

Contribution & Primary Distribution

RX1 v15.x

User Guide

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CHAPTER 1

Design Overview

Design Overview

The MediaKind RX1 is designed as a highly flexible edge device. It provides a set of processing functions that allows the user to create a flexible end to end flow.

Figure 1. RX1 Processing Functions

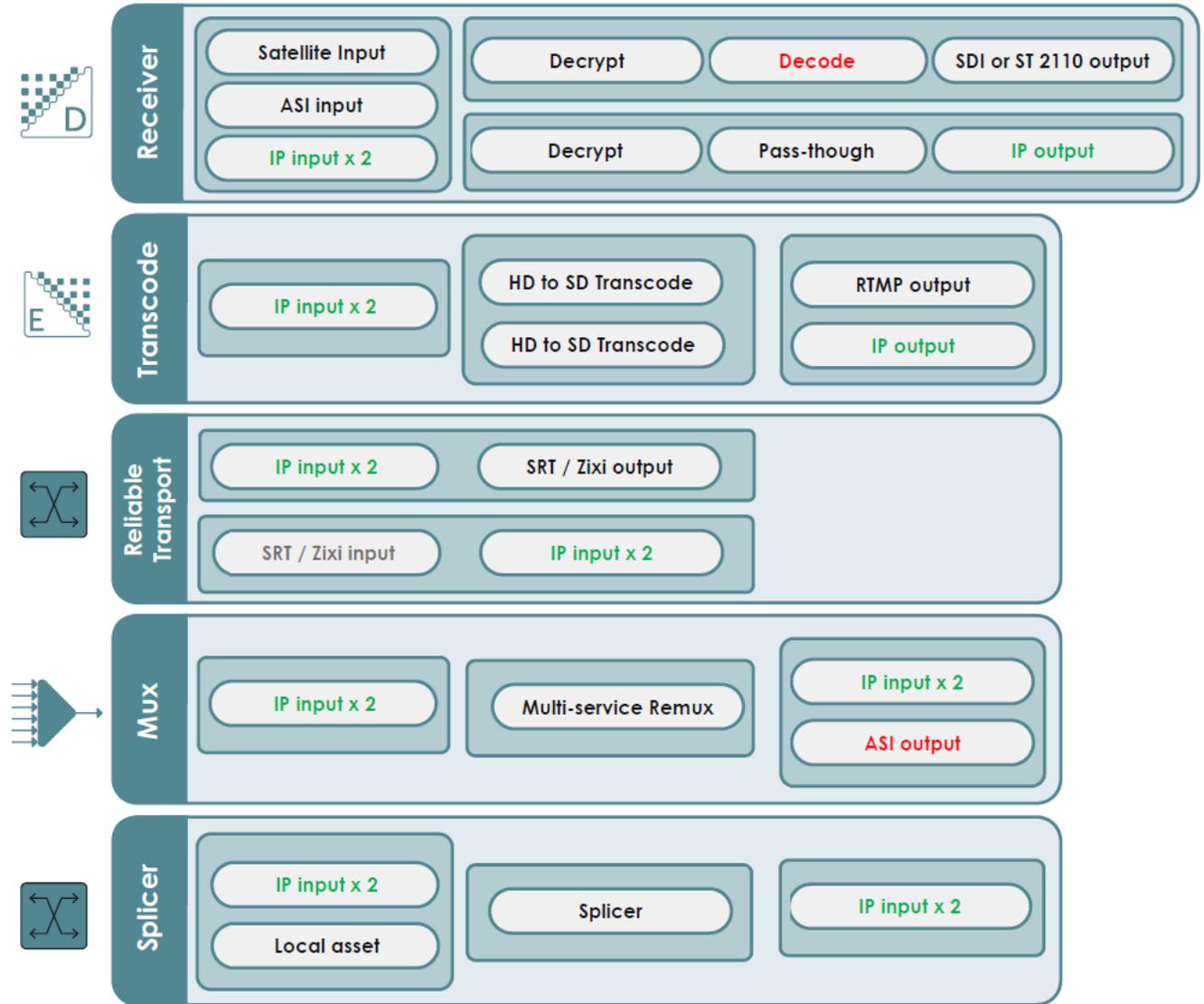
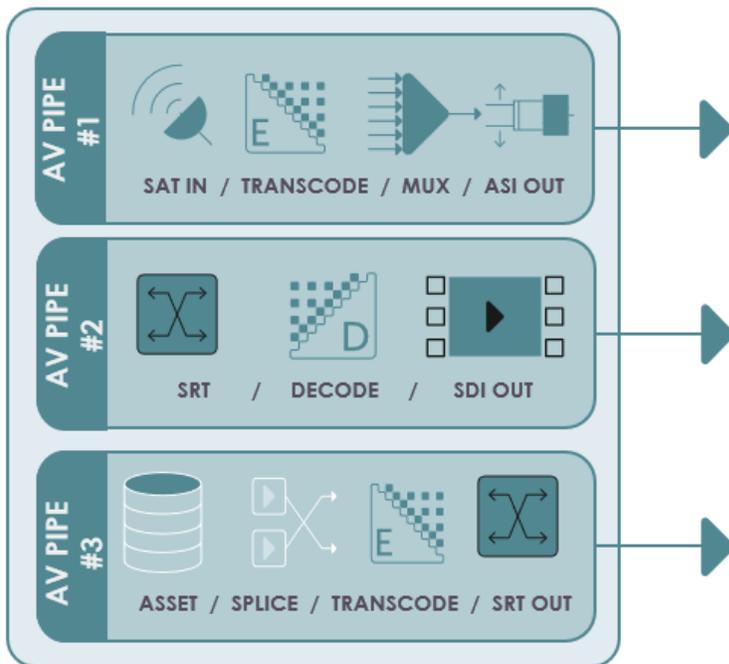


Figure 2. Customized A/V Processing



The following service types are provided by RX1:

- **Receiver**

The 'Receiver' function can be configured with ASI, Satellite or IP input and can be set into one of the following three modes: Pass-through, SD/HD Decode or UHD Decode. Input redundancy mechanisms are supported, notably ST2022-7 for the IP input mode. When set to pass-through mode, the 'Receiver' service outputs the signal as a Transport Stream over IP whereas the Decode modes output the signal as SDI or SMPTE ST 2110. Both modes have a decryption stage with a variety of decryption types such as BISS Mode 1, BISS Mode E, BISS-CA, Director and DVB-CI/CAM.

- **Live Encoding**

The '**Live Encoding**' function takes an IP Live Encoding input and performs transcoding of a single video program with a video input of MPEG-2, H.264 or HEVC in SD or HD 4:2:0 resolutions. To achieve the required density, RX1 is configured with Hardware acceleration (Intel QSV) and allows **Solution Manager Transcode** transcoding to MPEG-2, H.264 or HEVC in SD or HD 4:2:0 resolutions. Audio can be transcoded or pass-through and other meta-data such as SCTE-35 and DVB-Subtitles can also be passed through to the output program. IP input is supported but SDI or SMPTE ST 2110 input are not supported in RX1.

- **Multiplexing**

The 'Multiplexing' function takes in a Multiple Program Transport Stream and recreates an output Transport Stream with a choice of PIDs from the input to achieve the PID filtering and PID remapping function. It also supports re-multiplexing by passing-through a whole input program from the input to the output. Scrambling functions and Statistical Multiplexing functions are not supported in RX1.

