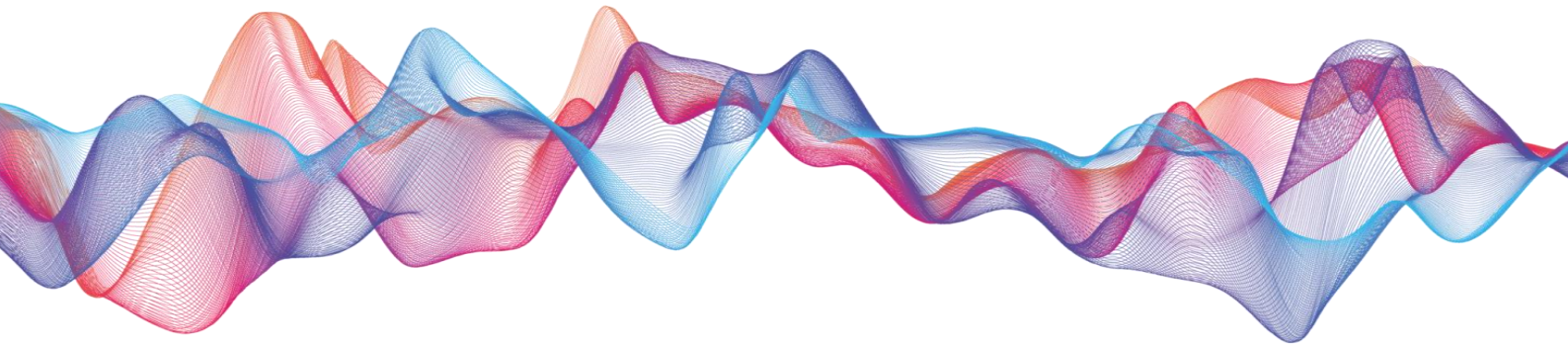
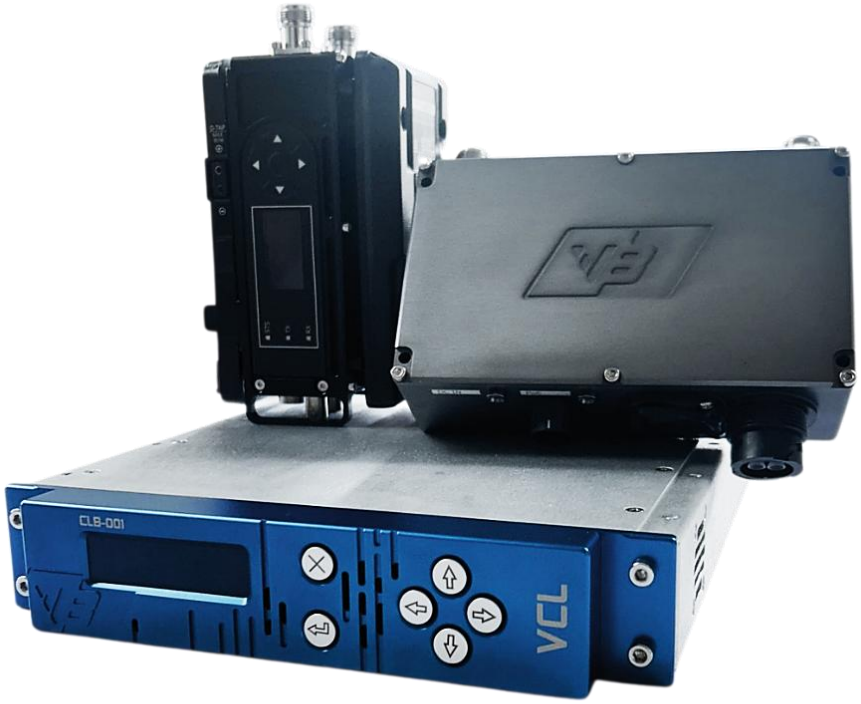
VideoSys Broadcast

CONNECTED LIVE MANUAL

VERSION 1 – APRIL 2026





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1 SYSTEM OVERVIEW

1.1 COMPONENTS

The Connected Live system is comprised of three main units:

1. **CL-Base**
   This unit combines an encoder/decoder with a camera control indoor unit designed to connect to a manufacturer's RCP. It can be used to receive and decoder a video stream from a CL-RTX or another CL-Base. It can also be used to send an encoded video stream to another unit (CL-RTX or CL-Base).

   Licence Options:
   - Encoder
   - Decoder
   - Camera Control Connection Method:
     - Serial
     - IP
   - Camera Control Manufacturer:
     - Sony
     - Grass Valley
     - Hitachi
     - Ikegami
     - Panasonic
     - Blackmagic

2. **CL-RTX**
   This unit combines an encoder/decoder, a camera control unit designed to connect to a manufacturer's camera, and a radio node. It can used to connect to CL-Node units wirelessly and send/receive video streams to and from other units (CL-RTX or CL-Base). It can also be used to establish a wireless camera control connection, and a transparent IP trunk for any other IP based system on the camera side.

   Licence Options:
   - Encoder
   - Decoder
   - Camera Control Manufacturer:
     - Sony
     - Grass Valley
     - Hitachi
     - Ikegami
     - Panasonic
     - Arri
     - Dreamchip / Proton
     - Blackmagic
     - Canon

3. **CL-Node**

   This unit included a radio board, that can be used to create a wireless infrastructure for CL-RTX units. It can be rigged using a standard RJ45 connection, or a fibre connection using the built-in media converter.

   Radio capabilities: dual band radio

   2.1 – 2.6 GHz band, 20/40 MHz bandwidth

   4.4 – 6.2 GHz band, 5/10/20/40/80 MHz bandwidth

1.2 EXAMPLE APPLICATION

Let's consider a typical application where there is a standard switch, and we need to cover two locations.

In this typical application the CL-RTX is used on the camera side and performs the following actions:

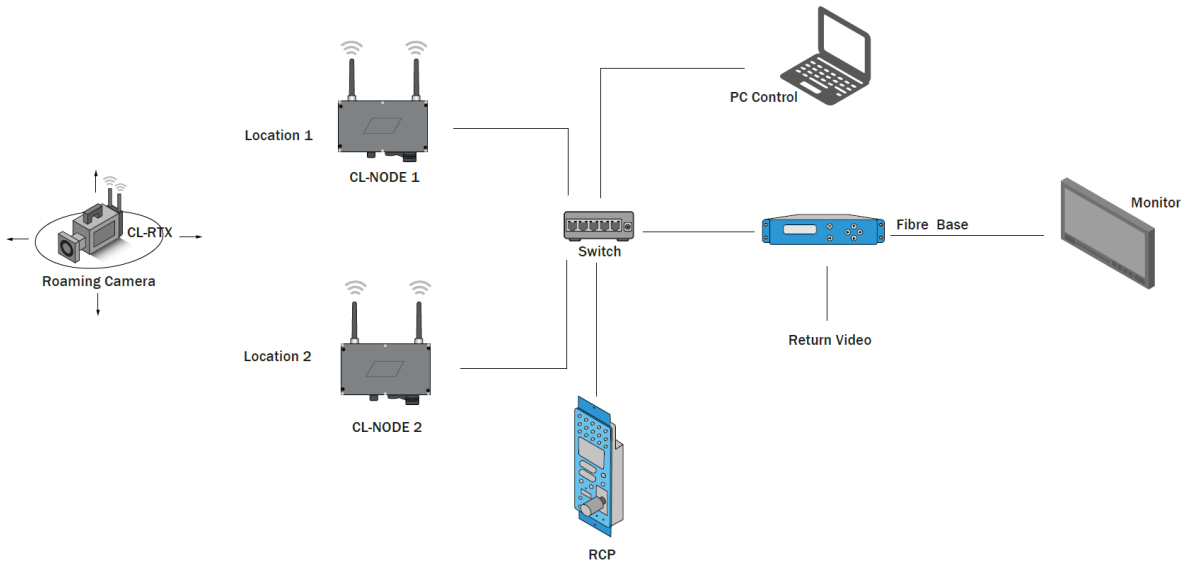
- ☐ Encode the main video form the camera and stream it over to a CL-Base
- ☐ Receive a return video stream from a CL-Base and decode it
- ☐ Connect to the camera's camera control interface
- ☐ Receive camera control data over the link and shade the camera accordingly

The CL-Base would be connected to the switch and be responsible for the following:

- ☐ Decode the main video being sent over from the CL-RTX
- ☐ Encode the return video and stream it over to the CL-RTX
- ☐ Connect to an RCP
- ☐ Send the camera control commands from the RCP over to the CL-RTX

One or more CL-Node would be positioned in the zones that need coverage and wired back to the switch via ethernet or fibre. These would allow for a connection to the CL-RTX.

A block diagram of these connections is shown below:



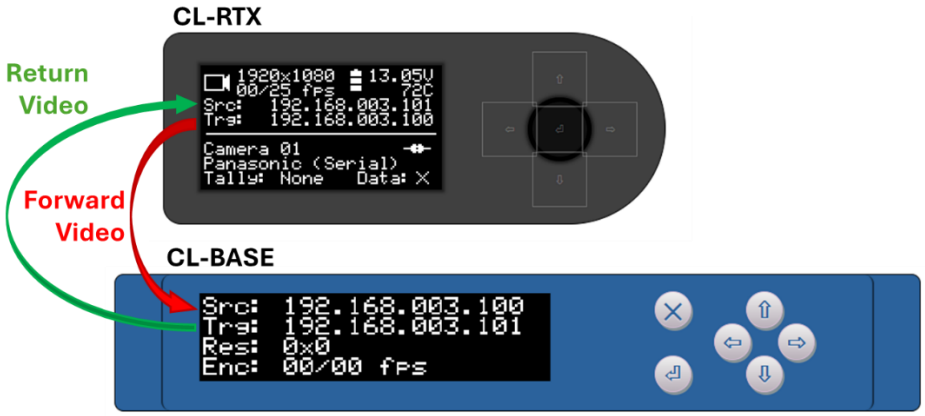
1.3 SETUP CHECKLIST

We are providing a short checklist to assist you with the setup and troubleshooting of the system. After you familiarise yourself with the system by reading the rest of the manual, you can use this as a quick-start guide when moving the system from one installation to another.

- ☐ Ensure you have a wireless connection between the CL-RTX and CL-Node.
  You can confirm this via the Cl-Node's web interface status screen. If there is no connection, check the following.
  Connect to radio boards inside the CL-Node and CL-RTX (ensure IP addresses are not duplicated) and ensure the following parameters match:
    - Radios > RF (chosen channel, custom frequency, bandwidth)
    - Radios > Configuration (camera network id, password, radios being used)
    - Set the modulation mode to auto if unsure

Always restart the radios after you finish setting up your settings. If connected via a wired connection, you can do this the toolbar at the top of the web interface.

- ☐ Video Streaming: Ensure the source and target IP address of the CL-Base and CL-RTX are targeting each other as shown below:



  To ensure optimal video streaming also check:
    - Service Priority = CS6
    - Latency Mode = Auto Normal
    - Target Port = 1234
    - Encoder settings are set to recommended if unsure (marked as [VB] on web gui)

- ☐ Camera Control: Ensure the following settings are correctly configured
    - Correct manufacturer is selected on both CL-RTX and CL-Base
    - Camera numbers set on the CL-RTX and CL-Base match
    - Data link addresses are configured correctly:

For the Forward path – **Data Multicast Group** of the CL-Base = Controller IP of the CL-RTX
For the Return path – **Data Return IP** of the CL-RTX = Controller IP of the CL-Base

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☐ Minimum number of IP allocations required per unit for a typical application:

On a CL-Base:

- Controller IP (for camera control and web interface access)
- Encoder/decoder source IP (for the video streaming)

On a CL-RTX

- Controller IP (for camera control and web interface access)
- Encoder/decoder source IP (for the video streaming)
- Built-in radio's IP (for accessing the web interface of the built-in radio node)

On a CL-Node

- Radio's IP (for accessing the web interface of the radio node)

2 CL-RTX

2.1 CONNECTORS

Number	Description	Connector	Pinout
1	Ethernet	RJ45	RJ45 T568B
2	Ethernet with PoE out up to 15W	RJ45	RJ45 T568B
3	CCAM – Camera control serial connector	Hirose HR10A-10R-10P(73)	1 – RS422 RX + 2 – RS422 RX - 3 – RS422 TX + 4 – RS422 TX - 5 – GND 6 – RS232 RX 7 – RS232 TX 8 – N/C 9 – N/C 10 – GND
4	12V Power In External power and battery are connected to a controller that prioritises external power	0B 4-pin Lemo with G keyway	1 – Vin 2 – N/C 3 – N/C 4 – GND
5	Tally and extra features (short pins 1 and 5 for return video	0B 6-pin Lemo with A keyway	1 – AUX RS232 RX 2 – AUX RS232 TX

	switching)		3 – Green Tally Out 4 – Red Tally Out 5 – Fused Power Out 6 – GND
6	Analog Audio Input (future feature)	-	-
7	AUX connector (future feature)	-	-
8	SDI IN	BNC	SDI input to encoder
9	SDI OUT	BNC	SDI output from the decoder / SDI in loop
10	2 x N-type antenna connectors	N-type	Internal connection to the radio's antenna ports

2.2 CONFIGURATION

2.2.1 FRONT PANEL NAVIGATION

The front panel of the CL-RTX has 5 buttons, Right, Left, Up, Down, and Enter, that can be used to navigate through the menus. Menus are organised into lists; these can be scrolled through with the Up and Down buttons. To enter a selected submenu or option press the Right button. Left will return to the previous screen. The Enter button is used to set or save an option. Left can be used to exit a submenu without making any changes.

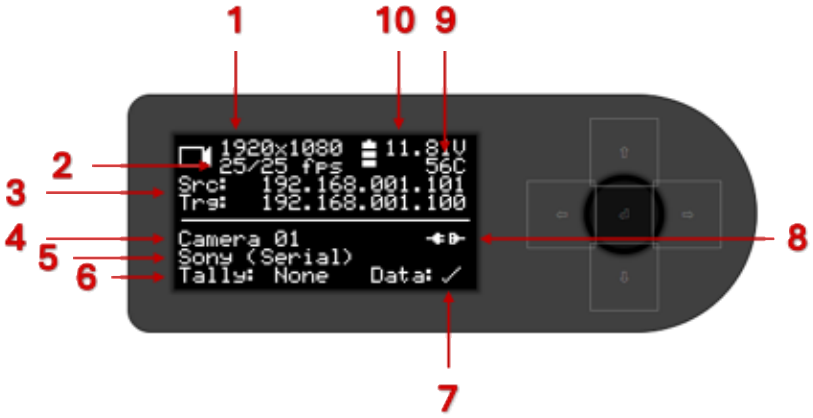
Within a text or number edit screen, the Left and Right buttons can be used to select a character for editing and the Up and Down buttons can be used to change it. To save press the Enter button. To discard any changes, press Left to scroll back to the first character and then press Left one more time.

On the left of the screen, you will also find 3 LEDs: STS, TX, RX. These can be interpreted according to the table below.

