



ViBE™ CP9000

SD / HD / UHD CONTRIBUTION ENCODER

Release 3.20

User Manual

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In Harmonic documents, special symbols and fonts call your attention to important information.

-  **DANGER:** The Danger symbol indicates information that, if ignored, can cause physical harm to you.
-  **CAUTION:** The Caution symbol indicates information that, if ignored, can adversely affect the performance of your Harmonic product, or that can make a procedure needlessly difficult.
-  **NOTE:** The Note symbol indicates especially important information you need, or it may provide additional information that applies in only some carefully delineated circumstances.
-  **IMPORTANT:** The Important symbol indicates information that should stand out when you are reading product details and procedural information.
-  **TIP:** The Tip symbol indicates parenthetical information that is not necessary for performing a given procedure, but which, if followed, makes the procedure easier, smoother, or more efficient.

In addition to these symbols, this guide may use the following text conventions:

Convention	Explanation
Typed Command	Indicates the text that you type in at the keyboard prompt.
Ctrl, Ctrl + Shift	A key or key sequence to press.
https://www.harmonicinc.com	The italics in blue text indicate cross-references in online documents and external web addresses.
Bold	Indicates a button to click or a menu item to select.
Screen Output	The text that is displayed on a computer screen.
Emphasis	The italics text used for emphasis and document references.

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Chapter 1

Overview

This chapter gives a general description of the equipment and its main features. It also identifies the controls, indicators and connectors on the front and rear panels.

- *Product Overview*
- *Product description*

Product Overview

Purpose

The ViBE CP9000 is a Contribution & Primary distribution encoder to address:

- Ultra High Definition contribution
- Home production / Remote production
- Bandwidth constrained contribution

The ViBE CP9000 supports multiple profiles and encoding delays for distribution / contribution applications.

The ViBE CP9000 features up to two video boards with each four 3G-SDI inputs or one 12G-SDI input to receive HD (4 channels) or UHD (1 channel) signal to encode.

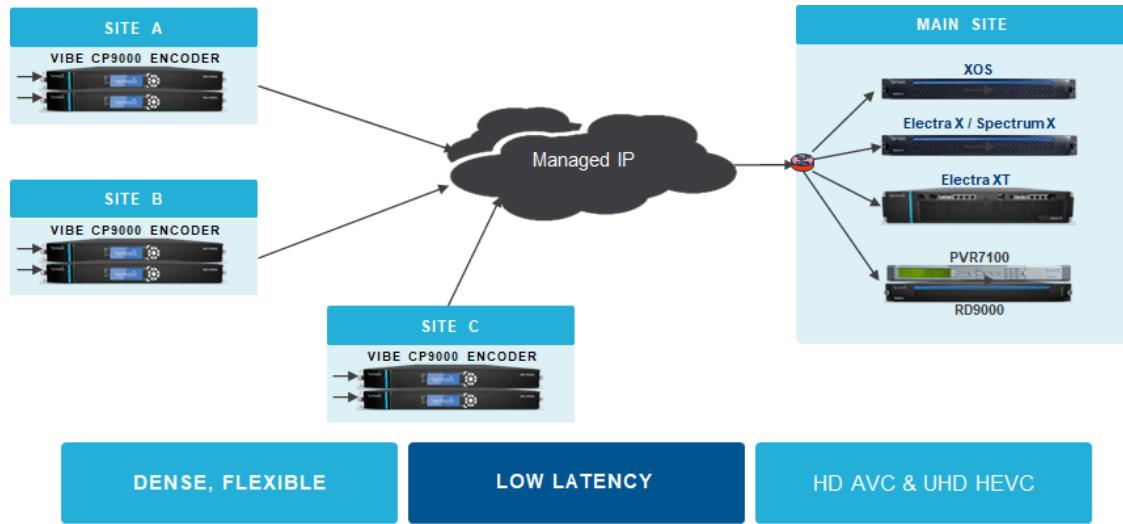


Figure 1-1: CP9000 in an acquisition system

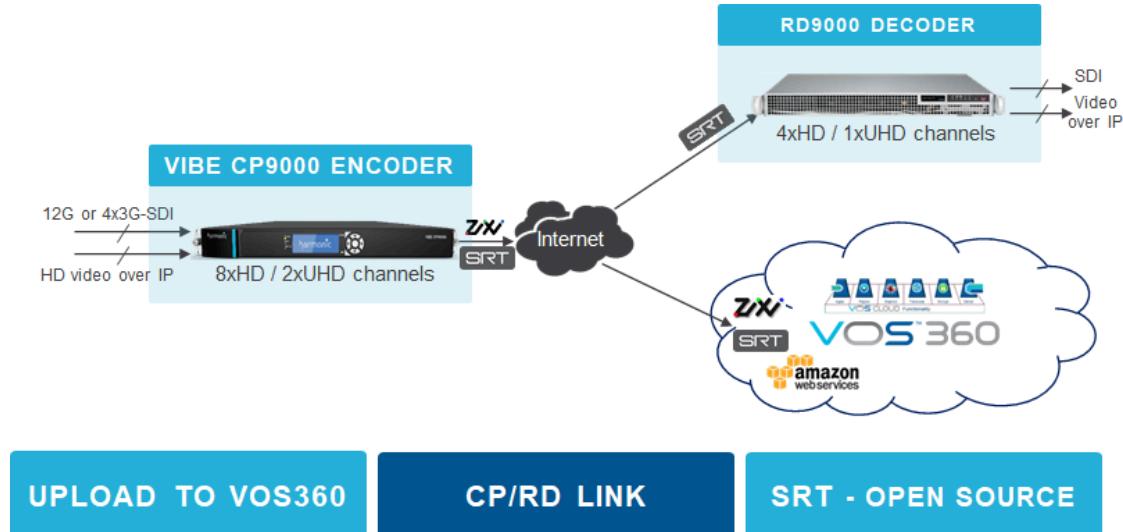


Figure 1-2: CP9000 in a C&D over internet using Zixi or SRT

Main Features

(some of them are optional)

System

- Compact 1RU rack
- Multiplexing

Interfaces

- 2 x SDI over IP: 10GbEth with SFP+ optical module. Second Video board optional.
- SMPTE 2022-6/7: 1 x HD 1.5G or 2 x FHD 3G. CP9000 is receiver classification :

- Class A for full HD
- Class B for HD
- ProMedia IP SMPTE 2110: 3 x (1x HD up to 1080i + up to 2x8 Audios PCM pairs or up to 2x3 AES pairs + Ancillary data). 2022-7 IP redundancy for 2110 streams. CP9000 is receiver classification D for HD.
- 2 x GigaEth outputs for TS over IP
- 2 x 100/1000 BT Ethernet Control & Command link
- 4 x ASI independent outputs (optional board)

Protocols

- 8 x Zixi output over LAN 1 in SPTS (caller/push modes - 1 per channel)
- 1 x Zixi output over LAN 1 in MPTS (caller/push modes)
- 8 x SRT outputs over LAN 1 and/or LAN 2 in SPTS (caller and listener mode - 1 per channel, SRT hitless redundancy mode)
- 1 x SRT outputs over LAN 1 and/or LAN 2 in MPTS (caller and listener mode, SRT hitless redundancy mode)

Video

- 1 UHDTV channel or 4 HDTV channels per board
- Up to 300Mb/s per video. The total bitrate of all video does not have to exceed 600Mb/s per board.

Audio

ViBE CP9000 offers a lot of flexibility in term of audio.

- MPEG-1 Layer II / MPEG-1 Layer II (AD)
- AAC-LC / HE-AAC / HE-AAC (AD) / HE-AAC v2
- Dolby Digital (AC3) / Dolby Digital plus (E-AC3) / Dolby Digital (AC4)

Table 1-1: Audio per chassis

Components	Maximum number of audio components per chassis: 80 (typically 56 stereo + 8 transparent + 16 DD to DD+)
Stereo	Maximum number of audio stereo per chassis (2.0): 64
Surround	Maximum number of audio surround (5.1) per chassis: 16 (equivalent to 3 x stereo)
Transparent	Maximum number of audio transparent per chassis: 8
Dolby-E	Maximum number of Dolby E audio decoding: 16
Transcode	Maximum number of audio DD/DD+ to MPEG1L2/DD/DD+ transcoding: 16
Transport	Maximum number of Audio Precompressed Transport/Pass-Through: 8
ALC	Maximum number of Automatic Level Control ALC (Junger): 32 x 2.0 (under license limitation)

Table 1-2: Audio per service

Components	Maximum number of audio components per service: 12
Stereo	Maximum number of audio stereo per service (2.0): 12
Surround	Maximum number of audio surround (5.1) per service: 4
Transparent	Maximum number of audio transparent per service: 8
Dolby-E	Maximum number of Dolby E audio decoding: 8
Transcode	Maximum number of audio precompress DD/DD+ to MPEG1L2/DD/DD+ transcoding: 2
Transport	Maximum number of audio Precompressed Transport/Pass-Through : 2
ALC	Maximum number of Automatic Level Control ALC (Junger): 8 x 2.0 (under license limitation)

Scrambling BISS 1 / BISS 2

- Mode-1
- Mode-E (injected-id, buried-id)
- Scrambling BISS-CA, only with BISS2

Control and Monitoring

- Control and Monitoring through the Web Browser.
- Monitoring through SNMP
- Partial configuration through REST API

Geo synchronization

- Input 2022-6
 - HD 1080i 50
 - HD 1080i 59.94
 - HD 1080i 60
 - HD 1080p 50
 - HD 1080p 59.94
 - HD 720p 50
 - HD 720p 59.94
 - HD 720p 60
- Input SDI SD
 - SD 480i 59.94
 - SD 576i 50
- Input SDI HD
 - HD 1080i 50
 - HD 1080i 59.94
 - HD 1080i 60
 - HD 1080p 50

- HD 1080p 59.94
- HD 1080p 60
- HD 720p 50
- HD 720p 59.94
- HD 720p 60
- Input UHD-4K level A SQD over SDI 4x3G
 - UHD-4K 3840x2160p 50
 - UHD-4K 3840x2160p 59.94
 - UHD-4K 3840x2160p 60
- Input UHD-4K level A SQD over SDI 12G
 - UHD-4K 3840x2160p 50
 - UHD-4K 3840x2160p 59.94
 - UHD-4K 3840x2160p 60

**NOTE:**

- Interfaces: In multi board context, each board supports either 4x3Gb/s or 12Gb/s SDI interface source mode independently.
- UHD-4k Encoding service through single 12 Gb/s SDI supports Audio Components, Ancillary Transparent S2038M and Teletext components, Closed Caption, AFD and Time code in band (SEI messages).
- UHD 4k is not supported with SDIoIP SMPTE 2022-6.
- Streams deinterlaced within CP9000 cannot be geo synchronized.

Standalone Redundancy

In order to ensure the continuous transmission of video/audio/data streams, the CP9000 allows to configure a pool of 1+1 device redundancy that protects from severe failures and provides a high level of assurance.

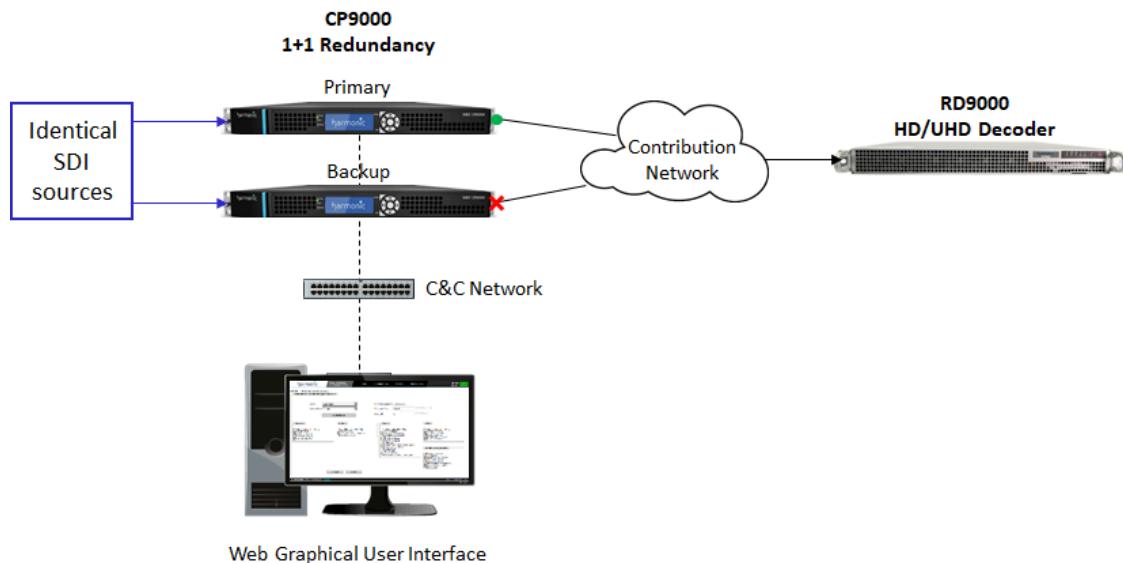


Figure 1-3: Standalone redundancy architecture

The Primary and Backup devices are connected to the Control & Command Network and communicate through a Multicast IP address and Port.

You can use many redundancy pairs by using a different group number for each pair. You can change the device mode but not the device state. At least one critical alarm must be set to use auto redundancy mode.

The primary CP9000 is Active and the Backup is inactive (Standby).

When an alarm is triggered, the backup CP9000 takes over from the primary CP9000. You cannot change the redundancy mode for an inactive primary or for an active backup. In the cases of an inactive primary and an active backup, you first need to change the device roles so that the primary is the active and the backup is the inactive and change mode to *None*.

! **Warning:**

Depending on the configuration of the switch linked to the CP9000s, after a power on (or reboot) of the primary CP9000 reboot, a double stream can be broadcast until reception of the messages sent by the backup CP9000.

To avoid this behavior due to a late transmission by the switch to the primary CP9000 of the messages sent by the backup CP9000, it is recommended to:

- If possible, disable the **spanning-tree** option on the switch linked to the CP9000.
- If it is not possible, enable **portfast** on the port connected to the CP9000 (to transmit messages from the backup equipment as soon as possible).

For configuration details, refer to section : [IP Redundancy](#) .

Geo Redundancy

It consists in synchronizing two CP9000, located in different sites, to ensure the continuity of video/audio/data streams transmission, in case of loss of channel signal.

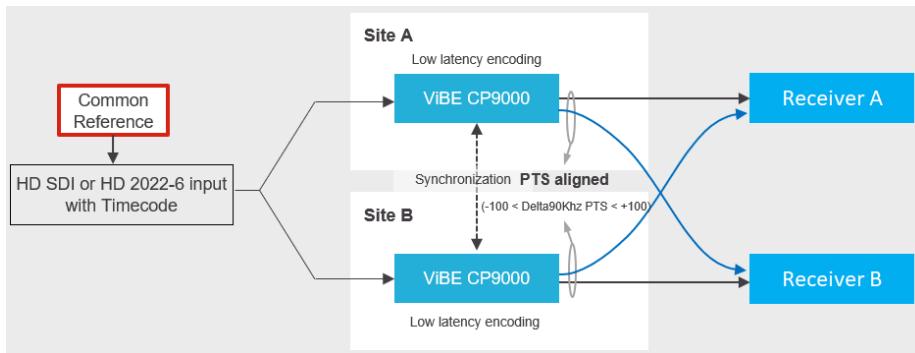


Figure 1-4: Geo Redundancy architecture

Geo synchronization is performed between channels on 2 CP9K pair equipment. Each CP9000 encoder is in a distinct location (sites A and B). A and B devices are using the same C&C network (same VLAN).

For a given encoding channel pair, PCR counters shall be synchronized (same origin time) to provide Video/Audio/Ancillary PTS timestamps to support seamless switching on downstream device.

PCR synchronization can be achieved if and only if the encoding sources (SDI or 2022-6) feeding channel pair are fully synchronous and have the same delay path.

To complete the synchronization, PCR alignment requires that CP9000 encoder pair is receiving the same flow containing the same VITC (Timecode). VITC is acting as the common Frame Time base for sites A and B.

One CP9000 is acting as Master reference for the PCR/PTS and the other as Slave per channel basis.

CP9000's role depends on error or failure events, some rules shall be specified to elect and assign a CP9000 to Master role for a channel.

CP9000 pair are connected together and exchange some messages including data such as role, status and Timestamps <VITC,PTS> on channel basis.

Channel pairing means same channel ID and same Board ID for CP9000 A and B: CP9000 A channel x board y can only be paired with CP9000 B channel x board y.

Configuration through REST API

The REST API can be used by the operator to integrate the CP9000 in its own Management System. The CP9000 can be partially configured through this application.

For more information, refer to section : [Management via REST API](#)

Product description

Chassis

Overview

The ViBE CP9000 is a modular product in a 1RU 19" chassis with dual built-in power supplies.

Front panel

The ViBE CP9000 base unit is supplied with or without LCD screen on the front panel.

- Reference without LCD screen: CP9000-1U-2AC-V3

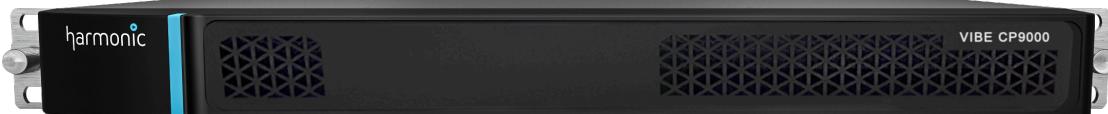


Figure 1-5: CP9000 Lite front panel

- Reference with LCD screen: CP9000-1U-2AC-V2

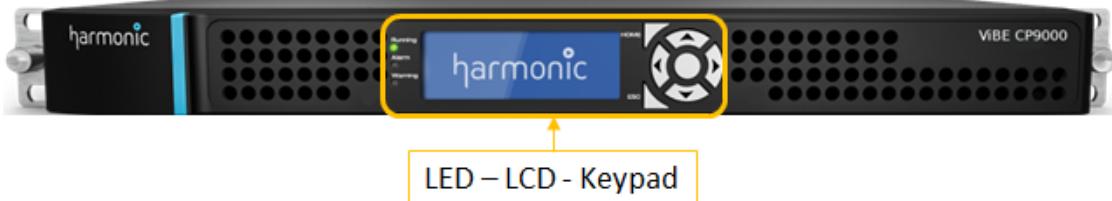


Figure 1-6: CP9000 front panel

The features of the ViBE CP9000 front panel with LCD screen are described in the Chapter [Front panel description](#) of this user manual.

Rear panel

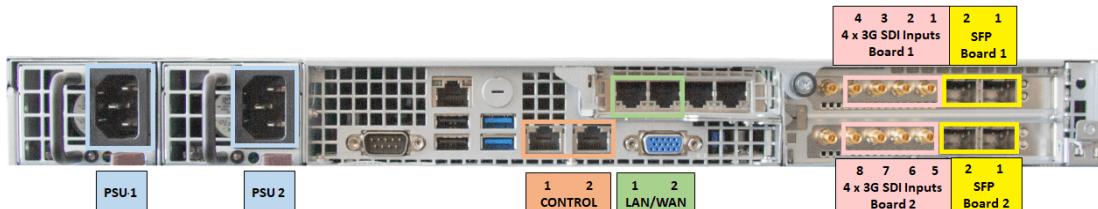


Figure 1-7: CP9000 X12 chassis rear panel with two encoding boards (2nd optional)

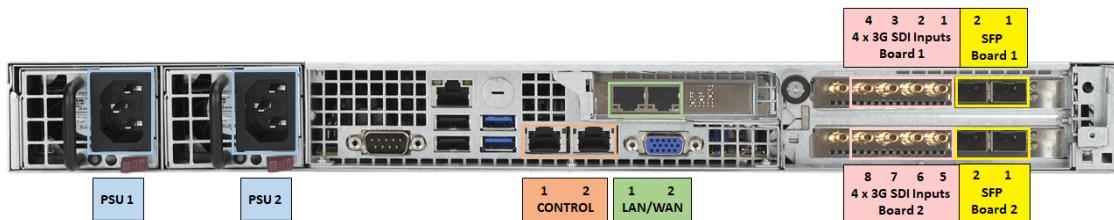


Figure 1-8: CP9000 X11 chassis rear panel with two encoding boards (2nd optional)

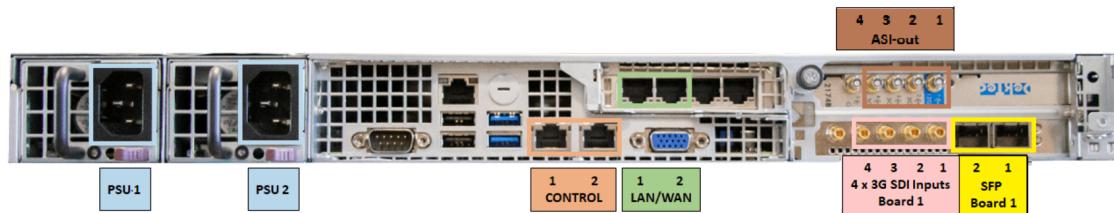


Figure 1-9: CP9000 X12 chassis rear panel with 4 x ASI outputs board (optional)

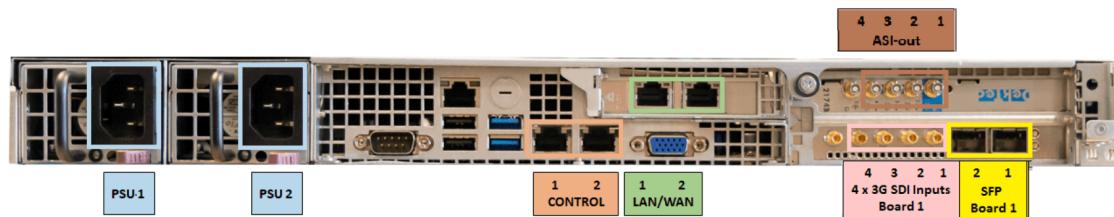


Figure 1-10: CP9000 X11 chassis rear panel with 4 x ASI outputs board (optional)

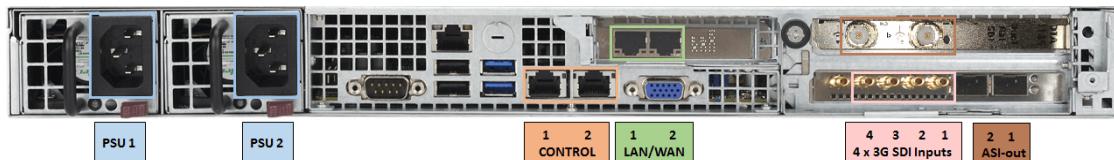


Figure 1-11: CP9000 X11 chassis rear panel with 2 x ASI outputs board (optional)

Combinations of board in Slot 1 and Slot 2

It is possible to combine the different boards in the same chassis:

NOTE: The boards Input video SDI only and dual ASI outputs are no longer available.

Input video board SDI only



Input video board SDI and SDIoIP or 2110 over IP



Dual output ASI board



Quad output ASI board



Quad output ASI board with Mini-BNC connectors. When equipped with this board, device is delivered with four 'micro-BNC to BNC' cables.

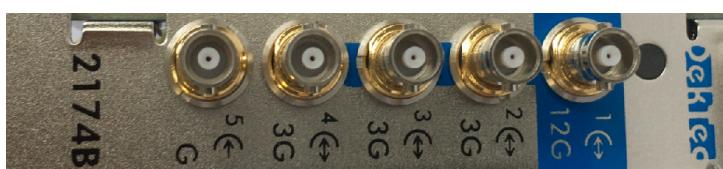


Table 1-3: Possible Combinations of boards

Slot 1 (Top)	Slot 2 (Bottom)
SDI / SDIoIP SMPTE 2022-6	SDI / SDIoIP SMPTE 2022-6
SDI / SDIoIP SMPTE 2022-6	SDI only
SDI / SDIoIP SMPTE 2022-6	Dual or Quad ASI Outputs
SDI only	SDI only
SDI only	Dual or Quad ASI Outputs
Dual or Quad ASI Outputs	SDI only
SDI / SDIoIP SMPTE 2022-6	None
SDI only	None
SDI / ProMedia IP SMPTE 2110	SDI / ProMedia IP SMPTE 2110
SDI / ProMedia IP SMPTE 2110	SDI only
SDI / ProMedia IP SMPTE 2110	Dual or Quad ASI Outputs
SDI / ProMedia IP SMPTE 2110	None
SDI / ProMedia IP SMPTE 2110	SDI / SDIoIP SMPTE 2022-6
SDI / SDIoIP SMPTE 2022-6	SDI / ProMedia IP SMPTE 2110

Chapter 2

Installation and Startup

This chapter provides the procedures required for equipment installation and initial configuration and describes how to connect the equipment to other devices in your system.

 **IMPORTANT:** Please read and follow the important safety information in section [Safety Instructions](#), paying particular attention to the instructions related to the risk of fire, electric shock or bodily injury.

- [*Unpacking*](#)
- [*Removing the protective film*](#)
- [*Installing the equipment*](#)
- [*Performing the initial settings*](#)
- [*Running the Web browser*](#)
- [*Initial Configuration settings*](#)

Unpacking

The table below lists the accessories that are always shipped with your equipment. Use this list to ensure that your order is complete.

More accessories can be delivered depending on your chosen options.

Table 2-1: List of accessories delivered with the equipment

Quantity	Description
1	1-RU rack-mountable ViBE CP9000 equipment.
1	ViBE CP9000 Quick Start Guide
1	12G-SDI / 3G-SDI Break out cable (BNC female/DIN 1.0/2.3 male - max.length = 20cm). The black cable is compatible with 12G-SDI and 3G-SDI input. It is highly recommended to plug it to SDI-1 (even if 3G-SDI is configured to avoid error in case of future configuration change).
4	3G-SDI only break out cables (BNC female/DIN 1.0/2.3 male - max length = 20cm). White/Yellow cables are only compatible with 3G-SDI input. These cables can be plugged to SDI-2, SDI-3, SDI-4 (and synchronization). They can be plugged to SDI-1 only if 12G-SDI is not configured.
x	Power cable(s) if ordered

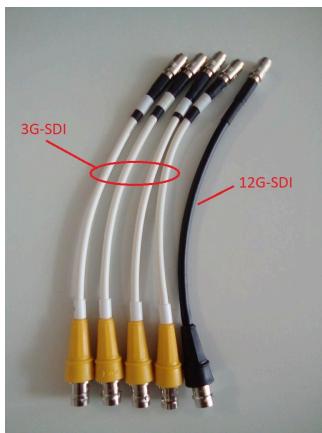


Figure 2-1: Break out cables

Removing the protective film

Remove the protective film from both sides (top and bottom) before installation in the rack.

Installing the equipment

The following steps are required for equipment installation and initial configuration:

1. Mount the equipment in a rack.
2. Power up the equipment.
3. Enter the initial parameters via the Local Console application or via the Front Panel (IP parameters, Date/Time, etc.).
4. Connect the equipment to the other devices.
5. Launch a Web Browser.

Mounting in the rack

Rack mounting is not mandatory for the ViBE CP9000 but the ventilation and safety requirements given in this section must be observed in all cases.

 **CAUTION:** The chassis must not be fixed with its rack mounting ears only. If you intend to install it in a rack, L-profiles are required and you must observe the ventilation and safety instructions described in the following sections.

ViBE CP9000 installation requirements

This section lists the principles to be observed and the steps to be taken when installing the CP9000 in a 19" rack.

Restrictions must be observed:

- related to ventilation (see section [Ventilation](#))
- related to cabling (see section [Cabling](#))
- related to EMC ground (see section [EMC ground](#))
- related to Power supply and protective ground (see section [Power supply and protective ground](#))

Ventilation

Please note that product failure rates are increased by high temperatures. The following precautions should therefore be observed:

- Prevent hot air from one equipment being introduced into other equipments.
- Ensure adequate distribution of air flows to the equipment intakes.
- Avoid the effects of natural convection between equipments.
- Avoid hot/cold air short-circuits.
- Avoid transverse effects in coupled racks.
- Prevent hot air from accumulating in the rack.
- Check the air flows: the rack should ensure a sufficient supply of cold air and sufficient evacuation of hot air (according to the number of equipments mounted in the rack and their corresponding air flows).

The following important requirements should be noted in addition to the general recommendations:

- The equipment must be installed in a room according to ETSI 300019-1-3 class 3.1. The climatic parameters, biological conditions, chemically substances, mechanically substances and mechanical conditions must be respected. Example: A maximum density of dust in the air must not exceed 200 $\mu\text{g}/\text{m}^3$. To prevent the power supply from overheating, remember to regularly clean the rack filter (if there is one) according to the manufacturer's recommendations and clean ViBE CP9000's air inlet grill (at least once a year).
- There must be enough room for a column of cold air to circulate on the front of the chassis and a column of hot air to circulate on the rear of the chassis.
- The chassis is provided with guide rails on each side already fixed to allow to make it slide. It is possible to use a set of square of fixation (L-profiles). In this case, remove guide rails from the chassis.



Figure 2-2: Chassis with guide rail

- Given its 1RU height, CP9000 has to be placed in the rack with at least space of 1RU between every 4 chassis.

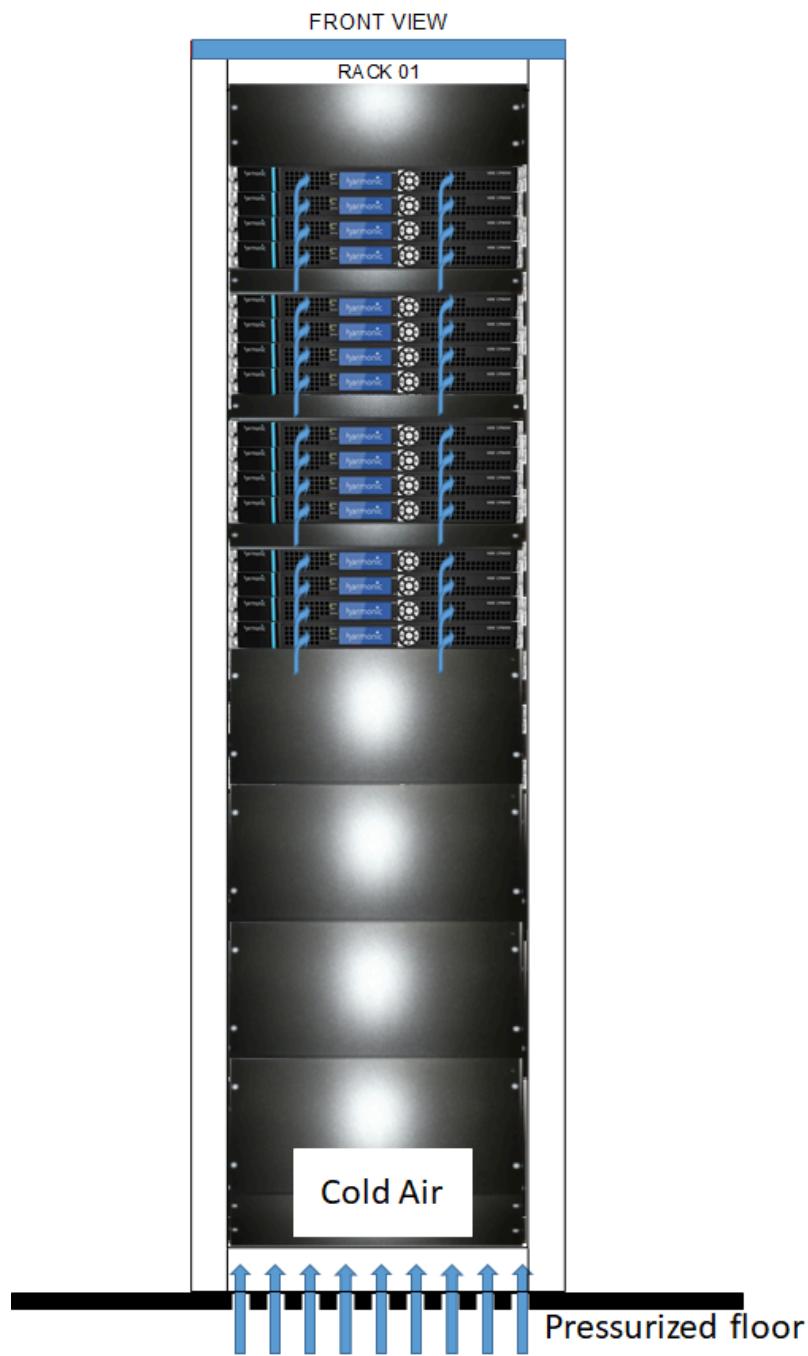


Figure 2-3: CP9000 on a pressurized floor in a standard rack (front view)

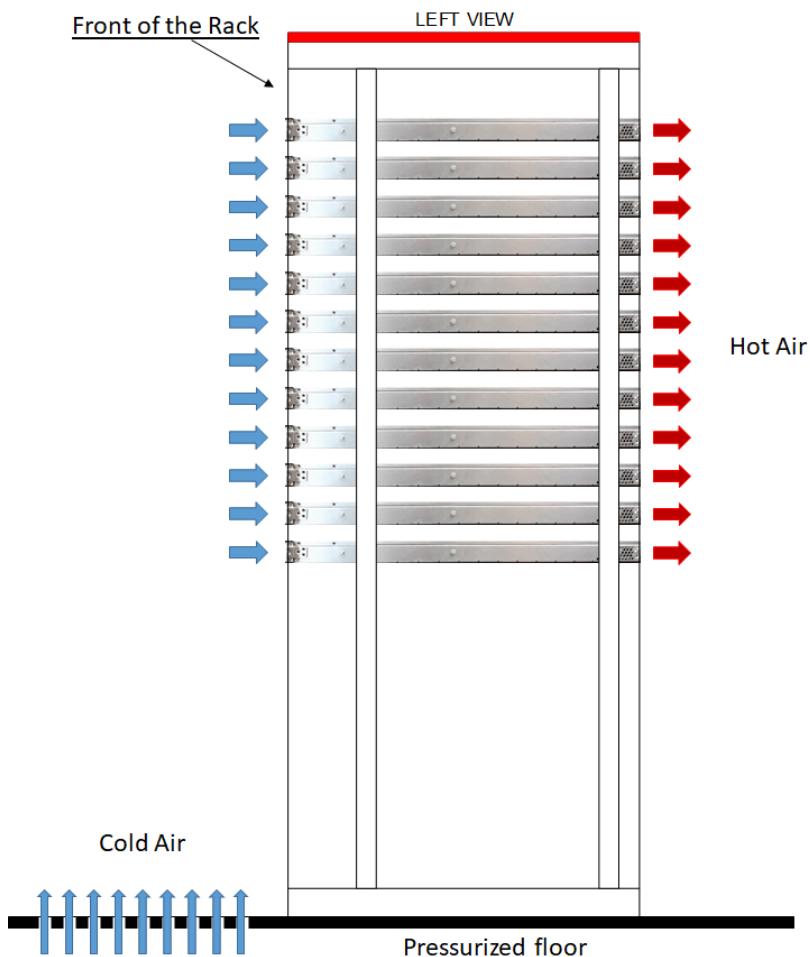


Figure 2-4: CP9000 on a pressurized floor in a standard rack (front view)



CAUTION: Failure to observe these installation requirements will directly result in a deterioration in performance, reliability and service life of equipment.

Cabling

It is essential to separate the power supply cables from the signal cables. When facing the rear of the rack (as the equipment is connected via the rear panel), the power supply cables must be guided to the left of the chassis and the signal cables to the right.

EMC ground

The EMC connection is required to ensure ground equipotentiality between the different devices in the technical center (only one connection is required per device).

Each CP9000 side panel features a tapped hole to connect a bonding strip. The bonding strip can be fixed either on one side of the chassis (right or left side) or on the rear of the chassis (left side).

- Fixing the bonding strip on the side of the chassis. The bonding strip is fixed using an M4 screw whose length depends on the bonding strip type (no more than 15 mm of the screw must be inserted into the CP9000).
- Fixing the bonding strip on the back of the chassis. The bonding strip is fixed using an insulated or uninsulated 6.35mm female lug plugged into the grounding terminal.

 **NOTE:** The grounding terminal can be replaced with a ring lug crimped onto the bonding strip.

The rack EMC bus (to which the ViBE CP9000 EMC strip is connected) must be connected to the rack ground pin. This pin is also connected to the safety ground.

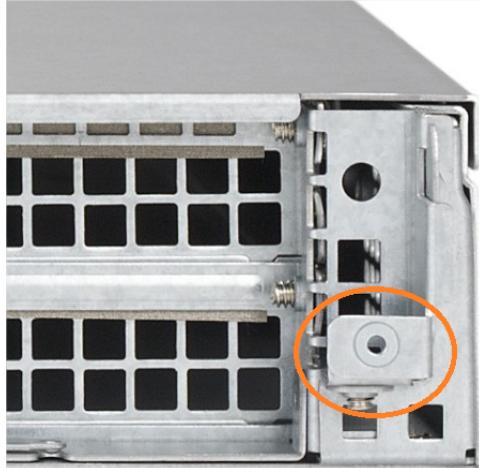


Figure 2-5: EMC connection (rear panel)

Power supply and protective ground

Power Supply Cord(s) Specifications

The AC mains power cords are only shipped with the equipment if ordered. Otherwise, it is advisable to use mains cables with the following features:

- Device end of cable: IEC 60320 C13 compliant connector.
- Flexible wire: 3 x 1 mm² cross-section or 18 AWG, 10 A minimum, 250 V compliant with the applicable standard or rules of the country where the equipment is installed.
- Mains outlet end of cable: plug compliant with the applicable standard or rules of the country where the equipment is installed.

Connecting AC Mains Power Supply Cords

Power supply end:

The connection panel should comply with the legislation in force in the country of installation. The connection panel must be positioned in the rack in such a way that the plug and power cords are within easy reach for switching off purposes.

For mains inlets, the wiring system must feature overload and earth fault protection and a bipolar cut-off equipment or a differential circuit breaker. If in doubt, contact a qualified electrician.

CP9000 end

Plug the power cords into the mains inlets.

Powering up

- NOTE:** Check that ViBE CP9000 is not yet connected to the LAN as factory-set IP addresses may cause disturbance on the LAN when CP9000 is switched on (address conflict).
- Connect the power cords. On the LCD screen the following message “**ViBE launching**” is displayed during the boot.
- After a start-up phase, the equipment will become operational. When the equipment is switched on, the last stored configuration will be active.

Performing the initial settings

The equipment is managed through IP Control & Command Network and some primary actions and settings are necessary to manage it and use it.

Connection to the C&C Network

Connect the IP cable on the LAN/WAN 1 of the equipment to the C&C Network (IP switch) as shown in the figure below:

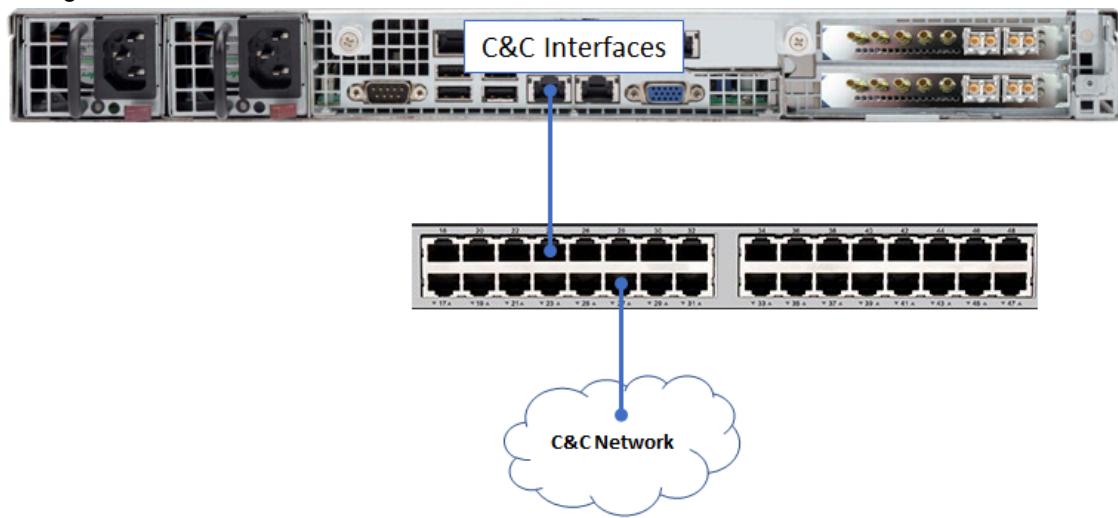


Figure 2-6: Connection to the C&C Network

- NOTE:** LAN/WAN 2 is used if the NIC bonding feature is enabled. Refer to, section [Editing IP NIC Bonding Parameter \(iptogg\)](#).

Setting IP addresses and Date & Time

For **IP addresses**, two ways are possible:

- using the Front Panel: Refer to Chapter 3 [Screen description](#).
- using the Local Console: Refer to Appendix 5 [Commands related to IP parameters](#) .

For **Date & Time**, two ways are possible:

- using the Local Console: Refer to Chapter 5 [Commands related to the Date and Time](#).
- by synchronizing the CP9000 with NTP server from the web interface, Device Configuration/Date & Time menu: Refer to section [Device Configuration](#).

Connecting the signal cables

UHD (4x3G SDI Input) Use Case

1. Connect the 4 x 3G-SDI sources to the Video Board / SDI IN connectors according to the wiring diagram below using the white/yellow cables delivered with the chassis:
 - for Square division mapping methods / 4x3G SDI Level A or B:
 - The quadrant 1 (top left) of the picture is connected to the DIN male connector 1.
 - The quadrant 2 (top right) of the picture is connected to the DIN male connector 2.
 - The quadrant 3 (bottom right) of the picture is connected to the DIN male connector 3.
 - The quadrant 4 (bottom left) of the picture is connected to the DIN male connector 4.
 - for 2-Sample Interleave mapping methods / 4x3G 2-Sample Interleave:
 - The Sub-Image 1 of the picture is connected to the DIN male connector 1.
 - The Sub-Image 2 of the picture is connected to the DIN male connector 2.
 - The Sub-Image 3 of the picture is connected to the DIN male connector 3.
 - The Sub-Image 4 of the picture is connected to the DIN male connector 4.
2. Connect the outputs GEth1 & 2 to the IP port destination devices.

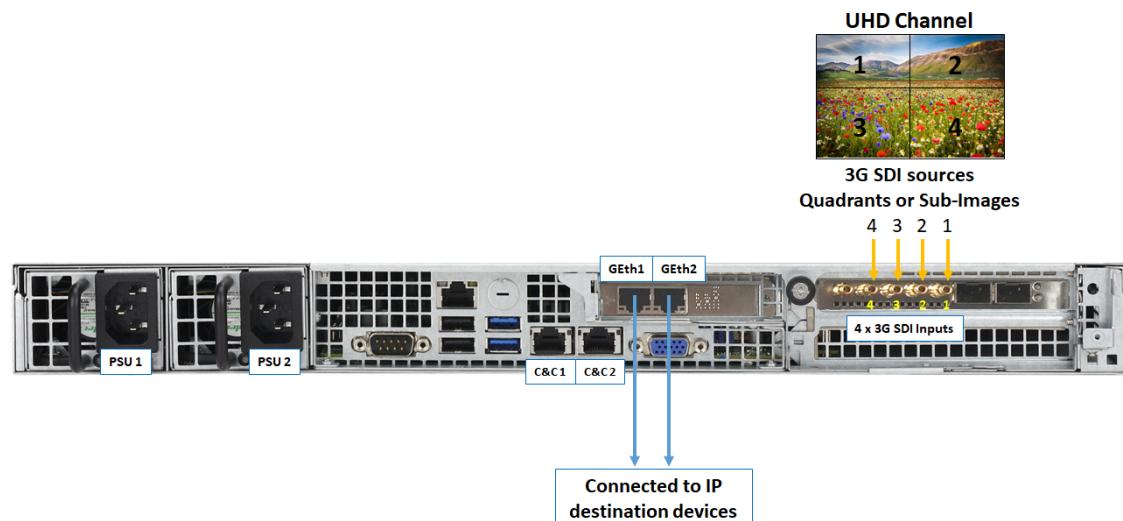


Figure 2-7: Rear panel connection, UHD (3G SDI input) use case

UHD (12G SDI Input) use case

1. Connect the 12G SDI Source to the DIN male connector 1 as shown in the diagram below using the black cable delivered with the chassis. The 12G SDI source contains the four Sub-Images of the source using 2-Sample Interleave methods and mapped on a virtual interface links 1, 2, 3 and 4.
2. Connect the outputs GEth1 & 2 to the IP port destination devices.

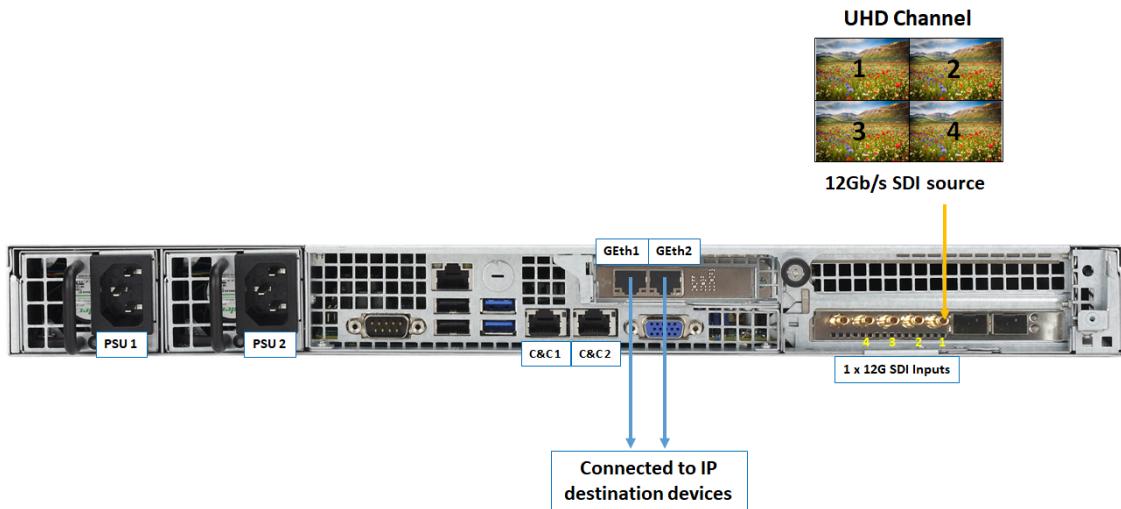


Figure 2-8: Rear panel connection, UHD (12G SDI input) use case

NOTE:

- The connector 1 is considered as a physical link + virtual link 1 and the connectors 2, 3 and 4 are considered as virtual links 2, 3 and 4.
- Once received by the encoder, the 4 Sub-Images of the source are processed as 4 independent SDI, in the same way as 4 x 3G-SDI sources.

HD use case

1. Connect each 3G-SDI source to one DIN male connector of the Video Board.
2. Connect the outputs GEth1 & 2 to the IP port destination devices.

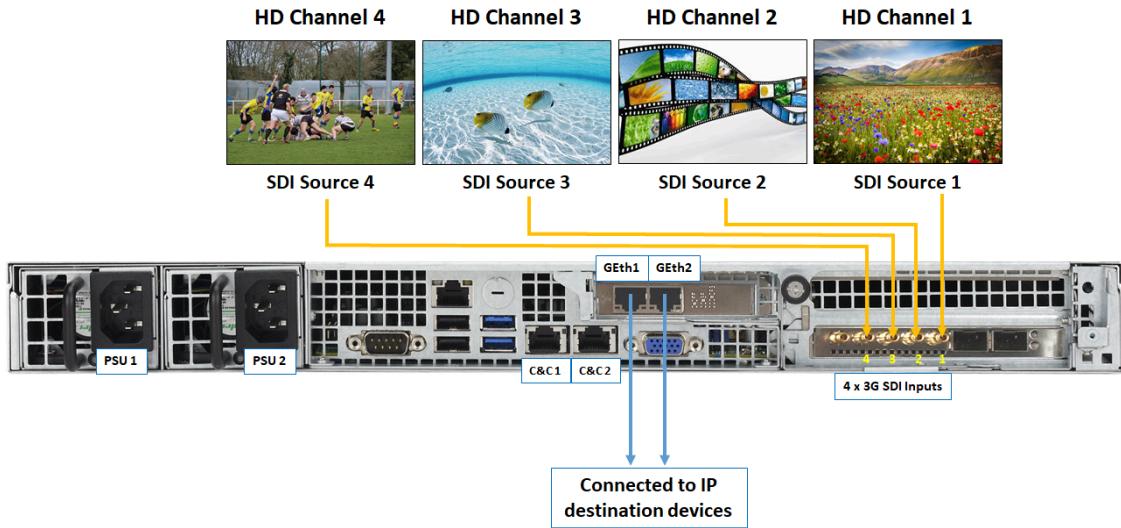


Figure 2-9: Rear panel connection, HD use case

HD Use Case through SDIoIP (SMPTE 2022-6)

1. Connect the optical cable to the SFP module on Port 1 (right)

2. Connect the outputs GEth1 & 2 to the IP port destination devices

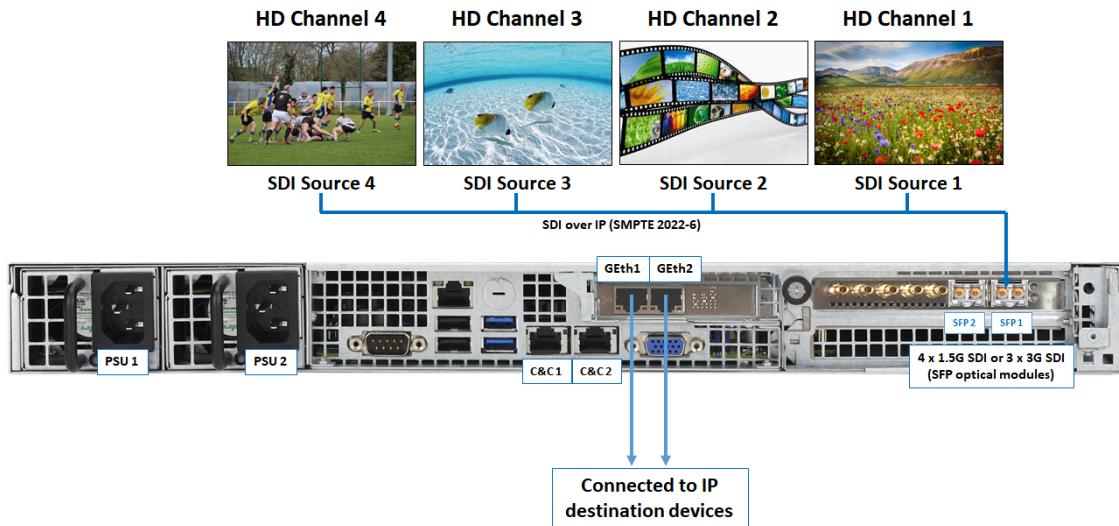


Figure 2-10: Rear panel connection, HD use case with SDI over IP sources

HD Use Case through ProMedia IP (SMPTE 2110)

1. Connect the optical cable to the SFP module on Port 1 (right)
2. If redundancy is used : Connect the optical cable to the SFP module on Port 2 (left)
3. Connect the outputs GEth1 & 2 to the IP port destination devices

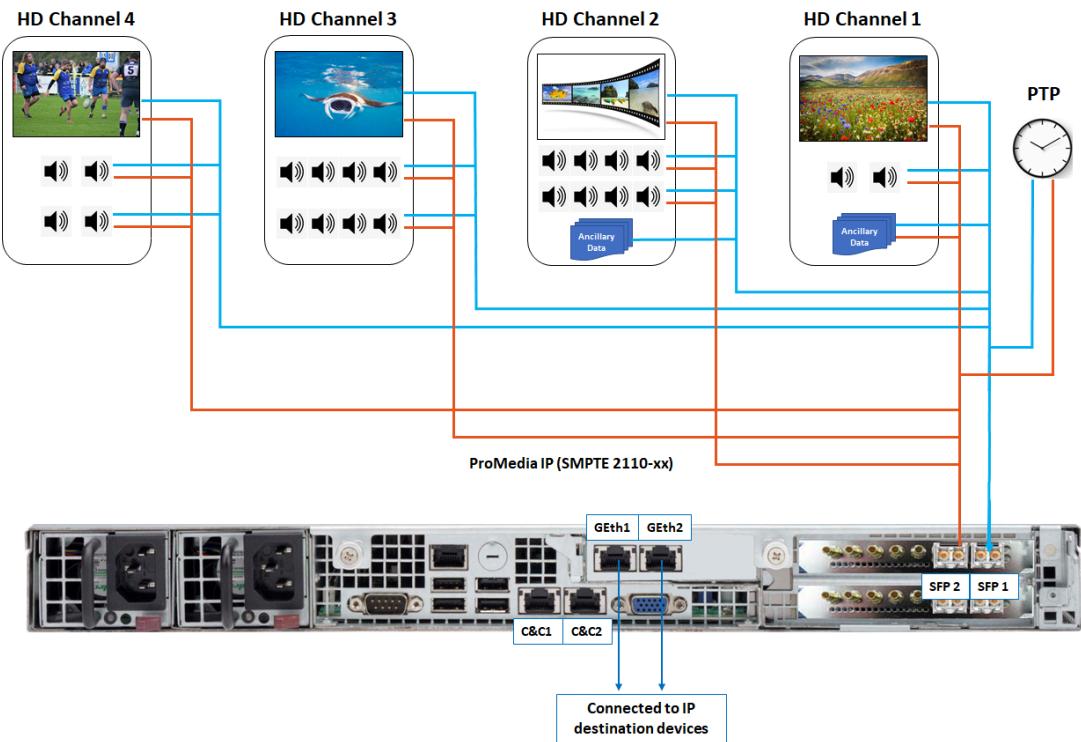


Figure 2-11: Rear panel connection, HD use case with SDI over IP sources

For each Channel, each component is transmitted through a dedicated multicast, as well as the PTP.

Running the Web browser

When the previous installation procedure is complete, equipment operation can begin. Set up the connection between the PC and the equipment.

To do this:

1. Run the Web browser on the PC connected to the equipment via the Control Ethernet link.
2. Connect to the equipment by entering its IP address. The login page will be displayed:



Figure 2-12: ViBE CP9000 login page

3. Log in by entering your Username and Password (admin can be entered for both the default username and password if it has not been deleted from the list of Users). The equipment Status/Summary page will be displayed:

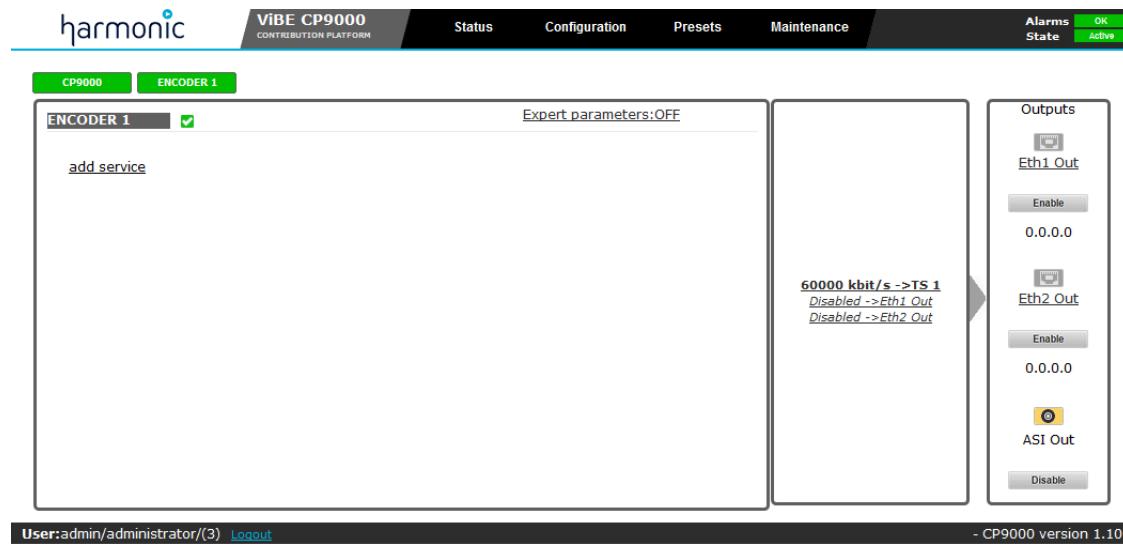


Figure 2-13: Status / Summary page

To operate the equipment via its Web Browser Interface, refer to Chapter 4 [Web Browser Interface](#).

Initial Configuration settings

Once connected to the Browser interface, it is recommended to :

1. Change the interface default password. Harmonic assures no responsibilities for unauthorized access to device or network due to the use by users of default password or poor complexity.
2. Change the SNMP default Read/Write community - see [Managing Community Strings and SNMP Agent Information](#).

SNMP is used by NMX to communicate with CP9K. It is also mandatory to change the password in NMX interface to continue the CP9000 monitoring – see [Management with NMX](#).

NOTE: Be aware that the following special characters are not accepted by NMX within communityName : "& <> \ : | * " ? ' , ; #

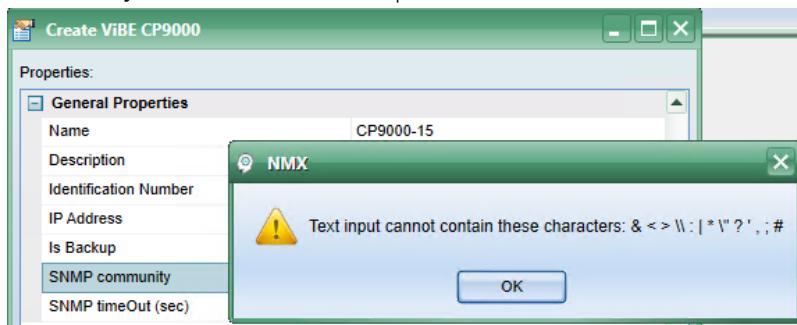


Figure 2-14: SNMP Community forbidden characters

3. Change RestAPI default password – see [Management via REST API](#).

4. Change the default SSH user password – see [*Commands related to SSH password*](#)

Chapter 3

Front Panel Operation

This chapter explains how to use the Front Panel with LCD screen that allows to configure basic settings of the equipment.

 **IMPORTANT:**

ViBE CP9000 base unit is supplied with or without LCD screen on the front panel.

Read this chapter only if the ViBE CP9000 is delivered with LCD screen.

- *Front panel description*
- *Screen description*

Front panel description

Foreword

The aim of the front panel is not to replace the Management System but to provide a basic control/command interface for the main settings.

Device operation via its front panel is generally limited to:

- changing basic settings (IP settings, etc.).
- displaying equipment codes and serial numbers.
- displaying installed software releases.
- displaying raised alarms.
- recalling predefined configurations. These configurations are defined via the Web Interface or in-factory. For more information, see section [Web Browser Interface](#).
- displaying equipment internal temperature.
- rebooting the equipment.

Description and overview

This section applies only to deprecated CP9000-1U-2AC-V2 equipment that is equipped with a front panel. The front panel features an LCD screen, a 7-key keypad (Home, ESC, OK and 4 arrow keys) and a set of three status LEDs and 2 Power Supply LEDs.

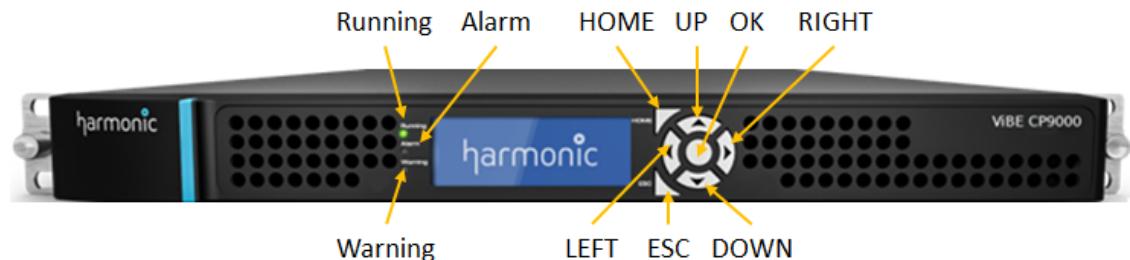


Figure 3-1: CP9000 front panel description

Device status LEDs

The LEDs indicate the status of the device:

Table 3-1: Device status LED specifications

LED	Status	Description
RUNNING	Green	The device is On.
ALARM	red	At least one major alarm has been raised.
WARNING	orange	At least one minor alarm has been raised.

Keypad

The keypad features 7 keys used to display and select a menu or a setting:

Table 3-2: Keypad specifications

Key	Function
→	Move the cursor to the right
←	Move the cursor to the left
↑	Move the cursor up
↓	Move the cursor down
OK	Access the main menu, a sub-menu or confirm a setting value
ESC	Go back to the menu above
HOME	Go back to the MAIN menu

To change a numeric value with the keypad:

1. Select the value to change using the ← or → key until the marker indicates the value to change.
2. Set the value with the ↑ or ↓ key.
3. Press the OK key to confirm the new value.

LCD screen

The LCD screen features a graphic display (192 x 64 pixels). It provides up to 4 lines:

- Line 1: menu context
- Lines 2, 3 and 4: 2 x 3 menu matrix



Figure 3-2: LCD menu matrix overview

Symbols (or markers) help to locate and/or select displayed items:

Table 3-3: Keypad specifications

Symbol	Meaning
<	Animated symbol, in the top right of the status screen, indicating that the equipment is operational.
> <	Text preselection marker. The selected text can then be confirmed by pressing the OK key on the keypad. Move this marker using one of the 4 arrow keys.

Setting LCD screen brightness and contrast

For optimum readability of texts displayed on the LCD screen, it may be necessary to adjust the Brightness and Contrast according to the lighting conditions. Refer to section [LCD CAL Screen](#).

Screen description

Screen tree menu

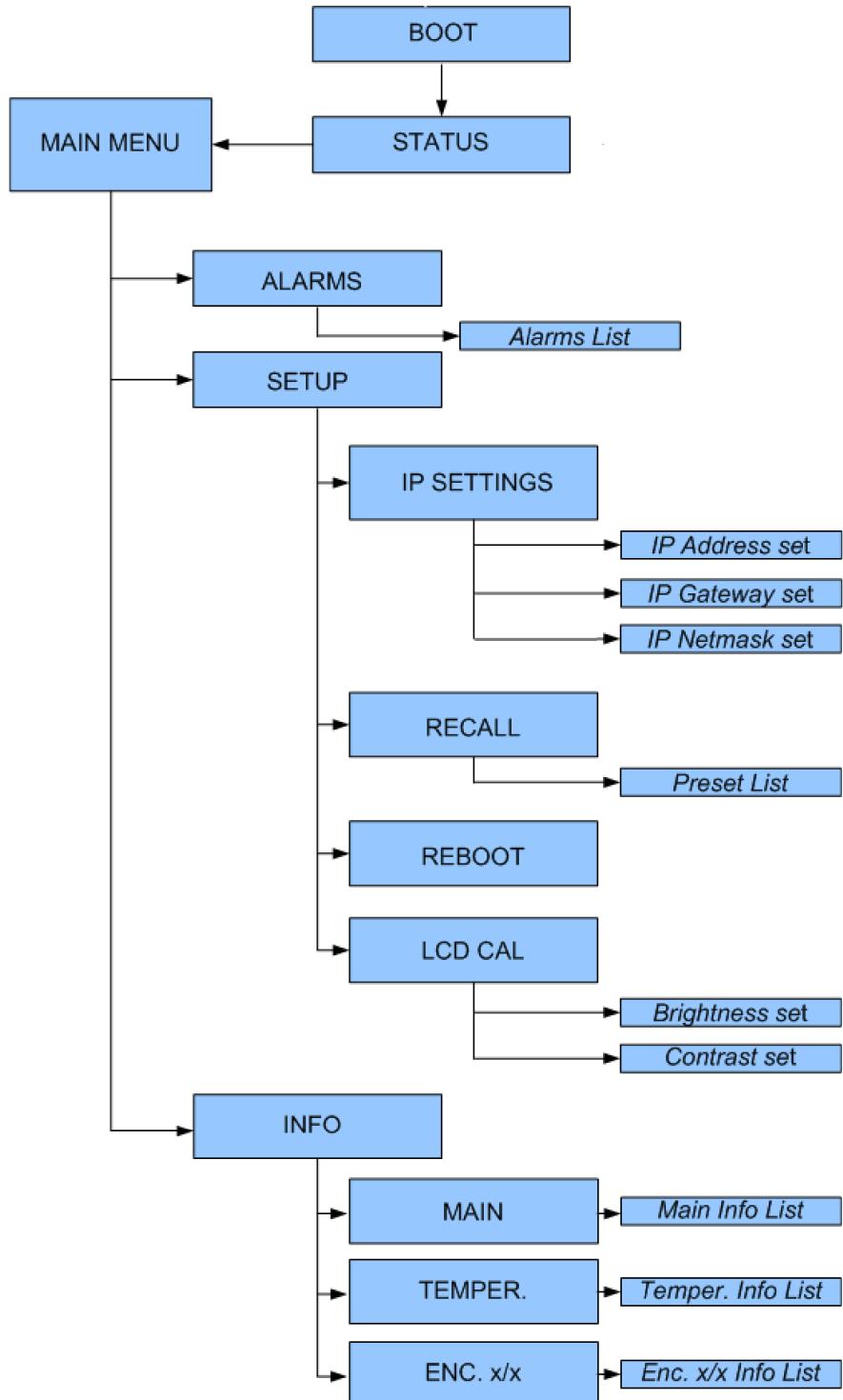


Figure 3-3: Menu tree of screens displayed on the Equipment front panel

Summary of screen functions

List summarizing the functions that can be accessed via the screens:

Table 3-4: Keypad specifications

Screen	Functions
section <i>Equipment booting screen</i>	Indicates that the equipment is starting up
section <i>Status screen</i>	Indicates the equipment name and IP address.
section <i>Main Menu Screen</i>	Displays available sub-menus.
section <i>Alarms Screen</i>	Displays alarms raised on the equipment.
section <i>Setup Screen</i>	Displays available sub-menus.
<ul style="list-style-type: none"> • section <i>IP Settings Screen</i> • section <i>Recall Screen</i> • section <i>Reboot Screen</i> • section <i>LCD CAL Screen</i> 	<ul style="list-style-type: none"> Displays and used to edit equipment IP settings. Used to recall a predefined configuration. Used to reboot the equipment. Used to adjust the LCD Brightness and Contrast.
section <i>Info Screen</i>	Displays available sub-menus.
<ul style="list-style-type: none"> • section <i>Main Board Information Screen</i> • section <i>Temperature Information Screen</i> • section <i>Encoding Board Information Screen</i> 	<ul style="list-style-type: none"> Displays Main board information. Displays Temperature information. Displays Encoder board(s) information.

Equipment booting screen

When the equipment is powered on, after a few seconds the LCD lights on and the following message is displayed during the booting process:

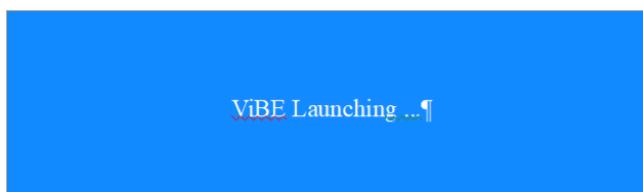


Figure 3-4: Booting screen

Status screen

The Status screen will be displayed once the booting process is complete:

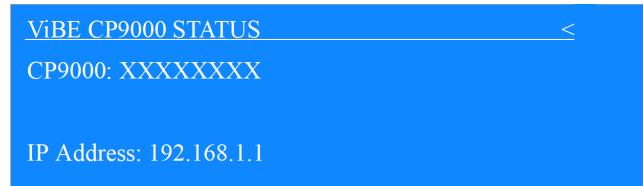


Figure 3-5: Status screen

- < Animated symbol, used to indicate that the equipment is operational.
- CP9000** Indicates the name of the equipment. This name is assigned via the Management System (Web Browser or NMX).
- IP Address** Indicates the equipment IP address.

Main Menu Screen

To display the main menu screen:

- From the status screen, press the **OK** key.
- From a sub-menu, press the **ESC** key once or more depending on the sub-menu displayed.

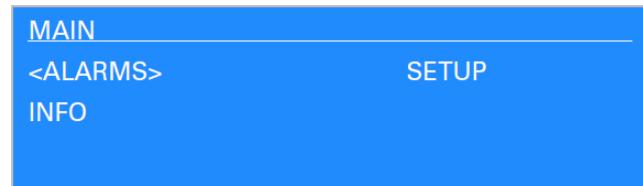


Figure 3-6: Main Menu screen

To select a sub-menu, use the ←, →, ↓ and ↑ keys and then confirm your choice by pressing the **OK** key.

Available sub-menus:

Table 3-5: Sub-menus on Main screen

Menus	Description
Alarms	Used to display alarms raised on the equipment.
Setup	Used to <ul style="list-style-type: none"> • Set equipment IP settings • Recall a predefined configuration • Reboot the equipment • LCD adjustments (Contrast and Brightness)
Info	Used to get information about encoder board references, chassis references, serial numbers, release numbers and temperatures

Alarms Screen

The Alarms screen is used to view alarms raised on the equipment.

To display this screen, go to the Main menu screen, select **ALARMS** using the arrow keys and press **OK**.

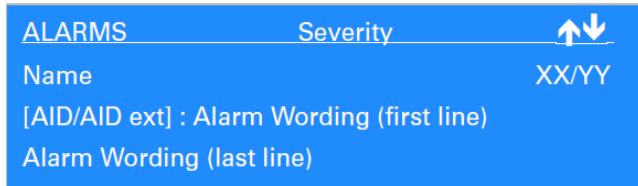


Figure 3-7: Alarms screen

Severity	Used to indicate alarm severity. The alarm can be Critical , Major , Minor or Warning .
Name	Used to indicate the name of the function with the alarm(s): MAIN Brd , ENCODER 1 Brd , etc.
XX/YY	XX indicates the number of the alarm in the YY list, where YY represents the total number of alarms raised.
AID/AID ext	Used to indicate the alarm identifiers (Alarm ID and Alarm ID Extension) so that it is easier to find relevant information in the documentation.
Alarm Wording	Used to provide the alarm description, which is identical to the description displayed on the Management System.

If necessary, the ↑ and ↓ keys can be used to display the next or previous alarm.

NOTE: The list of alarms is created when the Alarms screen is selected. To update the list of alarms, you will need to exit the Alarms screen.