- **Reliable Transport**

The 'Reliable Transport' function takes in UDP packets and output them as either SRT (caller or listener) or Zixi feeder. It can also take in SRT input or Zixi input and output the content as UDP. The

UDP content is processed as a pipe without any modification to the UDP content and is typically used - but not solely- to carry Transport stream encapsulated in UDP or RTP within the UDP packets.

- **TS Splicer (Stream Personalization)**

The 'TS Splicer' function enables splicing of content using SCTE-35 triggers based on message types it should trigger on. The video clip can either be retrieved from an external asset server or locally stored in the RX1.

- **Stream Conditioning**

The 'Stream Conditioning' can be used with 'Encoding Live' to trigger functions such as SCTE-35 rewrite, Animation/Text crawling, Slate/Logo insertion, live-to-file and file-to-live video switching using operation type "Video clip".

- **Viewing Policy Manager**

The 'Viewing Policy Manager' is used to configure the ingest of programming events schedules. This has limited functionality in the current version of RX1.

- **Solution Manager and Solution Manager Transcode**

These cannot be enabled in the User interface; they are used for very specific deployments within a distribution system controlled by Director. Please talk to product management for the target use case.

Brief example of a channel configuration with multiple functions

The various functions can be created and configured as a chain to create a specific use case.

As an example, a **Receiver** service configured with a Satellite input can be set in pass-through mode and chained with a **Live Encoding** service to perform transcoding and output the transport stream over IP output.

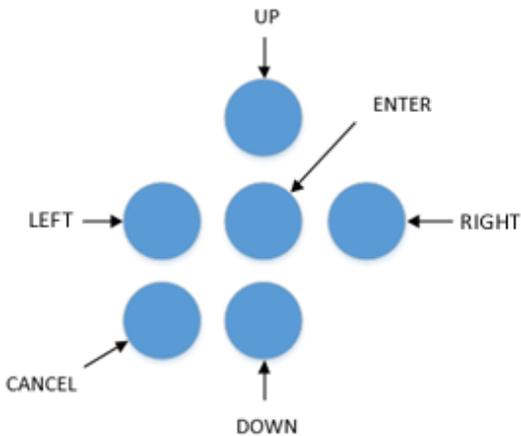
The Transport Stream is carried from one function to another function as IP traffic using the internal network within the RX1.

CHAPTER 2

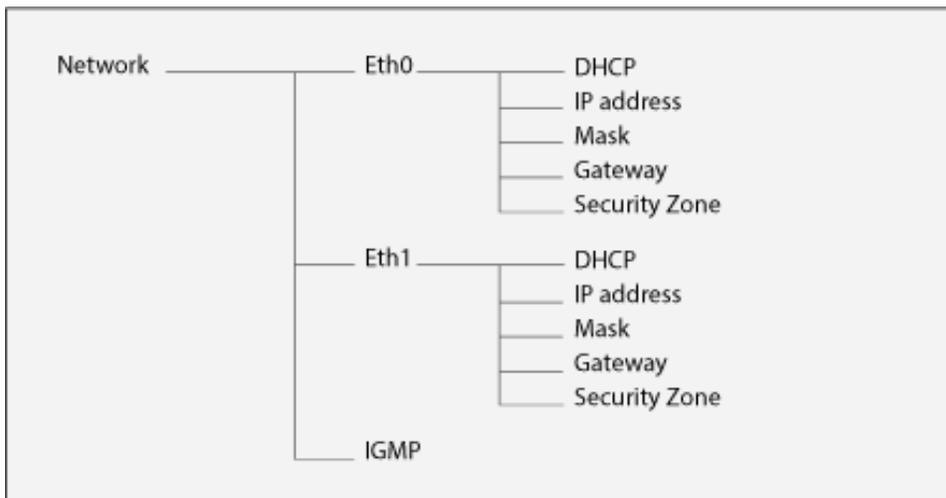
Quick Start

Set the control IP address

The control network interface can be configured via the M1 LCD front panel. The following buttons on the front panel can be used to navigate into the menus, make selections, and configure the control IP address:



Below is the current front panel menu structure:



1. Use the buttons on the front panel to set the IP address for the eth0 network interface.
2. Use the **UP**, **DOWN**, **LEFT** and **BACK** buttons to navigate and select the parameter to be changed.
3. Use the **UP** and **DOWN** buttons to adjust the value.
4. Press **ENTER** to apply the new value.

Connect to the Controller

1. Open a Web browser.
2. Enter the access URL, then press **Enter**.

NOTE Your access is either HTTP or HTTPS depending on your security settings.

HTTP example: http://[IP-Address]:8080

HTTPS example: https://[IP-address]:8443

Result: The **Login** page displays if user authentication is activated and configured.



The screenshot shows a login form with two input fields. The first field is labeled 'Username' and contains the text 'Username'. The second field is labeled 'Password' and contains the text 'Password'. Below the fields is a blue button labeled 'Login'.

3. When the **Login** page displays: Enter your **username** and **password**.

NOTE Default admin user log in information:

- **Username: admin**
- **Password: admin**

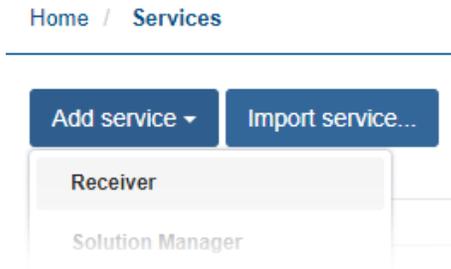
IMPORTANT We strongly recommend that you change the default password to increase security. Password can be changed by clicking the user account on the upper right corner of the window.

Result: The **Home** page displays.

Configure a basic Receiver service

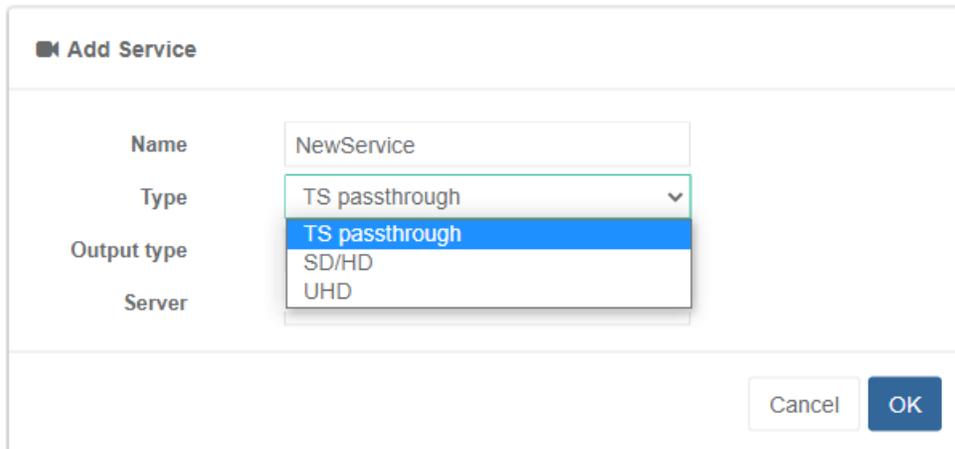
This configuration context is a basic example configuration and does not cover a specific configuration context.

1. [Connect to the web interface.](#)
2. Navigate to the **Services** menu on the left-hand pane.
3. Click **Add service** and select **Receiver** to create and configure the service.



NOTE Other service types are also available.