LED	Description
STS	This is the camera control status indicator. GREEN – camera is connected and control data are being received over the radio RED – camera is disconnected or no valid data for this camera number are being received
TX	GREEN – the encoder is actively encoding the video signal and sending it to the destination OFF – the encoder is not encoding; no input is connected or the destination is wrong or inaccessible
RX	GREEN – the decoder (return video) is actively decoding a stream OFF – no stream is being sent to the decoder

2.2.2 STATUS SCREEN

The status screen on the CL-RTX is being described below:



1. Resolution of signal detected on SDI IN.
2. Frame rate detected and encoding. Interlaced frame rates will be displayed as the equivalent progressive, because of the way two interlaced fields are being encoded as a single frame. “25/25” means all 25 frames are being encoded and sent to the destination.
3. “Src” – the IP address of the encoder/decoder inside the CL-RTX. Return video should be sent to this address.
   “Trg” – the destination IP that the encoder is sending the video to. This is usually the address of the CL-Base encoder/decoder.
4. Camera number of the camera control.
5. Camera manufacturer and connection method selected.
6. Current tally status as it is being sent from the CL-Base.
7. Camera control data status. A tick indicates valid data for the correct camera number are being received. A cross indicates no valid data are being received.
8. Camera connection status. A connected plug means the connection to the camera has been established.
9. Internal temperature of the encoder/decoder platform. A temperature of around 60 degrees is normal during operation.
10. Input voltage measurement. This would be either the input voltage from the external connector or the battery plate.

2.2.3 MENU STRUCTURE

The following menu structure is available on the CL-RTX unit. Individual settings are being explained to the corresponding sections are indicated in brackets, e.g. “[2.3]”.

- Main Menu
  - Encoder Settings [2.3]
    - Latency (manual)
    - Trg Bitrate
    - Fixed Bitrate
    - Bit Depth
    - Chroma Format
    - Enc Prediction
    - Deblocking Filter
    - Interlaced Enc
    - First Sequence
    - Second Sequence
    - SDI Output
  - Stream Network [2.3]
    - Source IP
    - Source Gateway
    - Source Netmask
    - Target IP
    - Target Port
    - Service Priority
    - IP Mode
    - Stream MAC 1/2
    - Stream MAC 2/2
  - Enc/Dec Information
  - Camera Control [2.4]
    - Camera Number
    - Camera Manufacturer
    - Camera Network
      - Multicast Group
      - Data Return IP
      - Panasonic IP
      - Sony IP
      - IDT IP
      - Arri CAP IP
      - BlackMagic IP
      - Canon IP
    - Advanced Options

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- 5600K
- Tally Mode
- Shutter Mode
- Hitachi ND
- Sony Filters
- Sony Colours
- Arri Port
- Arri CAP Password
- Arri CAP Exposure
- IDT Port
- DreamChip Mapping
- DreamChip Expo Speed
- DreamChip RGB Range
- Proton Mapping
- Proton Expo Speed
- Proton RGB Range
- Panasonic Port
- Sony Tally Mode
- Black Magic Exposure

- Controller Network [2.4]
  - IP Address
  - Netmask
  - Gateway
  - IP Mode

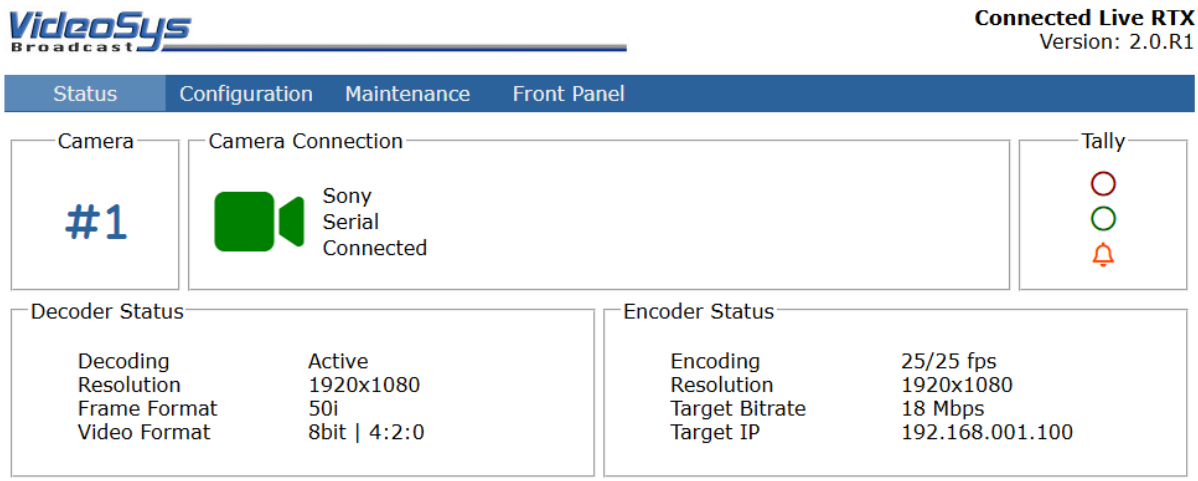
- Radio Commands [2.5]
  - Reboot
  - Factory Reset

- System
  - System Info
  - Licence Info
  - Licence Key
  - Screen Orientation
  - Fan Speed
  - Latency Mode [2.3]
  - System Reset
  - Debug Mode
  - Enc/Dec Update

2.2.4 WEB INTERFACE

The **Controller Network IP Address** can be used to access the main web interface of the CL-RTX. By default, and after a System Reset, this is set to **192.168.1.250**.

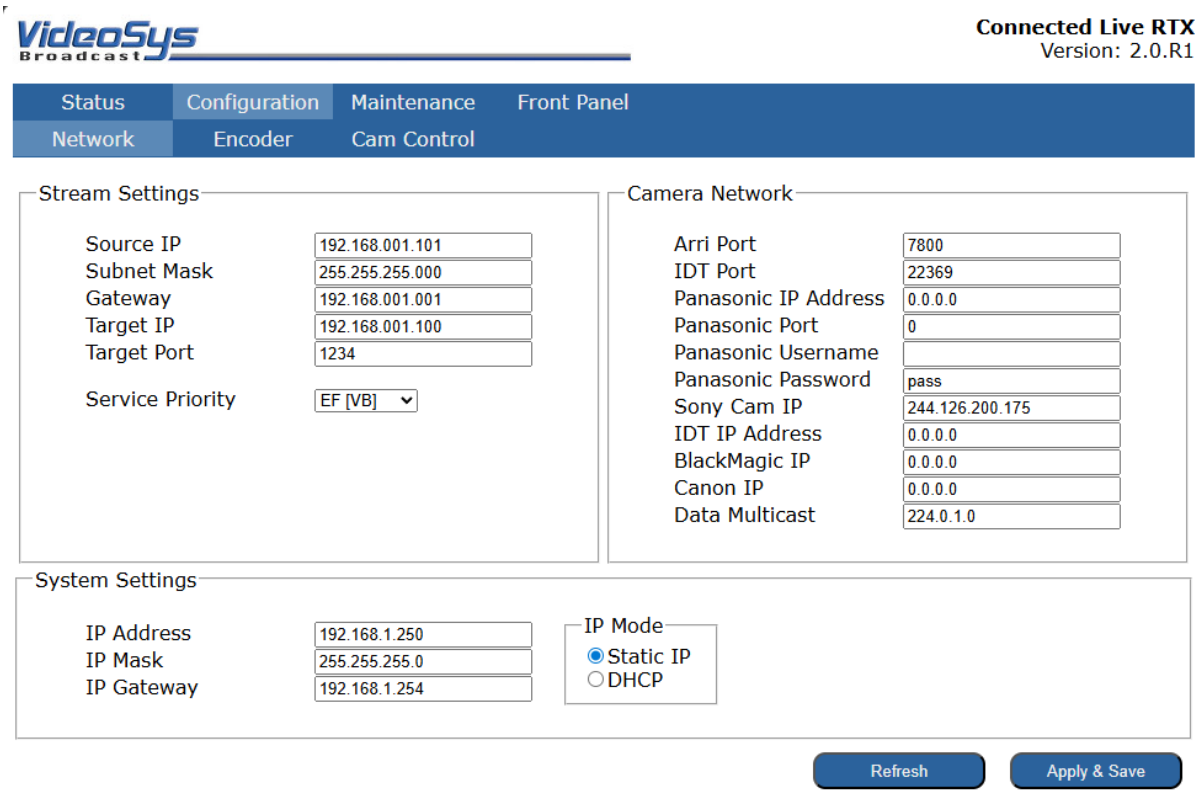
The main status subpage is shown below:



- **Camera** > This indicates the camera number assigned to this CL-RTX
- **Camera Connection** > This provides information on the connection to the camera
- **Tally** > Live indication of the tally as it is being triggered from the CL-Base
- **Decoder** > Decoder status information
- **Encoder** > Encoder status information

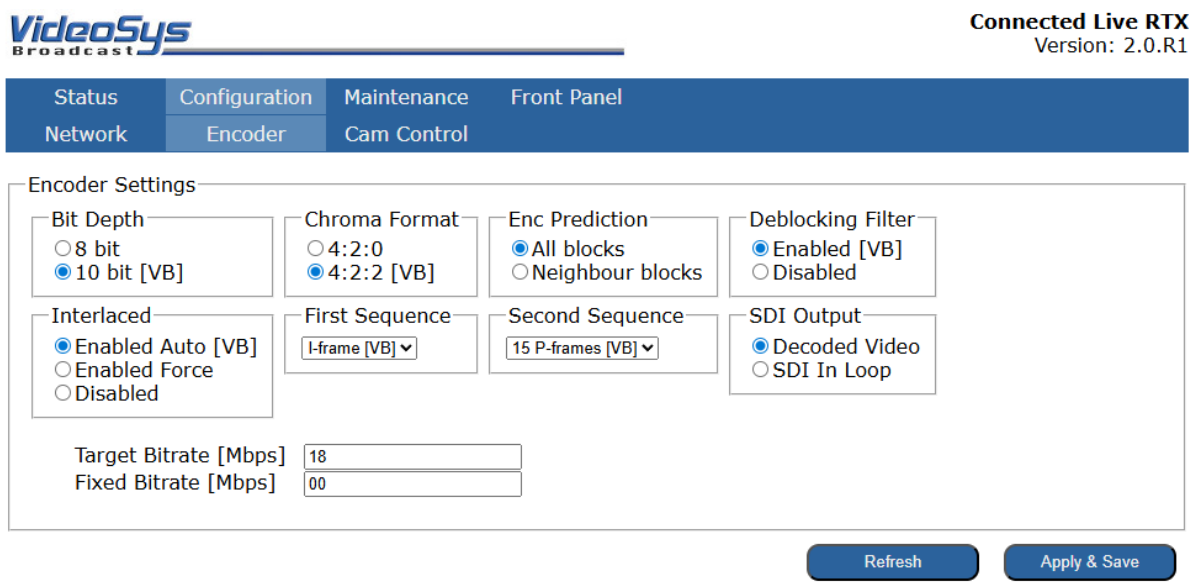
When the user is in the Configuration submenu, the buttons at the bottom can be used to read the settings of the device again [Refresh], and apply & save any changes made [Apply & Save]. The Configuration submenu is separated into three subsections:

1. **Network**



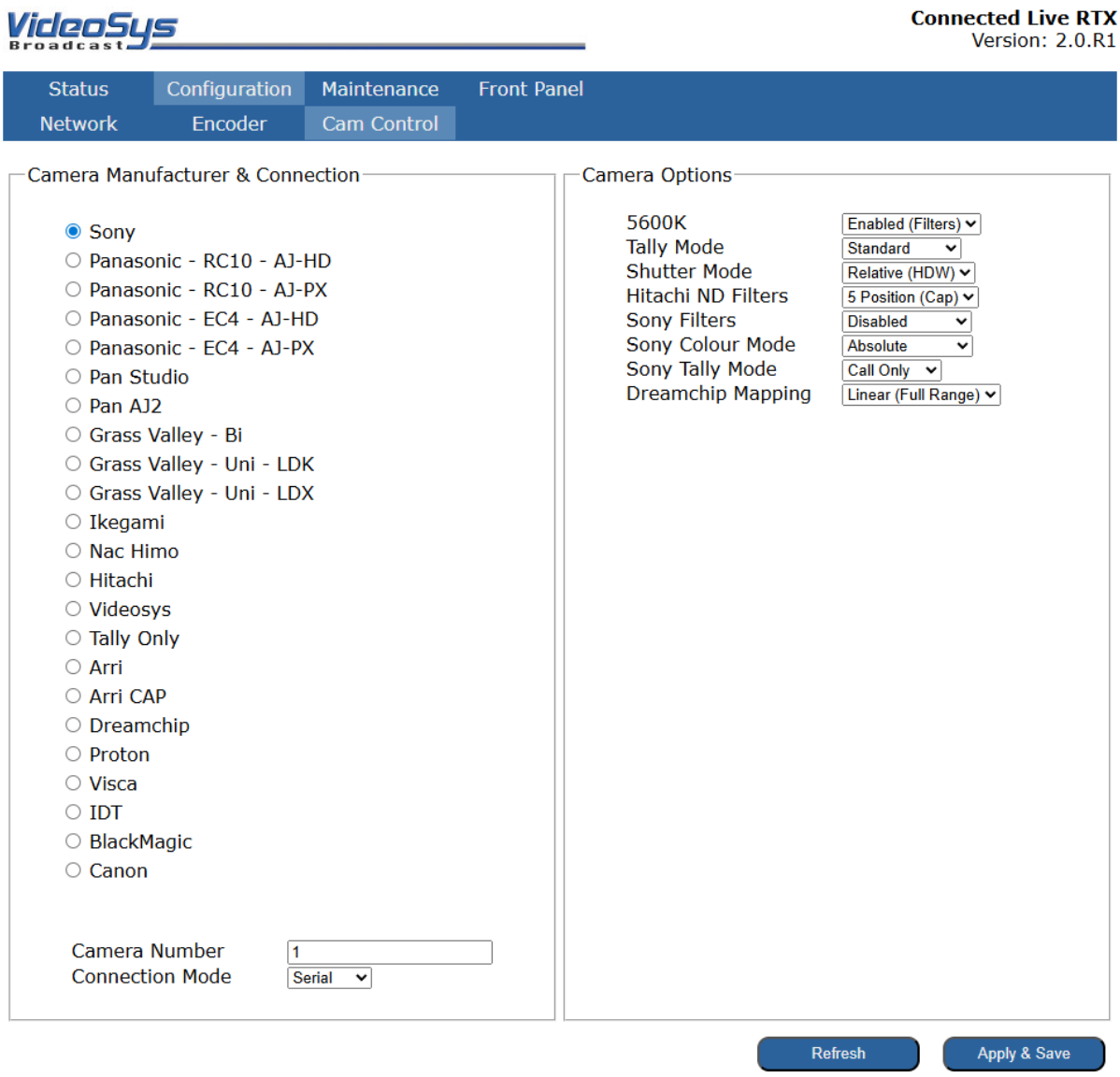
a. **Stream Settings** > Settings related to the encoder and decoder IP address and streaming.
b. **Camera Network** > Settings related to IP based camera control. If using IP as a connection method to a camera, you can configure the IP parameter from here. The "Data Multicast" address is the listening multicast group of the CL-RTX for camera control data. The unit also listens to the Controller's IP address by default.
c. **System Settings** > This is the Controller's network settings. This is the IP address that you used to get to this web interface.

2. Encoder



a. **Encoder Settings** > Settings related to the encoding mechanism. Refer to section 2.3 for more details of each setting.
Suggested settings are marked with "[VB]".