Setup Screen

The Setup screen is used to access the IP Settings, Recall, Reboot and LCD Calibration sub-menus.

To display this screen, go to the Main menu screen, select **SETUP** using the arrow keys and press **OK**.

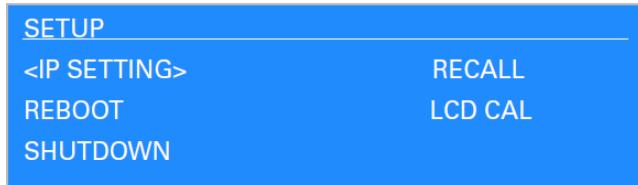


Figure 3-8: Alarms screen

IP Settings Screen

The IP settings screen is used to view and set the Control & Command IP Settings.

To display this screen, go to Setup screen, select **IP SETTING** using the ← and → keys and press **OK**.

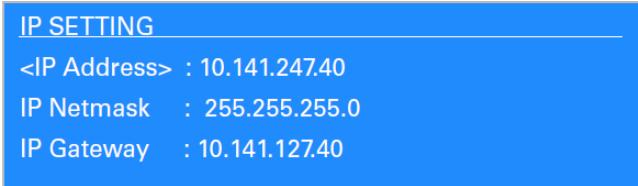


Figure 3-9: IP Setting screen

Example: Procedure for editing the IP Address (the procedure is the same to edit IP Netmask or IP Gateway):

- Use the ↓ and ↑ keys to select Address, Netmask or Gateway setting and press **OK**. The first digit is blinking.
- Use the ← and → keys to select the field to be modified and then use the ↓ and ↑ keys to adjust the value. Refer to figure below:

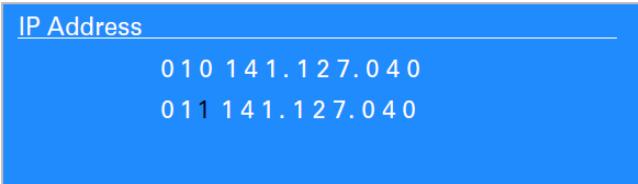


Figure 3-10: IP Address screen

- Confirm the new value by pressing **OK**. The Confirm screen will be displayed:

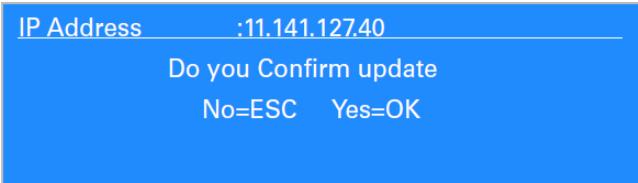


Figure 3-11: IP Address confirm screen

- Press **OK** to enable the new IP address or press **ESC/HOME** to exit this screen.

NOTE:

- The consistency between IP address and Gateway address is checked. If an error is detected a **Bad value** message can be displayed. The gateway address can also be reseted.
- The changes will be acknowledged after the equipment has been rebooted.

Recall Screen

The Recall Screen is used to recall a predefined configuration. The configurations are predefined via the Web Interface. To define configurations, see section [Predefined Configurations](#).

To display the Recall Screen, go to Setup screen, select **RECALL** using the ← and → keys and press **OK**.



Figure 3-12: Recall screen

Indications	Description
XX/YY	XX indicates the number of the currently selected configuration where YY represents the total number of predefined configurations.
ZZ EQU:.....	ZZ is used to indicate the ID of the configuration. EQU (or ENC) is used to indicate the type of configuration (Only EQU= Equipment is used in this release).: Name of the configuration as set on creation.

Procedure for recalling a configuration:

- Select the configuration to be recalled on the Recall screen using the ↓ or ↑ keys.
- Confirm your choice by pressing **OK**. The Recall Confirm screen will be displayed:

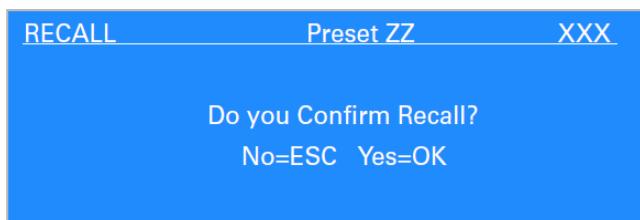


Figure 3-13: Recall, confirm screen

- Press **OK** to enable the recall or **ESC/HOME** to exit this screen.

At the end of the operation and if the recall was successful, the following screen will be displayed:

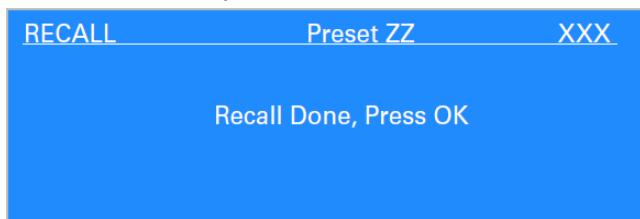


Figure 3-14: Recall, successful screen

An error message will be displayed in the event of failure.

Reboot Screen

The Reboot Screen is used to reboot the equipment.

To display this screen, go to the Setup screen, select **REBOOT** using the ← and → keys and press **OK**.

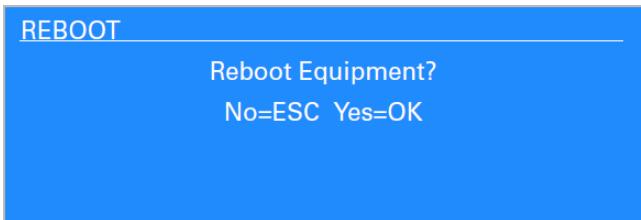


Figure 3-15: Reboot screen

Press **OK** to reboot the equipment. If you do not wish to reboot the equipment, press **ESC/HOME** to exit this screen.

LCD CAL Screen

The LCD Calibration screen is used to adjust the LCD Brightness and Contrast.

To display this screen, go to the Setup screen, select **LCD CAL** using the \leftarrow and \rightarrow keys and press **OK**.

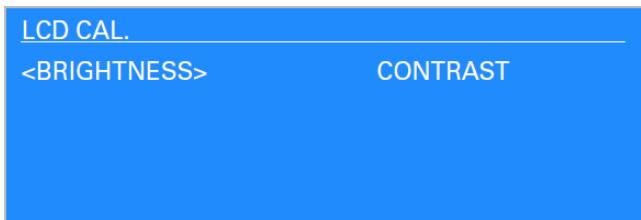


Figure 3-16: LCD CAL screen

Use the \leftarrow and \rightarrow keys to select the Brightness or Contrast setting and press **OK**.



Figure 3-17: Brightness CAL screen

- Use the \leftarrow and \rightarrow keys to adjust the setting according to the lighting conditions.
- Press **OK** to confirm and save the setting(s) or **ESC/HOME** to exit this screen without saving the setting(s). If OK is pressed the new settings will be restored on next equipment power up, otherwise the previous settings will be recalled.

Info Screen

The Info screen is used to access to the Main Board or Encoding Board(s) information sub-menu.

To display this screen, go to the Main menu screen, select **Info** using the \leftarrow and \rightarrow keys and press **OK**.

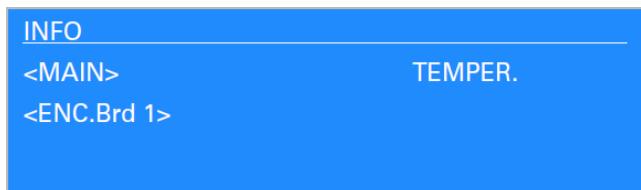


Figure 3-18: Info screen

Main Board Information Screen

The Main Board information screen is used to get Main Board information.

To display this screen, go to the Info screen, select **MAIN** using the ← and → keys and press **OK**.



Figure 3-19: Main Board Information screen

Indications	Description
Active SW	Indicates the Main Board active Software release number.
HW Version	Indicates the Main Board Hardware release number.
EQCODE	Indicates the Main Board equipment code. The equipment code is used to order a software license.
S/N	Indicates the Main Board serial number.

Temperature Information Screen

The Temperature Information screen is used to display the Ambient temperature.

To display this screen, go to the Info screen, select **TEMPER.** using the ← and → keys and press **OK**. The following information will be displayed:

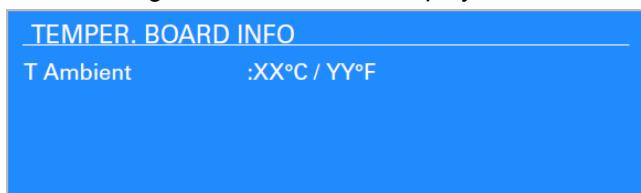


Figure 3-20: Temperature Info screen

Indications	Description
T Ambient	Indicates the air temperature at the equipment input. The temperature is displayed in degree Centigrade XX°C and in degree Fahrenheit YY°F .

Encoding Board Information Screen

The Encoding Board information screen is used to get Encoding Board information.

To display this screen, go to the Info screen, select **ENC.Brd 1** using the ← and → keys and press **OK**.
The following information will be displayed:

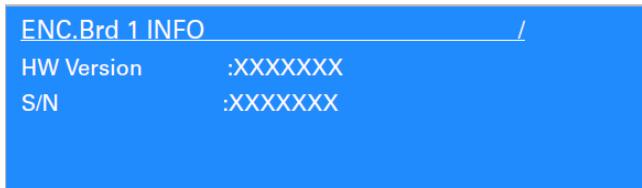


Figure 3-21: Encoding Board Info screen

Indications	Description
HW Version	Indicates the Encoding board Hardware release number.
S/N	Indicates the Encoding board Serial number.

Chapter 4

Web Browser Interface

This chapter explains how to use the Web Browser Graphical User interface to configure the ViBE CP9000.

- *Equipment Web Interface Specifications*
- *Reaching the GUI*
- *Quick configuration*
- *Screen Layout*
- *Equipment Status*
- *Setting the ViBE CP9000 Equipment*
- *Maintenance*

Equipment Web Interface Specifications

Protocol used

HTTP protocol version 1.1 is supported.

Compatible Web Browsers

The Web Interface has been tested with a Web Browser installed on a Windows system.

To run the CP9000 GUI on your computer, you have to observe the following requirements:

- Web browser must be Mozilla Firefox 36 (or higher) or Google Chrome 41 (or higher).
- Java script must be enabled.
 - A security exception has to be added on Java:
- Open the Java control panel and select the security tab

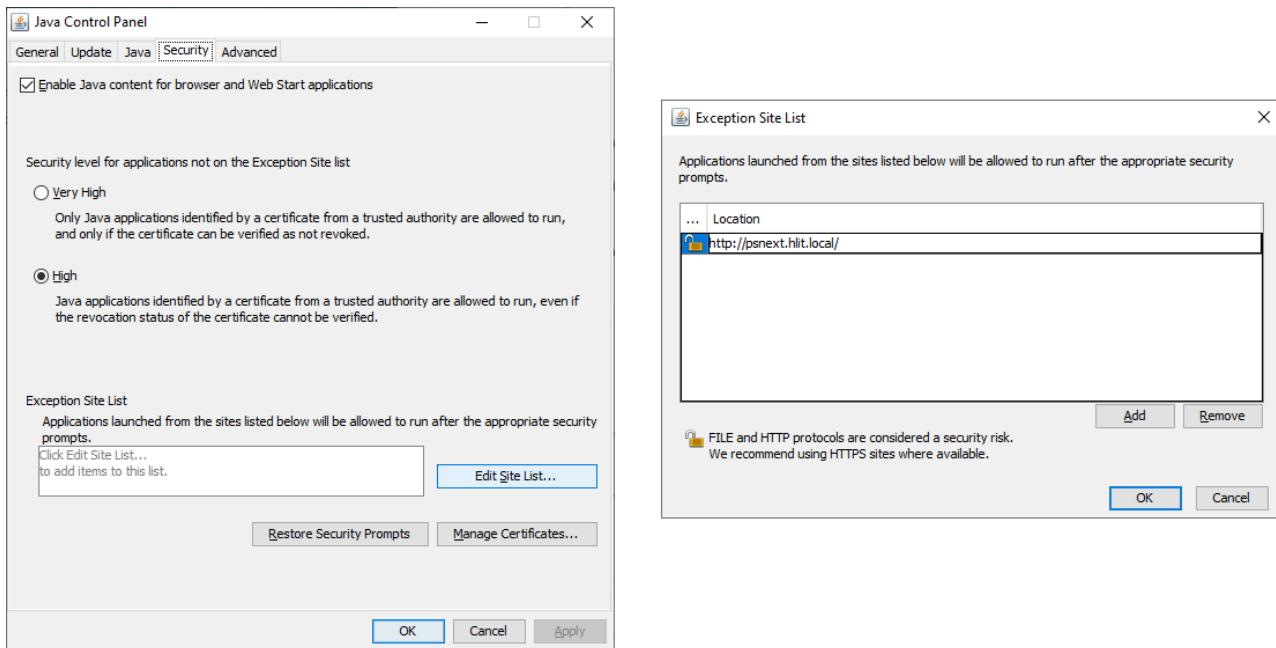


Figure 4-1: Java control panel - Security tab

! **CAUTION:**

Internet Explorer is not recommended.

Displays defaults may occur with IE11 (or higher) depending on Microsoft updates.

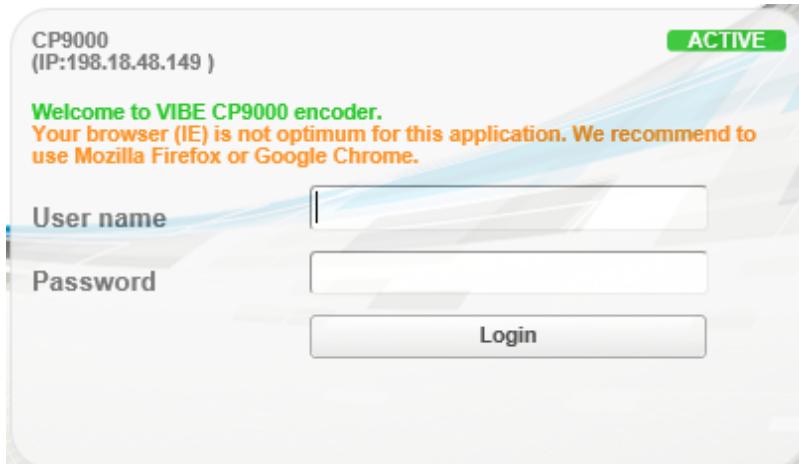


Figure 4-2: Open Web GUI with IE

Maximum number of connected Users

Ten Users can be connected to the equipment via its Web Interface at any one time. No priority rules are set between Users. To disconnect from the equipment you are advised to use the **Logout** link on the Interface pages to reduce the number of Users.

Definition of Equipment Users

To operate the equipment via a Web Browser connected to its Web Interface, Users must be declared in the equipment. Users are declared and managed (creation, deletion, passwords, rights, etc.) via the Local Console application featured in the equipment. Refer to the [Servicing](#) chapter in this Manual.

The following Users are set on equipment shipment. They have the following names, passwords and profiles:

Table 4-1: Users set on equipment shipment

User Name	Password	Profile
admin	admin	administrator
user	user	operator

It is possible to edit the characteristics of these Users and a maximum of 64 Users can be defined.

The different profiles provide the following rights:

Table 4-2: User profiles and corresponding rights

	operator	administrator
View Topology	X	X
View Predefined Configurations	X	X
Create Predefined Configurations		X
Recall Predefined Configurations		X
View Equipment Configuration	X	X
Edit Equipment Configuration		X
View Alarms	X	X
Reboot Equipment		X
Create User		X

Reaching the GUI

Setting up the link between the operating PC and the CP9000.

To set up the link between the operating PC and the equipment Web Interface and reach the GUI:

1. Connect the PC Ethernet link to the **Control 1** connector on the equipment rear panel, or to the network connected to this connector.
2. Run the Web Browser on the PC and enter the equipment IP address as the **HTTP/HTTPS address**.



Figure 4-3: Reaching the GUI

Following connection, the Web interface Login page will be displayed:



Figure 4-4: Login page

3. Enter your Username and Password. See section [Definition of Equipment Users](#).

 **NOTE:** Default users are set on equipment shipment (e.g. **User name**= admin and **Password**= admin)

The **Status/Summary** page will be displayed. See section [Status /Summary page](#).

Quick configuration

To rapidly configure the equipment please follow these steps:

1. **Load a Predefined in-factory Configuration:** Refer to section [Loading a Predefined Configuration \(pdcloud\)](#)....
2. **Configure the output IP interfaces:** Refer to section [Configuring LAN/WAN network interfaces](#).
3. **Configure the TS stream and output IP encapsulation:** Refer to section [Configuring Transport Stream and IP encapsulation](#).
4. **Fine tune the configuration to actual encoder use:** Refer to section [Setting the Encoder](#).

Screen Layout

General Information

Each page comprises:

- a menu bar featuring the following items

Table 4-3: Menu bar

Item	Use
	shortcut to access the Status/Summary page.
Status	to access the Summary page, Alarms, Events, Monitoring, Zixi Monitoring, SRT Monitoring and HW/SW information pages.
Configuration	<ul style="list-style-type: none"> • to configure the encoding mode (UHD or HD) • to load Logos, Slates and Public Keys • to configure Automatic Configuration • to configure Automatic Redundancy • to configure Geo Synchronisation • to configure the ETH1 and ETH2 Outputs IP interfaces • to configure ASI output • to access the Expert Parameters page of the equipment
Preset	<ul style="list-style-type: none"> • to save the active configuration to the internal memory or to a disk • to recall a configuration from the equipment internal memory or from a disk
Maintenance	<ul style="list-style-type: none"> • to reboot the equipment • to shut down the equipment • to reset the configuration • to set the names of the equipment and encoder • to save the encoder settings to a disk • to load the encoder settings from a disk • to generate activity reports for labs
	To indicate that the LCD flashing function is On. Refer to section Configuring the Names of the Equipment and its Encoder .
Alarms / State	<ul style="list-style-type: none"> • to indicate the highest alarm raised on the equipment • to indicate the status of the equipment

- The page contents.
- A footer indicating the User login name, current User profile, number of Users connected to the equipment and the equipment software version. A **Logout** link, used to end the session, is also displayed.



Figure 4-5: Web Interface page breakdown

The pages used to configure the equipment also contain the following buttons:

Table 4-4: Reset and submit buttons

Button	Definition
<input type="submit"/>	Confirms changes made on the current page
<input type="reset"/>	Cancels changes made on the current page

Status / Summary page

The Status/Summary page is defined as being the home page of the ViBE CP9000.

The Status/Summary page is displayed as soon as the User has been identified via the Login page, or by clicking the Harmonic logo.

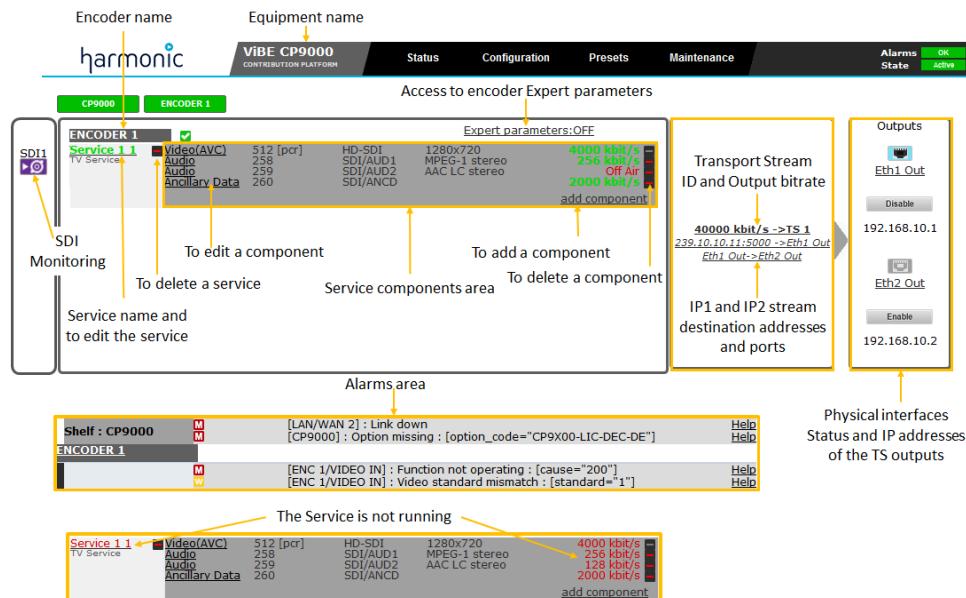


Figure 4-6: Status / Summary page breakdown

You can display SDI Monitoring information by pausing the mouse pointer over the SDI icon.



Figure 4-7: Summary page - SDI monitoring

On this page:

- The equipment and encoder names are set on the Maintenance/Identification page. See section [Configuring the Names of the Equipment and its Encoder](#).
- Click the service name link or [add service](#) to display the encoded service configuration page. See section [Adding/Editing a Service](#).
- Click a component link to display the component configuration page.
 - HEVC / UHD Video Component: See section [Adding/Editing an HEVC UHD video component](#).
 - AVC / UHD Video Component: See section [Adding/Editing an AVC UHD video component](#).
 - HEVC / HD Video Component: see section [Adding/Editing an HEVC HD video component](#).
 - AVC / HD Video Component: see section [Adding/Editing an AVC HD video component](#).
 - Audio Component: See section [Adding/Editing an Audio component](#).
 - PCR Component: See section [Adding/Editing a PCR component](#).
- Click the [Ethx Out](#) link (Physical output) to display the IP Physical output configuration page. See section [Configuring LAN/WAN network interfaces](#).
- Click the [TS ID](#) link to display the TS and IP Encapsulation configuration page. This page can only be accessed via this Status/Summary page and is described below.
- Refer to section [Alarms menu](#) to have details on the equipment and encoder alarms areas.



NOTE:

- When a Component is set “Off Air”, this information appears in red in the GUI, while the Service name and the bitrate of the other components appear in green.
- When a Service is set “Not Running”, the service name appears in red and the bitrate of all components appears in red.

Equipment Status

The following section will explain how to display the status of the equipment.

To display the Summary, Alarms and HW/SW Information pages click **Status** on the Menu bar.

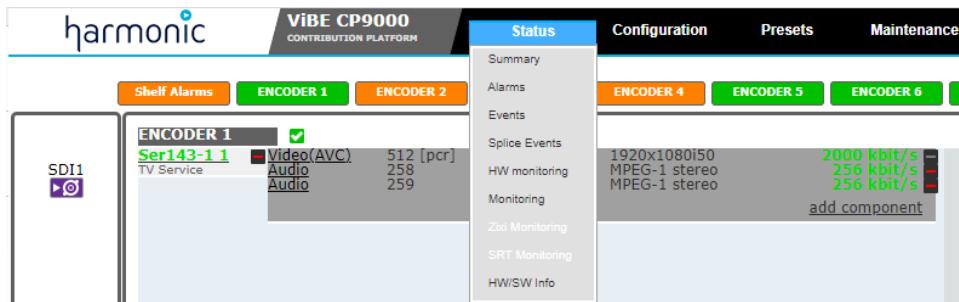


Figure 4-8: Status menu

Summary menu

This menu displays the same page as the page displayed by clicking on the Harmonic logo. Refer to section [Status /Summary page](#).

Alarms menu

This menu displays the page of alarms raised on the equipment.

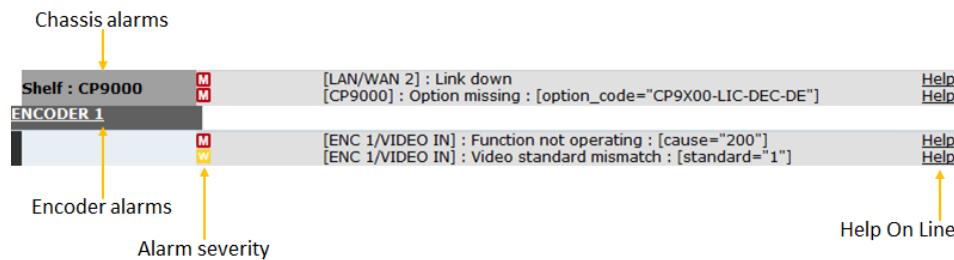


Figure 4-9: Description of alarms

Alarm	Severity
C	Critical
M	Major
m	Minor
!	Warning

Click [Help](#) associated with an alarm to display the details of the alarm.

Link down	
Probable Cause:	Link down
Category:	Communications
Default severity:	major
Cause:	The line transceiver of the board cannot lock on signal. Note : This event, as many other reception alarms, is generally produced by transmission problems in the network. It can also come from a device partial failure. The quality of transmission shall be analysed by skilled staff. A check of network state shall be made. If no cause is directly detected there, a transmission analyser shall be used in place of the device for comparison. If a test system is not available a device exchange can be performed. Hereunder analysis proposal covers only trivial causes.
Action:	Check if the good cable is plug on the board. If signal conformity is proved, de plug and re plug the board. Wait until it is recognised by the control and command software.

Figure 4-10: Details of alarms

Specific case with the mode of the board in UHD 12G

- If no physical link or 12G-SDI input unlocked, then the alarm “Loss of signal” is displayed for all links, as shown below:

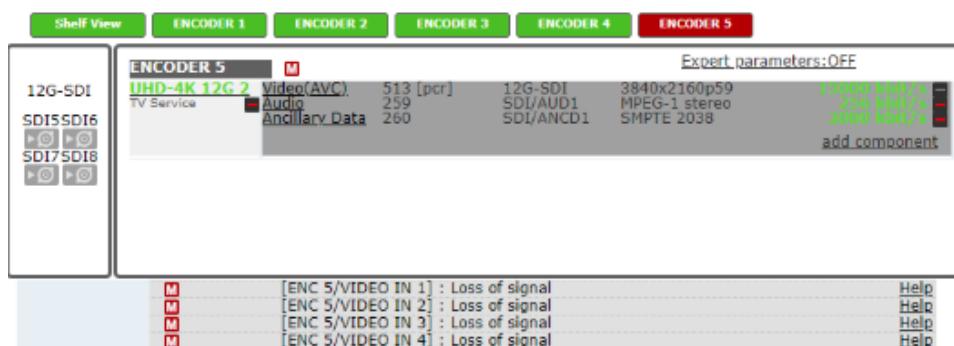


Figure 4-11: 12G SDI input - Loss of signal

- If the video standard received is different than the one configured, then the alarm “Video standard mismatch” is displayed for all links, as shown below:

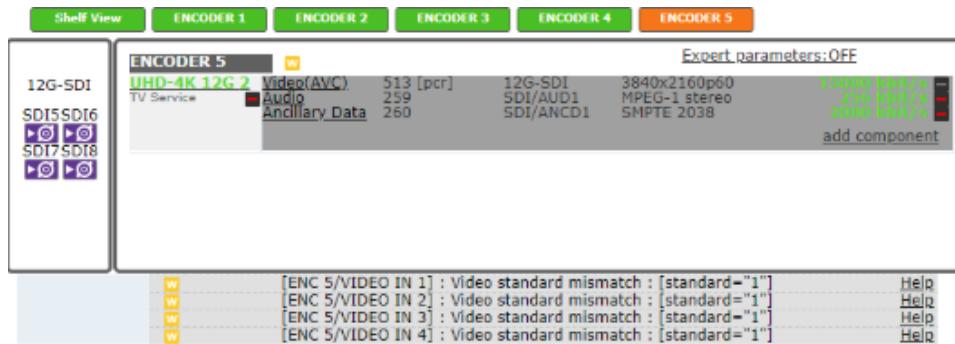


Figure 4-12: 12G SDI input - Video standard mismatch

Events menu

This menu displays up to 400 events in the past since last equipment reboot.

Events							
Local event Time	Component	Description	Type	Severity	Specific Problem	Help	
Fri Oct 8 08:31:21 2021	CP9000	(Re)booting	ALARM RAISED	WARNING	None	Help	
Fri Oct 8 08:31:26 2021	CP9000	(Re)booting	ALARM FAILED	WARNING	None	Help	
Fri Oct 8 08:31:56 2021	ENC 1/VIDEO IN	Video standard mismatch	ALARM RAISED	WARNING	standard="1"	Help	
Fri Oct 8 08:32:05 2021	ENC 1/VIDEO IN	Video standard mismatch	ALARM FAILED	WARNING	standard="1"	Help	

Figure 4-13: Status - Events

Click Help associated with an event to display its details.

Splice Events menu

This menu displays filtered splice events present in the list of events.

Splice Events							
Local event Time	Component	Description	Type	Severity	Specific Problem	Help	
Fri Oct 20 16:35:27 2023	ENC 1/VIDEO	init_request	UNKNOWN	NONE	None	Help	
Fri Oct 20 16:35:30 2023	ENC 1/VIDEO	splice_normal	UNKNOWN	NONE	pre-call=4000	Help	
Fri Oct 20 16:35:30 2023	ENC 1/VIDEO	Splice info	UNKNOWN	NONE	cause="4"	Help	

User:admin/administrator/(1) [Logout](#) - PXE MODE - ANDREAS9K_3.20.0.3

Click Help associated with an event to display its details.

HW Monitoring menu

This menu displays ambient temperature in °Celsius and °Fahrenheit.

Temperature information							
Ambient temperature: 26 °C / 78 °F							
User:admin/administrator/(1) Logout - PXE MODE - ANDREAS9K_3.20.0.3							

Monitoring menu

This menu displays SDI inputs information, whatever the configuration of each board, as shown in the picture below:

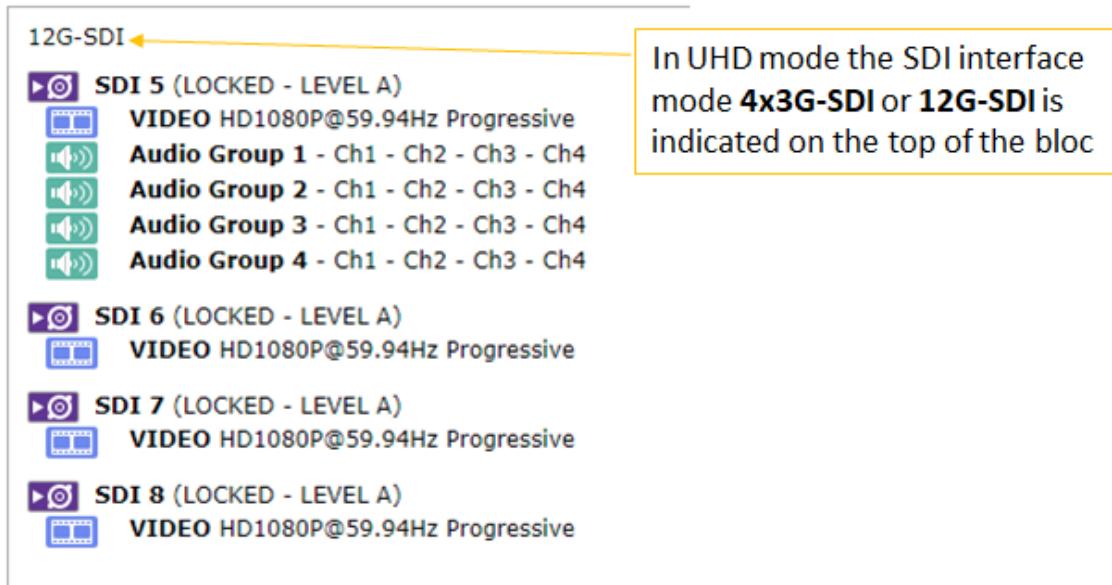


Figure 4-14: Status - SDI monitoring

In 12G SDI source, each SDI# BNC icon monitors the state of the virtual links matching with Sub-Images 1, 2, 3 and 4.

Zixi Monitoring menu

This menu allows to display all status and statistics of each ZIXI IP Transmission.

It is useful for configuration and troubleshooting. For details about configuration refer to section [Configuring LAN/WAN network interfaces](#).

Connection:	
Connexion Status:	CONNECTED
Number of Reconnections:	0
Up time:	115 ms
Last status change:	Fri Sep 28 09:52:04 2018
Last error:	0

Network:	
Bitrate:	11265389 bps
Available Bitrate:	0 bps
Jitter:	1 ms
RTT:	5 ms
Actual latency:	4000 ms
Transmitted Packets:	800049
Transmitted Bytes:	161379384
Number of Re-Ordered Packets:	0
Number of Dropped Packets:	0
Number of Duplicate Packets:	0

Error:	
FEC bitrate:	575424 bps
Number of ARQ Packets:	0
Number of FEC Packets:	37969
Number of Packets Recovered by ARQ:	0
Number of Packets Recovered by FEC:	0
Number of Unrecovered Packets:	0
Number of Overflows:	0
Number of Packets Too Late:	0

Figure 4-15: Status - Zixi monitoring

SRT Monitoring menu (mode Alpha)

This menu allows to display all status and statistics of each SRT Transmission IP1 and IP2, and of transmission group if SRT bonding is activated, for each encoder. This is useful for configuration and troubleshooting. For details about configuration refer to section [Configuring Transport Stream and IP encapsulation](#).

A network is considered good if the level of loss is lower than 0.2% with no important burst loss.

Level of loss = total number of lost packets (sender side) / total number of sent data packets including retransmissions.

As NACK and ACK packets contain list of several data packets,

- The **total number of lost packets (sender side)** can be higher than the **total number of received NACK packets**.
- The **total number of received ACK packets** is usually lower than the **number of sent data packets**.

A difference between the received NACK packets and the number of lost data packets is an indication of loss of packets per burst.

The number of data packets reported as lost at the sender side does not correspond to the packets detected as lost at the receiver side. A packet is considered lost in two cases:

- Sender receives a loss report from a receiver (this information is provided by the receiver)
- Sender initiates retransmission after not receiving an ACK packet for a certain timeout.

The number of data packets reported as lost at the sender side may not be equal to the number of retransmitted packets sent by the SRT sender because some packets are not retransmitted:

- If it is considered as too late
- If it was meanwhile acknowledged

If the **number of too-late-to-send dropped packets** and the **number of too-late-to-play missing packets** are not null these numbers indicate:

- A bad connection / loss connection or incorrect configuration with a too short configured latency.
- An overload of the CP9000.

Round trip delay indicates the average time between the emission of a packet and the reception of the acknowledgement.

When SRT bonding is activated additional metrics are available to check if the data were correctly sent on the bonded streams.

The screenshot shows the 'SRT Monitoring' section of the CP9000 interface. It displays three separate transmission groups, each with its own set of metrics. The groups are labeled 'ENCODER1', 'ENCODER2', and 'ENCODER3'. Each group has a 'Reset' button. The 'Connection' status for all three groups is 'CONNECTED'. The metrics listed for each group include:

- ENCODER1:**
 - Connection Status: CONNECTED
 - time since the UDT entity is started, in milliseconds: 42607
 - total number of unique data packets sent: 35731
 - total number of unique data byte sent: 48594160
- ENCODER2:**
 - Connection Status: CONNECTED
 - time since the UDT entity is started, in milliseconds: 42526
 - total number of sent data packets, including retransmissions: 35654
 - total number of lost packets (sender side): 0
 - total number of retransmitted packets: 0
 - total number of received ACK packets: 3735
 - total number of received NAK packets: 0
 - number of too-late-to-send dropped packets: 0
 - number of too-late-to-play missing packets: 0
 - Round Trip delay, in milliseconds: 0.986
- ENCODER3:**
 - Connection Status: CONNECTED
 - time since the UDT entity is started, in milliseconds: 42536
 - total number of sent data packets, including retransmissions: 35663
 - total number of lost packets (sender side): 0
 - total number of retransmitted packets: 0
 - total number of received ACK packets: 3563
 - total number of received NAK packets: 0
 - number of too-late-to-send dropped packets: 0
 - number of too-late-to-play missing packets: 0
 - Round Trip delay, in milliseconds: 0.060

Figure 4-16: SRT Monitoring with bonding

SRT Monitoring	
<input type="button" value="ENCODER1"/> <input type="button" value="ENCODER2"/> <input type="button" value="ENCODER3"/> <input type="button" value="ENCODER4"/> <input type="button" value="ENCODER5"/> <input type="button" value="ENCODER6"/> <input type="button" value="ENCODER7"/> <input type="button" value="ENCODER8"/>	
Transmission Group <input type="button" value="Reset"/>	
Connection:	
Connection Status:	NONEEXIST
time since the UDT entity is started, in milliseconds:	0
total number of unique data packets sent:	0
total number of unique data byte sent:	0
Transmission IP1 <input type="button" value="Reset"/>	
Connection:	
Connection Status:	CONNECTED
time since the UDT entity is started, in milliseconds:	2046785
total number of sent data packets, including retransmissions:	2916253
total number of lost packets (sender side):	89
total number of retransmitted packets:	89
total number of received ACK packets:	191028
total number of received NAK packets:	59
number of too-late-to-send dropped packets:	0
number of too-late-to play missing packets:	0
Round Trip delay, in milliseconds:	0.156
Transmission IP2 <input type="button" value="Reset"/>	
Connection:	
Connection Status:	NONEEXIST
time since the UDT entity is started, in milliseconds:	0
total number of sent data packets, including retransmissions:	0
total number of lost packets (sender side):	0
total number of retransmitted packets:	0
total number of received ACK packets:	0
total number of received NAK packets:	0
number of too-late-to-send dropped packets:	0
number of too-late-to play missing packets:	0
Round Trip delay, in milliseconds:	0

SRT Monitoring

ENCODER1	ENCODER2	ENCODER3	ENCODER4	ENCODER5	ENCODER6	ENCODER7	ENCODER8
----------	----------	----------	----------	----------	----------	----------	----------

Transmission Group Reset

Connection:

Connection Status:	NONEEXIST
time since the UDT entity is started, in milliseconds:	0
total number of unique data packets sent:	0
total number of unique data byte sent:	0

Transmission IP1 Reset

Connection:

Connection Status:	NONEEXIST
time since the UDT entity is started, in milliseconds:	0
total number of sent data packets, including retransmissions:	0
total number of lost packets (sender side):	0
total number of retransmitted packets:	0
total number of received ACK packets:	0
total number of received NAK packets:	0
number of too-late-to-send dropped packets:	0
number of too-late-to-play missing packets:	0
Round Trip delay, in milliseconds:	0

Transmission IP2 Reset

Connection:

Connection Status:	CONNECTED
time since the UDT entity is started, in milliseconds:	2085302
total number of sent data packets, including retransmissions:	2971070
total number of lost packets (sender side):	27
total number of retransmitted packets:	27
total number of received ACK packets:	192144
total number of received NAK packets:	20
number of too-late-to-send dropped packets:	0
number of too-late-to-play missing packets:	0
Round Trip delay, in milliseconds:	0.156

Figure 4-17: SRT Monitoring with no bonding

Possible Connection status:

- **NONEEXIST:** This is not a valid socket
- **OPENED:** The socket is created but not yet used
- **CONNECTING:** The connect operation is initiated, but not yet finished
- **CONNECTED:** The socket is connected and ready for transmission

HW/SW information menu

This menu displays equipment Hardware and Software information:

Hardware			
Sales Part	Industrial Part	Name	
CP9000-1U-2AC	CP9000-1U-2AC-01-01	X11 platform with 1 Intel Xeon Processor Intel E3-1225 SkyLake	
Hardware Installed options			
Sales Part	Industrial Part	Quantity	Name
CP9000-OPT-1AC	CP9000-OPT-1AC-01-01	0	CP9K 2ND OR SPARE AC PSU
CP9X00-HW-ASI-DUAL	CP9X00-HW-ASI-01-01	0	CP9K DUAL ASI CARD
CP9X00-HW-HEVC-SDI	CP9X00-HW-HEVC-SDI-01-01	0	CP9K HEVC CARD - SDI IN
CP9X00-HW-HEVC-IP	CP9X00-HW-HEVC-IP-01-01	1	CP9K HEVC CARD - SDI&IP IN
CP9X00-HW-ASI	CP9X00-HW-ASI-04-01-02	0	CP9K QUAD ASI CARD
CP9X00-HW-HEVC-IP V2	CP9X00-HW-HEVC-IP-V2-01-01	0	CP9K HEVC CARD - SDI&IP IN V2
CP9X00-HW-ASI-4	CP9X00-HW-ASI-04-02-01	1	CP9K QUAD ASI CARD
Software Installed options			
Sales Part	Industrial Part	Quantity	Name
CP9X00-LIC-ENC-HEVC-1HD-420	CP9X00-LIC-ENC-HEVC-1HD-420-01	0	First HD HEVC/AVC 4:2:0
CP9X00-LIC-ENC-HEVC-1HD-422	CP9X00-LIC-ENC-HEVC-1HD-422-01	0	First HD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-HEVC-HD-420	CP9X00-LIC-ENC-HEVC-HD-420-01	0	Add HD HEVC/AVC 4:2:0
CP9X00-LIC-ENC-HEVC-HD-422	CP9X00-LIC-ENC-HEVC-HD-422-01	0	Add HD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-HEVC-UHD-420	CP9X00-LIC-ENC-HEVC-UHD-420-01	0	one HD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-HEVC-UHD-422	CP9X00-LIC-HEVC-UHD-422-01	1	one UHD HEVC/AVC or 4xHD HEVC/AVC 4:2:0
CP9X00-LIC-HDR-PQ	CP9X00-LIC-HDR-PQ-01	0	HDR with SMPTE 2084 (PQ) gamma law
CP9X00-LIC-HDR-HLG	CP9X00-LIC-HDR-HLG-01	0	HDR with HLG gamma law
CP9X00-LIC-HDR	CP9X00-LIC-HDR-01	4	HDR with HLG and PQ gamma law
CP9X00-LIC-HEVC-ULL	CP9X00-LIC-HEVC-ULL-01	1	one HDR or UHD HEVC Ultra Low Latency
CP9X00-LIC-ENC-HEVC-1HD-420	CP9X00-LIC-ENC-HEVC-1HD-420-01	0	First HD AVC 4:2:0
CP9X00-LIC-ENC-AVC-1HD-420	CP9X00-LIC-ENC-AVC-1HD-420-01	0	First HD AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-AVC-HD-420	CP9X00-LIC-ENC-AVC-HD-420-01	0	Add HD AVC 4:2:0
CP9X00-LIC-ENC-AVC-HD-422	CP9X00-LIC-ENC-AVC-HD-422-01	0	Add HD AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-AVC-UHD-420	CP9X00-LIC-ENC-AVC-UHD-420-01	0	one UHD AVC or 4xHD AVC 4:2:0
CP9X00-LIC-ENC-AVC-UHD-422	CP9X00-LIC-ENC-AVC-UHD-422-01	0	one UHD AVC or 4xHD AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-AAC	CP9X00-LIC-ENC-AAC-01	12	one stereo AAC/LC/ME
CP9X00-LIC-ENC-DD	CP9X00-LIC-ENC-DD-01	8	one stereo DD-DD+
CP9X00-LIC-TRX-DDTODD+	CP9X00-LIC-TRX-DDTODD+-01	0	one DD or DD+ transcoding to DD or DD+ or MP1L2
CP9X00-LIC-DEC-DE	CP9X00-LIC-DEC-DE-01	4	one Dolby E decoding
CP9X00-LIC-ENC-AC4	CP9X00-LIC-ENC-AC4-01	0	one stereo AC4
CP9X00-LIC-SCTE	CP9X00-LIC-SCTE-01	0	one stereo Juniper Loudness control
CP9X00-LIC-SCTE	CP9X00-LIC-SCTE-01	2	one stereo Juniper SCTE104 to SCTE35
CP9X00-LIC-FEC	CP9X00-LIC-FEC-01	0	FEC generation
CP9X00-LIC-SMPTE-2110	CP9X00-LIC-SMPTE-2110-01	0	one IP SMPTE 2110 Input Service (one per HD, 1xUHD=4xHD)
CP9X00-LIC-BISS-CA	CP9X00-LIC-SMPTE-BISS-CA-01	0	BISS-2 mode CA (BISS-CA) encryption (license per unit)
CP9X00-LIC-LOGO-SLATE	CP9X00-LIC-LOGO-SLATE-01	1	Logo or slate insertion (license per unit)
CP9X00-LIC-GEO-SYNC	CP9X00-LIC-GEO-SYNC-01	1	geo-synchronization between CP9000 (license per unit)
Add option			
Product Identification			
Active package	CP9000_03.00.00.003_SUDO		
Previous package	CP9000_03.00.00.006_RC		
Configuration part number	CP9000		
Configuration sale ref			
Configuration serial number			
Configuration chassis count	1		
Manufacturing date			
Inactive package	CP9000_02.60.00.006_A		
Inactive package	CP9000_02.80.03.000_RC		
Inactive package	CP9000_02.90.00.005_A		
Inactive package	CP9000_03.00.00.006_RC		
Download a new package			
MAIN-Board			
Board Type	MAIN-Board		
Prod Unit Part Number	CP9000-1U-2AC-01-01		
Product Serial Number			
Prod Unit Variant Number			
Equipment Code	D2B0		
Power 1 Serial Number			
Power 1 Part Number			
Power 2 Serial Number			
Power 2 Part Number			
Power 3 Serial Number			
Power 3 Part Number			
ENCODING-Board 1			
Board Type	ENCODING-Board		
Prod Unit Part Number	CP9X00-HW-HEVC-SDI-01-01		
Product Serial Number			
Board Id			
ASI-OUT-Board			
Board Type	ASI-OUT-Board		
Prod Unit Part Number	CP9X00-HW-ASI-04-01-01		
Product Serial Number	ESE022875		
Board Id	9692A5311E		

Figure 4-18: HW/SW information

In the Hardware box

Sales Part, Industrial Part and Name of the hardware part(s) declared in the equipment.

In the Hardware Installed options group box

Sales Part, Industrial Part, Quantity and Name of the hardware option(s) declared in the equipment.

In the Software Installed options group box

Sales Part, Industrial Part, Quantity and **Name** of the software license(s) declared in the equipment.

Possibility to add option by clicking on the “gear” icon.

In the Product Identification group box

- **Active package:** Software version in use on the encoder.
- **Previous package:** Software version loaded onto the equipment but not in use. For more information, refer to [Servicing](#) chapter.
- **Configuration part number, Configuration sale ref, Configuration serial number, Configuration chassis count** and **Manufacturing date** are for Factory use only.
- **Inactive package:** Old software versions stored on the equipment. Possibility to toggle or to delete the package.
- **Download a new package:** Download a package from the Management PC. For more information, refer to [Servicing](#) chapter.

In the Main-Board group box

- **Board type:** Type of Board.
- **Prod Unit Part Number:** Equipment reference.
- **Product Serial Number:** Equipment serial number.
- **Prod Unit Variant Number:** Factory use.
- **Equipment code:** This code is used to order software licenses. For more information refer to [Servicing](#) chapter.
- **Power 1 Part Number:** Factory use.
- **Power 1 Serial Number:** Factory use.
- **Power 2 Part Number:** Factory use.
- **Power 2 Serial Number:** Factory use.

In the Encoding-Board and ASI-Out-Board group boxes

- **Board type:** Type of Board.
- **Prod Unit Part Number:** Factory use.
- **Product Serial Number:** Factory use.
- **Board Id:** Factory use.

Setting the ViBE CP9000 Equipment

The following section will explain how to set all the parameters of the equipment and display its status.

Device Configuration

The two first steps necessary to configure the CP9000 are to select the parameters of "*Encoding mode*" and the "*SPTS/MPTS mode*" as explained below:



Figure 4-19: Device Config.

In the **Shelf tab** define the:

- TS mode
 - SPTS (1xTS per channel) - 1 TS over IP generated at the output of each basic encoder
 - MPTS (1xTS per shelf) - 1TS over IP generated at the output of the CP9000
- Scrambling mode: OFF or BISS 1 or BISS2 or BISS CA
- **Device Configuration**

Shelf	Board 1 Mode	Board 2 Mode	DNS	FTP Server	Date & Time	Misc
--------------	--------------	--------------	-----	------------	-------------	------

TS mode: **MPTS (1xTS per shelf)**

⚠ This parameter modification will imply a configuration reset

Scrambling mode: **OFF**

submit **reset**

Figure 4-20: Device configuration - Shelf

In the **Board Mode** tab define the Input and Encoding parameters:

- Latency mode:

- Normal
- Ultra-Low (only available in HEVC)

Restrictions when Ultra-Low Latency mode is selected:

- up to two HD or one UHD per video board
- rescale is not allowed
- only one GOP mode: IPPP Intra refresh
- HDR not available
- Slate / Logo insertion not available
- Geo Redundancy not available
- audio only in Transparent mode
- create a SCTE-35 component is not allowed
- scrambling is not allowed
- edition of Expert video parameters is not allowed
- VBI settings are not allowed
- No source mode is not available: No encoding
- Board mode:
 - 4xHD
 - 1xUHD
 - 1xHD from UHD (for downscale process)
 - 4xHD/SD
- Input mode:
 - SDI
 - SDI 12G (only with 1xUHD or 1xHD from UHD board mode)
 - SDIoIP 2022-6 (only with 4xHD board mode)
 - ProMedia IP 2110 (only with 4xHD board mode)
- Standard:
 - HEVC
 - AVC
- Robust mode (video pattern generator):
 - Blue screen
 - Black screen
 - Last Picture

 **IMPORTANT:** Modifying the board mode / input mode will imply a configuration reset and potentially a reboot of the chassis.

If a reboot is required, depending on the transition, application of the new configuration may take around 4 minutes (chassis reboot – service impacting) and up to 15 minutes (load of new firmware - 10 minutes - no service impact, chassis reboot – around 4 minutes - service impacting).

The list of transitions and their impacts is detailed in Appendix A [Firmware bank transitions](#).

Device Configuration

Shelf	Board 1 Mode	Board 2 Mode	DNS	FTP Server	Date & Time	Misc
Latency mode	Normal					
Board mode	4xHD					
Input mode	SDI&IP 2022-6					
Standard	HEVC					
⚠ This parameter modification will imply a configuration reset on board 1						
Robust mode	Blue screen					
				submit	reset	

Figure 4-21: Device Configuration - Board Mode

DNS tab allows the operator to use URL to define the streaming destination, CP9000 converts this URL into a valid IP address and UDP port. This is done by sending out a request to the DNS server for IP address resolution and parsing the URL to get the UDP port.

- Up to 3 DNS Servers can be set. If the first DNS server does not respond, the CP9000 sends a request to the second, etc...

By default, the CP9000 is set to Google's DNS servers.

Device Configuration

Shelf	Board 1 Mode	Board 2 Mode	DNS	FTP Server	Date & Time	Misc
DNS server number 1 address	8.8.8.0					
DNS server number 2 address	8.8.4.4					
DNS server number 3 address	0.0.0.0					
submit reset						

Figure 4-22: Device configuration - DNS servers

FTP Server tab: Slate and Logo files can either be loaded thanks to web (local file) or in using a secured FTP Server (recommended). To use FTP mode an FTP Server shall be configured:

The screenshot shows the 'Device Configuration' interface with the 'FTP Server' tab selected. It displays two sections: 'Primary FTP Server' and 'Backup FTP Server'. The 'Primary FTP Server' section contains fields for IP address (198.18.51.252), Login (Harmonic), Password (Harmonic), and Status (Unknown). The 'Backup FTP Server' section has an 'Enable' field set to 'Off' (radio button selected), and fields for IP address (0.0.0.0), Login, Password, and Status (Unknown).

Figure 4-23: Device configuration - FTP servers

Date & Time tab allows to display the current date & time and to synchronize the CP9000 with NTP server. To do so, enable NTP and set the IP address of the NTP server:

The screenshot shows the 'Device Configuration' interface with the 'Date & Time' tab selected. It includes sections for 'NTP' and 'Date & Time'. In the 'NTP' section, 'NTP Enable' is checked and 'Server IP' is set to 10.11.255.24. In the 'Date & Time' section, 'Date' is set to 12-October-2022, 'Time' is 7:59:24 AM, and 'Time Zone' is GMT +00:00. Below these, 'Time Zone Region' is set to Etc and 'Time Zone Country' is set to UTC. A note at the bottom states: 'Daylight saving time is enabled according to the selected country. It is possible to select a specific time zone "GMT + X" in the Time Zone Country list by selecting "Etc" in Time Zone Region.'

Figure 4-24: Device configuration - Date & Time

The local time is configured selecting **Time Zone Region** and **Country**. Daylight saving time is enabled according to the selected country.

It impacts the date of the events, alarms displayed in the GUI and available by SNMP.

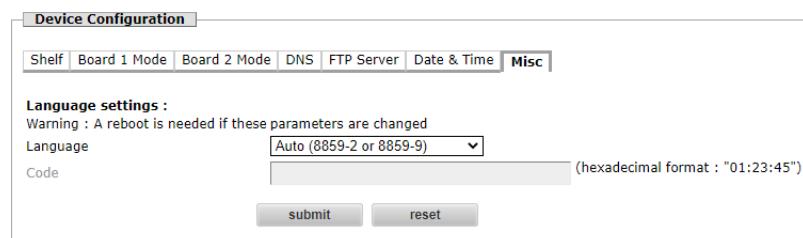
 **NOTE:**

Zones Etc/GMT+X are consistent with POSIX TZ settings with positive signs west of Greenwich. This is the inverse of what is usually expected.

TZ='Etc/GMT+4' uses the abbreviation "-04" and corresponds to 4 hours BEHIND UT (i.e. west of Greenwich) even though many people would expect it to mean 4 hours AHEAD of UT (i.e. east of Greenwich).

Misc tab allows to provide information on SDT table regarding the language used:

- **Language:** Character table used to encode the service name and provider in the SDT. Choice between **Auto (8859-2 or 8859-9)** and **UTF-16BE**.
- **Code:** it is inserted before the service name and provider in the SDT if the language is set to **UTF-16BE**. The code is set-top box dependent.



Device Configuration

Shelf | Board 1 Mode | Board 2 Mode | DNS | FTP Server | Date & Time | **Misc**

Language settings :
Warning : A reboot is needed if these parameters are changed

Language: **Auto (8859-2 or 8859-9)**

Code: **01:23:45** (hexadecimal format : "01:23:45")

submit | reset

Figure 4-25: Device configuration - Misc page

 **NOTE:** Any change on Language Settings needs a reboot of the equipment to apply it.

Automatic Configuration

The CP9000 allows to automatically load a predefined encoder configuration according to the detected SDI input signal.

 **Restriction:** Not available when:

- the board is in **UHD** mode
- SPTS/MPTS is set to **1 MPTS/Shelf**

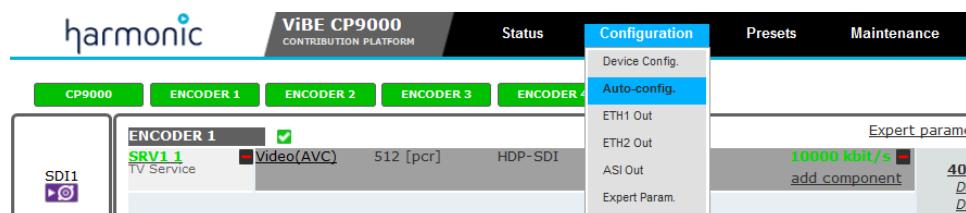


Figure 4-26: Configuration - Auto-config

The encoder configuration is based on the standard and the frame rate (1080i-25 / 1080i-29.97 / 720p-50 / 720p-59.94 / 1080p-50 / 1080p-59.94) of the incoming SDI signal. The presets have to be created before to set Automatic configuration. Refer to section [Predefined Configurations](#), to create the presets.

 **CAUTION:** It is important to create presets for each Encoder/Channel with different IP Multicast address at output, to avoid any IP conflict.

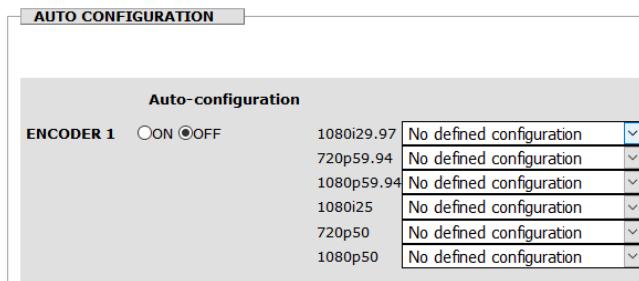


Figure 4-27: Auto Configuration - Parameters

- Select predefined configuration with the drop-down menu. At least one preset has to be selected.
- Select **ON** to enable the Automatic configuration.
- Do the same thing for other encoders/channels if required.

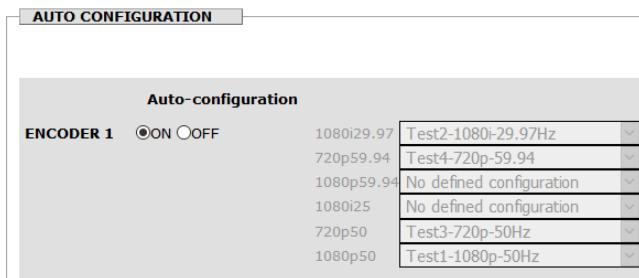


Figure 4-28: Auto Configuration - On

- Submit to apply your settings

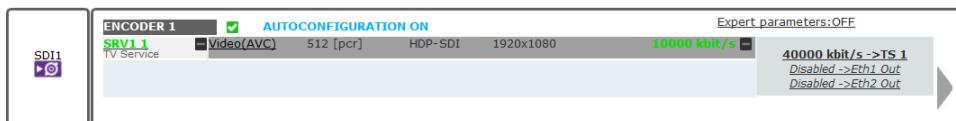


Figure 4-29: Encoder Auto Configuration On

Once the encoder is set to **Automatic configuration**, it is not possible anymore to delete or to change parameters of the associated components.

The screenshot shows the 'HD Video Configuration' interface with the 'General' tab selected. The configuration includes:

- Source: SDI Input 1
- SDI standard: 1x3G-SDI Level A or B
- No Source Mode: Blue Color Pattern
- Standard: 1080p
- Frame Rate: 50 fps
- Profile: AVC 4:2:2 10 bits (Hi422P)
- Compression Delay: Standard
- ES Rate: 10000 kbit/s (2000 to 54000 kbit/s)
- PID: 512 (32 to 8190)
- PCR: On
- Status: On Air

A red box highlights the message: "Autoconfiguration activated for this service. Configuration update not allowed."

Figure 4-30: Component - Auto Configuration On

When the CP9000 detects the incoming SDI signal, it immediately applies the corresponding preset if it exists.

NOTE:

- When no preset was created for a given encoder and SDI signal, the configuration in place does not change and a “*video standard mismatch*” alarm is raised.
- In the drop-down menu, only the presets corresponding to the standard (AVC or HEVC) of the board are displayed.

Restriction: The presets with SCTE35 components will not be available in the presets list to avoid consistency rules problems.

Logos Insertion

A logo picture can be inserted in the video, the first step is to load a logo, to do so:

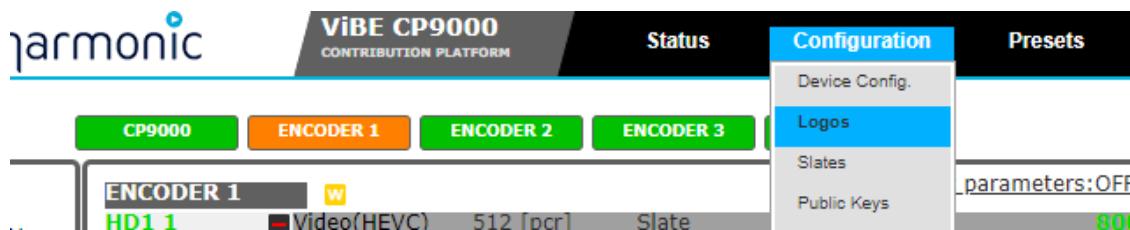


Figure 4-31: Configuration - Logos

Click on load button to choose a logo

Select the mode of transfer: FTP (default and recommended mode) or WEB

- **Limitations:**

- Number max of the logo files in the CP9000 = **32**
- Logo file name max length size = **64** characters (case sensitive)
- Logo file extension = **.png** (case sensitive)
- Logo geometry max size = **512 x 512** pixels. In addition Hsize shall be 16 pixels aligned and Vsize shall be 4 pixels aligned and > 0 so at least 16x4.

The screenshot shows a table titled "Logos configuration" with columns: "load", "del", "id", "mode", "path name", "logo name", and "status". There are three entries:

load	del	id	mode	path name	logo name	status
<input type="checkbox"/>	<input type="checkbox"/>	1	FTP	/home/leblancj/custom/HD-1080	sunset.png	Loaded
<input type="checkbox"/>	<input type="checkbox"/>	2	FTP	/home/leblancj/custom/HD-720	winter.png	Loaded
<input type="checkbox"/>	<input type="checkbox"/>	3	WEB	-	Harmonic_Logo.png	Loaded
<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-	Empty

Below the table are input fields for "Mode" (set to "FTP"), "Pathname", and "Filename", along with "submit" and "reset" buttons.

Figure 4-32: Configuration - Logos loaded

- Status:
 - Empty: slot free
 - Loaded: logo file loaded and ready to be used
 - Local file missing: the png file expected is not present on the CP9000
 - Picture format error: the png file requested is bad formatted (bad geometry or Hsize or Vsize bad size)
 - PNG format error: the png file header is bad formatted

NOTE:

- To delete a logo from the CP9000, click *del* button.
- Do not delete any logo used in a video.
- When rescaling or DE-interlacing function is enabled, *Logo/Slate/Moving* pattern are no longer available.

Slates Insertion

A slate picture can be inserted, to do so, refer to section [Logos Insertion](#).

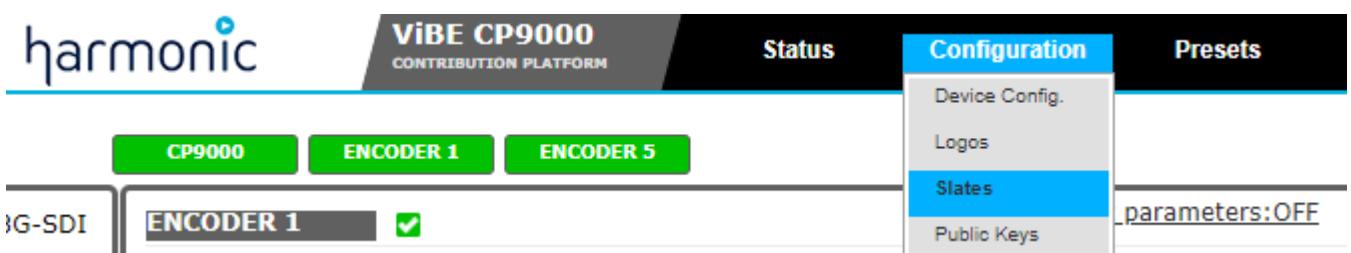


Figure 4-33: Configuration - Slate

- **Limitations:**
 - Number max of the slate files in the CP9000 = **32**
 - Slate file name max length size = **64** characters (case sensitive)

- Slate file extension = **.png** (case sensitive)
- Slate max size < **10 Mb**.

Public Keys

Public Keys tab allows the operator to load in advance public keys files (csv format - following EBU BISS-CA Public Key upload file format) when using BISS CA mode.

name	Receivers list	del
BISS-CA_56Keys_with_IRD_A.csv		
14_PubKey_with_IRD_A.csv		

Download a new file

Figure 4-34: Device configuration - Public Keys

IP Redundancy

The CP9000 allows to perform several types of IP redundancies:

- 1+1 Automatic IP Redundancy in a standalone mode (i.e. without management system).
- 1+1 Automatic IP Redundancy performed by a management system (NMX).

For both cases it is recommended that:

- Both CP9000s shall be in the same software version.
- The configuration of both CP9000s shall be aligned.

Figure 4-35: Configuration - Redundancy

The user has to configure the parameters of the Redundancy mode, the Redundancy network and the Redundancy triggers.

Standalone redundancy

CP9000 : Redundancy

Redundancy parameters

Mode: Standalone - Manual	Multicast Address: 239.0.0.0		
Device Role: Primary	Multicast Port: 1024 (1024 to 65535)		
Switch Back			
System	Video	Audio	VBI
<input type="checkbox"/> Function not operating <input type="checkbox"/> Corrupt data <input type="checkbox"/> Stream overflow <input type="checkbox"/> Hardware failure <input type="checkbox"/> Out of CPU cycle <input type="checkbox"/> Loss of real time	<input type="checkbox"/> Function not operating <input type="checkbox"/> Loss of signal <input type="checkbox"/> Video standard mismatch <input type="checkbox"/> Degraded signal	<input type="checkbox"/> Function not operating <input type="checkbox"/> Loss of signal <input type="checkbox"/> No embedded signal <input type="checkbox"/> Bad embedded signal <input type="checkbox"/> Detected silence <input type="checkbox"/> Saturated signal <input type="checkbox"/> No PCM in signal <input type="checkbox"/> Bad bitrate <input type="checkbox"/> No expected standard in signal <input type="checkbox"/> No AD track control <input type="checkbox"/> Stream error <input type="checkbox"/> Corrupt data <input type="checkbox"/> Lost of stream <input type="checkbox"/> No stream carried in program	<input type="checkbox"/> Function not operating <input type="checkbox"/> Stream overflow <input type="checkbox"/> No data in signal <input type="checkbox"/> Bitrate overflow <input type="checkbox"/> No teletext in signal <input type="checkbox"/> No TC in signal
IPout+C&C/ASIout			
<input type="checkbox"/> Stream overflow <input type="checkbox"/> Link down <input type="checkbox"/> Unsuitable link speed <input type="checkbox"/> Half duplex mode <input type="checkbox"/> Hardware failure <input type="checkbox"/> Unreachable destination <input type="checkbox"/> Duplicate information <input type="checkbox"/> Congestion			
submit		reset	

Figure 4-36: Configuration - Redundancy parameters

! **Attention:**

- When Standalone redundancy is configured, the output Ethernet configuration interface **SHALL** also be changed. See [LAN/WAN network interface Eth1](#)
- The network interface “Deactivation mode” parameter **SHALL** be set to “link UP / No traffic” so that when an equipment is in “**Standby**” state the broadcast of the output streams is stopped but the monitoring of the IP link down continues.

Standalone redundancy mode

- Mode:**
 - NONE: the redundancy is disabled.
 - Standalone - Manual: It corresponds to an edition mode while there is no communication between both CP9000s and where the user can set the triggers.
 - Standalone - Automatic: if a critical alarm, that is selected as a trigger, is raised, then the backup CP9000 takes over from the primary CP9000.
- Device Role:** The parameters are *Primary* and *Backup*. This device can be either the primary or the backup. The backup device needs to have the most updated configuration from the primary CP9000. The default is Primary.

Communication parameters:

- Multicast Address:** Used to communicate between both CP9000. The same multicast address must be configured for both CP9000. The range is 224.0.0.0 to 239.255.255.255.
- Multicast Port:** the range is 1024 to 65535.
- Group ID:** Use the same group number for each redundancy pair. The range is 1 to 65535.

NOTE: The Multicast address and port must be different than those used for the streaming.

Triggering parameters:

- **System**
- **Video**
- **Audio**
- **VBI**
- **IP Output and C&C + ASI output**

Once the configuration is done, the Primary CP9000 is **Active** and the Backup CP9000 is **Standby**.



Figure 4-37: Configuration - CP9000 States

When an automatic switch occurs, the primary becomes the Standby and the backup becomes the Active.

It is possible to switch back to the primary (after resolving the problem, no more alarm on the primary) by clicking on the **Switch Back** button from the backup.

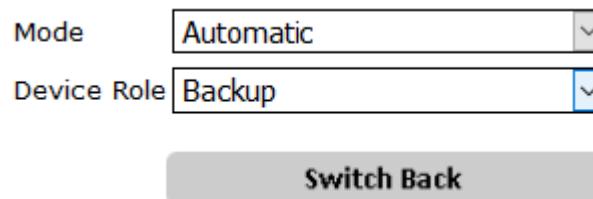


Figure 4-38: Configuration - Switch Back

 **NOTE:** When an equipment is in **standby** state (output streams stop to be broadcast), it is not possible to give a status for all the IP out triggers as the streams are not broadcast anymore. Only **IP link down** and **Hardware failure** continue to be monitored and can be used to decide to manually switch the equipment status from Backup to Primary.

IP Redundancy - controlled by NMX

If the CP9000 is part of a 1 + 1 IP redundancy couple controlled by NMX, then NMX will decide which CP9000 in the couple is active or backup by enabling/disabling their IP interface.

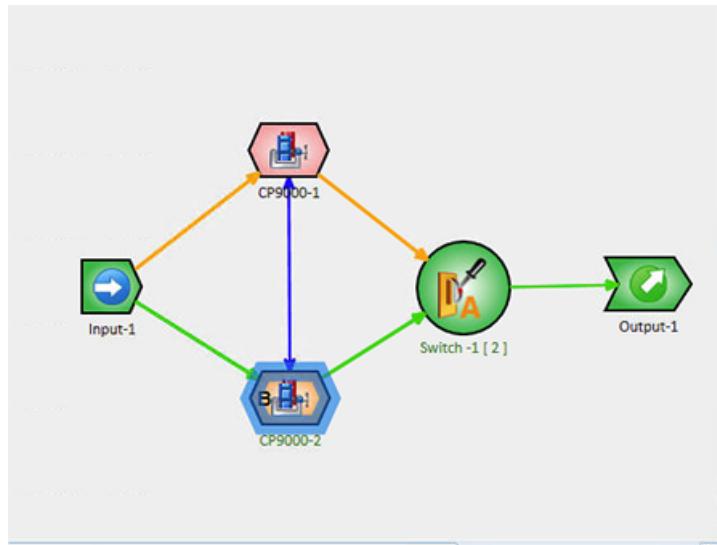


Figure 4-39: CP9000 under NMX in a 1+1 configuration

When CP9000s are included in a pair controlled by NMX, the CP9000s shall be configured in mode "controlled by NMX" in the 'Redundancy parameters' tab.

