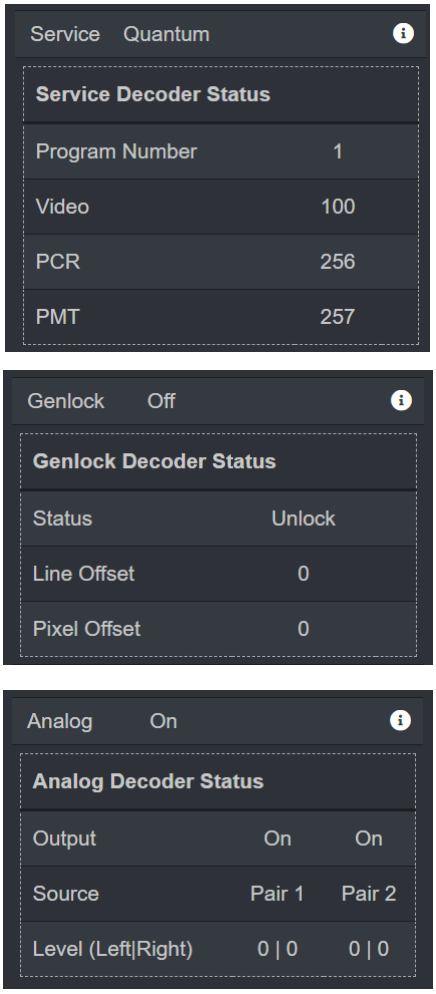

Figure 6-22 Status>Decoder – More Information

6.3.5.4. Stream Out

The **Stream Out** accordion panel details the active output streaming settings.

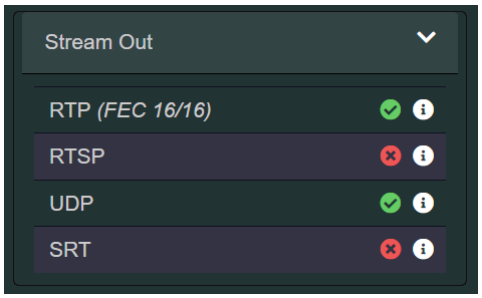

Figure 6-23 Status>Stream Out

The **Stream Out** panel displays the following settings:

- **RTP** – displays the status of the Real-Time Transport Protocol (RTP).
- **RTSP** – displays the status of the Real-Time Streaming Protocol (RTSP).
- **UDP** – displays the status of the User Datagram Protocol (UDP), useful for low-latency and loss-tolerating connections.
- **SRT** – display the status of the Secure Reliable Transport (SRT) Protocol, useful for good quality, low-latency live video streaming.

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Clicking ⓘ displays further information about each of these settings.

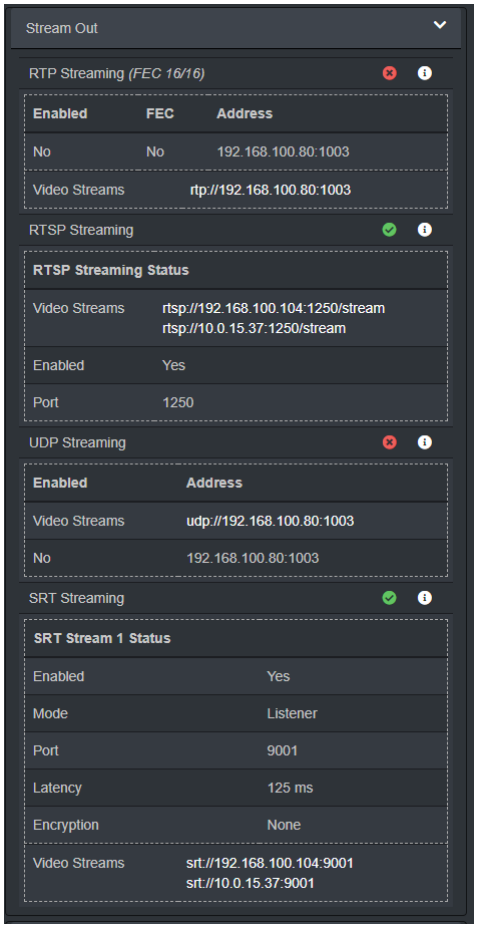

Figure 6-24 Status>Stream Out – More Information

6.3.5.5. Network

The **Network** accordion panel details the active network settings.

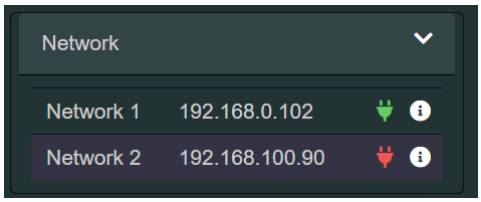

Figure 6-25 Status>Network

The **Network** panel displays the following settings:

- **Network 1/LAN** – displays the IP address and status (green = connected, red = disconnected).
- **Network 2/WAN** – displays the IP address and status (green = connected, red = disconnected).

Clicking ⓘ displays further information about these settings.

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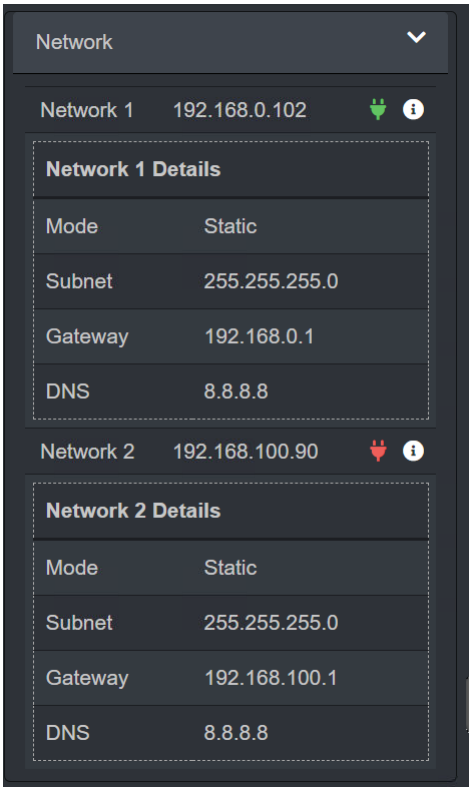

Figure 6-26 Status>Network – More Information

6.3.5.6. Global

The **Global** accordion panel details the active global **ASI** and **User Data** settings.

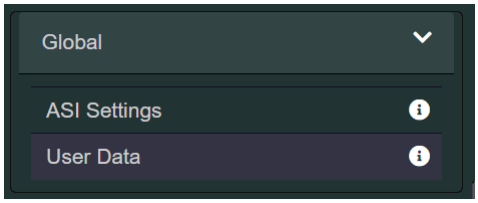

Figure 6-27 Status>Global

The **Global** panel displays the following settings:

- **ASI Settings** – displays the Asynchronous Serial Interface (ASI) settings.
- **User Data** – displays the User Data settings.

Clicking ⓘ displays further information about these settings.

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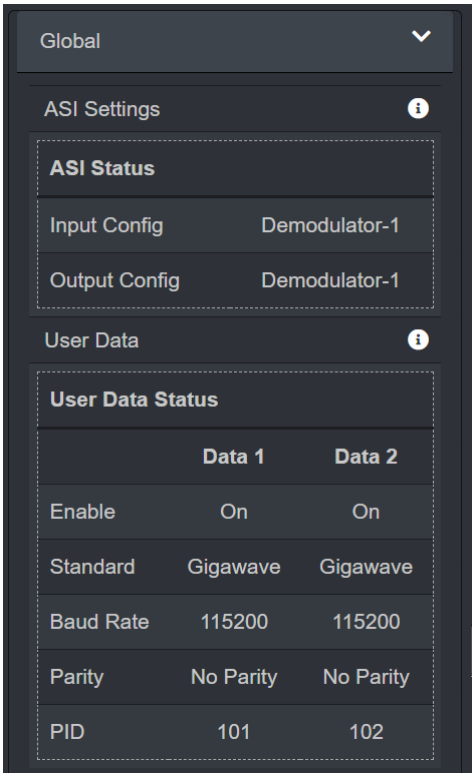

Figure 6-28 Status>Global – More Information

6.4. Settings

Clicking on the **Settings** menu enables detailed settings to be displayed in the central panel of the screen.

6.4.1. RF

The **Settings>RF** panel details the settings for the unit to receive signals on the RF inputs.

The **RF** panel provides further tabs for configuration of **Modulation**, **Channel Plan** and **BDC**.

6.4.1.1. Modulation

The **Settings>RF>Modulation** tab specifies the modulation settings for the signals received on the RF inputs.

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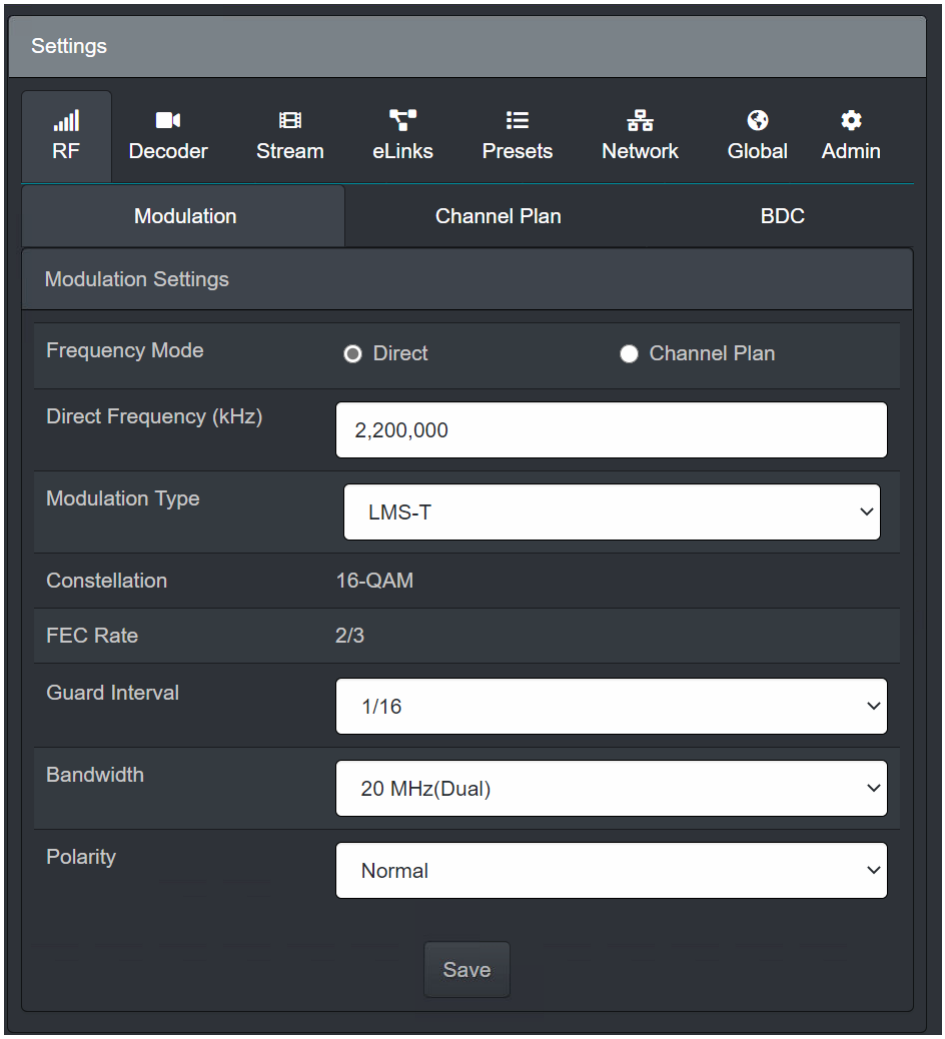

Figure 6-29 Settings>RF>Modulation

The **Modulation** tab enables configuration of the following settings. These settings will not be actioned until the **Save** button has been clicked:

Modulation Settings

- **Frequency Mode** – enables either a **Direct** or **Channel Plan** mode to be selected by clicking the relevant button. By selecting the **Direct** option, changes can be made to the active settings used by the receiver to enable manual modification of individual frequency settings. Selecting the **Channel Plan** option will activate a pre-determined frequency setting created using the **Channel Plan** tab. Using Channel Plans, therefore, is a quick way to apply or restore a frequency setting.
- **Direct Frequency (kHz)** – enables the RF frequency to be typed or incremented/ decremented using the buttons displayed by hovering over this field.
- **Modulation Type** – enables different modulation types to be selected from the drop-down list (LMS-T or DVB-T).
- **Constellation** – displays the phase states used by the selected modulation type.
- **FEC Rate** – displays the Forward Error Correction (FEC) rate used to help check and recover lost data (errors) in the received RF signals.
- **Guard Interval** – enables a fraction of the transmission symbol duration to be selected from the drop-down list to ensure that there is no interference/overlap from multi-path effects such as propagation delays, diffraction, scattering and reflections.

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- **Bandwidth** – enables the bandwidth to be selected from the drop-down list.
- **Polarity** – enables the RF polarity to be selected from the drop-down list.

6.4.1.2. Channel Plan

The **Settings>RF>Channel Plan** tab specifies the channel plan settings for the signals received on the RF inputs.

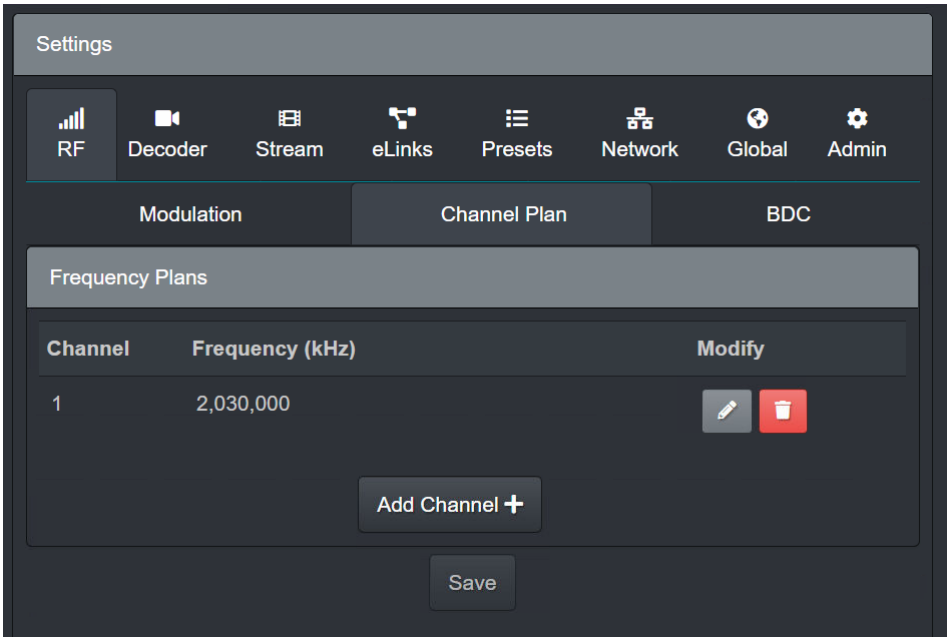

Figure 6-30 Settings>RF>Channel Plan

The **Channel Plan** tab enables the creation and storage of a channel plan (a pre-determined configuration) consisting of the active modulation settings as selected in the **Modulation** tab. The settings will not be actioned until the **Save** button has been clicked:

Frequency Plans

- **Channel List** – a list of defined frequency plans or pre-determined configurations for quickly implementing a new modulation.
  Channel plans may be modified by clicking on the edit or delete button.
- **Add Channel +** – clicking this button enables a new channel plan to be created.