4. Select the type of service you require. This can be **HD/SD**, **UHD** or **TS passthrough**.

A screenshot of a dialog box titled 'Add Service'. It has a header with a camera icon and the text 'Add Service'. Below the header, there are four fields: 'Name' with the value 'NewService', 'Type' with a dropdown menu showing 'TS passthrough', 'Output type' with a dropdown menu showing 'TS passthrough' (highlighted), 'SD/HD', and 'UHD', and 'Server' which is empty. At the bottom right, there are 'Cancel' and 'OK' buttons.

RESTRICTION At this time SD is not fully supported.

Result: The new service is now created and must be edited before starting.

5. From the **Services** pane, select the edit icon,  for the newly created service.

- Set the input source configuration from the newly visible service edit screen: fill in the required parameters for the input type required. In the case below this will be **TS packet size** and **Port**.

Parameters

Input Decrypt Decoding Output

Redundancy mode: Off

Input loss timeout: 500 ms

Primary Secondary

Input type: ASI

Status: Service has exclusive use of source

TS packet size: 188

Port: 1

7. Set the [decoding configuration](#).
 - a. Open the **Audio** tab and click **Decode all input audio**.

Parameters

Input Decrypt **Decoding** Output

Service Auto

Video **Audio** Data

Add audio decode Decode all input audio Remove all input audio

Auto
Select

Name	Input	Output channel configuration
Audio 1	Auto	Stereo

- b. Open the **Data** tab and click **Decode all input data**.

Parameters

Input Decrypt **Decoding** Output

Service Auto

Delay mode Compatibility

Video **Audio** **Data**

Add data decode Decode all input data Remove all input data

Name	Input	Data type	Action
There is no data to display			

- c. Select the **Data type** (Ancillary or Teletext) for each component in the data input list

8. Set the [output configuration](#).

The screenshot shows the 'Parameters' configuration page with the 'Output' tab selected. Under the 'SDI 1' section, there is a plus sign icon. Below this, several settings are listed in a table-like format:

Link mode	Quadrant
Output interface	SDI ports 1-4 (In use by services: IanS Test Service, IanS Test Service)
Dynamic range signalling	Follow input
Clock reference	Free running
3G-SDI level	Level A
Video failure mode	Freeze frame

- a. If you have [UHD video output](#), then set the output link format to be either quadrant or interleaved.
- b. Open the **Audio** tab and select **Add all**
- c. Then, for each component in the audio output list, select the location in the output SDI where to embed.
- d. Open the **Data** tab then, for each VANC type, from the drop down, select either **OFF** or the line required.

Use-case 1: Satellite input, Transcode and ASI output

This use case configures a **Receiver** service with Satellite input and IP output. This is connected in the internal interface tap0 to several **Live Encoding** services performing transcoding from IP input to IP output. The services are then multiplexed on a **Multiplexing** service via the tap0 internal interface, with IP and ASI outputs.

The configuration is based on the following main steps:

1. Configure a **Receiver** service followed by a **Live Encoding** service.
2. Configure a **Reliable Transport** service followed by a **Receiver** service.
3. Configure a **Receiver** service, followed by a **Live Encoding**, followed by a **Multiplexing** service.

To configure this use case, follow these steps:

1. Create a new **Receiver** service:
 - a. Follow the instructions under [Configure a basic Receiver service](#) on page 17 setting the **Service type** to **TS passthrough**.
 - b. From the **Input** tab, set the **Input type** to **Satellite** and configure the Satellite input parameters accordingly.

Parameters			
Input	Decrypt	Decoding	Output
Redundancy mode	Off		
Input loss timeout	250	ms	
Primary		Secondary	
Input type	Satellite		
Status	Service has exclusive use of source		
Source	RF 1		
LNB			
LNB frequency	9750	MHz	
LNB voltage	voltage off		
22kHz	<input type="checkbox"/>		
Tuner			
Frequency	11750	MHz	
Symbol rate	27.5	MSym/s	
Search range	10000	kHz	
C/N margin alarm	2.0	dB	
MIS enable	<input type="checkbox"/>		
MIS stream ID	1		
Gold code	0		

- c. From the **Decrypt** tab, configure the CA Module by choosing the incoming service to descramble and the CAM to be used.

Parameters

Input **Decrypt** Output

BISS BISS-CA Director 5 Director 6 **DVB-CI**

Auto recover CAM Slot 2 30 seconds

Explore CAM in Slot 1 ☰ Explore CAM in Slot 2 ☰

Reset CAM in Slot 1 ⏻ Reset CAM in Slot 2 ⏻

Program Configuration

Add decrypted program **Remove all**

Name	Service	Decryption type	Action
Decrypt 1	FOX News Channel	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 2	FOX Sports 1	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 3	FOX Sports 2	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 4	Fox Sports Racing	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 5	FOX Deportes	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 6	FOX Soccer Plus	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 7	FOX Weather	CAM Slot 2 - Unregistered ID	🗑️
Decrypt 8	FOX Business Network	CAM Slot 2 - Unregistered ID	🗑️

- d. From the **Output** tab, set the Receiver network interface to tap0. This is the internal routing interface.

Parameters

Input Decrypt **Output**

TS over IP

Network interface tap0

Stream address 235.0.0.1

UDP port 5555

Time to live 64

2. Create and configure a **Live Encoding** service performing transcoding from IP input to IP output:
 - a. On the **Services** page, create a **Live Encoding** service.

Home / Services / Add Live Encoding

General Input Media processing Encoding Output Advanced parameters

General

Name *

Template

Hardware acceleration (Intel QSV)

QSV Device *

- b. In the **Input** tab, set the network interface to match the Satellite output.

General **Input** Media processing Encoding Output Advanced parameters

General parameters

Type *

Input redundancy *

Input loss timeout ms

Source error management

Switch on ES data loss

State if no source at start

Sources

Primary

Network interface *

Stream address *

Port *

IGMPv3 source filtering

FEC port(s)

Input synchronization mode *

Program ID

- c. Configure the **Live Encoding** service accordingly.
 - d. The video bitrate will fluctuate up to the maximum value set in the UI. In order to get a constant video bitrate on the output, please set the following entry and value in the advanced parameters tab: Mpeg2ts.NullPacketStuffing False.

General Input Media processing Encoding Output **Advanced parameters**

Parameter name	Value	Variants	Actions
<input type="text" value="Mpeg2ts.NullPacketStuffing"/>	<input type="text" value="False"/>		<input type="button" value="🗑"/>
<input type="button" value="+Add"/>			

3. Repeat steps 2 to create as many **Live Encoding** services as are required.
4. Create and configure the Mux:
 - a. On the **Services** page, create a **Multiplexing** service.
 - b. Configure the Mux by adding the programs in the **Transport Stream** tree:
 - Either by adding the whole service as a pass-through,
 - or by adding a service manually and the PIDs one by one in the service tree with the right descriptors.

Home / Services / Mux / Edit Mux

Name* Mux

Stream Processing Scrambling

Output Stream

- Transport Stream
 - TOT
 - NIT
 - 7TWO (2402)
 - Service Descriptor
 - 7mate (2403)
 - Service Descriptor
 - GWN7 (2391)
 - Service Descriptor

Properties

Mux

Output	PSI SI
Total Bitrate*	23,052,460 bps
Minimum Null Bitrate*	0 bps
Statistical Bit Rate Allocation	<input type="checkbox"/>
Transport Stream ID*	2462
Original Network ID*	1

- c. Configure the **Output** parameters of the Mux, notably the Mux rate and the output interface.