3. Cam Control



a. **Camera Manufacturer & Connection** > Use this submenu to select the desired manufacturer, camera number, and connection mode
b. **Camera Options** > A list of advanced options that control the camera control behaviour when used in unidirectional mode.

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2.3 ENCODER SETUP

The encoder inside the CL-RTX unit is a low latency 10-bit 4:2:2 H.264 encoder. When used in combination with a CL-Base decoder, the low latency mode is used by default. When used with a third-party H.264 decoder (e.g. VLC on a computer), the latency cannot be guaranteed.

The main operating principle of the system is based on the encoder creating an transport stream with the encoded signal that is being sent to a destination IP address and port via UDP.

The encoder related settings are being explained below

- **STREAM NETWORK** > This is where the streaming can be configured so that one CL-RTX targets a CL-Base or any other compatible H.264 decoder.
    - **Source IP, Gateway, Netmask** > This is the encoder/decoder platform's own IP address. This is where the IP stream will be generated from. This is also the IP that the return video must be sent to for the decoder inside the CL-RTX can pick it up.
    - **Target IP, Target Port** > This is the target or destination of the UDP IP stream. On a typical system configuration, this would be the source IP of a CL-Base unit. If you wanted to send the video to a computer, this would be the IP of the computer and a port number that you would have defined in advance.

      NOTE! The decoder inside the CL-RTX and the CL-Base listens to port number "1234" by default and this cannot be changed.
    - **Service Priority** > This controls the type-of-service field of the IPv4 header of the UDP stream. In practise, this tags the packets with a priority field that notifies the rest of the network to treat them accordingly. We recommend the settings "EF" or "CS6" to give the video stream top priority and reduce network latency to a minimum.
    - **IP Mode** > Allows you to use a static IP or DHCP for the encoder/decoder platform.
- **ENCODER SETTINGS** > These options can be used to fine tune the H.264 encoding.
    - **Trg Bitrate** > Controls the target bitrate of the encoder in Mbps. This controls the level of compression and is the bitrate that the encoder will try to compress to, but the result stream remains variable and depends on the how much the image changes. For a 3G HD signal, we recommend setting this to about 18-20 Mbps.
    - **Fixed Bitrate** > By default this is set to 0. When used, it needs to be set to a value higher than the target bitrate, and it will force the encoder to append null packets to the stream to ensure a constant bitrate stream is being sent.

- **Bit Depth** > 8 bit or 10 bit. This enables and disabled 10-bit encoding.
- **Chroma Format** > 4:2:0 or 4:2:2. Choose according to the chroma encoding you want to choose. 4:2:2 encoding will give you improved black levels.
- **Enc Prediction** > Advanced H.264 configuration. Must be set to “All Blocks”.
- **Deblocking Filter** > H.264 compression filter that reduces blocking artifacts, improving overall video quality.
- **Interlaced Enc** > Controls the encoding of interlaced signals:
  Disabled – Interlaced signals will be encoded as progressive or not encoded.
  Enabled Auto – Interlaced signals will be automatically detected and encoded accordingly [default]
  Enabled Forced – All input signals will be encoded as interlaced
- **First Sequence** > Advanced H.264 configuration. First sequence of the H.264 group of pictures. This must be set to “I-frame” unless your application requires otherwise.
- **Second Sequence** > Advanced H.264 configuration. Second sequence of the H.264 group of pictures. This must be set to “15 P-frames” unless your application requires otherwise.
- **SDI Output** > Allows control of what the SDI OUT of the CL-RTX will output:
  Decoded Video – This will connect the SDI OUT port to the output of the build-in decoder
  SDI In Loop – This will create a loop through between SDI IN and SDI OUT, and your input signal will be pushed to the output port.
- **Latency (manual)** > This setting only applies when the “Latency Mode” setting shown below is set to “Manual”. It will allow you to set a manual presentation latency to the transport stream. This is useful when the system is used with third party decoders or the network adds a large amount of latency.

- **SYSTEM SETTINGS > LATENCY MODE** > This allows switching between automatic and manual latency mode. The default setting is “Auto Normal”, which is the setting we recommend for getting optimal performance.

These settings are accessible from both the front panel and the web interface.

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2.4 CAMERA CONTROL SETUP

2.4.1 PRINCIPAL OF OPERATION

The CL-RTX camera control system emulates a camera manufacturer's RCP, allowing for a light-weight communication protocol optimised for transmission over the radio link. Two fundamentally different modes can be selected: Uni-directional and Bi-directional camera control.

In Uni-directional mode, the control is achieved using one way traffic from the CL-Base to the CL-RTX. This provides a quick, easy, and robust control link. It also allows cross-protocol conversion between RCP and Camera (e.g. using a Sony RCP to shade a BlackMagic camera, or an ATEM switcher to shade a Panasonic camera. However, uni-directional control limits the number of features that can be controlled.

Bi-directional control utilises the bidirectional data link to allow for the full functionality of the manufacturer's RCP and camera. In order to synchronise the two sides of the control system over the radio link, an initialisation procedure on start up ensures that the RCP is fully aware of all the supported features of the camera. This requires the RCP and the camera side to be of the same manufacturer, and sometimes of the same product line (e.g. for some Panasonic cameras). Not all manufactures support bi-directional mode.

2.4.2 CONNECTING TO THE CAMERA

There are two ways the CL-RTX can establish a connection to the camera, either via a serial connection using the CCAM port, or an IP connection using one of the two RJ45 ports on the unit. Serial cables are included with the purchase of each camera control manufacturer licence, and their drawings are available on our website.

An IP connection is different for each manufacturer and specific guides are available on our website under: "Support > Software Updates > Videosys Products > Camera Control > Guides".

2.4.3 CAMERA CONTROL MENUS

The camera control related menus are described below:

- **Camera Control**
  - **Camera Number**
    Allows for the camera number to be set between 01 and 96. This must be aligned with the camera number used in the CL-Base.

  - **Camera Manufacturer**
    The camera manufacturer and connection mode can be set here. For some manufacturers the control mode (uni-directional vs bi-directional) is automatically chosen based on the CL-Base settings. Refer to the table below for camera specific information.

We are constantly improving our camera control and expanding the manufacturers we support so please reach out to our team for an up-to-date list.

Manufacturer (camera side)	Serial	IP	Unidirectional	Bidirectional	Auto Bidi
Sony	✓	✓	✓	✓	✓
Grass Valley	✓	✓	✓	✓	x
Hitachi	✓	x	✓	✓	✓
Ikegami	✓	x	✓	x	x
Panasonic	✓	✓	✓	✓	✓
Arri (Sony)	x	✓	✓	✓	✓
Arri (CAP)	x	✓	✓	x	x
Dreamchip	✓	x	✓	x	x
Proton	✓	x	✓	x	x
Blackmagic	x	✓	✓	x	x
Canon	x	✓	✓	x	x

  - **Camera Network**
    - **Multicast Group**
      This is a multicast group (by default 224.0.1.0) that the device will be listening to for camera control data being sent from a CL-Base.

A CL-RTX is listening for camera control data to both the multicast group and its own Controller IP at the same time. One of these addresses must be typed into the corresponding CL-Base as a data address so that it is sending the camera control information to the correct destination

    - **Data Return IP**
      This must be the Controller IP address of the corresponding CL-Base, for the bidirectional control mode to work.

        - **Panasonic IP**
        - **Sony IP**
        - **IDT IP**
        - **Arri CAP IP**
        - **BlackMagic IP**
        - **Canon IP**

          These are all camera IP addresses that are being used when connecting to one of these manufacturers via IP. These must match the IP address of the camera that we are connecting to.

    - **Advanced Options**
        - **5600K**
        - **Tally Mode**
        - **Shutter Mode**
        - **Hitachi ND**
        - **Sony Filters**
        - **Sony Colours**

          Set this to relative when using a Sony camera in unidirectional mode for the AutoWhiteBalance feature to work correctly.
        - **Arri Port**
        - **Arri CAP Password**
        - **Arri CAP Exposure**
        - **IDT Port**
        - **DreamChip Mapping**
        - **DreamChip Expo Speed**
        - **DreamChip RGB Range**
        - **Proton Mapping**
        - **Proton Expo Speed**
        - **Proton RGB Range**
        - **Panasonic Port**
        - **Sony Tally Mode**
        - **Black Magic Exposure**

          These are camera control specific settings that change the behaviour of the system in unidirectional mode. Please reach out to the Videosys team for more information about them.

- **Controller Network**
    - **IP Address**
    - **Netmask**
    - **Gateway**
    - **IP Mode**

      These IP settings are the camera control system's interface. This interface is used for web gui access as shown above, and for connecting to the camera if an IP connection method is used.

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2.5 BUILD-IN RADIO NODE

Inside the CL-RTX unit, there is a radio board that is configured as a camera node. This is identical to the Videosys radio board that is used inside the CL-Node unit, and therefore share the same code. Please refer to the CL-Node instructions in section 4.2 for setup information.

Currently the radio inside the CL-RTX can only be configured via a web interface, but the user can still reboot and restore the default settings to the radio via the front panel:

- **Main Menu**
  - **Radio Commands**
    - **Reboot** > Triggers a reboot to the radio board. No settings will be lost. A connection will be reestablished in approximately 30-60 seconds.

    - **Factory Reset** > The radio board will be reset to the default settings. Connection will be lost and a physical connection via the RJ45 ports will be required to re-establish a connection.
      Please refer to the note below.

Note!

After a factory reset to the radio board inside the CL-RTX, the radio will be set to IP address ***192.168.2.1*** with a username and password ***admin/admin***.

It will also be configured as a fixed node, which will need to be changed to a camera node to re-establish a connection (refer to 4.3.2.1 for more information).

This is a temporary problem, which will be rectified with a software update in the future, and we offer configuration files that can be reloaded to the radio in order to re-establish a working system.

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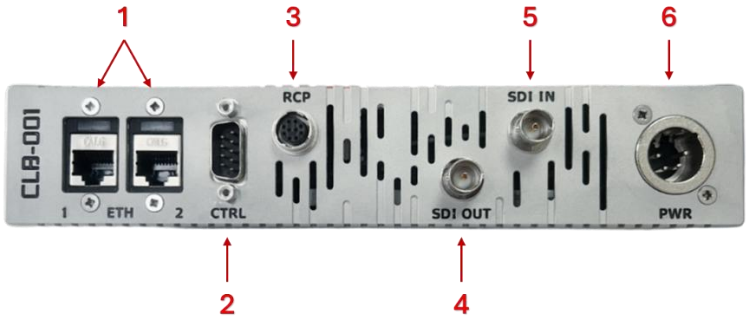
3 CL-BASE

3.1 CONNECTORS



Number	Description	Connector	Pinout
1	ETH – Ethernet connection	RJ45 x 2	RJ45 T568B
2	CTRL – Control connection for auxiliary features For tally triggers: short pins 1 and 2 or 1 and 8 for red and green respectively.	D9 Male	1 – Fused Power Out 2 – RS232 #1 RX / Red Tally Input 3 – RS232 #1 TX 4 – 3.3V 5 – GND 6 – GPIO 1 7 – GPIO 2 8 – RS232 #2 RX / Green Tally Input 9 – RS232 #2 TX
3	CCAM – Camera control serial connector	Hirose HR10A-10R-10S(71)	1 – RS422 RX + 2 – RS422 RX - 3 – RS422 TX + 4 – RS422 TX - 5 – GND 6 – RS232 RX 7 – RS232 TX 8 – N/C 9 – Unregulated Power Out 10 – GND
4	SDI OUT	BNC	SDI output from the decoder
5	SDI IN	BNC	SDI input to encoder
6	12V Power In	Neutrik NC4MD-LX 4-Pin XLR	1 – GND 2 – N/C 3 – N/C 4 – Vin

3.2 CONFIGURATION

3.2.1 FRONT PANEL NAVIGATION

The Up, Down, Left, Right, Enter, and Cancel buttons can be used to navigate through the menus. Menus are organised into lists; these can be scrolled through with the Up and Down buttons. To enter a selected submenu or option press the Enter button. Cancel will return to the previous screen. The Enter button is used to set or save an option. Cancel can be used to exit a submenu without making any changes.

Within a text or number edit screen, the Left and Right buttons can be used to select a character for editing and the Up and Down buttons can be used to change it. To save press the Enter button. To discard any changes and return to the previous screen, press Cancel.

3.2.2 STATUS SCREEN

The first screen that will be displayed to the user on power-up is the status screen. This is split into three views that can be changed using the Up and Down buttons:

1. **Camera Control View**

This is the default status screen that will change based on the camera control mode that is being used. In unidirectional mode the status screen is shown below:

Line 1: “[cam number]: [connection status]” This indicates the camera number assigned to the system and the connection status to the RCP (Connected or Disconnected).

Line 2: “Mfg: [manufacturer]” This informs the user of the RCP manufacturer they selected.

Line 3: “Con: [connection method]” This informs the user of how they connect to the RCP (IP or Serial)

Line 4: “Tally: [R or -] [G or -] [C or -]” Indicates the tally status being triggered for Red, Green and Call.

Bidirectional control can be broken down into four main data paths:

- Return Data = from CL-RTX to CL-Base
- Forward Data = From CL-Base to CL-RTX
- Panel Data = Connection between CL-Base and RCP
- Camera Data = Connection between CL-RTX and camera

Each one needs to be configured correctly for bidirectional control to work.

In bidirectional mode the status screen is shown below:

Line 1: "[cam number]: [bidirectional status]" This indicates the camera number assigned to the system and the bidirectional status of the camera control. The status could be:

- "Not Ready" – At least one of the four data paths are not currently connected or configured correctly
- "Sync …" – All four paths are connected and the Panel and Camera are initialising or syncing the information they have
- "Active" – The system is initialised and in sync
  Normal operation can be performed while the system shows "Sync …" or "Active".

Line 2: "Data: RTN [✓ / X] | FWD [✓ / X / ?]" These are indications for the return and forward data path status:

RTN:	✓	The CL-Base is receiving valid return data from the CL-RTX
	X	The CL-Base is not receiving valid return data (check the return data IP setting in the CL-RTX unit
FWD:	✓	Both return and forward data paths are ok
	X	The forward data path is not ok (check the data multicast setting of the CL-Base – this needs to match the IP of the CL-RTX controller or the multicast group)
	?	The state of the forward data path cannot be determined as the return data path is not correct (address the return data path problem first)

Line 3: "Panel: [✓ / X / ~] | Cam [✓ / X / ~]" This informs the user of the connection status between the CL-Base and the RCP, and between the CL-RTX and the camera:

✓	The connection is OK and in sync
X	The connection is not established
~	The connection is established and is being synchronised

Line 4: "Tally: [R or -] [G or -] [C or -]" Indicates the tally status being triggered for Red, Green and Call.

2. Encoder/Decoder View

Push Down once from the camera control status screen to view the Encoder/Decoder status, that includes information about the video streaming, as shown below:

Line 1: The source IP address of the encoder/decoder platform inside the CL-Base. The CL-RTX must be set to target this IP address.

Line 2: The destination IP address of the encoder of the CL-Base. This is usually set to the source IP of the CL-RTX that we are sending return video to.