6.4.1.3. BDC

The **Settings>RF>BDC** tab specifies the Block Down-Converter (BDC) power settings for the RF inputs.

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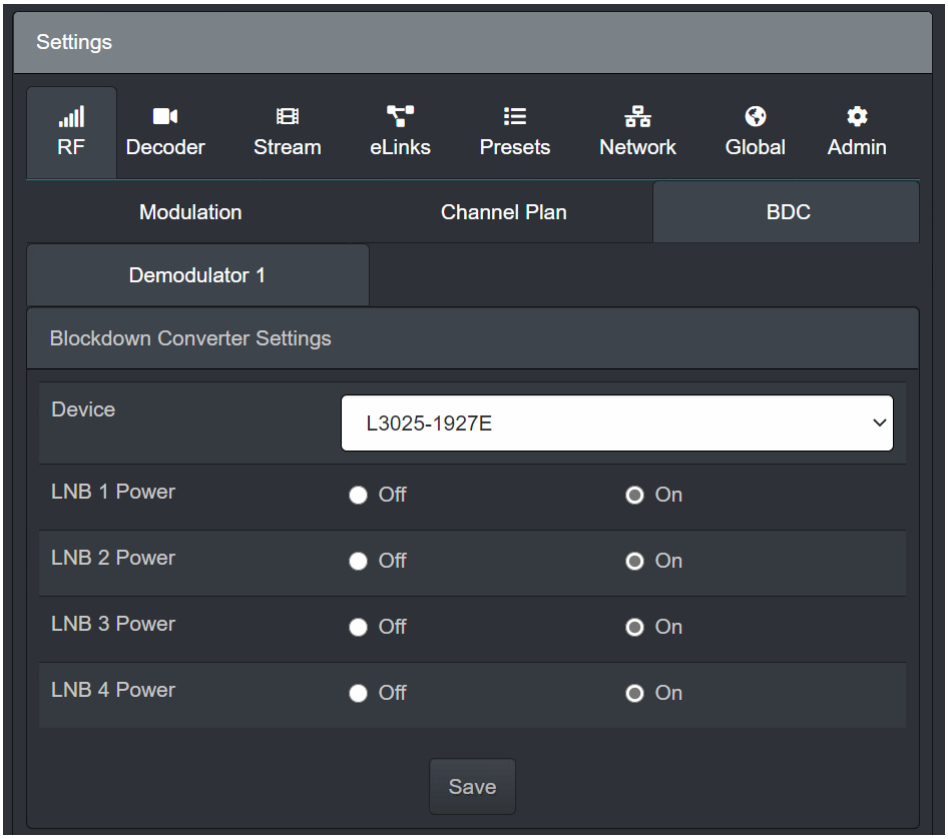

Figure 6-31 Settings>RF>Channel Plan

The **BDC** tab specifies power settings for the selected LNBs. The settings will not be actioned until the **Save** button has been clicked:

Blockdown Converter Settings

- **Device** – enables selection of the input RF device from the drop-down menu. Different part numbers identify the frequency range they can receive, which effects the frequency input to the Demodulator.
- **LNB 1-4 Power** – enables or disables Low Noise Block (LNB) power for the selected device.

6.4.2. Decoder

The **Settings>Decoder** panel details the settings for the unit to decode input signals.

The **Decoder** panel provides further tabs for configuration of **Low Latency**, **Service**, **Genlock** and **Analog**.

6.4.2.1. Low Latency

The **Settings>Decoder>Low Latency** tab specifies the video and audio settings for low latency decoding.

From the camera to video encoders and the final display, each of the individual components in a streaming workflow creates processing delays. The choice of video protocol, used for contribution, and distribution formats, for viewing on a device, also greatly increases video latency. In addition, the type of error correction used to counter packet loss and jitter can also add to latency. The

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settings that affect latency are presented on the screen below to enable careful selection to keep it as low as possible.

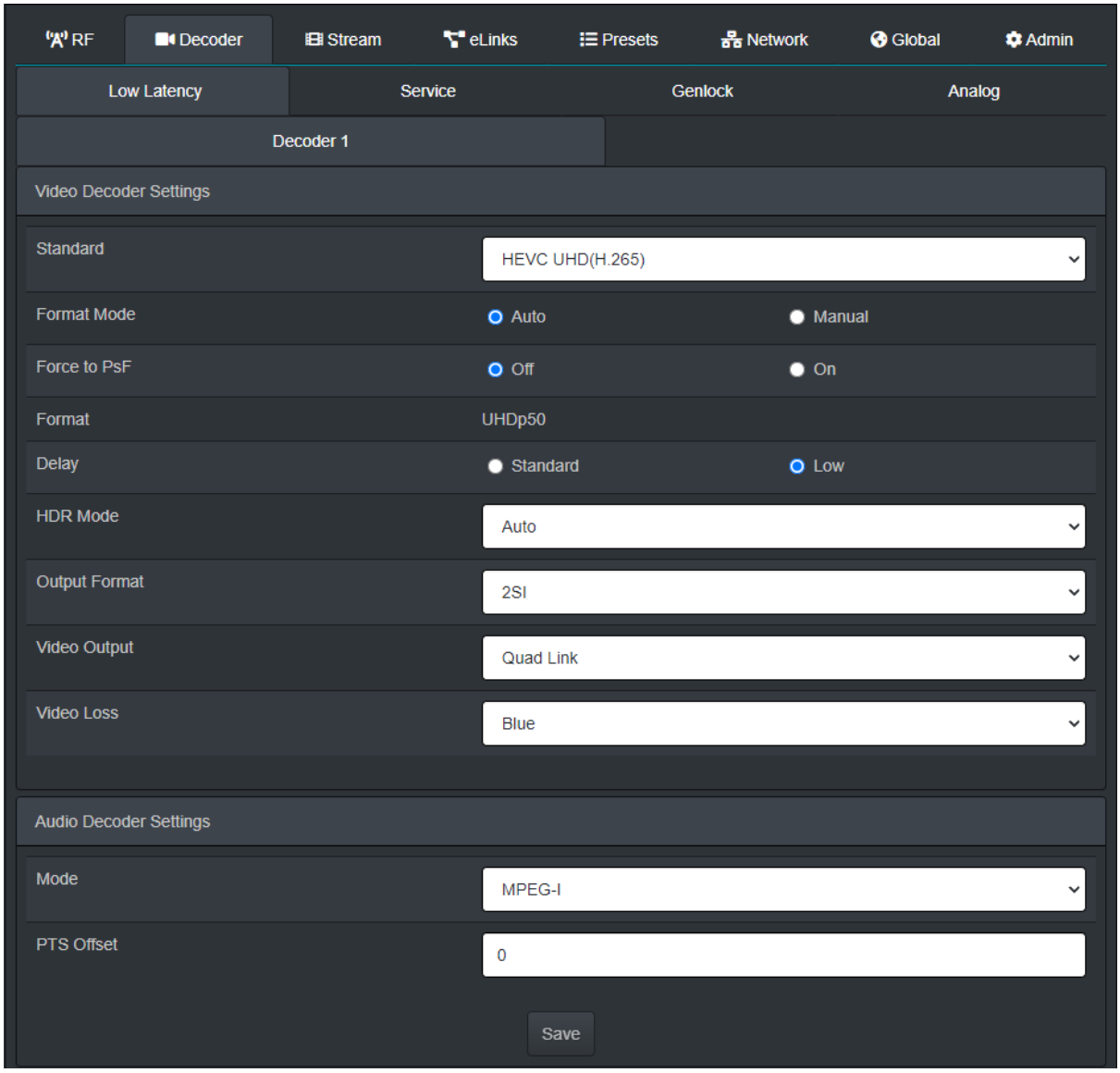

Figure 6-32 Settings>Decoder>Low Latency

The **Low Latency** tab specifies latency affected settings for video and audio decoder. The settings will not be actioned until the **Save** button has been clicked:

Video Decoder Settings

- **Standard** – enables selection of the main video decoding standard from a drop-down menu (MPEG2, H.264, HEVC UHD(H.265) or HEVC dual HD).
- **Format Mode** – enables selection of the **Auto** or **Manual** formatting. Automatic formatting will detect the format of the incoming video and set the parameters automatically.
- **Force to PsF** – enables/disable the selection of Progressive segmented Frame (PsF), used with high-definition video to divide a progressive frame into separate odd-line and even-line segments where both represent the same instant in time, unlike interlaced fields. The receiver uses an interlace setting (1080i) as a pass-through for PsF formats. PsF signalling is added at the decoder to enable other

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equipment, like a monitor, to detect the format. Setting **Force to PsF** to **On** adds the signalling (otherwise the monitor would detect 1080i).

- **Format** – If the **Format Mode** is set to **Manual**, the required format must be selected here. If the **Format Mode** is set to **Auto**, the detected video decoding format of the incoming video is displayed.
- **Delay** – enables selection of a **Standard** or **Low** system delay to help with smooth decoding of encoded streams.
- **HDR Mode** – enables selection of High Dynamic Range (HDR) options from the dropdown menu (SDR, HDR or Auto). HDR removes the limitations presented by older video equipment and adds more data about brightness and color across a wider color gamut.
- **Output Format** – enables selection of the video output stream (UHD format only) from a drop-down menu (2SI or Quad Split).
- **Video Output** – enables selection of the main Video outputs to Quad or Single Link (UHD formats only),
  Single Link outputs 4x 6G or 12G (format dependent). Requires 2x 12G Dual SFP's
- **Video Loss** – defines the output required on loss of video at the input connector from a drop-down menu (Color Bars, Blue, Black or Freeze).

Audio Decoder Settings

- **Mode** – enables the selection of the audio decoding mode from a drop-down menu (Off, PCM, MPEG-I or MPEG-II).
- **PTS Offset** – enables the Presentation Time Stamp (PTS) to be offset to achieve synchronisation of audio and video. Type a number or hover over the field and use the increment/decrement buttons to select a value.

6.4.2.2. Service

The **Settings>Decoder>Service** tab specifies the service settings for decoding.

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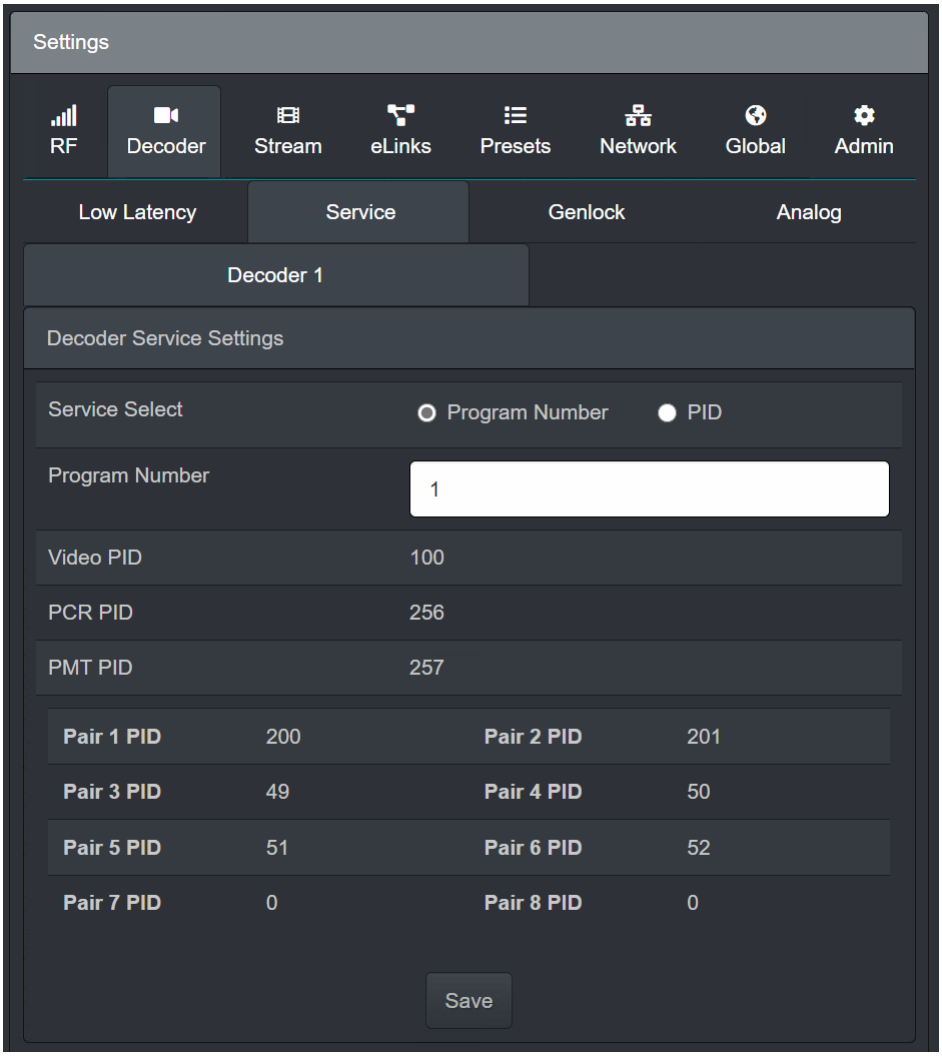

Figure 6-33 Settings>Decoder>Service

The **Service** tab specifies the service decoding settings. The settings will not be actioned until the **Save** button has been clicked:

Decoder Service Settings

- **Service Select** – enables selection of the service from those available in the incoming multiplex by program number or PID.
- **Program Number** – enables selection of the service/program by typing or by hovering over the field and clicking the increment/decrement buttons.
- **Video PID** – identifies the location of the selected service in the video PID.
- **PCR PID** – identifies the location of the selected service in the Program Clock Reference (PCR) PID.
- **PMT PID** – identifies the location of the selected service in the Program Map Table (PMT) PID.
- **Pair 1-8 PID** – identifies the audio pairs.

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6.4.2.3. Genlock

The **Settings>Decoder>Genlock** tab specifies the decoder synchronisation settings to be used.

An external or internal analog signal can be used as a timing reference signal to synchronise all received video input signals to allow easy switching from one source to another without disruption. To do this, input signals must be "genlocked" (generator locked) to a reference. Typically, a video signal which does not have picture information on it is used.

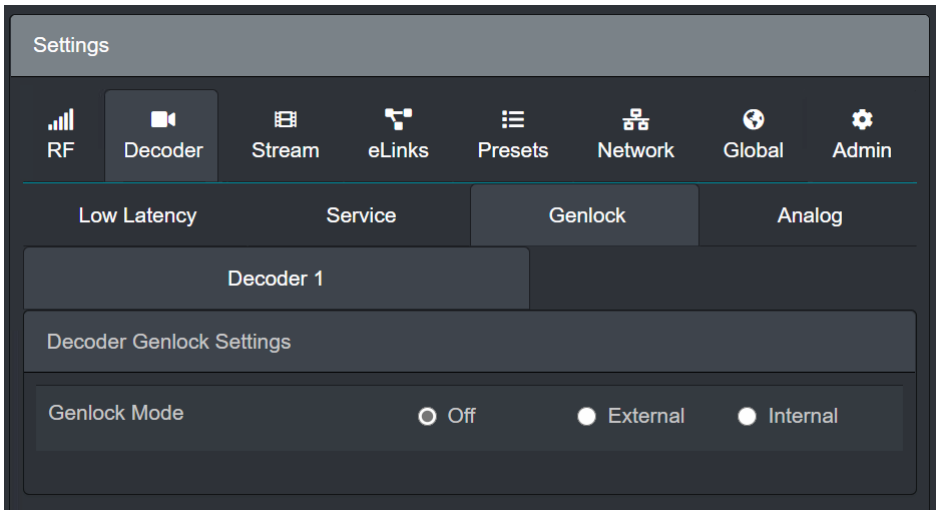

Figure 6-34 Settings>Decoder>Genlock

The **Genlock** tab specifies the mode for generator locking/synchronisation:

Decoder Genlock Settings

- **Genlock Mode** – enables genlock to be set as **Off**, **External** or **Internal**.