Home / Services / Mux / Edit Mux

Name* Mux

Stream Processing Scrambling

Output Stream

- Transport Stream
 - TOT
 - NIT
 - 7TWO (2402)
 - Service Descriptor
 - 7mate (2403)
 - Service Descriptor
 - GWN7 (2391)
 - Service Descriptor
 - RACING.COM (2408)

Properties

Mux Output PSI SI

Output + Add

Output Name*	Output
Type	ASI
Connectors*	1
Server filter	*
Output in the clear	<input type="checkbox"/>

5. On the **Services** page, for each service you want to run, assign a server and start the service.

Use case 2: SRT Input with Decode and SDI Output

The configuration is based on the following main steps:

1. Configure an **SRT** input.
2. Configure an **SRT** listener with UDP IP output.
3. Connect that UDP output to a **Receiver** service.
4. Configure the **Receiver** service for SDI output.

To configure this use case, follow these steps:

1. Connect to the web interface then navigate to the **Services** menu on the left-hand pane.
2. Click **Add service** and select **Reliable Transport** to create and configure the service.
3. Enter a name for this service.
4. In the **Input** section, set the **Input Mode** to **SRT Listener**.
5. In the **Output** section, set the **Output Mode** to **UDP**.
6. Configure the SRT Listener **Connection** parameters with the listener address and port. If required, then **Encryption**. **Link characteristics** parameters can also be set or adjusted.
7. Configure the **Output Connection** parameters.

Result: You should get the following:

Home / Services / MySRT / Edit

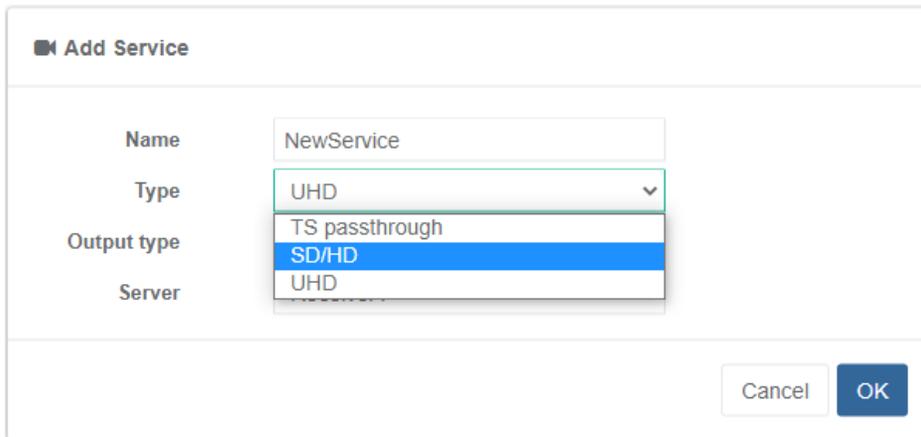
  

Name*

<h3>Input</h3> <p>Mode</p> <p>Input Mode* <input type="text" value="SRT Listener"/></p> <p>Connection</p> <p>Listener Interface* <input type="text" value="eth1"/></p> <p>Listener Port* <input type="text" value="1666"/></p> <p>Encryption</p> <p>Encryption* <input type="text" value="AES-128"/></p> <p>Pass Phrase* <input type="text" value="PA55w0rD2021"/></p> <p>Predicted Worst Case Link Characteristics</p> <p>Latency* <input type="text" value="612"/> <input type="text" value="ms"/></p> <p>Maximum SRT Bandwidth Overhead* <input type="text" value="33"/> <input style="width: 40px;" type="text" value="%"/></p> <p style="text-align: right;"><input type="button" value="Calculate"/></p>	<h3>Output</h3> <p>Mode</p> <p>Output Mode* <input type="text" value="UDP"/></p> <p>Connection</p> <p>Network Interface* <input type="text" value="tap0"/></p> <p>Stream Address* <input type="text" value="235.10.10.2"/></p> <p>Port* <input type="text" value="5001"/></p>
--	---

8. Click **Save and exit** to save your modifications.
9. Navigate to the **Services** menu on the left-hand pane.

10. Click **Add service** and select **Receiver** to create and configure the service.
11. Set service **Type** to **SD/HD**.



Add Service

Name: NewService

Type: UHD (dropdown menu open showing options: UHD, TS passthrough, SD/HD, UHD)

Output type: (empty)

Server: UHD (dropdown menu open showing option: UHD)

Buttons: Cancel, OK

Result: The new service is now created and must be edited before starting.

12. From the **Services** pane, select the edit icon,  for the newly created service.
13. On the newly visible service edit screen, set the **Input Type** to **IP**.



Primary Secondary

Input type: IP (dropdown menu)

Unicast:

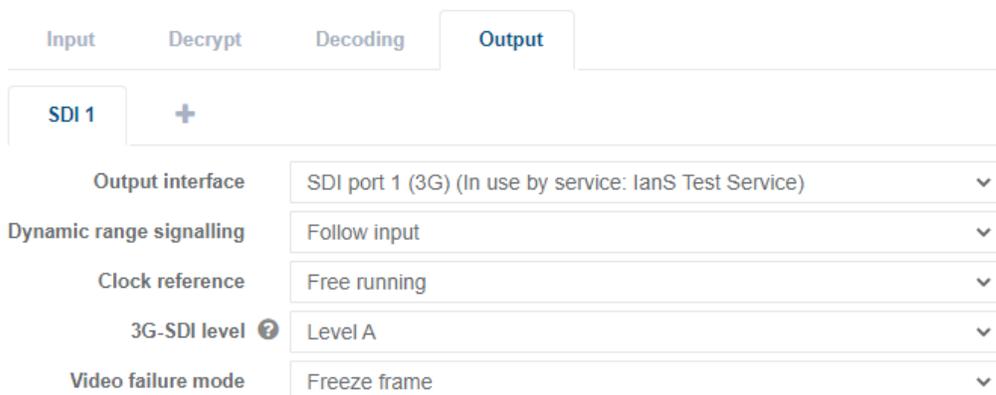
Stream address: 239.100.1.2

IGMPv3 source filtering: (empty)

Port: 5000

Network interface: eth1 (dropdown menu)

14. Configure SDI output parameters.



Input Decrypt Decoding **Output**

SDI 1 +

Output interface: SDI port 1 (3G) (In use by service: IanS Test Service) (dropdown menu)

Dynamic range signalling: Follow input (dropdown menu)

Clock reference: Free running (dropdown menu)

3G-SDI level : Level A (dropdown menu)

Video failure mode: Freeze frame (dropdown menu)

15. Once all the parameters are configured, click on **Save and exit**.
16. In the **Services** page, assign a server for each service you want to run and start the services.