CP9000 : Redundancy

Redundancy parameters

Mode	<input type="button" value="Controlled by NMX"/>	Multicast Address	<input type="text" value="239.10.20.100"/>												
⚠ This mode shall be activated only if the CP9000 is controlled by NMX in 1+1 mode															
Device Role	<input type="button" value="Primary"/>	Multicast Port	<input type="text" value="1072 (1024 to 65535)"/>												
		Group ID	<input type="text" value="10 (1 to 65535)"/>												
Switch Back															
<table border="0"> <tr> <td>System</td> <td>Video</td> <td>Audio</td> <td>VBI</td> </tr> <tr> <td> <input type="checkbox"/> Function not operating <input type="checkbox"/> Corrupt data <input type="checkbox"/> Stream overflow <input type="checkbox"/> Hardware failure <input type="checkbox"/> Out of CPU cycle <input type="checkbox"/> Loss of real time </td> <td> <input type="checkbox"/> Function not operating <input checked="" type="checkbox"/> Loss of signal <input type="checkbox"/> Video standard mismatch <input type="checkbox"/> Degraded signal </td> <td> <input type="checkbox"/> Function not operating <input type="checkbox"/> Loss of signal <input type="checkbox"/> No embedded signal <input type="checkbox"/> Bad embedded signal <input type="checkbox"/> Detected silence <input type="checkbox"/> Saturated signal <input type="checkbox"/> No PCM in signal <input type="checkbox"/> Bad bitrate <input type="checkbox"/> No expected standard in signal <input type="checkbox"/> No AD track control <input type="checkbox"/> Stream error <input type="checkbox"/> Corrupt data <input type="checkbox"/> Lost of stream <input type="checkbox"/> No stream carried in program </td> <td> <input type="checkbox"/> Function not operating <input type="checkbox"/> Stream overflow <input type="checkbox"/> No data in signal <input type="checkbox"/> Bitrate overflow <input type="checkbox"/> No teletext in signal <input type="checkbox"/> No TC in signal </td> </tr> <tr> <td colspan="4" style="text-align: center;"> <input type="button" value="submit"/> <input type="button" value="reset"/> </td> </tr> </table>				System	Video	Audio	VBI	<input type="checkbox"/> Function not operating <input type="checkbox"/> Corrupt data <input type="checkbox"/> Stream overflow <input type="checkbox"/> Hardware failure <input type="checkbox"/> Out of CPU cycle <input type="checkbox"/> Loss of real time	<input type="checkbox"/> Function not operating <input checked="" type="checkbox"/> Loss of signal <input type="checkbox"/> Video standard mismatch <input type="checkbox"/> Degraded signal	<input type="checkbox"/> Function not operating <input type="checkbox"/> Loss of signal <input type="checkbox"/> No embedded signal <input type="checkbox"/> Bad embedded signal <input type="checkbox"/> Detected silence <input type="checkbox"/> Saturated signal <input type="checkbox"/> No PCM in signal <input type="checkbox"/> Bad bitrate <input type="checkbox"/> No expected standard in signal <input type="checkbox"/> No AD track control <input type="checkbox"/> Stream error <input type="checkbox"/> Corrupt data <input type="checkbox"/> Lost of stream <input type="checkbox"/> No stream carried in program	<input type="checkbox"/> Function not operating <input type="checkbox"/> Stream overflow <input type="checkbox"/> No data in signal <input type="checkbox"/> Bitrate overflow <input type="checkbox"/> No teletext in signal <input type="checkbox"/> No TC in signal	<input type="button" value="submit"/> <input type="button" value="reset"/>			
System	Video	Audio	VBI												
<input type="checkbox"/> Function not operating <input type="checkbox"/> Corrupt data <input type="checkbox"/> Stream overflow <input type="checkbox"/> Hardware failure <input type="checkbox"/> Out of CPU cycle <input type="checkbox"/> Loss of real time	<input type="checkbox"/> Function not operating <input checked="" type="checkbox"/> Loss of signal <input type="checkbox"/> Video standard mismatch <input type="checkbox"/> Degraded signal	<input type="checkbox"/> Function not operating <input type="checkbox"/> Loss of signal <input type="checkbox"/> No embedded signal <input type="checkbox"/> Bad embedded signal <input type="checkbox"/> Detected silence <input type="checkbox"/> Saturated signal <input type="checkbox"/> No PCM in signal <input type="checkbox"/> Bad bitrate <input type="checkbox"/> No expected standard in signal <input type="checkbox"/> No AD track control <input type="checkbox"/> Stream error <input type="checkbox"/> Corrupt data <input type="checkbox"/> Lost of stream <input type="checkbox"/> No stream carried in program	<input type="checkbox"/> Function not operating <input type="checkbox"/> Stream overflow <input type="checkbox"/> No data in signal <input type="checkbox"/> Bitrate overflow <input type="checkbox"/> No teletext in signal <input type="checkbox"/> No TC in signal												
<input type="button" value="submit"/> <input type="button" value="reset"/>															

Figure 4-40: CP9000 "Controlled by NMX mode"

In this mode, at CP9000 restart, the IP interface are forced in a disabled state whatever is declared in the configuration. The IP interface will be reactivated by NMX if the equipment is active. The state of CP9000 configured in NMX 1+1 IP redundancy is set to "NMX-Mode".

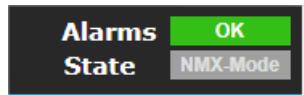


Figure 4-41: CP9000 status when controlled by NMX

The State text and color does not permit to know if the CP9000 is Active or Backup. It is necessary to check the state of the ethernet output to know which configuration is applied by the NMX

NOTE:

- Both CP900s shall be in the same software version and configuration of both CP9000s shall be aligned.
- Make sure to select this mode only if the equipment is configured in 1 + 1 redundancy in NMX. Otherwise after a reboot no data will be broadcast at the output of the CP9000 even if the IP interface are indicated enabled.

Geo Synchronization

The CP9000 allows to perform a 1+1 Geo-Redundancy using PCR synchronization on both remote CP9000s.

For both CP9000s and this from the Configuration menu, select PCR Geo Sync.

A screenshot of a configuration form titled 'PCR Geo Sync parameters'. The form contains several input fields and dropdown menus:

Mode	<input type="text" value="ON"/>	Destination Address	<input type="text" value="198.18.48.231"/>
Device Role	<input type="text" value="Primary"/>	Destination Port	<input type="text" value="1024"/> (1024 to 65535)
		Group ID	<input type="text" value="1"/> (1 to 65535)
		Pairing Address	<input type="text" value="198.18.48.231"/>

Below the form are two buttons: 'submit' and 'reset'.

Figure 4-42: PCR Geo Sync

- **Mode:** set it to ON to enable the PCR synchronization for Geo-Redundancy.
- **Device Role:** Set this CP9000 as Primary or Backup.
- **Destination Address:** multicast or unicast used to align PTS on both channels. If unicast address is configured the group id and pairing address are disabled. The group id is forced to 1.
- **Destination Port:** port number of the multicast or unicast.
- **Group ID:** to identify two channels to pair.
- **Pairing Address:** Remote device management IP source address for pairing the devices involved.

Geo-sync pairs are created between chassis with the same destination address / destination port / Group ID. However, it is recommended to set different Group ID or different Multicast address and/or port for each pair.

Geo redundancy data are transmitted out of band through the C&C network. Both CP9000s shall be able to communicate through this network.

To avoid conflict during installation phase or error of configuration, only data received from CP9000 with the indicated C&C pairing address will be accepted.

Once configured at equipment level, Geo redundancy shall be activated service per service. Refer to section [Adding/Editing a Service](#).

Once set, the Geo-Sync state is reported at encoder level as shown below:

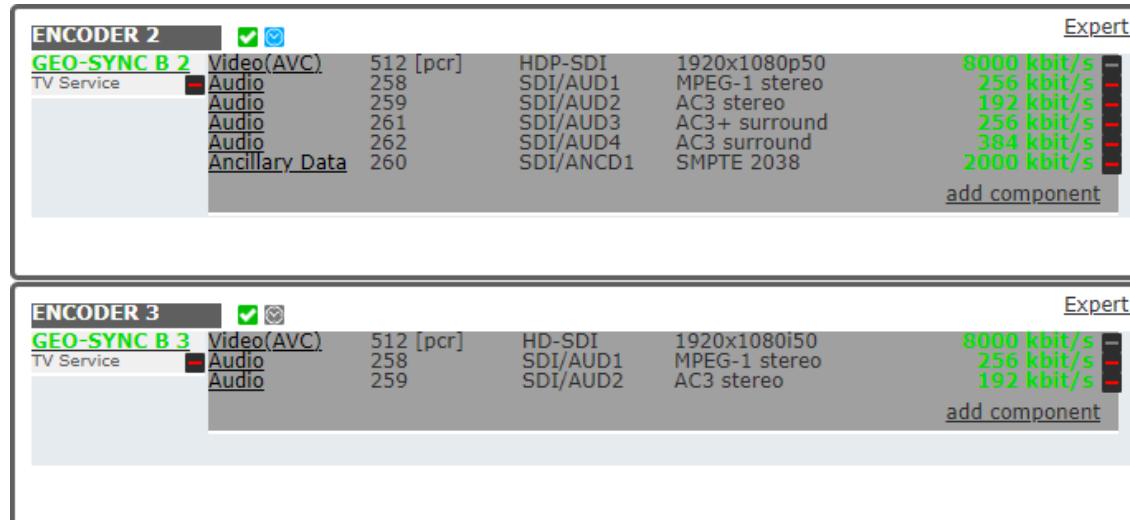


Figure 4-43: Geo-Sync state



- Cyan icon = Geo-Sync **Master** channel
- Grey icon = Geo-Sync **Slave** channel
- No icon = Geo-Sync is Off

Configuring SFP modules

The SFP modules are used to receive SDIoIP SMPTE 2022-6 or ProMedia IP 2110 inputs.

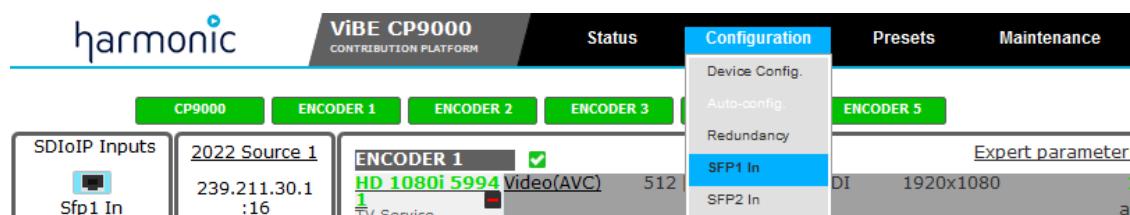


Figure 4-44: Configuration - Module SFP1

The user has to configure the IP parameters of the SFP module:

SFP ETH-10G IN1

Internal Configuration:

enabled disabled

Speed:

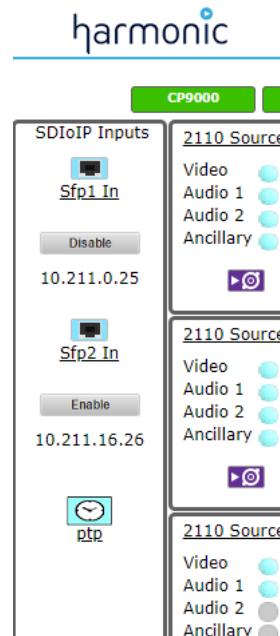
Address:

IP address:

Netmask:

Figure 4-45: Configuration - IP parameters

- Internal Configuration:
 - enabled /disabled:** When the Interface is disabled, not only the network traffic is stopped to IP Receiver but the SFP Link status is also reported as “down” towards the network. This action does not impact the “SFP#_in” icon color Gray (SFP Module no present or remote Port Down) or cyan (Module present and remote port Up).



! **CAUTION:** Enabling/Disabling SFP interface disturbs all 2110 sources for a few seconds and generates some transient alarms.

If SFP1 is disabled, it is not possible to successfully setup 2110 Main sources.

In the same way if SFP2 is disabled, user cannot successfully setup Backup IP-2110 sources.

To enable 2022-7 (Backup stream) both SFP1 and SFP2 must be Enabled and properly setup.

Assign a dedicated VLAN for Main (SFP1) and Backup (SFP2) Networks.

No VLAN tag setting at CP9000 level, only sub network masking.

- *Speed*: this parameter defaults to **10 Gbp**.
- Address:
 - *IP address*: of the SFP module
 - *Netmask*: of the SFP module.

NOTE:

- The Netmask address does not appear when **SDIoIP 2022-6** Input mode is selected.
- If the chassis contains a second video board with SFP modules, then SFP3 and SFP4 will be added on the Configuration menu.

Configuring PTP for ProMedia IP 2110

To use ProMedia IP 2110 standard, the incoming sources have to be accuracy synchronized, to do so, the CP9000 uses the Precision Time Protocol (PTP) that is a time synchronization Ethernet protocol.



Figure 4-46: Configuration - PTP board 1

The different IP sources, Video, Audios and Ancillary data, are thus synchronized.

PTP board 1

Common Configuration:

Genlock	<input type="text" value="PTP"/>
BMCA	<input type="text" value="Auto"/>
priority 1	<input type="text" value="128"/> (0 to 255)
priority 2	<input type="text" value="128"/> (0 to 255)
profile	<input type="text" value="Interop AES67/SMPTE 2059"/>
Domain Number	<input type="text" value="0"/> (0 to 127)
DSCP	<input type="text" value="46"/> (0 to 63)
Delay Mechanism	<input type="text" value="AUTO"/>
Mode	<input type="text" value="Multicast"/>

Figure 4-47: Configuration - PTP parameters

- Common Configuration:
 - **Genlock:** Only **PTP** is available.
 - **BMCA:** Best Master Clock Algorithm is always running, **Auto** mode.
 - **priority 1:** **128** default, not configurable.
 - **priority 2:** **128** default, not configurable.
 - **profile:** to set the appropriate value for PTP protocol.
 - AES67/SMPTE 2059-2: announcement message = 0 (1 per second)
 - SMPTE 2059-2: announcement message = -2 (1 per 0.25 second)
 - **Domain Number:** 0 to 127, 0 default. AES67/SMPTE 2059-2.
- If SMPTE 2059-2 profile is selected, recommended value is **127**.
- **DSCP:** Differentiated Service Code Point - 0 to 63 - 46 recommended.
- **Delay Mechanism:** Combo list P2P or E2E or AUTO recommended.
- **Mode:** Combo List **Multicast** or **Hybrid**
 - if Delay Mechanism = Auto or P2P: Only Multicast mode is available.

Configuring LAN/WAN network interfaces

LAN/WAN network interface Eth1

This command is used to configure the equipment's LAN/WAN ETH1 network interface.

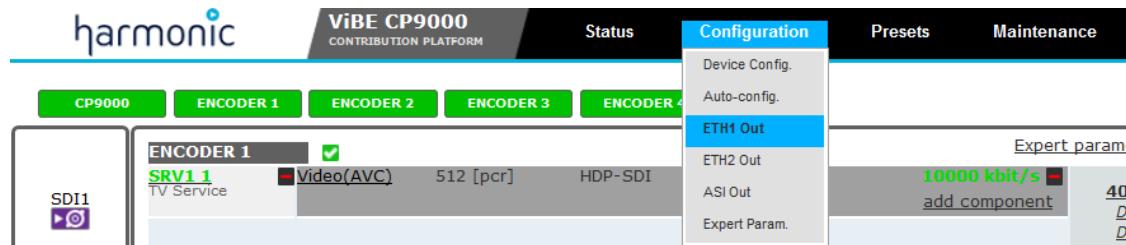


Figure 4-48: Configuration - Eth 1 Out

First of all, select enabled to use this IP interface output.

Zixi Configuration:	enable
Internal Configuration:	
Negotiation	automatic
Speed	100 Mbps
Mode	full duplex
Addresses:	
IP address	10.248.16.131
Netmask	255.255.255.0
Default Gateway	10.248.16.1
Interface State when disabled:	
Interface Deactivation	Link Down
Interface State when standby:	
Interface Status	Disabled

Figure 4-49: Eth1 Out Configuration - Network interface tab

Network Interface tab:

- **Zixi Configuration:** when enable, some new parameters appear in **TS & IP Encapsulation / Transmission IP#x** (for details refer to section *Zixi configuration*)
- **Negotiation:** automatic or manual mode.

- automatic: the interface is automatically set at **100 Mbps** or **1000 Mbps** bitrate and **half duplex** or **full duplex** mode.
- manual: the interface must be configured manually.
- **Speed:** This parameter is used to configure Ethernet bitrate in manual mode. Available bitrates are 100 Mbps or 1000 Mbps.
- **Mode:** This parameter is used to configure the Ethernet operating mode in manual mode. The available modes are half duplex or full duplex (recommended mode).
- **IP address:** Interface address. It must be between 0.0.0.0 and 255.255.255.255.
- **Netmask:** Interface netmask value. It must be between 0.0.0.0 and 255.255.255.255.
- **Default gateway:** Default gateway value. It must be between 0.0.0.0 and 255.255.255.255.
- **Interface Deactivation:** To set the Interface State when disabled. Operating mode for the IP interface when it is not (**enabled/disabled** set to **disabled**):

 - Link Down: The interface is not powered electrically.
 - Link Up / No Traffic: The interface is powered electrically but it does not support any traffic.

- **Interface Status:** To set the Interface State when the NMX sets it to standby:

 - Disabled: The interface status is set to Disabled (see above **Interface Deactivation**) parameter.
 - Unchanged: The interface status is not modified.

Routing tab:

First of all, select **enabled** to use the routing table.

Index	Destination @	Destination Subnet Mask	Gateway @
0	0.0.0.0	0.0.0.0	0.0.0.0
1	0.0.0.0	0.0.0.0	0.0.0.0
2	0.0.0.0	0.0.0.0	0.0.0.0
3	0.0.0.0	0.0.0.0	0.0.0.0

submit **reset**

Figure 4-50: Eth1 Out Configuration - Routing tab

4 routes can be set with the following parameters:

- **Destination @:** IP address of the network or destination host.
- **Destination Subnet Mask:** Subnet mask of the network or destination host.
- **Gateway @:** IP address of the router to be used to reach the network or destination host.

LAN/WAN network interface Eth2

This command is used to configure the equipment's LAN/WAN ETH2 network interface.

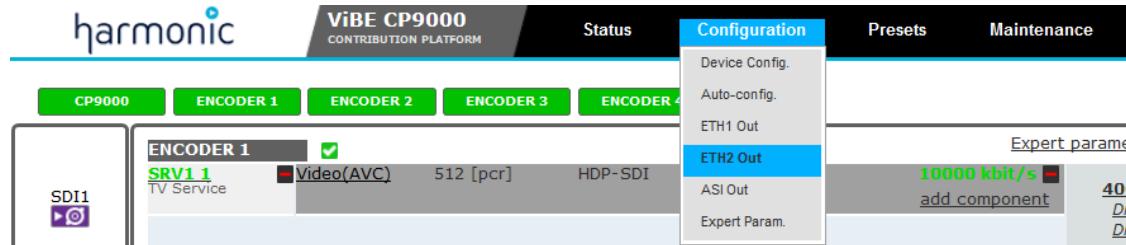


Figure 4-51: Configuration - Eth 2 Out

The configuration pages are identical to those displayed with the **Eth1 Out** command. See section [.LAN/WAN network interface Eth1](#)

Zixi configuration

Zixi is a proprietary software designed to ensure error free reception regardless of encoding format, distance, jitter and packets loss.

IMPORTANT: ZIXI is activable only on Eth1. CP9000 does not support ZIXI and SRT outputs on the same Ethernet interface. It is possible to configure ZIXI on Eth1 and SRT on Eth2.

When Zixi is enabled the following features are disabled/masked:

- **Source UDP port**
- **Virtual source IP address**
- **VLAN tagging**
- **FEC (SMPTE2022)**

TS parameters

Transport Stream **Transmission IP #1** **Transmission IP #2**

Tx parameters:

Output Enabled Disabled
 Destination IP Address: 239.1.1.124
 Destination UDP port: 5000 (2 to 65530)
 TOS/DiffServe byte: Other 0x10 (0x00 to 0xff)
 Time To Live byte (TTL): 32 (1 to 255)

TX Encapsulation:

Tx Encapsulation: MPEG/UDP/IP
 Number of MPEG packets per IP frame: 7 (1 to 7)

ZIXI :

Channel ID
 Channel NAME
 FEC block in ms: 1000 (0 to 1000)
 FEC overhead in %: 0 (0 to 50)
 Latency mode: Static
 Maximum latency in ms: 1100 (10 to 8000)
 Timeout in ms: 10000 (0 to 10000)
 user: HARMONIC
 password
 encryption type: No Encryption
 encryption key

submit **reset**

Figure 4-52: TS parameters - Transmission IP - Zixi enable

 **Restriction:**

- The mirroring between **IP#1 & IP#2** is not allowed.
- It works only in Tx Encapsulation mode: **MPEG/UDP/IP**

In **Zixi** area, set the following parameters:

- Channel ID:** Channel identifier.
- Channel NAME:** Channel name that should also be defined on receiver side.
- FEC block in ms:** Default value is **1000**.
- FEC overhead in %:** FEC overhead in% on top of the original stream bitrate. Default value is **0**
- Latency mode:** Not editable. Default value is **STATIC**.
- Maximum latency in ms:** max latency for Zixi error correction. Default value is **1100**
- Timeout in ms:** Default value is **10000**
- user:** Not editable. Default value is **HARMONIC**.
- password:** Not editable. No password required.
- encryption type:**Not editable. Default value is **No Encryption**
- encryption key:**Not editable - Not available

ASI Output

This command is used to configure the Transport Stream output general parameters.

Two optional boards are available:

- Dual ASI output (supports only 1+1 mirrored output)
- Quad ASI output (MPTS : supports only 1 +1 mirrored output , SPTS support up to 4 independent outputs)

Dual ASI identical Outputs

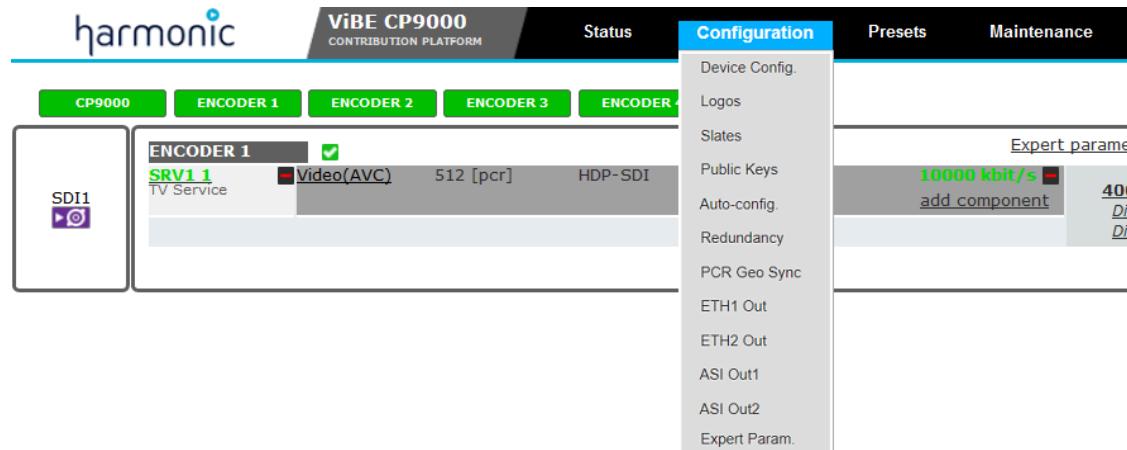


Figure 4-53: Configuration - ASI Output

Configuration of the parameters:

The dialog box is titled 'ASI Output Configuration'. It contains two sections: 'TS Packet Size' and 'TS bitrate'. Under 'TS Packet Size', there is a radio button group for 'enabled' (selected) and 'disabled', and a dropdown menu showing '188 bytes'. Under 'TS bitrate', there is a text input field containing '120000.000' followed by 'kbit/s' and a note '(200.000 kbit/s to 213000.000 kbit/s)'. At the bottom are 'submit' and 'reset' buttons.

Figure 4-54: Configuration - ASI Output general parameters

Enable the ASI output:

- **TS Packet Size:** 188 bytes or 188 + 16 bytes
- **TS bitrate:** Maximum = 213 Mbps



Figure 4-55: Home page - ASI Out enabled

Restriction:

- Only 1 ASI port appears on the GUI
- If the Mode **SPTS / 1 TS per Channel** is activated, then ASI output can be enabled only with the 1st Encoder. Both ASI outputs are mirrored.

4 x ASI independent Outputs

In SPTS, this menu allows to configure independently the 4 ASI Transport Stream output general parameters.

Figure 4-56: Configuration - 4 x ASI Out

Configuration of the parameters:

ASI Output Configuration

TS Packet Size: enabled disabled
188 bytes

TS bitrate: 210000.000 kbit/s (200.000 kbit/s to 213000.000 kbit/s)

submit **reset**

Figure 4-57: Configuration - 4 ASI Out general parameters

Enable the ASI output:

- **TS Packet Size:** 188 bytes or 188 + 16 bytes

The TS bitrate is set with the Transport Stream parameters. Refer to section [Configuring Transport Stream and IP encapsulation](#).

NOTE:

- If the CP9000 is equipped with a DTA-2174B board then the maximum bit rate is 213 Mbps per ASI output.
- If the CP9000 is equipped with a DTA-2174 board then the maximum bit rate is 213 Mbps per ASI output with a 300 Mbps maximum cumulative bit rate over the four ASI outputs.

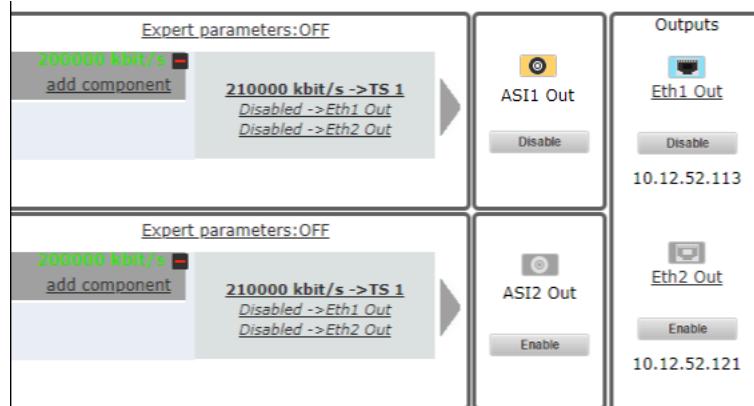


Figure 4-58: Home page - 4 ASI Out

NOTE: If the mode MPTS / 1 TS per Shelf is activated, then only the two first ASI ports are activated and mirrored.

Configuring Expert Parameters

On the Configuration menu click **Expert Parameters** to display the Expert parameters configuration page.

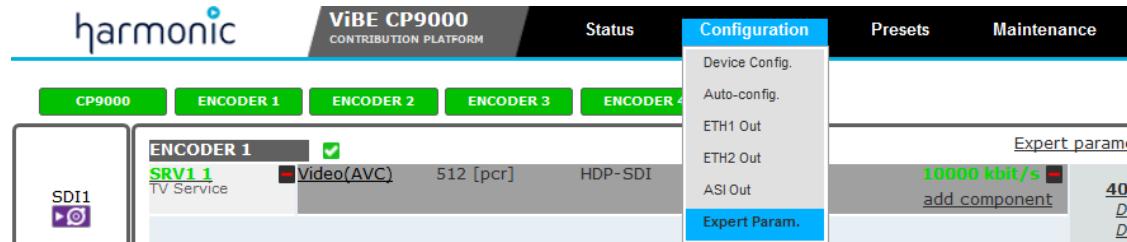


Figure 4-59: Configuration - Expert Parameters

This command is used to configure the Expert parameters that do not affect encoding features. Select on to use them.

A screenshot of a configuration form titled 'Declared Expert parameters'. It has a section for 'Use Expert parameters' with a radio button set to 'On'. Below this is a 'Other' tab containing a list of checkboxes for 'No empty packet on IP' and various 'Param D' options (D2 through D8). At the bottom are 'submit' and 'reset' buttons.

Figure 4-60: Configuration - Declared Expert Parameters

- **Use Expert parameters:**
 - If **On**, the checked Expert parameters are enabled.
 - If **Off**, Expert parameters are disabled.
- **No empty packet on IP:** The null (stuffing) packets (PID 8191) are deleted on both IP outputs.

Configuring Transport Stream and IP encapsulation

On the Status/Summary page, click on the TS stream to edit the TS parameters.

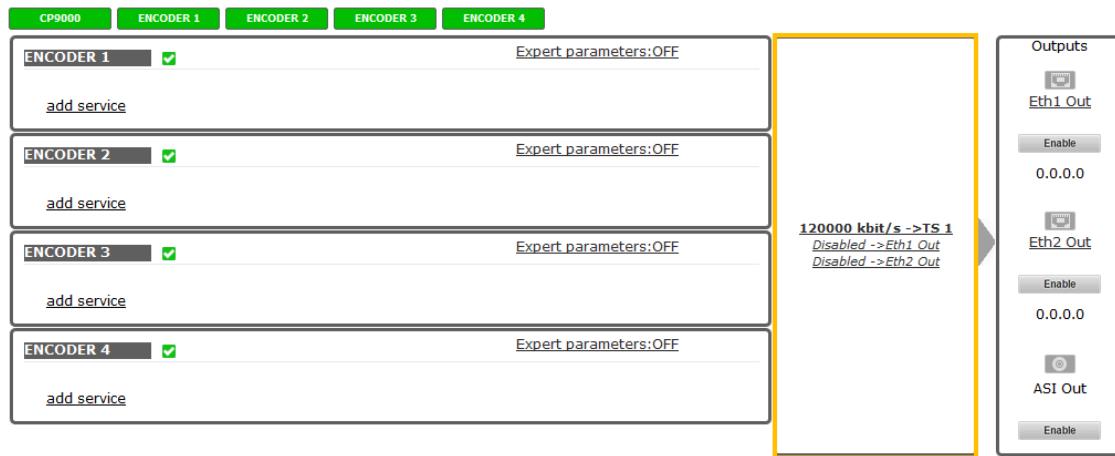


Figure 4-61: Status/Summary - TS & IP Encapsulation

Transport Stream

Figure 4-62: Transport Stream configuration page

- **Original Network Id:** It is defined as the unique identifier of a network. It is inserted on DVB-SI tables.
- **Transport Stream Id:** it is defined as the unique identifier of a TS that contains several services. It is inserted on DVB-SI tables.
- **Signaling Mode:** 3 choices to set the signaling mode.
 - ISO Conformity: Only ISO tables (PAT, PMT, CAT) are sent in the outgoing signal.
 - DVB Conformity: The equipment also generates and sends DVB tables (NIT, SDT, EIT, TDT, TOT).
 - Without Signaling: The equipment does not send any signaling.
- **NIT in PAT:** Only available in ISO mode.
 - Off/On: Set to On to reference the NIT in the PAT.
- **Generate TSDT:**

- Off/On: Set to **On** to generate the Transport Stream Description Table.
- **Station Identification:** Identification of the station. Available only if Generate TSDT is **On**.
- **TSDT Repetition Rate:** Repetition period of the TSDT. Available only if Generate TSDT is **On**. The value must be: 10s, 5s, 2s, 1s, 500ms, 200ms or 100ms.
- **TS bitrate:** TS bitrate with null packets. The minimum rate is automatically calculated and depends on the bitrates allocated to the service(s). **Max = 600Mbps.**

Transmission IP#1 configuration

To display the configuration page for the transmission of TS over Eth1.

TS parameters

Transport Stream **Transmission IP #1** Transmission IP #2

Tx parameters:

- Output: Enabled Disabled
- DNS mode: Enabled Disabled
- Destination URL:
- Destination IP Address:
- Destination UDP port: (2 to 65530)
- Source UDP port: Enabled Disabled (2 to 65530)
- Virtual Source IP Address: Enabled Disabled
- VLAN tagging: Enabled Disabled
- VLAN ID: (50 to 4094)
- VLAN Priority Level: (0 to 7)
- TOS/DiffServe byte: (0x00 to 0xff)
- Time To Live byte (TTL): (1 to 255)

TX Encapsulation:

- Tx Encapsulation:
- Number of MPEG packets per IP frame: (1 to 7)

SRT parameters:

- SRT: Enabled Disabled
- Mode:
- Latency: (20 to 8000 ms)
- Key lenght:
- passphrase:
- streamid:

FEC :

- Packets output: Enabled Disabled
- Mode: FEC-1D FEC-2D
- L Columns: (1 to 20)
- D Rows: (4 to 20)
- Column packets destination UDP port: (4 to 65532)
- Row packets destination UDP port: (6 to 65534)
- Alignment and linearisation:

Buttons:

Figure 4-63: Transmission IP #1 configuration page

In the TX Parameters group box:

- Output:** This parameter is used to enable or disable the output IP #1.
- DNS mode:** This parameter is used to enable or disable the DNS.

- **Destination URL:** set the URL destination. The port number is mandatory as shown in the example above.
- **Destination IP Address:** Destination IP address for IP frames transporting MPEG packets (unicast or multicast address). It must be between 0 . 0 . 0 . 0 and 255 . 255 . 255 . 255.
- **Destination UDP port:** Destination UDP port number for IP frames transporting MPEG packets. It must be between 2 and 65530. Default value= **5000**.
-  **NOTE:** If DNS mode is enabled, the Destination IP Address and Destination UDP Port are no longer configurable. It's done automatically once CP9000 is connected to the Destination URL.
- **Source UDP port:** If "enabled" set the source UDP port number between 2 and 65530.
- **Virtual Source IP Address:** Used for transmitted frames. It must be between 0 . 0 . 0 . 0 and 255 . 255 . 255 . 255. The virtual source address is used to set an IP address that is different from the port address in the multicast packet source address field. This feature is used in some redundancy architectures implementing an IGMP v3 network when all Ethernet interfaces of all encoders (including those of redundant encoders) need to be accessible via the ping command. If not used, set the **enabled/disabled** parameter to disabled.
- **VLAN tagging:** To use it, select enable.
- **VLAN ID:** The identifier must be between 50 and 4094.
- **VLAN Priority Level:** Used to set the priority level associated with the VLAN ID. Possible values from 0 to 7. 7 is the highest priority.
- **TOS / DiffServe byte:** This parameter is used to configure the field for IP frames transporting MPEG packets. If **Other** is selected, the Operator can edit the field value and enter the required value in the right-hand field. The default value is **0x00**. The other choices correspond to the following DiffServe values as shown on the table below:

Label	DiffServ byte value
Best Effort (BE)	0x00
AF11 ^a	0x28
AF12	0x30
AF13	0x38
AF21	0x48
AF22	0x50
AF23	0x58
AF31	0x68
AF32	0x70
AF33	0x78
AF41	0x88
AF42	0x90
AF43	0x98
Expedited Forwarding (EF)	0xB8

 **NOTE:** ^a AF stands for Assured Forward.

- **Time To Live byte (TTL):** This parameter sets the data stream time-to-live, expressed as a number of hops. Each time the IP packet goes through a router, the TTL value is decreased by one unit. When the TTL reaches zero, the packet is discarded. The default value is **32**.

In the TX Encapsulation group box:

- **TX Encapsulation:** two choices, MPEG/RTP/UDP/IP or MPEG/UDP/IP.
- **Number of MPEG packets per IP frame:** This parameter is used to set the number of MPEG packets per IP frame sent. Possible values are between 1 and 7. The recommended value is **7** to get the smallest IP overhead. This value is identical for all the IP streams.

In the SRT parameters group box:

- **SRT:** enabled or disabled.
- **Mode:** Caller or Listener.
- **Latency:** between 20 to 8000ms. Default value= **120**.
- **Key length:**length of the AES key (128, 256 or 512).
- **Passphrase:** encryption word (alphanumeric). It must be between 10 and 79 characters.

 **CAUTION:** Changing of SRT passphrase is not seamless.

- **StreamId:** This is a string of maximum 512 characters set on the caller side. It can be retrieved at the listener side to confirm the identity of the stream received (optional).

When SRT is enabled the following features are disabled/masked:

- Source UDP port
- Virtual source IP address
- VLAN tagging
- FEC (SMPTE2022)

 **IMPORTANT:** When SRT is activated, FEC is automatically disabled.

In the FEC group box:

- **Packets output:** This parameter enables or disables the sending of FEC frames. FEC can be enabled if the **Number of MPEG packets per IP frame** parameter is # **4**.
- **Mode:** This parameter is used to select the FEC mode. Possible values are **1D** or **2D**. The **1D** value is used to have the lowest IP overhead and/or ensure interoperability with some decoders.
- **L Columns:** This parameter is used to choose the number of columns used for FEC packet generation. Possible values are between 1 and 20 (**1D** mode) (default value = **1**) or 4 and 20 (**2D** mode) (default value = **4**).
- **D Rows:** This parameter is used to choose the number of rows used for FEC packet generation. Possible values are between 4 and 20. The default value is **4**.

 **NOTE:** The **L Columns * D Rows** value must be between 4 and 100 (**1D** mode) or between 16 and 100 (**2D** mode).

- **Column packets destination UDP port:** It is equal to the main UDP port (**Destination UDP port** above) + 2.
- **Row packets destination UDP port:** It is equal to the main UDP port (**Destination UDP port** above) + 4.
- **Alignment and linearisation:** This parameter is used to choose the FEC alignment and linearization compliance.

- Compliance with informative **Annex A** - Non block aligned FEC arrangement.
- Compliance with informative **Annex B** - Block aligned FEC linearization.

Transmission IP#2 configuration (mode Alpha)

To display the configuration page for the transmission of TS over Eth 2.

Same parameters than **Transmission IP #1** except for the **Transmission Mode**:

TS parameters	
Transport Stream	Transmission IP #1
Transmission IP #2	
Transmission Mode	<input type="button" value="Independent"/> Independent <input type="button" value="Mirroring"/> <input type="button" value="RTP Synchro (s2022-7)"/> <input type="button" value="SRT Bonding - backup mode"/>
Tx parameters:	
Output	
Destination IP Address	

Figure 4-64: Transmission IP#2 parameters

- **Mirroring:**

1 TS streaming on **Transmission IP #1** (Eth1 out) and 1 mirrored (same TX parameters) TS streaming on **Transmission IP #2** (Eth2 out).

Same TS content received by the receiver but packets may be grouped differently in different network frames and IP, UDP are the same for both streams.

- **Independent:** 2 cases.

- 1 TS streaming on **Transmission IP #1** (Eth1 out) or on **Transmission IP #2** (Eth2 out). Only 1 TS content is transmitted over the network.
- 2 independent TS streaming on **Transmission IP #1** (Eth1 out) and **Transmission IP #2** (Eth2 out).

In this configuration, same TS content is received by the receiver but packets may be grouped differently in different network frames. IP, UDP and optionally RTP layers may be different for both streams.

- **RTP Synchro (s2022-7):** Only available when **TX encapsulation of IP1** is set to **MPEG/RTP/UDP/IP**. Use to transmit the same RTP stream (seamless redundancy) on totally different network, with the following constraints:

- 1 TS streaming on **Transmission IP #1** (Eth1 out) and 1 RTP synchronized TS streaming on **Transmission IP #2** (Eth2 out).
- Same TS content received by the receiver and packets shall be grouped identically in network frames for both streams.
- IP and UDP layers may be different.
- RTP layers are identical for both streams except SSRC (Synchronization source identifier uniquely identifies the source of a stream) that may differ between **Transmission IP #1** and **Transmission IP #2**.

- **SRT Bonding - backup mode:** only available when SRT selected in IP1. Use to transmit the same SRT stream on a totally different network. In this case SRT parameters are grayed (not modifiable) and the values equivalent to the ones set for Eth 1. When activated one SRT connection is set on **Transmission IP #1** (Eth1 out) and a second SRT connection is set on **Transmission IP #2** (Eth2 out). The IP and UDP layers may be different depending on the customer network configuration.

Setting the SDI over IP 2022-6 sources

In Device Configuration, if **SDIoIP 2022-6** is selected as the input mode, then the user needs to set the IP source, one per SDI received:

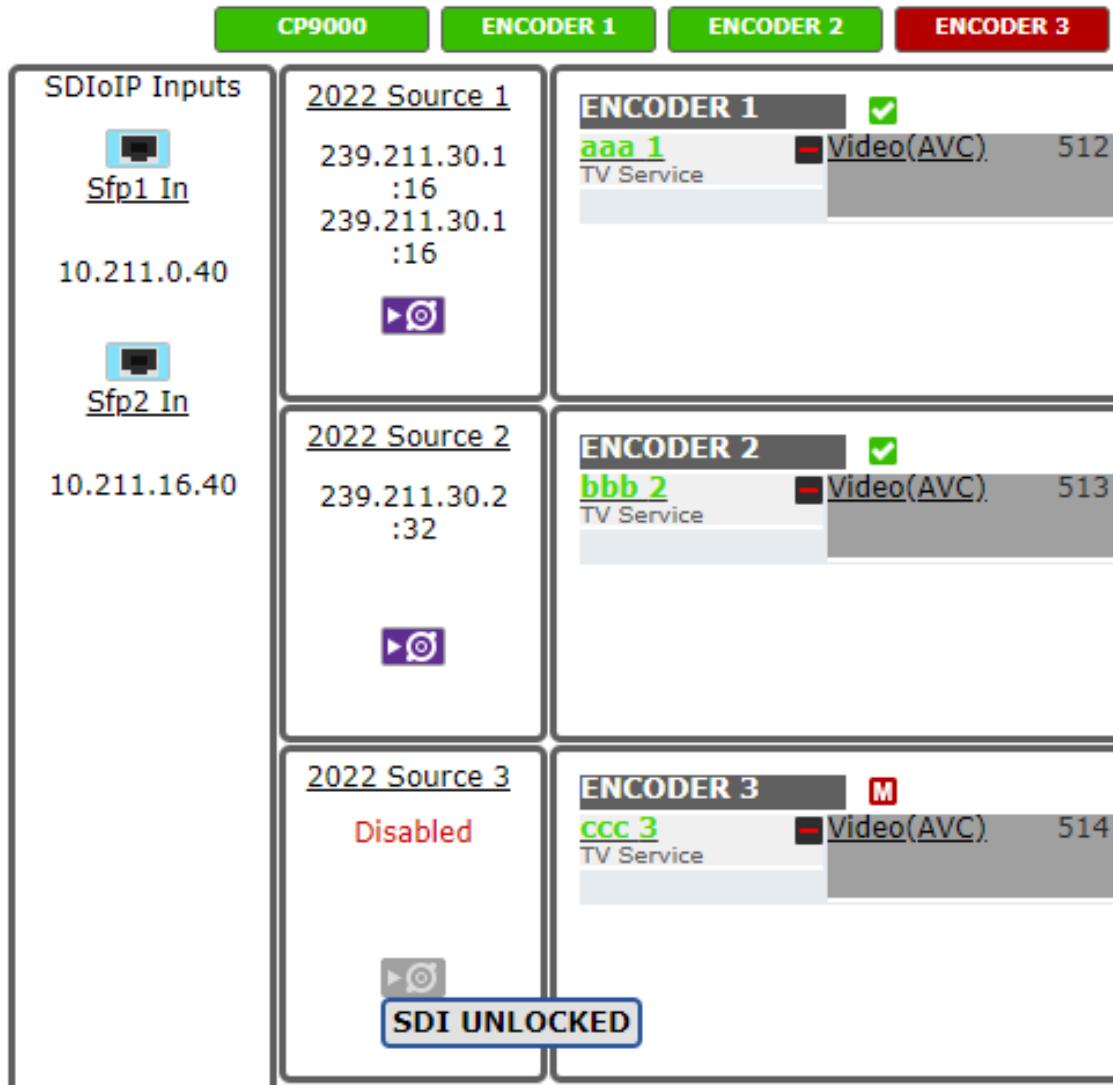


Figure 4-65: SDIoIP source

Click on the 2022 Source to set the parameters for receiving the SDI signal.

Configuration Source 2022-6

Transport Layer

Input Enabled Disabled

Redundancy scheme:
Internal redundancy On Off

Rx parameters:

	Status	IP address	UDP port	Source filter	Source filter Address	Physical port
Main	<input checked="" type="checkbox"/>	239.211.30.1	16 (2 to 65530)	<input type="radio"/> On <input checked="" type="radio"/> Off	0.0.0.0	<input checked="" type="radio"/> Sfp1 <input type="radio"/> Sfp2
Backup	<input checked="" type="checkbox"/>	239.211.30.1	16 (2 to 65530)	<input type="radio"/> On <input checked="" type="radio"/> Off	0.0.0.0	<input type="radio"/> Sfp1 <input checked="" type="radio"/> Sfp2

submit **reset**

Figure 4-66: SDIoIP source - parameters

- **Input:** to use it set to Enabled
- **Redundancy scheme:** Check On to use the **Internal redundancy** (SMPTE-2022-7).
- **Rx parameters:**
 - **Main:** set the IP address, UDP port and Source Filter (if required) to receive the SDI signal.
 - **Backup:** If Internal redundancy is On, then define backup IP parameters.

Setting the ProMedia IP 2110 sources

In Device Configuration, Board Mode, if **ProMedia IP 2110** is selected as the input mode, then the user needs to set the IP source, one per components received.

 **NOTE:** All incoming sources have to be accuracy synchronized using the PTP protocol, refer to section [Configuring PTP for ProMedia IP 2110](#).

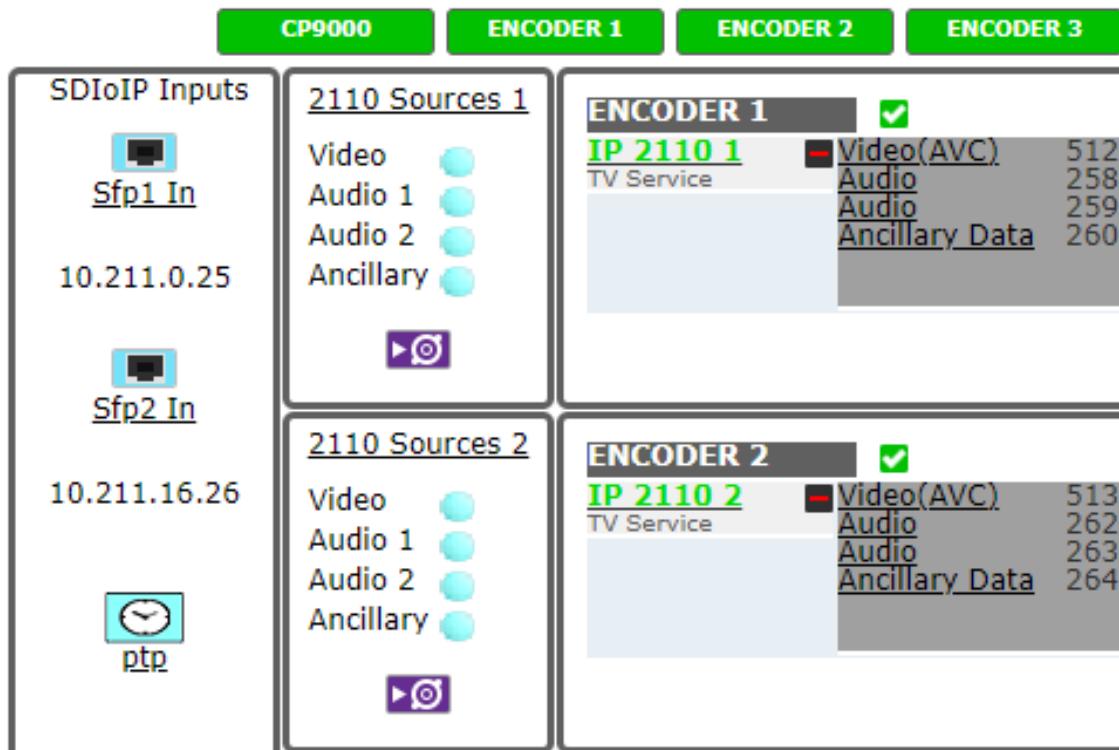


Figure 4-67: ProMedia IP sources

Click on the 2110 Sources to set the parameters for receiving, independently, the SDI signals for the Video, Audio (up to 2 sources, 8 audios each) and Ancillary data. Optionally configure 2022-7 redundancy parameters.

Restriction: Be aware that 2022-7 feature has the following limitations for IP-2110 :

- Receiver is Class D: Ultra Low-Skew D
- Seamless reconstruction on Physical link loss or whole streams loss.
- Stream by stream reconstruction on stream loss is not supported.

CAUTION: Prior to any 2110-xx sources configuration it is mandatory to setup and enable at least SFP 1, 3. In addition, if 2022-7 is required, it is mandatory to setup and enable SFP 2, 4 prior to any backup 2110-xx sources.

NOTE: If SFP 1 or 3 is disabled and related link is Down, a warning "SFP# Link Down" is raised. Disabling SFP Ethernet IF only stops 2110-xx flow traffics but not PTP protocol allowing Slave PTP PLL to lock if link is UP, ready for 2110 experience.

The CP9000 allows the user to import predefined parameters of the sources using SDP (Session Description Protocol), to do so, click Import SDP button to download the file.

NOTE: Note the importance of rigorous compliance of 2110 (SDP) source parameters with incident sources. An incorrect parameter which can lead to malfunctions that are difficult to detect, the protocol 2110 does not include information in the Header and Payload RTP allowing it.

2110-20 Video source

Configuration Sources 2110-xx

2110-20 Video | 2110-3x Audio 1 | 2110-3x Audio 2 | 2110-40 Ancillary

Import SDP:

Auto Mode Backup Mode

Input Enabled Disabled

Redundancy scheme:
2022-7 On Off

Rx parameters:

Status	IP address	UDP port	SSM	SSM Address	RTP payload	Physical port
Main <input checked="" type="checkbox"/>	239.211.17.1	10020 (2 to 65530)	<input checked="" type="radio"/> On <input type="radio"/> Off	10.211.0.17	96 (96 to 127)	<input checked="" type="radio"/> Sfp1 <input type="radio"/> Sfp2
Backup <input checked="" type="checkbox"/>	239.211.17.2	10020 (2 to 65530)	<input checked="" type="radio"/> On <input checked="" type="radio"/> Off	0.0.0.0	96 (96 to 127)	<input checked="" type="radio"/> Sfp1 <input checked="" type="radio"/> Sfp2

Video Format Picture Resolution

Figure 4-68: ProMedia IP - Video source

- **Input:** to use it set to **Enabled**
- **Redundancy scheme:** Activate 2022-7 redundancy. Since 2022-7 is a global setting for all encoding channel sources, its activation is proposed in the 2110-20 Video tab only.
If deactivated, then there is no backup stream. Only Main IP stream parameters need to be set.
If activated, the Main and Backup redundancy IP streams parameters need to be configured independently in video source. Video format and RTP Payload type are common settings for main and backup streams.
- **Rx parameters:**
 - **Main:** set the IP address, UDP port and SSM (if required) to receive the SDI signal.
 - **Backup:** available if 2022-7 is ON. RTP Payload Main and Backup must be identical to meet 2022-7 Requirements. Therefore RTP Payload **Backup** value is always read-only and follows **Main** value.
 - **Video Format:** Set the video format of the incoming signal.
 - **Picture Resolution:** Not configurable.

2110-3x Audio 1 and Audio 2 sources

Configuration Sources 2110-xx

2110-20 Video **2110-3x Audio 1** **2110-3x Audio 2** **2110-40 Ancillary**

Import SDP:

Auto Mode Backup Mode

Input Enabled Disabled

Redundancy scheme:
2022-7 On Off

Rx parameters:

	Status	IP address	UDP port	SSM	SSM Address	RTP Payload	Physical port
Main	<input checked="" type="checkbox"/>	239.211.17.11	10030 (2 to 65530)	<input checked="" type="radio"/> On <input type="radio"/> Off	10.211.0.17	97 (96 to 127)	<input checked="" type="radio"/> Sfp1 <input type="radio"/> Sfp2
Backup	<input checked="" type="checkbox"/>	239.211.17.21	10030 (2 to 65530)	<input type="radio"/> On <input checked="" type="radio"/> Off	0.0.0.0	97 (96 to 127)	<input type="radio"/> Sfp1 <input checked="" type="radio"/> Sfp2

Encoding Mode

Number of channel

Packet Time

Figure 4-69: ProMedia IP - Audio sources

- **Input:** to use it set to **Enabled**
- **Redundancy scheme:** Activate 2022-7 redundancy. Since 2022-7 is a global setting for all encoding channel sources, its activation is proposed in the 2110-20 Video tab only.
If deactivated, then there is no backup stream. Only Main IP stream parameters need to be set.
If activated, the Main and Backup redundancy IP streams parameters need to be configured independently. RTP Payload, Audio Encoding Mode, number of channel and Packet Time are common settings for Main and Backup streams.
- **Rx parameters:**
 - **Main:** set the IP address, UDP port and SSM (if required) to receive the SDI signal.
 - **Backup:** available if 2022-7 is ON (See 2110-20 Video configuration tab). RTP Payload Main and Backup must be identical to meet 2022-7 Requirements. Therefore RTP Payload **Backup** value is always read-only and it follows **Main** value.
 - **Encoding Mode:** Set the encoding mode of the incoming signal.
 - **Number of channel:** Set the number of channels present in the incoming signal.
 - 2/4/6/8 for PCM pairs
 - 2/4/6 for AES3 pairs
 - **Packet Time:** 1ms

2110-40 Ancillary source

Figure 4-70: ProMedia IP - Ancillary source

- Input:** to use it set to **Enabled**
- Redundancy scheme:** Activate 2022-7 redundancy. Since 2022-7 is a global setting for all encoding channel sources, its activation is proposed in the 2110-20 Video tab only.
If deactivated, then there is no backup stream. Only Main IP stream parameters need to be set.
If activated, the Main and Backup redundancy IP streams parameters need to be configured independently. RTP Payload value is common for Main and backup sources.
- Rx parameters:**
 - Main:* set the IP address, UDP port and SSM (if required) to receive the SDI signal.
 - Backup:* available if 2022-7 is ON (See 2110-20 Video configuration tab). RTP Payload Main and Backup must be identical to meet 2022-7 Requirements. Therefore RTP Payload *Backup* value is always read-only and it follows *Main* value.

Setting the Encoder

The following section will explain how to configure the encoding parameters of the encoder.

The name of the encoder can be set on the Maintenance/Identification page. See section [Configuring the Names of the Equipment and its Encoder](#).

Figure 4-71: Encoder views without service and with service and its components

IMPORTANT: Before adding a service be sure to have set the right EncodingStandard and Board mode. Refer to section [Device Configuration](#).

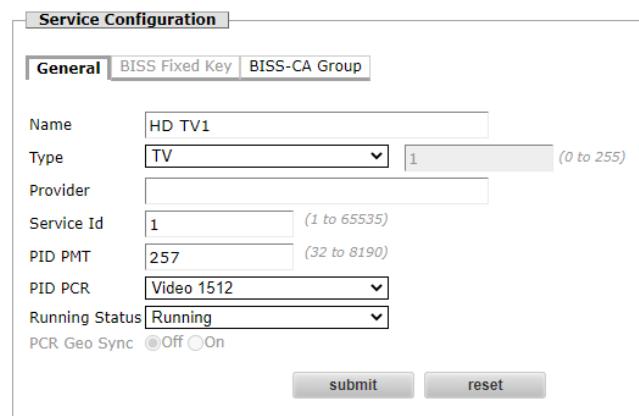
 **NOTE:** The parameters of the UHD Video component are totally identical whatever the type of the source, 3G SDI or 12G SDI.

Adding/Editing a Service

Click on the **Service name** or **add service** if no service is declared.

General parameters

This page is used to set general service parameters and scrambling if required.



Service Configuration	
<input checked="" type="button"/> General <input type="button"/> BISS Fixed Key <input type="button"/> BISS-CA Group	
Name	HD TV1
Type	TV
Provider	
Service Id	1 (1 to 65535)
PID PMT	257 (32 to 8190)
PID PCR	Video 1512
Running Status	Running
PCR Geo Sync	<input checked="" type="radio"/> Off <input type="radio"/> On
<input type="button"/> submit <input type="button"/> reset	

Figure 4-72: Service Configuration - General parameters

- **Name:** Used to indicate the name of the service.
- **Type:** Used to indicate the service type (TV, HEVC TV, Advanced Codec HD or Other). The standardized numerical value corresponding to the service type is displayed in the right-hand box. If the desired service type is not available, select **Other** and enter the value in the right-hand box.
- **Provider:** Used to indicate the name of the service provider displayed by the Decoder.
- **PID PMT:** Used to indicate the PID of TS packets in which the PMT describing the service will be inserted. Services may use PMT PIDs specific to each service or a PMT PID common to all services.
- **PID PCR:** Used to indicate the PID of the component in which the PCR is sent. The PCR can be transported by the Video component or a separate component. Refer to section [Adding/Editing a PCR component](#).
- **Running Status:** Used to select several broadcasting types: Not Running, Starts in few seconds, Pausing or Running. This parameter can be used to insert (or not insert) the service and its components in the outgoing TS. It affects the SDT field indicating service status.
- **PCR Geo Sync:** Only available if **PCR Geo Sync** has been set at device level. When set to ON then Geo synchronization is activated for the indicated service. The activation shall be done on the same service on the paired CP9000. Geo synchronization is performed between channel with the same position in the pair equipment (board id / channel id). Refer to section [Geo Synchronization](#).

BISS Fixed Key scrambling parameters:

By default, scrambling with fixed key is disabled. To enable it, change the scrambling mode. To do so, refer to section [Device Configuration](#)

The screenshot shows a web-based configuration interface for 'Service Configuration'. A top navigation bar has tabs for 'General' and 'Scrambling', with 'Scrambling' being the active tab. Below this, there's a section for 'Use Scrambling' with two radio button options: 'Off' (selected) and 'Fixed Key'. A dropdown menu labeled 'Mode' is set to 'BISS Mode 1'. A text input field for 'Key' contains the hex value 'XX XX XX XX XX XX'. At the bottom are two buttons: 'submit' and 'reset'.

Figure 4-73: Service Configuration - Scrambling parameters

- **Use Scrambling:** By default the scrambling is disabled (**Off**).
- **Mode:** Choice of scrambling mode when **Fixed Key** has been selected.
 - BISS Mode 1: Scrambling is performed with a fixed control word (SW).
 - BISS mode E Buried ID: Scrambling is performed with a scrambled control word (ESW) and an internal Encoder ID defined by the manufacturer and linked uniquely to the device itself.
 - BISS mode E Injected ID: Scrambling is performed with a scrambled control word (ESW) and an ID injected into the Encoder.
- **Key:** Control word injection:
 - When **BISS1** is selected:
 - In **Mode 1**, all components are scrambled by a fixed Control Word (CW on 8 bytes) derived from a clear Session Word (SW on 6 bytes).
 - In **Mode E**, all components are scrambled by a fixed Control Word (CW on 8 bytes) derived from an Encrypted Session Word (ESW 8 bytes).
 - When **BISS2** is selected:
 - In **Mode 1**, All components are scrambled by a fixed Session Word (SW on 64 bytes). The SW is transmitted out of band in clear to the receivers.
 - In **Mode E**, All components are scrambled by a fixed Session Word (SW on 64 bytes). The SW is encrypted with a fixed Session Key (SK) and the resulting Encrypted Session Word (ESW) is transmitted out of band to the receivers.

To read the Buried-ID and to set the Injected-ID, refer to section [Commands related to Scrambling BISS Mode E](#).

BISS-CA Group scrambling parameters

By default, BISS-CA scrambling is disabled. To enable it, change the scrambling mode and download a validated csv keys file. To do so, refer to section [Device Configuration](#).

Service Configuration

BISS-CA Group

Use BISS_CA	<input type="radio"/> Off <input checked="" type="radio"/> On
Entitlement Session Id	1 <small>(1 to 65535)</small>
Entities Keys File	IRD_A_keys.csv
EMM PID	33 <small>(32 to 8190)</small>
ECM PID	34 <small>(32 to 8190)</small>
CW validity	10 <small>(5 to 120 s)</small>
EMM bitrate	15 kbit/s

NB Keys (In Entitle Keys File) : 1

Total acquisition time : 2.2 seconds

Watermark Flags

prevent_descrambled_forward	<input type="radio"/> On <input checked="" type="radio"/> Off
prevent_decoded_forward	<input type="radio"/> On <input checked="" type="radio"/> Off
insert_watermark	<input type="radio"/> On <input checked="" type="radio"/> Off

submit **reset**

Figure 4-74: Service Configuration - Scrambling parameters

- **Use BISS_CA:** Select **On** to use the scrambling BISS-CA for the service.
- **Entitlement Session Id:** Session Id value.
- **Entitlement Keys File:** select the csv keys file uploaded on the device. (See [Public Keys](#))
- **EMM PID and ECM PID:** component PIDs values
- **CW validity:** period of CW change (default =10s)
- **EMM bitrate:** by default the value is computed by the device. This value can be modified under limit according to the number of Public Key given in the csv file.
- **Nb keys:** This is an indication field. It indicates the number of Public Keys detected in the selected csv file. Max=3840. Only the first 3840 Public Keys of a CSV are used in an entitlement session.
- **Total Acquisition time:** This is an indication field. It indicates in seconds, the duration of EMM and ECM acquisition time before decoding. This value depends on the number of Public Keys in the csv file.
- **Watermark Flags:** each flag, if selected, is transported in the EMM components.

Adding/Editing an HEVC UHD video component

Click **add component** to select the shortcut menu and click **Add HEVC Video UHD** or click the **video component**.



Figure 4-75: Add HEVC Ultra HD video component

The following pages will be displayed:

HEVC UHD video General tab

Ultra HD Video Configuration	
General Advanced HEVC Advanced AVC HDR VBI Slate Pattern/Logo Misc.	
Source	<input type="button" value="4xSDI Inputs"/>
SDI standard	<input type="button" value="4x3G-SDI Level A or B SQD"/>
No Source Mode	<input type="button" value="Blue Screen"/>
Pattern/Logo Mode	<input type="button" value="Off"/>
Standard	<input type="button" value="2160p"/>
Frame Rate	<input type="button" value="59.94 fps"/>
Profile	<input type="button" value="HEVC Main10 4:2:2"/>
Tier	<input type="button" value="Auto"/>
Level	<input type="button" value="5.1"/>
Compression Delay	<input type="button" value="Standard"/>
ES Rate	<input type="button" value="10000"/> (4000 to 600000 kbit/s)
PID	<input type="button" value="512"/> (32 to 8190)
PCR	<input type="radio"/> On <input type="radio"/> Off
Status	<input type="button" value="On Air"/>

Warning : Modifying video parameters may lead to temporary service disruption.

Figure 4-76: HEVC UHD video component - General parameters

- **Source:** editable only if at least one slate file is loaded on the CP9000, that corresponds to the video geometry and selected in the Slate tab. Choice between SDI Inputs or Slate.
- **SDI Standard:** If the source is **12G-SDI**, it is not editable (only 12G-SDI 2-Sample Interleave is supported) and if the source is **3G-SDI**, then 2 choices are available:
 - 4x3G-SDI Level A or B:
 - The Level A format is the direct mapping of uncompressed 1080p (up to 60 fps) video into a serial digital interface at the nominal 3 Gbit/s.
 - The Level B, Dual link mapping, specifies the mapping of the SMPTE ST 372 Dual Link 1.5Gb/s interface into a serial digital operating at a nominal rate of 3Gb/s.
 - 4x3G 2-Sample Interleave: It uses quad HD-SDI links at 3Gb/s with each link containing the full image at ¼ resolution.

- **No Source Mode:** Used to select the mode if the video signal is lost or standard mismatch at encoder input.
 - Blue screen / Black screen / Last picture: In case of video input loss or format mismatch event, the encoder automatically replaces, in robust mode (means PCR accuracy may be altered), the incoming content by the selected pattern. To select the Robust mode pattern, refer to section [Device Configuration](#).
 - No encoding: The encoding is stopped. Only available when Ultra-Low latency is selected. Refer to section [Device Configuration](#).
 - Null video bit rate on TS: The video component bitrate is null (if the PCR is carried by the video component there is no longer any PCR broadcast for this service).
 - Null bit rate on TS: The TS bitrate is null.

! **Attention:** If the service is part of an MPTS then the complete MPTS output bitrate is null. All the services within the MPTS are impacted.

 - Disable IP output interfaces: The IP output interfaces are disabled electrically.

! **Attention:** All the Ethernet interfaces are disabled. All the services on the chassis are impacted.

 - Slate: available when a slate is selected in the Slate tab.
- **Pattern/Logo mode:** According to Pattern/Logo selection, either insert a color square moving pattern to distinguish one channel from another or the selected logo (not moving). The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - **Off:** Not used
 - **On:** The moving pattern or a Logo is overlaid to the current picture.
 - **No source mode:** The moving pattern is only inserted when the input signal is lost and overlaid to the picture selected in the No Source Mode parameter.
- **Standard:** Used to indicate the video standard at encoder input: **2160p**.
- **Frame Rate:** Used to select the video frame rate at encoder input. Choice between 24, 25, 29.97, 30, 50, 59.94 and 60 fps.
- **Profile:** Used to select the video encoding profile. HEVC Main-4:2:0, HEVC Main10-4:2:0 or HEVC Main10-4:2:2.
- **Tier:** Used to determinate a Sub-Level (Main or High). If set to Auto the Level and Sub-Level are automatically chosen according to the bitrate allocated. For more details, refer to section [HEVC Bitrate Extension](#).
- **Level:** This parameter appears only when **Main or High** is selected for **Tier**. Use to determinate the Level of the Profile. Choice between 4.1, 5.0, 5.1, 5.2, 6.0, 6.1 and 6.2.
- **Compression Delay:** Used to set the encoding delay. Long or Standard or Short, When **Ultra-Low latency** is selected in Device Configuration, then the Compression delay is not editable. When **Short latency** is selected, to preserve the video quality it is recommended to increase the bitrate.
- **ES Rate:** Used to set the Elementary Stream bitrate for the video component. The default values proposed depend on the **Compression Delay** parameter.
- **PID:** Used to identify the TS packets transporting the video component. The value must be between 32 and 8190.
- **PCR:** Used to insert the Program Clock Reference of the service in the TS packets transporting the video component.
 - **Off:** The **PCR** is not carried by the video component. This value can be selected if a PCR component has been added to the Service and if the PID of the PCR component is indicated as **PID PCR** value in the Service Configuration page.
 - **On:** The **PCR** is carried by the video component.

- **Status:** Used to select video component broadcasting state.
 - Off Air: Component broadcasting is postponed but the component is present in the service configuration.
 - On Air: The component is On Air.
- ⚠ **DANGER:** Changing at least one of the following parameters stops the outgoing video signal for approximately 5 to 10 seconds: **Frame Rate - Profile - Compression Delay - ES Rate.**

HEVC UHD video Advanced HEVC tab

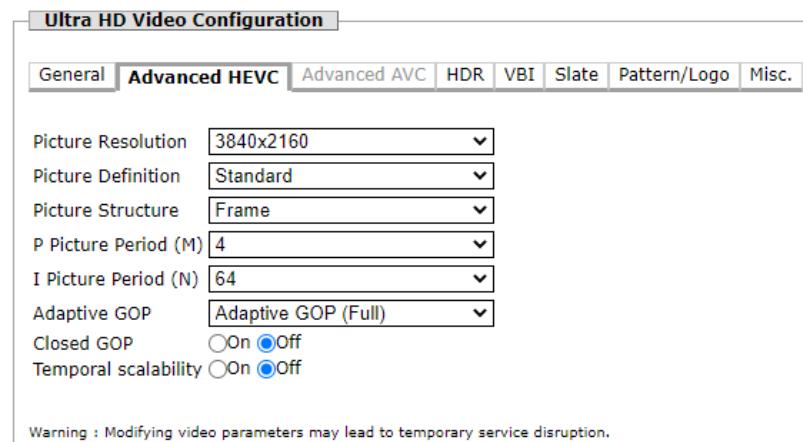


Figure 4-77: UHD video component - Advanced HEVC parameters

- **Picture Resolution:** Used to adjust picture resolution according to the desired video bitrate. In this release, only **3840x2160** is available.
- **Picture Definition:** Used to set the definition of the picture, allowing to configure the encoding loop deblocking filter.
 - **Sharp:** the encoding loop deblocking filter is not activated
 - **Standard:** the encoding loop deblocking filter is activated
- **Picture Structure:** Structure of the picture at encoder input. In this release, only **Frame** structure is available.
- **P Picture Period (M):** Used to set the repetition rate for P pictures. Choice between: 1 (if standard delay UHD HEVC), 2, 4 and 8. The value must be a sub-multiple of the **I Picture Period (N)** below. A lower value will reduce the number of B-pictures in the GOP (these pictures are the most efficient in terms of compression ratio). Default value = 4. If set to 1, the stream will not contain B-pictures. This configuration is highly recommended for HEVC UHD with high bit rate (> 60 Mbps) (check [UHD contribution encoding recommended settings](#)). Only available when Long and Standard delays have been selected.
- **I Picture Period (N):** Used to set the repetition rate for I-pictures. Value between 8 and 96 by steps of 8. The values 50, 80, 100 and 128 are also available mainly for OTT packaging applications. As I-pictures require more bits than B or P pictures, a bigger GOP size leads to better encoding performance.
- **Adaptive GOP:** Used to set the Adaptive GOP feature.

- Fixed GOP: In this mode, both P picture period and GOP size are set to the values **P picture period (M)** and **GOP size (N)** above.
- Adaptive GOP (Full): In this mode, the effective **I picture period (N)** varies according to video content (i.e. spatio-temporal complexity and events such as scene changes or fades). The GOP (N) is a multiple of P period (M) which remains unchanged.
- **Closed GOP:** Used to enable On or disable Off Closed GOP mode. It is used to break temporal dependency between GOPs.



Attention:

- Closed GOP mode reduces encoding quality and should only be used when stream editing operations are expected.
- When Closed GOP is used, the last P period is reduced by one picture so as to preserve the size of the GOP (N).

- **Temporal Scalability:** Used to enable On or disable Off the temporal scalability.

When **Temporal scalability** is **On**, the number of sub-layers depend on **P Picture Period (M)**:

- **P Picture Period (M) = 2 # 2 sub-layers**
- **P Picture Period (M) = 4 # 3 sub-layers**
- **P Picture Period (M) = 8 # 4 sub-layers**

Specific case when the Compression delay is set to Short:

Ultra HD Video Configuration

General Advanced HEVC Advanced AVC HDR VBI Slate Pattern/Logo Misc.

Picture Resolution	3840x2160
Picture Definition	Sharp
Picture Structure	Frame
GOP structure	IPPP
I Picture Period (N)	64
Closed GOP	<input type="radio"/> On <input checked="" type="radio"/> Off
Temporal scalability	<input type="radio"/> On <input checked="" type="radio"/> Off

Warning : Modifying video parameters may lead to temporary service disruption.

Figure 4-78: Ultra HD video component - Advanced HEVC tab - Short Delay - GOP Structure

- GOP Structure (Only available when Short delay has been selected):
 - **I-only:** The GOP contains only I pictures.
 - **IPPP:** The GOP contains one I picture and several P pictures according to the value of **I Picture Period**.