Line 3: The resolution of the return video that has been connected to the SDI IN port of the CL-Base

Line 4: Frame rate detected and encoding. Interlaced frame rates will be displayed as the equivalent progressive, because of the way two interlaced fields are being encoded as a single frame. “25/25” means all 25 frames are being encoded and sent to the destination.

3. Control Network View

Push Down one more time from the Encoder/Decoder status screen to view the system’s IP address. This is the IP address of the controller that can be used for camera control and for the web interface shown in section 3.2.4. When DHCP is used, you can use this screen to see the assigned IP address.

Line 1: DHCP status when used.

Line 2: Controller’s IP address. Can be used for camera control and web interface access

Line 3: Controller’s netmask.

Line 4: Controller’s gateway address.

3.2.3 MENU STRUCTURE

The following menu structure is available on the CL-Base unit. Individual settings are being explained to the corresponding sections are indicated in brackets, e.g. “[3.3]”.

- Main Menu
  - Camera Control [3.4]
    - Camera Number
    - Camera Manufacturer
    - Bidi Panel Drop
  - Network
    - System Settings [3.4]
      - IP Address
      - Netmask
      - Gateway
      - VLAN
      - IP Mode
    - Stream Settings [3.3]
      - Source IP
      - Subnet Mask
      - Gateway
      - Target IP
      - Target Port
      - Service Priority
      - IP Mode
      - Stream MAC 1/2
      - Stream MAC 2/2
    - Camera Network [3.4]
      - Cam Control IP
      - Cam Control Netmask
      - Cam Control Gateway
      - Cam Control VLAN
      - Data Multicast Group
      - Cascade Target IP
      - Sony MSU Target IP
      - Panasonic Ports
        - Channel Port
        - Panel ROP Port
      - ATEM Switcher
  - Encoder Settings [3.3]
    - Latency (manual)

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- Trg Bitrate
- Fixed Bitrate
- Bit Depth
- Chroma Format
- Enc Prediction
- Deblocking Filter
- Interlaced Enc
- First Sequence
- Second Sequence
- SDI Output

- System
  - System Information
  - Enc/Dec Information
  - Licence Information
  - Paint Clear [3.4]
  - System Reset [3.4]
  - Latency Mode [3.3]
  - Debug Mode
  - Enc/Dec Update

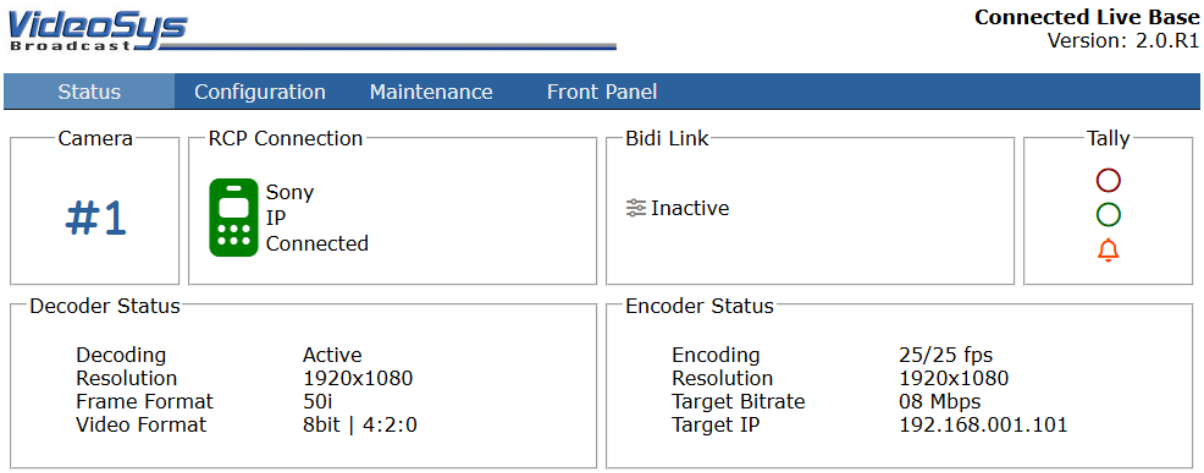
3.2.4 WEB INTERFACE

The **Controller Network IP Address** can be used to access the main web interface of the CL-Base. By default, and after a System Reset, this is set to **192.168.1.230**. If using DHCP, use the status screen on the unit to find out which IP address was assigned to the device. If no DHCP server is available, the CL-Base will fall back to the static IP address that was defined by the user (or the default one after a system reset).

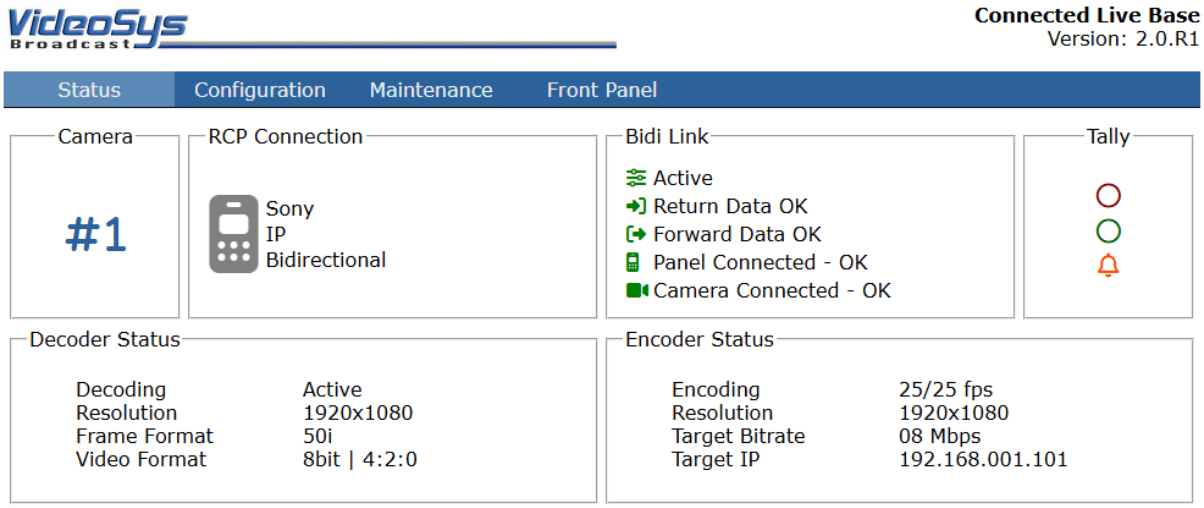
3.2.4.1 STATUS TAB

The main status subpage of the CL-Base will depend upon the camera control mode that is being used.

In unidirectional mode the status page is shown below:



In bidirectional mode the status page is shown below:

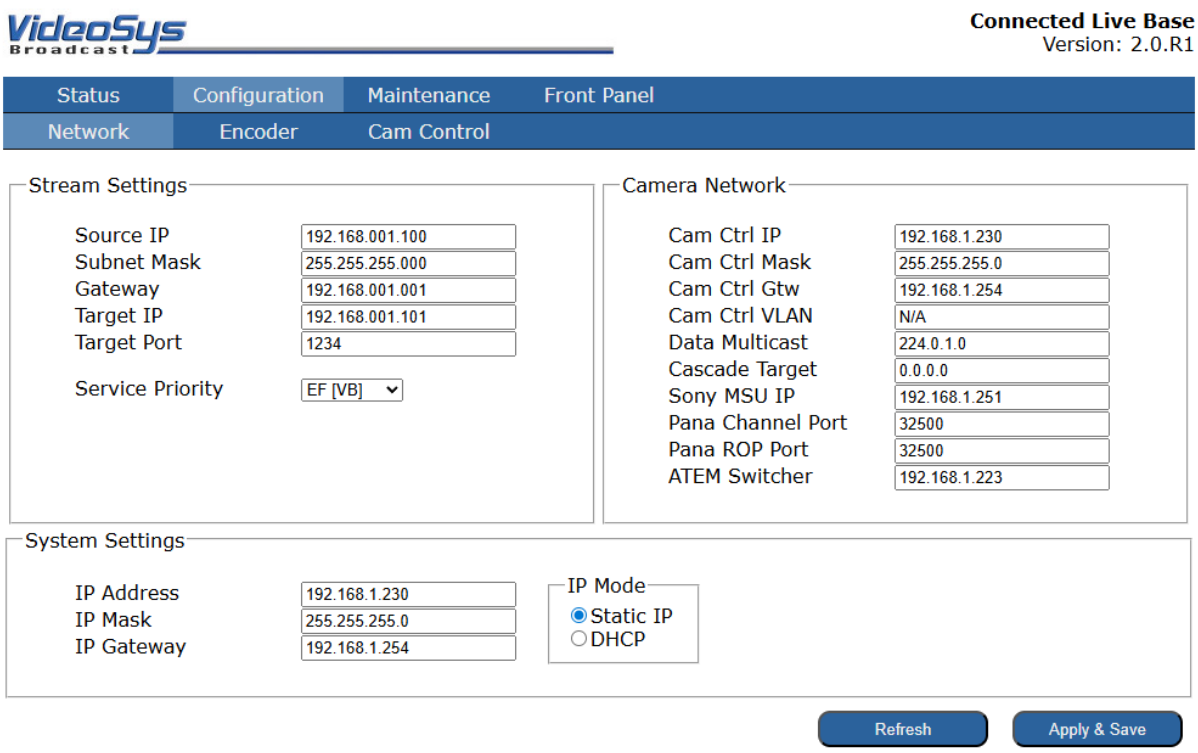


- **Camera** > This indicates the camera number assigned to this CL-Base
- **RCP Connection** > This provides information on the connection to the RCP
- **Bidi Link** > This provides information on the connection to the RCP
- **Tally** > Live indication of the tally as it is being triggered from the GPIO pins or call
- **Decoder** > Decoder status information
- **Encoder** > Encoder status information

3.2.4.2 CONFIGURATION TAB

When the user is in the Configuration submenu, the buttons at the bottom can be used to read the settings of the device again [Refresh], and apply & save any changes made [Apply & Save]. The Configuration submenu is separated into three subsections:

1. **Network**

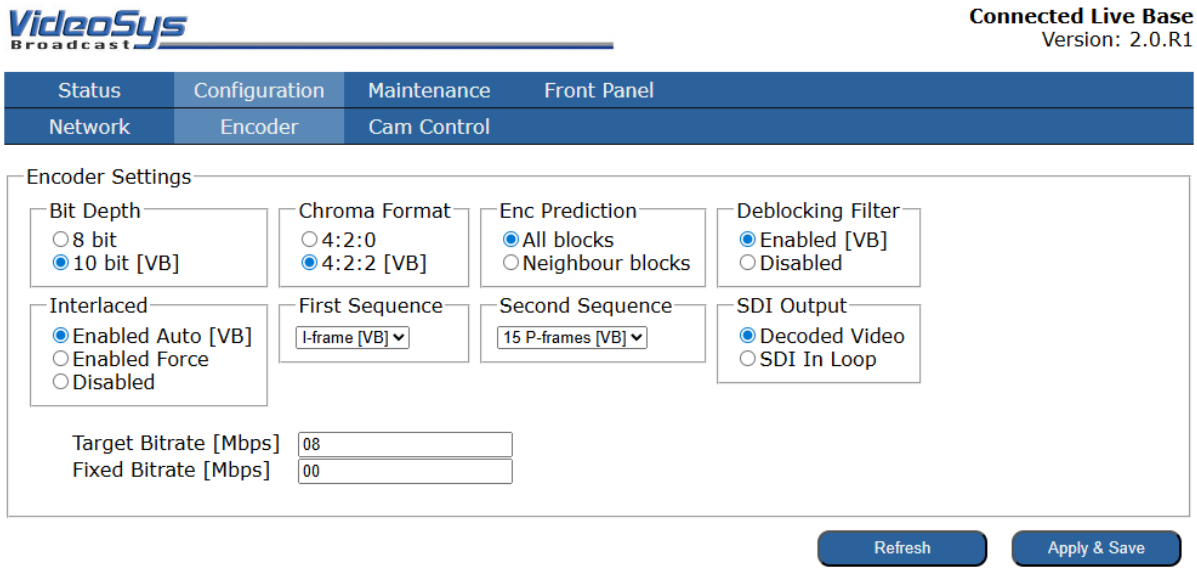


   a. **Stream Settings** > Settings related to the encoder and decoder IP address and streaming.
   b. **Camera Network** > Settings related to IP based camera control. If using IP as a connection method to an RCP, you can assign a different subnet to the camera control connection from here.

The “Data Multicast” address is the target address for camera control data. This can be either the multicast group of the CL-RTX or the actual controller IP of the CL-RTX that you want to control using this CL-Base.

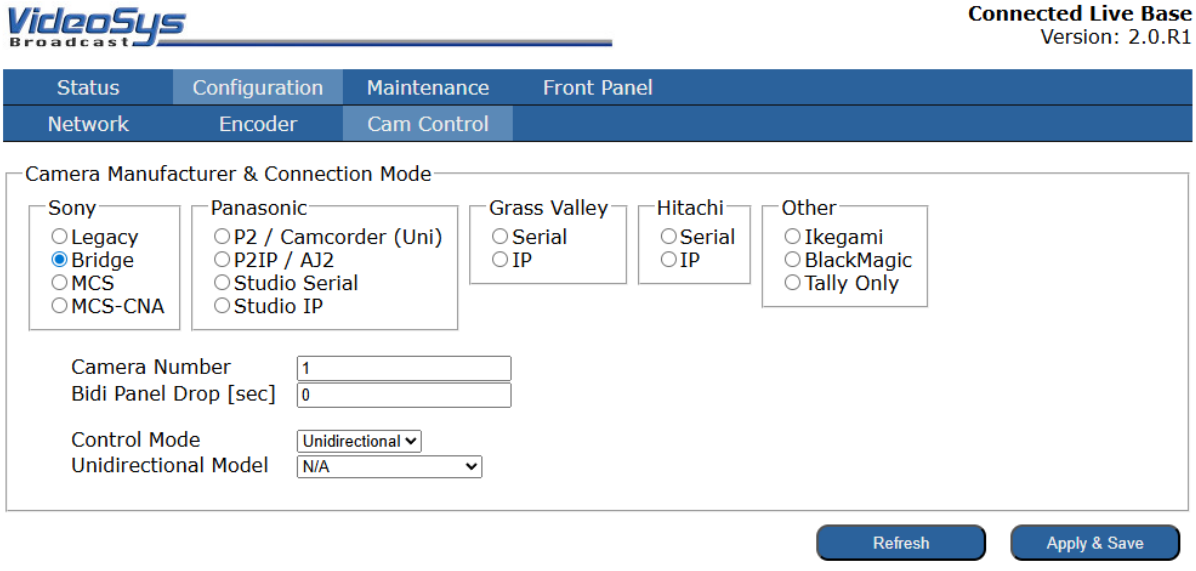
   c. **System Settings** > This is the Controller’s network settings. This is the IP address that you used to get to this web interface.

2. Encoder



a. **Encoder Settings** > Settings related to the encoding mechanism. Refer to section 3.3 for more details of each setting.
Suggested settings are marked with "[VB]".