CHAPTER 3

Menus and navigation

Menus and navigation

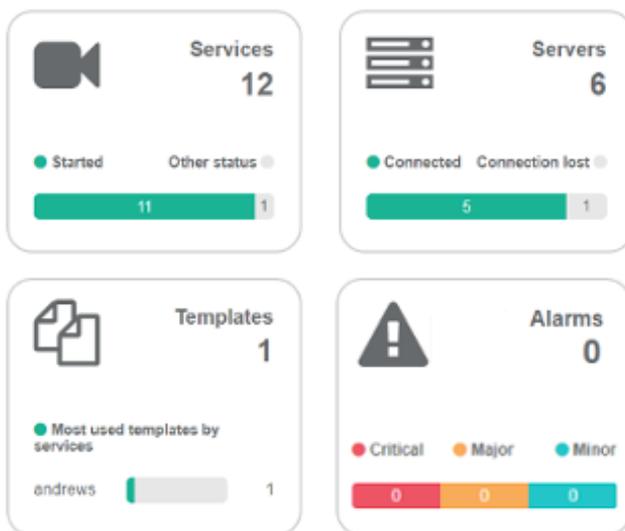
There are multiple navigation options in the Controller. Some **menu options depend on the MediaKind products that you have installed.**

IMPORTANT Features, menus and options vary based on your solution and the MediaKind products installed.

Home page and dashboard overviews

The **Home** page displays a dashboard with overviews for services, servers, templates and alarms. Click an overview to link to the related page.

NOTE The overview display may vary depending on the products you have installed.



Collapse/expand button

The button collapses or expands the **Menu panel** to either hide or display menu text.

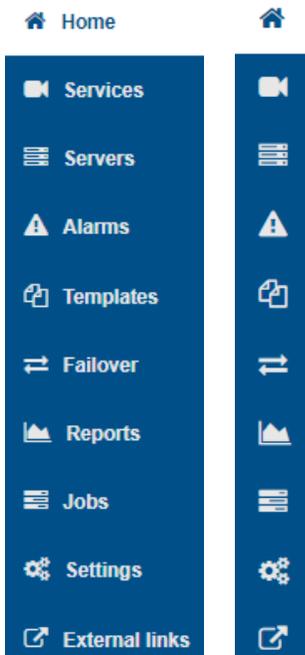


Menu panel

Access information and configuration options.

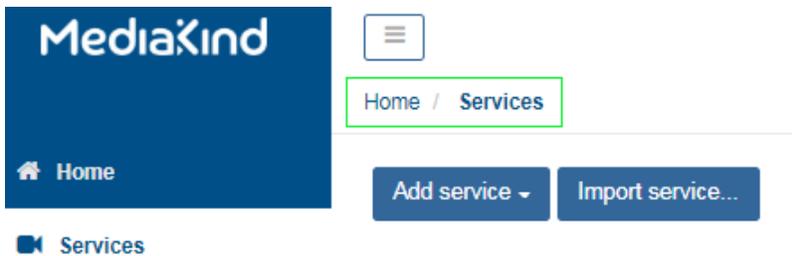
NOTE Menu options may vary depending on the products you have installed.

Examples: Full / Collapsed



Breadcrumbs

Breadcrumbs are navigational links to previous pages. Breadcrumbs display above the viewing screen.



System center menu

The **System Center** menu drops down after clicking the  in the upper right corner of the screen.



Alarms banner

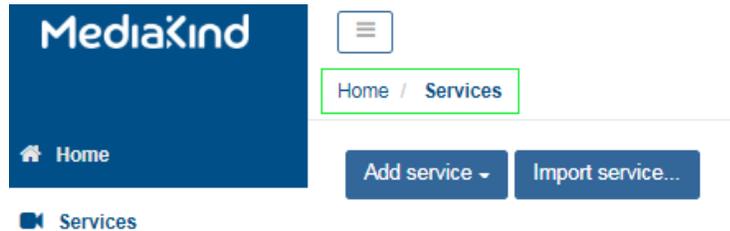
The Alarms banner displays in the upper right corner of the screen, next to the System Center menu icon .



Services processing types available on the RX1

A service is a set of parameters required for a given processing type. Services can be manually started and stopped.

NOTE Access services from the **Home** page dashboard or the left-side menu panel.



Service processing types

Processing type	Link to relevant chapter
Live Encoding	See Configure the Encoder on page 109 for more information.
Multiplexing	See Configure the Stream process component (Mux and encryption) for more information.
Receiver	See Configure the Receiver Services on page 38 for more information.
Reliable Transport	See Add a Reliable Transport service on page 105 for more information.
TS Splicer	See corresponding User Guide for more information.
Viewing Policy Manager	See Configure switch to TS playlist on page 142 for more information.
Stream Conditioning	See Configure switch to TS playlist on page 142 for more information.
Solution Manager	Not applicable to a standalone RX1.

Servers

The **Servers** view displays system information to monitor and manage the server running the Receiver and other services. The statuses indicate server availability: **connected** or **connection lost**.

Server Status

[Home](#) / [Servers](#)

Search in table					
Name	IP Address	Processing Type	Software	Status	Actions
Receiver1	127.0.0.1	Controller , Licensing , Content Processing , solution_manager , Solution Manager Transcode , Live Encoding , Multiplexing , SRT , Stream Conditioning , TS Splicer , Viewing Policy Manager	Encoding Live 114.0.6-85 , MFCP 14.1.0.1 , SRT 1.4.0-158 , Solution Manager Transcode 0.0.35-257 , Stream Conditioning 13.19.0-30 , Stream Processing 13.3.0-5115 , TS Splicer 14.0.43-180 , Viewing Policy Manager 13.19.0-30 , ericsson-controller 14.0.6.686 , ericsson-license-manager 0.72.0-0	connected	    

Rows per page: 20

From here:

- You can check alarms or alarm history to investigate possible causes.
- You can check server information for licenses and IP configurations.

Server processing types

Additional processing types are available from the [Servers](#) page.

Processing type	Required Software
Licensing	<p>Dedicated license server running the license manager</p> <p>NOTE The license manager may also be installed on the MediaKind Controller server.</p>
Controller	<p>Controller provides a centralized configuration and control interface, manages failover for Encoding Live, and offers a flexible licensing management for MediaKind applications.</p>

System Center for solution administration

The **System Center** menu provides access to administration features. Administrators can manage users, system backups and restore options, as well as monitor servers, and manage settings.

Access the System Center

The **System Center** () menu includes a number of options for system administration and monitoring.

Features are available depending on your user rights.

System Center				
Group	Restore	Backup	User Management	Settings
<i>Admin</i>	Yes	Yes	R+W	Yes
<i>Monitoring</i>	No	Yes	N/A	Yes
<i>Configuration</i>	Yes	Yes	N/A	Yes

Manage displays for RX1

The **Status** window displays when editing service parameters: **Input**, **Decoding**, **Output**

1. Display **Services**.
2. Edit a service.

Result: Service **Parameters** and **Status** display.

The screenshot shows two side-by-side windows. The left window is titled 'Status' and contains two sections. The top section is 'Input status' with 'Current input' set to 'Primary' and a button to toggle between primary and secondary. Below it is 'Latest secondary keys'. The bottom section is 'Input status (Primary)' with a table of metrics: Input type (IP), Source status (Receiving (10 Services)), CC errors (2453), and Bit rate (50.0 Mbps). The right window is titled 'Parameters' and has tabs for 'Input', 'Decrypt', 'Decoding', and 'Output'. The 'Input' tab is active, showing 'Redundancy mode' (Off), 'Input loss timeout' (500 ms), and a sub-section for 'Primary' and 'Secondary' settings. Under 'Primary', 'Input type' is IP, 'Unicast' is unchecked, 'Stream address' is 239.100.1.2, 'IGMPv3 source filtering' is empty, 'Port' is 5000, and 'Network interface' is eth1.