When **External** is selected, line and pixel adjustment parameters are displayed.

6.4.2.4. Analog

The **Settings>Decoder>Analog** tab specifies the analog decoder output settings to be used.

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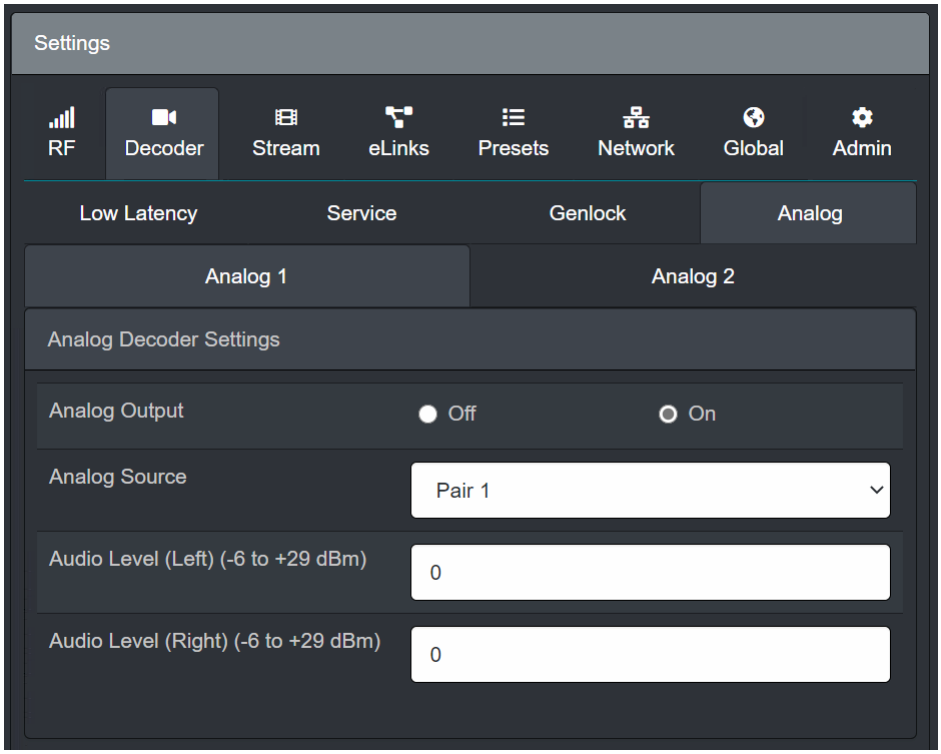

Figure 6-35 Settings>Decoder>Analog

The **Analog** tab specifies the settings for each analog output:

Analog Decoder Settings

- **Analog Output** – enables/disables the analog output.
- **Analog Source** – enables a selection of the stereo pairs to be used from the drop-down menu.
- **Audio Level (Left)** – enables the audio level to be set (in dBm) for the left audio channel. Type or hover over the field and click the increment/decrement buttons.
- **Audio Level (Right)** – enables the audio level to be set (in dBm) for the right audio channel. Type or hover over the field and click the increment/decrement buttons.

6.4.3. Stream Output

The **Settings>Stream** panel details the settings for the streaming input & output.

The **Stream** panel provides further tabs for configuration of **RTP/RTSP** (Real Time Streaming Protocol), **UDP** (User Datagram Protocol), and **SRT** (Secure Reliable Transport Protocol).

6.4.3.1. RTP

The **Settings>Stream>RTP/RTSP** tab specifies the settings for controlling the transport protocol (RTP).

RTP runs over UDP for low latency and though it does not include packet-loss recovery it has mechanisms to compensate for any minor loss of data when used in conjunction with the RTP Control Protocol (RTCP).

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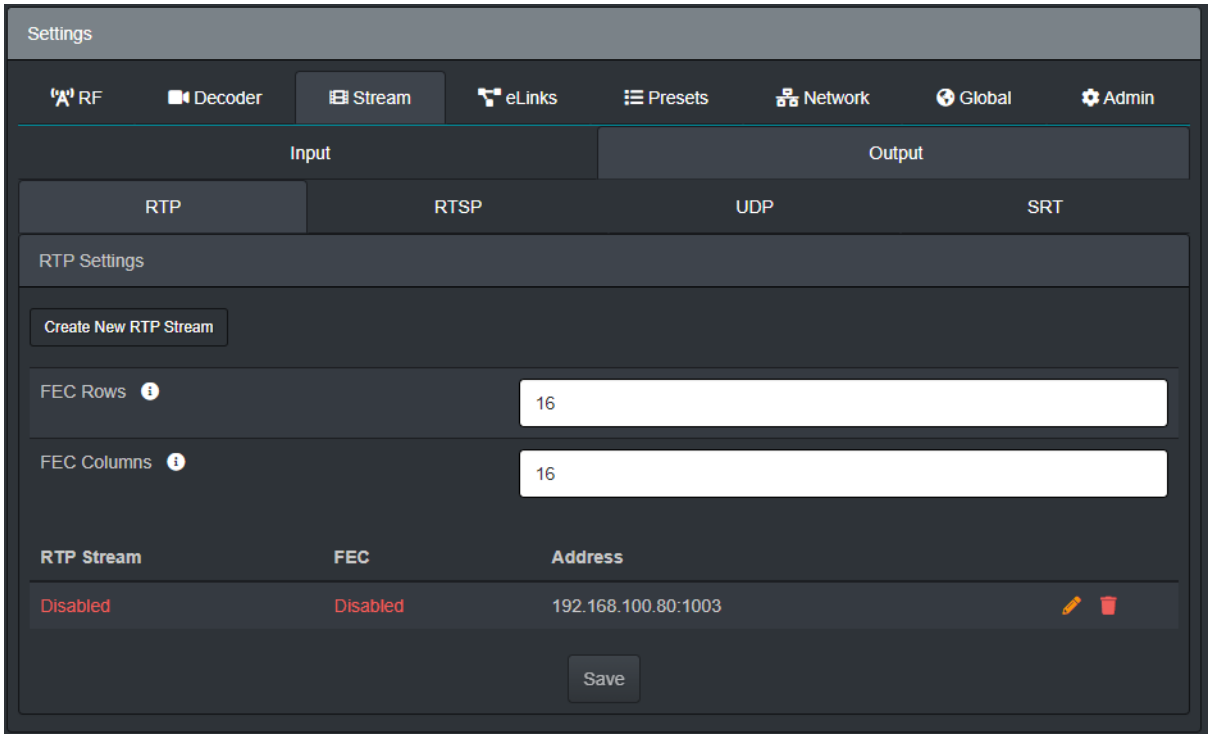


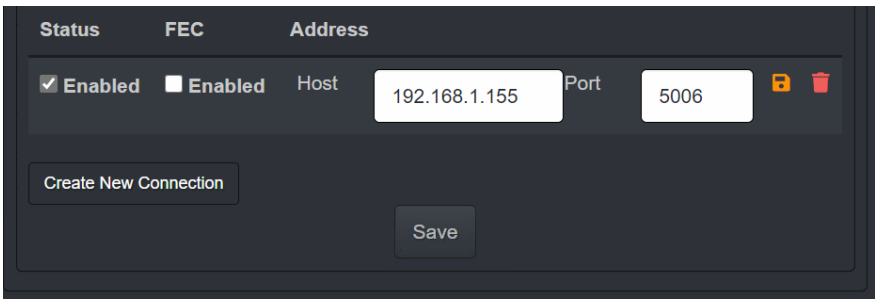
Figure 6-36 Settings>Stream>RTP

The **RTP** tab specifies streaming settings. The settings will not be actioned until the **Save** button has been clicked:

RTP Settings

- **Create New RTP Stream** – clicking on this button enables the creation of a new RTSP streaming connection.
- **FEC Rows** – specifies the number of Forward Error Correction (FEC) rows to be used.
- **FEC Columns** – specifies the number of Forward Error Correction (FEC) columns to be used.
- **RTP Stream List** – displays the status of each streaming connection and the output URL.

  Streaming connections may be deleted by clicking on the icon or modified by clicking on the edit icon. This enables changes to be made to the host address and port, as well as enabling/disabling the streaming output and FEC.



Changes may be saved by clicking on the icon or deleted by clicking on the icon.

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6.4.3.2. RTSP

The **Settings>Stream>RTSP** tab specifies the settings for controlling media transmission (RTSP).

RTCP monitors transmission statistics and provide quality of service (QoS) feedback and aids synchronization of multiple streams. RTSP allows viewers to remotely pause, play, and stop video streams via the Internet without the need for local downloads.

NOTE: RTSP streams require that '/stream' is added to the end of IP Address (e.g. rtsp://127.0.0.1.554/stream).

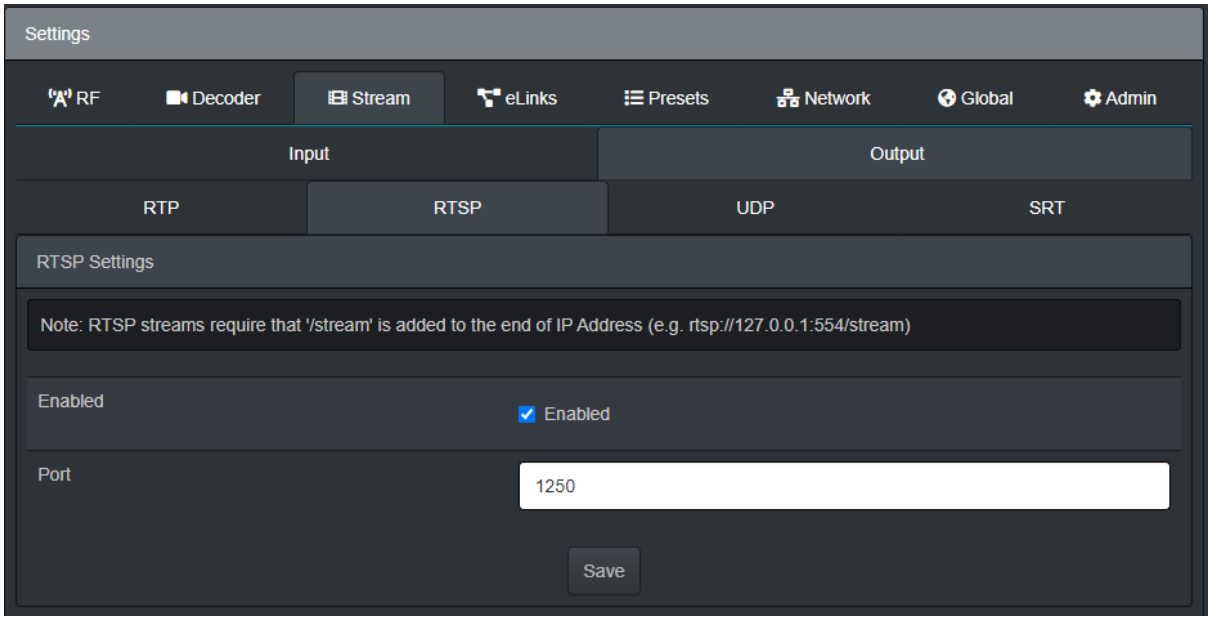

Figure 6-37 Settings>Stream>RTSP

RTSP Settings

- **Enabled** – enables/disables RTSP streaming.
- **Port** – specifies the port to be used for streaming. Type or hover over the field and click the increment/decrement buttons.

6.4.3.3. UDP

The **Settings>Stream>UDP** tab specifies the settings for streaming using the User Datagram Protocol (UDP).

UDP is fast and is frequently used for time-sensitive applications such as online gaming or live broadcasts where perceived latency is more critical than packet loss. Packets, are sent to the recipient, the sender does not wait to make sure the recipient received them; it continues sending the more packets. This is sometimes called a "best effort" service.

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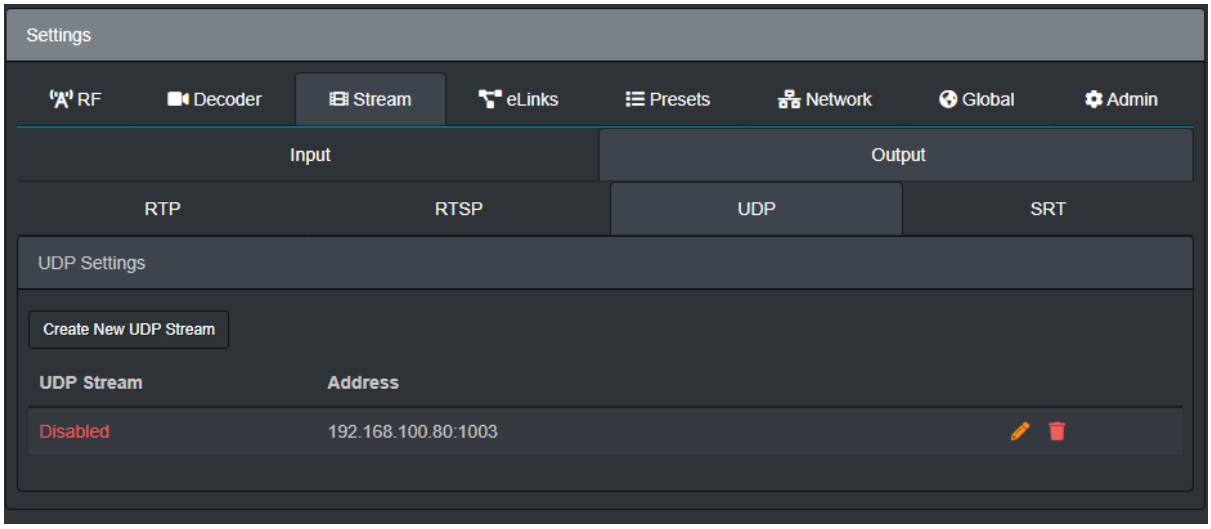
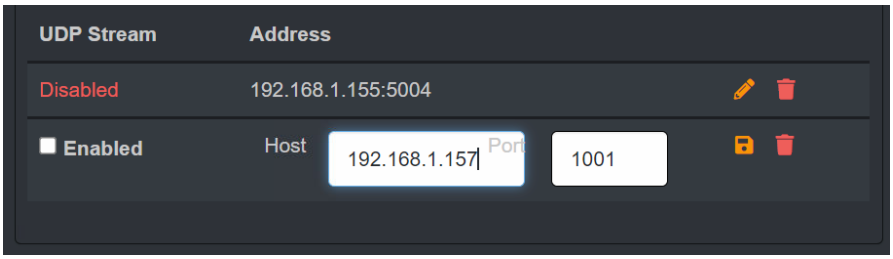


Figure 6-38 Settings>Stream>UDP

The **UDP** tab specifies the settings for UDP streaming:

UDP Settings

- **Create New UDP Stream** – clicking on this button enables the creation of a new UDP streaming connection.
- **UDP Stream List** – displays the status of the stream and the output URL. Streaming connections may be deleted by clicking on the icon or modified by clicking on the edit icon. This enables changes to be made to the host address and port, as well as enabling/disabling the streaming output and FEC.



Changes may be saved by clicking on the icon or deleted by clicking on the icon.

6.4.3.4. SRT

The **Settings>Stream>SRT** tab specifies the settings for streaming using the Secure Reliable Transport (SRT) Protocol.