Specific case when the Ultra Low Delay is set in Device Configuration:

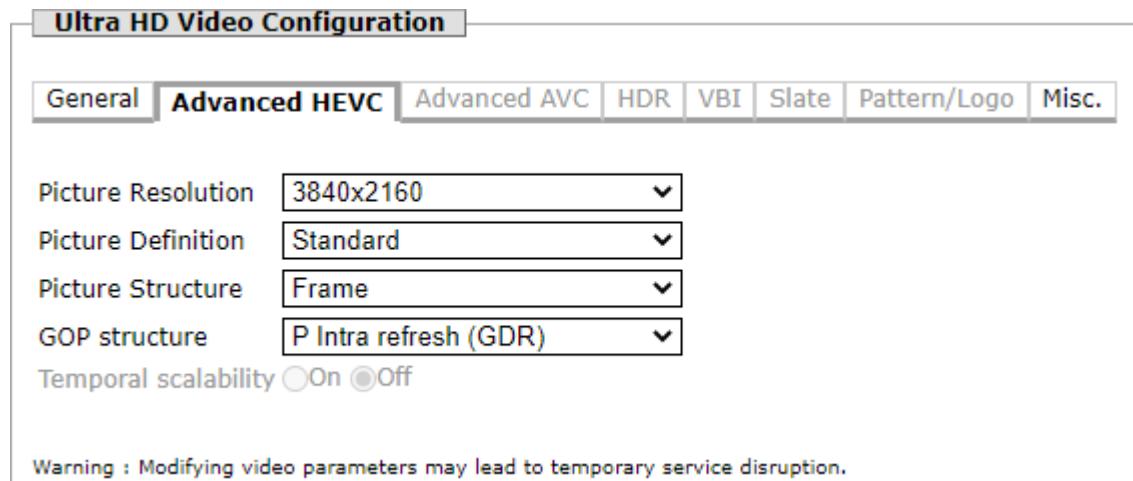


Figure 4-79: Ultra HD video component - Advanced HEVC tab - Ultra Low Delay - GOP Structure

- GOP Structure:
 - **P Intra refresh (GDR)**: P pictures with Intra refresh by Macro Block rows.
- NOTE:** With Ultra Low Delay mode, HDR / VBI processing and Slate / Logo insertion are not allowed.

HEVC UHD video HDR (High Dynamic Range) tab

to set the VUI (Video Usability Info) parameters.

- **HDR - WCG** (Wide Color Gamut): 2 **SDR** (Simple Dynamic Range) and 2 **HDR** (High Dynamic Range) choices are available with fixed values, details on the table below.

	VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
SDR - BT 709	color_primaries=1 transfer_characteristics=1 matrix_coeffs=1	No	No	No
SDR - BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No	No
PQ10 (HDR10) BT 2020	color_primaries=9 transfer_characteristics=16 matrix_coeffs=9	Yes	Yes	No

VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
HLG10 BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No
FOLLOW INPUT	Automatic dynamic HDR signalization and Metadata insertion “in band (VUI+SEI)” in the compressed TS AVC or HEVC stream. Follow input data extracted from ST-352:2013 information. This insertion shall be triggered and fed by embedded signaling and Metadata carried over the SDI stream.		

SEI message "Mastering_color_volume_info" indicates the color space of the display used for mastering.

SEI message "content_light_level_info" indicates upper bounds for the nominal target brightness light level of the pictures.

SEI message "alternative_transfer_characteristics" indicates the preferred transfer characteristics to be used by the decoder.

When **SDR** (either **BT 709** or **BT 2020**) is selected, no other parameter appears in this page:

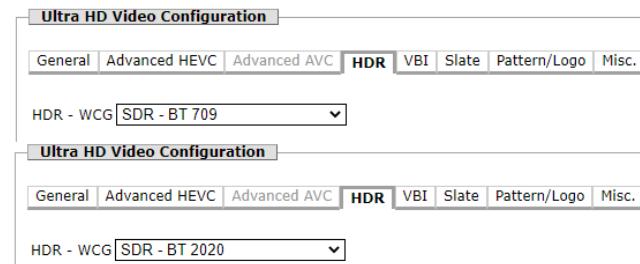


Figure 4-80: Dynamic Range - SDR (BT 709 or BT 2020)

When **HLG10** is selected, and if **SEI 147** is set to **Yes 147**, then default value =18 (not configurable):

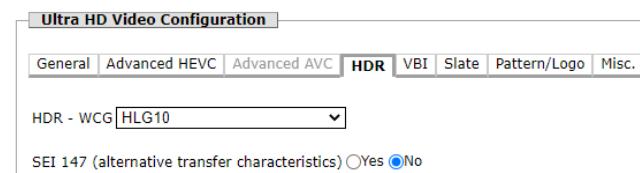


Figure 4-81: Dynamic Range - HLG10

When **PQ10 (HDR10)** is selected 4 choices are possible for the **Color Space** but the values cannot be edited:

The screenshot shows the 'Ultra HD Video Configuration' interface with the 'HDR' tab selected. The 'Color Space' dropdown is set to 'BT2020'. Under 'SEI 137 (mastering colour volume info)', the 'Yes' radio button is selected. The 'Display primaries' section shows values for R, G, and B: R=0.708, G=0.17, B=0.131. The 'White point' section shows values for x and y: x=0.3127, y=0.329. The 'Max display mastering luminance' is set to 1200, and 'Min display mastering luminance' is set to 0. Under 'SEI 144 (content light level info)', the 'Yes' radio button is selected. The 'Max content light level' is set to 0, and 'Max frame average light level' is also set to 0.

Figure 4-82: Dynamic Range - PQ10 (HDR10)

- **Color Space:**

- BT2020: the values are predetermined and fixed.
- DCI-P3 D65: the values are predetermined and fixed.
- DCI-P3 THEATER: the values are predetermined and fixed.
- CUSTOM: all the values can be change with the following limitation:

Display primaries x, Display primaries y, White point x, White point y must be set in increments of 0.00002 according to the CIE 1931 definition of x and y as specified in ISO 11664-1.

When **Follow Input** is selected, other parameters fields are disabled and hidden.

The screenshot shows the 'Ultra HD Video Configuration' interface with the 'HDR' tab selected. The 'Color Space' dropdown is set to 'FOLLOW INPUT'. The 'General' tab is highlighted.

Figure 4-83: HDR - Follow Input

In case of missing HDR Signalization in the incoming SDI, an alarm is raised:

- [ENC#/VBI4]: No embedded signal [cause = "No HDR Signaling"]

In case of inconsistency HDR Signalization in the incoming SDI, the latest valid HDR Signaling received is maintained as long as a valid one is restored on the SDI.

NOTE:

- If **Video Rescaling** is enabled, the HDR Follow Input mode is not allowed as CP9000 doesn't support SDR to HDR conversion.
- If **ProMedia IP 2110** input mode is selected, the HDR Follow Input mode is not allowed.

HEVC UHD video VBI tab

To set the **Closed Caption** and **AFD**

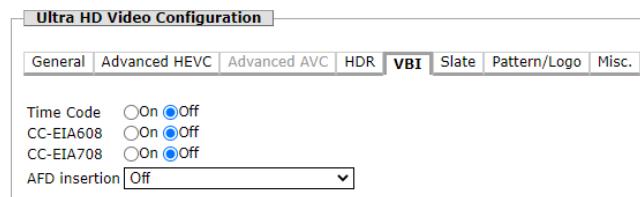


Figure 4-84: UHD video component - VBI tab

- Time Code:** If set to ON, the Time Code information is sent in the MPEG video component. After extraction from the digital field blanking or from the video component, the Time Code is inserted in the Video component as "*Picture Timing*" SEI message NAL Unit in H264 or the "*Time code*" SEI message NAL unit in H265.
- CC-EIA608:** If set to ON, the **Closed Caption** information (line 21) and the extended data service information (line 284) carried in an Ancillary Data packet (SMPTE 334-1) are extracted from the **HD** video blanking and are inserted in the Video component in the "*SEI message NAL Unit*" in H264/H265.
- CC-EIA708:** If set to ON, the **Closed Caption** information extracted from the **HD** digital video field blanking is sent in the "*SEI NAL Unit*" in H264 or H265.
- AFD insertion:** This parameter determines whether the AFD value should be sent (Follow input) or not sent (Off).

Restriction: CC-EIA608 and CC-EIA708 are mutually exclusive.

HEVC UHD video Slate tab

To insert a slate picture instead of the video, select a slate, if at least one slate, conforming to the geometry of the video, is already loaded on CP9000.



Figure 4-85: Ultra HD video component - Slate tab

- Name:** From the drop down menu select the appropriate slate already loaded.
- Slate Mute audio:** When a Slate is selected then audio components generated from PCM input, Dolby E input , precompressed input with transcoding operation or transparent PCM input are muted (silence is generated).

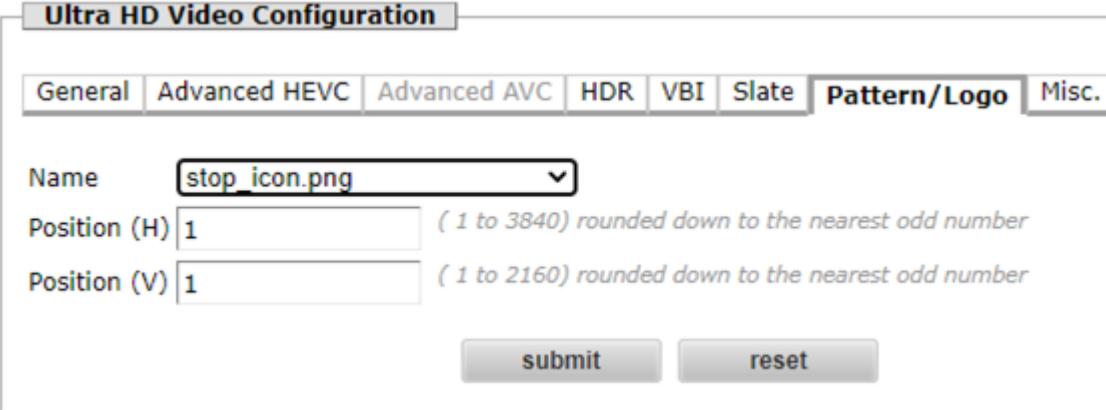
The mute of Audio components from precompressed Transport (No transcoding) is not guaranteed and an alarm indicating an error "No expected standard in signal" can be raised.

 **NOTE:** Transparent Audio components containing a Non-PCM content (Dolby E, precompressed...) : audio Data are also muted. These components may not be detected as an encoded silence by backend equipment.

It is possible to remove them from the PMT and to stop their generation by setting **Audio Output Status** to **Off Air**.

HEVC UHD video Pattern/Logo tab

Use to insert a moving pattern or a logo in the video.



Ultra HD Video Configuration

General Advanced HEVC Advanced AVC HDR VBI Slate **Pattern/Logo** Misc.

Name: stop_icon.png

Position (H): 1 (1 to 3840) rounded down to the nearest odd number

Position (V): 1 (1 to 2160) rounded down to the nearest odd number

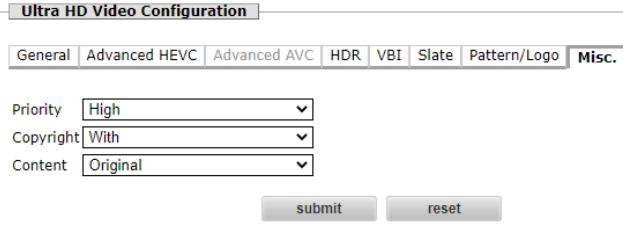
submit reset

Figure 4-86: Ultra HD video component - Patter/Logo tab

- **Name:** From the drop down menu select Moving Pattern or any logo already loaded.
 - Moving Pattern: Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - To load a logo, refer to section [Logos Insertion](#).
- **Position (H) and Position (V):** define the horizontal and vertical position of the logo in the video. position H,V (1,1) = top corner left.

HEVC UHD video Miscellaneous parameters

To set the other video component parameters.



Ultra HD Video Configuration

General Advanced HEVC Advanced AVC HDR VBI Slate Pattern/Logo **Misc.**

Priority: High

Copyright: With

Content: Original

submit reset

Figure 4-87: UHD video component - Misc. tab

- **Priority:** Used to set Normal or High priority by positioning a flag in the PES packet header.
- **Copyright:** Used to indicate whether the video content is With or Without a Copyright by positioning a flag in the PES packet header.

- **Content:** Used to indicate whether the video content is a **Copy** or an **Original** by positioning a flag in the PES packet header.

Confirm all the changes by clicking **submit**.

Adding/Editing an AVC UHD video component

Click **add component** to select the shortcut menu and click **Add AVC Video UHD** or click the **video component**.



Figure 4-88: Add AVC Ultra HD video component

AVC UHD video General tab

 A screenshot of the 'Ultra HD Video Configuration' dialog. At the top, there's a tabs bar with 'General' selected (it's highlighted in grey), followed by 'Advanced HEVC', 'Advanced AVC', 'HDR', 'VBI', 'Slate', 'Pattern/Logo', and 'Misc'. Below the tabs, there are several configuration options:

- Source: 4xSDI Inputs
- SDI standard: 4x3G-SDI Level A or B SQD
- No Source Mode: Blue Screen
- Pattern/Logo Mode: Off
- Standard: 2160p
- Frame Rate: 59.94 fps
- Profile: AVC 4:2:2 10 bits (Hi422P)
- Compression Delay: Standard
- ES Rate: 16000 (15000 to 600000 kbit/s)
- PID: 512 (32 to 8190)
- PCR: On (radio button selected)
- Status: On Air

 At the bottom of the dialog, there's a warning message: 'Warning : Modifying video parameters may lead to temporary service disruption.'

Figure 4-89: AVC UHD video component - General parameters

- **Source:** editable only if at least one slate file is loaded on the CP9000, that corresponds to the video geometry and selected in the Slate tab. Choice between SDI Inputs or Slate.
- **SDI Standard:** If the source is **12G-SDI**, it is not editable (only 12G-SDI 2-Sample Interleave is supported) and if the source is **3G-SDI**, then 2 choices are available:
 - 4x3G-SDI Level A or B:
 - The Level A format is the direct mapping of uncompressed 1080p (up to 60 fps) video into a serial digital interface at the nominal 3 Gbit/s.
 - The Level B, Dual link mapping, specifies the mapping of the SMPTE ST 372 Dual Link 1.5Gb/s interface into a serial digital operating at a nominal rate of 3Gb/s.
 - 4x3G 2-Sample Interleave: It uses quad HD-SDI links at 3Gb/s with each link containing the full image at ¼ resolution.

- **No Source Mode:** Used to select the mode if the video signal is lost or standard mismatch at encoder input.
 - Blue screen / Black screen / Last picture: In case of video input loss or format mismatch event, the encoder automatically replaces, in robust mode (means PCR accuracy may be altered), the incoming content by the selected pattern. To select the Robust mode pattern, refer to section [Device Configuration](#).
 - No encoding: The encoding is stopped. Only available when Ultra-Low latency is selected. Refer to section [Device Configuration](#).
 - Null video bit rate on TS: The video component bitrate is null (if the PCR is carried by the video component there is no longer any PCR broadcast for this service).
 - Null bit rate on TS: The TS bitrate is null.
- ! **Attention:** If the service is part of an MPTS then the complete MPTS output bitrate is null. All the services within the MPTS are impacted.
- Disable IP output interfaces: The IP output interfaces are disabled electrically.
- ! **Attention:** All the Ethernet interfaces are disabled. All the services on the chassis are impacted.
- Slate: available when a slate is selected in the Slate tab.
- **Pattern/Logo mode:** According to Pattern/Logo selection, either insert a color square moving pattern to distinguish one channel from another or the selected logo (not moving). The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
- **Off:** Not used
- **On:** The moving pattern or a Logo is overlaid to the current picture.
- **No source mode:** The moving pattern is only inserted when the input signal is lost and overlaid to the picture selected in the No Source Mode parameter.
- **Standard:** Used to indicate the video standard at encoder input: **2160p**.
- **Frame Rate:** Used to select the video frame rate at encoder input. Choice between 24, 25, 29.97, 30, 50, 59.94 and 60 fps.
- **Profile:** Used to select the video encoding profile. AVC 4:2:0 8 bits or AVC 4:2:0 10 bits or AVC 4:2:2 8 bits or AVC 4:2:2 10 bits.
- **Compression Delay:** Used to set the encoding delay. Long or Standard or Short, When **Ultra-Low latency** is selected in Device Configuration, then the Compression delay is not editable. When **Short latency** is selected, to preserve the video quality it is recommended to increase the bitrate.
- **ES Rate:** Used to set the Elementary Stream bitrate for the video component. The default values proposed depend on the **Compression Delay** parameter.
- **PID:** Used to identify the TS packets transporting the video component. The value must be between 32 and 8190.
- **PCR:** Used to insert the Program Clock Reference of the service in the TS packets transporting the video component.
 - **Off:** The **PCR** is not carried by the video component. This value can be selected if a PCR component has been added to the Service and if the PID of the PCR component is indicated as **PID PCR** value in the Service Configuration page.
 - **On:** The **PCR** is carried by the video component.
- **Status:** Used to select video component broadcasting state.
 - **Off Air:** Component broadcasting is postponed but the component is present in the service configuration.
 - **On Air:** The component is On Air.

- **Tier:** Not indicated with AVC encoding as only **High** is used.
- **Level:** The detail of the Level is not indicated as it depends on the **ES rate** allocated. To see which level is used, refer to the tables in the section [AVC Profiles and Levels](#).

AVC UHD Advanced AVC tab

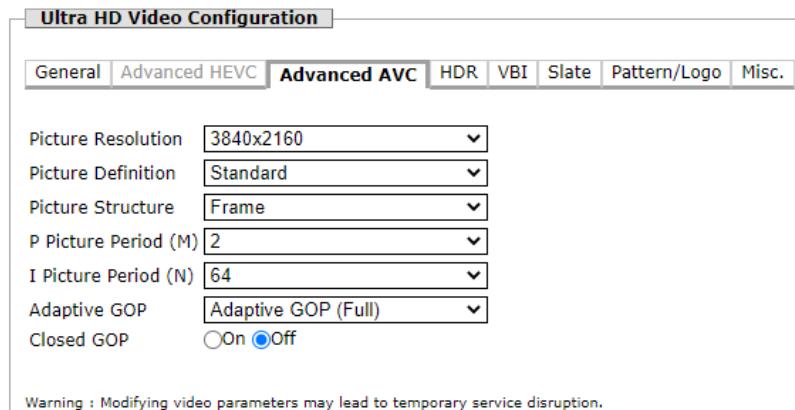


Figure 4-90: AVC UHD video component - Advanced AVC parameters

- **Picture Resolution:** Used to adjust picture resolution according to the desired video bitrate. In this release, only **3840x2160** is available.
- **Picture Definition:** Used to set the definition of the picture, allowing to configure the encoding loop deblocking filter.
 - **Sharp:** the encoding loop deblocking filter is not activated
 - **Standard:** the encoding loop deblocking filter is activated
- **Picture Structure:** Structure of the picture at encoder input. In this release, only **Frame** structure is available.
- **P Picture Period (M):** Used to set the repetition rate for P pictures. Choice between: 2 or 3. The value must be a sub-multiple of the **I Picture Period (N)** below.
- **I Picture Period (N):** Used to set the repetition rate for I-pictures. Value between 8 and 64 by steps of 8. The value 50 is also available mainly for OTT packaging applications.
- **Adaptive GOP:** Used to set the Adaptive GOP feature.
 - **Fixed GOP:** In this mode, both P picture period and GOP size are set to the values **P picture period (M)** and **GOP size (N)** above.
 - **Adaptive GOP (Full):** In this mode, the effective **I picture period (N)** varies according to video content (i.e. spatio-temporal complexity and events such as scene changes or fades). The GOP (N) is a multiple of P period (M) which remains unchanged.
- **Closed GOP:** Used to enable **On** or disable **Off** Closed GOP mode. It is used to break temporal dependency between GOPs.



Attention:

- Closed GOP mode reduces encoding quality and should only be used when stream editing operations are expected.
- When Closed GOP is used, the last P period is reduced by one picture so as to preserve the size of the GOP (N).

Specific case when the **Compression delay** is set to **Short**:

- **GOP Structure** instead of **P Picture period (M)**
- no **Adaptive GOP**

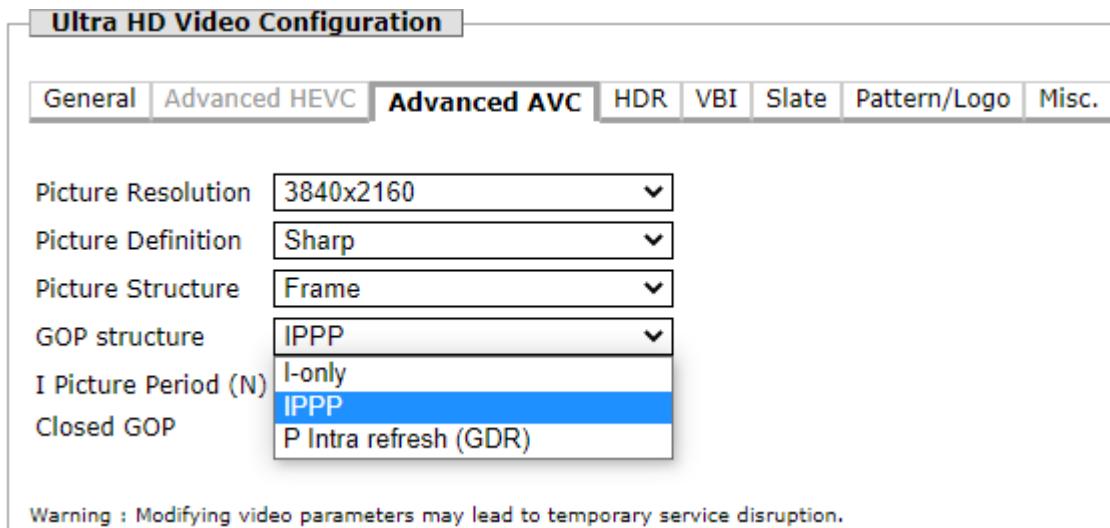


Figure 4-91: AVC UHD video component - Advanced AVC parameters - GOP Structure

AVC UHD video HDR (High Dynamic Range) tab

to set the VUI (Video Usability Info) parameters.

- **HDR - WCG** (Wide Color Gamut): 2 **SDR** (Simple Dynamic Range) and 2 **HDR** (High Dynamic Range) choices are available with fixed values, details on the table below.

	VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
SDR - BT 709	color_primaries=1 transfer_characteristics=1 matrix_coeffs=1	No	No	No
SDR - BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No	No
PQ10 (HDR10) BT 2020	color_primaries=9 transfer_characteristics=16 matrix_coeffs=9	Yes	Yes	No

VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
HLG10 BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No
FOLLOW INPUT	Automatic dynamic HDR signalization and Metadata insertion “in band (VUI+SEI)” in the compressed TS AVC or HEVC stream. Follow input data extracted from ST-352:2013 information. This insertion shall be triggered and fed by embedded signaling and Metadata carried over the SDI stream.		

SEI message "Mastering_color_volume_info" indicates the color space of the display used for mastering.

SEI message "content_light_level_info" indicates upper bounds for the nominal target brightness light level of the pictures.

SEI message "alternative_transfer_characteristics" indicates the preferred transfer characteristics to be used by the decoder.

When **SDR** (either **BT 709** or **BT 2020**) is selected, no other parameter appears in this page:

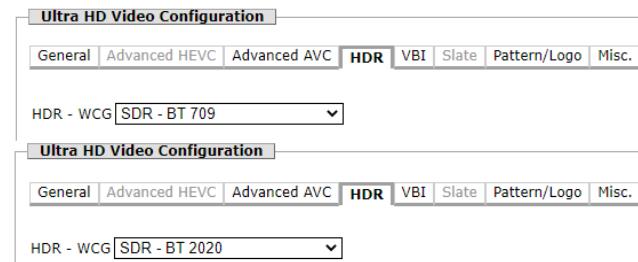


Figure 4-92: Dynamic Range - SDR (BT 709 or BT 2020)

When **HLG10** is selected, and if **SEI 147** is set to **Yes 147**, then default value =18 (not configurable):

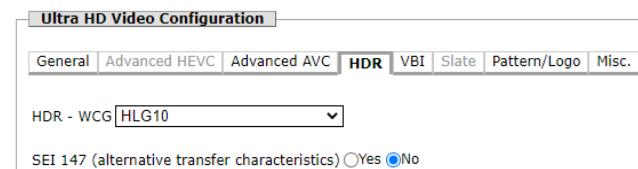


Figure 4-93: Dynamic Range - HLG10

When **PQ10 (HDR10)** is selected 4 choices are possible for the **Color Space** but the values cannot be edited:

The screenshot shows the 'Ultra HD Video Configuration' interface with the 'HDR' tab selected. Under 'Color Space', 'BT2020' is chosen. The 'SEI 137 (mastering colour volume info)' section has 'Yes' selected. The 'Display primaries' table shows values for R, G, and B:

	R	G	B	(0.00000 to 1.00000)
Display primaries x	0.708	0.17	0.131	(0.00000 to 1.00000)
Display primaries y	0.292	0.797	0.046	(0.00000 to 1.00000)
White point x	0.3127	(0.00000 to 1.00000)		
White point y	0.329	(0.00000 to 1.00000)		
Max display mastering luminance	1200	(0 to 10000 cd/m²)		
Min display mastering luminance	0	(0 to 10000 cd/m²)		

The 'SEI 144 (content light level info)' section has 'Yes' selected. The 'Max content light level' and 'Max frame average light level' fields are both set to 0.

Figure 4-94: Dynamic Range - PQ10 (HDR10)

- **Color Space:**

- BT2020: the values are predetermined and fixed.
- DCI-P3 D65: the values are predetermined and fixed.
- DCI-P3 THEATER: the values are predetermined and fixed.
- CUSTOM: all the values can be change with the following limitation:

Display primaries x, Display primaries y, White point x, White point y must be set in increments of 0.00002 according to the CIE 1931 definition of x and y as specified in ISO 11664-1.

When **Follow Input** is selected, other parameters fields are disabled and hidden.

The screenshot shows the 'Ultra HD Video Configuration' interface with the 'HDR' tab selected. Under 'Color Space', 'FOLLOW INPUT' is chosen. The 'SEI 137 (mastering colour volume info)' section is disabled.

Figure 4-95: HDR - Follow Input

In case of missing HDR Signalization in the incoming SDI, an alarm is raised:

- [ENC#/VBI4]: No embedded signal [cause = "No HDR Signaling"]

In case of inconsistency HDR Signalization in the incoming SDI, the latest valid HDR Signaling received is maintained as long as a valid one is restored on the SDI.

NOTE:

- If **Video Rescaling** is enabled, the HDR Follow Input mode is not allowed as CP9000 doesn't support SDR to HDR conversion.
- If **ProMedia IP 2110** input mode is selected, the HDR Follow Input mode is not allowed.

AVC UHD video VBI tab

To set the **Closed Caption** and **AFD**

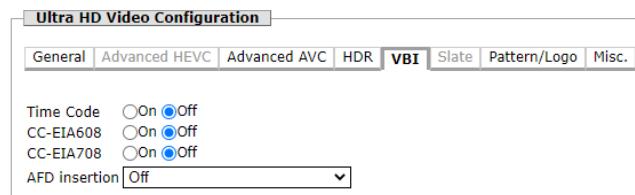


Figure 4-96: AVC UHD video component - VBI tab

- Time Code:** If set to ON, the Time Code information is sent in the MPEG video component. After extraction from the digital field blanking or from the video component, the Time Code is inserted in the Video component as "*Picture Timing*" SEI message NAL Unit in H264 or the "*Time code*" SEI message NAL unit in H265.
- CC-EIA608:** If set to ON, the **Closed Caption** information (line 21) and the extended data service information (line 284) carried in an Ancillary Data packet (SMPTE 334-1) are extracted from the **HD** video blanking and are inserted in the Video component in the "*SEI message NAL Unit*" in H264/H265.
- CC-EIA708:** If set to ON, the **Closed Caption** information extracted from the **HD** digital video field blanking is sent in the "*SEI NAL Unit*" in H264 or H265.
- AFD insertion:** This parameter determines whether the AFD value should be sent (Follow input) or not sent (Off).

Restriction: CC-EIA608 and CC-EIA708 are mutually exclusive.

AVC UHD video Slate tab

To insert a slate picture instead of the video, select a slate, if at least one slate, conforming to the geometry of the video, is already loaded on CP9000.



Figure 4-97: AVC UHD video component - Slate tab

- Name:** From the drop down menu select the appropriate slate already loaded.
- Slate Mute audio:** When a Slate is selected then audio components generated from PCM input, Dolby E input , precompressed input with transcoding operation or transparent PCM input are muted (silence is generated).

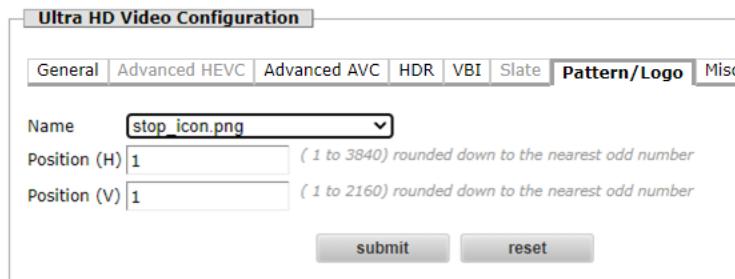
The mute of Audio components from precompressed Transport (No transcoding) is not guaranteed and an alarm indicating an error "No expected standard in signal" can be raised.

 **NOTE:** Transparent Audio components containing a Non-PCM content (Dolby E, precompressed...) : audio Data are also muted. These components may not be detected as an encoded silence by backend equipment.

It is possible to remove them from the PMT and to stop their generation by setting **Audio Output Status** to **Off Air**.

AVC UHD video Pattern/Logo tab

Use to insert a moving pattern or a logo in the video.



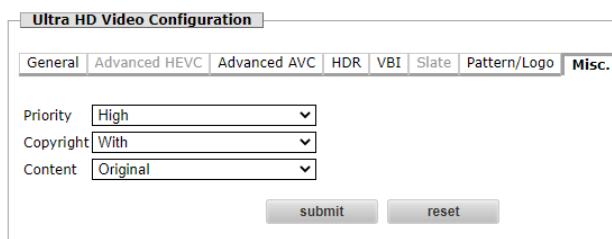
The screenshot shows the 'Ultra HD Video Configuration' interface with the 'Pattern/Logo' tab selected. There are three input fields: 'Name' with the value 'stop_icon.png', 'Position (H)' with the value '1', and 'Position (V)' with the value '1'. Below these fields are two buttons: 'submit' and 'reset'.

Figure 4-98: AVC UHD video component - Patter/Logo tab

- **Name:** From the drop down menu select Moving Pattern or any logo already loaded.
 - Moving Pattern: Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - To load a logo, refer to section [Logos Insertion](#).
- **Position (H) and Position (V):** define the horizontal and vertical position of the logo in the video. position H,V (1,1) = top corner left.

AVC UHD video Miscellaneous parameters

To set the other video component parameters.



The screenshot shows the 'Ultra HD Video Configuration' interface with the 'Misc.' tab selected. There are three dropdown menus: 'Priority' set to 'High', 'Copyright' set to 'With', and 'Content' set to 'Original'. Below these dropdowns are two buttons: 'submit' and 'reset'.

Figure 4-99: AVC UHD video component - Misc. tab

- **Priority:** Used to set **Normal** or **High** priority by positioning a flag in the PES packet header.
- **Copyright:** Used to indicate whether the video content is **With** or **Without** a Copyright by positioning a flag in the PES packet header.
- **Content:** Used to indicate whether the video content is a **Copy** or an **Original** by positioning a flag in the PES packet header.

Confirm all the changes by clicking **submit**.

Adding/Editing an HEVC HD video component

Click **add component** to select the shortcut menu and click **Add HEVC Video HD** or click the **video component**.



Figure 4-100: Add HEVC HD video component

The following pages will be displayed:

HEVC HD video General tab

General		Advanced HEVC	Advanced AVC	HDR	VBI	Slate	Pattern/Logo	Misc.
Source	SDI Input 1							
SDI standard	1x3G-SDI Level A or B							
No Source Mode	Blue Screen							
Pattern/Logo Mode	Off							
Standard In	1080p							
Standard Out	1080p							
Frame Rate	59.94 fps							
Profile	HEVC Main10 4:2:0							
Tier	Auto							
Compression Delay	Standard							
ES Rate	8000	(600 to 600000 kbit/s)						
PID	512	(32 to 8190)						
PCR	<input checked="" type="radio"/> On <input type="radio"/> Off							
Status	On Air							

Warning : Modifying video parameters may lead to temporary service disruption.

Figure 4-101: HEVC HD video component - General parameters

- **Source:** editable only if at least one slate file is loaded on the CP9000, that corresponds to the video geometry and selected in the Slate tab. Choice between SDI Input or Slate.
- **SDI Standard:** Not editable, but changes according to the **Standard** used:
 - 1x3G-SDI Level A or B if **1080p** is selected:
 - 1x1.5G-SDI: if **1080i** or **720p** is selected.
- **No Source Mode:** Used to select the mode if the video signal is not present at encoder input.
 - Blue screen / Black screen / Last picture: In case of video input loss or format mismatch event, the encoder automatically replaces, in robust mode (means PCR accuracy may

be altered), the incoming content by the selected pattern. To select the Robust mode pattern, refer to section [Device Configuration](#).

- Null video bit rate on TS: The video component bitrate is null (if the PCR is carried by the video component there is no longer any PCR broadcast for this service).
- Null bit rate on TS: The TS bitrate is null.

 **CAUTION:** If the service is part of an MPTS then the complete MPTS output bitrate is null. All the services within the MPTS are impacted.

- Disable IP output interfaces: The IP output interfaces are disabled electrically.

 **CAUTION:** All the Ethernet interfaces are disabled. All the services on the chassis are impacted.

- **Pattern/Logo Mode:** Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.

- **Off:** Not used
- **On:** The moving pattern is overlaid to the current picture.
- **No source mode:** The moving pattern is only inserted when the input signal is lost and overlaid to the picture selected in the No Source Mode parameter

- **Standard In :**

- **2160p** when downscale from UHD is selected, not editable.

To select 1 HD from UHD downscale, refer to section [#unique_33/unique_33_Connect_42_ul_m4n_hn3_4gb](#).

- Otherwise, **No rescale** or **1080p** or **1080i**, depends on the Standard Out chosen.

- **Standard Out:** Used to indicate the video standard at encoder output: **1080p**, **1080i** or **720p**.
- **Frame Rate:** Values available depend on the selected **Standard**. Choice between 24, 25, 29.97, 30, 50, 59.94 and 60 fps. This parameter concerns input and output formats, the frame rate is not convertible.
- **Profile:** Used to select the video encoding profile. HEVC Main-4:2:0, HEVC Main10-4:2:0 or HEVC Main10-4:2:2.
- **Tier:** Used to determinate the Profiles. Auto or Main or High. If the Auto mode is selected, the Tier is automatically chosen according to the bitrate allocated.

For more details, refer to section [HEVC Bitrate Extension](#).

- **Level:** This parameter appears only when **Main** or **High** is selected. Use to determinate the Level of the Profile. Choice between 4.1, 5.0, 5.1, 5.2, 6.0, 6.1 and 6.2.
- **Compression Delay:** Used to set the encoding delay. Long or Standard or Short.
- **ES Rate:** Used to set the Elementary Stream bitrate for the video component. The default values proposed depend on the **Compression Delay** parameter.
- **PID:** Used to identify the TS packets transporting the video component. The value must be between 32 and 8190.
- **PCR:** Used to insert the Program Clock Reference of the service in the TS packets transporting the video component.
 - **Off:** The **PCR** is not carried by the video component. This value can be selected if a PCR component has been added to the Service and if the PID of the PCR component is indicated as **PID PCR** value in the Service Configuration page.
 - **On:** The **PCR** is carried by the video component.
- **Status:** Used to select video component broadcasting state.

- Off Air: Component broadcasting is postponed but the component is present in the service configuration.
- On Air: The component is On Air.

DANGER:

 **NOTE:** Changing at least one of the following parameters stops the outgoing video signal for approximately 5 to 10 seconds: **Frame Rate - Profile - Compression Delay - ES Rate**.

HEVC HD video Advanced HEVC tab

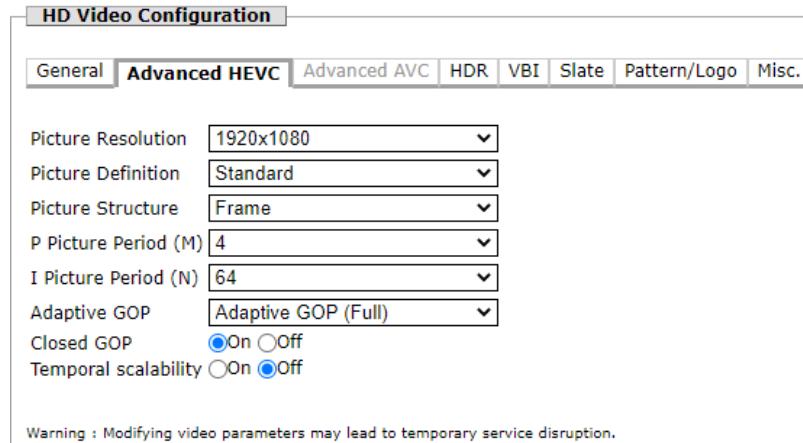


Figure 4-102: HEVC HD video component - Advanced HEVC parameters

- **Picture Resolution:** Used to adjust picture resolution according to the desired video bitrate. 1920x1080, additional 1280x720 and sub resolutions 1440x1080, 960x720 are available in alpha mode .
- **Picture Definition:** Used to set the definition of the picture. Two choices, Standard and Sharp.
- **Picture Structure:** Structure of the picture at encoder input. In this release, only **Frame** structure is available.
- **P Picture Period (M):** only available when **Long and Standard** delays have been selected in Device Configuration.
 - If **1080i** is selected, choice between: 2 and 4.
 - If **1080p** or **720p** is selected, choice between: 2, 4 and 8.

The value must be a sub-multiple of the **I Picture Period (N)** below. A lower value will reduce the number of B-pictures in the GOP (these pictures are the most efficient in terms of compression ratio). Default value = 4.

- **I Picture Period (N):** only available when **Long and Standard** delays have been selected in Device Configuration. Values between 8 and 96 by steps of 8. The values 50, 80, 100 and 128 are also available mainly for OTT packaging applications. As I-pictures require more bits than B or P pictures, a bigger GOP size leads to better encoding performance.
- **GOP Structure:** Only available when **Short** delay has been selected (in video configuration, [HEVC HD video General tab](#)).
 - IPPP: No B picture.
 - I-only: No need to define the **Picture Period (GOP size)**

- **Adaptive GOP:** Only available when **Long and Standard** delay has been selected.
 - **Fixed GOP:** In this mode, both P picture period and GOP size are set to the values **P picture period (M)** and **GOP size (N)** above.
 - **Adaptive GOP (Full):** In this mode, the effective **I picture period (N)** varies according to video content (i.e. spatio-temporal complexity and events such as scene changes or fades). The GOP (N) is a multiple of P period (M) which remains unchanged.
- **Closed GOP:** Only available when **Long and Standard** delay has been selected. It is used to break temporal dependency between GOPs.


Attention:

- Closed GOP mode reduces encoding quality and should only be used when stream editing operations are expected.
- When Closed GOP is used, the last P period is reduced by one picture so as to preserve the size of the GOP (N).

- **Temporal Scalability:** Used to enable **On** or disable **Off** the temporal scalability.

When **Temporal scalability** is **On**, the number of sub-layers depend on **P Picture Period (M)**:

- **P Picture Period (M) = 2** # 2 sub-layers
- **P Picture Period (M) = 4** # 3 sub-layers
- **P Picture Period (M) = 8** # 4 sub-layers

HEVC HD video HDR (High Dynamic Range) tab

to set the VUI (Video Usability Info) parameters.

- **HDR - WCG** (Wide Color Gamut): 2 **SDR** (Simple Dynamic Range) and 2 **HDR** (High Dynamic Range) choices are available with fixed values, details on the table below.

	VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
SDR - BT 709	color_primaries=1 transfer_characteristics=1 matrix_coeffs=1	No	No	No
SDR - BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No	No
PQ10 (HDR10) BT 2020	color_primaries=9 transfer_characteristics=16 matrix_coeffs=9	Yes	Yes	No

VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
HLG10 BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No
FOLLOW INPUT	Automatic dynamic HDR signalization and Metadata insertion “in band (VUI+SEI)” in the compressed TS AVC or HEVC stream. Follow input data extracted from ST-352:2013 information. This insertion shall be triggered and fed by embedded signaling and Metadata carried over the SDI stream.		

SEI message "Mastering_color_volume_info" indicates the color space of the display used for mastering.

SEI message "content_light_level_info" indicates upper bounds for the nominal target brightness light level of the pictures.

SEI message "alternative_transfer_characteristics" indicates the preferred transfer characteristics to be used by the decoder.

When **SDR** (either **BT 709** or **BT 2020**) is selected, no other parameter appears in this page:

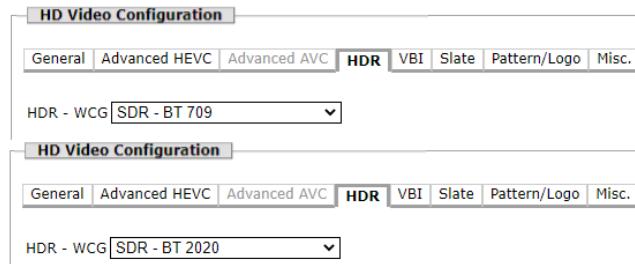


Figure 4-103: Dynamic Range - SDR (BT 709 or BT 2020)

When **HLG10** is selected, and if **SEI 147** is set to **Yes 147**, then default value =18 (not configurable):

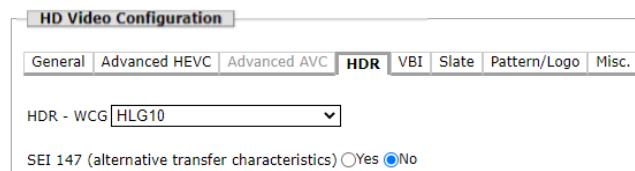


Figure 4-104: Dynamic Range - HLG10

When **PQ10 (HDR10)** is selected 4 choices are possible for the **Color Space** but the values cannot be edited:

The screenshot shows the 'HD Video Configuration' interface with the 'HDR' tab selected. Under 'Color Space', 'BT2020' is chosen. The 'SEI 137 (mastering colour volume info)' section has 'Yes' selected. Below it, color primaries and white point values are listed:

	R	G	B	(0.00000 to 1.00000)
Display primaries x	0.708	0.17	0.131	(0.00000 to 1.00000)
Display primaries y	0.292	0.797	0.046	(0.00000 to 1.00000)
White point x	0.3127	(0.00000 to 1.00000)		
White point y	0.329	(0.00000 to 1.00000)		
Max display mastering luminance	1200	(0 to 10000 cd/m²)		
Min display mastering luminance	0	(0 to 10000 cd/m²)		

The 'SEI 144 (content light level info)' section has 'Yes' selected. Below it, light level values are listed:

Max content light level	0	(0 to 10000 cd/m²)
Max frame average light level	0	(0 to 10000 cd/m²)

Figure 4-105: Dynamic Range - PQ10 (HDR10)

- **Color Space:**

- BT2020: the values are predetermined and fixed.
- DCI-P3 D65: the values are predetermined and fixed.
- DCI-P3 THEATER: the values are predetermined and fixed.
- CUSTOM: all the values can be change with the following limitation:

Display primaries x, Display primaries y, White point x, White point y must be set in increments of 0.00002 according to the CIE 1931 definition of x and y as specified in ISO 11664-1.

When **Follow Input** is selected, other parameters fields are disabled and hidden.

The screenshot shows the 'HD Video Configuration' interface with the 'HDR' tab selected. Under 'Color Space', 'FOLLOW INPUT' is chosen. The 'SEI 137 (mastering colour volume info)' section is disabled.

Figure 4-106: HDR - Follow Input

In case of missing HDR Signalization in the incoming SDI, an alarm is raised:

- [ENC#/VBI4]: No embedded signal [cause = "No HDR Signaling"]

In case of inconsistency HDR Signalization in the incoming SDI, the latest valid HDR Signaling received is maintained as long as a valid one is restored on the SDI.

NOTE:

- If **Video Rescaling** is enabled, the HDR Follow Input mode is not allowed as CP9000 doesn't support SDR to HDR conversion.
- If **ProMedia IP 2110** input mode is selected, the HDR Follow Input mode is not allowed.

HEVC HD video VBI tab

To set the **Closed Caption** and **AFD**

Figure 4-107: HEVC HD video component - VBI tab

- **Time Code:** If set to ON, the Time Code information is sent in the MPEG video component. After extraction from the digital field blanking or from the video component, the Time Code is inserted in the Video component as "*Picture Timing*" SEI message NAL Unit in H264 or the "*Time code*" SEI message NAL unit in H265.
- **CC-EIA608:** If set to ON, the **Closed Caption** information (line 21) and the extended data service information (line 284) carried in an Ancillary Data packet (SMPTE 334-1) are extracted from the **HD** video blanking and are inserted in the Video component in the "*SEI message NAL Unit*" in H264/H265.
- **CC-EIA708:** If set to ON, the **Closed Caption** information extracted from the **HD** digital video field blanking is sent in the "*SEI NAL Unit*" in H264 or H265.
- **AFD insertion:** This parameter determines whether the AFD value should be sent (Follow input) or not sent (Off).

Restriction: CC-EIA608 and CC-EIA708 are mutually exclusive.

HEVC HD video Slate tab

To insert a slate picture instead of the video, select a slate, if at least one slate, conforming to the geometry of the video, is already loaded on CP9000.

Figure 4-108: HEVC HD video component - Slate tab

- **Name:** From the drop down menu select the appropriate slate already loaded.
- **Slate Mute audio:** When a Slate is selected then audio components generated from PCM input, Dolby E input , precompressed input with transcoding operation or transparent PCM input are muted (silence is generated).

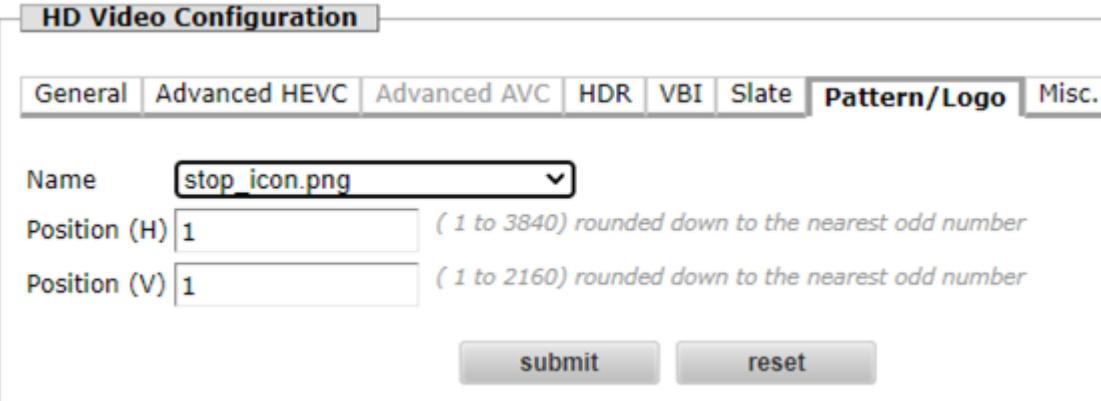
The mute of Audio components from precompressed Transport (No transcoding) is not guaranteed and an alarm indicating an error "No expected standard in signal" can be raised.

 **NOTE:** Transparent Audio components containing a Non-PCM content (Dolby E, precompressed...) : audio Data are also muted. These components may not be detected as an encoded silence by backend equipment.

It is possible to remove them from the PMT and to stop their generation by setting **Audio Output Status** to **Off Air**.

HEVC HD video Pattern/Logo tab

Use to insert a moving pattern or a logo in the video.



HD Video Configuration

General Advanced HEVC Advanced AVC HDR VBI Slate **Pattern/Logo** Misc.

Name: stop_icon.png

Position (H): 1 (1 to 3840) rounded down to the nearest odd number

Position (V): 1 (1 to 2160) rounded down to the nearest odd number

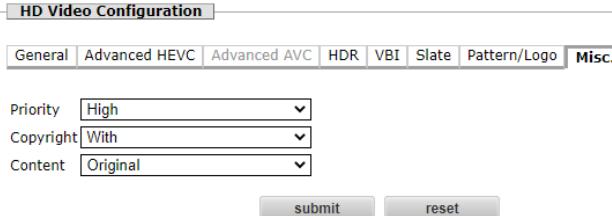
submit reset

Figure 4-109: HEVC HD video component - Patter/Logo tab

- **Name:** From the drop down menu select Moving Pattern or any logo already loaded.
 - Moving Pattern: Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - To load a logo, refer to section [Logos Insertion](#).
- **Position (H) and Position (V):** define the horizontal and vertical position of the logo in the video. position H,V (1,1) = top corner left.

HEVC HD video Miscellaneous parameters

To set the other video component parameters.



HD Video Configuration

General Advanced HEVC Advanced AVC HDR VBI Slate Pattern/Logo **Misc.**

Priority: High

Copyright: With

Content: Original

submit reset

Figure 4-110: HEVC HD video component - Misc. tab

- **Priority:** Used to set Normal or High priority by positioning a flag in the PES packet header.
- **Copyright:** Used to indicate whether the video content is With or Without a Copyright by positioning a flag in the PES packet header.

- **Content:** Used to indicate whether the video content is a **Copy** or an **Original** by positioning a flag in the PES packet header.

Confirm all the changes by clicking **submit**.

Adding/Editing an AVC HD video component

Click **add component** to select the shortcut menu and click **Add AVC Video HD** or click the **video component**.

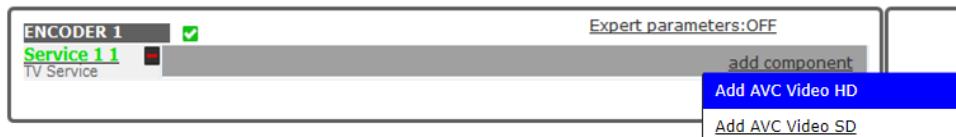


Figure 4-111: Add AVC HD video component

AVC HD video General tab

General		Advanced HEVC	Advanced AVC	HDR	VBI	Slate	Pattern/Logo	Misc.
Source	SDI Input 1							
SDI standard	1x1.5G-SDI							
No Source Mode	Blue Screen							
Pattern/Logo Mode	Off							
Standard In	1080i							
Standard Out	720p							
Frame Rate	59.94 fps							
Profile	AVC 4:2:2 10 bits (Hi422P)							
Compression Delay	Standard							
ES Rate	8000	(1000 to 540000 kbit/s)						
PID	512	(32 to 8190)						
PCR	<input checked="" type="radio"/> On <input type="radio"/> Off							
Status	On Air							

Warning : Modifying video parameters may lead to temporary service disruption.

Figure 4-112: AVC HD video component - General parameters

- **Source:** editable only if at least one slate file is loaded on the CP9000, that corresponds to the video geometry and selected in the Slate tab. Choice between SDI Input or Slate.
- **SDI Standard:** Not editable, but changes according to the **Standard** used:
 - 1x3G-SDI Level A or B if **1080p** is selected:
 - 1x1.5G-SDI: if **1080i** or **720p** is selected.
- **No Source Mode:** Used to select the mode if the video signal is not present at encoder input.
 - Blue screen / Black screen / Last picture: In case of video input loss or format mismatch event, the encoder automatically replaces, in robust mode (means PCR accuracy may

be altered), the incoming content by the selected pattern. To select the Robust mode pattern, refer to section [Device Configuration](#).

- Null video bit rate on TS: The video component bitrate is null (if the PCR is carried by the video component there is no longer any PCR broadcast for this service).
- Null bit rate on TS: The TS bitrate is null.

 **CAUTION:** If the service is part of an MPTS then the complete MPTS output bitrate is null. All the services within the MPTS are impacted.

- Disable IP output interfaces: The IP output interfaces are disabled electrically.

 **CAUTION:** All the Ethernet interfaces are disabled. All the services on the chassis are impacted.

- **Pattern/Logo Mode:** Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.

- **Off:** Not used
- **On:** The moving pattern is overlaid to the current picture.
- **No source mode:** The moving pattern is only inserted when the input signal is lost and overlaid to the picture selected in the No Source Mode parameter

- **Standard In :**

- **2160p** when downscale from UHD is selected, not editable.

To select 1 HD from UHD downscale, refer to section [#unique_33/unique_33_Connect_42_ul_m4n_hn3_4gb](#).

- Otherwise, **No rescale** or **1080p** or **1080i**, depends on the Standard Out chosen.

- **Standard Out:** Used to indicate the video standard at encoder output: **1080p**, **1080i** or **720p**.

- **Frame Rate:** Values available depend on the selected **Standard**. Choice between 24, 25, 29.97, 30, 50, 59.94 and 60 fps. This parameter concerns input and output formats, the frame rate is not convertible.

- **Profile:** Used to select the video encoding profile. AVC 4:2:0 8 bits (MP) or AVC 4:2:0 8 bits (HiP) or AVC 4:2:0 10 bits or AVC 4:2:2 8 bits or AVC 4:2:2 10 bits.

- **Compression Delay:** Used to set the encoding delay. Long or Standard or Short.

- **ES Rate:** Used to set the Elementary Stream bitrate for the video component. The default values proposed depend on the **Compression Delay** parameter.

- **PID:** Used to identify the TS packets transporting the video component. The value must be between 32 and 8190.

- **PCR:** Used to insert the Program Clock Reference of the service in the TS packets transporting the video component.

- **Off:** The **PCR** is not carried by the video component. This value can be selected if a PCR component has been added to the Service and if the PID of the PCR component is indicated as **PID PCR** value in the Service Configuration page.

- **On:** The **PCR** is carried by the video component.

- **Status:** Used to select video component broadcasting state.

- **Off Air:** Component broadcasting is postponed but the component is present in the service configuration.

- **On Air:** The component is On Air.

- **Level:** The detail of the Level is not indicated as it depends on the **ES rate** allocated. To see which level is used, refer to the tables in the section [AVC Profiles and Levels](#).

AVC HD video Advanced AVC tab

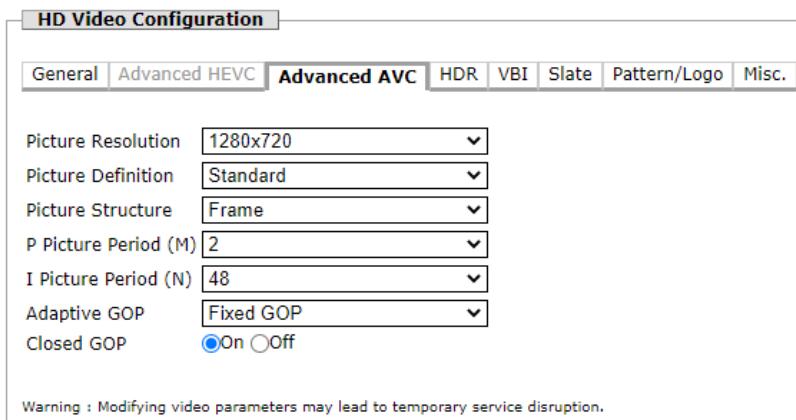


Figure 4-113: AVC HD video component - Advanced parameters

- Picture Resolution:** Used to adjust picture resolution according to the desired video bitrate. 1920x1080, additional 1280x720 and sub resolutions 1440x1080, 960x720 are available in alpha mode.
- Picture Definition:** Used to set the definition of the picture. Two choices, Standard and Sharp.
- Picture Structure:** Structure of the picture at encoder input. In this release, only Field structure is available.
- P Picture Period (M):** only available when **Long and Standard** delays have been selected. Choice between: 2 and 3. The value must be a sub-multiple of the **I Picture Period (N)** below.
- I Picture Period (N):** only available when **Long and Standard** delays have been selected. Value between 8 and 64 by steps of 8. The value 50 is also available mainly for OTT packaging applications.
- Adaptive GOP:** Only available when **Long and Standard** delay has been selected.
 - Fixed GOP: In this mode, both P picture period and GOP size are set to the values **P picture period (M)** and **GOP size (N)** above.
 - Adaptive GOP (Full): In this mode, the effective **I picture period (N)** varies according to video content (i.e. spatio-temporal complexity and events such as scene changes or fades). The GOP (N) is a multiple of P period (M) which remains unchanged.
- Closed GOP:** Only available when **Long and Standard** delay has been selected. It is used to break temporal dependency between GOPs.



Attention:

- Closed GOP mode reduces encoding quality and should only be used when stream editing operations are expected.
- When Closed GOP is used, the last P period is reduced by one picture so as to preserve the size of the GOP (N).

Specific case when the **Compression delay** is set to **Short**:

- GOP Structure** instead of **P Picture period (M)**
- no **I Picture Period (N)**, **Adaptive GOP** or **Closed GOP**

HD Video Configuration

General	Advanced HEVC	Advanced AVC	HDR	VBI	Slate	Pattern/Logo	Misc.	
Picture Resolution	1280x720							
Picture Definition	Sharp							
Picture Structure	Frame							
GOP structure	I-only I-only IPPP P Intra refresh (GDR)							
Warning : Modifying video parameters may cause service disruption.								
		submit	reset					

Descriptors

There is no descriptor for this element

[Add PMT descriptor](#)

 **NOTE:**

- For any type of video component, **HD/UHD** and **AVC/HEVC**, the maximum video bitrate per encoding is limited to **300 Mbps**.
- The maximal total video bitrate per board is limited to **600 Mbps**.

AVC HD video HDR (High Dynamic Range) tab

to set the VUI (Video Usability Info) parameters.

- HDR - WCG** (Wide Color Gamut): 2 **SDR** (Simple Dynamic Range) and 2 **HDR** (High Dynamic Range) choices are available with fixed values, details on the table below.

	VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
SDR - BT 709	color_primaries=1 transfer_characteristics=1 matrix_coeffs=1	No	No	No
SDR - BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No	No
PQ10 (HDR10) BT 2020	color_primaries=9 transfer_characteristics=16 matrix_coeffs=9	Yes	Yes	No

VUI Parameters	SEI 137 “Mastering color volume info”	SEI 144 “alternative transfer characteristics”	SEI “alternative transfer characteristics”
HLG10 BT 2020	color_primaries=9 transfer_characteristics=14 matrix_coeffs=9	No	No
FOLLOW INPUT	Automatic dynamic HDR signalization and Metadata insertion “in band (VUI+SEI)” in the compressed TS AVC or HEVC stream. Follow input data extracted from ST-352:2013 information. This insertion shall be triggered and fed by embedded signaling and Metadata carried over the SDI stream.		

SEI message "Mastering_color_volume_info" indicates the color space of the display used for mastering.

SEI message "content_light_level_info" indicates upper bounds for the nominal target brightness light level of the pictures.

SEI message "alternative_transfer_characteristics" indicates the preferred transfer characteristics to be used by the decoder.

When **SDR** (either **BT 709** or **BT 2020**) is selected, no other parameter appears in this page:

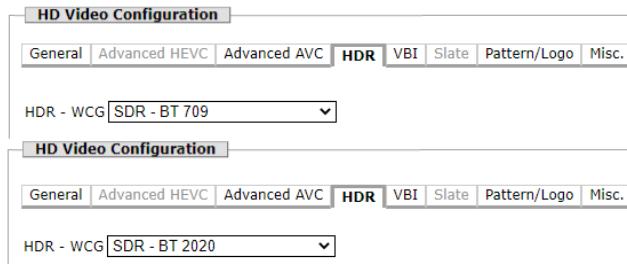


Figure 4-114: Dynamic Range - SDR (BT 709 or BT 2020)

When **HLG10** is selected, and if **SEI 147** is set to **Yes 147**, then default value =18 (not configurable):

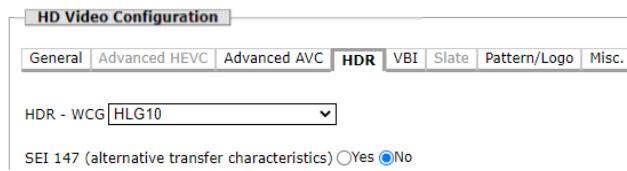


Figure 4-115: Dynamic Range - HLG10

When **PQ10 (HDR10)** is selected 4 choices are possible for the **Color Space** but the values cannot be edited:

The screenshot shows the 'HD Video Configuration' interface with the 'HDR' tab selected. It includes fields for 'Color Space' (set to BT2020), 'SEI 137 (mastering colour volume info)' (radio button set to 'Yes'), and a table for 'Display primaries' and 'White point'. Below this is a section for 'SEI 144 (content light level info)' with fields for 'Max content light level' and 'Max frame average light level'.

	R	G	B	(0.00000 to 1.00000)
Display primaries x	0.708	0.17	0.131	(0.00000 to 1.00000)
Display primaries y	0.292	0.797	0.046	(0.00000 to 1.00000)
White point x	0.3127	(0.00000 to 1.00000)		
White point y	0.329	(0.00000 to 1.00000)		
Max display mastering luminance	1200	(0 to 10000 cd/m²)		
Min display mastering luminance	0	(0 to 10000 cd/m²)		

Figure 4-116: Dynamic Range - PQ10 (HDR10)

- **Color Space:**

- BT2020: the values are predetermined and fixed.
- DCI-P3 D65: the values are predetermined and fixed.
- DCI-P3 THEATER: the values are predetermined and fixed.
- CUSTOM: all the values can be change with the following limitation:

Display primaries x, Display primaries y, White point x, White point y must be set in increments of 0.00002 according to the CIE 1931 definition of x and y as specified in ISO 11664-1.

When **Follow Input** is selected, other parameters fields are disabled and hidden.

The screenshot shows the 'HD Video Configuration' interface with the 'HDR' tab selected. The 'Color Space' dropdown is set to 'FOLLOW INPUT'. The rest of the interface is mostly disabled or hidden.

Figure 4-117: HDR - Follow Input

In case of missing HDR Signalization in the incoming SDI, an alarm is raised:

- [ENC#/VBI4]: No embedded signal [cause = "No HDR Signaling"]

In case of inconsistency HDR Signalization in the incoming SDI, the latest valid HDR Signaling received is maintained as long as a valid one is restored on the SDI.

NOTE:

- If **Video Rescaling** is enabled, the HDR Follow Input mode is not allowed as CP9000 doesn't support SDR to HDR conversion.
- If **ProMedia IP 2110** input mode is selected, the HDR Follow Input mode is not allowed.

AVC HD Video VBI tab

To set the **Closed Caption** and **AFD**

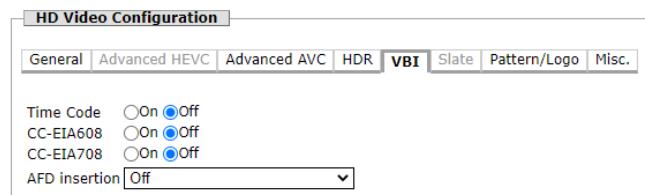


Figure 4-118: AVC HD video component - VBI tab

- **Time Code:** If set to ON, the Time Code information is sent in the MPEG video component. After extraction from the digital field blanking or from the video component, the Time Code is inserted in the Video component as "*Picture Timing*" SEI message NAL Unit in H264 or the "*Time code*" SEI message NAL unit in H265.
- **CC-EIA608:** If set to ON, the **Closed Caption** information (line 21) and the extended data service information (line 284) carried in an Ancillary Data packet (SMPTE 334-1) are extracted from the **HD** video blanking and are inserted in the Video component in the "*SEI message NAL Unit*" in H264/H265.
- **CC-EIA708:** If set to ON, the **Closed Caption** information extracted from the **HD** digital video field blanking is sent in the "*SEI NAL Unit*" in H264 or H265.
- **AFD insertion:** This parameter determines whether the AFD value should be sent (Follow input) or not sent (Off).

Restriction: CC-EIA608 and CC-EIA708 are mutually exclusive.

AVC HD video Slate tab

To insert a slate picture instead of the video, select a slate, if at least one slate, conforming to the geometry of the video, is already loaded on CP9000.



Figure 4-119: AVC HD video component - Slate tab

- **Name:** From the drop down menu select the appropriate slate already loaded.
- **Slate Mute audio:** When a Slate is selected then audio components generated from PCM input, Dolby E input , precompressed input with transcoding operation or transparent PCM input are muted (silence is generated).

The mute of Audio components from precompressed Transport (No transcoding) is not guaranteed and an alarm indicating an error "No expected standard in signal" can be raised.

NOTE: Transparent Audio components containing a Non-PCM content (Dolby E, precompressed...) : audio Data are also muted. These components may not be detected as an encoded silence by backend equipment.

It is possible to remove them from the PMT and to stop their generation by setting **Audio Output Status** to Off Air.

AVC HD video Pattern/Logo tab

Use to insert a moving pattern or a logo in the video.

The screenshot shows the 'HD Video Configuration' interface with the 'Pattern/Logo' tab selected. There are three input fields: 'Name' containing 'stop_icon.png', 'Position (H)' containing '1', and 'Position (V)' containing '1'. Below these fields are two buttons: 'submit' and 'reset'.

Figure 4-120: AVC HD video component - Patter/Logo tab

- **Name:** From the drop down menu select Moving Pattern or any logo already loaded.
 - Moving Pattern: Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - To load a logo, refer to section [Logos Insertion](#).
- **Position (H) and Position (V):** define the horizontal and vertical position of the logo in the video. position H,V (1,1) = top corner left.

AVC HD video Miscellaneous parameters

To set the other video component parameters.

The screenshot shows the 'HD Video Configuration' interface with the 'Misc.' tab selected. There are three dropdown menus: 'Priority' set to 'High', 'Copyright' set to 'With', and 'Content' set to 'Original'. Below these dropdowns are two buttons: 'submit' and 'reset'.

Figure 4-121: AVC HD video component - Misc. tab

- **Priority:** Used to set Normal or High priority by positioning a flag in the PES packet header.
- **Copyright:** Used to indicate whether the video content is With or Without a Copyright by positioning a flag in the PES packet header.
- **Content:** Used to indicate whether the video content is a Copy or an Original by positioning a flag in the PES packet header.

Confirm all the changes by clicking **submit**.

Adding/Editing an AVC SD video component

Click **add component** to select the shortcut menu and click **Add AVC Video SD** or click the video component.



Figure 4-122: Add AVC SD video component

AVC SD video General tab

SD Video Configuration						
	General	Advanced AVC	VBI	Pattern/Logo	Slate	Misc.
Source	SDI Input 1					
SDI standard	1x270Mb/s SDI Level C					
No Source Mode	Blue Screen					
Pattern/Logo Mode	On					
Standard In	576i					
Standard Out	576i					
Frame Rate	25 fps					
Format	4/3 Format					
Profile	AVC 4:2:2 10 bits (Hi422P)					
Compression Delay	Standard					
ES Rate	5000	(500 to 40000 kbit/s)				
PID	512	(32 to 8190)				
PCR	<input checked="" type="radio"/> On <input type="radio"/> Off					
Status	On Air					

Warning : Modifying video parameters may lead to temporary service disruption.

Figure 4-123: AVC SD video component - General parameters

- **Source:** editable only if at least one slate file is loaded on the CP9000, that corresponds to the video geometry and selected in the Slate tab. Choice between SDI input and Slate.
- **SDI Standard:** not editable, but changes according to the Standard used:
 - *1x1.5G-SDI* if 1080i is selected.
 - *1x270Mb/s SDI level C* if 480i is selected
- **No Source Mode:** Used to select the mode if the video signal is not present at encoder input.

- Blue screen / Black screen / Last picture: In case of video input loss or format mismatch event, the encoder automatically replaces, in robust mode (means PCR accuracy may be altered), the incoming content by the selected pattern. To select the Robust mode pattern, refer to section [Device Configuration](#).
 - Null video bit rate on TS: The video component bitrate is null (if the PCR is carried by the video component there is no longer any PCR broadcast for this service).
 - Null bit rate on TS: The TS bitrate is null.
-  **CAUTION:** If the service is part of an MPTS then the complete MPTS output bitrate is null. All the services within the MPTS are impacted.
- Disable IP output interfaces: The IP output interfaces are disabled electrically.
-  **CAUTION:** All the Ethernet interfaces are disabled. All the services on the chassis are impacted.
- **Pattern/Logo Mode:** Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - **Off:** Not used
 - **On:** The moving pattern is overlaid to the current picture.
 - **No source mode:** The moving pattern is only inserted when the input signal is lost and overlaid to the picture selected in the No Source Mode parameter
 - **Standard In:**
 - **1080i:** downscale from HD to SD.
 - **480i** in 29.97 fps or **576i** in 25 fps.
 - **Standard Out:** Not editable. Used to indicate the video standard at encoder output: **480i** or **576i**
 - **Frame Rate:** **25** or **29.97**. This parameter concerns input and output formats, the frame rate is not convertible.
 - **Format:** Select the aspect ratio used by default, **4/3 Format** or **16/9 Format**. When AFD data is available in SDI input, use the **Automatic AFD** mode (4/3 or 16/9) to provide it at the output.
 - **Profile:** Used to select the video encoding profile. AVC 4:2:0 8 bits (MP) or AVC 4:2:0 8 bits (HiP) or AVC 4:2:0 10 bits or AVC 4:2:2 8 bits or AVC 4:2:2 10 bits.
 - **Compression Delay:** Used to set the encoding delay. Long or Standard or Short.
 - **ES Rate:** ES Rate can be set according to **Profile** and **Level**. See [SD Encoding](#).
 - **PID:** Used to identify the TS packets transporting the video component. The value must be between 32 and 8190.
 - **PCR:** Used to insert the Program Clock Reference of the service in the TS packets transporting the video component.
 - **Off:** The **PCR** is not carried by the video component. This value can be selected if a PCR component has been added to the Service and if the PID of the PCR component is indicated as **PID PCR** value in the Service Configuration page.
 - **On:** The **PCR** is carried by the video component.
 - **Status:** Used to select video component broadcasting state.
 - **Off Air:** Component broadcasting is postponed but the component is present in the service configuration.
 - **On Air:** The component is On Air.

 **NOTE:**

- The VUI data (aspect ratio) are statics and depend on the encoder configuration.
- The SEI data are dynamics and contain the active video format presents in the VANC if Automatic AFD is selected.