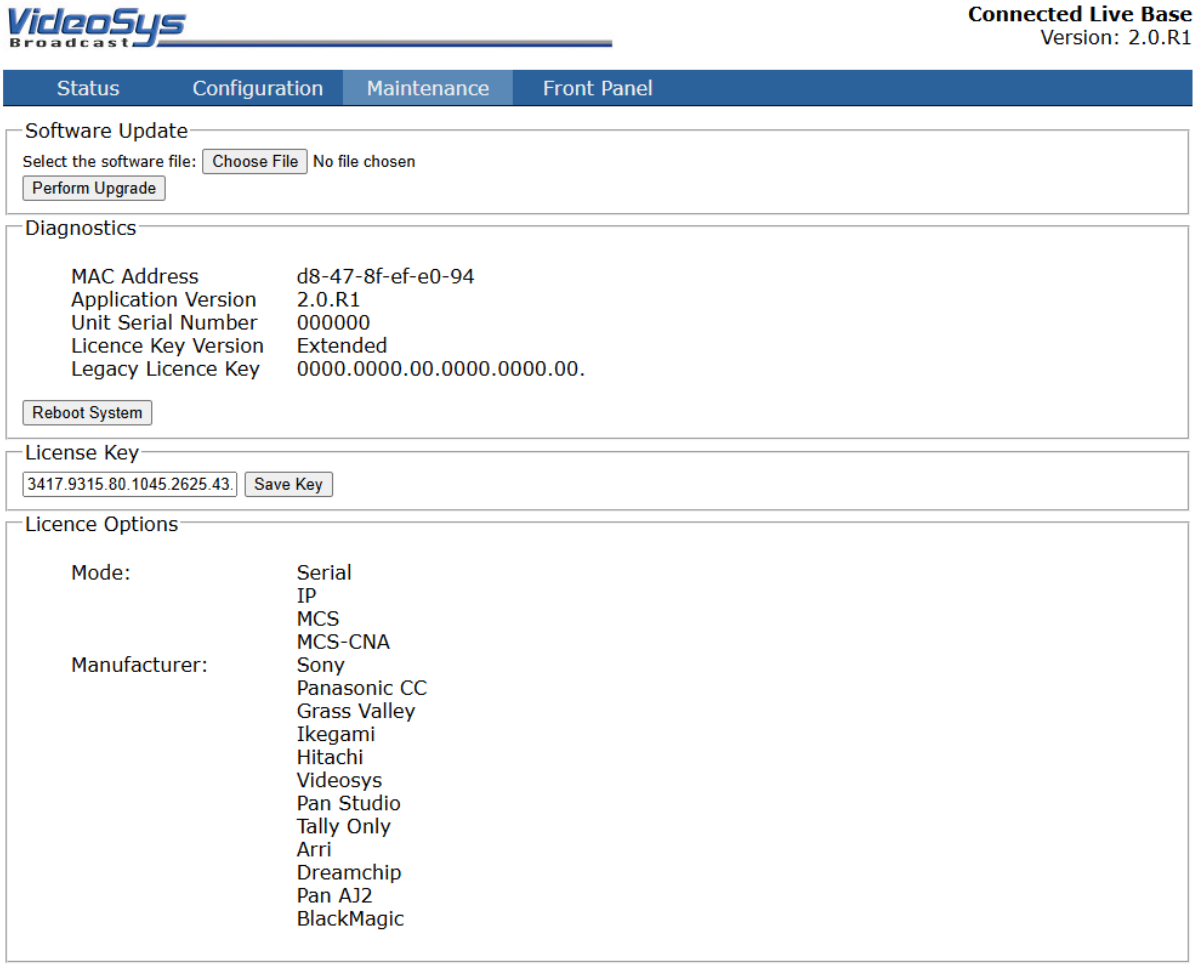
3. Cam Control



a. **Camera Manufacturer & Connection Mode** > Use this submenu to select the desired manufacturer, camera number, and connection mode

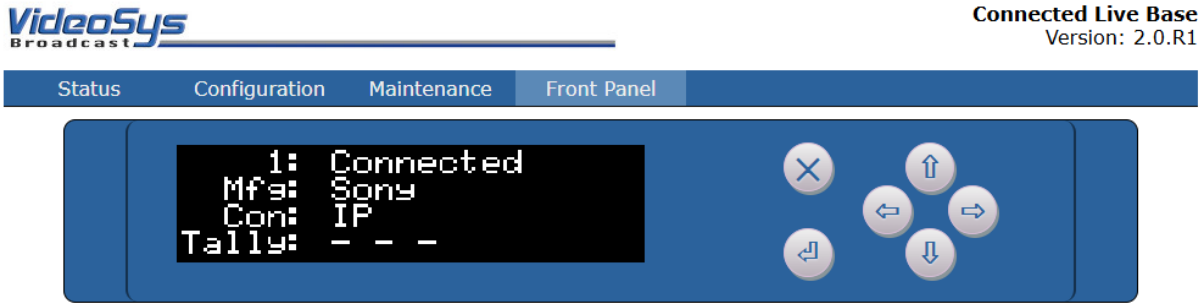
3.2.4.3 MAINTENANCE TAB

The Maintenance tab give information about the unit, including available camera control licences, and allows for software updates.



3.2.4.4 FRONT PANEL TAB

The Front Panel page mirrors the information presented on the unit's front panel and allows for remotely controlling the CL-Base.



3.3 DECODER / ENCODER SETUP

The decoder inside the CL-Base is designed to be used in parallel with a CL-RTX and offers low latency 10-bit 4:2:2 H.264 decoding. The only applicable setting is the source IP of the encoder/decoder, under the **Network > Stream Settings** submenu, which is the address that the CL-RTX needs to target. Everything else in the decoder is setup automatically.

The encoder inside the CL-Base unit is a low latency 10-bit 4:2:2 H.264 encoder. When used in combination with a CL-RTX decoder, the low latency mode is used by default, and it can be use to send return video to the camera side. When used with a third-party H.264 decoder (e.g. VLC on a computer), the latency cannot be guaranteed.

The encoder related settings are being explained below

- **NETWORK > STREAM Settings** > This is where the streaming can be configured so that one CL-Base targets a CL-RTX or any other compatible H.264 decoder.
    - **Source IP, Gateway, Netmask** > This is the encoder/decoder platform's own IP address. This is where the IP stream will be generated from. This is also the IP that the main video must be sent to for the decoder inside the CL-Base to pick it up.
    - **Target IP, Target Port** > This is the target or destination of the UDP IP stream. On a typical system configuration, this would be the source IP of a CL-RTX unit, if you wanted to send return video.

NOTE! The decoder inside the CL-RTX and the CL-Base listens to port number "1234" by default and this cannot be changed.

    - **Service Priority** > This controls the type-of-service field of the IPv4 header of the UDP stream. In practise, this tags the packets with a priority field that notifies the rest of the network to treat them accordingly. We recommend the settings "EF" or "CS6" to give the video stream top priority and reduce network latency to a minimum.
    - **IP Mode** > Allows you to use a static IP or DHCP for the encoder/decoder platform.
- **ENCODER SETTINGS** > These options can be used to fine tune the H.264 encoding.
    - **Trg Bitrate** > Controls the target bitrate of the encoder in Mbps. This controls the level of compression and is the bitrate that the encoder will try to compress to, but the result stream remains variable and depends on the how much the image changes. For return video, we recommend setting this to about 5 - 10 Mbps.

- **Fixed Bitrate** > By default this is set to 0. When used, it needs to be set to a value higher than the target bitrate, and it will force the encoder to append null packets to the stream to ensure a constant bitrate stream is being sent.

- **Bit Depth** > 8 bit or 10 bit. This enables and disabled 10-bit encoding.

- **Chroma Format** > 4:2:0 or 4:2:2. Choose according to the chroma encoding you want to choose. 4:2:2 encoding will give you improved black levels.

- **Enc Prediction** > Advanced H.264 configuration. Must be set to “All Blocks”.

- **Deblocking Filter** > H.264 compression filter that reduces blocking artifacts, improving overall video quality.

- **Interlaced Enc** > Controls the encoding of interlaced signals:
  Disabled – Interlaced signals will be encoded as progressive or not encoded.
  Enabled Auto – Interlaced signals will be automatically detected and encoded accordingly [default]
  Enabled Forced – All input signals will be encoded as interlaced

- **First Sequence** > Advanced H.264 configuration. First sequence of the H.264 group of pictures. This must be set to “I-frame” unless your application requires otherwise.

- **Second Sequence** > Advanced H.264 configuration. Second sequence of the H.264 group of pictures. This must be set to “15 P-frames” unless your application requires otherwise.

- **SDI Output** > Allows control of what the SDI OUT of the CL-RTX will output:
  Decoded Video – This will connect the SDI OUT port to the output of the build-in decoder
  SDI In Loop – This will create a loop through between SDI IN and SDI OUT, and your input signal will be pushed to the output port.

- **Latency (manual)** > This setting only applies when the “Latency Mode” setting shown below is set to “Manual”. It will allow you to set a manual presentation latency to the transport stream. This is useful when the system is used with third party decoders or the network adds a large amount of latency.

- **SYSTEM SETTINGS > LATENCY MODE** > This allows switching between automatic and manual latency mode. The default setting is “Auto Normal”, which is the setting we recommend for getting optimal performance.

These settings are accessible from both the front panel and the web interface.

3.4 CAMERA CONTROL SETUP

3.4.1 PRINCIPAL OF OPERATION

The CL-Base camera control system emulates a camera to connect to a manufacturer's remote control panel, and send paint commands over a wireless link, optimising the data and communication protocol for transmission over radio. Two fundamentally different modes of operation are available:

Unidirectional Mode

In this mode the CL-Base acts as a virtual camera and talks to the RCP via its native protocol. Changes to this virtual camera are then encoded into our low latency protocol, and sent to the CL-RTX, where a virtual panel shades the connected camera in its native protocol.

- ✓ This approach allows high performance in an poor RF environment as data loss will not cause link failure.
- ✓ Unidirectional operation boasts simple setup, as only one data path needs to be configured.
- ✓ Due to the use of an intermediate protocol, Uni-directional operation allows operators to mix and match different manufacturer's cameras and control panels.
- × As each command has to be implemented and handled separately, not all of the features available on manufacturer's cameras and control panels will be available when used with a unidirectional control link You can see a list of supported features here: Camera Parameters supported in Uni-directional.pdf
  (Videosys.tv > Support > Software Updates > Videosys Products > Camera Control > Guides > Camera Parameters supported in Uni-directional.pdf)

Bidirectional Mode

In this mode an RCP natively communicates to the CL-Base. Data is then conditioned and forwarded on to the CL-RTX, which then communicates with the manufacturer's camera. Return data (i.e. the responses of the camera) is sent from the CL-RTX back to the CL-Base. The CL-Base ensures the two sides of the connection are in sync, and the panel is populated with the real data of the camera.

- ✓ All the features that would be available via a cabled setup are available via our Bidirectional setup.
- ✓ The housekeeping and link monitoring that happens inside the CL-Base ensures no interruptions or sync issues happen when the camera is out of range or the operator performs a battery change.
- × The same manufacturer must be used for both the RCP and the camera.
- × Due to the RF connection restrictions, wake-up times for the RCP might be slightly longer compared to a unidirectional setup or a direct wired connection.

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3.4.2 CONNECTING TO AN RCP

You can connect to an RCP via an ethernet connection or a serial connection using the legacy CCAM connector at the back of the unit. Serial cables are available to purchase separately, and their drawings are available free of charge on our website.

An IP connection is different for each manufacturer and specific guides are available on our website under: “Support > Software Updates > Videosys Products > Camera Control > Guides”.

3.4.3 TALLY TRIGGER

Red and green tally can be triggered on the CL-Base via the D9 connector at the back of the unit. Refer to the table in section 3.1 for the pins that you need to short in order to trigger the tally. Once triggered, the display will indicate that it has been switched on, the RCP tally will be triggered, and the tally command will be sent across the link to the CL-RTX in order to trigger the camera’s tally.

A TSL implementation is available upon request.

3.4.4 CAMERA CONTROL MENUS

The camera control related menus are described below:

- **Camera Control**
  - **Camera Number**
    Allows for the camera number to be set between 01 and 96. This must be aligned with the camera number used in the CL-RTX.

  - **Camera Manufacturer**
    The camera manufacturer and connection mode can be set here. Refer to the table below for camera specific information.

We are constantly improving our camera control and expanding the manufacturers we support so please reach out to our team for an up-to-date list.

Manufacturer (rcp side)	Serial	IP	Unidirectional	Bidirectional
Sony	✓	✓ (Bridge, MCS)	✓	✓
Grass Valley	✓	✓	✓	✓
Hitachi	✓	✓	✓	✓
Ikegami	✓	x	✓	x
Panasonic	✓	✓	✓	✓
Blackmagic	x	✓	✓	x

  - **Bidi Panel Drop**
    Setting that applied in bidirectional mode. Timeout in seconds after which the connection to the RCP will be dropped if there is no valid data link or no connection to the camera. Set this to 0 if you don't want to drop the connection to the panel during a battery change, and if you don't want the panel to reinitialise.

- **Network > Camera Network**
  - **Cam Control IP, Netmask, Gateway, VLAN**
    You can change the subnet of the camera control connection to an ethernet panel, keeping the management interface IP (controller's network) to a different subnet. This will be reset to match the controller's IP address if you change the IP address of the controller.

  - **Data Multicast Group**
    This is the address that the camera control data will be sent to (to the CL-RTX).

A CL-RTX is listening for camera control data to both the multicast group and its own Controller IP at the same time. One of these addresses must be typed into this field of the CL-Base.

- **Cascade Target IP**
  You can target another CL-Base or another Videosys camera control system (an IDU) in order to use cascade the data and use another unit's data path.

- **Sony MSU Target IP**
  This is used when connecting to a Sony panel via an MSU.

- **Panasonic Ports**
  Populate these fields and ensure they match the setup on your Panasonic Studio RCP to establish an IP connection.

- **ATEM Switcher**
  ATEM IP address, used when connecting to a Blackmagic ecosystem.

- **Network > System Settings**
  - **IP Address**
  - **Netmask**
  - **Gateway**
  - **IP Mode**

These IP settings are the camera control system's interface. This interface is used for web gui access as shown above, and for connecting to the camera if an IP connection method is used (unless a different interface has been setup under the camera network submenu above).

3.4.4.1 RESETING THE SYSTEM

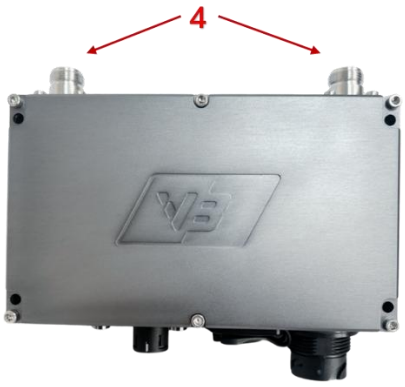
There are two types of system reset that can be performed on a CL-Base unit:

- **System > Paint Clear**
  This will clear all the stored paint parameters for unidirectional mode. When shading the virtual camera in this mode, the colour settings applied are stored in non-volatile memory in order to quickly restore the system after a power cycle. Use this setting to reset all paint features to the default values (all 0).