3. Click the items in the **Status** window to minimize or expand views.

Example:

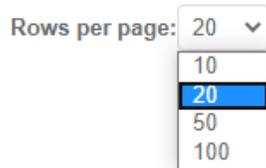
The screenshot shows the 'Status' window with a button labeled 'Input Status' highlighted. A mouse cursor is pointing at the button, indicating it is being clicked.

Edit the number of rows displayed

For most menu pages available in the Controller UI, You can display more rows in the table, or less rows, by selecting the number of rows to display.

1. Use the left-side **Menu** panel to display a specific page.
2. Scroll to the bottom of the selected page and edit the number of rows to display per page.

Example:



Use the search bar

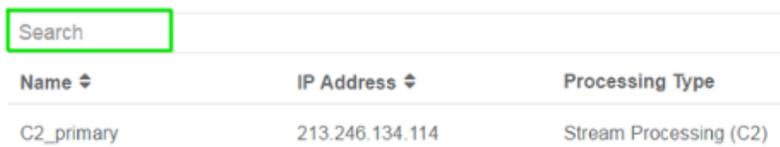
The **Search** bar displays in pages with table displays.

1. Use the left-side **Menu** panel to display a specific page.
2. Enter one or several keywords in the **Search** bar to filter the table.

Search requirements:

- Keyword based
- Not case sensitive
- No wildcard

Example:



Name ↕	IP Address ↕	Processing Type
C2_primary	213.246.134.114	Stream Processing (C2)

CHAPTER 4

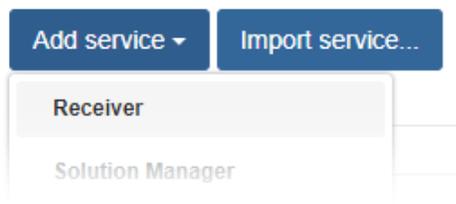
Configure the Receiver Services

Receiver service overview

The **Receiver** service is the service with the RX1 server that controls and configures the traditional receiver/decoder functionality available on the RX1 server.

Each receiver service configured can handle the input, decode and output or passthrough of a single transport stream service.

[Home](#) / [Services](#)



To instantiate a receiver service with in the RX1 server the following service from the drop down must be selected. This chapter describes how to use a **Receiver** Service within the RX1 server

NOTE

- Instructions for use of other services are covered elsewhere in other component guides.
 - Other services are only offered with **limited use cases**. Please refer to the release notes for those supported use cases.
 - The number of inputs, quantities of decode and output configurations defined in this section assume that **only receiver services are running within the RX1 server**. Addition of other services (as defined previously) may compromise the maximum performance of those services.
 - When running only receiver services, the RX1 can run either **1 UHD** service or up to **4 independent HD full bit rate services**.
 - When running only receiver services the RX1 can support up to **4 passthrough services**. Combinations of **passthrough and decode** receiver services are supported, this **may** be as many as 4 of each, however, the exact number depends upon the complexity of the decode services running.
-

Configure the input

There are multiple types of transport stream configurations. Each type presents a different set of parameters.

The screenshot displays the configuration interface for a Receiver Service, divided into two main sections: Status and Parameters.

Status Section:

- Input status:** Shows the current input as 'Primary' with a swap icon. Below it, it indicates 'Latest secondary keys'.
- Input status (Primary):** A detailed view of the primary input with the following data:
 - Input type: IP
 - Source status: Receiving (10 Services) - indicated by a green status box.
 - CC errors: 2453
 - Bit rate: 50.0 Mbps

Parameters Section:

- Input Tab:** Contains settings for the input stream:
 - Redundancy mode: Off (dropdown menu)
 - Input loss timeout: 500 ms
- Primary Tab:** Contains settings for the primary input:
 - Input type: IP (dropdown menu)
 - Unicast:
 - Stream address: 239.100.1.2
 - IGMPv3 source filtering: (empty text field)
 - Port: 5000
 - Network interface: eth1 (dropdown menu)

Configure a transport stream input for Satellite demodulator

Prerequisites:

- For this functionality the following must be available within the server (option: **MKP/HWO/PCI/SAT/DEMOD**).
 - A **Receiver** service is configured.
1. [Display Services](#).
 2. Click  to edit the Receiver service.

3. Select **Satellite** for the **Input type**.

Result: Satellite input options display.

Example:

The screenshot displays the configuration interface for a receiver service, specifically for a satellite input. The interface is organized into several sections:

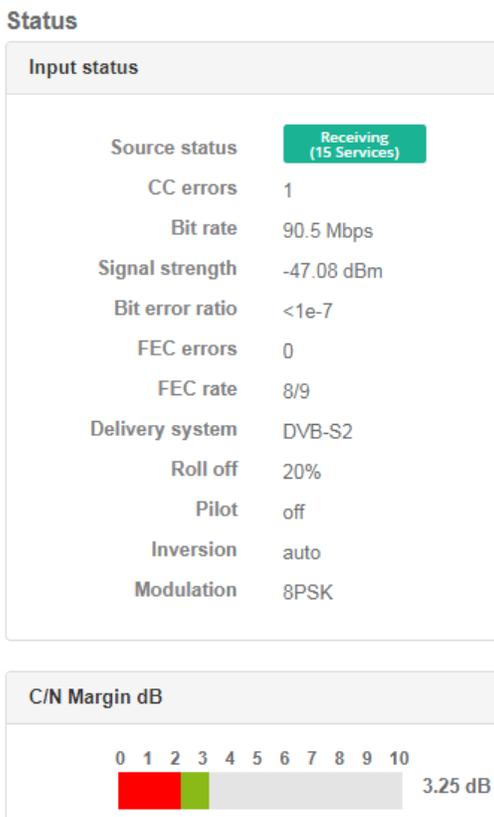
- Parameters:** This section contains tabs for **Input**, **Decrypt**, **Decoding**, and **Output**. Under the **Input** tab, there are two fields: **Redundancy mode** (set to **Off**) and **Input loss timeout** (set to **500** ms).
- Primary/Secondary:** This section has tabs for **Primary** and **Secondary**. Under the **Primary** tab, there are two fields: **Input type** (set to **Satellite**) and **Status** (set to **Service has exclusive use of source**).
- Source:** A dropdown menu showing **RF 4**.
- LNB:** This section contains three fields: **LNB frequency** (set to **9750** MHz), **LNB voltage** (set to **13v (vertical)**), and a **22kHz** checkbox (which is unchecked).
- Tuner:** This section contains six fields: **Frequency** (set to **10758** MHz), **Symbol rate** (set to **22** MSym/s), **Search range** (set to **2000** kHz), **C/N margin alarm** (set to **2.0** dB), **MIS enable** (checkbox, unchecked), **MIS stream ID** (set to **1**), and **Gold code** (set to **0**).

4. Set the **LNB** parameters:

- **LNB frequency**
- **LNB voltage**
- **22kHz**

NOTE 2 license key tokens (Max 4 inputs requires 8 tokens) are required to enable the higher order modulation schemes (16APSK and above) for each satellite input.

5. Set the **Tuner** parameters:
 - **Frequency**
 - **Symbol rate**
 - **Search range**
 - **C/N Margin Alarm**
 - **MIS enable**
 - **MIS Stream ID**
 - **Gold code**
6. Ensure that the **Source Status** is green (receiving) for existing sources, and that no errors occur.
Example:



Configure the transport stream input for satellite

There are 4 independent satellite inputs. You can route a single satellite input to independent services, or to route a single input to multiple services.