Format	VUI (NAL/SPS)	SEI (NAL/SEI)
4/3	(12:11) for 720x576 (10:11) for 720x480	0 = no AFD_data insertion
4/3 auto		1 = AFD_data insertion (if any)
16/9	(16:11) for 720x576 (40:33) for 720x480	0 = no AFD_data insertion
16/9 auto		1 = AFD_data insertion (if any)

AVC SD video Advanced AVC tab

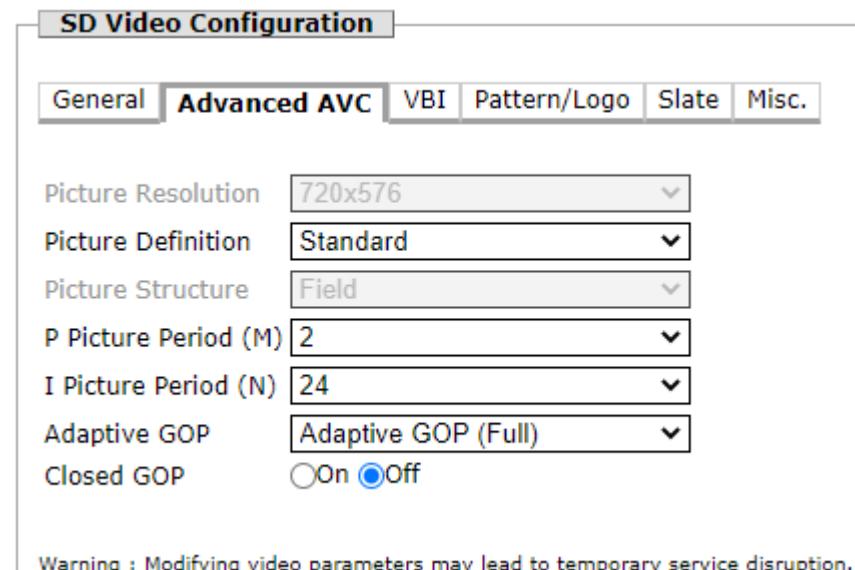


Figure 4-124: AVC SD video component - Advanced AVC parameters

- **Picture Resolution** is not editable.
- **Picture Definition:** Used to set the definition of the picture. Two choices, Standard and Sharp.
- **Picture Structure** is not editable.
- **P Picture Period (M):** only available when **Long and Standard** delays have been selected. Choice between: 2 and 3. The value must be a sub-multiple of the **I Picture Period (N)** below.
- **I Picture Period (N):** only available when **Long and Standard** delays have been selected. Value between 8 and 64 by steps of 8. The value 50 is also available mainly for OTT packaging applications.
- **Adaptive GOP:** Only available when **Long and Standard** delay has been selected.

- Fixed GOP: In this mode, both P picture period and GOP size are set to the values **P picture period (M)** and **GOP size (N)** above.
- Adaptive GOP (Full): In this mode, the effective **I picture period (N)** varies according to video content (i.e. spatio-temporal complexity and events such as scene changes or fades). The GOP (N) is a multiple of P period (M) which remains unchanged.
- **Closed GOP:** Only available when **Long and Standard** delay has been selected. It is used to break temporal dependency between GOPs.



Attention:

- Closed GOP mode reduces encoding quality and should only be used when stream editing operations are expected.
- When Closed GOP is used, the last P period is reduced by one picture so as to preserve the size of the GOP (N).

AVC SD video VBI tab

To set the **Closed Caption** and **AFD**

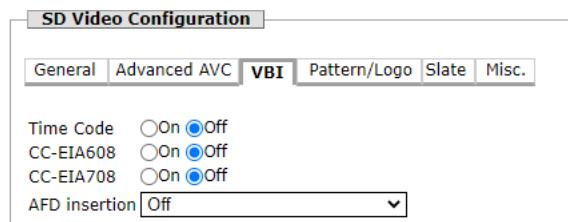


Figure 4-125: AVC SD video component - VBI tab

- **Time Code:** If set to **ON**, the Time Code information is sent in the MPEG video component. After extraction from the digital field blanking or from the video component, the Time Code is inserted in the Video component as "*Picture Timing*" SEI message NAL Unit in H264 or the "*Time code*" SEI message NAL unit in H265.
- **CC-EIA608:** If set to **ON**, the **Closed Caption** information (line 21) and the extended data service information (line 284) carried in an Ancillary Data packet (SMPTE 334-1) are extracted from the **HD** video blanking and are inserted in the Video component in the "*SEI message NAL Unit*" in H264/H265. Closed caption Line 21 digitized waveform are not supported.
- **CC-EIA708:** If set to **ON**, the **Closed Caption** information extracted from the **HD** digital video field blanking is sent in the "*SEI NAL Unit*" in H264 or H265.
- 🚫 **Restriction:** Extraction of analog digitized Closed Caption waveform information (line 21 in waveform) is not supported.
- 🚫 **Restriction:** CC-EIA608 and CC-EIA708 are mutually exclusive.

AVC SD video Slate tab

To insert a slate picture instead of the video, select a slate, if at least one slate, conforming to the geometry of the video, is already loaded on CP9000.

The screenshot shows the 'SD Video Configuration' interface with the 'Slate' tab selected. There is a dropdown menu labeled 'Name' containing 'Slate #1 - City_night_3840x21'. Below the dropdown are two buttons: 'submit' and 'reset'.

Figure 4-126: AVC SD video component - Slate tab

- **Name:** From the drop down menu select the appropriate slate already loaded.
- **Slate Mute audio:** When a Slate is selected then audio components generated from PCM input, Dolby E input , precompressed input with transcoding operation or transparent PCM input are muted (silence is generated).

The mute of Audio components from precompressed Transport (No transcoding) is not guaranteed and an alarm indicating an error "No expected standard in signal" can be raised.



NOTE: Transparent Audio components containing a Non-PCM content (Dolby E, precompressed...) : audio Data are also muted. These components may not be detected as an encoded silence by backend equipment.

It is possible to remove them from the PMT and to stop their generation by setting **Audio Output Status** to Off Air .

AVC SD video Pattern/Logo tab

Use to insert a moving pattern or a logo in the video.

The screenshot shows the 'SD Video Configuration' interface with the 'Pattern/Logo' tab selected. It includes fields for 'Name' (set to 'stop_icon.png'), 'Position (H)' (set to '1'), and 'Position (V)' (set to '1'). Below these fields are two buttons: 'submit' and 'reset'.

Figure 4-127: AVC SD video component - Patter/Logo tab

- **Name:** From the drop down menu select Moving Pattern or any logo already loaded.
 - Moving Pattern: Insert a color square moving pattern to distinguish one channel from another. The pattern for the 1st channel is green, 2nd is yellow, 3rd is blue and the 4th is red.
 - To load a logo, refer to section [Logos Insertion](#).
- **Position (H) and Position (V):** define the horizontal and vertical position of the logo in the video. position H,V (1,1) = top corner left.

AVC SD video Miscellaneous parameters

To set the other video component parameters.

The screenshot shows a web-based configuration interface for an SD Video component. At the top, there is a navigation bar with tabs: General, Advanced AVC, VBI, Pattern/Logo, Slate, and Misc. The 'Misc.' tab is currently selected. Below the tabs, there are three dropdown menus: 'Priority' set to 'High', 'Copyright' set to 'With', and 'Content' set to 'Original'. At the bottom of the form are two buttons: 'submit' and 'reset'.

Figure 4-128: AVC SD video component - Misc. tab

- **Priority:** Used to set Normal or High priority by positioning a flag in the PES packet header.
- **Copyright:** Used to indicate whether the video content is With or Without a Copyright by positioning a flag in the PES packet header.
- **Content:** Used to indicate whether the video content is a **Copy** or an **Original** by positioning a flag in the PES packet header.

Confirm all the changes by clicking **submit**.

Adding/Editing an Audio component

A video component must be present in the service.

Restriction: Depending on the video compression delay, some audio formats are not compatible as audio encoding delay might be longer than the end to end video processing time.

The supported Audio format set depending on the video format and encoding delay is available in [Audio Restrictions vs Video Compression Delay](#)

Click **add component** to select the shortcut menu and click **Add Audio** or click the **audio component**.

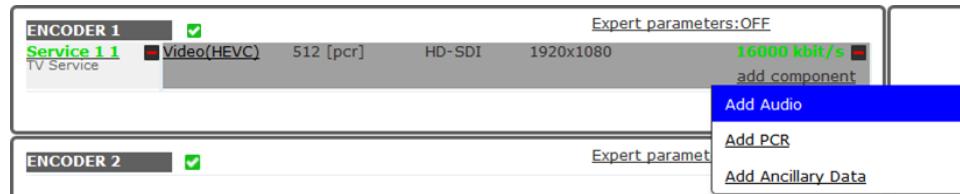


Figure 4-129: Add Audio component

If the maximum number of audio components has already been reached, **Add Audio** will not be displayed anymore.

The Audio component General tab will be displayed. The Input group box of the General tab depends on the audio Input Format (**Dolby E**, **Audio PCM**, **Precompressed** or **Transparent**).

Audio Dolby E Input Format

In the Input group box, select the **Input Format: Dolby E**

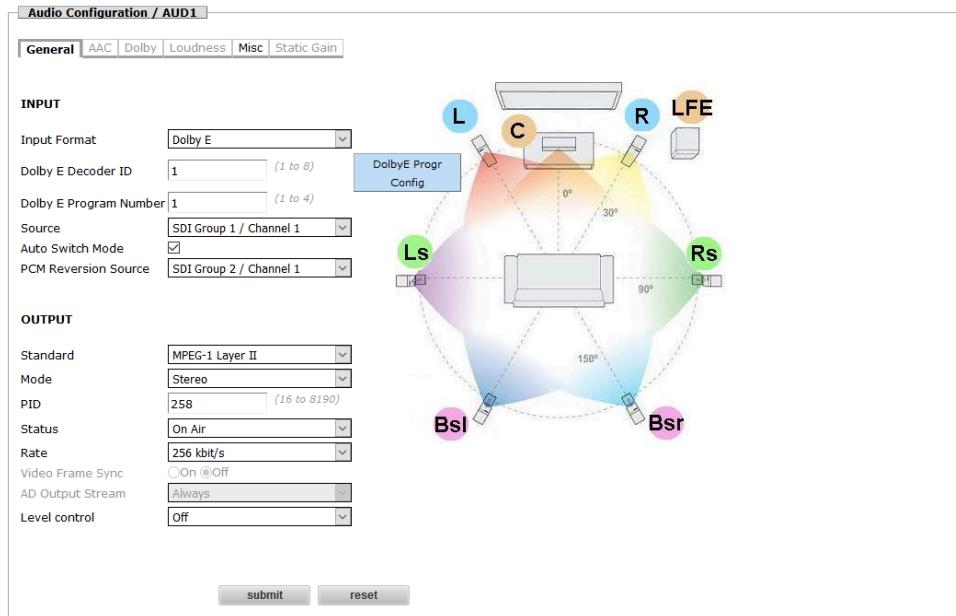


Figure 4-130: Audio component - Dolby E input

- Dolby E Decoder ID:** Used to indicate the Dolby# E decoder which must be used.
- Dolby E Program Number:** Used to select the program to be decoded in the Dolby® E stream. Choices from 1 to 4. #

Program selection is facilitated by the Monitoring function. Click on the **DolbyE Progr Config** button to display the monitoring window:

		Program Number			
		1	2	3	4
Program Config	0	5.1	2.0		
	1	5.1	1.0	1.0	
	6	2.0	2.0	2.0	2.0
	7	2.0	2.0	2.0	1.0
	9	2.0	1.0	1.0	1.0
	10-17-21	1.0	1.0	1.0	1.0
	11	5.1			
	14	2.0	2.0	2.0	
	15	2.0	2.0	1.0	1.0
	16	2.0	1.0	1.0	1.0
	19	2.0	2.0		
	20	2.0	1.0	1.0	

Current Program Config: 0

Figure 4-131: Audio component - General tab - Dolby E Progr Config monitoring

The incoming Dolby# E stream program configuration is displayed. The configuration related to the **Program Number** is used to set the program type.

For example, if **Current Program Config = 0** then **Program Number 1** will decode a 5.1-type stream (6 mono channels) and **Program Number 2** will decode a stereo-type stream (2 mono channels). Program Number 3 and 4 are unusable.

- **Source:** Used to select the Source of the Dolby# E stream to be decoded. Choice between SDI Group 1 / Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1 / Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).
- **Auto Switch Mode:** Dolby# E to PCM auto switch mode configuration.

- **Dolby# E 5.1 to PCM 2.0 detection**

When **Auto Switch Mode** is **ON**: If Dolby® E 5.1 disappears the audio encoder switches to the source defined by the **PCM Reversion Source** parameter below with a default bitrate. The encoder signals a stereo stream (rather than a surround stream).

The default bitrate cannot be set by the User and is indicated in the table below:

Output Standard	Dolby# E 5.1 detected (User Bitrate)	PCM 2.0 detected (Fixed Bitrate)
Dolby# Digital (AC3)	384 kbit/s	192 kbit/s
	384 kbit/s	384 kbit/s
	448 kbit/s	256 kbit/s
Dolby# Digital Plus (E-AC3)	192 kbit/s	96 kbit/s
	256 kbit/s	128 kbit/s
AAC-LC	256 kbit/s	96 kbit/s
	320 kbit/s	128 kbit/s
HE-AAC	128 kbit/s	48 kbit/s
	160 kbit/s	64 kbit/s
	192 kbit/s	96 kbit/s
	256 kbit/s	128 kbit/s

In down-mixed or (Dolby 5.1® and MPEG-1 Layer II) mode the MPEG-1 Layer II encoder encodes the PCM 2.0 source instead of the Dolby# E 5.1 source. The bitrate is unchanged.

When **Auto Switch Mode** is **OFF**: If Dolby® E 5.1 disappears, the last valid Dolby® E frame will be repeated 3 times and if it is still not resynchronized, the encoder will be muted (encoding of silence at the same bitrate).

In down-mixed or (Dolby 5.1® and MPEG-1 Layer II) mode the MPEG-1 Layer II encoder will be muted. The bitrate is unchanged.

- **Dolby# E 5.1 to Dolby# E 2.0 detection**

When **Auto Switch Mode** is **ON**: If the Dolby# E stream contains 2.0 instead of 5.1, the encoder switches to the default bitrate.

The default bitrates cannot be set by the User and are indicated in the table below:

Output Standard	Dolby# E 5.1 detected (User Bitrate)	Dolby# E 2.0 detected (Fixed Bitrate)
Dolby# Digital (AC3)	384 kbit/s	192 kbit/s
	448 kbit/s	256 kbit/s

Output Standard	Dolby# E 5.1 detected (User Bitrate)	Dolby# E 2.0 detected (Fixed Bitrate)
Dolby# Digital Plus (E-AC3)	192 kbit/s	96 kbit/s
	256 kbit/s	128 kbit/s
AAC-LC	256 kbit/s	96 kbit/s
	320 kbit/s	128 kbit/s
HE-AAC	160 kbit/s	64 kbit/s
	192 kbit/s	96 kbit/s
	256 kbit/s	128 kbit/s

In down-mixed or (Dolby 5.1# and MPEG-1 Layer II) mode the MPEG-1 Layer II encoder encodes the Dolby# E 2.0 source instead of the Dolby# E 5.1 source. The bitrate is unchanged.

When **Auto Switch Mode** is OFF: If the Dolby# E stream contains 2.0 instead of 5.1, a 5.1 signal is still encoded with front left and right using the Dolby# E 2.0 input, and the other channels are silenced.

In down-mixed or (Dolby 5.1# and MPEG-1 Layer II) mode the MPEG-1 Layer II encoder is muted. The bitrate is unchanged.

- **PCM Reversion Source:** If **Auto Switch Mode** is ON, choice of the PCM source when PCM 2.0 is detected instead of Dolby# E. Choice between SDI Group 1/ Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1/ Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).
- 🚫 **Restriction:** The Input Format **Dolby E** is not available when the video compression delay is set to **short**. The time to transcode the audio is longer than the end to end video processing.

Audio PCM Input Format

In the Input group box, select the **Input Format: PCM**

Figure 4-132: Audio component - PCM input

- Source L/R:** Used to select the source of the L/R signal (or mono signal). Choice between SDI Group 1 / Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1 / Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).
- Source C/LFE:** Used to select the source of the C/LFE signal when **5.0** or **5.1** mode is selected. Choice between SDI Group 1 / Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1 / Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).
- Source Ls/Rs:** Used to select the source of the Ls/Rs signal when **5.0** or **5.1** mode is selected. Choice between SDI Group 1 / Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1 / Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).
- Source Bsl/Bsr:** Not used in this release.
- Auto Switch Mode:** Not used in this release.
- PCM Reversion Source:** Not used in this release.

NOTE: When Input Format **PCM** is selected, the following:

- compression standard modes are not available when the video compression delay is set to **short**: AAC-HE, AAC-HE(AD) and AAC-HE(v2).
- sources Sine Tone and Setup Tone can be used to replace incoming PCM audio data to be encoded in any available output format.

Audio Precompressed Input Format

In the Input group box, select the **Input Format:** Precompressed

Audio Configuration / AUD1

- General** AAC Dolby Loudness Misc Static Gain

INPUT

Input Format: 2110-3x Precompressed

Source: Audio 1 / Pair 1

OUTPUT

Standard: AC-3 Transport

Mode: Dual Channel

PID: 266 (32 to 8190)

Status: On Air

Rate: 192 kbit/s

Video Frame Sync: On @Off

AD Output Stream: Always

Level control: Off

Figure 4-133: Audio component - Precompressed input

- **Source:** Used to select the source of the Precompressed audio signal. Choice between SDI Group 1 / Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1 / Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).

Audio Transparent Input Format

In the Input group box, select the **Input Format:** Transparent

Audio Configuration / AUD1

General AAC Dolby Loudness Misc Static Gain

INPUT

Input Format: 2110-31 Transparent
Source: Audio 1 / Pair 1

OUTPUT

Standard: SMPTE 302M Transport
Mode: Dual Channel
PID: 258 (32 to 8190)
Status: On Air
Rate: Transparent 20 bits
Video Frame Sync: On
AD Output Stream: Always
Level control: Off

submit reset

Figure 4-134: Audio component - Transparent input

- **Source:** Used to select the source of the Transparent audio signal. Choice between SDI Group 1 / Channel 1, 2/1, 3/1, 4/1 (group choice for Mux 1) and SDI Group 1 / Channel 2, 2/2, 3/2, 4/2 (group choice for Mux 2).

Audio Output Format

Some Audio output parameters depend on the Audio input signal.

OUTPUT

Standard: Dolby Digital (AC-3)
Mode: 2/0 (Stereo)
PID: 258 (32 to 8190)
Status: On Air
Rate: 192 kbit/s
Video Frame Sync: On
AD Output Stream: Always
Level control: Off

Figure 4-135: Audio component - Output parameters

In the Output group box:

Standard

Used to select the compression standard:

- **MPEG-1 Layer II:** This standard is not available if the **Input Format** is Precompressed or Dolby E with **Dolby E Program Number** other than 1 or 2.
- **MPEG-1 Layer II (AD):** The Audio Description feature is enabled and the audio description is encoded in MPEG-1 Layer II. This standard is not available if the **Input Format** is Dolby E or Precompressed.
- **AAC LC or HE-AAC or HE-AAC v2:** The SBR signaling, syntax and packet type are set on the AAC page.
- **HE-AAC (AD):** The Audio Description feature is enabled and the audio description is encoded in HE-AAC. The SBR signaling, syntax and packet type are set on the AAC page. This standard is not available if the **Input Format** is Dolby E or Precompressed.
- **Dolby Digital (AC-3):** AC3 encoding parameters are set on the Dolby page. This standard is not available if the **Input Format** is Precompressed.
- **Dolby Digital Plus (E-AC-3):** E-AC3 encoding parameters are set on the Dolby page. This standard is not available if the **Input Format** is Precompressed.
- **AC-3 Transport or E-AC-3 Transport:** This standard (Dolby# AC3 packetization) is used to send audio samples synchronous with the video. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **AC-4 Transport:** This standard (Dolby# AC4 packetization) is used to send audio samples synchronous with the video. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **HE-AAC Transport:** This standard is used to send HE-AAC precompressed audio samples synchronous with the video. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **AC-3 to E-AC-3 Transcoding:** This standard is used to transcode a Dolby® Digital (AC-3) stream to a Dolby® Digital Plus (E-AC-3) stream. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **AC-3 to AC-3 Transcoding:** This standard is used to transcode a Dolby® Digital (AC-3) stream to a Dolby® Digital (AC-3) stream. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **E-AC-3 to AC-3 Transcoding:** This standard is used to transcode a Dolby® Digital Plus (E-AC-3) stream to a Dolby® Digital (AC-3) stream. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **AC-3 to MPEG-1 Layer II Transcoding:** This standard is used to transcode a Dolby® Digital (AC-3) stream to a MPEG-1 Layer II stream. This standard can only be chosen if the **Input Format** above is set to Precompressed.
- **E-AC-3 to MPEG-1 Layer II Transcoding:** This standard is used to transcode a Dolby® Digital Plus (E-AC-3) stream to a MPEG-1 Layer II stream. This standard can only be chosen if the **Input Format** above is set to Precompressed
- **SMPTE 302M Transport:** This standard is used only when the **Input Format** above is set to Transparent.

Mode

Used to select the encoding mode. The modes available depend on the encoding standard and Input Format.

- **Input Format= PCM or Dolby E**
 - In **MPEG1 layer II** - Choice between: Stereo, Joint Stereo, Mono Left, Mono Right and Dual channel.
 - In **AAC LC or HE-AAC** - Choice between: Stereo, Joint Stereo, Mono Left, Mono Right and 5.1 Surround.
 - In **HE-AAC v2** - Only Stereo mode is available.
 - In **Dolby Digital (AC-3) or Dolby Digital Plus (E-AC3)** - Choice between: 1/0 (Mono Left), 2/0 (Stereo), 3/2 (5.0 Surround), 3/2L (5.1 Surround).
- **Input Format = Precompressed**
 - In **Transport** standard, only Dual Channel mode is available.
 - In **AC-3 to E-AC-3 Transcoding** standard, Follow Input mode cannot be modified. In this mode the output channel mode is identical to the input channel mode (i.e. 5.1 on input delivers 5.1 on output).
- **Input Format = Transparent**
 - In **SMPTE 302M Transport** standard, only Dual Channel mode is available.

PID

Used to indicate the PID value assigned to the audio component.

Status

Used to select the broadcast status for the audio component.

- **Off Air:** Component broadcasting is postponed but the component remains in the service configuration.
- **On Air:** The component is On Air.

Rate

Used to select audio bitrates. The bitrates available depend on the audio encoding standard and mode.

- Specific case 1 with:
 - **Input Format = Dolby E**
 - **Standard = Dolby Digital (AC3) or Dolby Digital Plus (E-AC3) or HE-AAC or AAC-LC**
 - **Mode = 5.1 or 5.0**
 - **Auto Switch Mode** is checked

Then 2 bitrate groups are proposed as shown in the figure below:

INPUT

Input Format	<input type="button" value="Dolby E"/>
Dolby E Decoder ID	<input type="text" value="1"/> (1 to 8)
Dolby E Program Number	<input type="text" value="1"/> (1 to 4)
Source	<input type="button" value="SDI Group 1 / Channel 1"/>
Auto Switch Mode	<input checked="" type="checkbox"/>
PCM Reversion Source	<input type="button" value="SDI Group 1 / Channel 1"/>

OUTPUT

Standard	<input type="button" value="Dolby Digital (AC-3)"/>
Mode	<input type="button" value="3/2L (5.1 Surround)"/>
PID	<input type="text" value="258"/> (16 to 8190)
Status	<input type="button" value="On Air"/>
Rate	<input type="button" value="384/192 kbit/s"/>
Video Frame Sync	<input type="radio"/> On <input checked="" type="radio"/> Off
AD Output Stream	<input type="button" value="Always"/>
Level control	<input type="button" value="Off"/>

Figure 4-136: Audio component - Output parameters - 2 bitrate groups

- Specific case 2 with:
 - **Input Format** = Transparent
 - **Standard** = AC-3 Transport or E-AC-3 Transport or HE AAC-Transport or AC-4 Transport
 - **Rate** = Transparent 16 / 20 / 24. These bits modes match with the maximum bitrate authorized.

Video Frame Sync

Can be used with **video format HD1080i_50/59.94** when **Audio Input Format** = Transparent, to align the audio content frame with the video frame. Useful for Dolby E Transparent.

AD Output Stream

In Audio Description encoding mode.

- Adaptive: No AD packet on output when no AD Metadata input.
- Full Adaptive: No AD packet on output when no AD Metadata input or when the audio track is silence.
- Always: AD packets on output even when no AD input (null packets are generated).

Level Control

Used to select the type of Level control.

- Off: No Level Control
- Static gain: The value of the gain is fixed. This value can be selected if the **Input Format** = Audio PCM. Refer to the section [Static Gain Audio parameters](#).
- Automatic Loudness Control: The value of the gain is variable to have a constant audio loudness. This value can be selected if:
 - **Input Format** = Audio PCM or Dolby E
 - **Input Format** = Precompressed and **Standard** = AC-3 to E-AC-3 Transcoding
 For details, refer to section [Automatic Loudness Control parameters](#).

AAC audio component parameters

Click on **AAC** tab to set audio component AAC parameters when AAC-LC or HE-AAC or HE-AAC (AD) or HE-AAC v2 has been chosen as the audio Output Standard on the General tab.

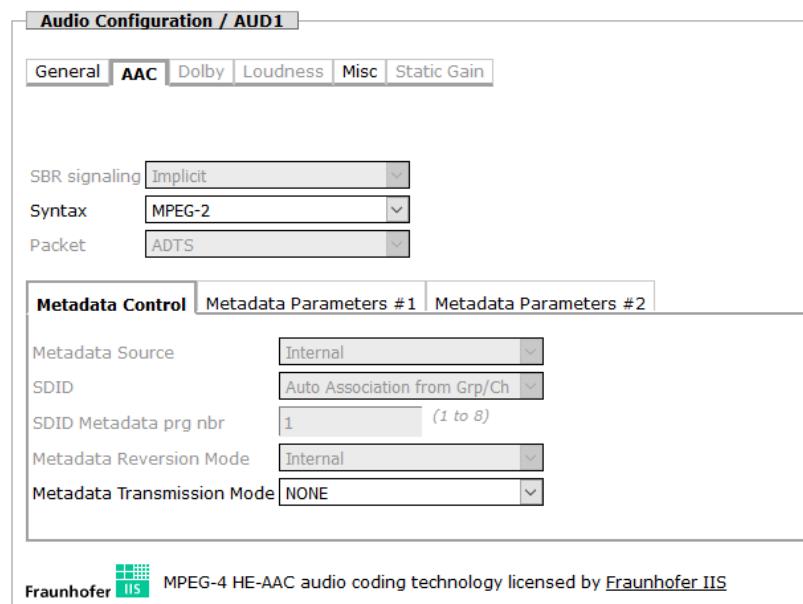


Figure 4-137: Audio component - AAC parameters

- **SBR Signaling:** Used to set the SBR signaling mode if **Packet** = LOAS. Choice between **Implicit** and **Explicit** NBC (NBC = Non Backward Compatible).
- **Syntax:** Used to set the syntax of AAC encoding. Choice between **MPEG-2** and **MPEG-4**.
- **Packet:** Used to set the type of AAC encapsulation. Choice between **ADTS** (Audio Data Transport Stream) and **LOAS** (Low Overhead Audio Stream) if **Syntax** = **MPEG-4**.

On Metadata Control sub-tab:

- **Metadata Source:** Used to set the Metadata source if **Metadata Transmission Mode** is set to DVB or MPEG and if the **Input Format** is set to Dolby E on the General tab.
 - **Internal:** Metadata is set via the **Metadata parameters # 1** and **Metadata parameters # 2** sub-tabs.
 - **Dolby E:** Metadata is extracted from the Dolby# E encoded stream.
- **SDID:** Not used in this release.

- **SDID Metadata prg nbr:** Not used in this release.
- **Metadata Reversion Mode:** Not used in this release.
- **Metadata Transmission Mode:** Used to set the Metadata Transmission Mode.
 - None: Metadata is not transmitted
 - DVB: Metadata is transmitted according to **ETSI TR 101 154**
 - MPEG: Metadata is transmitted according to **ISO MPEG 14496-3**

Metadata Parameters #1

Click on the **Metadata Parameters #1** sub-tab to display the 1st AAC Metadata configuration sub-tab.

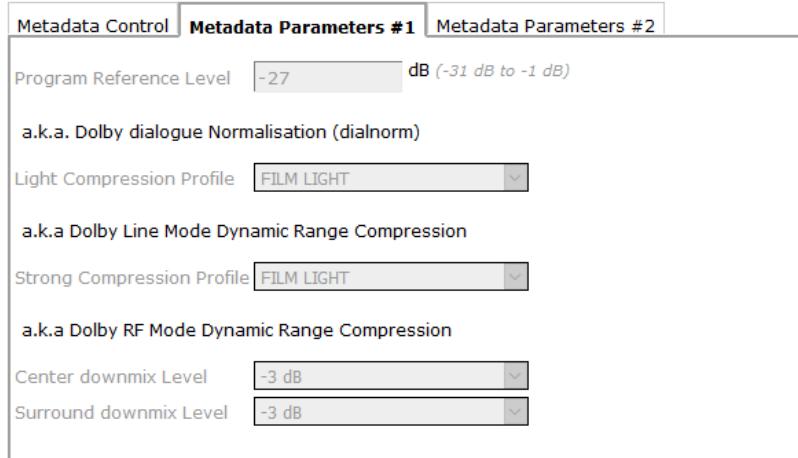


Figure 4-138: Audio component - AAC Metadata parameters #1 sub-tab

- **Program Reference Level:** Used to indicate the average dialog level of the audio program. Range from -1 dB to -31 dB in 1 dB steps. Default value: **-27 dB**.
- **Light Compression Profile:** This information is used by AAC audio decoders with line-level outputs, to adjust their output dynamic according to a profile. Choice between: None, Film standard, Film light, Music standard, Music light, Speech. Default value: **Film light**.
- **Strong Compression Profile:** This information is used by AAC audio decoders with an RF-remodulated output, to adjust their output dynamic according to a profile. Choice between: None, Film standard, Film light, Music standard, Music light, Speech. Default value: **Film light**.
- **Center downmix Level:** This parameter, enabled in 5.1 mode, is used to select the level shift applied to the Center channel when adding to the left and right outputs as a result of downmixing to an Lt/Rt output.
 - **Transmission mode = DVB:** 0.0 dB, -1.5dB, -3 dB, -4.5 dB, -6.0 dB, -7.5 dB, -9 dB, - infinite dB. Default value: **-3 dB**.
 - **Transmission mode = MPEG:** -3 dB, -6.0 dB, -9 dB, -infinite dB. Default value: **-3 dB**.
- **Surround downmix Level:** This parameter, enabled in 5.1 mode, is used to select the level shift applied to the Surround channels when downmixing to an Lt/Rt output.
 - **Transmission mode = DVB:** 0.0 dB, -1.5dB, -3 dB, -4.5 dB, -6.0 dB, -7.5 dB, -9 dB, - infinite dB. Default value: **-3 dB**.
 - **Transmission mode = MPEG:** -3 dB, -6.0 dB, -9 dB, -infinite dB. Default value: **-3 dB**.

Metadata Parameters #2

Click on the Metadata Parameters #2 sub-tab to display the 2nd AAC Metadata configuration sub-tab.

Metadata Control | Metadata Parameters #1 | **Metadata Parameters #2**

DC Filter

LFE Channel Filter

120 Hz low-pass filter is applied to LFE channel

Surround Phase Shift

90 degree phase shift is applied to surround channels

Surround 3 dB Attenuation

3 dB attenuation is applied to surround channels

Dolby Surround Mode

Figure 4-139: Audio component - AAC Metadata parameters #2 sub-tab

- **DC Filter:** Used to enable or disable the DC filter on the input audio samples. Default value: **On**.
- **LFE Channel Filter:** This parameter, enabled in 5.1 mode, is used to enable or disable a 120 Hz filter. The filter is applied to the LFE channel input of a Dolby® Digital encoder prior to encoding. It is ignored if the LFE channel is disabled. The filter removes frequencies above 120 Hz that would cause aliasing when decoded. This filter should only be switched off if the audio to be encoded is known not to have any signals above 120 Hz. Default value: **On**.
- **Surround Phase Shift:** This parameter, enabled in 5.1 mode, is used to enable or disable application of a 90-degree phase shift to the Surround channels. The AAC decoder can therefore easily create an Lt/Rt downmix. Default value: **On**.
- **Surround 3 dB Attenuation:** This parameter, enabled in 5.1 mode, is used to enable or disable a 3 dB attenuation before encoding the Surround channel(s). Default value: **Off**.
- **Dolby Surround Mode:** Used to indicate whether the stereo audio is Dolby# Surround encoded. Choice between: Not indicated, Yes and No. Default value: **Not indicated**.

Dolby audio component parameters

This page is used to set the Metadata source when **Dolby Digital (AC3)** or **Dolby Digital Plus (E-AC3)** has been chosen as the audio Output Standard on the General tab.

On Metadata Control sub-tab:

When the Input Format is set to Dolby E:

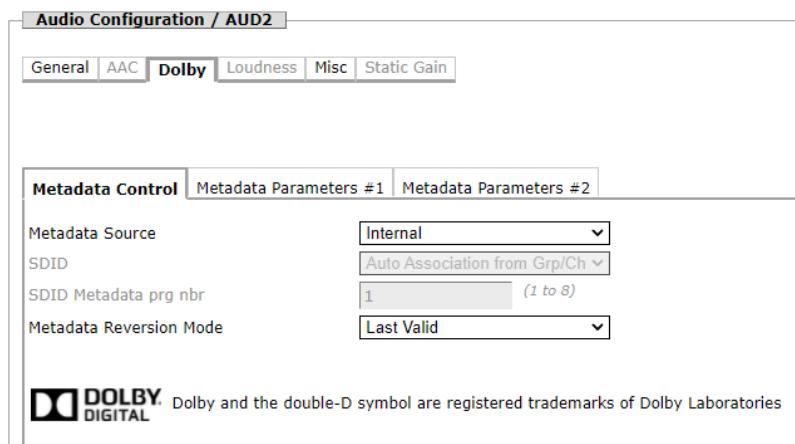


Figure 4-140: Audio component - Dolby tab - Metadata Control sub-tab - Dolby E input

- **Metadata Source**
 - **Internal:** Metadata is set via the **Metadata parameters # 1** and **Metadata parameters # 2** sub-tabs.
 - **Dolby E:** Metadata is extracted from the Dolby# E encoded stream.
- **SDID:** Not used in this release.
- **SDID Metadata prg nbr:** Not used in this release.
- **Metadata Reversion Mode:** Not used in this release.

When the Input Format is set to PCM:

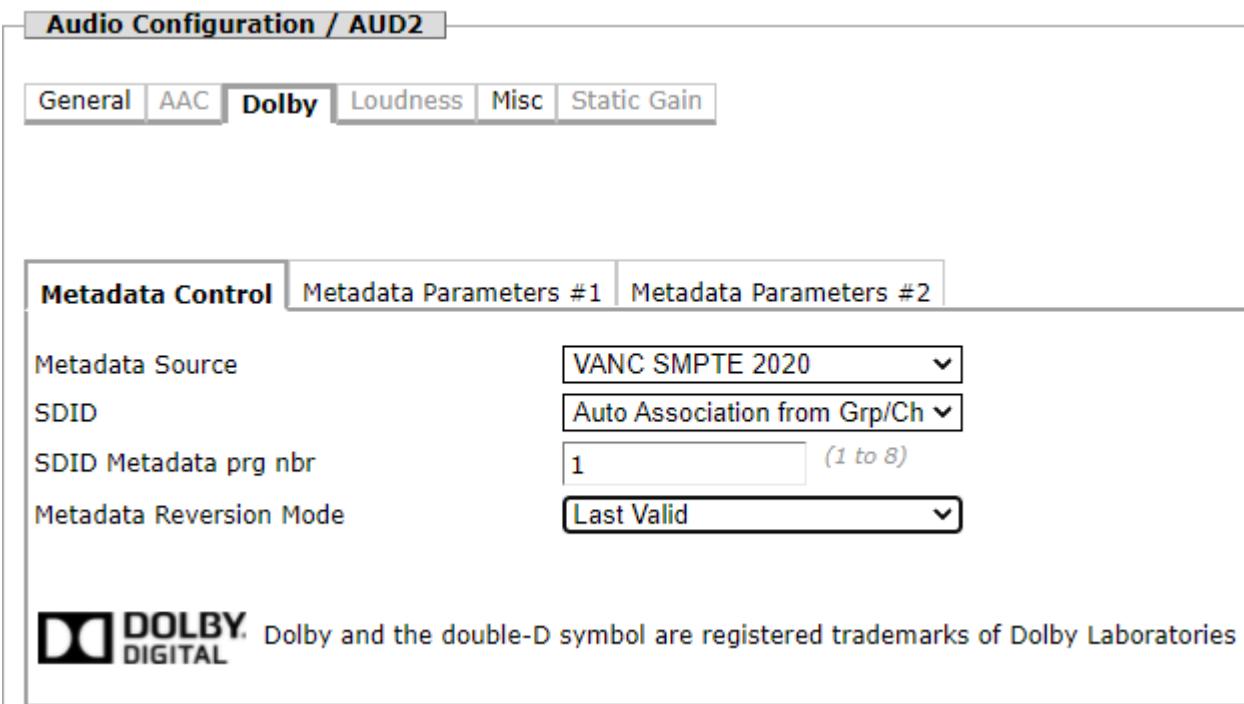
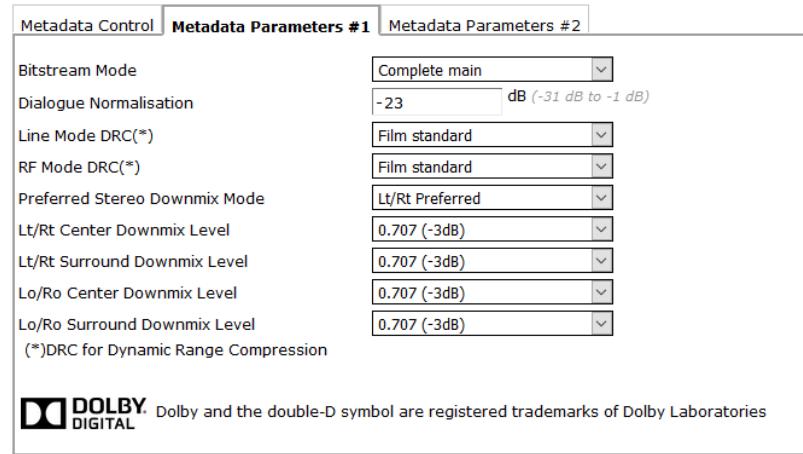


Figure 4-141: Audio component - Dolby tab - Metadata Control sub-tab - PCM input

- **Metadata Source**
 - **Internal:** Metadata is set via the **Metadata parameters # 1** and **Metadata parameters # 2** sub-tabs.
 - **ANC SMPTE 2020:** Metadata is extracted from the ancillary data.
 - **SDID:** Only used when VANC SMPTE 2020 is selected. Secondary Data Identifier used to indicate the type of ancillary data that the packet corresponds to.
 - **SDID Metadata prg nbr:** Only used when VANC SMPTE 2020 is selected.
 - **Metadata Reversion Mode:** Only used when Auto switch mode is selected on the General tab and VANC SMPTE 2020 is selected.
 - **Last valid:** the encoder uses the last valid metadata received.
 - **Internal:** the encoder uses the Metadata parameters # 1 and Metadata parameters # 2
-  **NOTE:** In case of AC3 5.0 or 5.1 encoding using Metadata from VANC SMPTE 2020, with PCM reversion mode, three bitrate groups are proposed instead of two with AC3+:
- 384/192 kbits/s
 - 384/384 kbits/s
 - 448/256 kbits/s

Metadata Parameters #1

Click on the **Metadata Parameters #1** sub-tab to display the 1st Dolby® Metadata configuration sub-tab.



Setting	Value
Bitstream Mode	Complete main
Dialogue Normalisation	-23 dB
Line Mode DRC(*)	Film standard
RF Mode DRC(*)	Film standard
Preferred Stereo Downmix Mode	Lt/Rt Preferred
Lt/Rt Center Downmix Level	0.707 (-3dB)
Lt/Rt Surround Downmix Level	0.707 (-3dB)
Lo/Ro Center Downmix Level	0.707 (-3dB)
Lo/Ro Surround Downmix Level	0.707 (-3dB)

(*)DRC for Dynamic Range Compression

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Figure 4-142: Audio component - Dolby - Metadata Parameters #1 sub-tab

- **Bitstream Mode:** Used to indicate the type of audio service.
 - Main audio service:Complete main
 - Main audio service:Music and effects
 - Associated service:Visually impaired
 - Associated service:Hearing impaired
 - Associated service:Dialogue
 - Associated service:Commentary
 - Associated service:Emergency
 - Associated service:Voiceover/Karaoke
- **Dialogue Normalization:** Used to indicate the average dialog level of the audio program. Range from -1 dB to -31 dB in 1 dB steps. Default value: **-23 dB**.

- **Line Mode DRC:** This information is used by Dolby® Digital audio decoders with line-level outputs, to adjust their output dynamic according to a profile. Choice between: None, Film standard, Film light, Music standard, Music light, Speech. Default value: **Film standard**.
- **RF Mode DRC:** This information is used by Dolby® Digital audio decoders with an RF-remodulated output, to adjust their output dynamic according to a profile. Choice between: None, Film standard, Film light, Music standard, Music light, Speech. Default value: **Film standard**.
- **Preferred Stereo Downmix Mode:** This parameter, enabled in 5.0 or 5.1 mode, is used to select either the Lt/Rt or Lo/Ro downmix in a decoder with stereo outputs. Choice between: Not indicated, Lt/Rt Preferred, Lo/Ro Preferred. Default value: **Lt/Rt Preferred**.



NOTE:

- **Lt/Rt:** Left total/Right total. The Lt/Rt downmix totals the Surround channels and adds them in-phase to the Left channel and out-of-phase to the Right channel. This enables a Dolby® Surround Pro Logic decoder to rebuild the L/C/R/S channels for a Pro Logic home theater.
- **Lo/Ro:** Left only/Right only. The Lo/Ro downmix discretely adds the Left and Right Surround channels to the Left and Right speaker channels, respectively. This preserves stereo separation for stereo-only monitoring and produces a mono-compatible signal.
- The **LFE** channel is not included in any downmixes.
- **Lt/Rt Center Downmix Level:** This parameter, enabled in 5.0 or 5.1 mode, is used to select the level shift applied to the Center channel when adding to the left and right outputs as a result of downmixing to an Lt/Rt output. Choice between: 1.414 (+3.0 dB), 1.189 (+1.5 dB), 1.000 (0.0 dB), 0.841 (-1.5dB), 0.707 (-3 dB), 0.595 (-4.5 dB), 0.500 (-6.0dB). Default value: **0.707 (-3 dB)**.
- **Lt/Rt Surround Downmix Level:** This parameter, enabled in 5.0 or 5.1 mode, is used to select the level shift applied to the Surround channels when downmixing to an Lt/Rt output. Choice between: 0.841 (-1.5dB), 0.707 (-3 dB), 0.595 (-4.5 dB), 0.500 (-6.0dB). Default value: **0.707 (-3 dB)**.
- **Lo/Ro Center Downmix Level:** This parameter, enabled in 5.0 or 5.1 mode, is used to select the level shift applied to the Center channel when adding to the left and right outputs as a result of downmixing to an Lo/Ro output. Choice between: 1.414 (+3.0 dB), 1.189 (+1.5 dB), 1.000 (0.0 dB), 0.841 (-1.5dB), 0.707 (-3 dB), 0.595 (-4.5 dB), 0.500 (-6.0dB). Default value: **0.707 (-3 dB)**.
- **Lo/Ro Surround Downmix Level:** This parameter, enabled in 5.0 or 5.1 mode, is used to select the level shift applied to the Surround channels when downmixing to an Lo/Ro output. Choice between: 0.841 (-1.5dB), 0.707 (-3 dB), 0.595 (-4.5 dB), 0.500 (-6.0dB). Default value: **0.707 (-3 dB)**.

Metadata Parameters #2

Click on the Metadata Parameters #2 sub-tab to display the 2nd Dolby® Metadata configuration sub-tab.

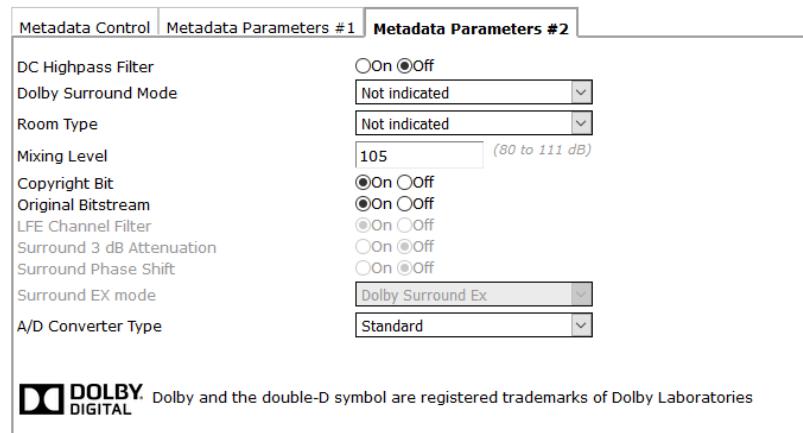


Figure 4-143: Audio component - Dolby - Metadata parameters #2 sub-tab

- **DC Highpass Filter:** Used to enable On or disable Off the high pass filter on the input audio samples. Default value: **Off**.
- **Dolby Surround Mode:** Used to indicate whether the stereo audio is Dolby® Surround encoded or not. Choice between: Not indicated, Not encoded and Encoded. Default value: **Not indicated**. The value is not acknowledged in 1/0 mode.
- **Room Type:** Used to indicate what type of mixing room was used for the final mixing. Choice between: Not indicated, Large, Small. Default value: **Not indicated**.
- **Mixing Level:** Used to indicate the acoustic pressure of the sound during the final mixing. Range between 80 and 111 dB in 1 dB steps. Default value: **105 dB**.
- **Copyright Bit:** Used to indicate whether the encoded Dolby® Digital Bitstream is copyright protected (On) or not (Off). Default value: **On**.
- **Original Bitstream:** Used to indicate whether the encoded Dolby® Digital Bitstream is the master version or a copy. Default value: **On**.
- **LFE Channel Filter:** This parameter, enabled in 5.0 or 5.1 mode, is used to enable (On) or disable (Off) a 120 Hz filter. The filter is applied to the LFE channel input of a Dolby® Digital encoder prior to encoding. It is ignored if the LFE channel is disabled. The filter removes frequencies above 120 Hz that would cause aliasing when decoded. This filter should only be switched off if the audio to be encoded is known not to have any signals above 120 Hz. Default value: **On**. This value will not be acknowledged if the **Mode** parameter is set to 1/0 (Mono left), 1/0 (Mono Right), 2/0 (Stereo).
- **Surround 3 dB Attenuation:** This parameter, enabled in 5.0 or 5.1 mode, is used to enable (On) or disable (Off) a 3 dB attenuation before encoding the Surround channel(s). Default value: **Off**.
- **Surround Phase Shift:** This parameter, enabled in 5.0 or 5.1 mode, is used to enable (On) or disable (Off) application of a 90-degree phase shift to the Surround channels. The Dolby® Digital decoder can therefore easily create an Lt/Rt downmix. Default value: **On**.
- **Surround EX mode:** This parameter, enabled in 5.0 or 5.1 mode, is used to indicate that a project was mixed in the Surround EX™ format with a matrix-encoded surround signal embedded within the two surround channels. Choice between: Not Surround Ex, Dolby Surround Ex, Small Room. Default value: **Not Surround Ex**.
- **A/D Converter Type:** This parameter enables audio that has passed through a particular A/D conversion stage to be marked as such, so that a decoder may apply the complementary D/A process. Choice between: Standard or HDCD. Default value: **Standard**.

Automatic Loudness Control parameters

This page is used to set the Loudness Control parameters when Automatic Loudness Control has been chosen as Level control on the General tab.

Loudness Control

Click on **Loudness** tab to display the Control parameters.

Figure 4-144: Audio component - Loudness Control

- **ALC mode:** Used to select the Audio Level Control measurement mode. Choice between **none** (Loudness Control is disabled), **Level Magic**, **ITU 1770-1**, **ITU1770-2** and **EBU R128**. Default value: **EBU R128**.
- **Preset:** Used to set the Loudness static gain.
 - **Zero Gain:** ALC works in a limited mode. Signals that are too loud are attenuated, and low level signals are preserved (no positive gain). This setting is reserved for classical music where audio dynamic shall be preserved with respect of the maximum loudness target.
 - **Soft:** Convergence of ALC is slow. Fast changes of audio level are smoothing processed. This setting is reserved for classical music where audio dynamic shall be preserved.
 - **Medium:** Convergence of ALC is fast. Fast changes of audio level are normally processed. This setting is recommended for channels broadcasting any type of content.
 - **Hard:** Convergence of ALC is fast. Fast changes of audio level are highly processed. This setting is reserved for pop music or for channels with extreme audio level disparity between programs.

Default value: **Medium**
- **leveler (AGC):** Used to set the Loudness Automatic Gain Control if Active is checked. The **Loudness Target** is used to adjust the Audio level after Automatic Gain Control. The adjustment range depends on the ALC mode above:
 - **Level Magic** mode: -25 dBFS to -10 dBFS. Default value: **-18 dBFS**
 - **ITU 1770-1** and **ITU 1770-2** modes: -30 LKFS to -15 LKFS. Default value: **-24 LKFS**
 - **EBU R128** mode: -30 LUFS to -15 LUFS. Default value: **-23 LUFS**
- **True Peak Limiter:** Used to set the Loudness limiter if Active is checked. The **Max Peak Level** is used to adjust the Audio peak. The adjustment range depends on the ALC mode above:
 - **Level Magic** mode: -20 dBFS to -1 dBFS. Default value: **-9 dBFS**
 - **ITU 1770-1**, **ITU 1770-2** and **EBU R128** modes: -20 dBTP to -1 dBTP. Default value: **-3 dBTP**

Loudness Monitoring

On the Loudness tab, click the **Monitoring** sub-tab to display the Loudness Monitoring page. The Monitoring is active after created a component with loudness and it displays the values of the component previously created with the last submitted settings.

The screenshot shows a web-based configuration interface for an audio component. At the top, there are two tabs: 'Control' and 'Monitoring', with 'Monitoring' being the active tab. Below the tabs, the title 'LAST SUBMITTED SETTINGS' is displayed. The interface is divided into two main sections: 'Levels before ALC stage' and 'Levels after ALC stage'. Each section contains three settings: 'Program Level Short term' (value 0.0 dBFS), 'Program Level Integrated' (value 0.0 dBFS), and 'Maximum true peak Level' (value 0.0 dBFS). The entire configuration area is enclosed in a light gray border.

Figure 4-145: Audio component - Loudness Monitoring sub-tab

This page displays the audio levels before and after the Automatic Level Control stage.

In the **Levels before ALC stage** group box:

- **Program Level Short term:** Level before ALC with update rate of 10 Hz.
- **Maximum true peak Level:** Maximum true Peak level before ALC (all channels).

In the **Levels after ALC stage** group box:

- **Program Level Short term:** Level after ALC with update rate of 10 Hz.
- **Program Level Integrated:** Level after ALC with update rate of 1 Hz.
- **Maximum true peak Level:** Maximum true Peak level after ALC (all channels).

Miscellaneous Audio parameters

Click on **Misc** tab to display other audio component parameters.

Additional Delay: 0 ms (-500 ms to +500 ms)

Alarm Saturation: On Off

Alarm Detected Silence: 2 s

Language: Select a language -->

Audio Type: Undefined

Copyright: With

Content: Original

Buttons: submit, reset

Figure 4-146: Audio component - Misc tab

- **Additional Delay:** Used to adjust the audio component in keeping with the video component to obtain correct lip-sync, by compensating for the audio/video phase shift generated upstream (an external audio encoder for instance). This parameter may also be used with a non-standard decoder. Range of settings available: -500 ms to +500 ms.
- **Alarm Saturation:** Used to enable On or disable Off feedback of alarm saturation generated when 2 consecutive audio samples have a value corresponding to 0 dBFS. If the source is permanently saturated, disable this parameter to prevent feedback of untimely and unimportant alarms.
- **Alarm Detected Silence:** Used to set activation of the Detected Silence alarm. The Detected Silence alarm indicates that the input audio signal value is below -65 dBFS for at least the duration set by this parameter. Range between 2 and 60 in 2 s steps.
- **Language:** Used to indicate the audio component language. The language code will be displayed in the right-hand box. It is possible to directly enter the language code in this box. The 3-letter language codes comply with ISO 639-2. Choice between: French (fra), English (eng), German (deu), Spanish (spa), Basque (bas), Italian (ita), Russian (rus), Dutch (ndl), Portuguese (por), Danish (dan), Greek (gre), Finnish (fin), Swedish (swe), Norwegian (nor), Other.
- **Audio Type:** Used to indicate the audio component type. Choice between: Undefined, Clean effects, Hearing impaired, Visual Impaired.
- **Copyright:** Used to indicate whether or not the audio signal is protected by copyright (flag in the PES packet header). Choice between: With or Without.
- **Content:** Used to indicate whether the audio signal is an original or a copy. Choice between: Original or Copy (flag in the PES packet header).

Static Gain Audio parameters

Click on **Static Gain** to display the gain page.

The screenshot shows the 'Audio Configuration / AUD1' interface. The 'Static Gain' tab is active. It includes a 'Static Gain' input field set to 0 dB, and sections for 'Mean' and 'Max' audio output levels for 'Left' and 'Right' channels, each with dBFS scales. Below the fields are 'submit' and 'reset' buttons.

Figure 4-147: Audio component - Static Gain tab

This page is used to set the Audio level control parameters when **Static Gain** has been chosen as **Level control** on the General tab.

- **Static Gain:** Used to set the Gain applied on audio input signals. Range from -20 dB to 20 dB in 0.5 dB steps.
- **Audio Output Level:** The **Mean** and **Max** values are displayed (in dBFS) and used to indicate the **Audio Output Level** of the **Right** and **Left** audio channels.

Confirm all Audio changes by clicking on **submit**.

Adding/Editing a PCR component

A video component must be present in the service.

NOTE: In a service, the PCR can be carried by the video component or a PCR component.

Click **add component** to select the shortcut menu and click **Add PCR** or click the **PCR component**.

NOTE: If a PCR component has already been added, **Add PCR** will not be displayed.

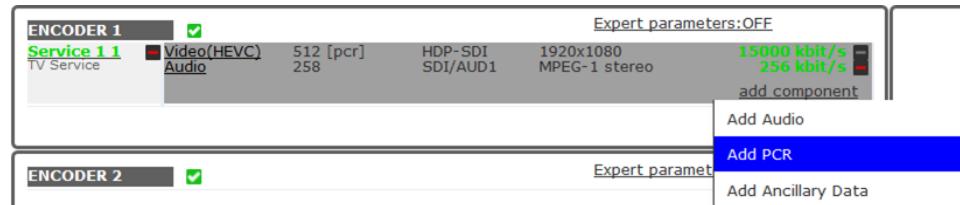


Figure 4-148: Adding a PCR component, PCR page

PCR Component parameters

The following page will be displayed and it is used to set the parameters of the PCR component:

PCR Configuration

PID	101	(32 to 8190)
PCR Bitrate	43	kbit/s
Status	On Air	<input type="button" value="▼"/>
<input type="button" value="submit"/> <input type="button" value="reset"/>		

Figure 4-149: PCR component parameters page

- **PID:** Used to set the PID value assigned to the PCR component. The value must be between 32 and 8190.
- **PCR Bitrate:** Used to indicate the bitrate of the PCR component. This value cannot be changed.
- **Status:** Used to select the broadcast status for the audio component.
 - Off Air: Component broadcasting is postponed but the component remains in the service configuration.
 - On Air: The component is On Air.

Confirm the changes by clicking on **submit**.

Adding/Editing an Ancillary Data component

A video component must be present in the service.

Click **add component** to select the shortcut menu and click **Add Ancillary Data** or click the **Data component**.

The maximum allocated bitrate for the Data component is 2Mbps per Video.

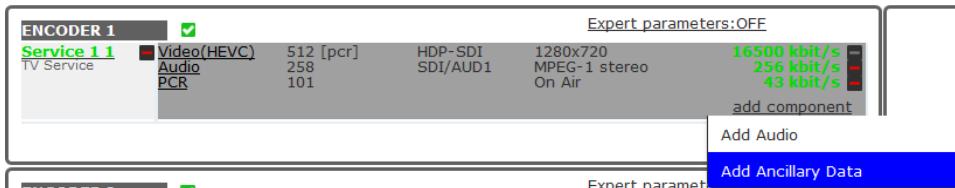


Figure 4-150: Adding an Ancillary Data component

Ancillary Data parameters

The following page will be displayed:

Figure 4-151: Ancillary Data parameters

- **Status:** Used to select the broadcast status for the data component.
 - Off Air: Component broadcasting is postponed but the component remains in the service configuration.
 - On Air: The component is On Air
- **PID:** Used to identify the TS packets transporting the Data component. The value must be between 32 and 8190.
- **Anc Data Type:** Choice between Ancillary Transparent (S2038) or HD Teletext (OP47) or HD Teletext (SMPTE2031).

Restriction:

- Only 1 Ancillary Transparent (S2038) component can be added to the same service.
- Only 1 HD Teletext component can be added to the same service.

By selecting **HD Teletext (OP47 or SMPTE2031)** some additional parameters appear:

HD Teletext specific parameters

Language	Select a language -->	---
Teletext type	Undefined	0 (0 to 31)
Magazine number	0 (0 to 7)	
Page number	0 (0 to 255)	

HD Teletext alarm management

Detection VBI missing	<input checked="" type="radio"/> On <input type="radio"/> Off
Delay detection value	1 (0 to 90 s)

Figure 4-152: HD Teletext specific parameters

- **Language:** Used to set the language field of the PMT teletext descriptor. The language is displayed in the right-hand box. It is possible to enter the language in this box if Other is selected in the left-hand box.
- **Teletext type:** Used to set the Teletext type field of the PMT teletext descriptor.
- **Magazine number:** Used to set the Magazine number field of the PMT teletext descriptor. The value must be between 0 and 7. Default = 0 means 800.

- **Page number:** Used to set the Page number field of the PMT teletext descriptor. The value must be between 0 and 255. Default = **0**.
 - Example: page 888 is coded as M=0, P=136 (0x88)
- **Delay detection VBI missing:**
 - OFF (default): It means that the alarm "**no teletext in signal**" is disabled.
 - ON: Set the Delay detection value (default = **0**) in second. If no teletext in the signal, after X consecutive seconds an alarm is raised "**no teletext in signal**"

Confirm the changes by clicking on **submit**.

The PMT teletext descriptor is automatically created.

edit	del	type	description
		PMT	86 (teletext descriptor), 0 bytes

[Add PMT descriptor](#)

Figure 4-153: HD Teletext - PMT Descriptor

Adding/Editing a SCTE35 component

A video component must be present in the service.

Click **add component** to select the shortcut menu and click **Add SCTE35** or click the **SCTE35 component**.

ENCODER 1		Expert parameters:OFF			
Service 1 1	TV Service	Video(HEVC) Audio PCR	512 [pcr] 259 101	4 x 3G-SDI SDI/AUD1	3840x2160p50 MPEG-1 stereo On Air
<input checked="" type="checkbox"/> 50000 kbit/s <input type="checkbox"/> 256 kbit/s <input type="checkbox"/> 43 kbit/s					

add component

1100c

Add Audio
Add Ancillary Data
Add SCTE35

Figure 4-154: Adding a SCTE35 component

SCTE35 Component parameters

The following page is displayed for DPI configuration:

CP9000 : ENCODER 1 : Service 1 : New SCTE35

DPI Configuration	
DPI specific parameters	SCTE104 over IP
SCTE104 IP Port	6022 (1024 to 65530)
SCTE35 PID	800 (32 to 8190)
VITC alarm filtering	<input type="radio"/> On <input checked="" type="radio"/> Off
Audio stream conditioning	<input type="radio"/> On <input checked="" type="radio"/> Off
back-to-back SCTE104 messages	<input type="radio"/> On <input checked="" type="radio"/> Off
Keep alive with splice_null	<input type="radio"/> On <input checked="" type="radio"/> Off
Keep alive time repetition	0.5 sec.
IDR at DPI break duration	Off
No SCTE35 table repetition	Off
Multiple SCTE35 point to same PTS	Off
unique_pgm_id Passthru	Off
Force sub segment fields	Off

Figure 4-155: SCTE35 - DPI Configuration

- **DPI specific parameters:** Choice of DPI (Digital Program Insertion) feature management:
 - SCTE104 over IP: DPI is managed via SCTE104 messages received on the Control & Command IP port.
 - SMPTE 2010: DPI is managed via SMPTE 2010 messages received on the SDI video input.
- **SCTE104 IP Port:** To indicate the TCP communication port used by SCTE104 protocol when DPI is managed via the Control & Command IP port.
- **SCTE35 PID:** To indicate the PID of the component used to transport SCTE 35 tables to the external Splice device.
- **VITC alarm filtering:** Used to filter the alarm "No TC in signal" when the VITC is absent from SDI input.
 - On: The alarm is filtered (not raised). Default value.
 - Off: The alarm is not filtered and raised on VITC absence.
- **Audio stream conditioning:**
 - On: the **1 AU per PES around the splice point** mode is enabled. This mode can be used to have seamless audio splices.
 - Off: There are always several AUs per PES.
- **Back-to-back SCTE104 messages:** On, triggers the queuing management of SCTE104 messages.
- **Keep alive with splice null:** Used to send SCTE 35 messages with splice-null to the downstream device.
 - On: SCTE 35 messages are sent. The repetition time is set via the **Keep alive time repetition** parameter.
 - Off: No SCTE 35 message is sent.
- **Keep alive time repetition:** Choices between 0.5 sec, 1 sec, 2 sec and 5 sec.
- To enable the following expert parameters, refer to section [Editing Expert parameters](#).

- IRD at DPI break duration
- No SCTE35 table repetition
- Multiple SCTE35 point to same PTS
- unique_pgm_id passthru
- Force sub segment fields

Adding/Editing a PMT descriptor

The command used to edit PMT descriptors associates descriptors with services or components.

Descriptor editing should comply with the DVB standard in reference document ETS 300 468

"Specification for service information (SI) in Digital Video Broadcasting (DVB) systems"

Descriptors are added to components or services that have already been created. Edit the component or the service and click **Add PMT Descriptor** in the Descriptors group box.



Figure 4-156: Adding a PMT Descriptor

PMT Descriptor parameters

The Descriptor editing page will be displayed and used to set the PMT descriptor parameters:

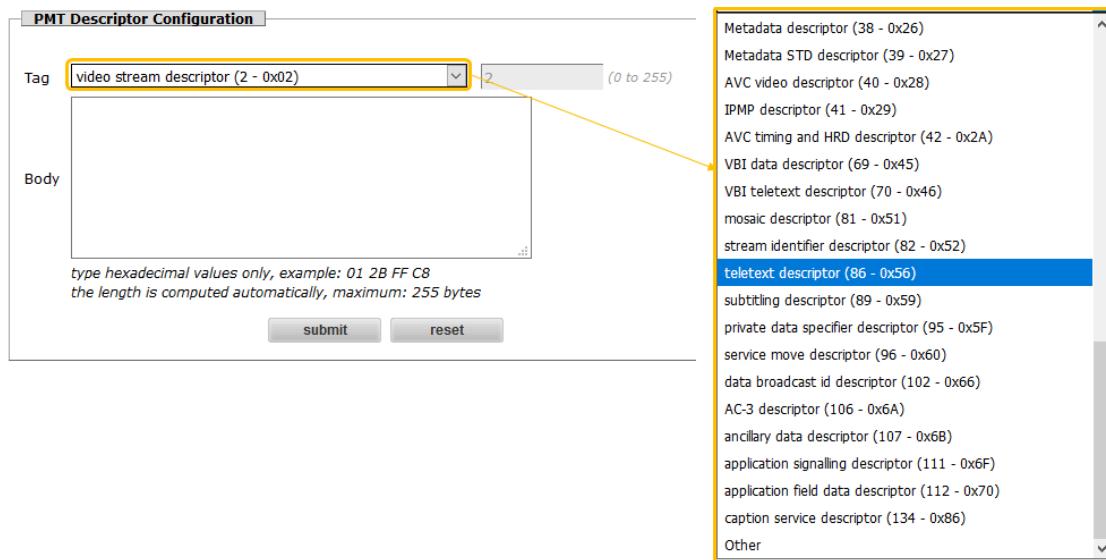


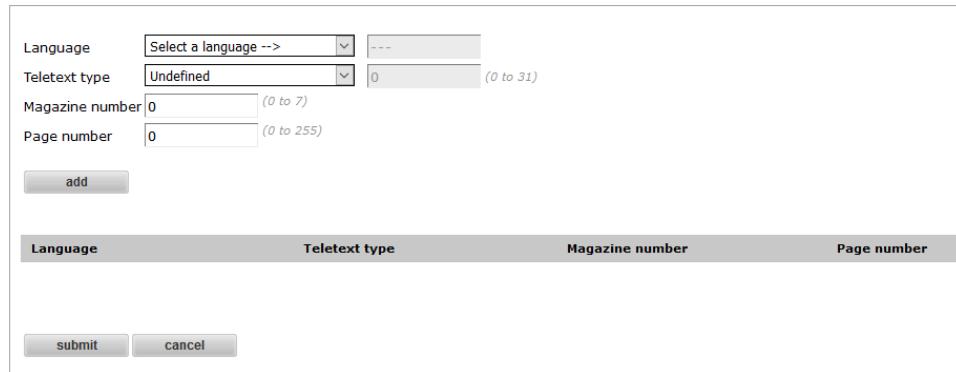
Figure 4-157: PMT Descriptor Configuration page

- **Tag:** Used to select the descriptor type. The descriptor number is displayed in the right-hand box. It is also possible to directly enter the descriptor number (decimal value) in this box.
- **Body:** Used to add parameters to the selected descriptor. Bytes must be entered in hexadecimal format in groups of 2 digits or letters separated (or not) by spaces. Upper and lower case letters can be used. The **Length** field is calculated automatically.

Example with **Teletext descriptor**:

 **NOTE:** The popup must be authorized in the Web browser.

If the descriptor type is a teletext descriptor (86 - 0x56) the following edit page is displayed:

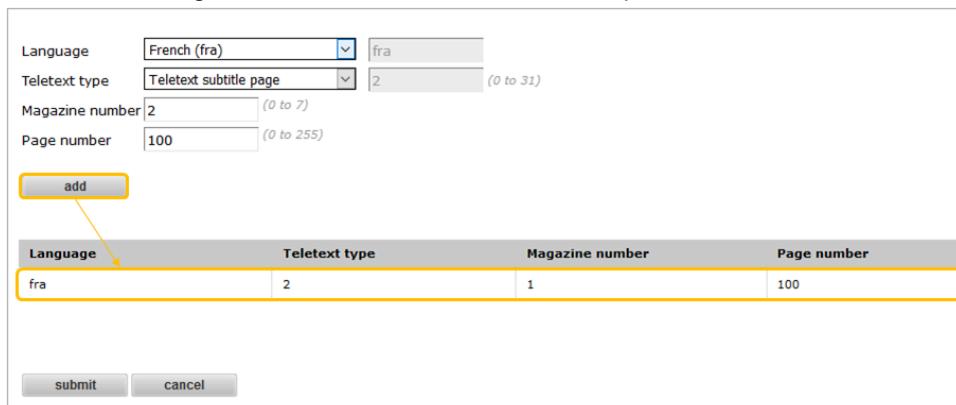


Language	Teletext type	Magazine number	Page number
fra	2	1	100

Figure 4-158: Adding a PMT Teletext Descriptor

- **Language:** Used to set the Language field of the PMT teletext descriptor. The language is displayed in the right-hand box. It is possible to enter the language in this box if Other is selected in the left-hand box.
- **Teletext type:** Used to set the Teletext type field of the PMT teletext descriptor.
- **Magazine number:** Used to set the Magazine number field of the PMT teletext descriptor. The value must be between 0 and 7.
- **Page number:** Used to set the Page number field of the PMT teletext descriptor. The value must be between 0 and 255.

Click on **add** to generate and add the Teletext descriptor in the PMT.



Language	Teletext type	Magazine number	Page number
fra	2	1	100

Figure 4-159: PMT Descriptor - Add Teletext descriptor

Confirm the changes by clicking on **submit**.

Return on the **Service** or **Video component** page to delete a descriptor from the PMT and click on the **bin** icon.

The screenshot shows a table with columns: edit, del, type, and description. There is one row selected with the following values: edit (highlighted in yellow), del, type (PMT), and description (86 (teletext descriptor), 5 bytes). Below the table is a link labeled "Add PMT descriptor".

Figure 4-160: Deleting the PMT teletext Descriptor

Editing Expert parameters

Expert Parameters are parameters which are used to set video, audio and VBI encoders to specific processing modes for particular clients.

On the Encoder area, click on **Expert parameters: OFF**

The screenshot shows the Encoder 1 configuration page. At the top right, there is a button labeled "Expert parameters: OFF" with a yellow border. Other settings shown include Service 1 1, Video(HEVC), 512 [pcr], HD-SDI, 1920x1080, and 16000 kbit/s.

Figure 4-161: Enable Expert parameters

Expert parameters

The Expert parameters page is displayed, select *On* to enable it.

CAUTION: Modifying expert parameters may lead to temporary service disruption.

The screenshot shows the "Declared Expert parameters" page. At the top, there is a radio button group with "On" selected. The page is divided into several sections: Video [1 to 32], Video [33 to 64], Audio, VBI, and Other. Each section contains a list of checkboxes for various parameters, many of which are labeled "Reserved". A warning message at the bottom states: "Warning : Modifying expert parameters may lead to temporary service disruption." At the very bottom are two buttons: "submit" and "reset".