- **System > System Reset**
  Use this system reset to restore all unit settings, including encoder/decoder settings to the defaults.
  The default IP for a CL-Base after a reset is 192.168.1.230

4 CL-NODE

4.1 CONNECTORS



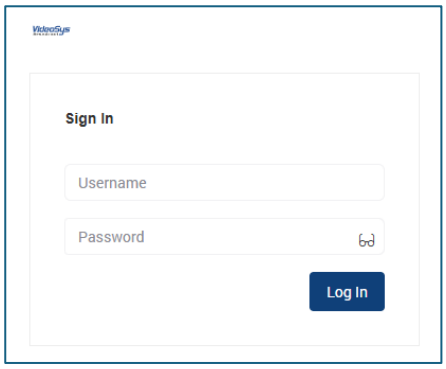
Number	Description	Connector	Pinout
1	PWR – External power input	Binder 99 9115 00 05	1 – GND 2 – GND 3 – Vin 4 – Vin 5 – NC
2	ETH – Ethernet connector. POE power input	Neutrik NE8FDV-B-TOP	RJ45 T568B
3	FIBRE – Fiber connection to a built-in media converter	Amphenol CONEC LC series 17-300010	Fitted with an SM321A-2(UN) SFP by default, unless specified differently on order
4	2 x N-type antenna connectors	N-type	Internal connection to the radio's antenna ports

4.2 WEB GUI

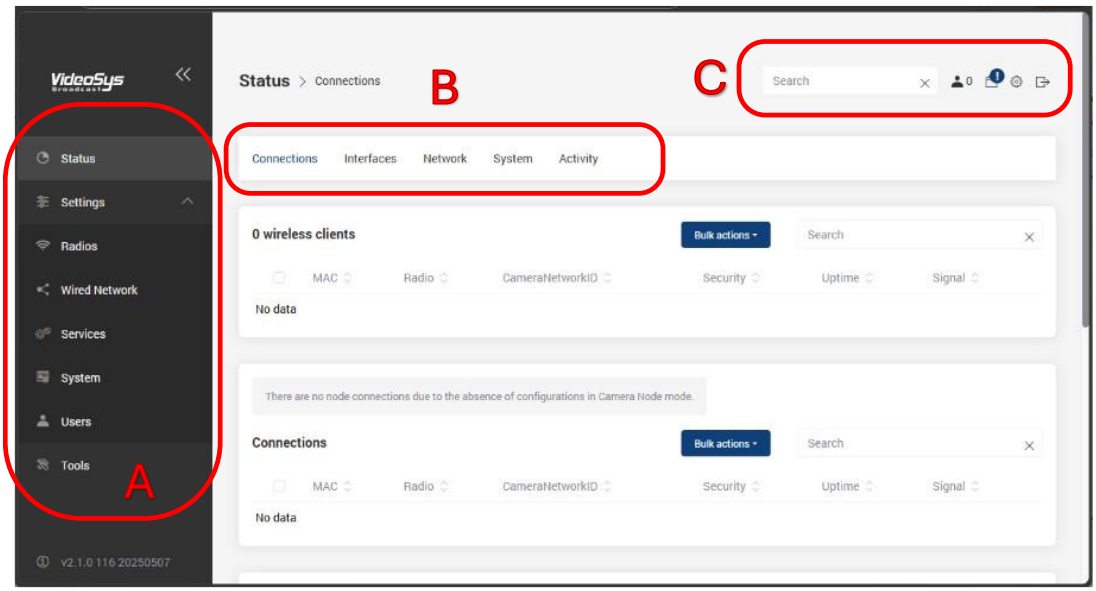
The default IP and login details of the radio unit are the following:

- IP Address = 192.168.2.1
- Username = admin
- Password = admin

On a successful login, you are presented with the main status screen, which is explained in the next section.



4.2.1 STATUS PAGE



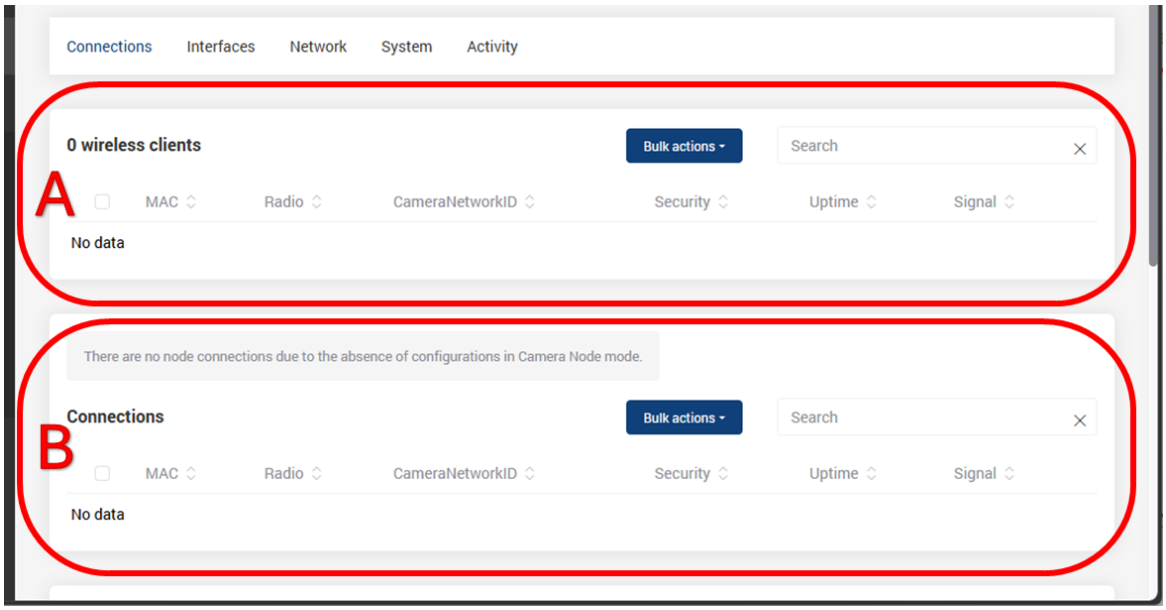
A. **Main Navigation Bar:** Use it to navigate to each main section of the web interface. You can switch between the Status page and the various Settings pages. A Tools page with various utilities is also available. The availability of menus will change depending on the levels of access that the logged in user has (refer to *** below).
B. **Secondary Navigation Bar:** Each main page might have more than one subpages that can be navigated to via this bar. The various options for the status page are described in the next subsections.
C. **Top Toolbar:** Used for general management of the radio (presets, reboot and more). Refer to section ** for more information.

4.2.1.1 STATUS > CONNECTIONS

This section lists which other radios are connected to this unit.

- When the radio is configured as a Fixed Node (i.e. in a typical CL-Node application), the connected camera nodes will appear in the top section (“A” shown below).
- When the radio is configured as a Camera Node (i.e. in a typical CL-RTX application), the connected fixed node will appear in the bottom section (“B” shown below).

- A radio can be configured to run both as a fixed node and as a camera node simultaneously (not normally needed), so both of these sections could show connected devices.



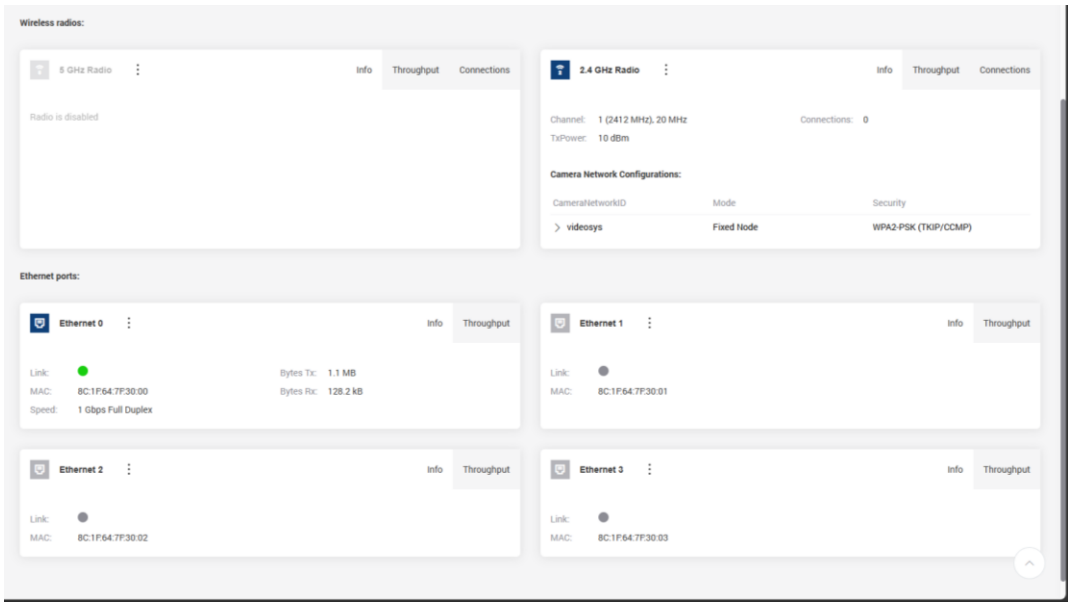
For each connected device, you can click on the drop down arrow to the left of the device to view more information, including a live preview of the dataflow

//insert image here

4.2.1.2 STATUS > INTERFACES

The “Interfaces” subsection of the status page will give you information about the 6 different interfaces that each radio has: 2 x wireless interfaces (2.4GHz and 5GHz radio) and 4 x wired interfaces (ethernet ports). You can monitor the following information on this screen:

- For the wireless interfaces:
  - Primary channel used (not necessarily the frequency if you are using a custom frequency)
  - Number of connections
  - Mode of operation
  - MAC address
  - Throughput
- For the wired interfaces:
  - Link status
  - Link speed
  - MAC address
  - Total TX and RX data
  - Throughput



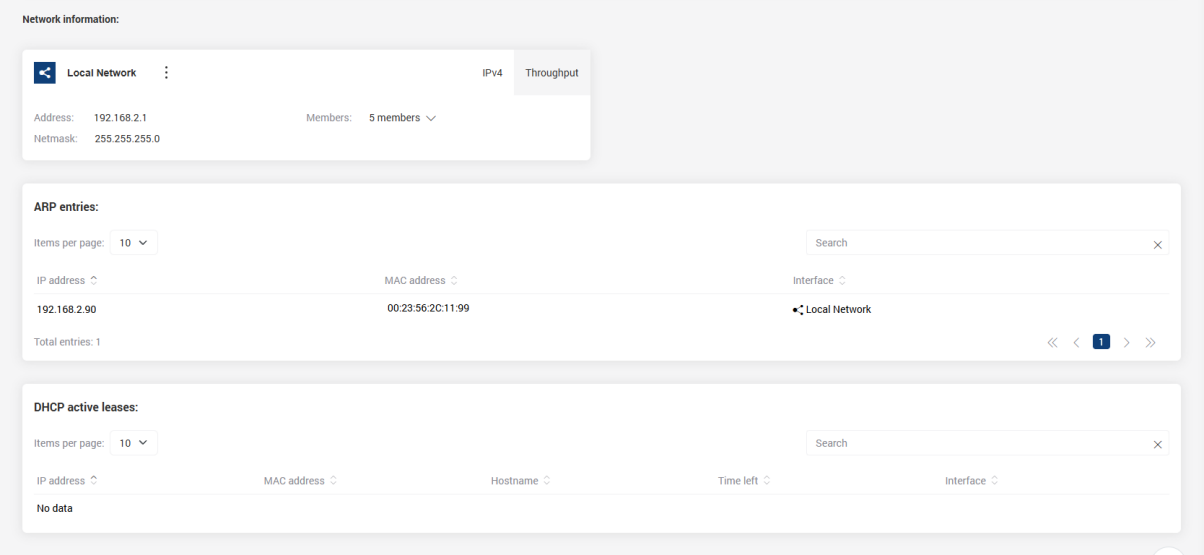
The table below shows how the ethernet interfaces are mapped inside the products:

Ethernet Port #	CL-NODE	CL-RTX
0	Not used	External port with PoE Output (15W)
1	Not used	External port without PoE
2	External connection. Compatible with PoE in power.	Internal connection to camera control interface
3	Internal connection to media converter. Available externally via the Fibre interface	Internal connection to encoder/decoder platform

4.2.1.3 STATUS > NETWORK

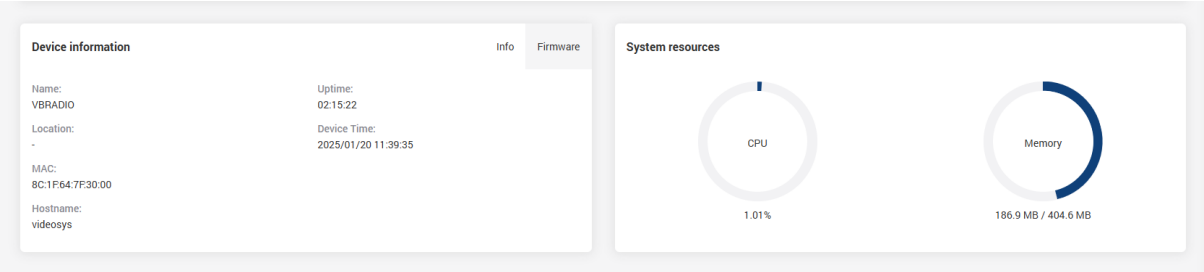
The radio can configure multiple networks on different subnets. This is useful for complex networks that require isolation between different services, such as camera control, video streaming, management interfaces. Only one local network would be required in the example application described in chapter 1 of the manual.

This status page displays network related information, including which interfaces are assigned to which network, the throughput of each network, ARP entries (mapping of IP addresses to MAC addresses that the radio encountered), DHCP active leases (if the DHCP server has been switched on).



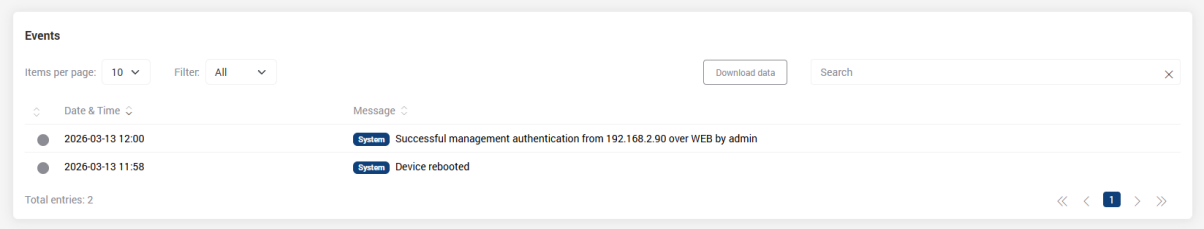
4.2.1.4 STATUS > SYSTEM

This page will display various information about the unit, including the firmware version and uptime of the system.



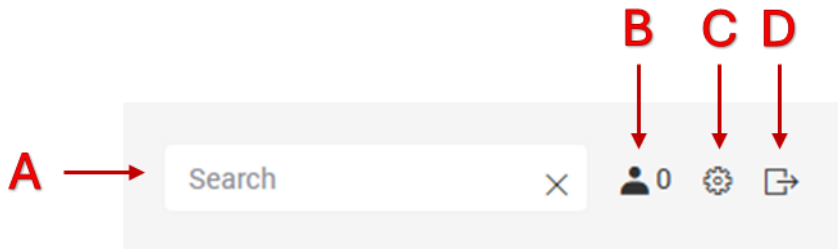
4.2.1.5 STATUS > ACTIVITY

This section will display activity and event related to the management of the radio.