SRT protects against jitter, packet loss, and bandwidth fluctuation, ensuring the best possible viewing experience. The SRT open source protocol utilizes ARQ (Automatic Repeat Request) error correction to help prevent packet loss while delivering the low latency performance of UDP. In addition, SRT can bring together multiple video, audio, and data streams within a single SRT stream to support highly complex workflows without burdening the network administrators.

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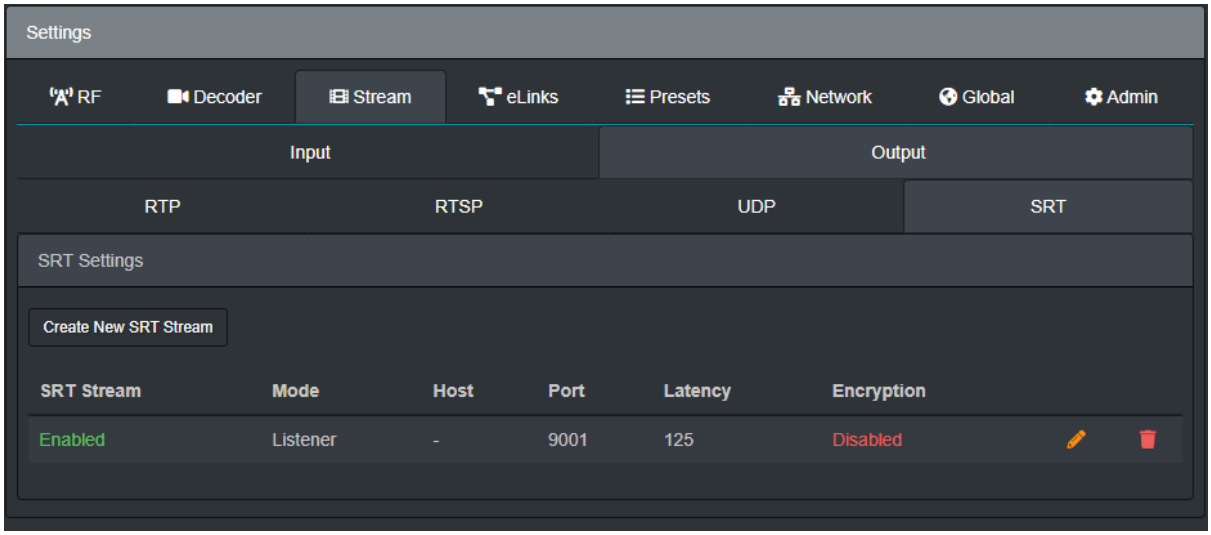

Figure 6-39 Settings>Stream>SRT

The **SRT** tab specifies the settings for SRT streaming. The settings will not be actioned until the **Save** button has been clicked:

SRT Settings

- **SRT Streaming** – enables/disables SRT streaming.
- **Mode** – Listener or Caller
- **Port** – specifies the output streaming port. Type or hover over the field and click the increment/decrement buttons.
- **Latency (ms)** – specifies the latency in milliseconds between video and audio.
- **Encryption** – enables a pass phrase to be used/changed.

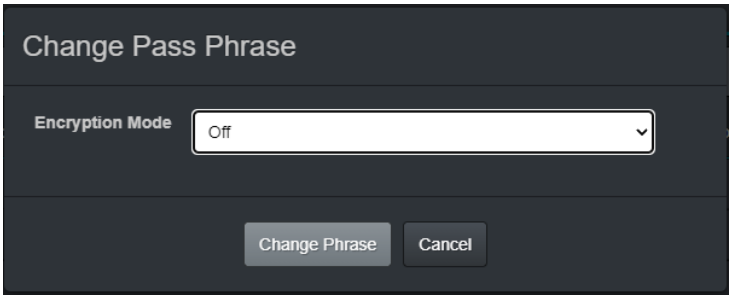

Figure 6-40 Settings>Stream>SRT - Change Pass Phrase

6.4.4. Stream Input

The **Settings>Stream** panel details the settings for the streaming input & output.

The **Stream** panel provides further tabs for configuration of **RTP/RTSP** (Real Time Streaming Protocol), **UDP** (User Datagram Protocol), and **SRT** (Secure Reliable Transport Protocol).

Configure **Global>ASI Settings>Input Config** to TSoIP

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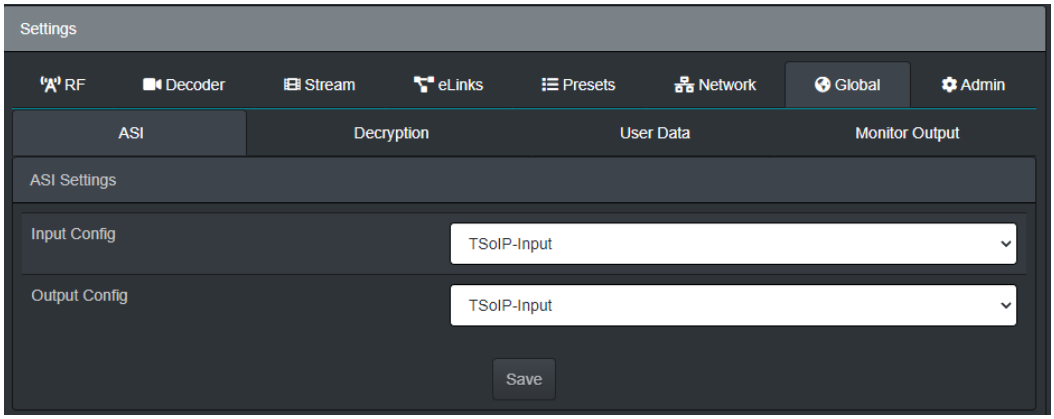

Figure 6-41 Settings>Global>ASI Settings

6.4.4.1. RTP

The Stream>Input>Mode>RTP specifies streaming settings. The settings will not be actioned until the **Save** button has been clicked:

RTP Settings

- **Port –** specifies the input streaming port.
- **Latency (ms)** – specifies the latency in milliseconds between video and audio.

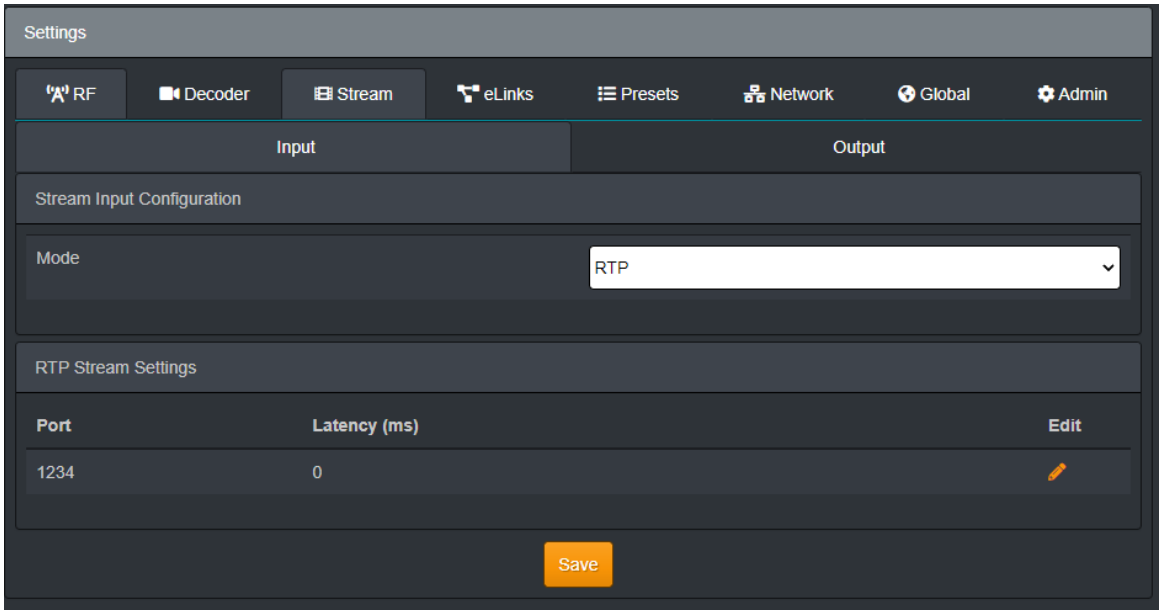

Figure 6-42 Setting>Stream>Input>RTP

6.4.4.2. RTSP

The Stream>Input>Mode>RTSP specifies streaming settings. The settings will not be actioned until the **Save** button has been clicked:

RTSP Settings

- **Host –** IP address from Host
- **Port –** specifies the input streaming port.

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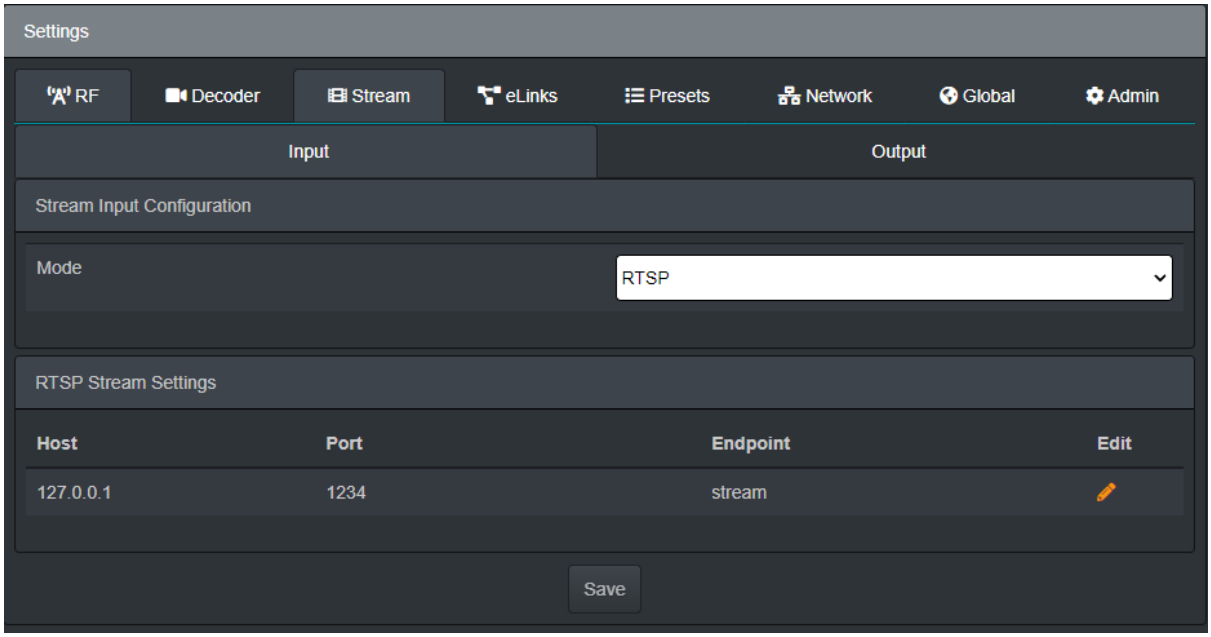

Figure 6-43 Setting>Stream>Input>RTSP

6.4.4.3. UDP

The Stream>Input>Mode>UDP specifies streaming settings. The settings will not be actioned until the **Save** button has been clicked:

UDP Settings

- **Port –** specifies the input streaming port.
- **Latency (ms)** – specifies the latency in milliseconds between video and audio.

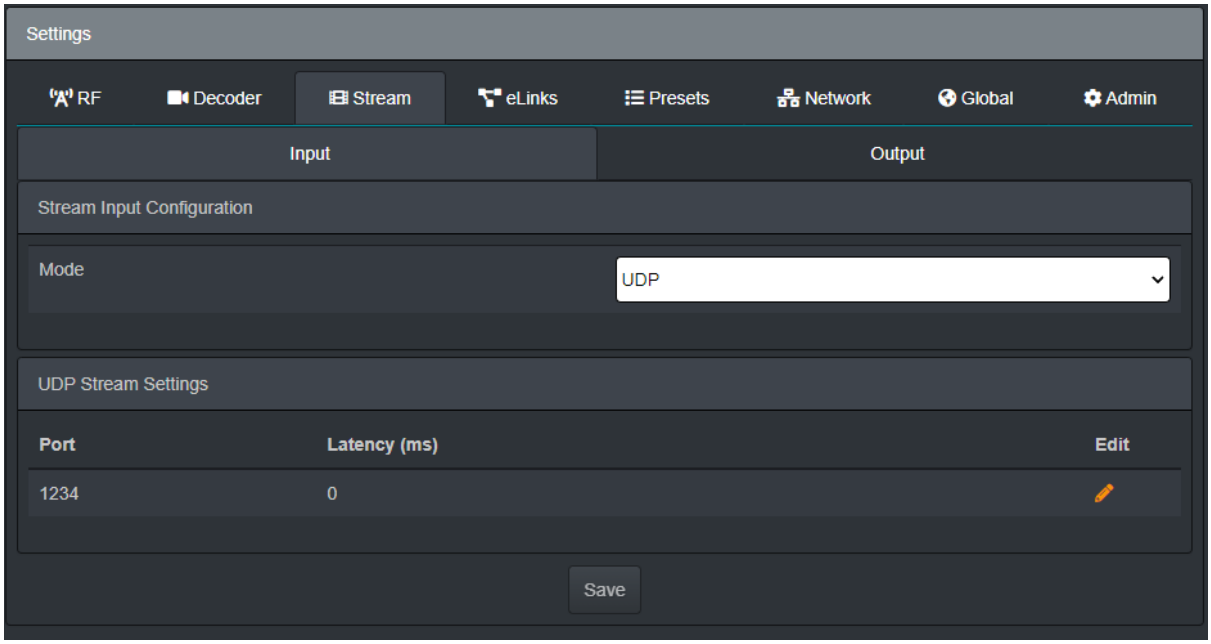

Figure 6-44 Setting>Stream>Input>UDP

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6.4.4.4. SRT

The Stream>Input>Mode>SRT specifies streaming settings. The settings will not be actioned until the **Save** button has been clicked:

SRT Settings

- **Mode** – Caller or Listener
- **Host** – IP address from Host
- **Port** – specifies the input streaming port.
- **Latency (ms)** – specifies the latency in milliseconds between video and audio
- **Encryption** - enables a pass phrase to be used/changed.

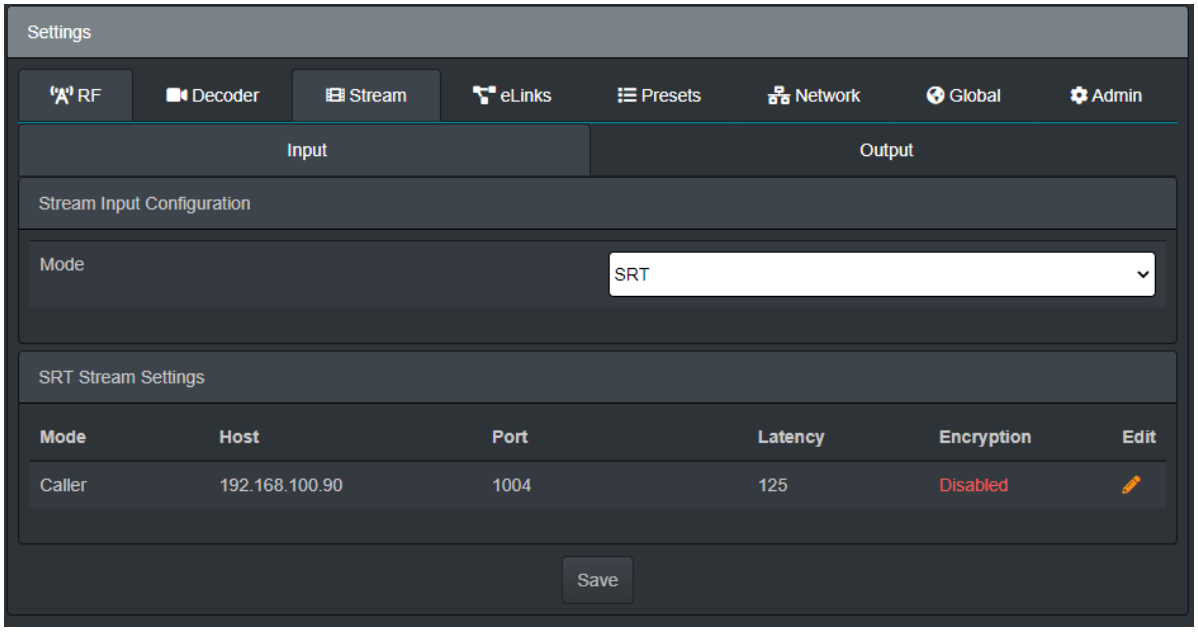

Figure 6-45 Setting>Stream>Input>SRT

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6.4.5. eLinks

The **Settings>eLinks** panel provides a status indication for the internal links to the RF/Demod Cards and a method of quickly connecting and disconnecting them.