The satellite input option is compatible with:

- DVB-S (EN300-421)
- DVB-S2 (EN302-307-1)
- DVB-S2 extensions
- DVB-S2X (EN302-307-2)

DVB-S2 offers up to a 30% increase in data rate carriage for an equivalent link margin compared to what the older DVB-S standard can offer. This functionality is often partnered with MPEG-4 or HEVC compression to give bandwidth efficient distribution of high definition or ultra-high definition services.

DVB-S2X is an extension to the DVB-S2 standard and can provide up to 20% performance improvement compared to DVB-S2 and increase the efficiency of satellite links. This will enable an increase in video quality or an increase in the number of video services or a reduction in leased satellite bandwidth, bringing lower operational expenditure.

Configure transport stream input for ASI

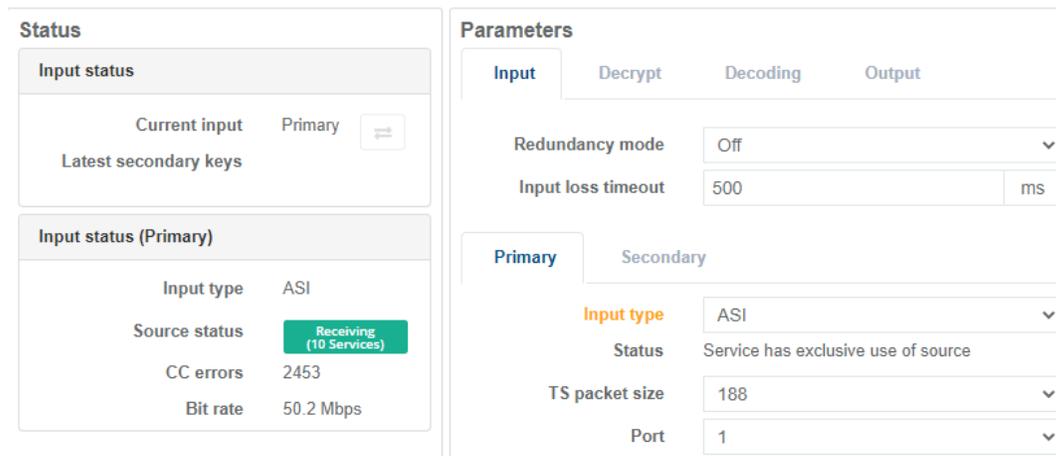
A Receiver service can support decoding or passthrough of transport streams into RX1 over ASI.

Prerequisites:

- At least one service is configured.
- For this functionality the following must be available within the server: **MKP/HWO/PCI/ASI/IN**.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Select **ASI** for **Input type**.

Example:



The screenshot displays the configuration interface for a Receiver service, divided into two main sections: Status and Parameters.

Status Section:

- Input status:** Shows 'Current input' as 'Primary' and 'Latest secondary keys'.
- Input status (Primary):** A table showing:

Input type	ASI
Source status	Receiving (10 Services)
CC errors	2453
Bit rate	50.2 Mbps

Parameters Section:

- Input tab:** Includes 'Redundancy mode' (Off) and 'Input loss timeout' (500 ms).
- Primary tab:** Includes:
 - Input type:** ASI
 - Status:** Service has exclusive use of source
 - TS packet size:** 188
 - Port:** 1

NOTE Packet size depends on the input format. For ASI options are either 188 or 204.

4. Configure the **TS packet size** and the ASI **Port**.
5. Ensure that the **Input Status** is green (receiving) and that they're no errors (this only applies if the source currently exists).

Configure transport stream input for IP input

A Receiver service can support decoding or passthrough of transport streams into RX1 via Ethernet.

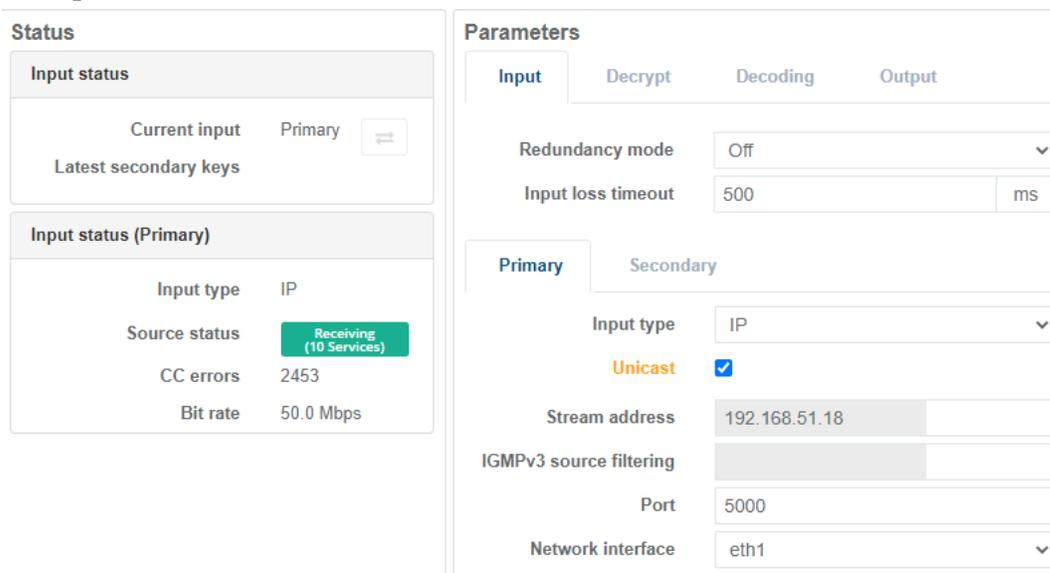
Configure transport stream input for IP in unicast

Prerequisites:

At least one **Receiver** service is configured.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Tick **Unicast**.

Example:



The screenshot shows the configuration interface for a Receiver service, divided into two main sections: Status and Parameters.

Status

- Input status**
 - Current input: Primary
 - Latest secondary keys: [edit icon]
- Input status (Primary)**
 - Input type: IP
 - Source status: Receiving (10 Services)
 - CC errors: 2453
 - Bit rate: 50.0 Mbps

Parameters

- Input** (selected)
 - Redundancy mode: Off
 - Input loss timeout: 500 ms
- Primary** (selected)
 - Input type: IP
 - Unicast:
 - Stream address: 192.168.51.18 (greyed out)
 - IGMPv3 source filtering: [greyed out]
 - Port: 5000
 - Network interface: eth1

Result: **Stream address** is greyed out and a port parameter displays.

4. Enter the UDP **Port** number for the incoming transport stream.
5. Select the Ethernet port for the **Network interface** that the incoming transport stream is available on.
6. Ensure that the **Input status** is green (receiving) and that they're no errors (this only applies if the source currently exists).

Configure transport stream input for IP in multicast

Prerequisites:

At least one **Receiver** service is configured.

Transport streams can be streamed into RX1 over either Ethernet (IP) or ASI depending on the hardware installation.

1. [Display Services](#).
2. Click  to edit the Receiver service.