Figure 4-162: Expert parameters page

Video	
Parameter	Function
IPB	Only available with HEVC component. By default P pictures are encoded as B pictures (GOP structure is IB) for encoding efficiency. Check this parameter to encode P pictures as P pictures (then GOP structure is IPB).
No hierarchical GOP	Only available with HEVC component. Only applicable in Short delay mode. No effect in Long or Standard modes. Allow to disable the Hierarchical GOP mode.
CAVLC	Only available with AVC component. Allow to force the use of the CAVLC entropy coding algorithm in conformity with H264 standard. For more information, refer to section Entropy coding .
Force Multislice	Only available with HEVC-UHD or AVC HD component. HEVC-UHD: encode video as 2 dependent slices segments. AVC-HD-10bits: encode video in 4 slices (remains 1 slice in HD-420-8bits)
Insert PCR on RAI	Insertion of PCR on RAI is authorized by the standard but could cause some accuracy errors on analyzers.
IDR Insertion	Insert IDR for each GOP (instead of 1 over 100 by default).
Weighted Pred Off	Disable weighted pred.
Recovery point On	Attach recovery point SEI to I pictures.
Wavefront Parallel (WPP)	The WPP mode is supported for parallel processing and can be combined with the slice division. Only available with HEVC UHD.
No IDR reordering	IDR is the first picture in display order when IP_PERIOD > 1
Max MV Length Limitation	Limitation log2_max_mv_length_horizontal=9 / log2_max_mv_length_vertical=9 in SPS/VUI instead of 16 by default. Only available with AVC.
PPS insertion	PPS insertion every picture.
EOS-EOB Insertion	Insert end_of_sequence and end_of_bitstream when encode stop.
reduced CPB_delay	Only available in AVC encoding with short delay. Allows to restore a shorter latency as in previous versions. With this parameter enabled, if video encoding bitrate is too low or video encoding complexity is too high, it may lead to video artifact. Please use with caution.
increased CPB_delay	Only available in AVC encoding with standard delay, increase video quality by increasing latency.

Video	
Parameter	Function
Adaptive Quantization <input checked="" type="checkbox"/> Off	Only available with HEVC component. Improve high bitrate video coding and also provides better video quality when using PSNR metric.
No RAI on I (open GOP)	Only active in AVC HD/UHD, Open GOP, long /standard delay mode. Default value is unchecked. When checked, RAI=1 on IDR (unchanged) but RAI=0 on I picture.
No_Pan_Scan	In AVC mode, pan_scan_rect() information in the SEI syntax is used to indicate a cropped sub-region of the picture for display on small screens. This expert parameter allows to disable pan_scan_rect() insertion in the SEI syntax.
SDI source tolerance	By default, a transient SDI source disruption on input may raise a “loss of signal” alarm, also possibility triggering the “No source mode”. When a tolerance on SDI disruption is preferred, checking this parameter allows to support slight SDI source disturbance, significantly reducing “loss of signal”
SD480i No L21 Encoding	Check this option if close captions are broadcast as CEA-608 waveform in line 21 of SDI-SD signal. When this option is checked, the line is not encoded decoded but is discarded, however the VUI Resolution is still declared as 720x480. The option shall be checked only if format is SD480i.

Audio	
Parameter	Function
MPEG2 SIG. ON	Audio signaling in the PMT complies with the ISO/IEC 13818-3 audio standard (MPEG2).
AC3 stream type	Signaling adaptation for AC3 streams. Standard signaling (0x06 stream type for private data plus an AC3 descriptor) is replaced by specific signaling (0x81 stream type without a descriptor).
Lower silence detection threshold	The detected silence alarm is raised if the audio signal is less than -70 dBFS instead of -65 dBFS.
AC3 Frame per PES	Used to configure the encoder to have only 1 AC3 Frame in a PES. Ensures compatibility with some set-top boxes or decoders.
Force stream ID	Stream_id is set to "0xC0" for all MPEG-1 Layer II and AAC components (by default, the stream_id is set to a default value which is incremented each time an audio component is created (0xC0, 0xC2, etc.)).
No error masking for AAC pass-thru	Default mode, if AAC audio disappears the component bitrate remains unchanged. If ticked, if AAC audio disappears the component bitrate falls to 0 (AAC pass-thru error masking is disabled).

Audio	
Parameter	Function
Force AAC SIG to 5.1	<p>Ensures compatibility with some set-top boxes. When ticked, if audio encoder is set to 5.1 HE-AAC and to listen to SMPTE 2020 audio metadata:</p> <ul style="list-style-type: none"> - When the incoming audio metadata signals 5.1 (multichannel), then the audio encoding is 5.1 and the Sig descriptor signalizes a 5.1 stream. - When the incoming audio metadata signals 2.0 (stereo), then the audio encoding is 2.0 and but the Sig descriptor signalizes a 5.1 stream. <p>This parameter is not used in this release.</p> <p>Disable weighted pred.</p>
Multi MP1 L2 AU per PES	In close GOP mode, allow to encapsulate several Audio Units per PES (AU number depending on ES bitrate setting). Default value is disabled, meaning 1 AU per PES
Other	
Parameter	Function
IDR at DPI break duration	Insertion of an I picture at the end of the splice period when no splice_in trigger is sent.
No SCTE35 table repetition	One single SCTE35 table is sent during pre-roll.
multiple SCTE35 point to same PTS	Allows to send two separate SCTE35 tables pointing at the same PTS point
unique_pgm_ID passthru	In DPI context, this expert parameter is used to force the value of the unique_pgm_ID received in incoming SCTE104/SMPTE2010 command into the outgoing SCTE35 tables regardless of its value.
Force sub_segment fields	<p>When the Expert_bit=1, for SCTE104 messages delivered by automation system running on older SCTE104 protocol version (before SCTE104), this bit controls the insertion of the sub_segment_num=0 and sub_segments_expected=0 fields in the SCTE35 segmentation_descriptor() syntax.</p> <p>Note: this bit has no effect on the CP9000, for automation system running on SCTE104 protocol version after 2016.</p>
SCTE104/35 Reserved	Reserved for Harmonic usage. Default value is unchecked. Do not check without explicit request from Harmonic.

VBI	
Parameter	Function
Reserved	

Predefined Configurations

On bar menu click on **Presets**.

The **Presets** menu is used to manage predefined configurations.

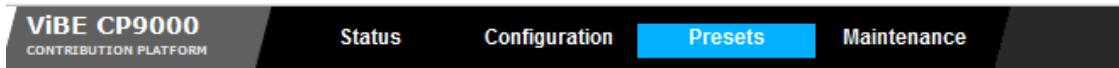


Figure 4-163: Preset menu

The **Presets** command displays the following screen:

Stored predefined configurations									
recall	del	save	num	date - time	user	access	size	type	description
			33	15/06/2017 - 10:18:19	admin	RO	61kb	Equipment	UHD_HEVC_50_STANDARD_DELAY
			34	15/06/2017 - 10:19:14	admin	RO	61kb	Equipment	UHD_HEVC_5994_STANDARD_DELAY
			35	29/11/2017 - 10:05:26	admin	RO	64kb	Equipment	UHD_HEVC_50_SHORT_DELAY
			36	29/11/2017 - 10:06:10	admin	RO	64kb	Equipment	UHD_HEVC_5994_SHORT_DELAY
			37	15/06/2017 - 14:56:09	admin	RO	102kb	Equipment	HD_HEVC_50_STANDARD_DELAY
			38	15/06/2017 - 14:54:28	admin	RO	102kb	Equipment	HD_HEVC_5994_STANDARD_DELAY
			39	30/11/2017 - 07:48:35	admin	RO	112kb	Equipment	HD_HEVC_50_SHORT_DELAY
			40	30/11/2017 - 07:55:36	admin	RO	112kb	Equipment	HD_HEVC_5994_SHORT_DELAY
			41	29/11/2017 - 10:20:49	admin	RO	112kb	Equipment	HD_AVG_50_STANDARD_DELAY
			42	29/11/2017 - 10:20:08	admin	RO	112kb	Equipment	HD_AVG_5994_STANDARD_DELAY
			43	29/11/2017 - 10:27:51	admin	RO	112kb	Equipment	HD_AVG_50_SHORT_DELAY
			44	29/11/2017 - 10:23:45	admin	RO	112kb	Equipment	HD_AVG_5994_SHORT_DELAY

Figure 4-164: Presets - Stored predefined configurations

Overview of Predefined Configurations

Predefined configurations are configurations that are stored in the equipment or can also be saved to disk in the form of files.

A predefined configuration contains the configuration parameters concerning:

- Services
- Components
- TS Out
- IP Out

The user can:

- Save the active configuration to the equipment.
- Recall predefined configurations stored in the equipment.
- Delete predefined configurations stored in the equipment.
- Save predefined configuration files to a disk.
- Load predefined configuration files stored on a disk.

32 configurations can be saved by the User in the equipment.

Recalling a configuration allows to switch automatically to the right Encoding **Standard** and **Board Mode**.

Displaying Predefined Configurations

Configurations stored in the equipment are displayed on the Presets page as follows:

The screenshot shows a table titled "Stored predefined configurations". The columns are: recall, del, save, num, date - time, user, access, size, type, auto-conf, and description. The table lists 48 rows of configuration data. Annotations with arrows point to specific columns and rows:

- An arrow points from the "Date & UTC Time when the configuration was saved" annotation to the "date - time" column.
- An arrow points from the "User who saved the configuration" annotation to the "user" column.
- An arrow points from the "Configuration type" annotation to the "type" column.
- An arrow points from the "Description given when the configuration was saved" annotation to the "description" column.
- An arrow points from the "when" annotation to the "date - time" column.
- An arrow points from the "Number of the memory" annotation to the "num" column.
- An arrow points from the "Memory space used by the current configuration" annotation to the "size" column.
- An arrow points from the "User configuration rights" annotation to the "access" column.
- An arrow points from the "Date & UTC Time when the configuration was saved" annotation to the "date - time" column of the first row.
- An arrow points from the "Date & UTC Time when the configuration was saved" annotation to the "date - time" column of the second row.
- An arrow points from the "Add new configuration from file - Save active configuration (54 KB)" annotation to the "date - time" column of the last row.

recall	del	save	num	date - time	user	access	size	type	auto-conf	description
			33	15/06/2017 - 10:18:19	admin	RO	61Kb	Equipment	NO	UHD_HEVC_50_STANDARD_DELAY
			34	15/06/2017 - 10:19:14	admin	RO	61Kb	Equipment	NO	UHD_HEVC_5994_STANDARD_DELAY
			35	29/11/2017 - 10:05:26	admin	RO	64Kb	Equipment	NO	UHD_HEVC_50_SHORT_DELAY
			36	29/11/2017 - 10:06:10	admin	RO	64Kb	Equipment	NO	UHD_HEVC_5994_SHORT_DELAY
			37	15/06/2017 - 14:56:09	admin	RO	102Kb	Equipment	NO	HD_HEVC_50_STANDARD_DELAY
			38	15/06/2017 - 14:54:28	admin	RO	102Kb	Equipment	NO	HD_HEVC_5994_STANDARD_DELAY
			39	30/11/2017 - 07:48:35	admin	RO	112Kb	Equipment	NO	HD_HEVC_50_SHORT_DELAY
			40	30/11/2017 - 07:55:36	admin	RO	112Kb	Equipment	NO	HD_HEVC_5994_SHORT_DELAY
			41	29/11/2017 - 10:20:49	admin	RO	112Kb	Equipment	NO	HD_AVG_50_STANDARD_DELAY
			42	29/11/2017 - 10:20:08	admin	RO	112Kb	Equipment	NO	HD_AVG_5994_STANDARD_DELAY
			43	29/11/2017 - 10:27:51	admin	RO	112Kb	Equipment	NO	HD_AVG_50_SHORT_DELAY
			44	29/11/2017 - 10:23:45	admin	RO	112Kb	Equipment	NO	HD_AVG_5994_SHORT_DELAY
			45	19/02/2021 - 14:52:18	admin	RO	183Kb	Equipment	NO	SD_AVG_50_STANDARD_DELAY
			46	19/02/2021 - 14:56:26	admin	RO	183Kb	Equipment	NO	SD_AVG_5994_STANDARD_DELAY
			47	19/02/2021 - 15:02:21	admin	RO	162Kb	Equipment	NO	SD_AVG_50_SHORT_DELAY
			48	19/02/2021 - 14:59:55	admin	RO	162Kb	Equipment	NO	SD_AVG_5994_SHORT_DELAY
			1	15/09/2021 - 08:37:17	admin	RW	178Kb	Equipment	NO	PL_Vian1330-1680
			2	30/09/2020 - 14:09:05	admin	RW	154Kb	Equipment	NO	PL-Zixi

Figure 4-165: Displaying predefined configurations

Configurations Predefined in-Factory

Sixteen configurations are stored on equipment shipment (see all configurations from factory on [#unique_60/unique_60_Connect_42_image_or3_szm_45b](#) Figure 4-131 'Presets - Stored predefined configurations'

The different configurations proposed are a mix of the following parameters:

- Video Format and Codec: **SD/AVC - HD/HEVC/AVC - UHD/HEVC**
- Frame Rate: **50Hz or 59.94Hz**
- Compression Delay: **Standard or Short**

They cannot be edited or deleted. They enable the Operator to quickly configure the encoder with standard settings.

NOTE:

- The configurations predefined in-factory configure only the components of the encoder. The Inputs / Outputs (IP, TS, etc.) must be configured separately.
- If you have 2 Video Boards, the same configuration will be applied.

Stored predefined configurations											Configuration stored in factory
recall	del	save	num	date - time	user	access	size	type	auto-conf	description	
			33	15/06/2017 - 10:18:19	admin	RO	61Kb	Equipment	NO	UHD_HEVC_50_STANDARD_DELAY	
			34	15/06/2017 - 10:19:14	admin	RO	61Kb	Equipment	NO	UHD_HEVC_5994_STANDARD_DELAY	
			35	29/11/2017 - 10:05:26	admin	RO	64Kb	Equipment	NO	UHD_HEVC_50_SHORT_DELAY	
			36	29/11/2017 - 10:06:10	admin	RO	64Kb	Equipment	NO	UHD_HEVC_5994_SHORT_DELAY	
			37	15/06/2017 - 14:56:09	admin	RO	102Kb	Equipment	NO	HD_HEVC_50_STANDARD_DELAY	
			38	15/06/2017 - 14:54:28	admin	RO	102Kb	Equipment	NO	HD_HEVC_5994_STANDARD_DELAY	
			39	30/11/2017 - 07:48:35	admin	RO	112Kb	Equipment	NO	HD_HEVC_50_SHORT_DELAY	
			40	30/11/2017 - 07:55:36	admin	RO	112Kb	Equipment	NO	HD_HEVC_5994_SHORT_DELAY	
			41	29/11/2017 - 10:20:49	admin	RO	112Kb	Equipment	NO	HD_AVC_50_STANDARD_DELAY	
			42	29/11/2017 - 10:20:08	admin	RO	112Kb	Equipment	NO	HD_AVC_5994_STANDARD_DELAY	
			43	29/11/2017 - 10:27:51	admin	RO	112Kb	Equipment	NO	HD_AVC_50_SHORT_DELAY	
			44	29/11/2017 - 10:23:45	admin	RO	112Kb	Equipment	NO	HD_AVC_5994_SHORT_DELAY	
			45	19/02/2021 - 14:52:18	admin	RO	183Kb	Equipment	NO	SD_AVC_50_STANDARD_DELAY	
			46	19/02/2021 - 14:56:26	admin	RO	183Kb	Equipment	NO	SD_AVC_5994_STANDARD_DELAY	
			47	19/02/2021 - 15:02:21	admin	RO	162Kb	Equipment	NO	SD_AVC_50_SHORT_DELAY	
			48	19/02/2021 - 14:59:55	admin	RO	162Kb	Equipment	NO	SD_AVC_5994_SHORT_DELAY	
			1	15/09/2021 - 08:37:17	admin	RW	178Kb	Equipment	NO	PL_Vlan1330-1680	
			2	30/09/2020 - 14:09:05	admin	RW	154Kb	Equipment	NO	PL-Zixi	

Figure 4-166: Configurations stored in-factory

Configurations Specifications

UHD_HEVC_STANDARD_DELAY 50 and 5994 Configurations Settings

Table 4-5:

Item	Description	UHD_HEVC_50	UHD_HEVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	UHD HEVC_50	UHD HEVC_5994
PID	Video PID	512	512
	Audio1 PID	4112	4112
	PMT PID	256	256
	PCR PID (=Video PID)	512	512
Video	Frame rate	50 fps	59.94 fps
	No source mode	Blue color pattern	Blue color pattern
	Standard	2160p	2160p
	Profile	HEVC Main10@L5.1 4:2:2	HEVC Main10@L5.1 4:2:2
	Picture Resolution	3840x2160	3840x2160
	Picture Definition	Sharp	Sharp
	Picture Structure	Frame	Frame
	Bitrate	50 Mbit/s	50 Mbit/s

Item	Description	UHD_HEVC_50	UHD_HEVC_5994
	GOP (I Picture Period: P Picture Period)	48:4	64:4
	Compression Delay	Standard	Standard
	Closed GOP	Off	Off
	Adaptive GOP	On	On
	Temporal Scalability	Off	Off
	Expert Parameters	Off	Off
Audio	Input format	PCM	PCM
	Standard	AAC-LC	AAC-LC
	Source	SDI Grp1/Ch1	SDI Grp1/Ch1
	Mode	Stereo	Stereo
	Rate	96 Kbit/s	96 Kbit/s
TS Out	Rate	60 Mbit/s	30 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

UHD_HEVC_SHORT DELAY 50 and 5994 Configurations Settings

Table 4-6:

Item	Description	UHD_HEVC_50	UHD_HEVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	UHD HEVC_50	UHD HEVC_5994
PID	Video PID	512	512
	Audio1 PID	4112	4112
	PMT PID	256	256
	PCR PID (=Video PID)	512	512
Video	Frame rate	50 fps	59.94 fps
	No source mode	Blue color pattern	Blue color pattern
	Standard	2160p	2160p
	Profile	HEVC Main10@L5.1 4:2:2	HEVC Main10@L5.1 4:2:2

Item	Description	UHD_HEVC_50	UHD_HEVC_5994
	Picture Resolution	3840x2160	3840x2160
	Picture Definition	Sharp	Sharp
	Picture Structure	Frame	Frame
	Bitrate	80 Mbit/s	80 Mbit/s
	GOP (I Picture Period: P Picture Period)	48:1	64:1
	Compression Delay	Short	Short
	Closed GOP	Off	Off
	Adaptive GOP	On	On
	Temporal Scalability	Off	Off
	Expert Parameters	Off	Off
Audio	Input format	Transparent	Transparent
	Standard	SMPTE-302M	SMPTE-302M
	Source	SDI Grp1/Ch1	SDI Grp1/Ch1
	Mode	Dual Channel	Dual Channel
	Rate	Transparent 20 bit/s	Transparent 20 bit/s
TS Out	Rate	90 Mbit/s	90 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

HD_HEVC_STANDARD_DELAY 50 and 5994 Configurations Settings

Table 4-7:

Item	Description	HD_HEVC_50	HD_HEVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	HD HEVC_50	HD HEVC_5994
PID	Video PID	512 - 515	512 - 515
	Audio1 PID	4112 - 4115	4112 - 4115
	PMT PID	256 - 259	256 - 259
	PCR PID (=Video PID)	512 - 515	512 - 515

Item	Description	HD_HEVC_50	HD_HEVC_5994
Video	Frame rate	25 fps	29.97 fps
	No source mode	Blue color pattern	Blue color pattern
	Standard	1080i	1080i
	Profile	HEVC Main10@L4.1 4:2:2	HEVC Main10@L4.1 4:2:2
	Picture Resolution	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720
	Picture Definition	Sharp	Sharp
	Picture Structure	Field	Field
	Bitrate	16 Mbit/s	16 Mbit/s
	GOP (I Picture Period: P Picture Period)	24:4	32:4
	Compression Delay	Standard	Standard
	Closed GOP	Off	Off
	Adaptive GOP	On	On
	Temporal Scalability	Off	Off
	Expert Parameters	Off	Off
Audio	Input format	PCM	PCM
	Standard	AAC-LC	AAC-LC
	Source	SDI Grp1/Ch1	SDI Grp1/Ch1
	Mode	Stereo	Stereo
	Rate	96 Kbit/s	96 Kbit/s
TS Out	Rate	80 Mbit/s	80 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

HD_HEVC_SHORT DELAY 50 and 5994 Configurations Settings

Table 4-8:

Item	Description	HD_HEVC_50	HD_HEVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	HD HEVC_50	HD HEVC_5994
PID	Video PID	512 - 515	512 - 515
	Audio1 PID	4112 - 4115	4112 - 4115
	PMT PID	256 - 259	256 - 259
	PCR PID (=Video PID)	512 - 515	512 - 515
Video	Frame rate	25 fps	29.97 fps
	No source mode	Blue color pattern	Blue color pattern
	Standard	1080i	1080i
	Profile	AVC Main10@L4.1 4:2:2	AVC Main10@L4.1 4:2:2
	Picture Resolution	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720
	Picture Definition	Sharp	Sharp
	Picture Structure	Field	Field
	Bitrate	20 Mbit/s	20 Mbit/s
	GOP (I Picture Period: P Picture Period)	24:4	32:4
	Compression Delay	Short	Short
	Closed GOP	Off	Off
	Adaptive GOP	On	On
	Temporal Scalability	Off	Off
	Expert Parameters	Off	Off
Audio	Input format	Transparent	Transparent
	Standard	SMPTE-302M	SMPTE-302M
	Source	SDI Grp1/Ch1	SDI Grp1/Ch1

Item	Description	HD_HEVC_50	HD_HEVC_5994
	Mode	Dual Channel	Dual Channel
	Rate	Transparent 20 bit/s	Transparent 20 bit/s
TS Out	Rate	100 Mbit/s	100 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

HD_AVC_STANDARD DELAY 50 and 5994 Configurations Settings

Table 4-9:

Item	Description	HD_AVC_50	HD_AVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	HD AVC_50	HD AVC_5994
PID	Video PID	512 - 515	512 - 515
	Audio1 PID	4112 - 4115	4112 - 4115
	PMT PID	256 - 259	256 - 259
	PCR PID (=Video PID)	512 - 515	512 - 515
Video	Frame rate	25 fps	29.97 fps
	No source mode	Blue color pattern	Blue color pattern
	Standard	1080i	1080i
	Profile	AVC 4:2:2 10 bits	AVC 4:2:2 10 bits
	Picture Resolution	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720
	Picture Definition	Sharp	Sharp
	Picture Structure	Field	Field
	Bitrate	28 Mbit/s	28 Mbit/s
	GOP (I Picture Period: P Picture Period)	24:2	32:2
	Compression Delay	Standard	Standard

Item	Description	HD_AVC_50	HD_AVC_5994
	Closed GOP	Off	Off
	Adaptive GOP	On	On
	Temporal Scalability	Off	Off
	Expert Parameters	Off	Off
Audio	Input format	PCM	PCM
	Standard	AAC-LC	AAC-LC
	Source	SDI Grp1/Ch1	SDI Grp1/Ch1
	Mode	Stereo	Stereo
	Rate	96 Kbit/s	96 Kbit/s
TS Out	Rate	80 Mbit/s	80 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

HD_AVC_SHORT DELAY 50 and 5994 Configurations Settings

Table 4-10:

Item	Description	HD_AVC_50	HD_AVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	HD AVC_50	HD AVC_5994
PID	Video PID	512 - 515	512 - 515
	Audio1 PID	4112 - 4115	4112 - 4115
	PMT PID	256 - 259	256 - 259
	PCR PID (=Video PID)	512 - 515	512 - 515
Video	Frame rate	25 fps	29.97 fps
	No source mode	Blue color pattern	Blue color pattern
	Standard	1080i	1080i
	Profile	AVC 4:2:2 10 bits	AVC 4:2:2 10 bits
	Picture Resolution	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720	HDi and HDp =1920x1080, 1440x1080 HDp = 1280x720, 960x720

Item	Description	HD_AVC_50	HD_AVC_5994
	Picture Definition	Sharp	Sharp
	Picture Structure	Field	Field
	Bitrate	35 Mbit/s	35 Mbit/s
	GOP (I Picture Period: P Picture Period)	24:IPPP	32:IPPP
	Compression Delay	Short	Short
	Closed GOP	Off	Off
	Adaptive GOP	On	On
	Temporal Scalability	Off	Off
	Expert Parameters	Off	Off
Audio	Input format	Transparent	Transparent
	Standard	SMPTE-302M	SMPTE-302M
	Source	SDI Grp1/Ch1	SDI Grp1/Ch1
	Mode	Dual Channel	Dual Channel
	Rate	Transparent 20 bit/s	Transparent 20 bit/s
TS Out	Rate	100 Mbit/s	100 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

SD_AVC_STANDARD DELAY 50 and 5994 Configurations Settings

Table 4-11:

Item	Description	SD_AVC_50	SD_AVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	SD AVC_50	SD AVC_5994
PID	Video PID	512 - 519	512 - 519
	Audio1 PID	4112 - 4118 , 265	4112 - 4118 , 265
	PMT PID	257 - 264	257 - 264
	PCR PID (=Video PID)	512 - 519	512 - 519
Video	Frame rate	25 fps	29.97 fps

Item	Description	SD_AVC_50	SD_AVC_5994
	No source mode	Blue Screen	Blue Screen
	Standard	576i	480i
	Profile	AVC 4:2:2 10 bits (Hi422P)	AVC 4:2:2 10 bits (Hi422P)
	Picture Resolution	720*576	720*480
	Picture Definition	Standard	Standard
	Picture Structure	Field	Field
	Bitrate	5000 kbit/s	5000 kbit/s
	GOP (I Picture Period: P Picture Period)	24:2	32:2
	Compression Delay	Standard	Standard
	Closed GOP	OFF	OFF
	Adaptive GOP	Adaptive GOP (Full)	Adaptive GOP (Full)
	Temporal Scalability	N/A	N/A
	Expert Parameters	OFF	OFF
Audio	Input format	Audio PCM	Audio PCM
	Standard	AAC LC	AAC LC
	Source	SDI Group1 / Ch 1-2	SDI Group1 / Ch 1-2
	Mode	Stereo	Stereo
	Rate	96 kbit/s	96 kbit/s
TS Out	Rate	100 Mbit/s	100 Mbit/s
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

SD_AVC_SHORT DELAY 50 and 5994 Configurations Settings

Table 4-12:

Item	Description	SD_AVC_50	SD_AVC_5994
Device	Configuration Mode	1 MPTS over IP	1 MPTS over IP
	Service Name	SD AVC_50	SD_AVC_5994
PID	Video PID	512 - 519	512 - 519

Item	Description	SD_AVC_50	SD_AVC_5994
	Audio1 PID	4112 - 4118 , 265	4112 - 4118 , 265
	PMT PID	257 - 264	257 - 264
	PCR PID (=Video PID)	512 - 519	512 - 519
Video	Frame rate	25 fps	29.97 fps
	No source mode	Blue Screen	Blue Screen
	Standard	576i	480i
	Profile	AVC 4:2:2 10 bits (Hi422P)	AVC 4:2:2 10 bits (Hi422P)
	Picture Resolution	720*576	720*480
	Picture Definition	Sharp	Sharp
	Picture Structure	Field	Field
	Bitrate	10 000 kbit/s	10 000 kbit/s
	GOP (I Picture Period: P Picture Period)	24:IPPP	32:IPPP
	Compression Delay	Short	Short
	Closed GOP	OFF	OFF
	Expert Parameters	OFF	OFF
Audio	Input format	Transparent	Transparent
	Source	SDI Group1 / Ch 1-2	SDI Group1 / Ch 1-2
	Standard	SMPTE 302M Transport	SMPTE 302M Transport
	Mode	Dual Channel	Dual Channel
	Status	On Air	On Air
	Rate	Transparent 20 bits	Transparent 20 bits
	Video Frame Sync	OFF	OFF
TS Out	Rate	150 Mbps	150 Mbps
	SIG	DVB	DVB
IP Out		Disabled & Not configured	Disabled & Not configured

Save / Recall Configurations

Saving the Active Configuration in the Equipment

To save the active configuration in the equipment, click Save active configuration on the Presets page. The following page will be displayed:

Save active configuration

Save to	num 2
Coder/Equipment	Equipment
Description	4xHD_Conf1

submit **reset**

Figure 4-167: Saving the active configuration

1. Fill the following fields:
 - **Save to:** Used to indicate the number of the memory in which the configuration will be saved. Only unused memory numbers will be displayed.
 - **Coder/Equipment:** Used to indicate the type of configuration to be saved at Equipment or Encoder level.
 - **Description:** Used to add any User comments.
2. Confirm the operation by clicking submit. The following screen will be displayed:

CP9000 : Presets
You have saved the current configuration in memory #2.

Figure 4-168: Saving the active configuration - Confirmation

3. The created configuration will be displayed in the Stored predefined configurations box on the Presets page.

<input type="checkbox"/>	<input type="checkbox"/>	49	15/06/2017 - 14:59:19	admin	RO	72Kb	Equipment	HD_HEVC_50_ULTRA_SHORT_DELAY
<input type="checkbox"/>	<input type="checkbox"/>	50	15/06/2017 - 15:00:33	admin	RO	72Kb	Equipment	HD_HEVC_5994_ULTRA_SHORT_DELAY
<input type="checkbox"/>	<input type="checkbox"/>	1	07/09/2017 - 16:49:47	admin	RW	57Kb	Equipment	test11
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	08/09/2017 - 08:13:32	admin	RW	90Kb	Equipment	4xHD_Conf1
<input type="checkbox"/>	<input type="checkbox"/>	3	29/08/2017 - 18:13:59	admin	RW	83Kb	Equipment	LOLO_4HD50

Add new configuration from file - Save active configuration (90 KB)

Figure 4-169: Presets page - New Configuration stored

Recalling a Configuration Stored in the Equipment

To recall a configuration stored in the equipment, click on the icon in the left column associated with the configuration on the Presets page. The following page will be displayed:

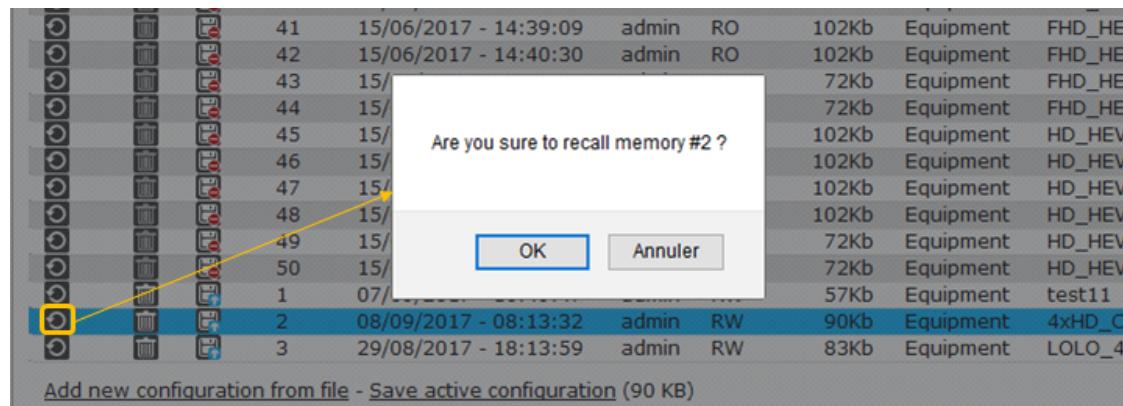


Figure 4-170: Recalling a configuration stored

Click **OK**. The recalled configuration is immediately applied to the equipment.

! **CAUTION:** When saving a Channel (Encoder) configuration, some stored parameters shall be checked when reloading Channel configuration, in order to make sure there is no conflict between the current status of the equipment or the board and parameters of the Channel.

The table below shows the control to perform before loading a channel preset:

Table 4-13:

	MPTS	SPTS
PID	PID is unique	N/A
SID	SID is unique	N/A
Bitrate	Sum of bitrate < output bitrate	N/A
Delay	Delay compatibility	Delay compatibility
Standard	Standard compatibility	Standard compatibility
Multicast @	N/A	@ is unique

If one of those controls don't match with the current status of the equipment, a message "rejected configuration" shall be displayed and the channel configuration shall not be applied.

! **CAUTION:** In SPTS mode, if you applied the same Channel configuration to several encoders, you need to change for each of them the destination Multicast IP address to avoid having conflicts in the network.

Deleting a Predefined Configuration from the Equipment

To delete a predefined configuration, click on the bin icon associated with the configuration on the Presets page. The following dialog box will be displayed:

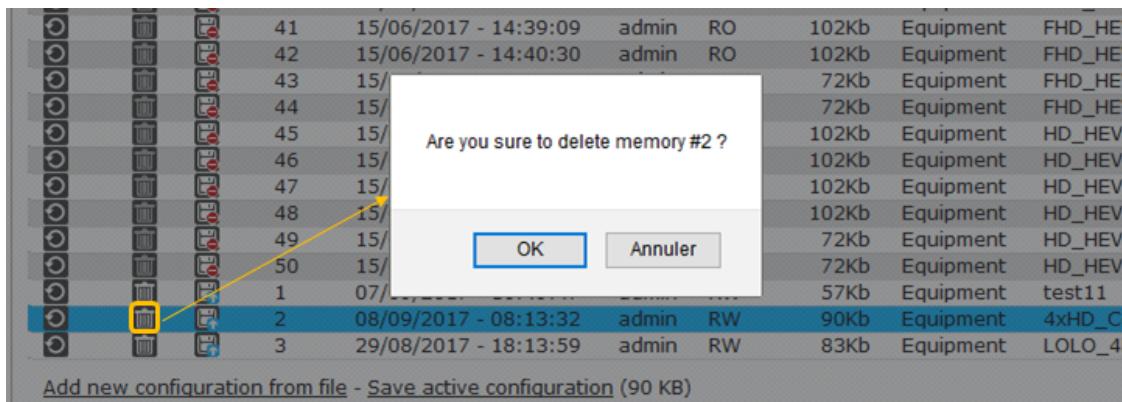


Figure 4-171: Confirming deletion of a predefined configuration

Click **OK**. The configuration is deleted from the storage.

Saving a predefined configuration file to disk

To save a predefined configuration file to disk, click on the Save icon associated with the configuration on the Presets page. The following page will be displayed:

CP9000 : Presets

Save configuration to disk

Click on the link below to save the configuration on your disk.

[configuration #2](#)

Figure 4-172: Saving a predefined configuration file to disk

1. Click **configuration # X** where **X** indicates the number of the memory whose content will be saved on the hard drive.
2. Select the destination directory for the file on the hard drive and enter the file name. The procedure to save the file depends on the Web Browser used.
3. Click **Save**.

Loading a predefined configuration file from a disk

To load a predefined configuration from a hard drive to a memory, click the [Add new configuration from file](#) link on the Presets page. The following page will be displayed:

CP9000 : Presets

Type the complete path name of the file you want to upload, or click the 'browse' button to select a file

The screenshot shows a web form titled "Load from file". It has a dropdown menu labeled "Load to" with the value "num 2". Below it is a file input field with the text "File" and a "Browse" button, showing the path "UHD_Conf1.zip". At the bottom is a "submit" button.

Figure 4-173: Loading a predefined configuration file from a hard drive - Browser

1. Fill the following fields:

- **Load to:** Number of the memory that will store the configuration. Only unused memory numbers will be displayed.
- **File:** Type the path to the configuration file or set the path by clicking **Browse**.

2. Confirm the operation by clicking submit. The following screen will be displayed:

CP9000 : Load Settings

The configuration has been successfully uploaded.

Figure 4-174: Loading a predefined configuration file from a hard drive - Confirmation

Presets used with Auto Configuration

When the user creates several presets, it's recommended to have different description for each preset. Indeed, the num identification doesn't appeared in the drop-down menu when the user selects the preset to use.

When a preset is used with the Auto configuration mode, it is not possible to delete it and the preset is displayed at the top of the list and YES appears in the auto-conf column.

recall	del	save	num	date - time	user	access	size	type	auto-conf	description
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	13/09/2018 - 11:36:32	admin	RO	18Kb	EM Encoder	YES	Test1-1080p-50Hz
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4	13/09/2018 - 11:37:04	admin	RO	18Kb	EM Encoder	YES	Test2-1080i-29.97Hz
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5	13/09/2018 - 11:37:37	admin	RO	18Kb	EM Encoder	YES	Test3-720p-50Hz
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	13/09/2018 - 11:38:18	admin	RO	18Kb	EM Encoder	YES	Test4-720p-59.94
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	33	15/06/2017 - 10:18:19	admin	RO	61Kb	Equipment	NO	UHD_HEVC_50_STANDARD_DELAY
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	34	15/06/2017 - 10:19:14	admin	RO	61Kb	Equipment	NO	UHD_HEVC_594_STANDARD_DELAY

Figure 4-175: Presets used with Auto Configuration

Maintenance

Rebooting the ViBE CP9000

On the **Maintenance** menu click **Reboot** to display the reboot page.

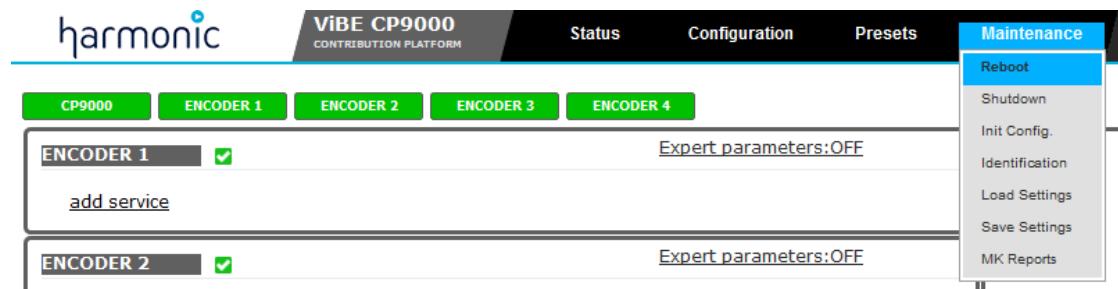


Figure 4-176: Maintenance menu - Reboot

This command is used to reboot the equipment.



Figure 4-177: Equipment Reboot page

- Reboot the unit: to reboot the ViBE CP9000, click **Yes**.
 - NOTE:** Connection with the equipment will be lost during the reboot process. Once the equipment reboot is complete, the Operator will have to reconnect to it by clicking on **Harmonic** logo, for instance. An error page may be displayed if reconnection is attempted too soon. If this is the case, try reconnecting by clicking on the Browser Refresh button.
- The following message is displayed:



Board is rebooting,
wait one minute to connect to website.

Figure 4-178: Message during reboot

Shutting down the ViBE CP9000

In the **Maintenance** menu click **Shutdown** to display the Shutdown Equipment page.

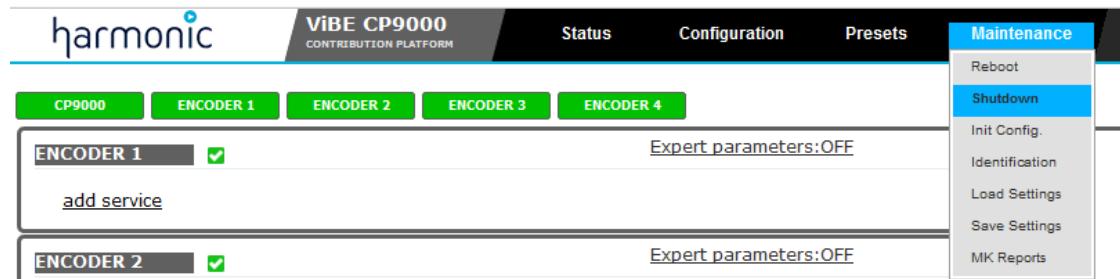


Figure 4-179: Maintenance menu - Shutdown

This command is used to shut down the ViBE CP9000.

CP9000 : Shutdown



Figure 4-180: Shutdown Equipment

- **Shutdown Equipment:** to Shutdown the ViBE CP9000, click Yes and confirm the command.

Initializing the ViBE CP9000 Configuration

In the **Maintenance** menu click **Init Config.** to display the Initialization Configuration page.

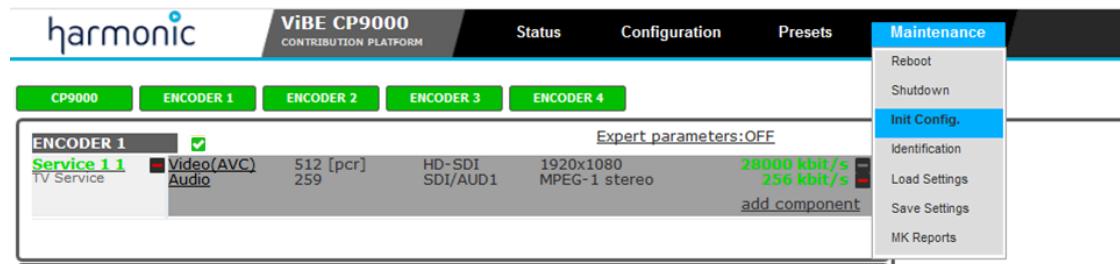


Figure 4-181: Maintenance menu - Init Config.

This command is used to erase the equipment configuration.



Figure 4-182: ViBE CP9000 Initialize Configuration page

- **Init Configuration:** To initialize the Encoder configuration, check **Init Equipment**.

The following dialog box is displayed:

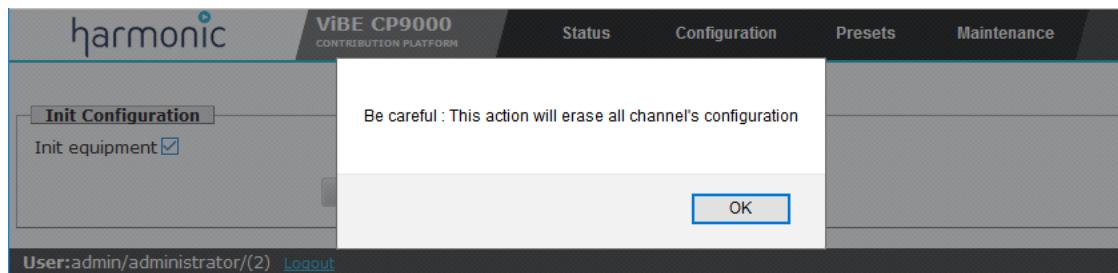


Figure 4-183: Maintenance menu - Init Config. - Dialog box

- Click **OK** and click **Submit** to confirm the initialization.

EM Controller Configuration

You have initialized the equipment

Figure 4-184: Maintenance menu - Init Config. - Dialog box

- Come back on the **Status/Summary** page by clicking on **Harmonic** icon.



Figure 4-185: Maintenance menu - Init Config.

- NOTE:** The command **Init config** does not make a reboot of the chassis, as it is made with the local console (command: **initcfg**).

Configuring the Names of the Equipment and its Encoder

On the **Maintenance** menu click **Identification** to display the identification page.

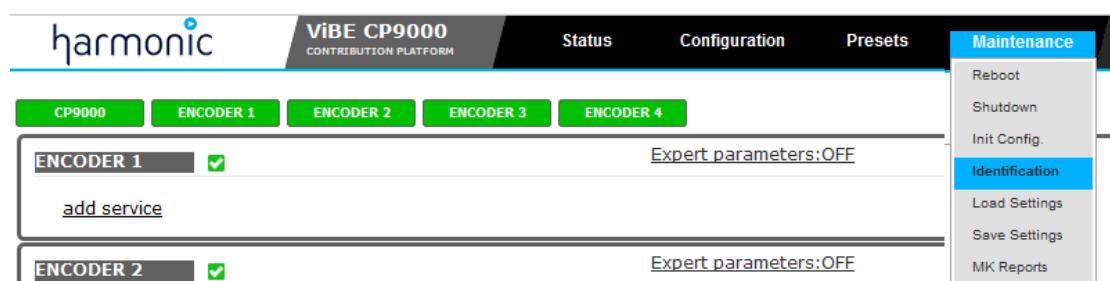


Figure 4-186: Maintenance menu - Identification

This command is used to configure the names of the equipment and its encoder.

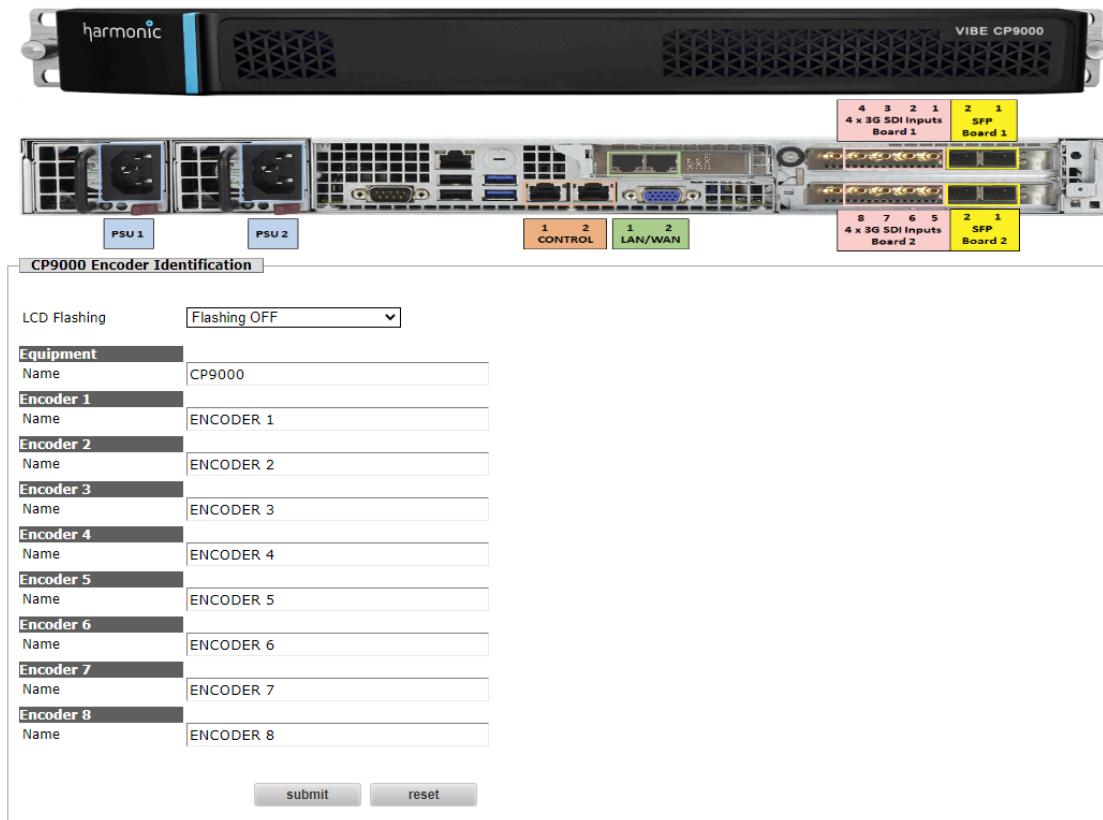


Figure 4-187: Maintenance - identification page (view with 2 Video boards)

- Parameters are directly edited in the related box:
 - LCD Flashing:** Use to enable/disable LCD flashing on the ViBE CP9000 front panel. This feature can be used to identify an equipment in a rack.
- If LCD flashing is set to **Flashing On**, then a LCD icon is displayed on the Status/Summary page as shown in the figure below:



Figure 4-188: Maintenance menu - Identification - LCD Flashing On

- Equipment:** To define the Name of the ViBE CP9000.
- Encoder Name:** To define the Name of each encoder (according to the number of boards and the device configuration 1 x UHD or 4 x HD).

By default, the name of each encoder depends on the device configuration:

- Board 1/1 UHD + Board 2/1 UHD = Encoder 1 + Encoder 5
- Board 1/1 UHD + Board 2/4 HD = Encoder 1 + Encoder 5 to 8
- Board 1/4 HD + Board 2/1 UHD = Encoder 1 to 4 + Encoder 5

- Board 1/4 HD + Board 2/4 HD = Encoder 1 to 4 + Encoder 5 to 8

Saving/Loading ViBE CP9000 Settings

In the **Maintenance** menu click **Load Settings** or **Save settings** to load / save a settings file.

The **Save Settings** command is used to save a file containing all the ViBE CP9000 settings to a hard drive. The **Load Settings** command is used to load a settings file from a hard drive.

Saving ViBE CP9000 Settings to a Disk

To save ViBE CP9000 settings:

1. Click **Save Settings**.

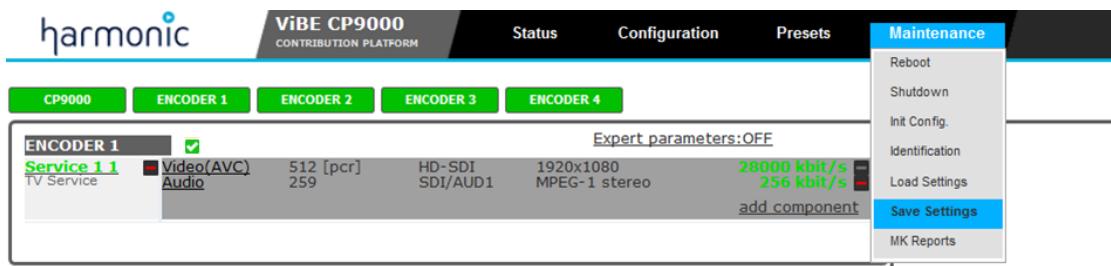


Figure 4-189: Maintenance menu - Save Settings

The following page will be displayed:

[CP9000 : Save Settings](#)

Save configuration to disk

Click on the link below to save the configuration on your disk.

[Active configuration](#)

Figure 4-190: Saving a configuration file to the hard drive

2. Click on **Active configuration**.

3. Save the file on the hard drive. The procedure to save the file depends on the Web Browser used.

Loading ViBE CP9000 Settings from a Disk

The Load settings command is used to load a settings file from a hard drive and immediately apply it to the ViBE CP9000. This file may have been created using the Save settings command described above or the command in the Presets menu.

To load ViBE CP9000 settings:

1. Click **Load Settings**.



Figure 4-191: Maintenance menu - Load Settings

The following page will be displayed:

CP9000 : Load Settings

Load configuration from disk

Type the complete path name of the file you want to upload, or click the 'browse' button to select a file

 A form titled 'Load from file'. It contains a 'File' input field with a 'Browse' button next to it. Below the input field is a 'submit' button.

Figure 4-192: Loading a configuration file from the hard drive 1/2

2. Type the path to the configuration file or set the path by clicking **Browse**....
3. Confirm the operation by clicking submit. The following page will be displayed:

CP9000 : Load Settings

The configuration has been successfully uploaded.

Figure 4-193: Loading a configuration file from the hard drive 2/2

If the file is not correct, the following message will be displayed:

CP9000 : Load Settings

The configuration could not be uploaded.

Figure 4-194: Loading a configuration, error

MK Reports Command

The **MK Reports** command is displayed if the user is connected to the ViBE CP9000 as Administrator. This command is reserved for Customer service use.



Figure 4-195: Maintenance menu - MK Reports menu

In case of Harmonic Customer Support request, follow the procedure below:

1. Click on **MK Reports**

The following page is displayed:



Figure 4-196: Maintenance menu - MK Reports page

2. Click on the button “Launch Analysis”

The following page is displayed with message “Analyse in Progress”



Figure 4-197: Maintenance menu - MK Reports in progress

3. At the end, return to the MK Reports page

The new report is ready to be uploaded.

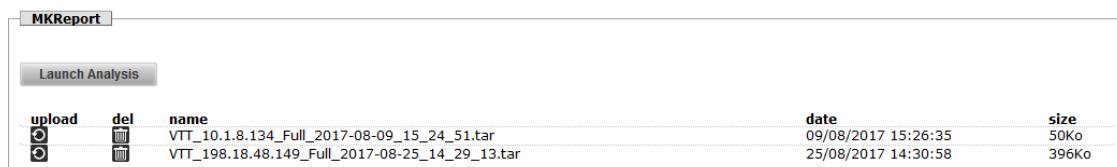


Figure 4-198: Maintenance menu - MK Reports - new report

Chapter 5

Servicing

Introduction

This chapter describes:

- The way to update the software release through the Web GUI.
 - The Local Console Application featured on the device. The Local Console application is used to perform certain servicing operations described in this chapter:
 - Access to the Local Console application
 - Operations performed via the Local Console application
 - Management of the CP9000 with the NMX
 - Maintenance operations relating to device fans.
-
- *Updating the software package*
 - *Operations performed using the Local Console*
 - *Management with NMX*
 - *Management via REST API*
 - *Preventive and Corrective Maintenance Operations*

Updating the software package

Download a new package

1. On the top bar of the Web GUI select the Status menu / HW/SW info:

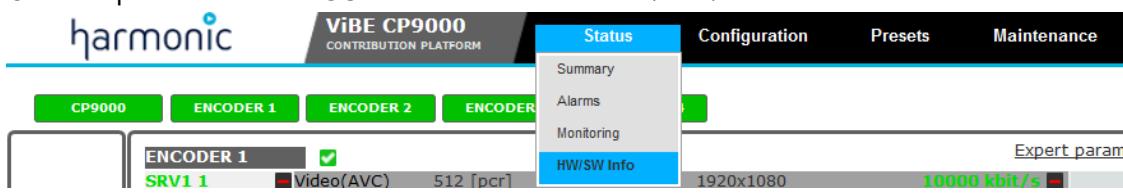


Figure 5-1: Status - HW/SW info

2. Go to the **Product Identification** group box and click on the floppy icon:

Product Identification

Active package	CP9000_01.20.01.003_A		
Previous package	CP9000_01.20.01.002_A		
Configuration part number	CP9000-256086		
Configuration sale ref	C5140AH02A50036		
Configuration serial number	I		
Configuration chassis count	1		
Manufacturing date	11/7/2018		
Inactive package	CP9000_01.20.00	<input type="radio"/>	<input type="checkbox"/>
Inactive package	CP9000_01.20.01.001_A	<input type="radio"/>	<input type="checkbox"/>
Inactive package	CP9000_01.20.01.002_A	<input type="radio"/>	<input type="checkbox"/>
Download a new package			

Figure 5-2: Status - HW/SW info - Download package

- Click on **Browse** to select the package to download:

Type the complete path name of the file you want to upload, or click the 'browse' button to select a file

Download package

File	<input type="text"/> Parcourir... CP9000_01.20.01.004.7z
submit	

Figure 5-3: Status - HW/SW info - Select package

- Click on the "submit" button and wait the end of the download:

Please stay on this page, it will takes several minutes

Download package

File	<input type="text"/> Parcourir... CP9000_01.20.00.7z
In progress	

Figure 5-4: Status - HW/SW info - Download in progress

- Once the download is finished, the new software package appears. To apply it as the active package, click on the "toggle" button:

Product Identification

Active package	CP9000_01.20.01.003_A		
Previous package	CP9000_01.20.01.002_A		
Configuration part number	CP9000-256086		
Configuration sale ref	C5140AH02A50036		
Configuration serial number	I		
Configuration chassis count	1		
Manufacturing date	11/7/2018		
Inactive package	CP9000_01.20.00	<input type="radio"/>	<input type="checkbox"/>
Inactive package	CP9000_01.20.01.001_A	<input type="radio"/>	<input type="checkbox"/>
Inactive package	CP9000_01.20.01.002_A	<input type="radio"/>	<input type="checkbox"/>
Inactive package	CP9000_01.20.01.004_A	<input checked="" type="radio"/>	<input type="checkbox"/>
Toggle			
Download a new package			

Figure 5-5: Status - HW/SW info - Toggle

It could take several minutes:

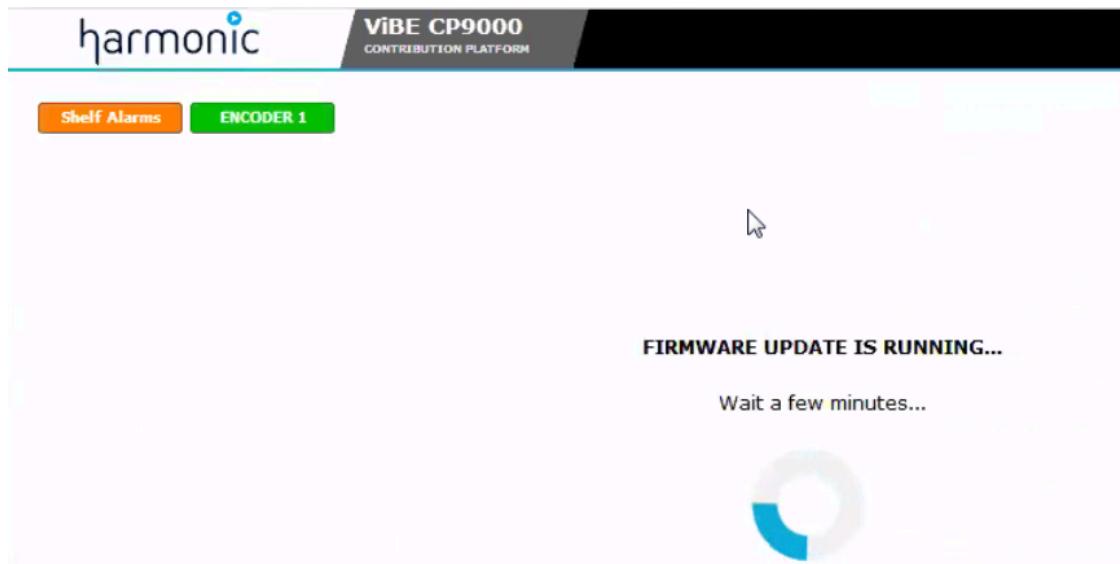


Figure 5-6: Status - HW/SW info - Toggle in progress

- Once the toggle is finished, come back to the Status HW/SW info to check that the new package is the active one:

Product Identification	
Active package	CP9000_01.20.01.004_A
Previous package	CP9000_01.20.01.003_A
Configuration part number	CP9000-256086
Configuration sale ref	C5140AH02A50036
Configuration serial number	1
Configuration chassis count	1
Manufacturing date	11/7/2018
Inactive package	CP9000_01.20.00
Inactive package	CP9000_01.20.01.001_A
Inactive package	CP9000_01.20.01.002_A
Inactive package	CP9000_01.20.01.003_A
Download a new package	

Figure 5-7: Status - HW/SW info - Toggle done

- Attention:**
- It does not support software downgrade to v1.0.0 nor v1.01 due to a different hardware.
 - With a version \geq 1.30 and at least with 1 video board in SDI-12G mode, it is not possible to downgrade to a version \leq 1.20.01
 - DO NOT shut down the unit during download progression.
- NOTE:** A Hardware Reboot is recommended if the unit is not operational after an upgrade.

Operations performed using the Local Console

Accessing the Local Console application

IP parameter values on Equipment shipment

The parameters are indicated on the Acceptance Test Report shipped with the device or can be viewed via the equipment Front panel (see section [Front Panel Operation](#)).

Accessing the Local Console

Use an SSH Client like Putty to access to the Local Console:

- Login: **user**
- Password: **user**

List of Local Console commands

To display all Local Console commands, type help after the ViBE prompt:

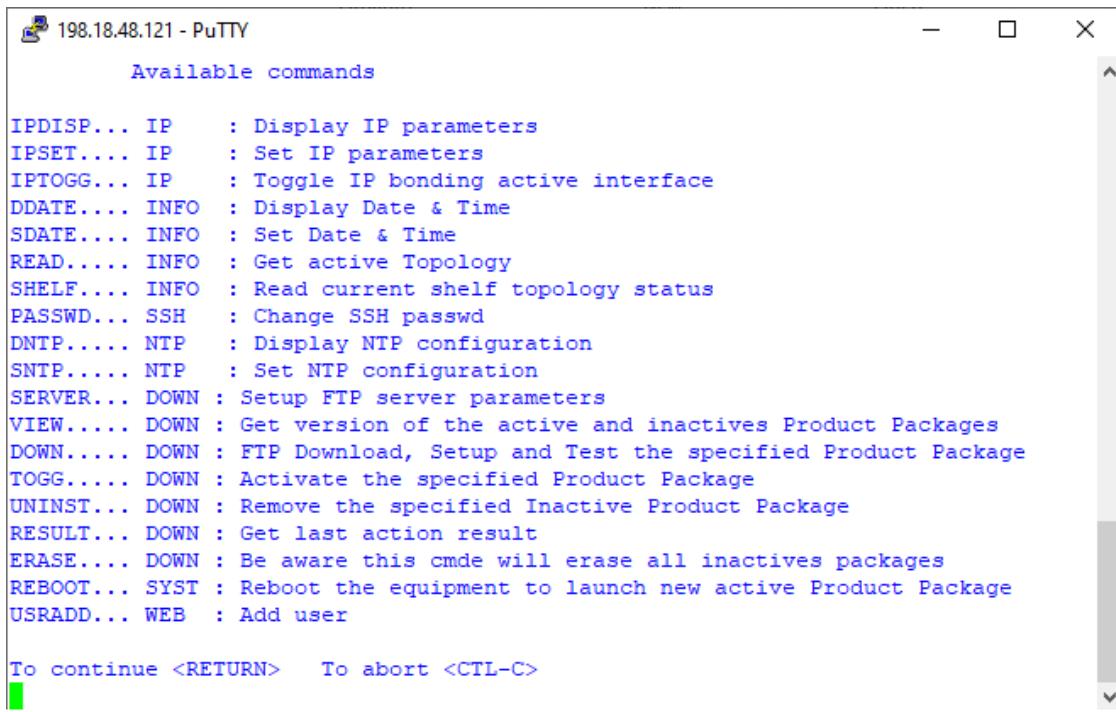
A screenshot of a PuTTY terminal window titled "198.18.48.129 - PuTTY". The window shows the following text:

```
ViBE utilities
-----
ViBE> help
```

The text "ViBE> help" is highlighted with a green box.

Figure 5-8: Displaying all Local Console commands

The list of available commands will be displayed:

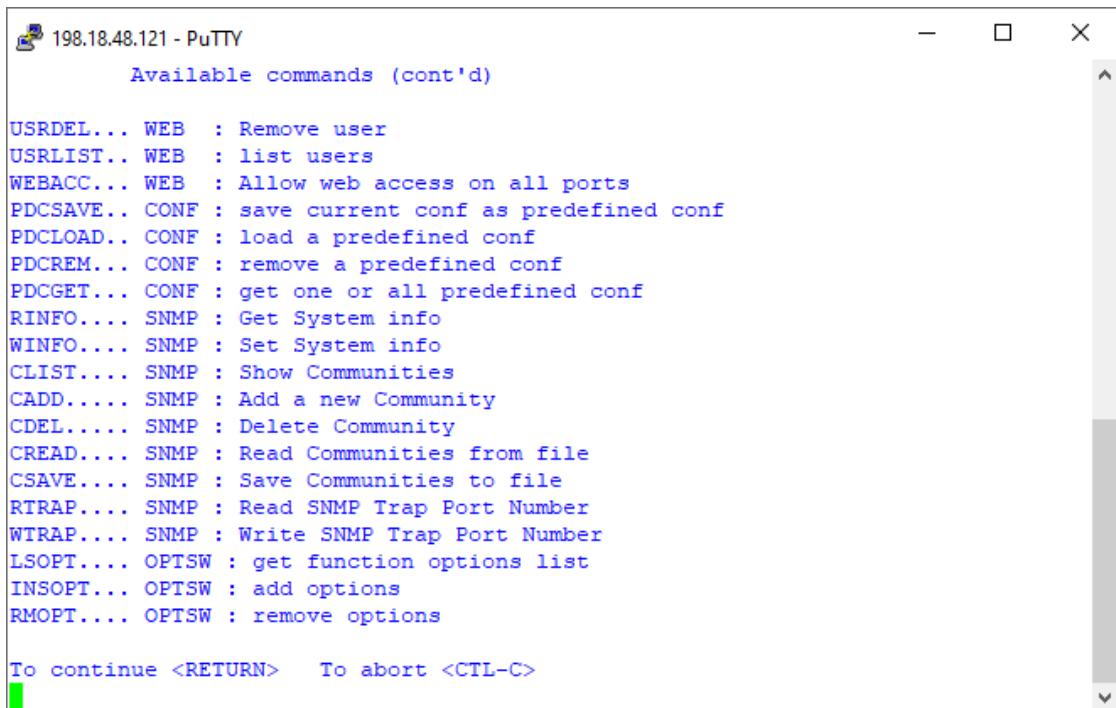


Available commands

```
IPDISP... IP      : Display IP parameters
IPSET.... IP      : Set IP parameters
IPTOGG... IP      : Toggle IP bonding active interface
DDATE.... INFO   : Display Date & Time
SDATE.... INFO   : Set Date & Time
READ..... INFO   : Get active Topology
SHELF.... INFO   : Read current shelf topology status
PASSWD... SSH     : Change SSH passwd
DNTP.... NTP     : Display NTP configuration
SNTP.... NTP     : Set NTP configuration
SERVER... DOWN   : Setup FTP server parameters
VIEW..... DOWN  : Get version of the active and inactives Product Packages
DOWN..... DOWN  : FTP Download, Setup and Test the specified Product Package
TOGG..... DOWN  : Activate the specified Product Package
UNINST... DOWN  : Remove the specified Inactive Product Package
RESULT... DOWN  : Get last action result
ERASE.... DOWN  : Be aware this cmde will erase all inactives packages
REBOOT... SYST   : Reboot the equipment to launch new active Product Package
USRADD... WEB    : Add user

To continue <RETURN> To abort <CTL-C>
```

Figure 5-9: List of Local Console commands 1/3

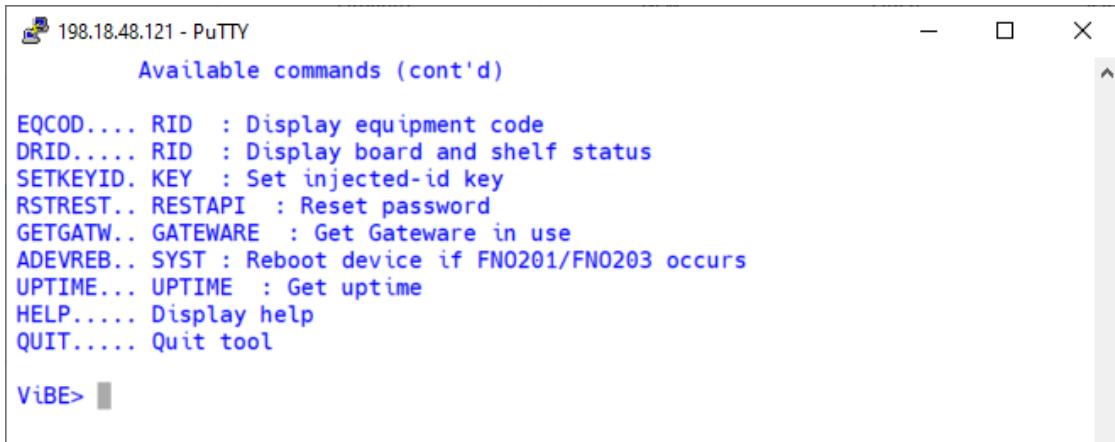


Available commands (cont'd)

```
USRDEL... WEB    : Remove user
USRLIST.. WEB   : list users
WEBACC... WEB    : Allow web access on all ports
PDCSAVE.. CONF  : save current conf as predefined conf
PDCLOAD.. CONF  : load a predefined conf
PDCREM... CONF  : remove a predefined conf
PDCGET... CONF  : get one or all predefined conf
RINFO.... SNMP   : Get System info
WINFO.... SNMP   : Set System info
CLIST.... SNMP   : Show Communities
CADD..... SNMP  : Add a new Community
CDEL..... SNMP  : Delete Community
CREAD.... SNMP  : Read Communities from file
CSAVE.... SNMP  : Save Communities to file
RTRAP.... SNMP  : Read SNMP Trap Port Number
WTRAP.... SNMP  : Write SNMP Trap Port Number
LSOPT.... OPTSW : get function options list
INSOPT... OPTSW : add options
RMOPT.... OPTSW : remove options

To continue <RETURN> To abort <CTL-C>
```

Figure 5-10: List of Local Console commands 2/3



The screenshot shows a PuTTY terminal window titled "198.18.48.121 - PuTTY". The window displays a list of available commands. The commands listed are:

```

Available commands (cont'd)

EQCOD.... RID : Display equipment code
DRID..... RID : Display board and shelf status
SETKEYID. KEY : Set injected-id key
RSTREST.. RESTAPI : Reset password
GETGATW.. GATEWARE : Get Gateware in use
ADEVREB.. SYST : Reboot device if FN0201/FN0203 occurs
UPTIME... UPTIME : Get uptime
HELP..... Display help
QUIT..... Quit tool

ViBE>

```

Figure 5-11: List of Local Console commands 3/3

Overview of commands

The Local Console application provides many commands. Some of these commands are not however intended for the device User but reserved for Harmonic use. Only the commands available to Users are therefore described. The following table lists these commands:

Table 5-1: Commands available on the Local Console application

User operations and related commands	Command description & page
Setting basic parameters	
• ipdisp	To display IP Control parameters, Commands related to IP parameters
• ipset	To set IP Control and NIC bonding parameters, Commands related to IP parameters
• iptogg	To edit the NIC bonding parameter, Editing IP NIC Bonding Parameter (iptogg)
• ddate	To display the current date and time, Displaying the Current Date and Time (ddate)
• sdate	To edit the date and time, Editing the Date and Time (sdate)
• uptime	To get device uptime, Figure 261: Get device uptime - uptime command
• passwd	To change the SSH user password, Commands related to SSH password
Synchronizing Equipment time with an NTP server	

User operations and related commands	Command description & page
• dntp	To display NTP synchronization status, Figure 263: Displaying NTP server status and IP address - dntp command
• sntp	To initialize the synchronization process via the NTP server, Figure 264: Editing NTP server status and IP address - sntp command
Managing Scrambling Biss Mode E	
• eenv	To display the Buried ID (sin variable), Scrambling BISS Mode E - Buried-id
• setkeyid	To set the Injected ID, Figure 266: Biss mode E - Set the Injected-id
Displaying chassis topology	
• read	To display the chassis topology, Figure 267: Displaying equipment chassis topology - read command
• shelf	To display the status, name and ordering reference of the board, Displaying Status, RID and Part Number (shelf)
Managing software licenses	
• lsopt	To display installed software licenses, Figure 269: Displaying software license status - lsopt command
• eqcod	To read the device equipment code, Figure 270: Reading the equipment code via the Local Console - eqcod command
• drid	To read the device serial number, Figure 271: Reading the product serial number via the Local Console - drid command
• insopt	To install a software license, Figure 273: Enabling a software license - insopt command
• rmopt	To uninstall a software license, Figure 275: Uninstalling a software license - rmopt command
Managing Web Interface Users	
• usradd	To add a User, Adding a User (usradd)
• usrdel	To delete a User, Deleting a User (usrdel)
• usrlst	To display the list of Users, Displaying the List of Users (usrlst)
Managing predefined configurations	

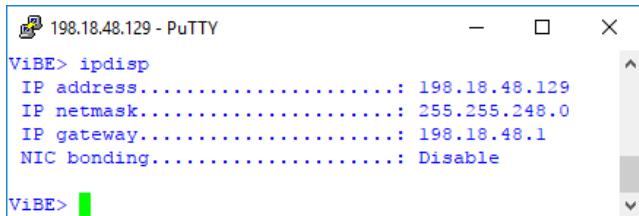
User operations and related commands	Command description & page
• pdcsave	To save a configuration, Saving a Current Configuration (pdcsave)
• pdcload	To load a predefined configuration, Loading a Predefined Configuration (pdcload)
• pdcrem	To delete a predefined configuration, Deleting a Predefined Configuration (pdcrem)
• pdcget	To get the description of a predefined configuration, Reading the Description of a Predefined Configuration (pdcget)
Managing community strings and SNMP agent information	
• rinfo	To display SNMP agent information, Reading SNMP Agent Information (rinfo)
• winfo	To write SNMP agent information, Writing SNMP Agent Information (winfo)
• cred	To display the list of community strings, Displaying the List of community strings (cred)
• clist	To display the list of temporary community strings, Displaying the List of Temporary community strings (clist)
• cadd	To add a community string, Adding a community string (cadd)
• cdel	To delete a community string, Deleting a community string (cdel)
• csave	To save the list of community strings, Saving the List of community strings (csave)
Managing REST API interface	
• rstrest	To reset REST API password
Displaying FPGA Gateware	
• getgatw	To display the Gateware currently in use. Verbose name of the FPGA Firmware Version

Description of basic parameters

Commands related to IP parameters

Displaying IP Parameters (ipdisp)

To display the equipment IP parameters, type ipdisp after the ViBE prompt:



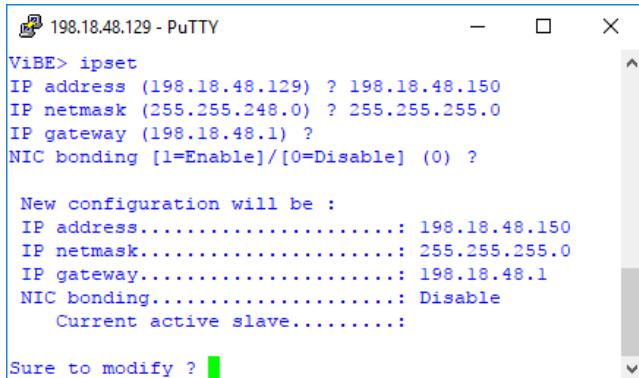
```
198.18.48.129 - PuTTY
ViBE> ipdisp
IP address.....: 198.18.48.129
IP netmask.....: 255.255.248.0
IP gateway.....: 198.18.48.1
NIC bonding.....: Disable

ViBE>
```

Figure 5-12: Displaying equipment IP parameters - ipdisp command

Editing IP Parameters (ipset)

To edit the equipment IP parameters, type ipset after the ViBE prompt:



```
198.18.48.129 - PuTTY
ViBE> ipset
IP address (198.18.48.129) ? 198.18.48.150
IP netmask (255.255.248.0) ? 255.255.255.0
IP gateway (198.18.48.1) ?
NIC bonding [1=Enable]/[0=Disable] (0) ?

New configuration will be :
IP address.....: 198.18.48.150
IP netmask.....: 255.255.255.0
IP gateway.....: 198.18.48.1
NIC bonding.....: Disable
Current active slave....:

Sure to modify ?
```

Figure 5-13: Editing equipment IP parameters - ipset command

- Enter the new value of the parameter(s) to be edited and press Return. If the parameter does not require editing, you do not need to enter its value. Just press Return straight after? to confirm the current value.
If the IP gateway address is not used, type 0.0.0.0.
If the NIC bonding feature is set to 1 (Enable), **eth0** (Control 1) or **eth1** (Control 2) must be entered. This value indicates the control/command connector to be used after an equipment reboot.
- Type **y** after **Sure to modify?** if you wish to confirm the new configuration or **n** if you wish to keep the previous configuration.