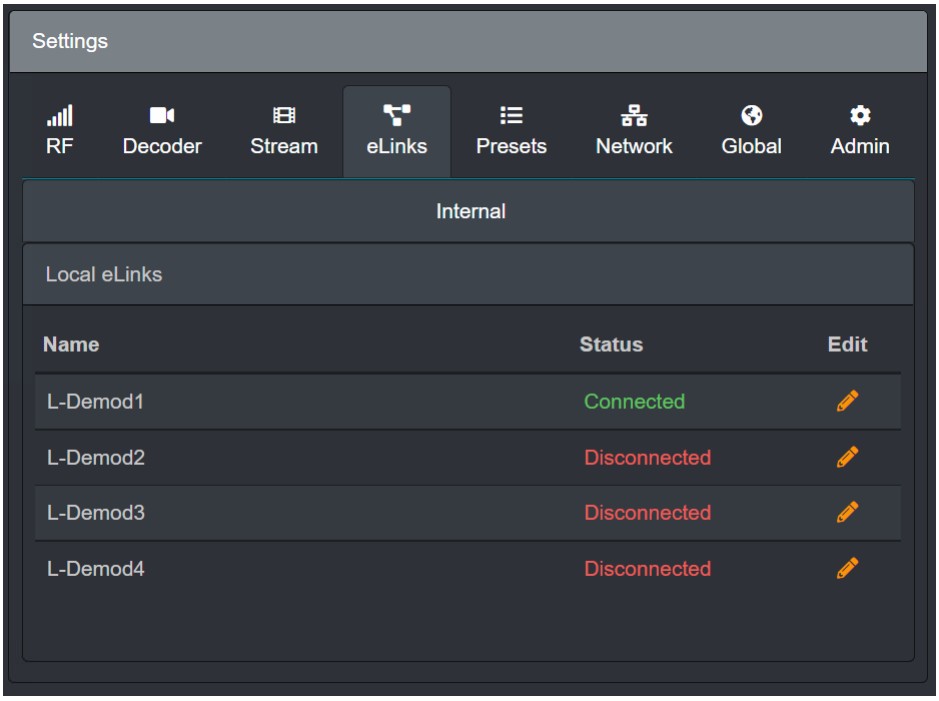
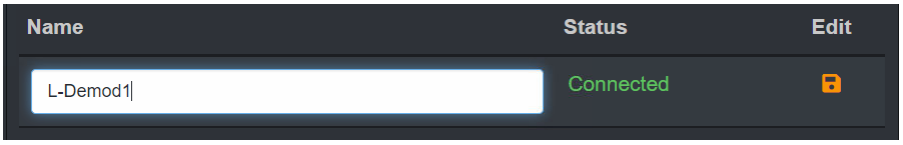


Figure 6-46 Settings>eLinks

Demod Card connection may be modified by clicking on the relevant edit icon, making the necessary changes and then clicking on the save icon.



6.4.6. Presets

The **Settings>Presets** panel provides tools for using presets; a quick way to store your current/active settings for different operational scenarios and quickly switch between them.

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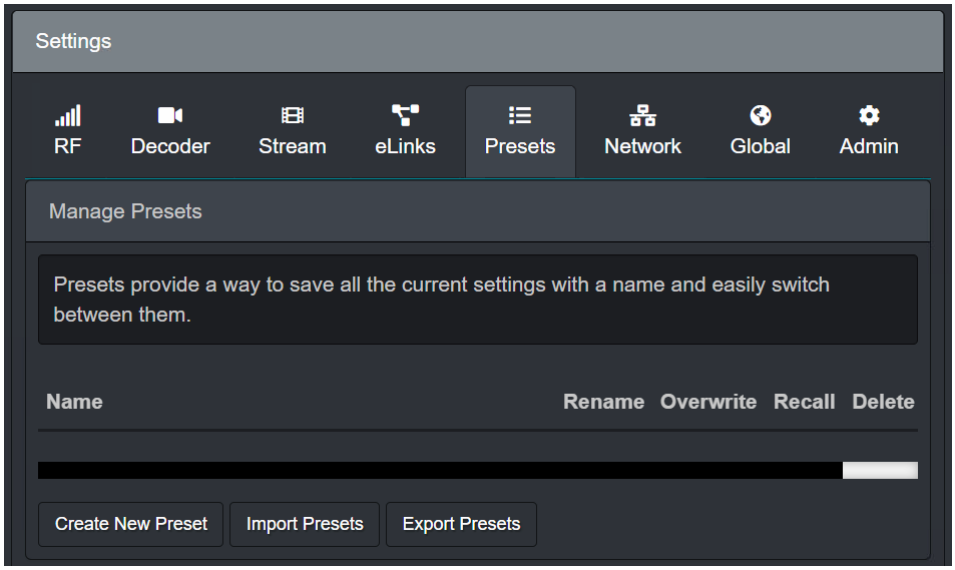

Figure 6-47 Settings>Presets

The **Presets** panel provides the following tools:

Manage Presets

- **Preset List** – previously stored presets are listed and can be managed from this screen. Either **Rename**, **Overwrite**, **Recall** or **Delete**.
- **Create New Preset** - enable you to create a new configuration preset, give it a name and store the current/active configuration settings.

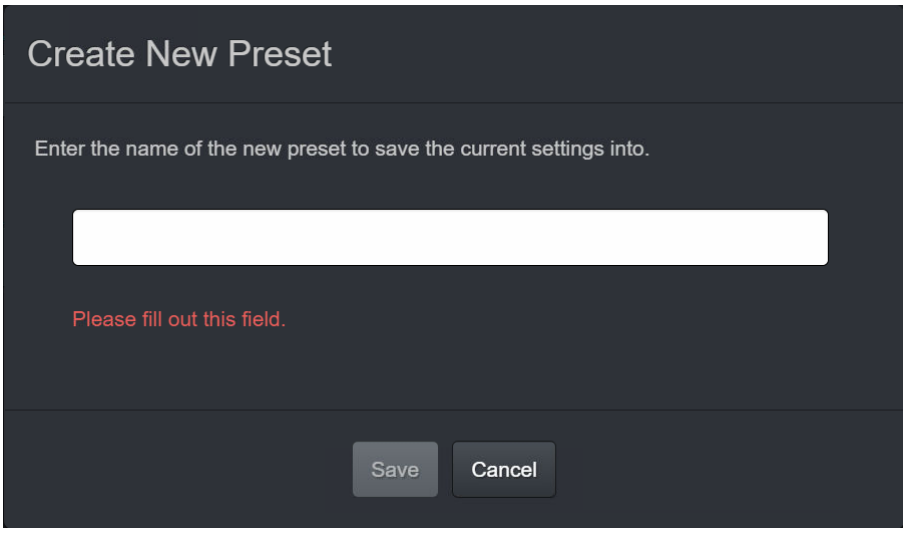

Figure 6-48 Settings>Presets - Create New Preset

- **Import Presets** - enable you to import presets from receivers. Configuration files (.cfg) created by other similar Quantum Receivers may be imported and used to configure the receiver. Once imported, they are listed and can be selected using the **Select Active Preset** option to overwrite the current settings.

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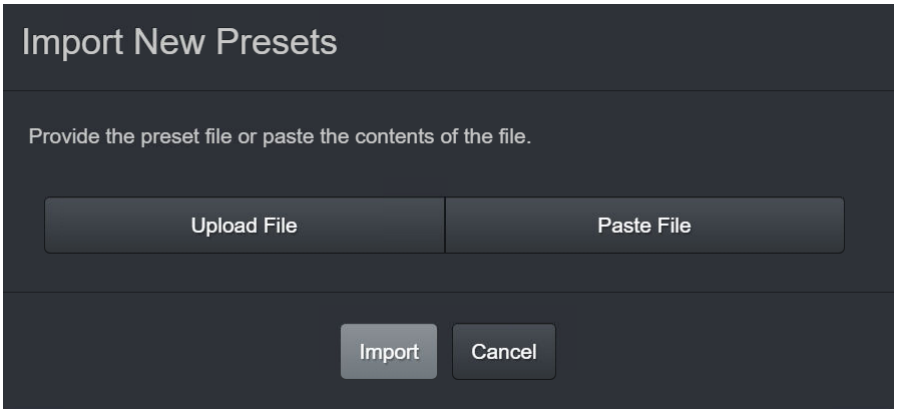

Figure 6-49 Settings>Presets - Import New Preset

- **Export Presets** - enable you to export presets to another similar receiver. When selected, a **cfg** file is created and stored at a location specified by the user using the date as the file name.

6.4.7. Network

The **Settings>Network** panel details the settings for networking.

6.4.7.1. Network 1/2

The **Settings>Network>Network 1(LAN)/2(WAN)** panel enables networking to be configured.

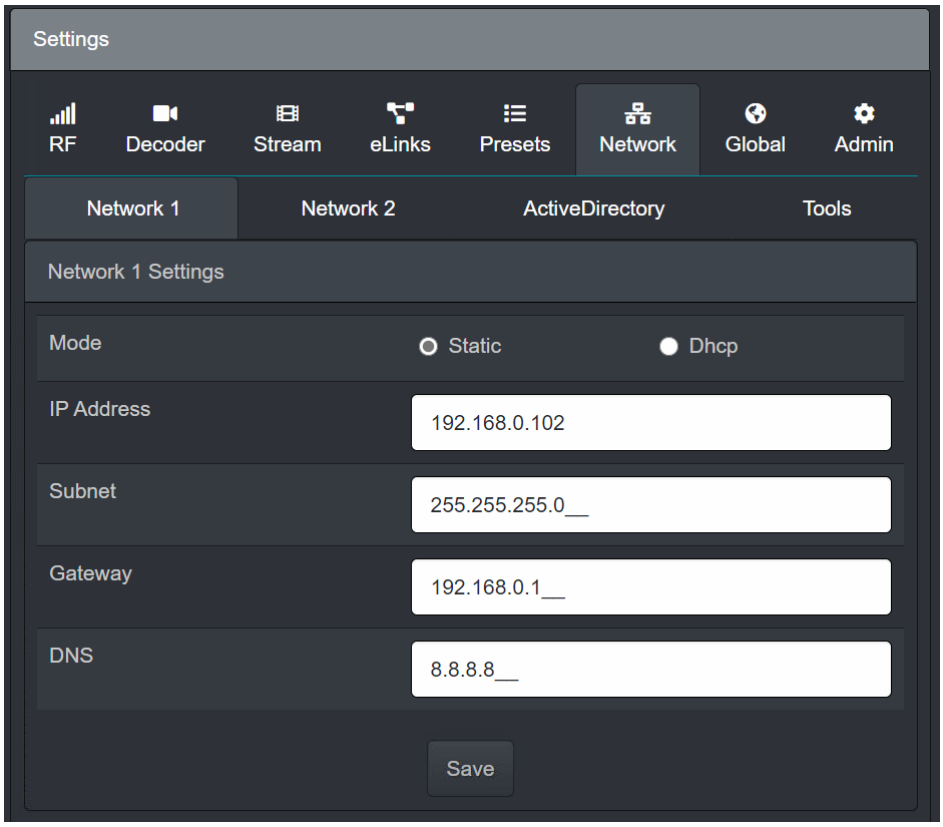

Figure 6-50 Settings>Network>Network 1/2

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The **Network 1(LAN)/2(WAN)** panel enables details to be specified for the networks. The settings will not be actioned until the **Save** button has been clicked:

Network 1(LAN)/2(WAN) Settings

- **Mode** – specifies the mode. Selecting **Static** permanently assigns and IP address to your receiver and must be entered manually, and Dynamic Host Configuration Protocol (**Dhcp**) automatically assigns IP addresses and other communication parameters to devices connected to the network eliminating the need for individually configuring network devices manually.
- **IP Address** – specifies the network IP address.
- **Subnet** – specifies the network subnet mask.
- **Gateway** – specifies the network gateway address.
- **DNS** – specifies the Domain Name System (DNS) for the network.

6.4.7.2. Active Directory

The **Settings>Network>ActiveDirectory** panel configures appropriate user access to the ActiveDirectory.

The ActiveDirectory is a secure location used for the management and storage of data relating to users of the receiver.

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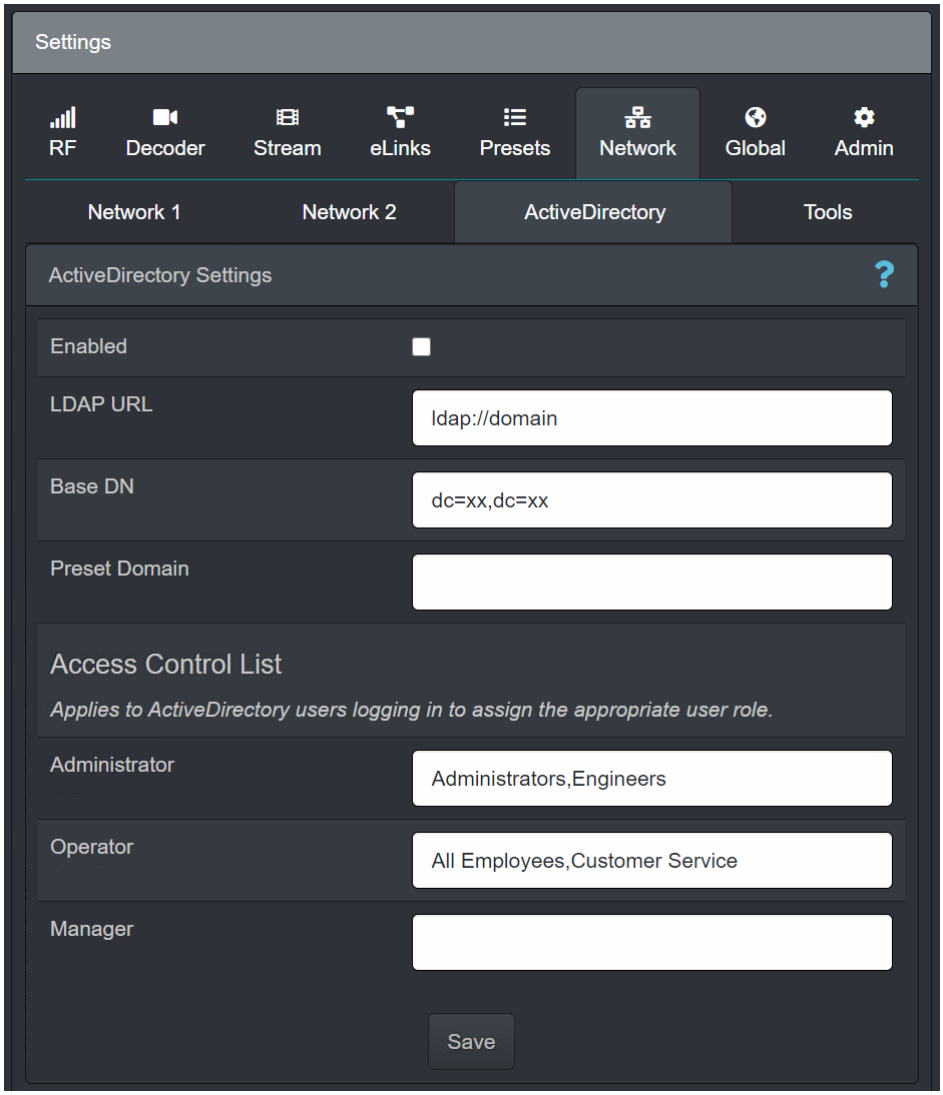

Figure 6-51 Settings>Network>ActiveDirectory

The **Active Directory** panel enables ActiveDirectory access to be configured. The settings will not be actioned until the **Save** button has been clicked:

ActiveDirectory Setting

- **Enabled** – enables/disables access to the ActiveDirectory. When enabled the login page enables the user to log in with their company's email and password. Custom groups can be created, enabled, disabled and removed. These groups can then be assigned to individual users in the accounts page.If the user belongs to the **All** group or any enabled group at the time of logging in, the system will allow access.
- **LDAP URL** – specifies the Lightweight Directory Access Protocol (LDAP) URL for the ActiveDirectory domain name server (must include the prefix **ldap://** in the field). The LDAP URL can be acquired in Windows using the following command: **nslookup-type=all_ldap._tcp**
- **Base DN** – specifies the point (Distinguished Name) from where the server will search for users. Domain Components specify the ActiveDirectory domain (not case-sensitive), example: **dc=xg,dc=local**.