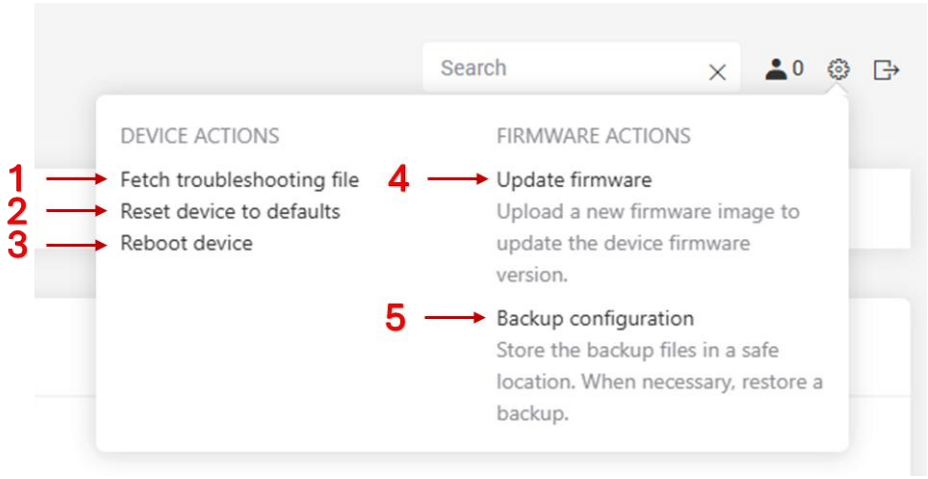


4.2.2 TOP TOOLBAR

Under normal operation the tools available on the top of the interface are the following:



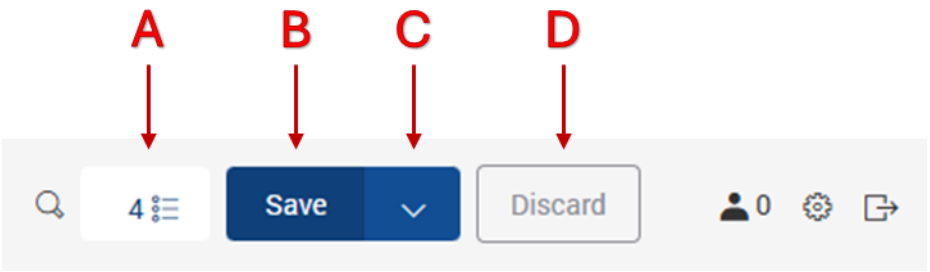
A. **Search Bar:** Can be used to search for any available setting.
B. **Connected Cameras:** If the radio is configured as a fixed node, it will display how many cameras are connected.
C. **Gear Icon:** This will open the following menu:



1. This will download a troubleshooting file that can be shared with Videosys to investigate issues.
2. This will reset the device to defaults (currently these are both the same on the radios inside the CL-Node and inside the CL-RTX).
3. This will reboot the device. The interface will reload and you will need to login again once the radio is running again.
4. This will allow you to upload a new firmware file
5. This will open another dialog that will allow you to download the current configuration or load another configuration that was downloaded previously.

D. **Logout:** This will logout the user from the management interface.

Once you start making changes under the settings submenus, the toolbar will change. The search bar will consolidate, and 3 more buttons will appear:



A. **Changes made:** Clicking on this icon, you will be provided with a list of all the changes you have made across the whole web interface. Clinking on one of the item in the list shown will then take you to that part of the web interface.
B. **Save:** Click on this save icon to save your changes to non-volatile memory
C. **Arrow > Test Changes:** Click on the arrow and then on “Test changes” to apply your changes for 3 minutes. Any changes made will then be reverted.
D. **Discard:** This will discard all the changes made and the unit will go back to the last saved settings.

4.2.3 SETTINGS

Using the main navigation bar on the left, you can navigate to the following settings pages:

- **Radios** → Used to configure the wireless interfaces. This is where a custom frequency, and the power output can be set.

- **Wired Interfaces** → Use this to setup the IP address of the radio, different networks, assign interfaces to networks, and more advanced networking services such as VLAN, static routes and port forwarding.

- **Services** → This will allow you to modify the network services that run on the radio unit. These are responsible for the web access to the unit, and for network compatibility. We recommend that you do NOT change these settings, unless you need to for the requirements of your network.

- **System** → This page will allow you to change the device’s name, hostname, location settings, and time.

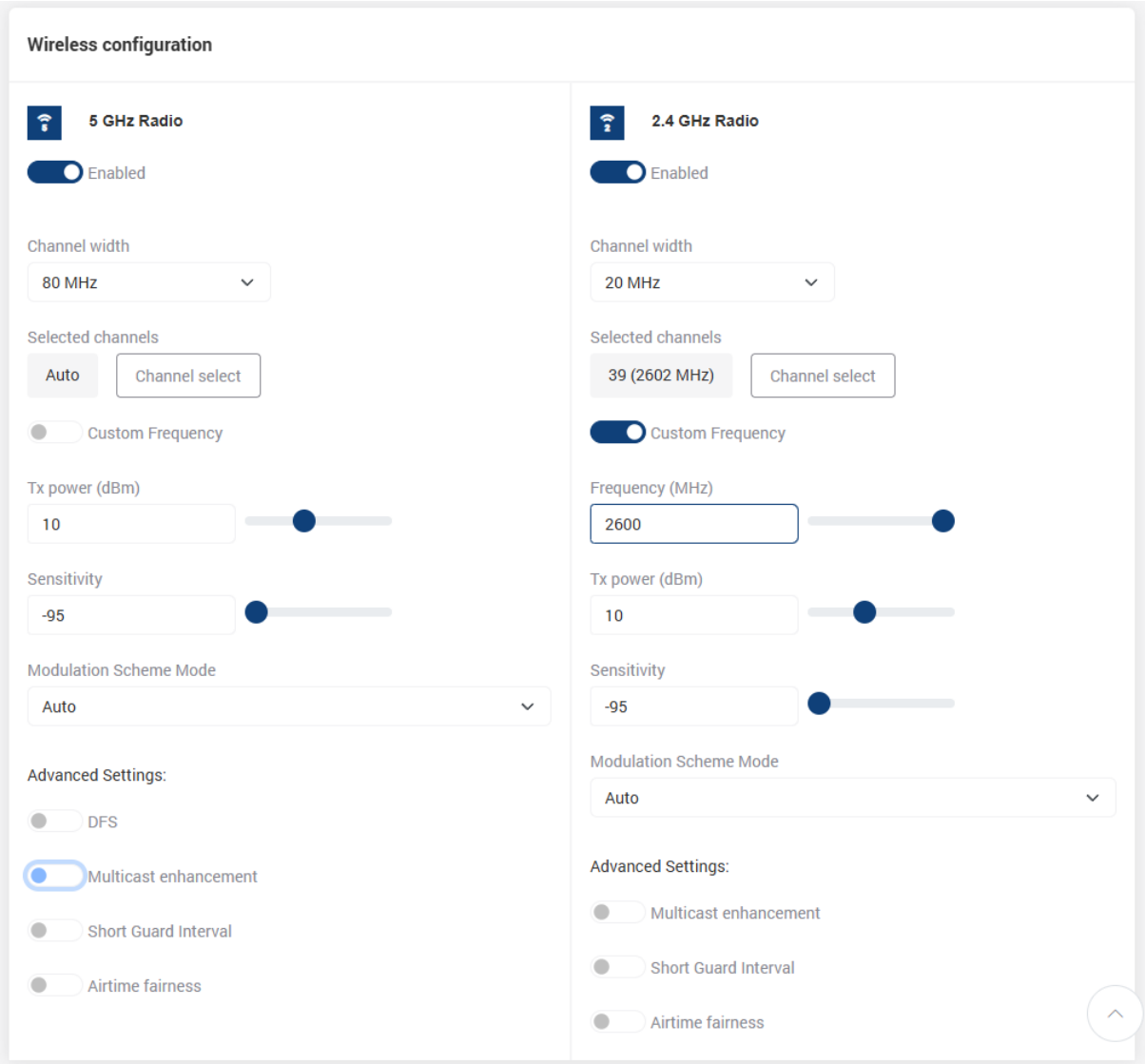
- **Users** → Use this tool to provide more user with access to the web interface and control what they are allows to change.

4.2.3.1 SETTINGS > RADIOS

The Radio settings are split into two subpages:

- **RF** → Settings related to the RF signal. Options for each radio (2.4GHz and 5GHz) include:
  - **Enabled/Disabled Toggle switch** > switches the radios on and off
  - **Channel width** > This is the RF bandwidth of the signal.
    Options for the 2.4GHz radio = 20MHz, 40MHz
    Options for the 5GHz radio = 5, 10, 20, 40, 80 MHz
  - **Selected channels** > this will provide a list of available channels that can be used without a licence. The automatic mode can be used to allow the radios to determine which channel to use. You can also select multiple channels if you want the radios to automatically choose between a subset of available channels.
    The list of available channels depend on the country of operation, which is settable under the system menu. The "Testing Country" can be used to allow for all channels to be tested under controlled conditions.
  - **Custom Frequency** > Enable this if you want to use a custom frequency. An additional frequency field will appear. Please follow the following steps for using a licensable frequency:
    - Ensure only one channel is selected under the "Selected channels" options. Do not leave this on auto and do not select multiple channels.
    - Toggle the custom frequency option to on.
    - Type in the Frequency you want to use in the box that appeared. The selected channel will move to the channel closest to the frequency you typed in (it will only go to channels between 1 and 39 – this is normal and expected).
    - Do not modify the selected channel again. You are now ready to save your settings and start using the radio.
  - **Tx power** > sets the radio's power in dBm
  - **Sensitivity** > The level at which the radio will stop trying to connect to another node or camera. In a single-node setup, leave this at -95 for maximum distance coverage.
  - **Modulation Scheme Mode** > This will change the type of 802.11 protocol the radios will be able to do. Leave this to "Auto" so that the radios are allowed to do up to 1024QAM constellations when in close distance. The RF performance will always be prioritised against data rate.
  - **Advanced Settings**:
    - **Multicast enhancement** > Instead of sending multicast packets once, it will convert them to unicast and ensure, using retries, that the packets have arrived to the other side of the radio link.
      This must be switched OFF when the radio is being used for low latency video streaming.

- **Short Guard Interval** > This will use a shorter Guard Interval, which will increase the available data bitrate at the risk of affecting the RF performance when in an environment will a lot of reflections.



- **Configuration** → Settings related to how the wireless interface is being introduced into the network. The key parameters for the first configured network (multiple could be configured) are outlined below:
  - **Mode** > This will determine if the radio is being used in a roaming camera configuration (CL-RTX) or a fixed node configuration (CL-Node).
    For option **Fixed Node:**
    - **Radio Camera Network ID:** a unique name for the wireless link we are creating.
    - **Security:** set the security parameter of this link. Typical setting are “WPA2 Personal” mode and an alphanumerical passphrase of your choice.

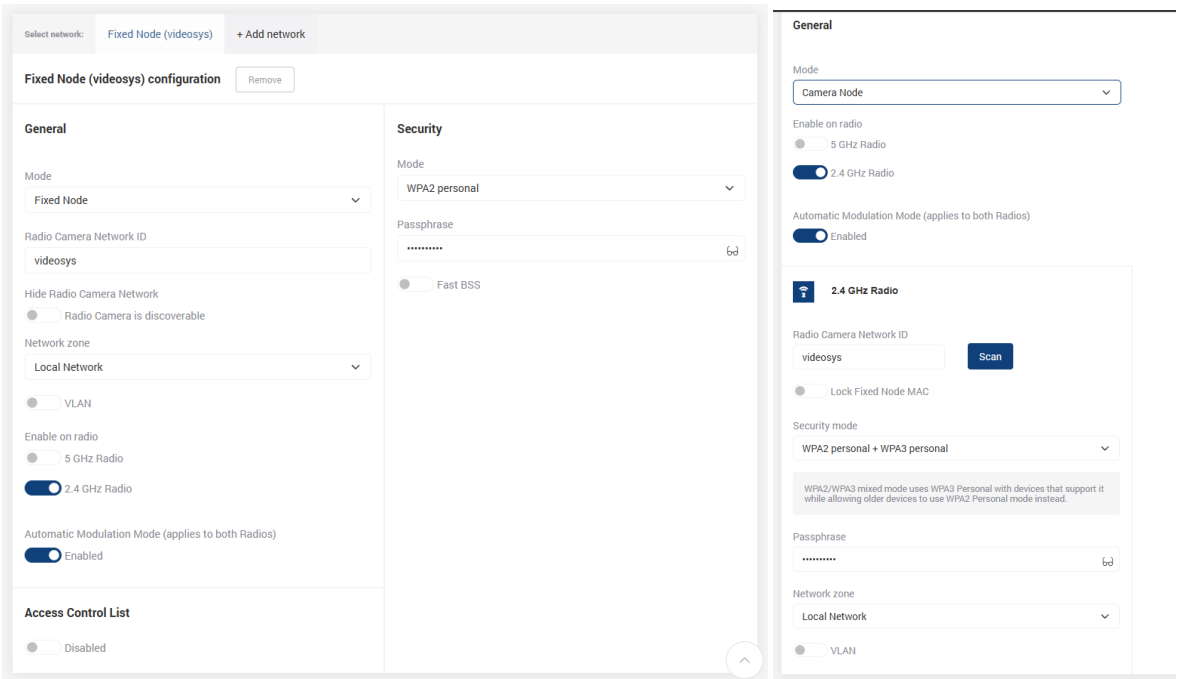
    Remember both of these settings as they need to be typed in the camera node (CL-RTX radio) to establish a connection.

For option **Camera Node:**

- **Radio Camera Network ID**
- **Security Mode**

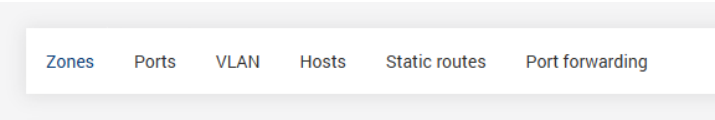
Set these to match the settings of your fixed node.