 **NOTE:**

- The changes will be acknowledged after the equipment has been rebooted.
- The equipment must be connected to the network during the boot which follows IP address configuration to facilitate detection of MAC/IP address pair changes.

Editing IP NIC Bonding Parameter (iptogg)

The NIC bonding feature must be enabled. Refer to the NIC bonding parameter above.

Type **iptogg** after the ViBE prompt:

```
198.18.48.129 - PuTTY
ViBE> iptogg
NIC bonding.....: Enable
Active slave (eth0) [eth0/eth1] ? eth0
Reboot to apply new IP parameters
ViBE>
```

Figure 5-14: Editing equipment IP parameters - **iptogg** command

- Enter the value of the control input **eth0** (Control 1) or **eth1** (Control 2) to be used. This value is the control input to use after an equipment reboot.
- Type **y** after **Sure to modify?** if you wish to confirm the new configuration or **n** to keep the previous configuration.

Commands related to the Date and Time

Displaying the Current Date and Time (ddate)

To display the current date and time, type **ddate** after the ViBE prompt:

```
198.18.48.129 - PuTTY
ViBE> ddate
Tue Sep 12 15:10:35 UTC 2017
ViBE>
```

Figure 5-15: Displaying the current date and time - **ddate** command

UTC date and time will be displayed.

Editing the Date and Time (sdate)

To edit the date and time, type **sdate** after the ViBE prompt:

```
198.18.48.129 - PuTTY
ViBE> sdate
Current UTC time is : Tue Sep 12 15:12:36 UTC 2017
Enter the new UTC time with the format MMDDhhmmYYYY
UTC time ? 09121508002017
Apply date&time now ? y
date: can't set date: Invalid argument
Sat Sep 12 15:08:00 UTC 20
Done
ViBE>
```

Figure 5-16: Editing the date and time - **sdate** command

Enter the following fields:

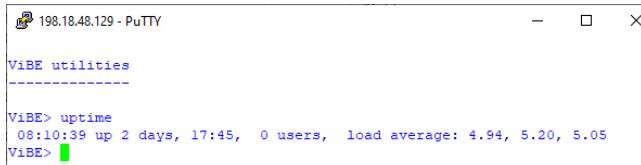
- Type the new date and time values in month, day, hour, minute and year format (without spaces) after **UTC time?**.
- Type **y** after **Apply date&time now?** if you wish to confirm the new values or **n** if you wish to keep the previous values.

The **Done** message will be displayed to indicate that the changes have been acknowledged.

Command related to device uptime

Get device uptime

To get device uptime, type `uptime` after the ViBE prompt:



```
198.18.48.129 - PuTTY
ViBE utilities
-----
ViBE> uptime
08:10:39 up 2 days, 17:45, 0 users, load average: 4.94, 5.20, 5.05
ViBE>
```

Figure 5-17: Get device uptime - uptime command

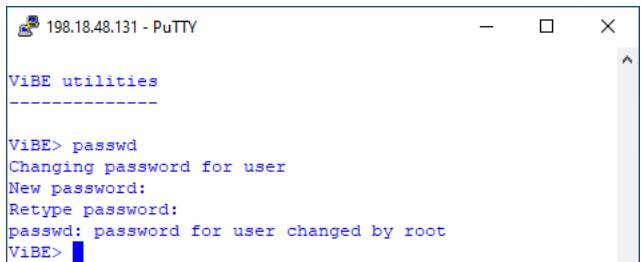
How to interpret the result:

- 08:10:39 = current time
- 2 days, 17:45 = how long the system has been in operation (2 days, 17 hours and 45 minutes)
- users = not used
- load average = load of the system (load average over 1 minute - load average over 5 minutes - load average over 15 minutes).

Commands related to SSH password

Change SSH user password

To change the SSH user password , type `passwd` after the ViBE prompt:



```
198.18.48.131 - PuTTY
ViBE utilities
-----
ViBE> passwd
Changing password for user
New password:
Retype password:
passwd: password for user changed by root
ViBE>
```

Figure 5-18: Changing SSH user password

Type in the new password.

Retype password for confirmation.

 **CAUTION:** After a version upgrade, due to implementation of security evolution, the password MAY be reseted and changed back to default password (user / user).

Commands related to NTP Configuration

The purpose of NTP (Network Time Protocol) is to synchronize devices via a shared network. An external NTP server serves as a reference for the equipment, which is an NTP client (its internal clock is synchronized with the NTP server).

Displaying NTP Server Status and IP Address (dntp)

To display the NTP server status and IP address, type dntp after the ViBE prompt:

```
ViBE> dntp
NTP time synchronization : Disable
Preferred NTP server address :

ViBE>
```

Figure 5-19: Displaying NTP server status and IP address - dntp command

Editing NTP Server Status and IP Address (sntp)

To edit the NTP server status and IP address, type sntp after the ViBE prompt:

```
ViBE> sntp
NTP time synchronization [1=Enable]/[0=Disable] (0) 1
Preferred NTP server IP address () : 192.168.40.41
Enable NTP time synchronization (server 192.168.40.41)
Change takes effect after board reboot

ViBE>
```

Figure 5-20: Editing NTP server status and IP address - sntp command

- To enable/disable time synchronization, type 1 (Enable) or 0 (Disable).
- To edit the server IP address, type the new address on the second line.

NOTE:

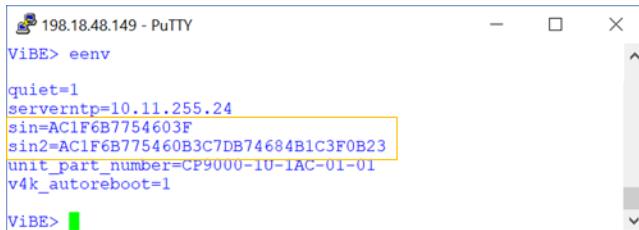
- The changes will be acknowledged after the equipment has been rebooted.
- The first synchronization operation may take up to 20 minutes.

Commands related to Scrambling BISS Mode E

Scrambling BISS Mode E - Buried-id

The ID Buried-id is an identifier that uniquely identifies a particular CP9000.

The Buried-id is stored in clear in the equipment in the environment variable **sin** (key for BISS1), **sin2** (key for BISS2) and can be read through the command: eenv



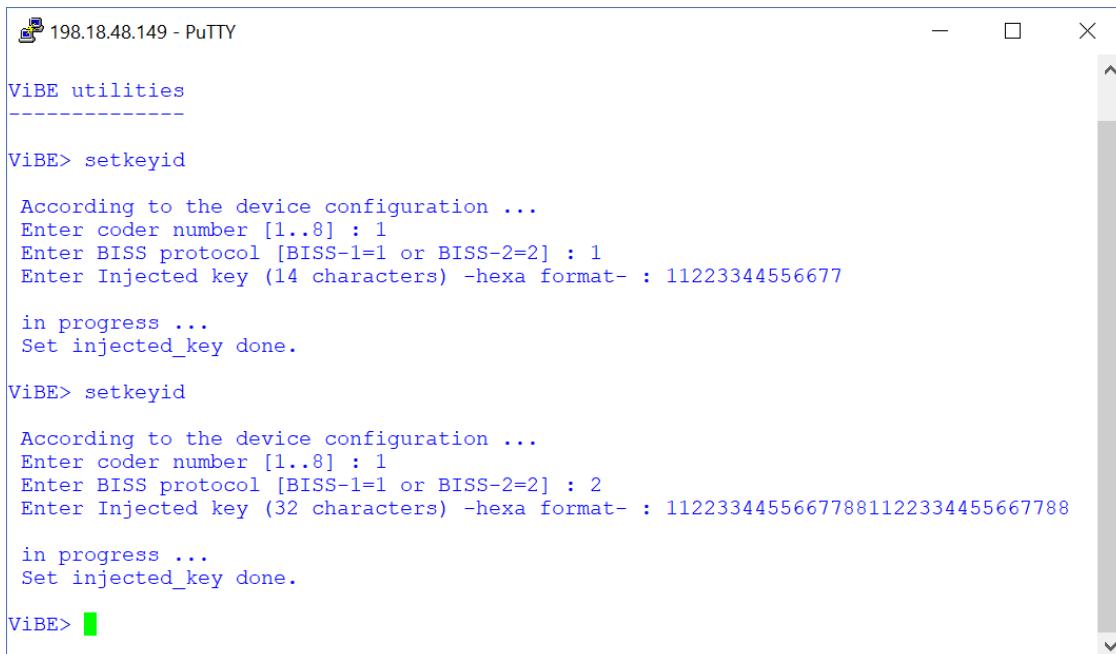
```
198.18.48.149 - PuTTY
ViBE> eenv
quiet=1
serverntp=10.11.255.24
sin=AC1F6B7754603F
sin2=AC1F6B775460B3C7DB74684B1C3F0B23
unit_part_number=CP9000-1U-IAC-01-01
v4k_autoreboot=1
ViBE>
```

Figure 5-21: Biss mode E - Read the Buried-idScrambling BISS Mode E - Injected-id

Scrambling BISS Mode E - Injected id

The ID Injected-id is an identifier that can be entered in the CP9000 by the user at any time.

Up to 8 Injected-id Key (one per Transport Stream) can be entered through the command: setkeyid



```
198.18.48.149 - PuTTY
ViBE utilities
-----
ViBE> setkeyid
According to the device configuration ...
Enter coder number [1..8] : 1
Enter BISS protocol [BISS-1=1 or BISS-2=2] : 1
Enter Injected key (14 characters) -hexa format- : 11223344556677
in progress ...
Set injected_key done.

ViBE> setkeyid
According to the device configuration ...
Enter coder number [1..8] : 1
Enter BISS protocol [BISS-1=1 or BISS-2=2] : 2
Enter Injected key (32 characters) -hexa format- : 11223344556677881122334455667788
in progress ...
Set injected_key done.

ViBE>
```

Figure 5-22: Biss mode E - Set the Injected-id

Commands related to Chassis Topology

Displaying Chassis Topology (read)

To display the equipment chassis topology, type `read` after the ViBE prompt:

```

ViBE utilities
-----
ViBE> read

Chassis [1....1]
slots      id      type          Boards
-----
[1]        1  EM Encoder  [ENCODING-Board]
[1]        2  EM Encoder  [ENCODING-Board]
[1]        3  EM Encoder  [ENCODING-Board]
[1]        4  EM Encoder  [ENCODING-Board]
[5]        9  EM Controller  [MAIN-Board]

ViBE>

```

Figure 5-23: Displaying equipment chassis topology - read command

The following information will be displayed:

- **slots**: Slot number
- **id**: Board ID number
- **type**: Type of the board
- **Boards**: Name of the board

Displaying Status, RID and Part Number (shelf)

To display the boards installed in the chassis together with their ordering references and names, type **shelf** after the ViBE prompt:

Slot	Status	RID	Part number	Name
Shelf : CP9000 shelf	OK	CP9000-1U-2AC-01-01	CP9000	

Figure 5-24: Displaying equipment status, RID and Part Number - shelf command

- **Slot**: slot number. Shelf refers to the chassis;
- **Status**: status of board in the slot. Possible messages are:
 - **CP9000 shelf**
- **RID**: indicates whether the read information is correct. Possible messages are:
 - **OK**: the information is correct
 - **Not Read**: the information has not been read
- **Part number**: Chassis ordering reference
- **Name**: Chassis name

Managing Software Licenses

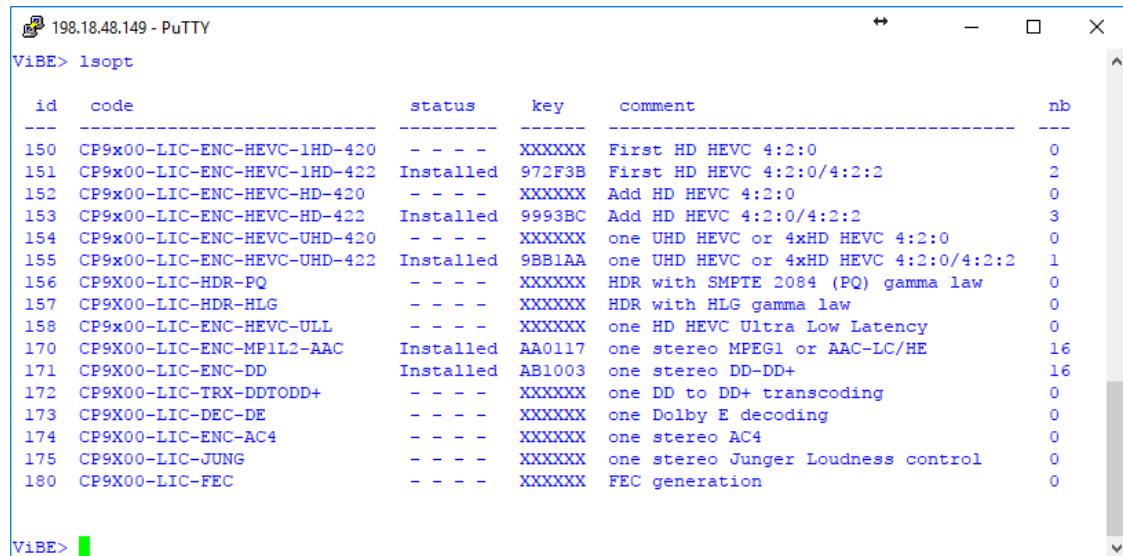
Software licenses are managed via the Local Console.

The purpose of this section is to explain the procedures for displaying device software license status and ordering and installing software licenses.

 **NOTE:** If licenses are ordered with the product, they will have been installed at the factory and will be immediately available to the operator.

Displaying Software Licenses (lsopt)

To display the software licenses installed, type lsopt after the ViBE prompt:



```

198.18.48.149 - PuTTY
ViBE> lsopt
id   code          status    key      comment                                nb
--- -----
150  CP9x00-LIC-ENC-HEVC-1HD-420  ----- XXXXXX First HD HEVC 4:2:0        0
151  CP9x00-LIC-ENC-HEVC-1HD-422  Installed 972F3B First HD HEVC 4:2:0/4:2:2  2
152  CP9x00-LIC-ENC-HEVC-HD-420  ----- XXXXXX Add HD HEVC 4:2:0           0
153  CP9x00-LIC-ENC-HEVC-HD-422  Installed 9993BC Add HD HEVC 4:2:0/4:2:2  3
154  CP9x00-LIC-ENC-HEVC-UHD-420  ----- XXXXXX one UHD HEVC or 4xHD HEVC 4:2:0  0
155  CP9x00-LIC-ENC-HEVC-UHD-422  Installed 9BB1AA one UHD HEVC or 4xHD HEVC 4:2:0/4:2:2 1
156  CP9X00-LIC-HDR-PQ          ----- XXXXXX HDR with SMPTE 2084 (PQ) gamma law  0
157  CP9X00-LIC-HDR-HLG         ----- XXXXXX HDR with HLG gamma law       0
158  CP9x00-LIC-ENC-HEVC-ULL    ----- XXXXXX one HD HEVC Ultra Low Latency  0
170  CP9X00-LIC-ENC-MP1L2-AAC   Installed AA0117 one stereo MPEG1 or AAC-LC/HE  16
171  CP9X00-LIC-ENC-DD          Installed AB1003 one stereo DD-DD+           16
172  CP9X00-LIC-TRX-DDTODD+     ----- XXXXXX one DD to DD+ transcoding  0
173  CP9X00-LIC-DEC-DE          ----- XXXXXX one Dolby E decoding        0
174  CP9X00-LIC-ENC-AC4         ----- XXXXXX one stereo AC4            0
175  CP9X00-LIC-JUNG          ----- XXXXXX one stereo Junger Loudness control 0
180  CP9X00-LIC-FEC           ----- XXXXXX FEC generation          0

```

Figure 5-25: Displaying software license status - lsopt command

The following information will be displayed:

- **id:** software license ID number
- **code:** software license sales reference
- **status:** license status; **installed** indicates that the license has been installed, **-----** indicates that the license has not been installed
- **key:** key used to install the license
- **comment:** license name.
- **nb:** number of licenses installed

Ordering and Installing Software Licenses

To order and install a software license, please observe the following procedure:

1. Order the software license from Harmonic by providing the equipment code and the serial number of the equipment.
2. Install the license using the key supplied by Harmonic.

Ordering a Software License (eqcod) (drid)

1. Read the device equipment code and product serial number

Two methods are available:

- via the Local Console
 - via a Web Browser
- a. Reading the device equipment code and product serial number via the Local Console

To read the device equipment code, type eqcod after the ViBE prompt:

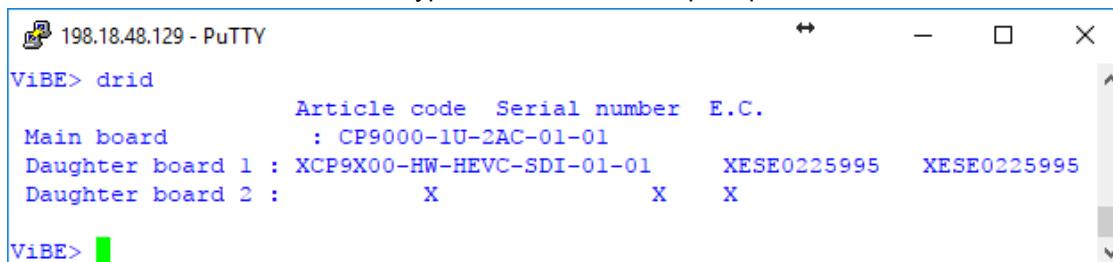


The screenshot shows a PuTTY terminal window titled "198.18.48.149 - PuTTY". The window contains the following text:
ViBE> eqcod
equipment code.....: 6EE6
ViBE>

Figure 5-26: Reading the equipment code via the Local Console - eqcod command

The code will be displayed.

To read the device serial number, type drid after the ViBE prompt:



The screenshot shows a PuTTY terminal window titled "198.18.48.129 - PuTTY". The window contains the following text:
ViBE> drid
Article code Serial number E.C.
Main board : CP9000-1U-2AC-01-01
Daughter board 1 : XCP9X00-HW-HEVC-SDI-01-01 XESE0225995 XESE0225995
Daughter board 2 : X X X
ViBE>

Figure 5-27: Reading the product serial number via the Local Console - drid command

The serial number will be displayed.

- b. Reading the device equipment code and product serial number via a Web Browser

The device equipment code and product serial number can be read via a Web Browser connected to the equipment's Web Interface. Select **HW/SW Information** in the Status page. For further information about operation via the Web Interface, see section [Web Browser Interface](#).

Hardware			
Sales Part	Industrial Part	Quantity	Name
CP9000-1U-2AC			
CP9000-1U-2AC-01-01			X11 platform with 1 Intel Xeon Processor Intel E3-1225 SkyLake
Hardware Installed options			
Sales Part	Industrial Part	Quantity	Name
CP9000-OPT-1AC-01-01	CP9X00-OPT-1AC-01-01	0	CP9K 2ND OR SPARE AC PSU
CP9X00-HW-ASI-DUAL	CP9X00-HW-ASI-01-01	0	CP9K DUAL ASI CARD
CP9X00-HW-HEVC-SDI	CP9X00-HW-HEVC-SDI-01-01	0	CP9K HEVC CARD - SDI IN
CP9X00-HW-HEVC-IP	CP9X00-HW-HEVC-IP-01-01	1	CP9K HEVC CARD - SDI&IP IN
CP9X00-HW-ASI-4	CP9X00-HW-ASI-04-01-02	0	CP9K QUAD ASI CARD
CP9X00-HW-HEVC-IP V2	CP9X00-HW-HEVC-IP-V2-01-01	0	CP9K HEVC CARD - SDI&IP IN V2
CP9X00-HW-ASI-4	CP9X00-HW-ASI-04-02-01	1	CP9K QUAD ASI CARD
Software Installed options			
Sales Part	Industrial Part	Quantity	Name
CP9X00-LIC-ENC-HEVC-1HD-420	CP9X00-LIC-ENC-HEVC-1HD-420-01	0	First HD HEVC/AVC 4:2:0
CP9X00-LIC-ENC-HEVC-1HD-422	CP9X00-LIC-ENC-HEVC-1HD-422-01	0	First HD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-HEVC-HD-420	CP9X00-LIC-ENC-HEVC-HD-420-01	0	Add HD HEVC/AVC 4:2:0
CP9X00-LIC-ENC-HEVC-HD-422	CP9X00-LIC-ENC-HEVC-HD-422-01	0	Add HD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-HEVC-HD	CP9X00-LIC-ENC-HEVC-HD-01-01	0	one HD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-HEVC-UHD-420	CP9X00-LIC-ENC-HEVC-UHD-420-01	0	one UHD HEVC or 4xHD HEVC/AVC 4:2:0
CP9X00-LIC-ENC-HEVC-UHD-422	CP9X00-LIC-ENC-HEVC-UHD-422-01	1	one UHD HEVC or 4xHD HEVC/AVC 4:2:0/4:2:2
CP9X00-LIC-HDR-PQ	CP9X00-LIC-HDR-PQ-01	0	HDR with SMPTE 2084 (PQ) gamma law
CP9X00-LIC-HDR-HLG	CP9X00-LIC-HDR-HLG-01	0	HDR with HLG gamma law
CP9X00-LIC-HDR	CP9X00-LIC-HDR-01	4	HDR with HLG and PQ gamma law
CP9X00-LIC-ENC-HEVC-ULL	CP9X00-LIC-ENC-HEVC-ULL-01	1	one HD or UHD HEVC Ultra Low Latency
CP9X00-LIC-ENC-HEVC-UHD-420	CP9X00-LIC-ENC-HEVC-UHD-420-01	0	PQLP HEVC 4:2:0
CP9X00-LIC-ENC-AVC-1HD-422	CP9X00-LIC-ENC-AVC-1HD-422-01	0	First HD AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-AVC-HD-420	CP9X00-LIC-ENC-AVC-HD-420-01	0	Add HD AVC 4:2:0
CP9X00-LIC-ENC-AVC-HD-422	CP9X00-LIC-ENC-AVC-HD-422-01	0	Add HD AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-AVC-UHD-420	CP9X00-LIC-ENC-AVC-UHD-420-01	0	one UHD AVC or 4xHD AVC 4:2:0/4:2:2
CP9X00-LIC-ENC-AVC-UHD-422	CP9X00-LIC-ENC-AVC-UHD-422-01	0	one UHD AVC or 4xHD AVC 4:2:0/4:2:2
CP9X00-LIC-DD	CP9X00-LIC-DD-01	12	one stereo DD+HE
CP9X00-LIC-TRX-DDTODD+	CP9X00-LIC-TRX-DDTODD+-01	0	one DD or DD+ transcoding to DD or DD+ or MP1L2
CP9X00-LIC-DEC-DEC	CP9X00-LIC-DEC-DE-01	4	one Dolby E decoding
CP9X00-LIC-ENC-AC4	CP9X00-LIC-ENC-AC4-01	0	one stereo AC4
CP9X00-LIC-JUNG	CP9X00-LIC-JUNG-01	0	one stereo Jungsing Loudness control
CP9X00-LIC-FEC	CP9X00-LIC-FEC-01	2	one FEC generation from SCTE104 to SCTE35
CP9X00-LIC-FEC	CP9X00-LIC-FEC-01	0	FEC generation
CP9X00-LIC-SMPTE-2110	CP9X00-LIC-SMPTE-2110-01	0	one IP SMPTE 2110 Input Service (one per HD, 1xIHD=4xHD)
CP9X00-LIC-BISS-CA	CP9X00-LIC-BISS-CA-01	0	BISS-2 mode CA (BISS-CA) encryption (license per unit)
CP9X00-LIC-LOGO-SLATE	CP9X00-LIC-LOGO-SLATE-01	1	Logo or slate insertion (license per unit)
CP9X00-LIC-GEO-SYNC	CP9X00-LIC-GEO-SYNC-01	1	geo-synchronization between CP9000(license per unit)
Add option			
Product Identification			
Active package	CP9000_03.00.00_003_SUDO		
Previous package	CP9000_03.00.00_006_RC		
Current equipment number	CP9000		
Configuration sale ref			
Configuration serial number			
Configuration chassis count	1		
Manufacturing date			
Inactive package	CP9000_02.60.00.006_A		
Inactive package	CP9000_02.80.03.000_RC		
Inactive package	CP9000_02.90.00.005_A		
Inactive package	CP9000_03.00.00.006_RC		
Download a new package			
MAIN-Board			
Board Type	MAIN-Board		
Prod Unit Part Number	CP9000-1U-2AC-01-01		
Product Serial Number			
Prod Unit Variant Number			
Equipment Code	D2B0		
Power 1 Part Number			
Power 1 Serial Number			
Power 2 Part Number			
Power 2 Serial Number			
ENCODING-Board 1			
Board Type	ENCODING-Board		
Prod Unit Part Number	CP9X00-HW-HEVC-SDI-01-01		
Product Serial Number			
Board Id			
ASI-OUT-Board			
Board Type	ASI-OUT-Board		
Prod Unit Part Number	CP9X00-HW-ASI-04-01-01		
Product Serial Number	ESE0228755		
Board Id	9692A33111E		

Figure 5-28: Reading the equipment code and the serial number via a Web Browser

- Provide Harmonic with the equipment code and specify the software license required. Harmonic will then supply a specific key (which is unique and can only be used for this equipment).
- Install the software license. See section [Installing a Software License \(insopt\)](#).

Installing a Software License (insopt)

To install a software license using the code supplied by Harmonic:

- Type `insopt` after the ViBE prompt:
- Enter the software license key.

```
ViBE> insopt
Option key : AF812C
Installation in progress...
Install option done.
```

Figure 5-29: Enabling a software license - insopt command

The **install option done** message will be displayed to indicate that the license has been installed.

You can also ensure that the license has been confirmed using the **lsopt** command (See section [Displaying Software Licenses \(lsopt\)](#)).

NOTE: When an installed license is edited (i.e. if the number of AAC audios must be increased), this license will need to be uninstalled before being reinstalled with the new key (see section below).

Uninstalling a Software License (rmopt)

To uninstall a software license, you will need its id. This information can be displayed using the **lsopt** command:

id	code	status	key	comment	nb
170	CP9X00-LIC-ENC-MP1L2-AAC	Installed	AA0117	one stereo MPEG1 or AAC-LC/HE	16
171	CP9X00-LIC-ENC-DD	Installed	AB1003	one stereo DD-DD+	16
172	CP9X00-LIC-TRX-DDTODD+	- - -	XXXXXX	one DD to DD+ transcoding	0
173	CP9X00-LIC-DEC-DE	- - -	XXXXXX	one Dolby E decoding	0
174	CP9X00-LIC-ENC-AC4	- - -	XXXXXX	one stereo AC4	0
175	CP9X00-LIC-JUNG	Installed	AF812C	one stereo Junger Loudness control	1
180	CP9X00-LIC-FEC	- - -	XXXXXX	FEC generation	0

ViBE> [yellow box] License to uninstall

Figure 5-30: Displaying license id and new license installed

To uninstall a software license:

1. Type **rmopt** after the ViBE prompt:
2. Enter the license id of the license to be uninstalled:

```
ViBE> rmopt
Option id : 175
Remove option done.
```

Figure 5-31: Uninstalling a software license - rmopt command

The **remove option done** message will be displayed to indicate that the license has been uninstalled.

Recovering Lost Keys

If you lose a software license key, please contact Harmonic Customer Services with:

- License purchase order
- Device **equipment code**
- Ordering reference of the license relating to the lost key.

Managing Video Licenses

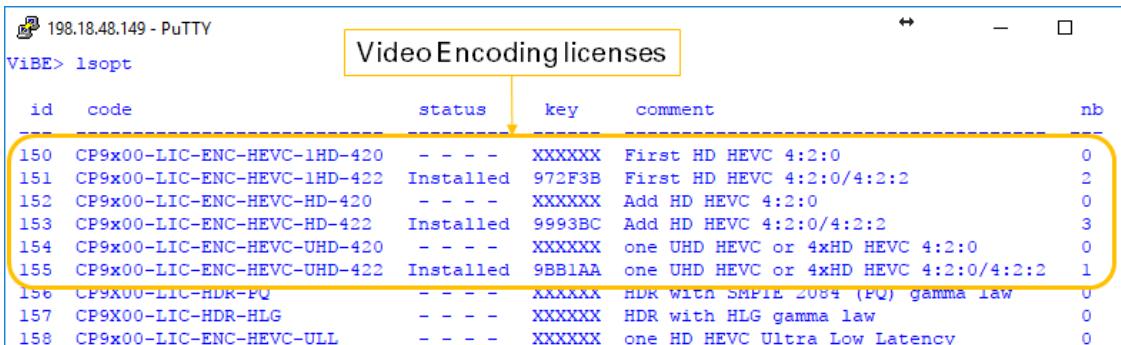
Video licenses are managed via the Local Console.

Video license management follows the same procedures as software license management (refer to section [Managing Software Licenses](#)).

 **NOTE:** If video licenses are ordered with the product, they will have been installed in-factory and be immediately available to the operator.

Example:

- Displaying video licenses



id	code	status	key	comment	nb
150	CP9x00-LIC-ENC-HEVC-1HD-420	-- -- -	XXXXXX	First HD HEVC 4:2:0	0
151	CP9x00-LIC-ENC-HEVC-1HD-422	Installed	972F3B	First HD HEVC 4:2:0/4:2:2	2
152	CP9x00-LIC-ENC-HEVC-HD-420	-- -- -	XXXXXX	Add HD HEVC 4:2:0	0
153	CP9x00-LIC-ENC-HEVC-HD-422	Installed	9993BC	Add HD HEVC 4:2:0/4:2:2	3
154	CP9x00-LIC-ENC-HEVC-UHD-420	-- -- -	XXXXXX	one UHD HEVC or 4xHD HEVC 4:2:0	0
155	CP9x00-LIC-ENC-HEVC-UHD-422	Installed	9BB1AA	one UHD HEVC or 4xHD HEVC 4:2:0/4:2:2	1
156	CP9X00-LIC-HDR-PQ	-- -- -	XXXXXX	HDR with SMPTE 2084 (PQ) gamma law	0
157	CP9X00-LIC-HDR-HLG	-- -- -	XXXXXX	HDR with HLG gamma law	0
158	CP9x00-LIC-ENC-HEVC-ULL	-- -- -	XXXXXX	one HD HEVC Ultra Low Latency	0

Figure 5-32: Displaying video license(s) - lsopt command

- Ordering and installing video licenses

To order and install a video license, please observe the following procedure:

1. Order the video license from Harmonic by providing the equipment code and the serial number of the device (refer to section [Ordering and Installing Software Licenses](#)).
2. Install the video license using the key supplied by Harmonic (refer to section [Installing a Software License \(insopt\)](#)).

Managing Web Interface Users

The equipment can be operated via a Web Browser connected to the Web Interface featured on the device. Users accessing the equipment via this Interface must have been declared in the device. User declaration and management (creation, deletion, password, rights, etc.) are performed via the Local Console. To see Users and Profiles available, refer to [Table 10: Users set on equipment shipment](#) and [Table 11: User profiles and corresponding rights](#).

Adding a User (usradd)

To add a User, type `usradd` after the **ViBE** prompt:

```

198.18.48.143 - PuTTY

ViBE utilities
-----
ViBE> usradd
Add user
  name ..... : Maintenance_1
  password ..... :
  confirm password ... :
  - administrator
  - operator
  profile ..... : operator
  add Maintenance_1 as operator
  Done.

ViBE>

```

Figure 5-33: Adding a Web Interface User - `usradd` command

Enter the following fields:

- **name**: User name
- **password**: password for accessing the Web Interface
- **confirm password**: re-enter the password for accessing the Web Interface
- **profile**: enter the User profile. Two available profiles are given just above this field.

The following information will be displayed:

- **add xxxxxx as yyyyymm**: User **xxxxxx** with the profile **yyyyymm** has been successfully added.
If the operation is not successful, the reason for failure will be displayed.

Deleting a User (usrdel)

To delete a User, type `usrdel` after the **ViBE** prompt:

```

198.18.48.143 - PuTTY

ViBE utilities
-----
ViBE> usrdel
Remove user
  name ..... : Maintenance_1
  remove Maintenance_1
  Done.

ViBE>

```

Figure 5-34: Deleting a Web Interface User - `usrdel` command

Enter the following fields:

- **name:** name of User to be deleted

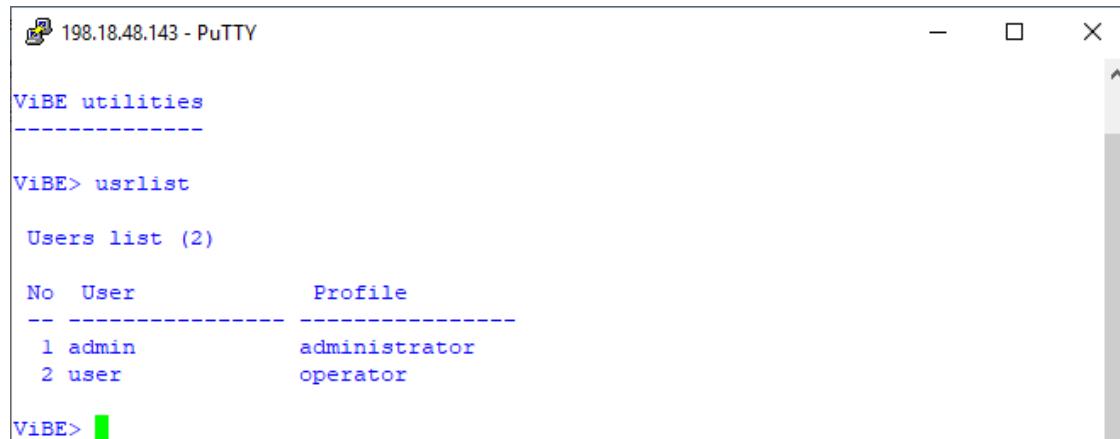
The following information will be displayed:

remove xxxx: User **xxxxx** has been successfully deleted.

If the operation is not successful, the reason for failure will be displayed.

Displaying the List of Users (usrlist)

To display the list of Users and their profiles, type usrlist after the **ViBE** prompt:



```
198.18.48.143 - PuTTY
ViBE utilities
-----
ViBE> usrlist
Users list (2)
No  User          Profile
--- -----
1  admin         administrator
2  user          operator
ViBE>
```

Figure 5-35: Displaying the list of Web Interface Users - usrlist command

The following information will be displayed:

- **User:** User name
- **Profile:** User profile

Managing Predefined Configurations

Predefined configurations are stored configurations.

The User can store a maximum of 32 configurations.

The Local Console is used to manage configurations (saving, loading, deleting, status reading, etc.). It cannot be used to define configuration contents. Configuration contents are defined via the Web Interface (which is also used for configuration management).

Table 5-2: Configuration use according to the application

	Local Console	Web Interface
Defining configurations		X
Managing configurations (saving, loading, deleting)	X	X

 **NOTE:** There is no locking mechanism between the different interfaces which have access to predefined configurations. It is therefore up to the User to manage operation of these interfaces.

Saving a Current Configuration (pdcsave)

To save a current configuration, type pdcsave after the ViBE prompt:

```
198.18.48.149 - PuTTY
ViBE> pdcsave

Topology :
cuid      0 - CHASSIS
cuid      1 - EM_ENCODER
cuid      2 - EM_ENCODER
cuid      3 - EM_ENCODER
cuid      4 - EM_ENCODER

cuid to save : 0
conf number : 5
author : TB
comment :
save cuid 0 in conf 5 OK
ViBE>
```

Figure 5-36: Saving a current configuration via the Local Console - *pdcsave command*

Enter the following fields:

- **cuid to save:**
 - 0: The configuration of the equipment is saved.
 - x: Not applicable.
 - **conf number:** enter the number assigned to the configuration (1 to 32). If the number is already being used, the predefined configuration corresponding to this number will be overwritten.
- NOTE:** Some numbers are reserved for predefined configurations stored in-factory and cannot be overwritten.
- **author:** enter the name of the predefined configuration's author.
 - **comment:** enter a personal comment to identify the configuration.

The following information will be displayed:

- **save cuid x in conf yy OK:** storage in memory has been performed successfully.

If the operation is not successful, the **save KO <xxxx>** message will be displayed where **xxxx** indicates the reason for failure.

Loading a Predefined Configuration (pdclload)

To load a predefined configuration, type pdclload after the ViBE prompt:

```
198.18.48.149 - PuTTY
ViBE> pdclload
conf number : 5
cuid : 0
load conf 5 in cuid 0 OK
ViBE>
```

Figure 5-37: Loading a predefined configuration via the Local Console - *pdclload command*

Enter the following fields:

- **conf number:** enter the predefined configuration number (**1 to 32**);
- **cuid:** enter the predefined configuration cuid:

- 0: The configuration is applied to the equipment.
- x: Not applicable.

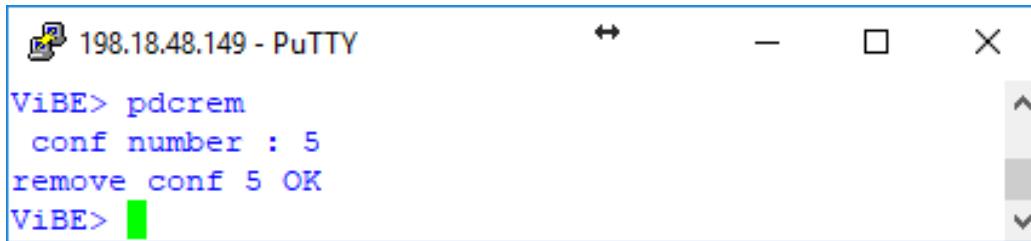
The following information will be displayed:

- **load conf x OK:** configuration x has been successfully loaded (a warning message may be displayed).

If the operation is not successful, the **load KO <xxxx>** message will be displayed where **xxxx** indicates the reason for failure.

Deleting a Predefined Configuration (pdcrem)

To delete a predefined configuration, type pdcrem after the **ViBE** prompt:



```
ViBE> pdcrem
conf number : 5
remove conf 5 OK
ViBE>
```

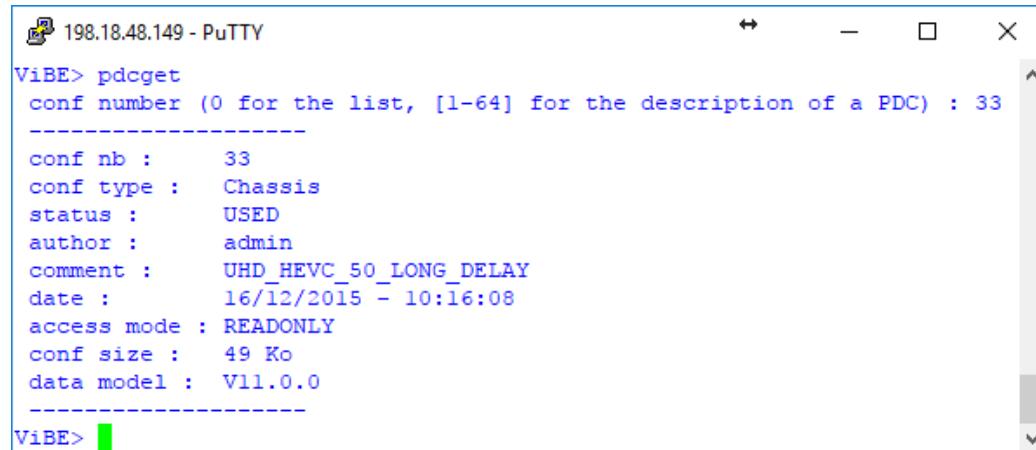
Figure 5-38: Deleting a predefined configuration via the Local Console - pdcrem command

Enter the following fields:

- **conf number:** enter the number of the predefined configuration to be deleted.
 - ❑ **NOTE:** Some configurations (33 to 64) are predefined configurations stored in-factory. They cannot be deleted.
- The following information will be displayed:
- **remove conf xx OK:** configuration xx has been successfully deleted (a warning message may be displayed).
- If the operation is not successful, the **remove KO <xxxx>** message will be displayed where **xxxx** indicates the reason for failure.

Reading the Description of a Predefined Configuration (pdcget)

To read the description of a predefined configuration, type pdcget after the ViBE prompt:



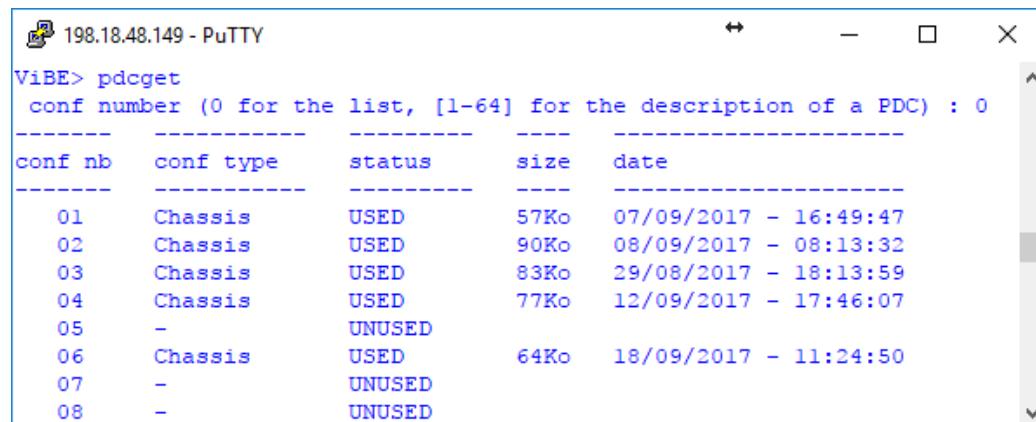
```
198.18.48.149 - PuTTY
ViBE> pdcget
conf number (0 for the list, [1-64] for the description of a PDC) : 33
-----
conf nb :      33
conf type :   Chassis
status :     USED
author :    admin
comment :  UHD_HEVC_50_LONG_DELAY
date :    16/12/2015 - 10:16:08
access mode : READONLY
conf size :  49 Ko
data model : V11.0.0
-----
ViBE>
```

Figure 5-39: Reading a predefined configuration description via the Local Console - pdcget

Enter the following fields:

- **conf number:** enter the predefined configuration number. Also refer to the note below.
The following information will be displayed:
- **conf nb:** predefined configuration number
- **conf type:** Not applicable
- **status:** **USED** indicates that the configuration is being used (**UNUSED** if not)
- **author:** name of the configuration's author (entered on creation of the predefined configuration)
- **comment:** comment entered on creation of the predefined configuration
- **date:** UTC time and date when the configuration was created
- **access mode:** configuration rights (**READ/WRITE** or **READ ONLY**)
- **size:** size of the memory used by the configuration
- **data model:** release of the NCCP protocol

 **NOTE:** To display the status, size and creation date of all the predefined configurations, type 0 as the conf number value.



```
198.18.48.149 - PuTTY
ViBE> pdcget
conf number (0 for the list, [1-64] for the description of a PDC) : 0
-----
----- ----- ----- -----
conf nb conf type   status   size   date
----- ----- ----- -----
  01   Chassis     USED    57Ko  07/09/2017 - 16:49:47
  02   Chassis     USED    90Ko  08/09/2017 - 08:13:32
  03   Chassis     USED    83Ko  29/08/2017 - 18:13:59
  04   Chassis     USED    77Ko  12/09/2017 - 17:46:07
  05   -           UNUSED
  06   Chassis     USED    64Ko  18/09/2017 - 11:24:50
  07   -           UNUSED
  08   -           UNUSED
```

Managing Community Strings and SNMP Agent Information

Community strings are identifiers that validate SNMP messages.

Community string principles are used in order to have a simplified access rights mechanism for SNMP requests.

Each *community string* is associated with an access level. All traps transporting MIB variables to the NMS are sent with a *community string* set to **public**.

The access level is used to refuse write access to an MIB variable for a specific *community string*, even if the MIB authorizes this write access.

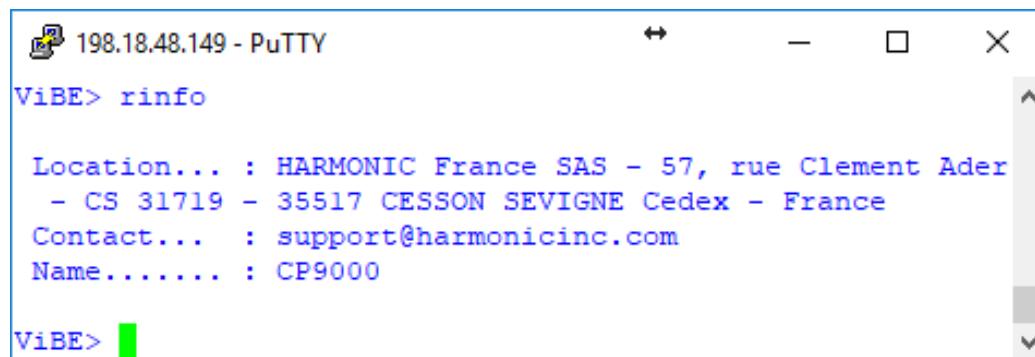
The Local Console is used to manage *community strings*. A maximum of 30 *community strings* can be created. The device is shipped with 2 predefined *community strings* (a **THVNPUBLIC** one with read only rights and a **THVNPRIVATE** one with read/write rights).

The list of *community strings* is edited in a temporary memory using the Cadd or Cdel commands. The contents of this temporary memory are sent to the *community string* memory (used by the SNMP agent) using the **csave** command. You can view the content of the community string memory at any time using the **cread** command. The **cread** command displays the contents of the *community string* memory and resets the temporary memory.

The Local Console is also used to define *sysContact*, *sysName* and *sysLocation* information for the SNMP agent Mib-2.system branch.

Reading SNMP Agent Information (rinfo)

To read SNMP agent Mib-2.system branch *sysContact*, *sysName* and *sysLocation* information, type rinfo after the *ViBE* prompt:



A screenshot of a PuTTY terminal window titled "198.18.48.149 - PuTTY". The window shows the command "ViBE> rinfo" followed by the output:
Location... : HARMONIC France SAS - 57, rue Clement Ader
- CS 31719 - 35517 CESSION SEVIGNE Cedex - France
Contact... : support@harmonicinc.com
Name..... : CP9000
ViBE>

Figure 5-40: Reading SNMP information - rinfo command

The following information will be displayed:

- **Location:** *sysLocation* information
- **Contact:** *sysContact* information
- **Name:** *sysName* information

Writing SNMP Agent Information (winfo)

To write SNMP agent Mib-2.system branch *sysContact*, *sysName* and *sysLocation* information, type *winfo* after the *ViBE* prompt:

```
198.18.48.149 - PuTTY
ViBE> winfo

Location... : HARMONIC France SAS - 57, rue Clement Ader
- CS 31719 - 35517 CESSION SEVIGNE Cedex - France
Contact... : support@harmonicinc.com
Name..... : CP9000

Location... :
Contact... :
Name... :
```

Figure 5-41: Writing SNMP agent sysContact, sysName and sysLocation information - *winfo* command

Enter the following fields:

- **Location:** *sysLocation* information
- **Contact:** *sysContact* information
- **Name:** *sysName* information

Displaying the List of community strings (cread)

To display the list of *community strings*, type *cread* after the *ViBE* prompt:

```
198.18.48.149 - PuTTY
ViBE> cread

Read communities from file ...
Done.

Communities that can be used to access the agent

Rights Community
-----
ro    THVNPUBLIC
rw    THVNPRIVATE

ViBE>
```

Figure 5-42: Displaying the list of SNMP communities - *cread* command

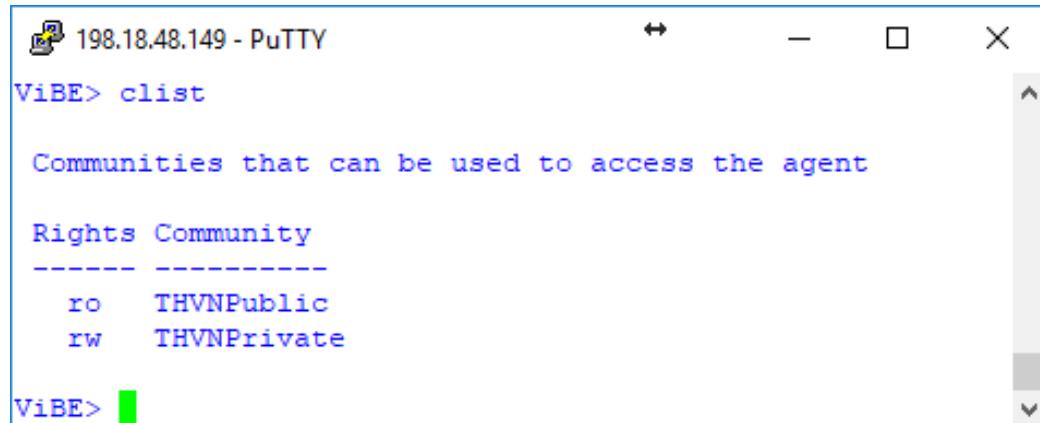
The following information will be displayed:

- **Rights:** community rights (**ro** read only authorized and **rw** read/write authorized)
- **Community:** community name

If the list has been edited beforehand using the **cdel** or **cadd** commands but has not been saved using the **csave** command, the following question will be displayed: **do you want to discard changes [Y]/[N] <N>**. Type **Y** to reset the temporary list (viewed using **clist**) with the contents of the community string memory (the previous changes will be deleted) or type **N** to cancel the operation without applying the changes.

Displaying the List of Temporary community strings (*clist*)

To display the list of temporary *community strings*, type **clist** after the **ViBE** prompt:



```
198.18.48.149 - PuTTY
ViBE> clist

Communities that can be used to access the agent

Rights Community
-----
ro    THVNPUBLIC
rw    THVNPRIvate

ViBE>
```

Figure 5-43: Displaying temporary community strings - *clist* command

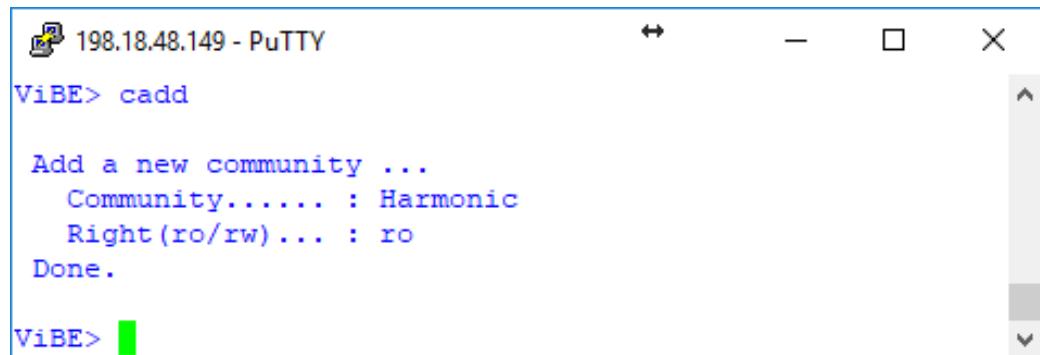
The following information will be displayed:

- **Rights**: community rights (**ro** read only authorized and **rw** read/write authorized)
- **Community**: community name

If the list has been edited beforehand using the **cdel** or **cadd** commands but has not been saved using the **csave** command, the following message will be displayed: **<don't forget to save changes>**.

Adding a community string (*cadd*)

To add a *community string*, type **cadd** after the **ViBE** prompt:



```
198.18.48.149 - PuTTY
ViBE> cadd

Add a new community ...
Community..... : Harmonic
Right(ro/rw)... : ro
Done.

ViBE>
```

Figure 5-44: Adding a community string - *cadd* command

Enter the following fields:

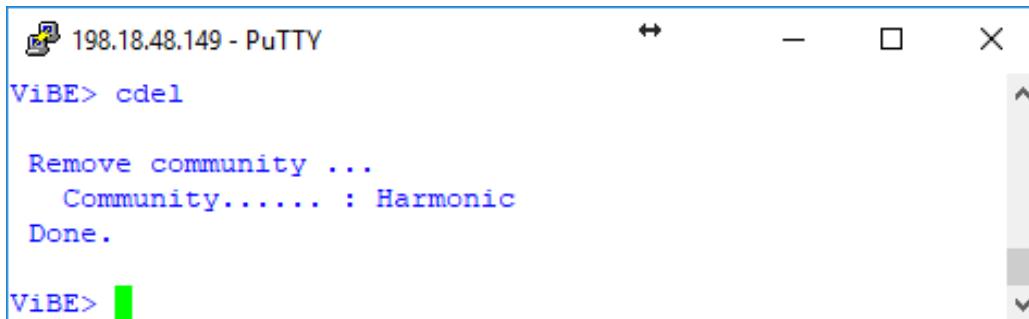
- **Community**: community name
- **Right <ro/rw>**: community right (**ro** read only authorized and **rw** read/write authorized)

The following information will be displayed:

- **Done:** the community has been created in the temporary memory. Creation should be confirmed using the **csave** command.

Deleting a community string (cdel)

To delete a *community string*, type cdel after the *ViBE* prompt:



```
ViBE> cdel
Remove community ...
Community..... : Harmonic
Done.

ViBE>
```

Figure 5-45: Deleting an SNMP community - *cdel command*

Enter the following fields:

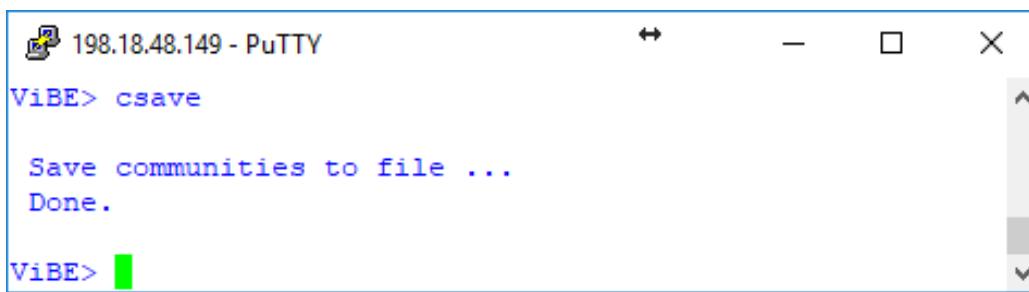
- **Community:** name of community to be deleted

The following information will be displayed:

- **Done:** the community has been deleted from the temporary memory. Deletion should be confirmed using the **csave** command.

Saving the List of community strings (csave)

To save the list of *community strings* (transfer the temporary memory to the community memory), type csave after the *ViBE* prompt:



```
ViBE> csave
Save communities to file ...
Done.

ViBE>
```

Figure 5-46: Saving the list of SNMP communities - *csave command*

The following information will be displayed:

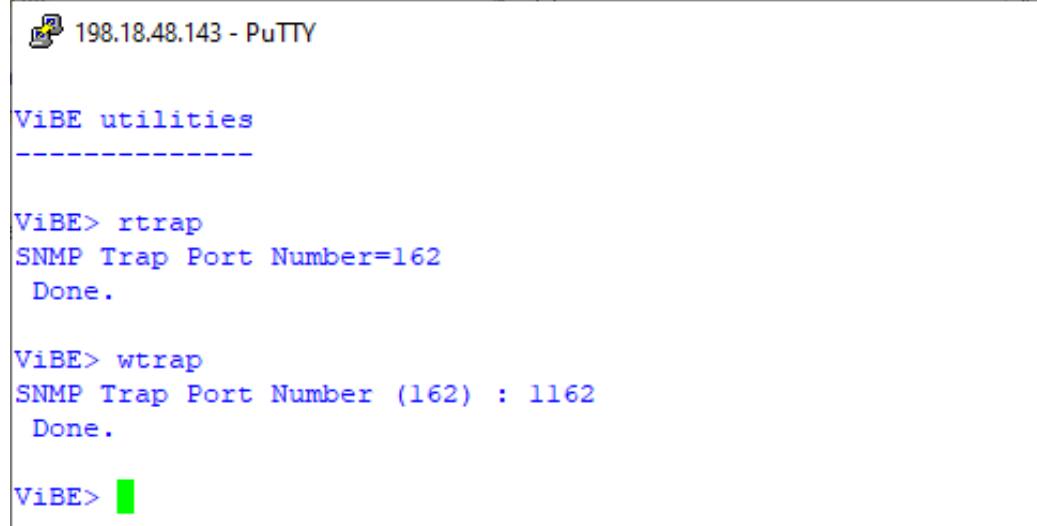
- **Save communities to file ... Done.:** the save operation has been performed successfully. If the contents of the community memory have not be edited by the transfer, the following message will be displayed: **Communities already saved.**

 **NOTE:** The equipment must be rebooted for the changes to be applied.

Changing the trap port number (**wtrap**)

Use **rtrap** to display the current trap port number.

To change the trap port number, type **wtrap** after the *ViBE* prompt:



```
198.18.48.143 - PuTTY

ViBE utilities
-----
ViBE> rtrap
SNMP Trap Port Number=162
Done.

ViBE> wtrap
SNMP Trap Port Number (162) : 1162
Done.

ViBE>
```

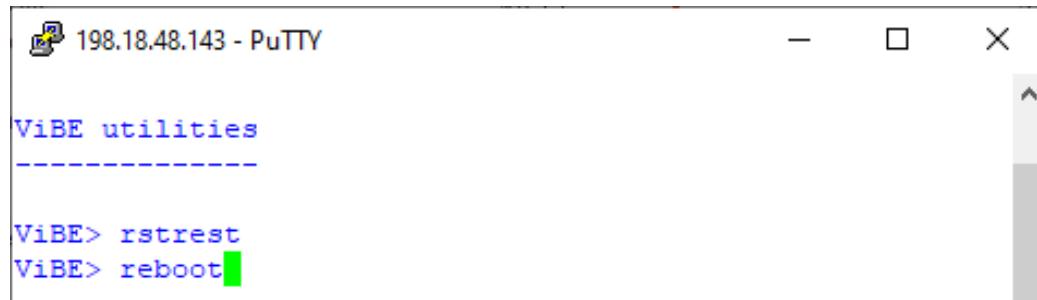
Figure 5-47: Changing the trap port number- **wtrap** command

 **NOTE:** The equipment must be rebooted for the changes to be applied.

Managing REST API Interface

Reset REST API password

To come back to factory default login/password (admin/admin), type **rstrest** after the *ViBE* prompt:



```
198.18.48.143 - PuTTY

ViBE utilities
-----
ViBE> rstrest
ViBE> reboot
```

Figure 5-48: Changing the REST API password -**rstrest** command

Do not forget to reboot to apply the reset.

Management with NMX

The Harmonic Management System (**NMX**) allows to monitor the CP9000 and therefore to display its alarms.

To allow the NMX to store the up to date configuration of a CP9000 unit and automatically apply it when NMX reconnects to the unit, the SNMP trap port of the CP9000 must be set to 1162.

The SNMP Community might have been changed during CP9000 installation step. Do not forget to modify it accordingly in NMX designer.

To do so, refer to section [Changing the trap port number \(wtrap\)](#).

- Installation of the CP9000 using **NMX Designer**

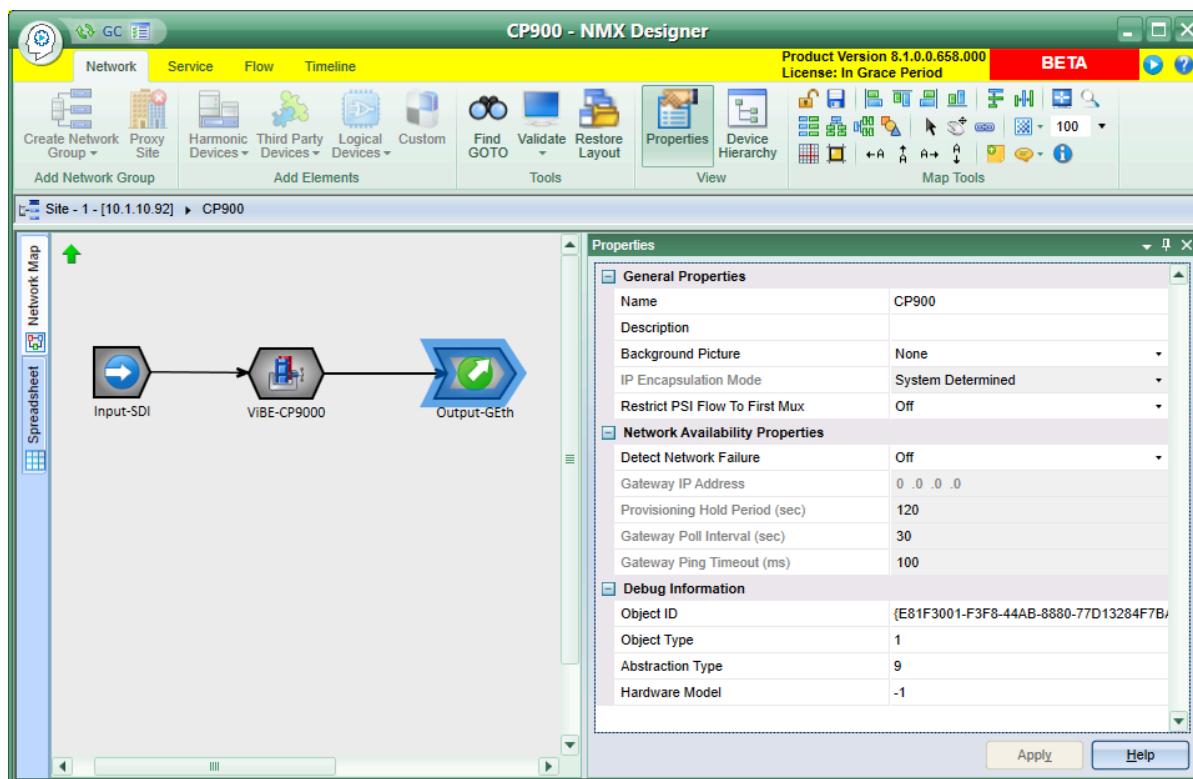


Figure 5-49: NMX Designer

It is possible in NMX to configure a couple of CP9000 equipment in 1+1 IP redundancy.

To do so check the box "Disable Hot backup Gbe Port":

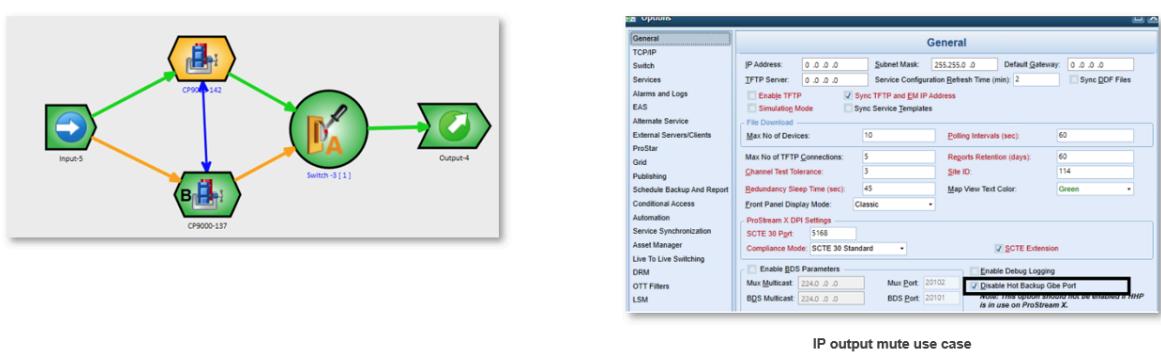


Figure 5-50: 1+1 IP redundancy

NOTE: Do not forget to configure the corresponding redundancy mode for the CP9000.