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- **Preset Domain** – specifies a preset domain name to be appended to the username while logging in to avoid typing the whole thing, example: **usesrname12345@company.com**

NOTE: If the preset domain is **company.com** then the user only has to enter **username12345** to log in.

NOTE: Do not enter the @ symbol when setting the preset domain.

Access Control List

- **Administrator** – specifies the users who have administrator access rights.
- **Operator** – specifies the users who have operator access rights.
- **Manager** – specifies the users who have manager access rights.

Role Type Restrictions

Menu	Administrator	Manager	Operator	Viewer
Status	✓	✓	✓	
Feed	✓	✓	✓	✓
Settings	✓	✓	✓	
RF	✓		✓	
Decoder	✓			
Stream	✓			
Presets	✓			
Network	✓			
Global	✓	✓	✓	
Admin	✓			
Info	✓	✓	✓	
Accounts	✓	✓	✓	✓

Table 6-1 Role Type Restrictions

6.4.7.3. Tools

The **Settings>Network>Tools** panel provides additional tools for configuring the ActiveDirectory.

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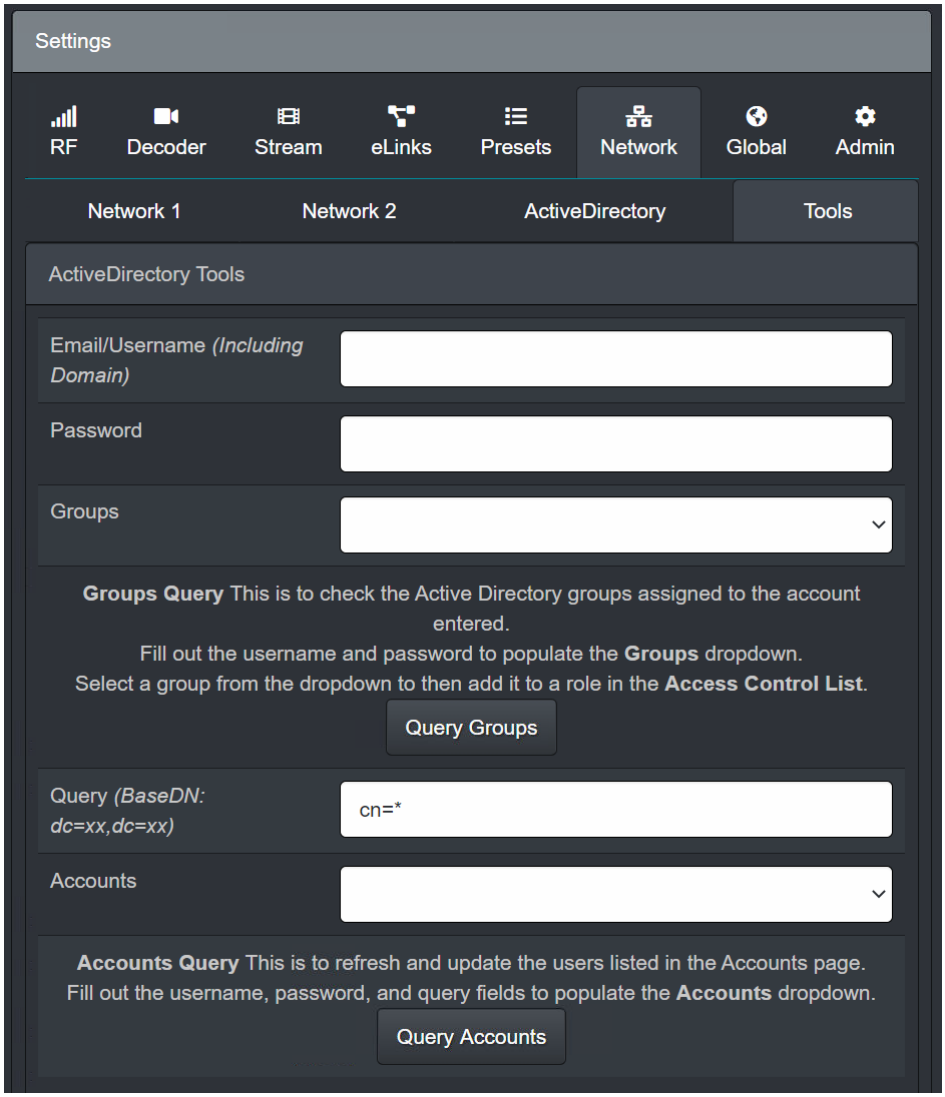

Figure 6-52 Settings>Network>Tools

The **Tools** tab provides tools for configuring ActiveDirectory groups and accounts:

ActiveDirectory Tools

- **Email/Username (Including Domain)** – enables entry of an email/username for the selected group.
- **Password** – enables a password to be set for the user.
- **Groups** – specifies the group which will be queried.
- **Query Groups** – enables the query of the groups database to be performed.
- **Query (BaseDN:dc=xx,dc=xx)** – enables a query to be performed.
- **Accounts** – specifies the account which will be queried.
- **Query Accounts** – enables a query of the accounts database to be performed.

6.4.8. Global

The **Settings>Global** panel details the settings for ASI, Decryption and User Data.

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6.4.8.1. ASI

The **Settings>Global>ASI** panel enables configuration of input and output Asynchronous Serial Interface (ASI).

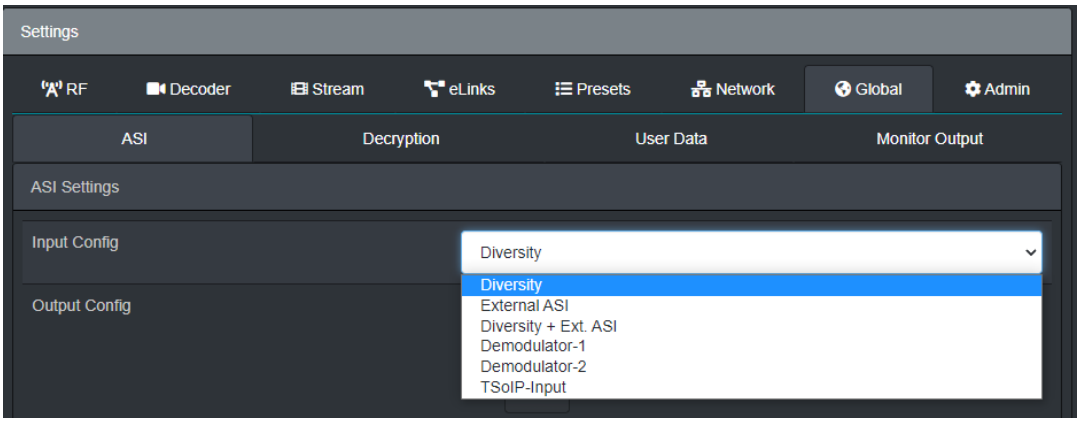

Figure 6-53 Settings>Global>ASI

The **ASI** tab enables the signals to be chosen for the ASI input and output ports. If Demod Cards 1-4 are fitted, all these options are available. Only three Demod Cards can be fitted if Diversity and External ASI is configured (Demod 4 will be disabled). The settings will not be actioned until the **Save** button has been clicked:

ASI Settings

- **Input Config** – specifies the ASI input signal from the drop-down menu (Diversity, External ASI, Diversity + Ext. ASI or Demodulator-1).
- **Output Config** - specifies the ASI output signal from the drop-down menu (Diversity, External ASI, Diversity + Ext. ASI or Demodulator-1).

6.4.8.2. Decryption

The **Settings>Global>Decryption** panel enables configuration of decryption.

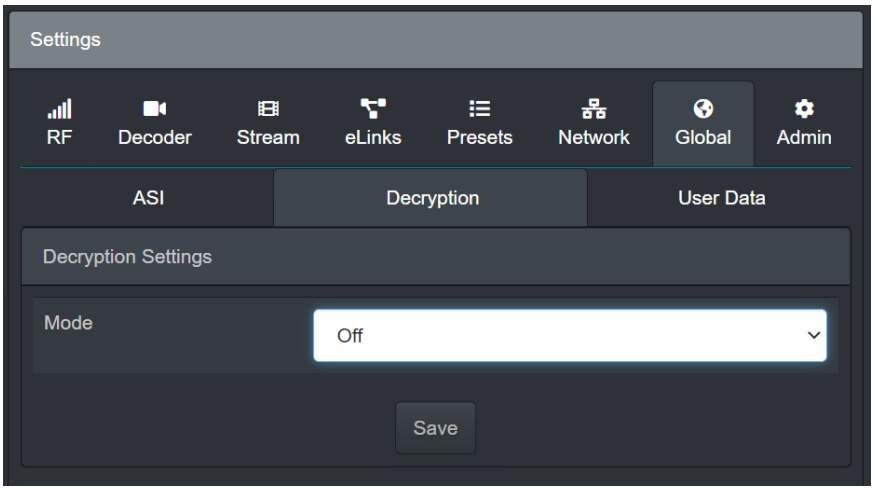

Figure 6-54 Settings>Global>Decryption

The **Decryption** tab enables the decryption mode to be selected. The settings will not be actioned until the **Save** button has been clicked:

Decryption Settings

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- **Mode** – specifies the Decryption mode from the drop-down menu (Off, BISS 1, BISS E, AES 128, AES 256, BCRYPT 128 or BCRYPT 256). This must be set to the type of encryption used on the transmitted broadcast. Once the correct mode is selected, the appropriate key must be entered via the Web Browser.

6.4.8.3. User Data

The **Settings>Global>User Data** panel enables configuration of the data presented to the **OCP/User/Tally 1** and **OCP/User/Tally 2** ports.

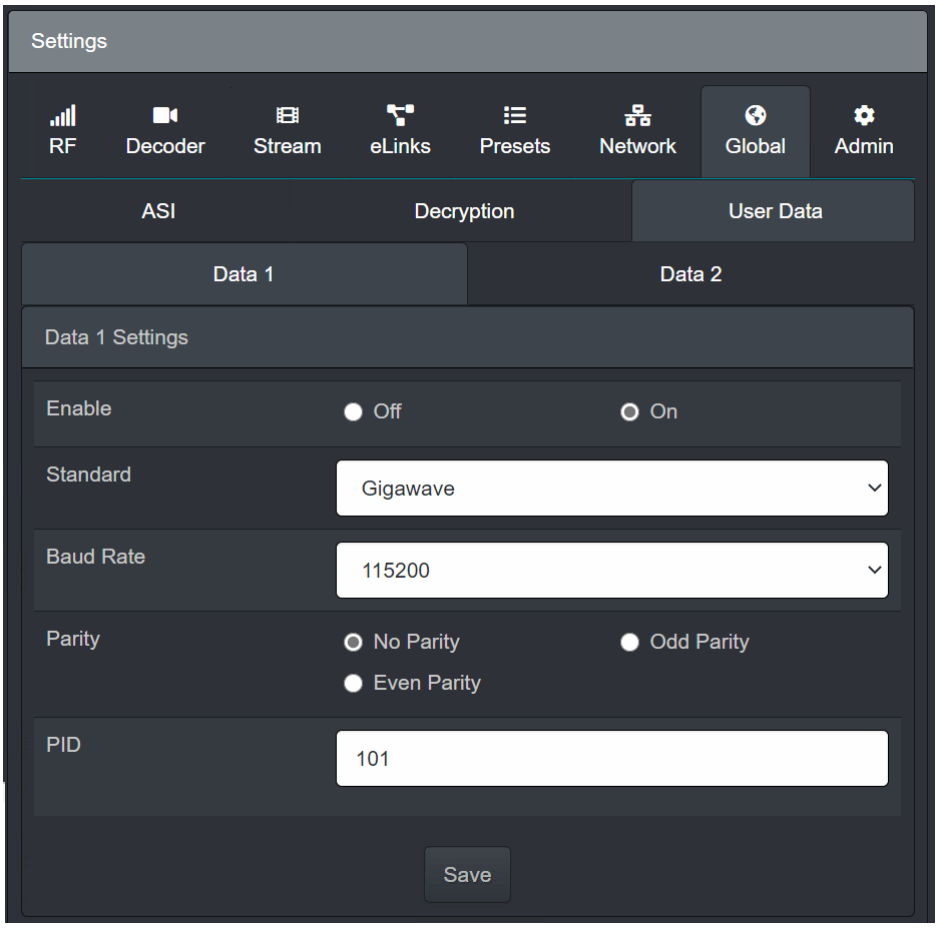

Figure 6-55 Settings>Global>User Data

The User Data tab enables configuration of the following settings. The settings will not be actioned until the **Save** button has been clicked:

Data1/2 Settings

- **Enable** – enables/disables the **OCP/User/Tally 1/2** port.
- **Standard** – enables the standard to be set for the port (Gigawave, Onboard, ADL or Link).
- **Baud Rate** – enables the baud rate to be set for of data transmission at the port.
- **Parity** – enables the parity to be set for the port.
- **PID** – specifies the PID for the location of the user data.

6.4.9. Admin

The **Settings>Admin** panel enables access to engineering settings. A valid password is required for entry. These settings are for factory use only.