- **Enable on radio** > which RF interfaces to use for this configuration.
- **Network Zone** > which network to assign this configuration and interface to. Most setups will only require one local network.
- **Automatic Modulation Mode** > use this to fix the constellation and forward error correction used. In most cases, we recommend using the kit in automatic mode. If the RF environment is highly occupied and you are facing RF performance issues, fixing the modulation mode will provide a more stable connection. We recommend that you fix both the node and camera radio when using the equipment in this mode.
- **Access Control List** > this is available when in “Fixed Node” mode and it allows you to block or whitelist MAC addresses from connecting to the wireless interface. This is useful for increased security, if you plan on using



4.2.3.2 SETTINGS > WIRED NETWORK

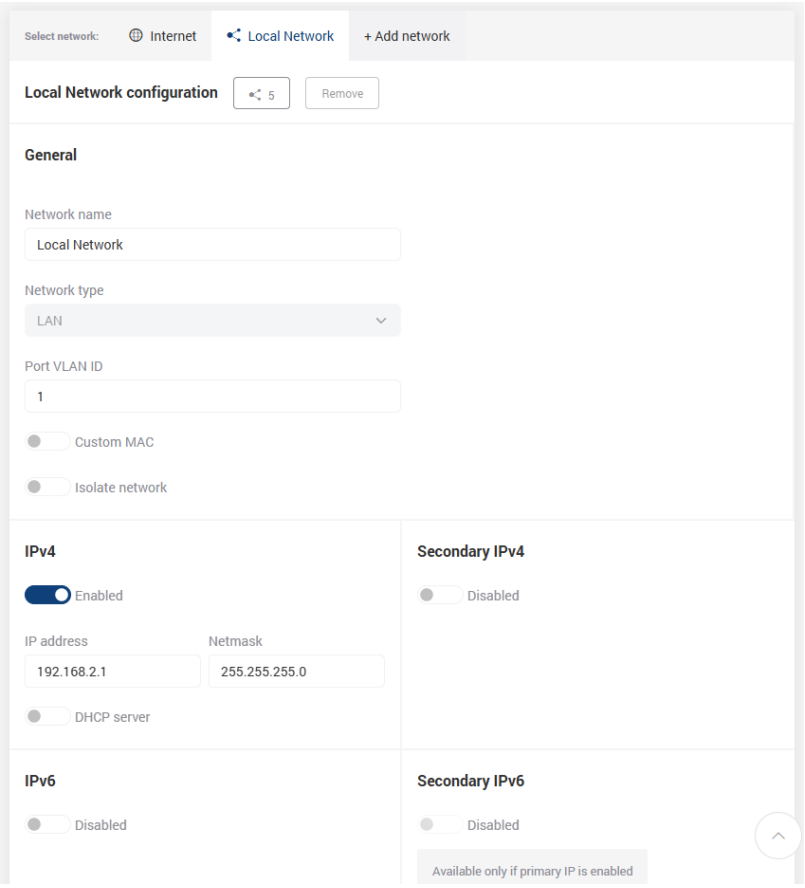
This section will allow you to setup the wired network including IP addresses and advanced networking features. The subsections of this section are separated in the below:



1. **Zones** → This includes setting up the various networks (wider area networks and local area networks), assigning an IP address to the radio, enabling a DHCP server for the local area networks
2. **Ports** → In this menu physical ethernet ports can be managed (assigned to a network, a VLAN, speed control, enabled/disabled)
3. **VLAN** → Use this to configure up to 30 VLAN configurations
4. **Hosts** → Advanced networking feature that allows for custom DNS configuration
5. **Static routes** → Advanced networking feature that allows for static routes to be configured
6. **Port forwarding** → Advanced networking feature that allows for port forwarding between WAN and LAN networks

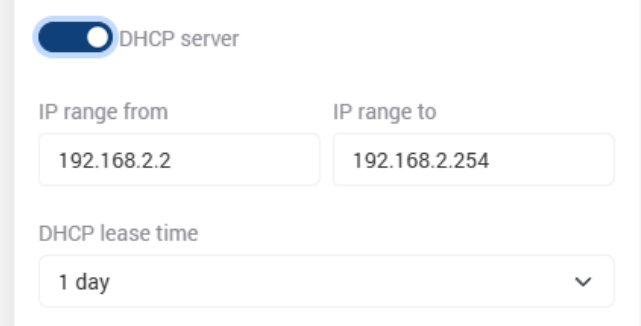
4.2.3.2.1 SETTINGS > WIRED NETWORK > ZONES

This section will allow you to configure both WAN and LAN networks. By default, the radios are configured to run on a LAN only. To setup the radio's IP address click on "Local Network":



- **General**
  - **Network Name** > You can assign a custom name to this network
  - **Network type** > Choose between WAN and LAN. By default the radio has one WAN and one LAN network, but you don't need to use both. The default configuration only makes use of the LAN network.
  - **Port VLAN ID** > Assign a VLAN ID to the network. Leave this to '1' if you not certain.
  - **Custom MAC** > You can emulate a custom MAC address to the rest of the devices on this network.
  - **Isolate network** > Enabling this will limit local network functionality, by blocking traffic between wirelessly connected cameras. This is useful if you are sharing your network with external suppliers and require increased security, but we recommend to keep it off otherwise.

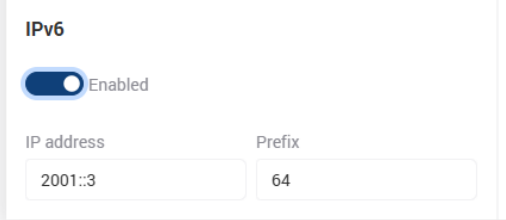
- **IPv4 & Secondary IPv4**
  - **Enabled** > Keep this enabled to assign the radio an IP address that you can use for managing it. You can also enable the secondary IPv4 for assigning multiple addresses to the radio.
  - **IP address & netmask** > This is where you define the radio's IP address for this network.
  - **DHCP server** > Enabling this allow you to configure a DHCP server in your local network that can assign addresses from a user defined range to connected devices in the network.



You can view the active assignments under:
Status > Network > DHCP active leases:

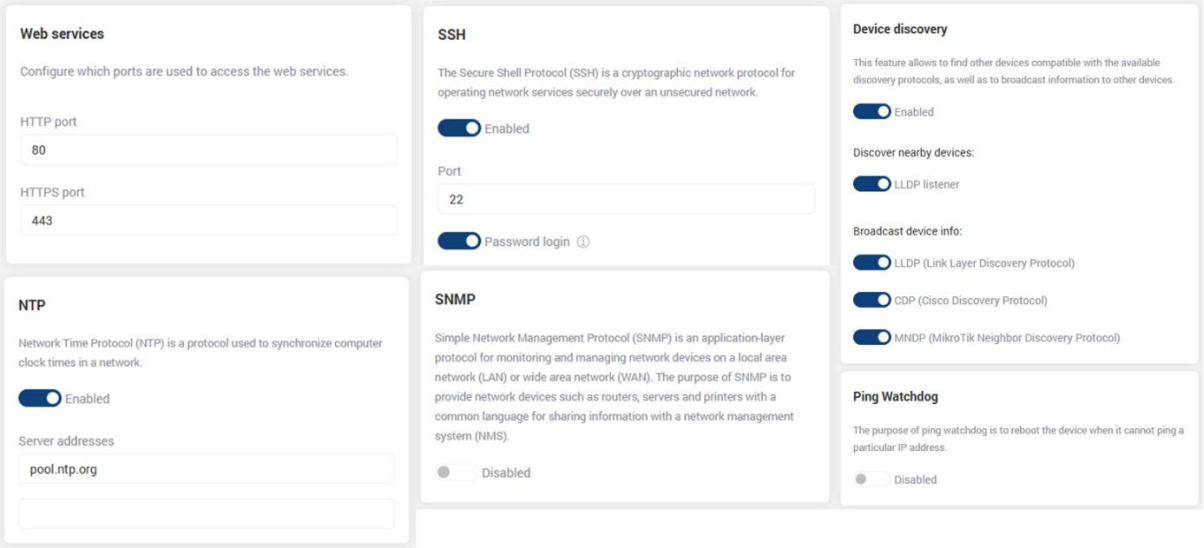
- **IPv6 & Secondary IPv6**

Enable this to assign an IPv6 address to the radio.



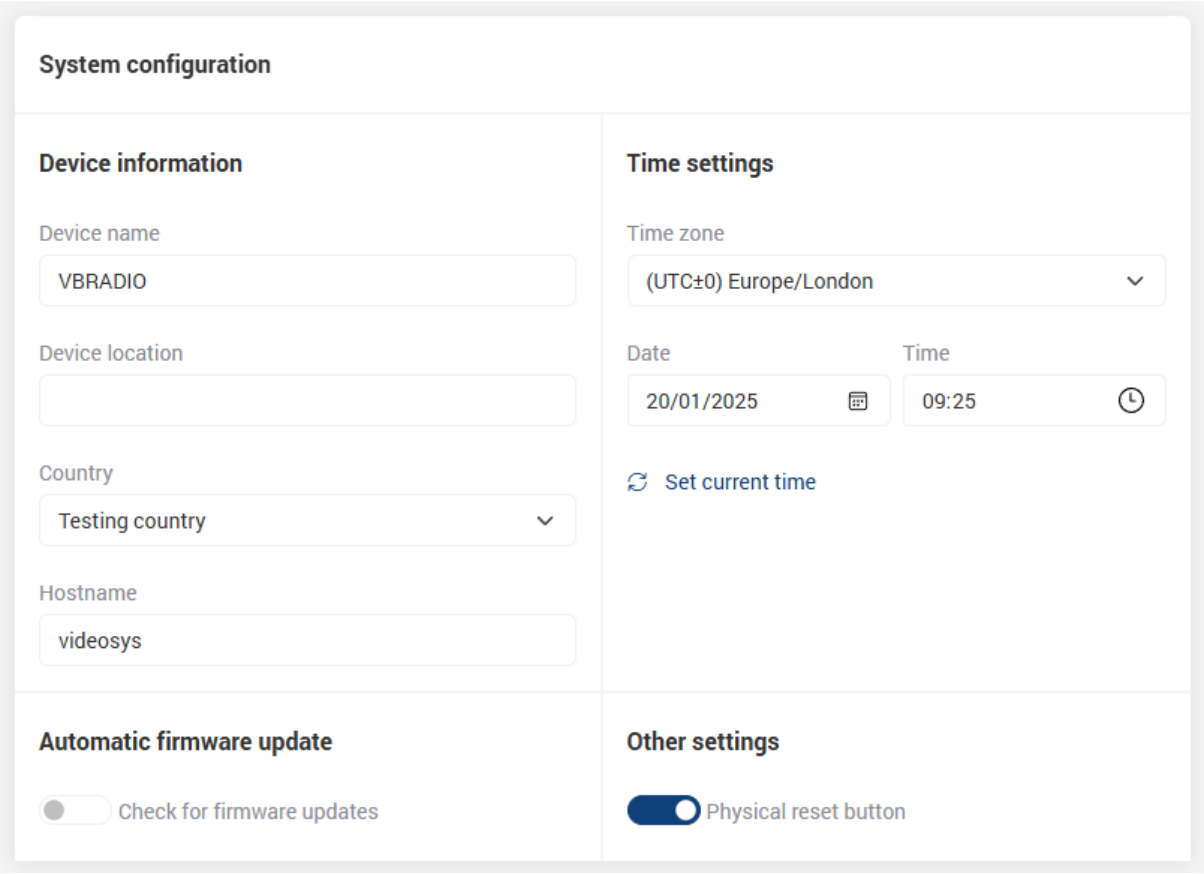
4.2.3.3 SETTINGS > SERVICES

You can configure the radio's network access services from this menu. We recommend that you do not change those unless your network has specific requirements. The default values are shown below:



4.2.3.4 SETTINGS > SYSTEM

The system settings menu allows for device information and time settings to be set:



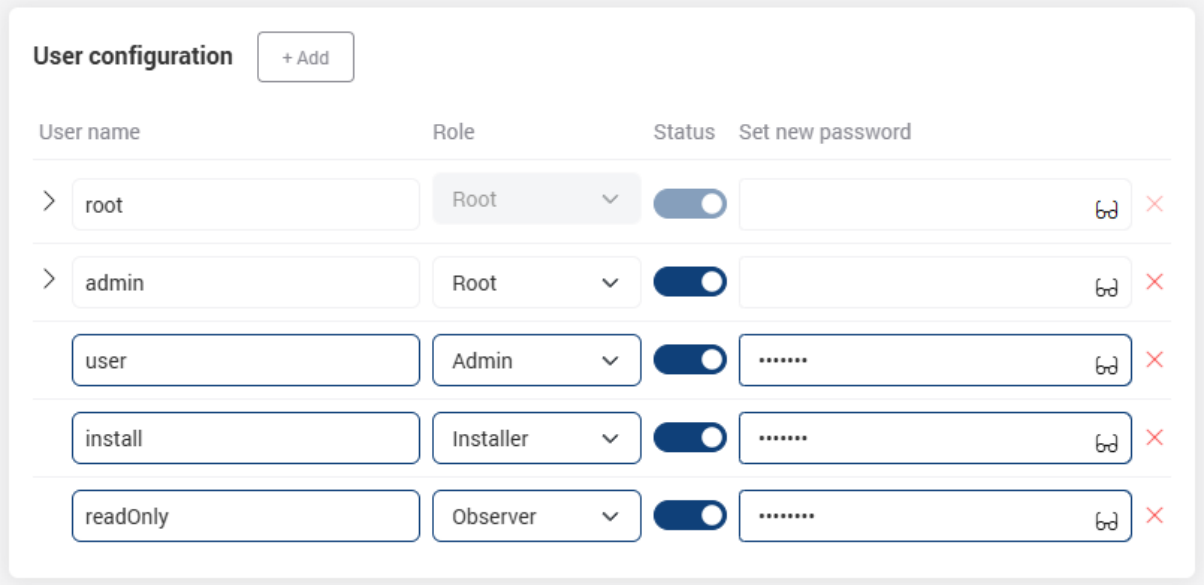
Key settings include:

- **Device name** > This will be added to the title of the web interface to help with identifying which radio is being configured.
- **Device location** > Another method for grouping and identifying the various radios you might have on your network. This can be left empty.
- **Country** > Select the country of operation to ensure compliance to the RF regulations of each country. Select “Testing Country” to evaluate all available configurations.
- **Hostname** > This is the hostname that will be advertised on the network.

4.2.3.5 SETTINGS > USERS

Multiple users can be configured to allow personalised access to the device. By default the following two users are available:

- Username = root > user created and used by Videosys for maintenance
- Username = admin | Password = admin > default user with root permissions



Each additional user can be assigned one of the following roles:

Role	Description
Root	This is the default user role that exposes all possible features.
Admin	Allows full access to the advanced wireless and wired configuration options, but limits access to the Services and Users submenu. Ideal for advanced users that should not be able to modify other users’ access.
Installer	Reduced version of the admin role. The modulation of the radios cannot be changed, and the advanced wired network settings are hidden.
Observer	Read only access. This level provides access only to the status page. All settings and the toolbar at the top right corner are hidden.

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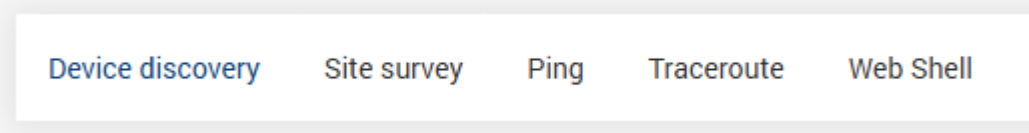
4.2.4 TOOLS

A set of tools are available through the radio to help with troubleshooting.



1. Device discovery > The radio device will automatically identify, classify, and map other devices on the network to its own interfaces.

2. Site survey > This will scan for wireless signals. Only available if the standard channels are used (not available when a custom frequency is used).

3. Ping > Devices can be pinged from any of the radio's interfaces (IPv4 and IPv6 ping available).

4. Traceroute > Traceroute a packet to map its path to a destination, listing every router hop in between.

5. Web Shell > Advanced access to the raw shell of the operating system. Used for troubleshooting by the Videosys team.

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4.3 COMMON GUIDES

4.3.1 HOW TO CHANGE THE IP ADDRESS OF THE RADIO

4.3.2 USING A LICENCED FREQUENCY

4.3.3 HOW TO ENABLE A FIXED CONSTALLATION

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MANUAL CHANGELOG

Version 1 – April 2026

- Initial release of the full manual