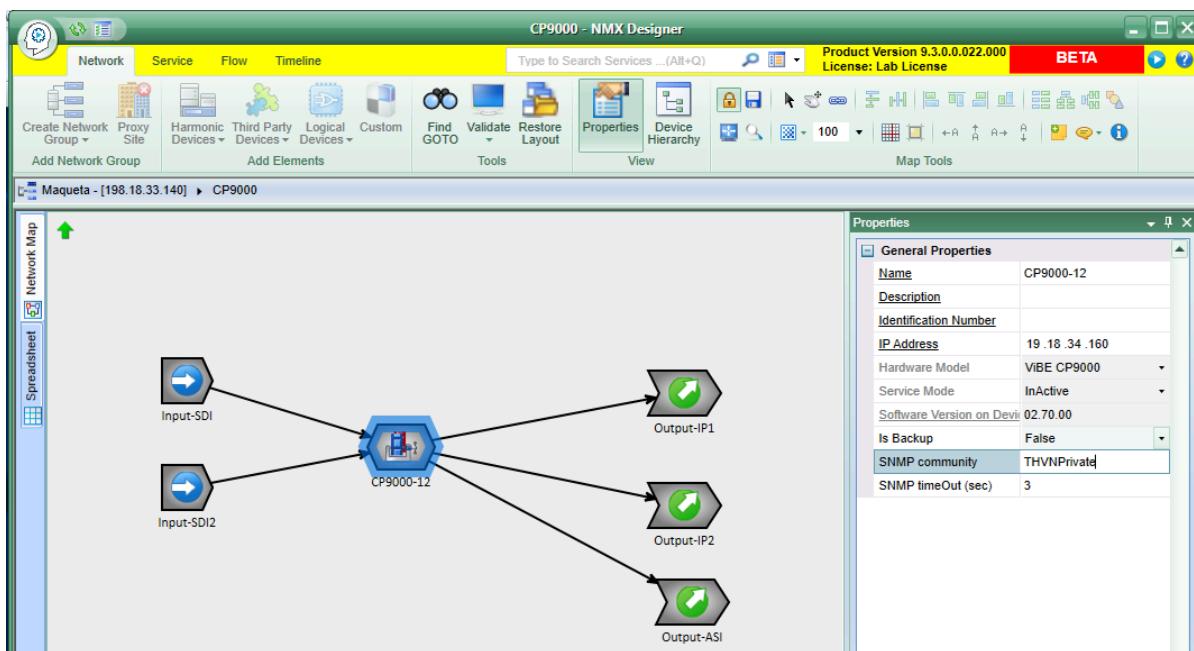


Figure 5-51: NMX Designer - SNMP Community

- Supervision of the CP9000 using **NMX Operator**

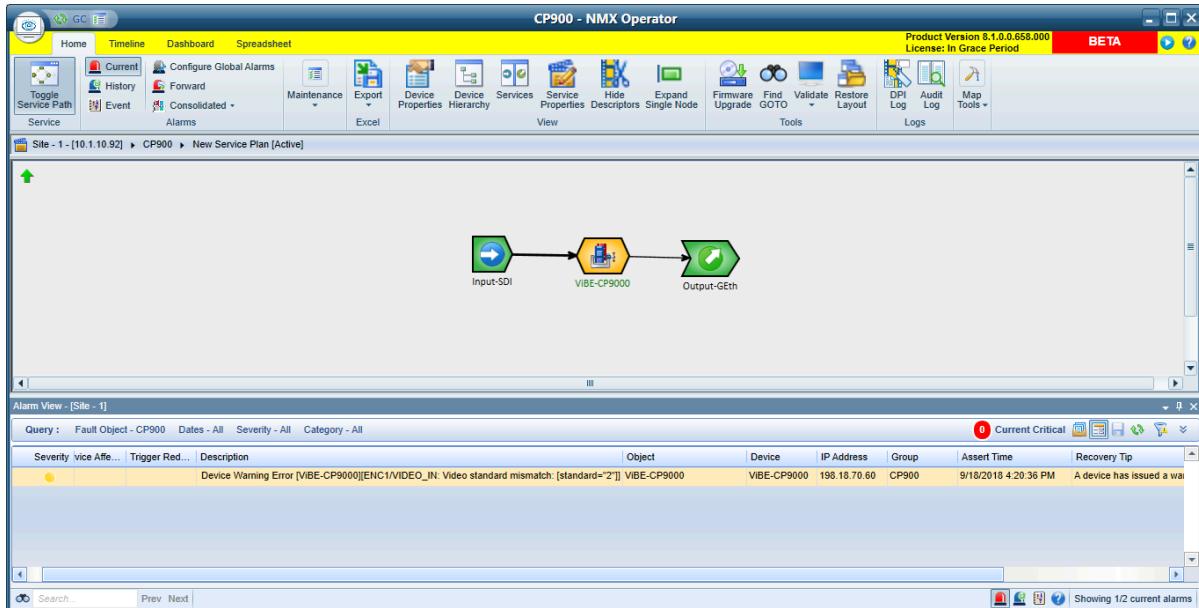


Figure 5-52: NMX Operator

For details how to install and supervise the CP9000, refer to the **NMX User Guide**.

Management via REST API

Use the following URL to be connected to the REST API of your device:

- https://IP@CP9000/REST_API/api-docs/#/

No user is available by default on REST API except admin.

Default login and password are: admin/admin

On first connection, the operator must change the default password to access all of REST API.

All passwords must enforce the following rules:

- At least 14 characters
- At least 1 upper case A...Z
- At least 1 lower case a...z
- At least 1 digit 0...9

To do so:

- On **User** part, select the PUT row (Modified an existing User password)

The screenshot shows the REST API for CP9000 version 1.0.0. At the top, there's a header with 'REST API for CP9000' and a 'Base URL: /REST_API'. Below it, a note says 'This is the REST API for CP9000. This provide the user basic authentication and VIBE CP9000 system management'. On the left, a dropdown menu shows 'Schemes: HTTPS'. On the right, there's a green 'Authorize' button with a lock icon.

Authentication: Log in with this route to get a JWT token before accessing /api route.

User: Managing user account using for authentication

PUT /users/{UserId} (ADMIN Only) Modified an existing User password

This route will modify a specific User password according to the id entered

Parameters:

Name	Description
UserId * required string (path)	ID of User to return <input type="text" value="UserId"/>
body * required object (body)	ID of User to modify Example Value Model <pre>{ "username": "string", "password": "string" }</pre>

Parameter content type: application/json

Figure 5-53: REST API - Modify the password

2. Click **Try it out**
3. Modify the password

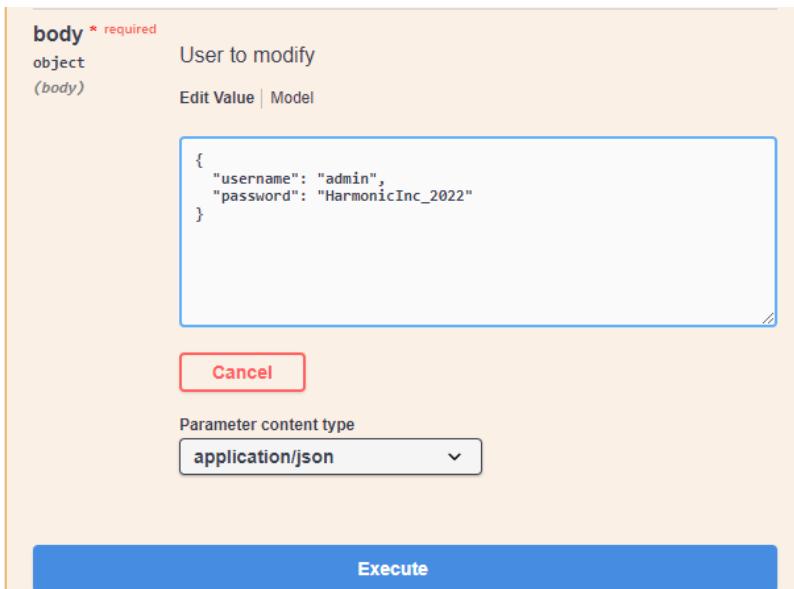


Figure 5-54: REST API - Modify the password

4. Click **Execute** to apply the change

Once modified, do the following to have full access to REST API:

1. On **Authentication** part, select POST row

The screenshot shows the REST API for CP9000 version 1.0.0. The main title bar includes the base URL: /REST_API. Below the title, a message states: "This is the REST API for CP9000. This provide the user basic authentication and VIBE CP9000 system management". A navigation bar at the top right includes "Schemes" dropdown set to "HTTPS", "Authorize" button, and a lock icon.

Authentication Log in with this route to get a JWT token before accessing /api route.

POST /login Log in with username and password

Save the task

Parameters

Name Description

body * required object (body) Using this route to log in by getting a JWT token Example Value | Model

```
{ "username": "string", "password": "string" }
```

Parameter content type application/json

Responses

Code Description

200 Log in successfully, copy the token found in Reponse to log in Example Value | Model

```
[ { "username": "string", "hash": "string", "salt": "string", "role": "string", "_id": "string" } ]
```

Figure 5-55: REST API - Authentication

2. Click **Try in out**
3. Use the new password

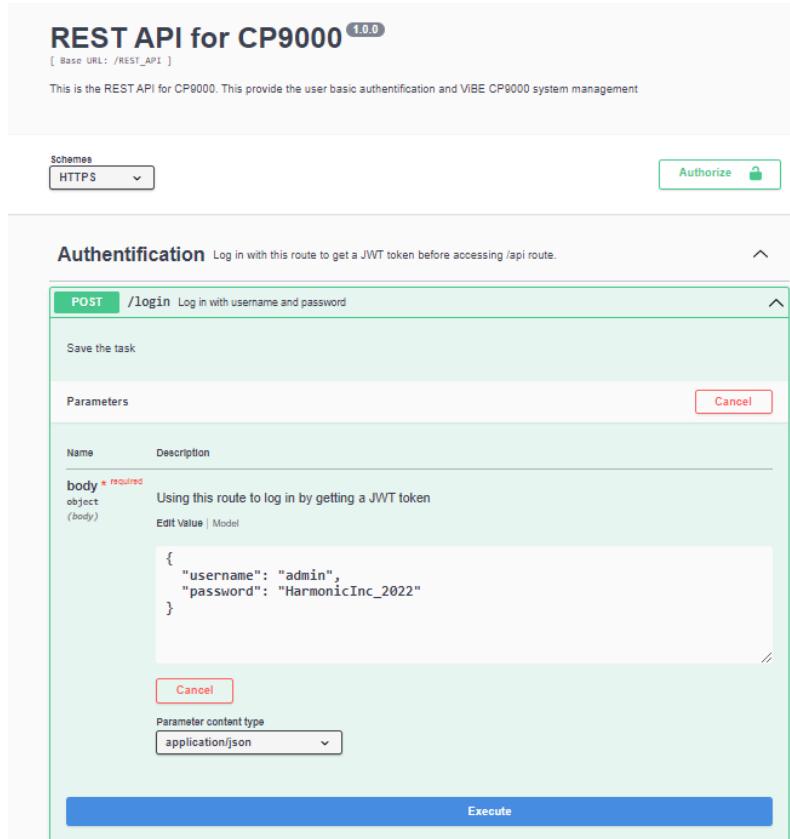


Figure 5-56: REST API - Authentication with new password

4. Click **Execute**

The JSON file is provided with the release and the REST API can be used with scripts (curl, python...) to be integrated with an NMS REST API.



NOTE:

- For security reason, no feedback (rules) except error is provided to operator thru REST API.
- Contact your Harmonic Technical Support for more information.

Preventive and Corrective Maintenance Operations

Cleaning Chassis Ventilation Grids

If dust is left to build up on the equipment ventilation grids, the internal temperature of the chassis will rise and this will affect device performance, service life and reliability.

You are therefore advised to regularly clean the ventilation grids (approximately every year).

Replacing Chassis Fans

The fans fitted in the chassis have a service life of 490000 hours at 40°C. T

The fans need to be replaced if one of them is faulty. To perform these operations, please contact Harmonic Customer Service.

Fault diagnosis

The chassis features a monitoring device that feeds an alarm back to the Management or Monitoring System when the temperature inside the device is too high or when a fan unit is out of order “Ventilation failure”.

When an “High Temperature” alarm is raised, then either the ambient temperature is too high ($> 40^{\circ} \text{ C}$), either it is a fault of fan.

Appendix A

Device Specifications

Introduction

This chapter gives:

- specifications of the device
 - device compliance
 - ordering guide to order the device and its licenses
 - Additional Technical information
-
- *General Device Specifications*
 - *Standard Compliance*
 - *Certifications and Environmental Specifications*
 - *Ordering Guide*
 - *Technical Information*

General Device Specifications

Electrical Specifications-X11 Platform

Power Supply

Table A-1: Power Supply specifications

Standards	Title
Mains voltage	100 - 240 VAC (one range with no switching).
Mains type	50 - 60 Hz
Max. total input current	6 A - 3 A
Max. input current per PSU	3.1 A - 1.6 A
Inrush current	< 25 A cold start up @ 230 V per unit, < 10 ms
Network connection	Type A device connected with a non-industrial IEC 60320 C14 compliant plug.

Standards	Title
Earthing arrangement	TN/TT For Norway and only for this country, this device can be connected to an earthing arrangement of IT type for an interphase voltage of 230 V.
Isolation class	I
Installation category	II
Overcurrent protection	Built-in protection, cannot be accessed or reset.

Power Consumption

- The maximum power required (primary) for the ViBE CP9000 Encoder depends on the chassis configuration and on the number added features running simultaneously like: audio encoding/decoding, loudness control:

Table A-2:

	230V - 50Hz		100V - 60Hz	
	1 PSU	2 PSU	1 PSU	2 PSU
Chassis + 1 Video board	70 W	81 W	70 W	80 W
Chassis + 2 Video boards 2 x (UHD + 1 Audio)	94 W	98 W	94 W	99 W
Chassis + 2 Video boards 8 x HD	96 W	101 W	96 W	102 W
Chassis + 2 Video boards 8 x (HD + 4 Audio)	105 W	119 W	105 W	110 W

Mechanical Features-X11 Platform

Dimensions

ViBE CP9000 has the following dimensions:

- Width: 438.40 mm without fixing (with fixing 19")
- Height: 1RU - 43.40 mm
- Depth: 429.50 mm without connector

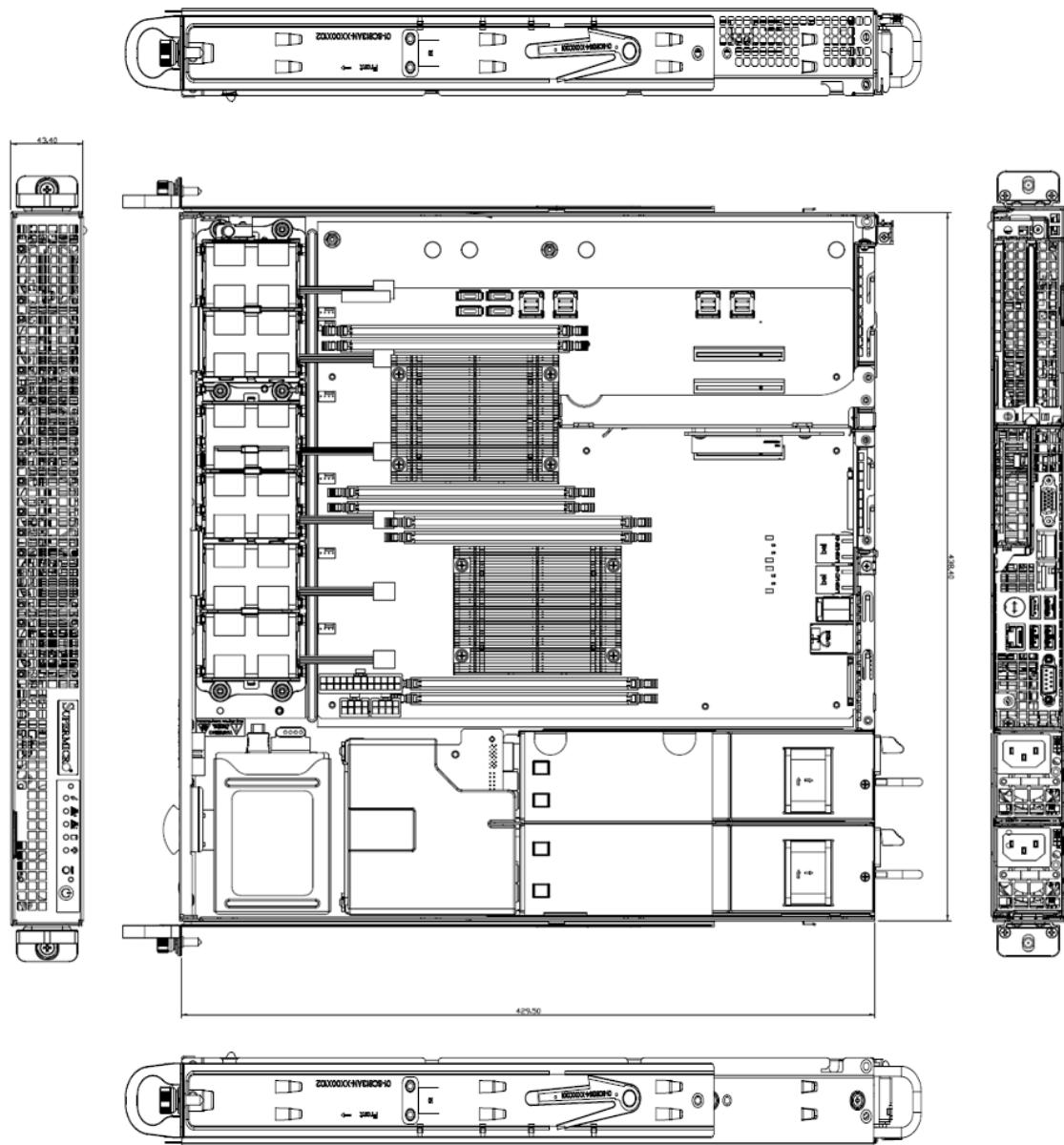


Figure A-1: ViBE CP9000 dimensions

Weight

Table A-3: ViBE CP9000 weight

Chassis	Weight (Kg)
ViBE CP9000 1RU with 2 Power supply AC	12

Ventilation

Table A-4: ViBE CP9000 ventilation

Built-in ventilation system	Description and Value
Ventilation	Air circulated from front to rear and sides
Ventilated air flow	46 m3/h The speed of the fans depends on the temperature
Temperature difference (Delta T)	< 15°C



Figure A-2: Cooling air flow

Heat Dissipating Power

Table A-5: ViBE CP9000 heat dissipating power

Chassis	Value (BTU/Hour)
ViBE CP9000 1RU with 2 Power supply AC	648

Reliability

Table A-6: ViBE CP9000 and MTBF (Mean Time Between Failure)

Reference	MTBF @ 40°C
ViBE CP9000-1RU-2AC-1CH	79,600 hours

These MTBFs are Telcordia SR332 Issue 2 compliant. If the temperature increases, the MTBF will be reduced.

ViBE CP9000 Boot Phase Duration

After connexion of the power cords, the ViBE CP9000 boot phase duration is about 75 seconds. After this time, the output stream is available.

Standard Compliance

Table A-7:

Standards	Title
SMPTE 299M:2010	24-Bit Digital Audio Format for SMPTE 292M Bit-Serial Interface
SMPTE 425-1 Level A and B-DL	Source image format and Ancillary Data Mapping for the 3Gb/s SDI - Direct Mapping
SMPTE 425-5	Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s SDI, Square Division and 2-Sample Interleave
SMPTE 2022-1	Forward Error Correction for Real-Time Video/Audio Transport Over IP Networks
SMPTE 2084	Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays
SMPTE 2082-1:2015	12 Gb/s Signal/Data Serial Interface - Electrical
SMPTE 2082-10:2018	2160-line and 1080-line Source Image and Ancillary Data Mapping for 12G-SDI
SMPTE 2036-1:2014	Ultra High Definition Television - Image Parameter Values for Program Production
SMPTE 292-1	1.5 Gb/s Signal / Data Serial Interface
SMPTE 2022-6	Transport of High Bit Rate Media Signals over IP Networks
SMPTE 2022-7	Seamless Protection Switching of SMPTE ST 2022 IP Datagrams
SMPTE 274M	1920 x 1080 Image Sample Structure, Digital Representation and Digital Timing Reference Sequences for Multiple Picture Rates
SMPTE 296	1280 x 720 Progressive Image 4:2:2 Sample Structure
SMPTE 424	3 Gb/s Signal / Data Serial Interface
SMPTE 2059-2 (PTP)	Precision Time Protocol defines an operating profile for the IEEE protocol optimized to the needs of media synchronization

Standards	Title
SMPTE 2110-10/20/30/31/40	<p>Suite of standards that describes how to send digital media over an IP network:</p> <ul style="list-style-type: none"> • 2110-10 - System architecture and synchronization: essences, RTP, SIP and PTP • 2110-20 - Uncompressed video transport, based on SMPTE 2022-6 • 2110-30 - Audio transport, based on AES67 • 2110-31 - Transport of AES3 formatted audio • 2110-40 - Transport of ancillary data • SMPTE ST2022-7.2019 SMPTE Standard - Seamless Protection Switching of RTP Datagrams

Certifications and Environmental Specifications

Table A-8: Certifications and environmental specifications

Country	Category	Standard and reports	Designed/tested for compliance with:
Common basic for most countries	Safety	IEC 62368-1:2014	Safety of Information Technology Equipment
		CB test report	N° CB 242716-80145757
		CB test certificate	N° CA/31268/CSA
			Other countries
Country	Category	Standard and reports	Designed/tested for compliance with:
Common basic for most countries	Environment testing	ETS 300 019-1-3 Operation	Environmental conditions for telecommunications equipment, Stationary use at weather protected locations
			Class3.1: Operation in temperature-controlled locations <ul style="list-style-type: none"> • + 5°C to + 35°C (+41°F to +95°F) • 85% humidity compliant with the climatogram featured in the standard • Stationary sinusoidal vibrations Non-Stationary vibrations, including shock

Country	Category	Standard and reports	Designed/tested for compliance with:
		ETS 300 019-1-2 Transport	<p>Environmental conditions for telecommunications equipment, Transportation</p> <p>Class2.2:Careful transportation in packaging</p> <ul style="list-style-type: none"> • -25°C to + 70°C (-13°F to +158°F) • 95%humidity compliant with the climatogram featured in the standard. • Stationarysinusoidal vibration • Stationary random vibration • Non-stationary vibration including shocks <p>Free fall</p>
		ETS 300 019-1-1 Storage	<p>Environmental conditions for telecommunications equipment, Storage</p> <p>Class1.2:Weather protected, not temperature-controlled storage locations in packaging</p> <ul style="list-style-type: none"> • -25°C to + 70°C (-13°F to +158°F) • 95%humidity compliant with the climatogram featured in the standard. • Stationary sinusoidal vibration <p>Non-stationary vibration including shocks</p>

Country	Category	Standard and reports	Designed/tested for compliance with:
Common basic for most countries	Pollution specifications		No.2 pollution.
	Protection specifications	IEC60529:1989	IP20 protection.

Country	Category	Standard and reports	Designed/tested for compliance with:
Europe	CE labeling	765/2008EC	REGULATION of the European Parliament and of the councilsetting out the requirements for accreditation and market surveillance relating to the marketing products.

Country	Category	Standard and reports	Designed/tested for compliance with:
	Safety	2014/35/EU	European Low Voltage Directive.
		EN 62368-1	Safety of Information Technology Equipment (EN 62368-1:2014 + A11:2017) Including in the CB report
Country	Category	Standard and reports	Designed/tested for compliance with:
Europe	ECM	2014/30/EU	EMC European Directive.
		EN 55032:2015 / A11:2020	Electromagnetic compatibility of multimedia equipment - Emission Requirements
		EN 61000-3-2:2014	Limits for harmonic current emissions
		EN 61000-3-3:2013	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems,
		EN 55035:2017 / A11:2020	Immunity from Information Technology Equipment
		EN 61000-4-2:2009	Electrostatic Discharge Immunity Test.
		EN 61000-4-3 :2006 + A1:2008 +A2:2010	Radiated, Radio-Frequency Electromagnetic Field Immunity Test.
		EN 61000-4-4:2012	Electrical Fast Transient/Burst Immunity Test.
		EN 61000-4-5:2014	Surge Immunity Test.
		EN 61000-4-6:2014	Immunity to Conducted Disturbances, Induced Radio-Frequency Fields.
		EN 61000-4-11:2004	Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests.
	EMF	Council recommendation 1999/519/EC	Recommendation on the limitation of exposure of the general public to electromagnetic fields.
		EN 62311:2008	Assessment of electronics and electrical equipment related to human exposure restrictions for electromagnetic fields.

Country	Category	Standard and reports	Designed/tested for compliance with:
Europe	ROHS	2011/65/EU	Restriction of use of certain Hazardous Substances Directive (ROHS2)
	WEEE	2012/19/EU	Waste Electrical and Electronic Equipment Directive (WEEE)
	REACH	2006/1907/EC	Registration, Evaluation, Authorization and Restriction of Chemicals Directive (REACH)
	Battery	2006/66/EC	Battery and Accumulator Directive.
Country	Category	Standard and reports	Designed/tested for compliance with:
North America US and CANADA	Safety	UL 62368-1 2nd Ed	Audio/video, information and communication technology equipment Part 1: Safety requirements
		CAN/CSA-C22.2 No. 62368-1:14	Audio/video, information and communication technology equipment Part 1: Safety requirements
		CSA certificate	N° 80058925 The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US  C US
	EMC	FCCCFR 47 part 15 Subpart B	Federal Communication Commission - part 15 (USA): Radio Frequency devices.
		ICES-003 Issue 7	Digital Apparatus (Canada).
Country	Category	Standard and reports	Designed/tested for compliance with:
Japan	EMC	VCCI-CIPR 32:2016	

Country	Category	Standard and reports	Designed/tested for compliance with:
Korea	EMC	KS C 9832 KS C 9835	EMC Test Report : N° HA221227-SPM-041-E03 Certificate N° 20231721000084035
Country	Category	Standard and reports	Designed/tested for compliance with:
Mexico	NYCE	NOM-019-SCFI-1998	DICTAMEN DE EQUIPO ALTAMENTE ESPECIALIZADO PARA PRODUCTO NUEVO NYC-2302DOC00283
Country	Category	Standard and reports	Designed/tested for compliance with:
Eastern Europe	Safety	EAC certificate	N° 15125420
Country	Category	Standard and reports	Designed/tested for compliance with:
China	ECM	GB/T 9254-1	Certificate N° 2023010911549685
		GB 17625-1	
	Safety	GB 4943-1	
Country	Category	Standard and reports	Designed/tested for compliance with:
India	Safety	IS 13252 (PART 1) : 2010 IEC 60950-1 : 2005	registration : CRS 223-5315/R-41271683

Ordering Guide

Table A-9:

Commercial reference	Description
Base System	
CP9000-1U-2AC-V3	ViBE CP9000 Contribution Platform - 1U - 2xAC PSU. Front panel lite without LCD screen. Encoding card must be ordered.

Commercial reference	Description
Base System	
CP9X00-HW-HEVC-IP-V2	ViBE CP9000 AVC/HEVC encoder card with SDI in & 10Gbe. Encodes up to 4 HD channels or 1 UHD channel. One HD channel enabled by default per board. (Built to order - Minimum 1 / maximum 2 per chassis).
CP9X00-HW-ASI-4	ViBE CP9000 ASI card with quad ASI outputs.
CP9000-SW-BASE	ViBE CP9000 Release. One license is mandatory per unit.
Video Encoding Licenses	
CP9X00-LIC-ENC-HEVC-HD	ViBE CP9000 - Additional license for AVC/HEVC HD 4:2:0/4:2:2 encoding. 3 x licenses to enable 1xUHD (MPEG-1 Layer2 audio included by default, AAC & DD audio licenses must be ordered)
Audio Encoding Licenses	
CP9X00-LIC-ENC-AAC	ViBE CP9000 Software License. This license enables one AAC-HE-AAC stereo pair encoding (3 licenses required per surround 5.1).
CP9X00-LIC-ENC-DD	ViBE CP9000 Software License. This license enables one DD/DD+ stereo encoding (3 licenses for surround).
CP9X00-LIC-JUNG	ViBE CP9000 Software license. This license enables automatic loudness control for one stereo including Jünger Level Magic (3 licenses for surround).
CP9X00-LIC-TRX-DDTODD+	ViBE CP9000 Software License. This license allows transcoding of 1 Dolby Digital stream (AC3) to Dolby Digital Plus (E-AC3).
General Licenses	
CP9X00-LIC-FEC	ViBE CP9000 Software License. This license enables FEC generation on output IP streams. It is compliant to SMPTE2022-1 (Pro-MPEG forum Code of Practice #3). One license per chassis.
CP9X00-LIC-HDR	ViBE CP9000 Software License. This license enables support of HDR encoding compliant with HLG gamma law & SMPTE 2084 (PQ) gamma law.

Commercial reference	Description
Base System	
CP9X00-LIC-DEC-DE	ViBE CP9000 Software License. This license enables one Dolby E decoding. Available when video input is in base band.
CP9X00-LIC-ENC-HEVC-ULL	ViBE CP9000 Software License. This license enables HEVC HD Ultra-Low Latency (4 licenses for UHD).
CP9X00-LIC-SCTE	ViBE CP9000 Software License. This license enables SCTE104 TO SCTE35 from SDI or IP input (one per channel).
CP9X00-LIC-SMPTE-2110	ViBE CP9000 Software License. One IP SMPTE 2110 Input Service (one per HD)
CP9X00-LIC-BISS-CA	ViBE CP9000 Software License. BISS-2 mode CA (BISS-CA) encryption (one license per unit)
CP9X00-LIC-LOGO-SLATE	ViBE CP9000 Software License. Logo or Slate insertion (one license per unit)

Technical Information

HEVC Bitrate Extension

Level and Tier - Automatic Mode

In order to extend the range of possible bitrates, it is proposed to assist the final user by hiding the detail of the level and tier which shall not be indicated in the GUI as they depend on the specified bitrate.

The table below shows the maximum ES Rate and applicable for all delays:

Table A-10:

Available Profiles	HD/FHD	UHD
HEVC Main 4:2:0	≤ 20 Mbps: Level= 4.1 Main Tier ≤ 50 Mbps: Level= 4.1 High Tier	≤ 40 Mbps: Level= 5.1 Main Tier ≤ 160 Mbps: Level= 5.1 High Tier
HEVC Main10 4:2:0	≤ 100 Mbps: Level= 5.0 High Tier	≤ 240 Mbps: Level= 5.2 High Tier
HEVC Main10 4:2:2	≤ 160 Mbps: Level= 5.1 High Tier ≤ 240 Mbps: Level= 5.2 High Tier ≤ 300 Mbps: Level= 6.1 High Tier ≤ 300 Mbps: Level= 6.2 High Tier	≤ 300 Mbps: Level= 6.1 High Tier ≤ 300 Mbps: Level= 6.2 High Tier

 **NOTE:** In Auto Mode, the Tier High and the lowest Level are privileged.

Example:

- Standard = 1080i
- Profile = HEVC Main10 4:2:0
- Bitrate = 150Mbps

The level is automatically set to **5.1 High Tier**

Level and Tier - Manual Mode

In order to avoid interoperability issues with decoders, it is proposed the Manual Mode to allow the user to have all possible combinations of Profile/Level/Tier, updating the bitrate accordingly.

The interoperability issues could occur because of some Standard recommendations, as described in the examples below:

- **DVB:** HEVC HDTV IRDs are not required to decode and display correctly HEVC bitstreams or HEVC temporal video sub-bitstreams that do not obey the constraints and limits associated with the Main or Main 10 Profile, Main Tier, Level 4.1.
- **ATSC 3.0:** The bitstream shall conform to HEVC Main 10 Profile or HEVC Scalable Main 10 Profile, Main Tier, Level 5.2.

 **NOTE:** Note that when a bitstream is indicated to conform to a level that is lower than Level 5.2, it is also considered as conforming to Level 5.2.

The table below is applicable for all available profiles:

Table A-11:

Max ES rate			
Level	Main Tier	High Tier	Video Format
4.1	20 Mbps	50 Mbps	HD/FHD
5.0	25 Mbps	100 Mbps	HD/FHD
5.1	40 Mbps	160 Mbps	HD/FHD/UHD
5.2	60 Mbps	240 Mbps	HD/FHD/UHD
6.0	60 Mbps	240 Mbps	HD/FHD/UHD
6.1	120 Mbps	300* Mbps	HD/FHD/UHD
6.2	240 Mbps	300* Mbps	HD/FHD/UHD

*Hardware Limitation

3 examples:

- The user knows the Level/Tier he wants to use:
 - In HD, whatever the Profile, in Level 5.2 Main Tier, the maximum bitrate shall be 60Mbps.
 - In UHD, whatever the Profile, in Level 6.1 High Tier, the maximum bitrate shall be 480Mbps.
- The user knows the bitrate he wants to set: HD @100Mbps. Whatever the Profile, he can use:

- He has an IRD constraint with DVB recommendation about Main Tier: Level 6.1/Main Tier, Level 6.2/Main Tier.
- He has no constraint: Level 5.1/High Tier up to Level 6.2/High Tier.
- The user knows the bitrate he wants to set: UHD @240Mbps. Whatever the Profile, he can use:
 - He has an IRD constraint with DVB recommendation about Main Tier: Level 6.2/Main Tier.
 - He has no constraint: Level 5.2/High Tier up to Level 6.2/High Tier.

AVC Profiles and Levels

The tables below show, according to the Profile and the ES rate allocated, the Level automatically used by the encoder and this one applicable for all delays

Table A-12: Profile: AVC 4:2:0, 8 bits (MP)

HD 1080i/720p	FHD 1080p
≤ 20 Mbps: Level= 4.0	≤ 50 Mbps: Level= 4.2
≤ 50 Mbps: Level= 4.1	≤ 135 Mbps: Level= 5.0
≤ 135 Mbps: Level= 5.0	≤ 240 Mbps: Level= 5.1
≤ 240 Mbps: Level= 5.1	

Table A-13: Profile: AVC 4:2:0, 8 bits (HiP)

HD	FHD	UHD
≤ 25 Mbps: Level= 4.0	≤ 62.5 Mbps: Level= 4.2	≤ 300 Mbps: Level= 5.2
≤ 62.5 Mbps: Level= 4.1	≤ 168.75 Mbps: Level= 5.0	I-Only ≤ 300 Mbps: Level= 5.2
≤ 168.75 Mbps: Level= 5.0	≤ 300 Mbps: Level= 5.1	
≤ 300 Mbps: Level= 5.1	I-Only ≤ 300 Mbps: Level= 5.1	
I-Only ≤ 300 Mbps: Level= 5.1		

Table A-14: Profile: AVC 4:2:0, 10 bits (Hi10P)

HD	FHD	UHD
≤ 60 Mbps: Level= 4.0	≤ 150 Mbps: Level= 4.2	≤ 370 Mbps*: Level= 5.2
≤ 150 Mbps: Level= 4.1	≤ 370 Mbps*: Level= 5.0	I-Only ≤ 300 Mbps*: Level= 5.2
≤ 370 Mbps: Level= 5.0	I-Only ≤ 300 Mbps*: Level= 5.1	* Hardware Limitation
I-Only ≤ 300 Mbps*: Level= 5.0 or 5.1	* Hardware Limitation	
* Hardware Limitation		

Table A-15: Profile: AVC 4:2:2, 8 or 10 bits (Hi422P)

HD	FHD	UHD
≤ 80 Mbps: Level= 4.0	≤ 200 Mbps: Level= 4.2	≤ 370 Mbps: Level= 5.2
≤ 200 Mbps: Level= 4.1	≤ 370 Mbps*: Level= 5.0	I-Only ≤ 300 Mbps*: Level= 5.2
≤ 370 Mbps*: Level= 5.0	I-Only ≤ 300 Mbps*: Level= 5.0 or 5.1	* Hardware Limitation
I-Only ≤ 300 Mbps*: Level= 5.0 or 5.1	≤ 300 Mbps*: Level= 5.1	
* Hardware Limitation	* Hardware Limitation	

Entropy coding

The CP9000 uses by default the CABAC entropy coding however beyond 64Mb/s for HD channel or 256Mb/s for UHD channel, it switches automatically to CAVLC entropy coding.

Nevertheless, the CAVLC entropy coding can be forced using an expert parameter. Refer to section [Editing Expert parameters](#) to set the CAVLC.

SD Encoding

- AVC profiles and levels for H264 standard:

Table A-16:

AVC Profiles	Max ES rate
AVC 4:2:0, 8 bits (MP)	ES rate ≤ 10Mbps: level = 3
AVC 4:2:0, 8 bits (HiP)	ES rate ≤ 12.5Mbps: level = 3
AVC 4:2:0, 10bits (Hi10P)	ES rate ≤ 30Mbps: level = 3
AVC 4:2:2, 8 bits (Hi422P)	ES rate ≤ 40Mbps: level = 3
AVC 4:2:2, 10bits (Hi422P)	ES rate ≤ 40Mbps: level = 3

- Minimum ES rate depends on the current profile and selected delay:

Table A-17:

Compression Delay	AVC Profiles	Minimum ES Rate
Long / Standard	AVC 4:2:0, 8 bits (MP)	500kbps
	AVC 4:2:0, 8 bits (HiP)	
	AVC 4:2:0, 10bits (Hi10P)	
	AVC 4:2:2, 8 bits (Hi422P)	
	AVC 4:2:2, 10bits (Hi422P)	
Short	AVC 4:2:0, 8 bits (MP)	1Mbps

Compression Delay	AVC Profiles	Minimum ES Rate
	AVC 4:2:0, 8 bits (HiP)	
	AVC 4:2:0, 10bits (Hi10P)	
	AVC 4:2:2, 8 bits (Hi422P)	
	AVC 4:2:2, 10bits (Hi422P)	

UHD contribution encoding recommended settings

Table A-18:

Stream specification	Profile: HEVC Main10 4:2:2 Picture Structure: Frame Picture Resolution : 3840x2160 Frame rate : 60fps / 59.94fps Definition:Sharp Temporal Scalability: Off (impact only for low bit rate – no impact in cases below)	
	Simple / Movie	Complex / Sport
Video Quality Premium	Bitrate: 40 Mbps GOP: 32:4 Compression Delay: Standard Adaptive GOP: Full Closed GOP: Off Adaptive Quantization On (case not checked in Expert parameter)	Bitrate: 60 Mbps GOP: 32:4 Compression Delay:Standard Adaptive GOP: Full Closed GOP: Off Adaptive Quantization Off (case checked in Expert parameter)
Video Quality Pristine	Bitrate: 60 Mbps GOP: 32:4 Compression Delay: Standard Adaptive GOP: Full Closed GOP: Off Adaptive Quantization Off (case checked in Expert parameter)	Bitrate: 80 Mbps GOP: 16:1 Compression Delay:Standard Adaptive GOP: Full Closed GOP: Off Adaptive Quantization Off (case checked in Expert parameter)

Audio Restrictions vs Video Compression Delay

Depending on the video compression delay, some audio formats are not compatible as audio encoding delay might be longer than the end to end video processing time. The supported Audio format set depending on the video format and encoding delay is presented in the table below.

Table A-19:

Audio Input Mode	Audi Encoding Mode	HEVC			AVC		
		Long/ Std	Short ⁽²⁾	ULL (GDR)	Long/ Std	Short	Short +GDR
PCM	MPEG1 L2	Y	Y	-	Y	Y	Y
	MPEG1 L2 (AD)	Y	Y	-	Y	Y	Y
	AAC-LC	Y	Y	-	Y	Y	Y
	AAC-HE	Y	-	-	Y	-	-
	AAC-HE (AD)	Y	-	-	Y	-	-
	AAC-HE v2	Y ⁽¹⁾	-	-	Y ⁽¹⁾	-	-
	AC-3	Y	Y	-	Y	Y	- ⁽³⁾
	E-AC-3	Y	Y	-	Y	Y	- ⁽³⁾
Dolby E	AC-4	Y	-	-	Y	-	-
	MPEG1 L2	Y	-	-	Y	-	-
	AAC-LC	Y	-	-	Y	-	-
	HE-AAC	Y	-	-	Y ⁽¹⁾	-	-
	AC-3	Y	-	-	Y	-	-
	E-AC-3	Y	-	-	Y	-	-
Precomp. Transcod AC3/ EAC3	AC3 / EAC3	Y	-	-	Y	-	-
	MPEG1-L2	Y	-	-	Y	-	-

Precomp. Transport	AC3 / EAC3	Y	Y	-	Y	Y	Y
	AAC-HE	Y	-	-	Y	-	-
	AC4	Y	-	-	Y	-	-
Transpar.	S302M	Y	Y	Y ⁽⁴⁾	Y	Y	Y

'-' = NOT SUPPORTED

(1) Force to 1 AU per PES in Standard Delay to support AAC-HE v2

(2) Force to 1 AU per PES in Short Delay

(3) GUI allows AC3/EAC3 but not supported anyway

(4) GUI allows Transparent S302M in HEVC ULL but very limit, output not guarantee.

Firmware bank transitions

CP9000 has four internal firmware modes. These modes are internal machinery for the user but transition from one mode to another may require a reboot or a firmware reload and a reboot. This section describes the behavior for firmware transition scenarios.

The four internal firmware modes are:

1. 4xSD/HD/FHD/UHD SDI-4x3G, referenced as "SDI" in the figure below.
2. SDI-UHD 12G, referenced as "12G" in the figure below.
3. 3xHDlP-2110, referenced as "2110" in the figure below.
4. 4xHD SDlP-2022-6, referenced as "2022-6" in the figure below.

Table A-20: Firmware bank transition legend

Icon	Transition
	This transition implies a firmware reload (up to 10 minutes) and then a reboot (around 4 minutes – service impacting)
	This transition implies a reboot (around 4 minutes – service impacting)
	This transition implies a simple change of configuration (no reboot)

(Board, input)	To	4xHD, 2022-6	4xHD, 2110	UHD, SDI	UHD, 12G	UHD2HD, SDI	UHD2HD, 12G	4xHDSD, SDI
From		-	○	■	○	■	○	■
4xHD, 2022-6		-	○	■	○	■	○	■
4xHD, 2110 (3)		■	-	○	○	○	○	○
4xHD, 2110 (0)		○	-	■	○	■	○	■
UHD, SDI		■	○	-	○	-	○	-
UHD, 12G (3)		■	○	○	-	○	-	○
UHD, 12G (0)		○	○	■	-	■	-	■
UHD2HD, SDI		■	○	-	○	-	○	-
UHD2HD, 12G (3)		■	○	○	-	○	-	○
UHD2HD, 12G (0)		○	○	■	-	■	-	■
4xHDSD, SDI		■	○	-	○	-	○	-

Figure A-3: Firmware bank transitions

**Notice:**

- (0) : Last firmware reload was 4xHD SDIoIP-2022-6
- (3) : Last firmware reload was 4xSD/HD/FHD/UHD SDI-4x3G

Appendix B

Safety Instructions

ENGLISH

Read and follow the important safety information in section [Safety Summary \(English\)](#), noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed there may be found throughout the manual

 **DANGER:**

To reduce the risk of electric shock, never remove the cover of the equipment. If you remove the cover of the equipment, the warranty ceases to apply.

GERMAN

Lesen und befolgen Sie die nachstehenden, wichtigen Sicherheitshinweise (section [Sicherheit - Begriffe, Hinweise und Warnzeichen](#)). Beachten Sie insbesondere die Anweisungen bezüglich Brand-, Stromschlag- und Verletzungsgefahr. Das Handbuch enthält weitere, hier nicht angeführte spezifische Warnhinweise.

 **DANGER:** Um die Stromschlaggefahr zu verringern, die Geräteabdeckung niemals entfernen.
Andernfalls erlischt die Garantie.

FRENCH

Il est recommandé de lire, de bien comprendre et surtout de respecter les informations relatives à la sécurité qui sont exposées au paragraphe section [Consignes de sécurité \(Français\)](#), notamment les consignes destinées à prévenir les risques d'incendie, les décharges électriques et les blessures aux personnes. Les avertissements complémentaires, qui ne sont pas nécessairement repris dans le paragraphe sus-cité, mais présents dans tous les paragraphes du manuel, sont également à prendre en considération.

 **DANGER:**

Pour prévenir les risques de décharges électriques, n'enlevez jamais le capot de l'équipement. Si le capot de l'équipement est enlevé, la garantie cesse de s'appliquer.

- [Safety Summary \(English\)](#)
- [Sicherheit - Überblick \(Deutsch\)](#)
- [Consignes de sécurité \(Français\)](#)
- [Safety Instructions for Finland, Norway, Sweden](#)

Safety Summary (English)

Safety Terms and Symbols

Terms on the Product

The following terms may appear on the product:

DANGER — A personal injury hazard is immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

Symbols on the Product

Table B-1: The following symbols may appear on the product:

	Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.
	Indicates that the user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.
	This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.
	Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.
	Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.
	Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Danger

DANGER: The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Mains Power Safety Instructions

Reliable earthing — The product is designed for connection to an earth-grounded AC outlet and must be correctly earthed through the main outlet of cable. To avoid risk of electrical shock or equipment damage, do not disconnect the grounding plug.

AC mains power cord — AC mains cords are only shipped with equipment if ordered. Otherwise, it is advisable to use mains cords as described in section [Power supply and protective ground](#). The mains power cords should comply with the legislation in force in the country of installation.

Mains power/Circuit overloading — For each branch circuit, the connection panel should feature overload and earth fault protection and a bipolar cut-off device or a differential circuit breaker.

Mains power/Connection panel — The connection panel should comply with the legislation in force in the country of installation. Connection panel position in the rack must ensure that plugs and power cords are within easy reach for switching off purposes.

Overload protection — Power supply unit has integrated overload protection which cannot be accessed or reset. In the event of a malfunction, please contact the Harmonic Customer Services Department.

Power disconnecting — The equipment may or does feature more than one power supply cord. To reduce the risk of electric shock, disconnect all power supply cords before any intervention.

Rack Mount Safety Instructions

Elevated Operating Ambient — If installed in a closed or multi-unit rack assembly, the operating air ambient temperature of the rack environment may be greater than room ambient. Provide proper ventilation as described in section [Mounting in the rack](#) to keep the equipment in an environment compatible with the maximum operating temperature specified by the manufacturer.

Mechanical loading — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring.

Reliable earthing — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

L-profiles use — The equipment must not be fixed with its rack mounting ears only. If you intend to install it in a rack, L-profiles are required and you must observe the ventilation and safety instructions described in section [Mounting in the rack](#).

Handling precautions — To avoid injury while installing the equipment in a rack (or removing it from a rack), take all the necessary precautions. Ask another person for help or use a suitable carry lift.

Operating Safety Instructions

Do not operate in explosive atmosphere — To avoid injury or fire hazard, do not operate this equipment in an explosive environment (atmosphere and materials).

Do not operate in wet/damp conditions — To avoid electric shock, this equipment should only be operated in dry conditions.

Replacement of lithium battery or RAM with built-in lithium battery — Some equipment contains a lithium battery or non-volatile RAM with a built-in lithium battery.

In this equipment, if for any reason replacement of these components proves necessary, please observe the following conditions:

- The operation must only be performed by qualified personnel;
- Only replace with components that have identical features;
- Ensure the component is inserted the right way round;
- Please dispose of dead components according to the manufacturer's instructions.

 **DANGER:** Danger of explosion if component is incorrectly replaced.

The lithium battery or RAM with a built-in lithium battery comply with IATA and 49CFR regulations. They require no special declaration, packaging or labeling.

Cautions

 **CAUTION:** The following caution statements identify conditions or practices that can result in damage to equipment or other property.

Use correct power source — Do not operate this equipment from a power source that applies a voltage outside the voltage range specified for the product.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions. All empty slots should be fitted with blank panels (mask plates) so as not to impair ventilation.

Do not operate with suspected equipment failure — If you suspect equipment damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — As mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible.

Route cable properly — Route power cords and other cables so that they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Retain original packaging — If equipment is returned to the Customer Service Department, the faulty equipment must be packed where possible in its original packaging (protective corners and boxes). If you no longer have the packaging, the faulty equipment must be protected against shocks during transportation. The Customer Service Department examines packaging on arrival and can refuse to carry out repairs if the packaging has been visibly damaged during transportation and this has led to further damage in addition to the fault originally noted.

Transportation costs and risks for equipment returns are borne by the customer. Equipment should only be returned with a Return Material Authorization form.

Warranty compliance — Observe the following rules:

- Only pluggable board replacement by a qualified personnel is allowed. In all other cases replace the equipment with a spare.
- Never remove the cover of the equipment.

Sicherheit - Überblick (Deutsch)

Sicherheit - Begriffe, Hinweise und Warnzeichen

Am Produkt angebrachte Hinweise

Folgende Hinweise können sich am Produkt befinden:

GEFAHR — Dieser Warnhinweis verweist auf eine unmittelbare Verletzungsgefahr.

VORSICHT — Dieser Warnhinweis verweist auf ein bestehendes Risiko für das Gerät, Produkt oder Betriebsmittel.

Am Produkt angebrachte Warnzeichen

Table B-2: Folgende Warnzeichen können sich am Produkt befinden:

	Warnung vor einer gefährlichen elektrischen Spannung im Gerätegehäuse, die stark genug sein kann, um eine Stromschlaggefahr darzustellen.
	Aufforderung an den Benutzer, Bediener oder Servicetechniker, die in den Produkthandbüchern angeführten wichtigen Bedienungs-, Wartungs- und Serviceanweisungen zur Kenntnis zu nehmen.
	Aufforderung, beim Auswechseln von Sicherungen den vorgeschriebenen Nennwert für die im Text angeführte Sicherung einzuhalten.
	Obligatorische Erdungsklemme zur ordnungsgemäßem Erdung, bevor weitere Geräte angeschlossen werden können.
	Zusätzliche, nicht obligatorische externe Erdungsklemme als Ergänzung zur internen Erdungsklemme.
	Statikempfindliche Bauteile, die durch elektrostatische Entladung (ESD) beschädigt werden können, sind durch ESD-geeignete Verfahren, Werkzeuge und antistatische Oberflächen während der Wartung zu schützen.

Gefahr

DANGER: Folgende Warnungen verweisen auf Situationen und Handlungen, die Verletzungs- oder Lebensgefahr zur Folge haben können.

Sicherheitshinweise bezüglich des Stromnetzes

Ordnungsgemäß Erdung — Das Gerät muss an einen geerdeten AC-Ausgang angeschlossen und ordnungsgemäß über den Hauptkabelausgang geerdet werden. Zum Vermeiden von Stromschlaggefahr und Geräteschäden den Schutzkontaktstecker nicht herausziehen.

AC Netzkabel — Geräte werden ohne AC-Netzkabel geliefert. Diese sind separat zu bestellen. Netzkabel sollten stets gemäß den Anweisungen im Abschnitt *Power supply and protective ground* verwendet werden und den anwendbaren Rechtsvorschriften im jeweiligen Installationsland entsprechen.

Überspannung des Stromnetzes/Stromkreises — Für jeden Abzweigstromkreis ist an der Anschlussplatte ein Überspannungs- und Erdschlussenschutz sowie eine doppelpolare Abschaltung oder ein Differentialschutzschalter vorzusehen.

Stromnetz/Anschlussplatte — Die Anschlussplatte hat den landesspezifischen Rechtsvorschriften zu genügen. Die Anschlussplatte ist so im Rack zu montieren, dass alle Stecker und Netzkabel zum Ausschalten leicht zugänglich sind.

Überspannungsschutz — Das Netzanschlussgerät ist mit einem nicht zugänglichen und nicht zurücksetzbaren Überspannungsschutz ausgestattet. Für die Behebung eventueller Störungen ist der Kundendienst von Harmonic zuständig.

Trennung der Stromversorgung — Einige Geräte verfügen ggf. über mehrere Spannungsversorgungskabel. Zur Verringerung der Stromschlaggefahr sind vor jedem Eingriff sämtliche Kabel herauszuziehen.

Sicherheitshinweise bezüglich Rackgehäuse

Betriebstemperaturumgebung — Bei geschlossenen Racks bzw. Mehrfach-Racks kann die Umgebungstemperatur im Rack höher als die Raumtemperatur sein. Durch eine ausreichende Belüftung gemäß Abschnitt section *Mounting in the rack* ist dafür zu sorgen, dass die vom Hersteller vorgeschriebene maximale Betriebstemperatur nicht überschritten wird (Temperaturangaben siehe Abschnitt Technische Daten des Benutzerhandbuchs).

Stromkreis-Überlastung — Beim Anschluss des Geräts an den Stromkreis sind die eventuellen Auswirkungen einer Stromkreis-Überlastung auf den Überstromschutz und die elektrischen Leitungen zu berücksichtigen.

Ordnungsgemäße Erdung — Rack-montierte Geräte sind vorschriftsmäßig zu erden. Hierbei ist besonders auf Netzanschlüsse ohne direkten Anschluss an den Abzweigstromkreis zu achten (z. B. bei der Verwendung von Mehrfachsteckdosen).

Verwendung von L-Profilen — Zur ordnungsgemäßen Anbringung des Geräts im Rack sind neben den Tragösen L-Profile zu verwenden. Beim Einbau sind die im Abschnitt section *Mounting in the rack* angeführten Sicherheitshinweise und Belüftungsanweisungen zu beachten.

Sicherheitsmaßnahmen beim Ein-/Ausbau — Zur Vermeidung von Verletzungen beim Ein- und Ausbau des Geräts in das bzw. aus dem Rack sind alle erforderlichen Vorsichtsmaßnahmen zu treffen. Es sollte eine weitere Person um Hilfe gebeten oder eine entsprechende Hubvorrichtung verwendet werden.

Sicherheitshinweise bezüglich des Betriebs

Gerätebetrieb in explosionsgeschützter Umgebung — Zur Vermeidung von Verletzungen und Brandgefahr darf das Gerät nicht in explosionsgefährdeten Umgebungen betrieben werden (Atmosphäre und Stoffe).

Gerätebetrieb in trockener Umgebung — Zur Vermeidung von Stromschlaggefahr darf das Gerät nicht in feuchter oder dunstiger Umgebung betrieben werden.

AUSWECHSELN DER LITHIUMBATTERIE ODER DES RAM-SPEICHERS MIT EINGEBAUTER LITHIUMBATTERIE — Einige Geräte besitzen eine Lithiumbatterie bzw. einen nicht flüchtigen RAM-Speicher mit eingebauter Lithiumbatterie.

Sollten in diesen Geräten aus welchem Grund auch immer diese Komponenten auszuwechseln sein, sind folgende Anweisungen zu beachten:

- Das Auswechseln hat durch qualifiziertes Personal zu erfolgen;
- Dieselben bzw. gleichwertigen Komponenten verwenden;
- Auf die richtige Positionierung der neuen Komponenten achten;
- Alte Komponenten gemäß den Anweisungen des Herstellers entsorgen.

 **CAUTION:** Bei nicht ordnungsgemäß installierten Komponenten besteht Explosionsgefahr.

Das Produkt enthält eine Lithiumbatterie bzw. einen RAM-Speicher mit eingebauter Lithiumbatterie, die mit den IATA- und 49CFR Gefahrgutvorschriften übereinstimmen und keine besondere Erklärung, Verpackung und Beschriftung erfordern.

Vorsichtshinweise

 **CAUTION:** Folgende Vorsichtshinweise verweisen auf Situationen und Handlungen, die zu Schäden an den Geräten oder sonstigen Betriebsmitteln führen können.

Angemessene Stromquelle verwenden — Das Gerät darf nicht an eine Stromquelle angeschlossen werden, die eine Spannung liefert, die außerhalb des für das Produkt zulässigen Nennspannungsbereichs liegt.

Gerät ausreichend belüften — Um einer Überhitzung des Geräts vorzubeugen, ist für eine angemessene Belüftung gemäß den Anweisungen in Abschnitt Installation des Benutzerhandbuchs zu sorgen. Leere Geräteeinschübe sind mit Leerblenden zu verschließen.

Gerät nicht bei Störung betreiben — Wird ein Geräteschaden oder eine Störung vermutet, ist das Gerät von qualifizierten Servicetechnikern zu überprüfen.

Trennung vom Stromnetz sicherstellen — Verfügt das Gerät über keine(n) Netzschalter, ist das Gerät durch Ziehen des/der Netzkabel vom Stromnetz zu trennen. Die Steckdose(n) ist/sind leicht zugänglich in unmittelbarer Nähe des Geräts anzubringen.

Kabel richtig verlegen — Netzkabel und sonstige Kabel sind so zu verlegen, dass sie nicht beschädigt werden können. Schwere Kabelbündel sind ordnungsgemäß abzustützen, um Schäden an den Steckverbindungen vorzubeugen.

Originalverpackung aufbewahren — Ist das Gerät beschädigt und an den Kundendienst zurückzuschicken, sollte zum sicheren Transport möglichst die Orginalverpackung (mit Eckenschutz und Schutzhüllen) verwendet werden oder das Gerät zumindest stoßsicher verpackt werden. Bei der Annahme des Gerätes untersucht der Kundendienst die Verpackung auf eventuelle Transportschäden und kann die Reparatur ablehnen, sollte die Verpackung während des Tranports beschädigt worden sein und dies zusätzliche Schäden am Gerät verursacht haben. Die mit der Rückgabe und den Transport verbundenen Kosten und Risiken sind vom Kunden zu tragen. Dem eingeschickten Gerät ist ein ordnungsgemäß ausgefüllter Rückgabeschein beizulegen.

Garantieleistung — Folgende Regeln sind für die Inanspruchnahme der Garantie zu beachten:

- Das Auswechseln der Steckkarte hat ausschließlich durch qualifiziertes Personal zu erfolgen. In allen anderen Fällen ist das Gerät durch ein Ersatzgerät zu ersetzen.
- Niemals die Abdeckungen des Gerätes abnehmen.

Consignes de sécurité (Français)

Consignes et symboles de sécurité

Signalétique apposée sur le produit

La signalétique suivante peut être apposée sur le produit :

DANGER — Risque de danger imminent pour l'utilisateur.

MISE EN GARDE — Risque d'endommagement du produit, des installations ou des autres équipements.

Symboles apposés sur le produit

Table B-3: Les symboles suivants peuvent être apposés sur le produit :

	Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.
	Signale que l'utilisateur, l'opérateur ou le technicien de maintenance doit faire référence au(x) manuel(s) pour prendre connaissance des instructions d'utilisation, de maintenance ou d'entretien.
	Il s'agit d'une invite à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.
	Identifie une borne de protection de mise à la masse qui doit être raccordée correctement avant de procéder au raccordement des autres équipements.
	Identifie une borne de protection de mise à la masse qui peut être connectée en tant que borne de mise à la masse supplémentaire.
	Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.

Avertissements

CAUTION: Les avertissements suivants signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire même fatales.

Instructions de sécurité relatives à l'alimentation secteur

Mise à la terre de protection — Assurez-vous que la mise à la terre est correctement effectuée avant de mettre l'appareil sous tension. La mise à la terre de protection se fait au travers du cordon d'alimentation. Pour éviter tout risque de chocs électriques ou de dommage à l'équipement, ne déconnectez jamais la fiche de terre.

Cordon d'alimentation Secteur (AC) — Les cordons secteur ne sont fournis avec l'équipement que s'ils ont été commandés. Sinon il est préconisé d'utiliser des cordons conformes à ceux décrits section [Power supply and protective ground](#). Les cordons secteur doivent être en conformité avec la législation du pays où le produit est installé.

Alimentation secteur et protections électriques — Pour chaque circuit électrique, le câblage doit comporter une protection contre les surintensités, une protection contre les défauts de fuite à la terre et un système de coupure des deux pôles ou un disjoncteur différentiel.

Alimentation secteur/Panneau de connexion — Le panneau de connexion doit être conforme à la législation du pays où le produit est installé. Ce panneau de connexion doit être placé dans la baie de telle sorte que les prises et les cordons d'alimentation soient à portée de main afin de permettre la mise hors tension de l'équipement.

Protection contre les surintensités — L'alimentation électrique dispose d'une protection intégrée contre les surintensités, non accessible et non réarmable. En cas de dysfonctionnement, contactez le Département Services Clients d'Harmonic.

Sources d'alimentation et Intervention dans le châssis — Le châssis peut être alimenté par deux sources d'alimentation pourvues pour chacune d'elles d'un cordon d'alimentation. Déconnectez tous les cordons d'alimentation avant toute intervention.

Instructions de sécurité relatives à l'installation du châssis dans une baie

Température d'ambiance élevée — Si l'équipement est installé dans une baie, la température d'ambiance de l'équipement peut être supérieure à la température du local technique. Assurez-vous que la ventilation est conforme à ce qui est indiqué section *Mounting in the rack* pour maintenir l'équipement dans un environnement compatible avec la température ambiante maximum spécifiée par le Constructeur.

Charge mécanique — Si l'équipement est installé dans une baie, veillez à ce que les conditions de montage soient conformes à ce qui est indiqué section *Mounting in the rack*.

Circuit de surcharge — Le produit est équipé de circuit de protection de surcharge des circuits d'alimentation et de protection contre les court-circuits. Appliquez les valeurs appropriées indiquées sur la plaque signalétique.

Liaison de terre — Assurez-vous de la continuité de la liaison de terre pour l'équipement monté en baie. Une attention particulière doit être apportée en cas d'utilisation de nourrices ou de boîtiers de raccordement.

Equerres inversées ou équerres en L — Il est strictement interdit de supporter le châssis par ses oreilles. Si le châssis doit être installé dans une baie, posez le châssis sur des équerres inversées ou sur des équerres avec profil en L et observez les règles de ventilation et de sécurité énoncées section *Mounting in the rack*.

Précautions lors des manipulations — Prenez toutes les précautions nécessaires pour ne pas vous blesser lors du montage / démontage de l'équipement dans une baie. N'hésitez pas à demander l'assistance d'une autre personne ou à utiliser un chariot élévateur adapté.

Instructions de sécurité générales

Atmosphère Explosive — Ne mettez en service le produit qu'en zone exempte de tout risque d'explosion (atmosphère et matériaux).

Humidité — De façon à éviter tout risque de choc électrique, ne mettez en service le produit qu'en zone sèche.

Remplacement de pile au lithium ou de mémoire avec pile au lithium incorporée — Certains équipements contiennent une pile au lithium où une mémoire sauvegardée avec une pile au lithium incorporée.

Dans ces équipements, si pour une raison quelconque le remplacement de ce composant s'avère nécessaire, il convient de respecter les conditions suivantes :

- L'opération ne doit être réalisée que par un personnel qualifié;
- Le composant doit être remplacé par un composant de mêmes caractéristiques;
- Le sens de montage du composant doit être respecté;
-

 **DANGER:** Il y a risque d'explosion si le composant est monté de manière incorrecte.

La batterie au lithium ou la mémoire avec pile au lithium incorporée sont conformes aux réglementations de l'IATA et du 49CFR. Elles ne nécessitent pas de déclaration, d'emballage ni d'étiquetage spécifiques.

Mises en garde

 **CAUTION:** Les mises en garde suivantes signalent les conditions et les pratiques susceptibles d'occasionner des dommages à l'équipement et aux installations.

Source d'alimentation adéquate — Ne branchez pas ce produit à une source d'alimentation qui délivre une tension hors de la plage de tension nominale spécifiée pour ce produit.

Ventilation adéquate — Pour éviter tout risque de surchauffe, ventilez correctement le produit. Reportez-vous section [Mounting in the rack](#). Pour ne pas perturber la ventilation, tous les emplacements non occupés par des cartes doivent être obturés par des caches de bouchement.

Dysfonctionnement suspecté — Si vous constatez une anomalie, faites procéder à une vérification par un personnel qualifié.

Marche/Arrêt de l'équipement — Le châssis ne comporte pas d'interrupteur Marche/Arrêt. Les cordons d'alimentation doivent être à portée de main afin de permettre la mise hors tension de l'équipement.

Acheminez les câbles correctement — Acheminez les câbles d'alimentation et les autres câbles de telle façon qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.

Emballage d'origine — En cas de retour au Département Service Clients, l'équipement défectueux doit être placé autant que possible dans son emballage d'origine (cales de protection et boîtes). Si vous ne disposez plus de l'emballage, l'équipement défectueux doit être protégé afin de supporter les chocs pendant le transport. Notre Département Service Clients examine les emballages à l'arrivée et pourra refuser d'effectuer une réparation en cas de défaut visuel sur l'emballage dû au transport et ayant entraîné de nouveaux défauts par rapport à la nature de l'anomalie que vous avez constatée.

Il est rappelé que le transport pour le retour des équipements est à la charge et aux risques du Client. L'équipement ne doit être retourné qu'accompagné d'une autorisation de retour d'équipement RMA (Return Material Authorisation).

Annulation de garantie — Respectuez les règles suivantes pour ne pas annuler la garantie :

- Seul le remplacement des cartes enfichables et qui ne requiert pas le démontage du capot est autorisé. Dans tous les autres cas, remplacez l'équipement par un équipement de rechange.
- Ne démontez jamais le capot.

Safety Instructions for Finland, Norway, Sweden

Specific Safety Instructions

Specific safety instructions for Finland — Laite on liittää suojamaadoituskoskettimilla varustettuun pistorasiaan.

Specific safety instructions for Norway — Apparatet må tilkoples jordet stikkontakt.

Specific safety instructions for Sweden — Apparaten skall anslutas till jordat uttag.

Appendix C

Recycling the product

WEEE Take-Back Request Program

In order to assist EU member states to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally, Harmonic strives to recycle in compliance with the WEEE Directive any of its products that cannot be re-used.

Harmonic's customers should:

- Not discard equipment in household or office garbage.
- Arrange proper recycling of unneeded equipment. For the take-back of Harmonic equipment, customers must:
 - Collect the information required to complete Harmonic's WEEE Take-Back Request form.
 - Complete and submit the online WEEE Take-Back Request form. Please note that forms must be fully completed in order to prevent process delays.
 - Receive instant online confirmation indicating the reference number.
 - Receive the End of Life (EOL) asset return authorization number and instruction for EOL asset return.
- Not ship EOL product to Harmonic without a Harmonic-provided EOL asset return authorization number.

The crossed-out wheeled bin symbol on a Harmonic-branded commercial product indicates that the product should not be disposed of along with municipal waste, but invites our customers to return the product to us under Harmonic's WEEE Take-Back program for product disposal.



Harmonic will pay for the cost of shipping and will provide a Certificate of Recycling or a Certificate of Destruction upon request. For more information on collection, reuse and recycling or to initiate the WEEE take-back process.

Please complete the form at:

- <https://www.harmonicinc.com/global-citizenship/weee-take-back-request/>

Or contact :Harmonic Technical Assistance Center (TAC): <https://www.harmonicinc.com/technical-support/>

Compliance with additional country specific environmental, safety and EMC standards

In addition to above listed standards and compliance regulations, Harmonic products may also be compliant with other country specific environmental, safety and EMC requirements.

Please contact Harmonic Compliance Team at:

- regulatory.compliance@harmonicinc.com

or your local sales representative for more information about compliance with particular country or standard

Appendix D

Regulatory Notices

FCC Emission Control

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Harmonic can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

EN55032 Class A Warning

Warning: This equipment is compliant with Class A of CISPR32. In a residential environment, this equipment may cause radio interference.

VCCI Class A Warning

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

V C C I - A

This is a Class A product based on standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

Appendix E

Customer Services

Harmonic Global Service and Support has many Technical Assistance Centers (TAC) located globally, but virtually co-located where our customers can obtain technical assistance or request on-site visits from the Regional Field Service Management team. The TAC operates a Follow-The-Sun support model to provide Global Technical Support anytime, anywhere, through a single case management and virtual telephone system. Depending on time of day, anywhere in the world, we will receive and address your calls or emails in one of our global support centers. The Follow-the-Sun model greatly benefits our customers by providing continuous problem resolution and escalation of issues around the clock.

- *Harmonic Technical Assistance Center contact information*
- *Harmonic corporate contact information*

Harmonic Technical Assistance Center contact information

A list of phone numbers, e-mail addresses, and important links for the Harmonic Technical Assistance Center (TAC).

Table E-1: Harmonic Technical Assistance Center phone numbers and email addresses

Region	Telephone Technical Support	Email
Americas	888.673.4896 (888.MPEG.TWO) 408.490.6477	support@harmonicinc.com
Europe, the Middle East and Africa (EMEA)	+44.1252.555.450	emeasupport@harmonicinc.com
India	+91.120.498.3199	apacsupport@harmonicinc.com
Japan	+81.3.5614.0524	japansupport@harmonicinc.com
Asia Pacific (APAC) – Other Territories	+852.3184.0045 +65.6542.0050	apacsupport@harmonicinc.com

Support URLs

Report an Issue Online: <https://www.harmonicinc.com/technical-support/report-issue/>

Technical Support: <https://www.harmonicinc.com/technical-support/>

Download software and documents from the cOS Portal

<https://cableos.harmonicinc.com/signin>

Contact Harmonic Technical Publications

techdocs@harmonicinc.com

Harmonic corporate contact information

Phone numbers and addresses for the corporate office.

Harmonic corporate address

2590 Orchard Parkway
San Jose, CA 95131
U.S.A.

Harmonic corporate telephone numbers

Tel. +1.800.828.5521 (from the U.S. and Canada)
Tel. +1.408.542.2559 (outside the U.S. and Canada)
Fax.+1.408.542.2511

Appendix F

Alarms

This chapter gives the list of alarms which can be displayed on the ViBE CP9000. For each alarm the diagnostics, action to be performed and alarm severity are given.

- *Alarm Help*

Alarm Help

Table F-1:

Wording	Severity	Diagnosis	Action
Loss of signal	Major	No input signal detected on physical interface.	Check signal at the input physical interface and check cable.
High Temperature	Critical	Internal temperature is over maximum ratings. The device may be permanently damaged if kept in that state.	Check if the ventilation is running, if air inlet and outlet are not obstructed and ambient external temperature is below 40°C.
Sfwr download failure	Major	Impossible to download a firmware in a programmable component.	Contact Customer Service for analysis and repair.
Loss of stream	Warming	No transport stream at device input.	Check input stream.
Stream overflow	Major	Input rate is too high.	Check input stream.
No embedded signal	Minor	No embedded signal.	Check input signal.
Video standard mismatch	Major	Input standard is different from the declared standard.	Change preferred standard in configuration or change standard of input signal.

Wording	Severity	Diagnosis	Action
Link down	Major	The line transceiver of the board cannot lock on signal.	Check if the good cable is plugged on the board. If signal conformity is proved, deplug and replug the board. Wait until it is recognized by the C&C software.
Half duplex mode	Minor	Auto negotiation done in half duplex mode (transceiver status).	Transmission and Reception could be correct but it is recommended to work in Full Duplex Mode.
Hardware failure	Critical	One or more key hardware modules of the unit are not responding.	Reboot the equipment. If the alarm registers again, contact Customer Service.
Ventilation failure	Critical	Fan concerned is out of service.	If external, check if an air fan is powered on. Else, check that no object has been inserted in the unit and is blocking a fan. If no external cause is detected, contact Customer Service.
(Re)booting	Major	(Re)boot of the device is in progress. The product does not render the expected service until this alarm disappears.	Wait for boot to be completed.
Function not operating	Major	A function of the equipment is found not operational.	Contact Customer Service.
No stream carried in program	Minor	No stream or program found.	Check source and if the problem persists, contact Customer service.
Invalid saved configuration	Critical	The configuration stored in the non volatile memory is invalid and has been discarded. The product is working with its default configuration.	Load a new configuration and if the problem persists, contact Customer Service.

Wording	Severity	Diagnosis	Action
Option missing	Minor	The current configuration cannot be fully applied due to a software option not installed or due to an insufficient count of software options. The function works in a degraded mode that does not render the expected service. The reference of the missing software option is displayed in the alarm wording.	Install the missing option or reconfigure the board in order to avoid the usage of this optional feature.
Rejected configuration	Major	TCP/IP connection has been established but communication cannot be established correctly because the equipment version is incompatible or configuration is incorrect.	Check equipment version and/or correct configuration.
Bad bitrate	Warning	Input bitrate does not match with expected one or bitrate violation.	Check received signal bitrate.
Unreachable destination	Major	Destination host is not connected to network or bad IP settings of destination host or problem of configuration on intermediate routers.	Check destination host. Contact your network infrastructure representative.
Detected silence	Major	Silence detected on specified channel.	Check input signal level or increase delay for silence detection.
No expected standard in signal	Major	Signal is not compliant with configured and specific standard.	Check input signal.
Unsuitable link speed	Minor	The affected Ethernet interface has detected a connection but the speed is not compatible with the port speed.	For the C&C Ethernet, check that the network is a 10Mbps or a 100Mbps network. For the Ethernet streaming port, check that the network is a 100Mbps or a 1000Mbps network.

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