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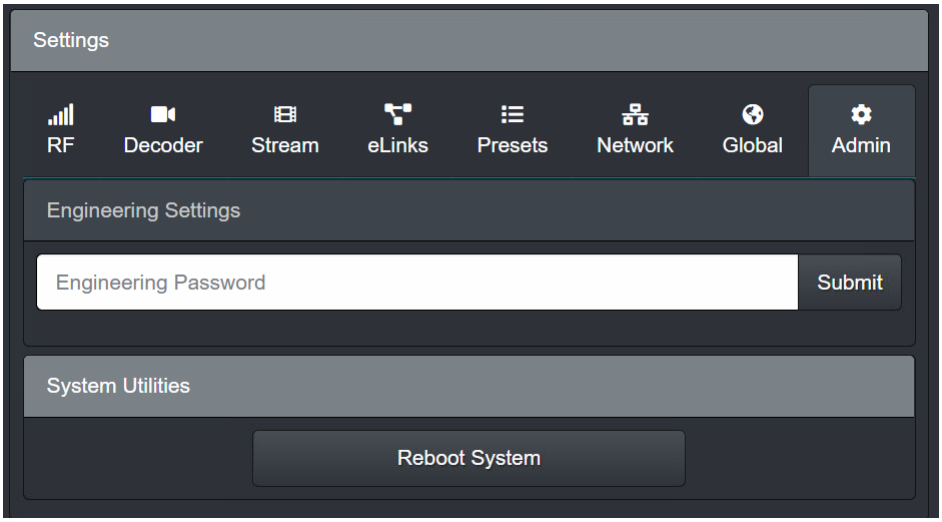

Figure 6-56 Settings>Admin

6.5. Info

Clicking on the **Info** menu enables details to be displayed in the central panel of the screen for unit and license information.

6.5.1. Unit Information

The **Info** panel displays **Unit Information** as shown below.

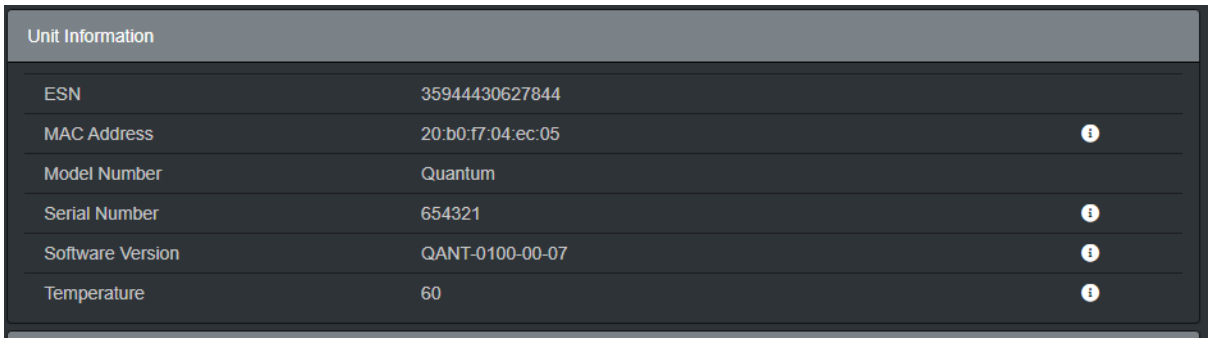

Figure 6-57 Info – Unit Information

The **Info** panel displays the following unit information:

- **ESN** – specifies the Electronic Serial Number (ESN) of the receiver. A unique hardware address assigned by the manufacturer to the unit for identification. This address serves as an electronic serial number.
- **MAC Address** – specifies the Media Access Control (MAC) address of the receiver. A unique hardware address assigned by the manufacturer to the unit for identification. This address serves as an electronic serial number.

  Clicking ⓘ displays the WAN and LAN addresses for the receiver.

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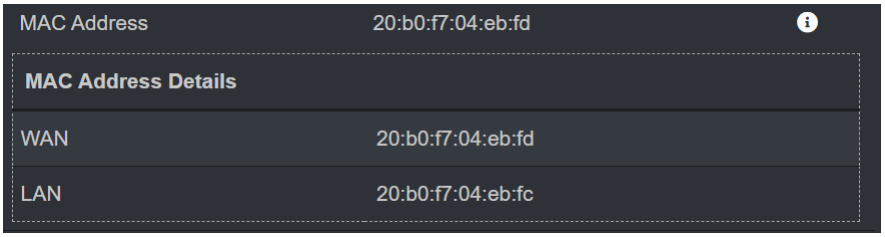

Figure 6-58 Info>Mac Address – More Information

- **Model Number** – specifies the model of the receiver as assigned by the manufacturer.
- **Serial Number** – specifies the unique serial number of the receiver.

  Clicking ⓘ displays **Decoder** and **Demodulator** serial numbers that add functionality to the receiver.

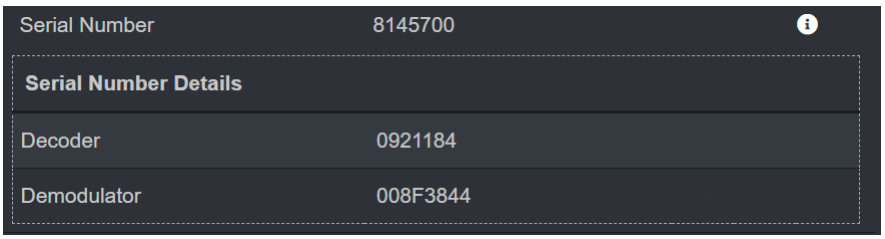

Figure 6-59 Info>Serial Number – More Information

- **Software Version** - specifies the software version of the receiver.

  Clicking ⓘ displays **System Software**, **Demodulator** and **Decoder Details** for the various software modules that contribute functionality to the receiver.

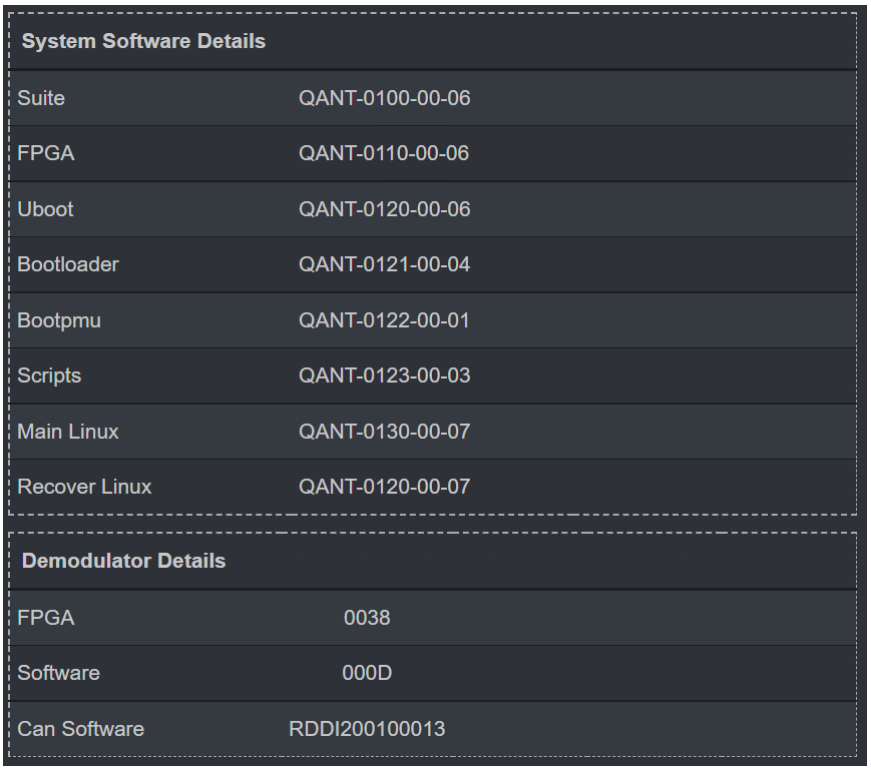

Figure 6-60 Info>Software Version – More Information

- **Temperature** - specifies the temperature (in degrees C) of the unit interior.

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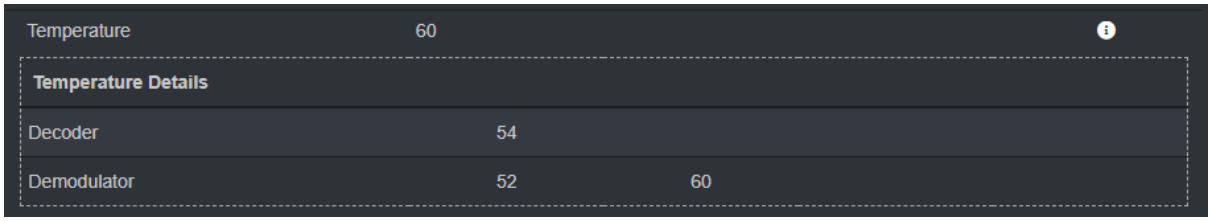

6.5.2. License Information

The **Info** panel displays **License Information** as shown below.

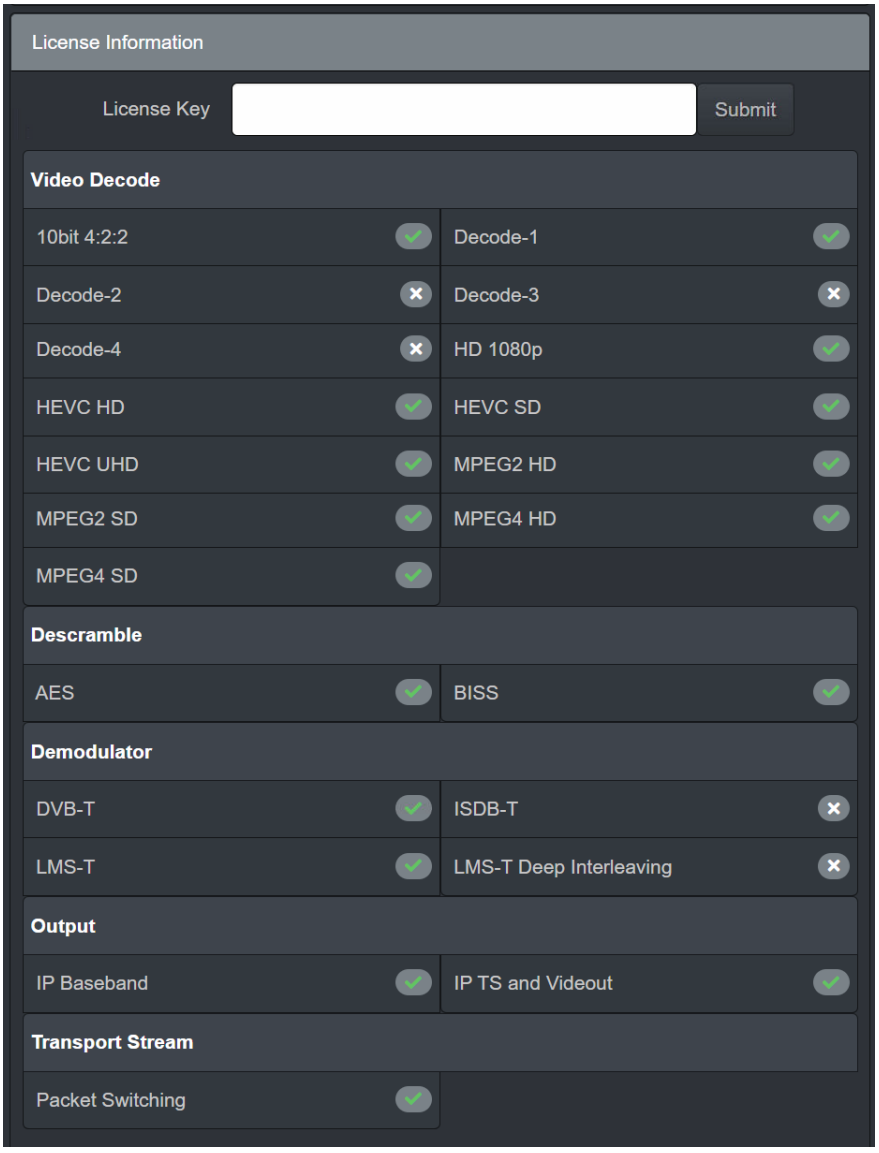

Figure 6-61 Info – License Information

The **Info** panel displays the following license information:

- **License Key** – enables the user to enter license numbers for purchased options, which add functionality to the receiver.
  To enter a new license, type the license number, obtained from Vislink, into the field and click the **Submit** button. When the receiver recognises the license number as valid, the appropriate feature will be enabled. The symbol alongside the feature will change from ⊗ (unavailable) to a check mark ✓ (available).

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- **Video Decode** – lists the range of video decoding features/functions that are available (licensed) for use on the receiver.
- **Descramble** – lists the range of descrambling features/functions that are available (licensed) for use on the receiver.
- **Demodulator** – lists the range of demodulator features/functions that are available (licensed) for use on the receiver.
- **Output** – lists the range of output features/functions that are available (licensed) for use on the receiver.
- **Transport Stream** – lists the range of video TS features/functions that are available (licensed) for use on the receiver.

6.6. Accounts

Clicking on the **Accounts** menu enables detailed settings to be displayed in the central panel of the screen for adding new accounts and users.

6.6.1. Users

The **Account** panel displays settings for **Users** as shown below.

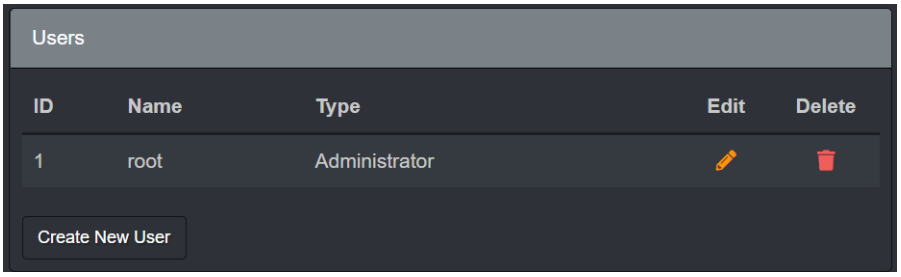

Figure 6-62 Accounts – Users

The **Accounts** panel displays the following user settings:

- **User List** – lists the users authorized to use the receiver and displays the role that they have been assigned. Users be deleted by clicking on the **Delete** icon or modified by clicking on the **Edit** icon to edit the existing account.
- **Create New User** – enables the creation of a new user account, described above.

6.6.2. Add New Account

The **Account** panel is displayed when the **Create New User** button is clicked. The settings for **Add New Account** as shown below.

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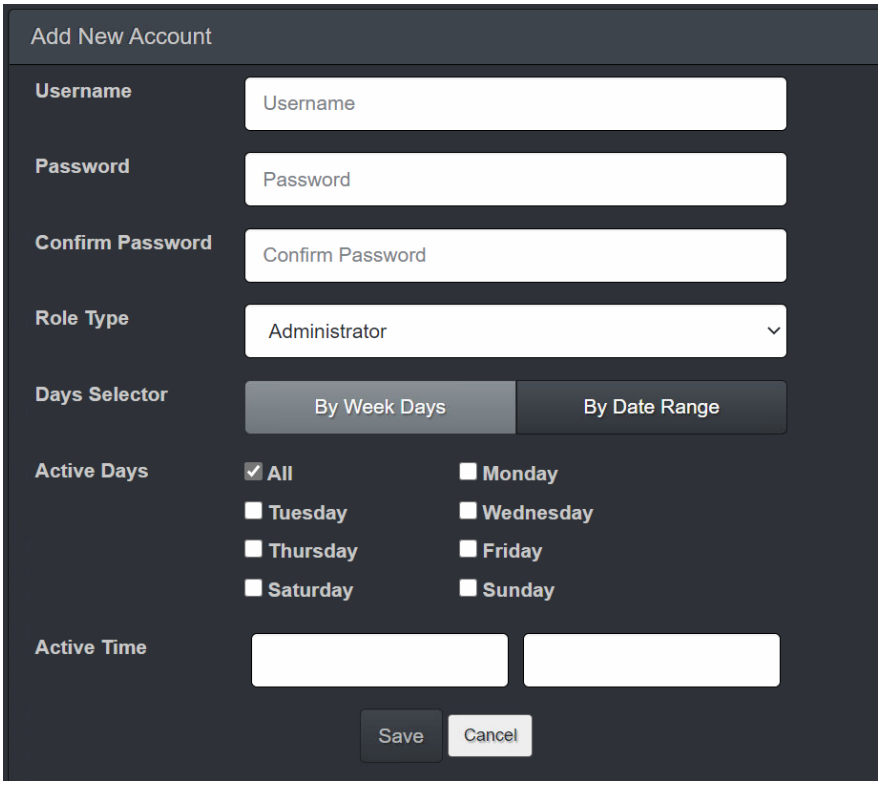
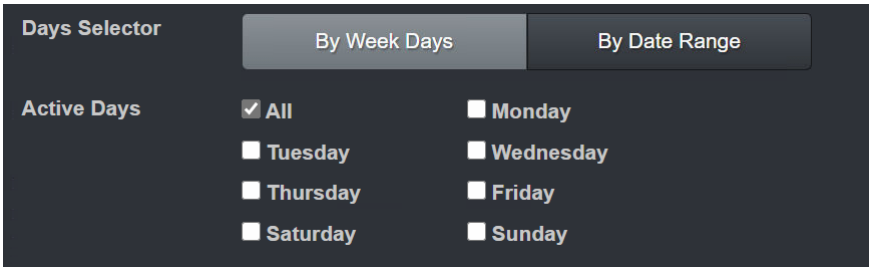


Figure 6-63 Accounts – Add New Account

The **Accounts** panel displays the following account settings. The settings will not be actioned until the **Save** button has been clicked:

- **Username** – specifies a name for the user.
- **Password** – specifies a password for the user.
- **Confirm Password** – enables the password to be confirmed by entering it again.
- **Role Type** – specifies a role for the user, for example: **Administrator**, **Manager**, **Operato** or **Viewer**, as selected from the drop-down menu.
- **Days Selector** – specifies daily access for the user:

  Select the **By Week Days** button to allow access on certain days of the week. Simply place a check mark in the box for the active days required.



  Select the **By Date Range** button to allow access for a specific period of time. The dates may be typed in or the field may be clicked to display a calendar from which to select the required from/to dates.

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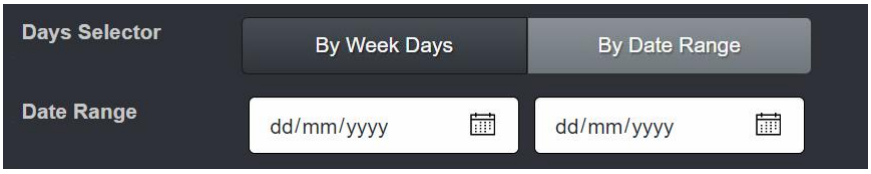

- **Active Time** – specifies a time of day that the user my access the receiver. Hover over the field and click on the increment/decrement buttons to set the from/to time of day.

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7. Receiver Installation & Setup

7.1. Before You Connect

See the Installation, Safety and Compliance Information supplied with your product for full installation instructions.

7.2. Connecting the Receiver

After the receiver has been installed, connect the relevant signal and power cables at the rear panel of the receiver, see *Section4 Rear Panel Connectors* for details.

- **Power Cable** - connect the ac power IEC cable to the rear panel and plug in to the available power supply.
- **RF Cables** – connect the RF BNC inputs from the down-converters to the relevant option cards (for Stream Adaption usage). The cards and connections required will depend on the licenses purchased.
- **Genlock -** connect coax connector to the video synchronisation source.
- **ASI IN/ASI OUT**- connect coax connectors to Transport Stream source/ destination.
- **Video Output** – connect the HD-BNC connectors from the SFP modules in the required configuration for either 4x 3G SDI, 2x 6G SDI or 1x 12G SDI out for local viewing or production of the video input.
- **Monitor Output** – connect the HD-BNC connectors from the SFP modules in the required configuration for either 4x 3G SDI, 2x 6G SDI or 1x 12G SDI out for local viewing or production of the video input.
- **Audio Output** – connect the Lemo connectors for stereo monitoring of audio.
- **Focal Point** – connect the Lemo connector for wireless camera control.
- **Return Data** – connect the 15-way D-type connector(s) for OCP, user data or Tally usage.
- **WAN/LAN** – connect the Ethernet connector(s) for web browser or network management usage.
- **LAN/LAN (PoE)** – connect Ethernet connectors(s) to the local area network to enable video transmission/reception via the internet.

7.3. Powering Up the Receiver

To power up the receiver:

1. Ensure all signal and power cables are connected as required (see above).
2. Switch on the ac power supply to the unit at the wall or rack outlet.

NOTE: The receiver is NOT fitted with a power on/off (I/O) switch.

3. Wait for receiver initialization to complete before attempting to use the front panel menus and controls. This will take approximately 2 minutes, depending on the options fitted.

7.4. Setting the Unit IP Address

Setting the IP address of the receiver is accomplished using the front panel display. This will need to be done before you can access the receiver using the web browser GUI.

To set the IP address:

1. Ensure the receiver is powered up and initialisation is complete (see above).

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2. On the front panel, using the rotary knob or touch screen, select the **Setup > Network> IP Address** option.
3. Press rotary control knob to select.
4. Using the rotary knob or touch screen, set the IP address, subnet mask and gateway address, as required. (LAN/Network1, WAN/Network2),
5. Press the **Select** button to save or **Cancel** to discard the changes.

NOTE: It may be necessary to set the IP address, gateway address and Virtual IP address to 0, and to set a subnet mask in order to allow the IP address to be changed.

IP addresses on the unit must adhere to the range of restrictions specified in RFC3330.

NOTE: The control network and data networks should not conflict. It is recommended that the ranges for these networks are in the Private-Use Networks as listed in the summary Table. IP Address range 192.168.10.x (subnet 255.255.255.0) is used for internal unit communications, so should not be used for external communications.

7.5. Accessing the Web GUI

The web browser Graphical User interface (GUI) is designed to configure, control and monitor the unit and can be run on any Personal Computer (PC) or laptop using a suitable web browser.

NOTE: The front panel touch-screen display provides limited control and monitoring of the unit when a PC or control system is unavailable.

The Ethernet LAN port is used to connect the unit to a control computer for control through a web browser or to a control system.

The following web browser is recommended:

- Google Chrome Version 92.0.4515.107

To access the web browser GUI:

1. Open a web browser.
2. Enter the IP address (assigned to the unit control port in the front panel **Setup** menu) into the address field of the web browser.
3. If the network is correctly configured, a login page will be displayed requesting a username and password. Enter your details to access the web GUI. (Default – User: **root**, Password: **root**)

The receiver can now be configured and monitored.

7.6. Configuring BDC (Down-conversion)

To choose the frequency range input to the demodulator, select the appropriate BDC device part number using the **Settings>RF>BDC** menu option, see *Section 6.4.1.3 BDC.* The correct BDC must be selected to enable the correct frequency range to be available in the menu.

The devices can be used passively or powered via the Demodulator connection. To turn on the power, if required, to the down-converter, turn the appropriate **LNB Power** setting to **On**.

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The Local Oscillator (LO) frequency of any unlisted down-converter can be selected using the **OTHER** option. The polarity can be set to take into account low- or high-side mixing in the down-converters.

7.7. Configuring Demodulation

The demodulator in the receiver can operate in three main operating modes:

- DVB-T
- Single Pedestal LMS-T(S)
- Dual Pedestal LMS-T(D)

NOTE: In LMS-T(D) mode, the bandwidth shown is the combined width of the 2 pedestals.

The LMST pedestal widths available are 3, 4, 5, 6, 7, 8, 10 & 12MHz. In Dual pedestal mode the effective width is therefore double that. This means that in some channel widths the system could be used in single or dual mode (e.g. 1 x 10MHz or 2 x 5MHz). The overall throughput will be the same, but this allows the RF performance to be optimised for particular operating environments.

NOTE: There is a short delay (approx 10s) after switching modes before the unit is fully reconfigured.

7.7.1. DVB-T Operation

The following procedure defines the changes and sequence required when changing to DVB-T operation. Configure these settings using the **Settings>RF>Modulation** menu option, see *Section 6.4.1.1 Modulation:*

1. Set **Frequency Mode** to **Direct** or **Channel Plan**.
2. Set the **Modulation Type** to **DVB-T**.
3. Set the **Bandwidth** to **Auto**.
4. Set **Guard Interval** to **Auto**.
5. Set **Polarity** to **Auto**.
6. Set **Frequency** as required.

The table below defines the corresponding gross bit rates for DVB-T operation. This includes video, audio, data and other Transport Stream data tables.

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Bitrates (Mbit/s) for a DVB-T system in 8 MHz channels					
Modulation	Code Rate	Guard Interval			
		1/4	1/8	1/16	1/32
QPSK	1/2	4.976	5.529	5.855	6.032
	2/3	6.635	7.373	7.806	8.043
	3/4	7.465	8.294	8.782	9.048
	5/6	8.294	9.216	9.758	10.053
	7/8	8.709	9.676	10.246	10.556
16-QAM	1/2	9.953	11.059	11.709	12.064
	2/3	13.271	14.745	15.612	16.086
	3/4	14.929	16.588	17.564	18.096
	5/6	16.588	18.431	19.516	20.107
	7/8	17.418	19.353	20.491	21.112
QPSK	1/2	14.929	16.588	17.564	18.096
	2/3	19.906	22.118	23.419	24.128
	3/4	22.394	24.882	26.346	27.144
	5/6	24.882	27.647	29.273	30.16
	7/8	26.126	29.029	30.737	31.668

Table 7-1 DVB-T Bitrates

7.7.2. LMS-T Operation

The following procedure defines the changes and sequence required when changing to LMS-T operation. Configure these settings using the **Settings>RF>Modulation** menu option, see *Section 6.4.1.1 Modulation*:

1. Set **Frequency Mode** to **Direct** or **Channel Plan**.
2. Set the **Modulation Type** to **LMS-T** (**Single** or **Dual**).
3. Set the **Bandwidth** to 3 - 12MHz (Single) or 6 – 24MHz (Dual).
4. Set **Guard Interval** to **Auto**.
5. Set **Polarity** to **Auto**.
6. Set **Frequency** as required.

The table below defines the corresponding gross bit rates for LMS-T operation at the two most common bandwidths (Single or Dual pedestal).

Bitrates (Mbit/s) for a LMS-T system in 8 MHz channels					
Channels		10MHz		20MHz	
Modulation	Code Rate	Guard Interval			
		1/8	1/16	1/8	1/16
QPSK	2/3	9.2	9.7	18.4	19.5
16-QAM	2/3	18.4	19.5	36.8	39

Table 7-2 LMS-T Bitrates

7.8. Configuring Diversity

The Decoder can be disabled, so that no error is displayed when only operating as a demodulator. It can be operated in HD or SD mode. It can also be switched to decode an ASI stream either from the demodulator output, the Packet Diversity output or an external source from the rear panel ASI IN connector.

Configure these settings using the **Settings>Global>ASI** menu option, see *Section 6.4.8.1 ASI:*

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1. Set **Input Config** to either **Diversity**, **External ASI** or **Diversity + Ext. ASI**, or **Demodulator-1**, as required.
2. Set **Output Config** to either **Diversity**, **External ASI**, **Diversity + Ext. ASI** or **Demodulator-1**, as required.

NOTE: The decoder and demodulator can be operated independently. Typically this can be used in cellular diversity applications, where a single demodulated ASI signal is taken via the ASI OUT connector, to a Vislink Diversity Packet Switch. The Packet diversity corrected output can then be fed back into the ASI IN for decoding. Contact Customer Support for further information.

7.9. Configuring Video Decoding

The Video Decoder can be operated in different modes, which need to be set by the operator (it will not automatically switch modes). Configure these settings using the **Settings>Decoder>Low Latency** menu option, see *Section 6.4.2.1 Low Latency:*

1. Set **Standard** to either **MPEG2** (SD and HD), **H.264** (SD and HD) or **HEVC UHD (H.265)**, or **HEVC dual HD**, as required.
2. Set **Format Mode** to either **Auto** (detection of incoming video) or **Manual**, as required.
3. Set **Force to PsF** as required.
4. Set system **Delay** as **Standard** or **Low** to help with smooth decoding.
5. Set **HDR Mode** to **Auto**.
6. Set the **Output Format** for the video stream, either **2SI** or **Quad Split**.
7. Set the output required on **Video Loss**.

7.10. Deinterleaving

The Quantum Receiver has a licensable deinterleaving option, to match the interleaving option in the Vislink transmitter. This option adds an extra layer of error correction to the ASI data steam that allows long breaks in RF reception to be corrected.

In the transmitter, you can select the amount of FEC used and the duration of RF break that can be corrected. When enabled, the receiver automatically detects these settings and adjusts deinterleaving appropriately. The settings are displayed for information but cannot be altered. Adding interleaving to an ASI stream reduces the ASI bit rate available for video/audio, etc., and adds a delay to the signal.

7.11. Configuring Decryption

Various decryption options are available depending on the licence options purchased for the receiver. Configure these settings using the **Settings>Global>Decryption** menu option, see *Section 6.4.8.2 Decryption:*

1. Set **Mode** the required decryption algorithm to either **Off**, **BISS 1**, **BISS E**, **AES 128**, **AES 256**, **BCRYPT 128** or **BCRYPT 256**, as required.
2. Enter the appropriate key either from the front panel or via Link Control software running on a PC. For the AES keys these must be entered in two (AES128) or four (AES256) 8 byte segments.

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The BISS-1, BISS-E and AES+ decryption will only decode an encrypted stream; EBS and AES will decode non encrypted (clear) streams and also the appropriately encrypted streams.

7.12. Configuring & Saving a Preset

Use the web browser GUI (or front panel display) to configure the receiver as required. When you have entered the correct configuration settings, save them as a named preset, in order that you can recall/reinstate them quickly should changes be made to the configuration.

Save your configuration using the **Settings > Presets** menu option:

1. Click on the **Create New Preset** button. A **Create New Preset** window will be displayed to enable you to save your current settings.
2. Type in a descriptive name for your configuration.
3. Click the **Save** button to save the configuration as a preset. The name of the preset should now appear in the list on the **Settings > Presets** screen and also on the **Status > Active Preset** panel.

Up to 64 presets may be defined on your receiver. Presets can be imported from other similar receivers or exported to other receivers as a cfg file to enable you to quickly configure multiple receivers.

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8. Licenses & Upgrades

8.1. About Licensing

The functionality of the receiver depends on the hardware options fitted and the software options installed. Software options are enabled or disabled by means of 'license keys'.

A license key is a string of numbers which, when downloaded to a unit, will enable a specific feature or feature set.

8.2. Obtaining New Licenses

You can add features to your unit by purchasing additional licenses from your local Vislink representative.

NOTE: Before ordering the license(s), you will need to provide the required ESN (Electronic Serial Numbers) and hardware serial numbers as requested on the webpage. See *Section 6.5 Info* to locate electronic serial numbers. Hardware serial numbers are located on the unit's chassis.

To verify which licenses are already installed and enabled on your unit see *Section 6.5.2 License Information.*

8.3. Firmware Upgrades

To upgrade the unit's firmware, refer to the firmware release note for your unit. Firmware update information is available from the Vislink support portal:

https://www.vislink.com/support-beyond-expectation/

The unit is upgraded via Ethernet connection by entering the unit IP address followed by the port number 8080 (e.g. 192.168.0.90:8080) and following the onscreen instructions (transfer upgrade file).

⚠ WARNING: Power should not be removed whilst the upgrade is in process or your unit may be rendered inoperable.

A complete upgrade will take approximately 40-45 minutes.

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