3. Check that the **Unicast** checkbox is unticked then enter a multicast **Stream address**.

Example:

The screenshot displays two main configuration panels. The **Status** panel on the left shows the 'Input status' as 'Primary' and 'Latest secondary keys'. Below it, the 'Input status (Primary)' section shows 'Input type' as 'IP', 'Source status' as 'Receiving (10 Services)', 'CC errors' as '2453', and 'Bit rate' as '50.0 Mbps'. The **Parameters** panel on the right has tabs for 'Input', 'Decrypt', 'Decoding', and 'Output'. Under the 'Input' tab, 'Redundancy mode' is set to 'Off' and 'Input loss timeout' is '500 ms'. Below this, there are tabs for 'Primary' and 'Secondary'. Under the 'Primary' tab, 'Input type' is 'IP', 'Unicast' is unchecked, 'Stream address' is '239.100.1.2', 'IGMPv3 source filtering' is empty, 'Port' is '5000', and 'Network interface' is 'eth1'.

NOTE The Multicast parameter is grayed out if **Unicast** is selected.

4. Enter the **UDP port** number for the incoming transport stream.
5. Select the Ethernet port for the **Interface** that the incoming transport stream is available on.
6. Ensure that the **Input status** is green (receiving) and that they're no errors (this only applies if the source currently exists).

Transport stream passthrough

The RX1 supports up to a maximum of 4 independent 'TS passthrough' **Receiver** services.

The incoming transport stream can be received via either the IP, ASI or Satellite interface and can be routed unaltered to the IP output interface.

It is possible to decrypt up to 15 services from the incoming TS using BISS v1, BISS v2 (including BISS-CA), Director or Common Interface (if fitted) before the stream is routed to the output.

1. **Display Services.**
2. Click **Add** service then select **Receiver**.

Result: A new window displays:

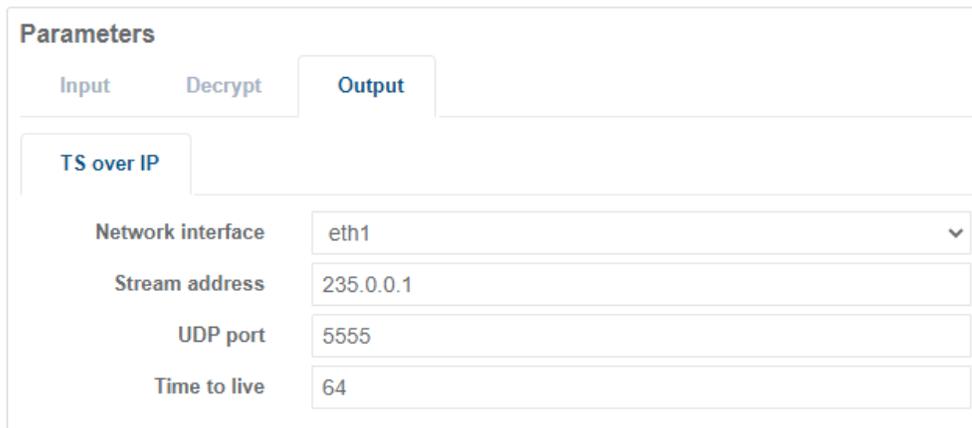
The 'Add Service' window shows three fields: 'Name' with the value 'Passthrough 1', 'Type' with a dropdown menu set to 'TS passthrough', and 'Server' with a dropdown menu set to 'Receiver1'.

3. Configure the following parameters:
 - a. Enter a suitable **Name** for the service.
 - b. Select the **Type** to be **TS Passthrough**.
 - c. Select the **Server** to be Receiver to create and configure the service.
4. Click  to edit the service.
5. See [Configure the input](#) on page 40 for how to set up in the input interface to receive the incoming transport stream.
6. See [Configure the decryption](#) on page 84 for how to decrypt any of the incoming service in the transport stream..

NOTE A maximum of 15 Transport stream services can be decrypted.

7. Select the **Output** tab from the **Parameters** window:

Result: A new window displays:



The screenshot shows a 'Parameters' window with three tabs: 'Input', 'Decrypt', and 'Output'. The 'Output' tab is selected. Below the tabs is a sub-section titled 'TS over IP'. It contains four configuration fields:

Network interface	eth1
Stream address	235.0.0.1
UDP port	5555
Time to live	64

8. Configure the following parameters:
 - a. Select the **Network interface** for the outgoing transport stream.
 - b. Enter a **Stream address** (Multicast IP address) and **UDP port** number for the outgoing transport stream.
 - c. Enter the **Time to live** for the outgoing data packets.

Configure the decoding

Delay Mode

Contribution decoding delay modes (latency)

The modes described here are used to configure decoding delay, or latency of the Contribution decoder. The delay modes effect the delay between the PCR/PTS relationship and delaying picture display (when compared to the system clock reference).

Table 1. Delay measurements per mode

Format	Decode Delay							
	Super low		Low		Standard		Compatibility	
	Delay	Frames	Delay	Frames	Delay	Frames	Delay	Frames
2160p59.94	200mS	12	250mS	15	400mS	24	651mS	39
1080p59.94	200mS	12	260mS	15	400mS	24	651mS	39
1080i29.97	334mS	10	367mS	11	501mS	15	734mS	22
2160p50	200mS	10	260mS	13	400mS	20	660mS	33
1080p50	200mS	10	260mS	13	490mS	20	660mS	33
1080i25	400mS	9	400mS	10	520mS	13	800mS	20

Table 2. Delay modes

- Compatibility** This mode has the longest delay. This mode ensures compatibility between all encoding units, in all modes.
- Standard** This is the default value. Standard mode allows using all current encoders, in all modes.
IMPORTANT: Older encoders that have buffer models that are too aggressive may prevent you from being able to use Standard mode for all bit rates and/or all audio encoding schemes.
- Low** This is the **recommended setting for simple contribution links**. You can also use this mode in any context where a low delay is required.

Super Low

This is the **recommended setting for simple contribution links** using ONLY encoders also in **Super Low** delay mode.⁽¹⁾

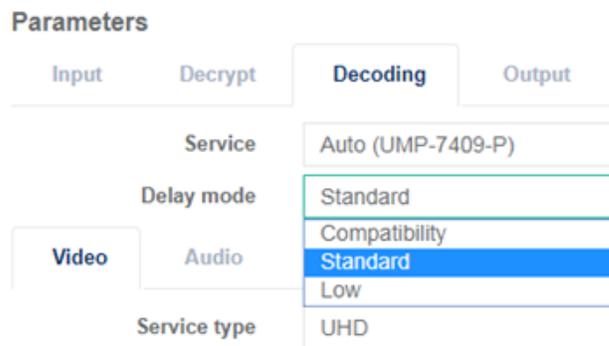
NOTE: Only audio passthrough (either Dolby-E or LPCM) is supported in this mode.
For multi-video decodes in this mode, it is recommended that all video components are supplied within the same transport stream.

1. Tests were carried out using a MediaKind AVP 2000 fitted with a CE-HEVC card running in super low delay mode.

Setting delay mode

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Open the **Decoding** tab in the **Parameters** window.
4. Select a **Delay mode**.

Example:



NOTE Low delay mode has been designed and tested to ensure an optimized error free minimum end to end delay. If a problem occurs trying to decode a valid input transport stream, please try Standard and Compatibility delay modes before raising a support request.

Video decoding

RX1's **Receiver** services are designed to decode video, audio and data from an incoming transport stream.

Video formats and decoding standards

Resolution	Frame rate	Bit depth	Chroma	Codec
1920 x 1080i	25 / 29.97 fps	8 / 10 bit	4:2:0 / 4:2:2	MPEG-2 H.264 H.265
1280 x 720p	50 / 59.94 fps	8 / 10 bit	4:2:0 / 4:2:2	MPEG-2 H.264 H.265

Resolution	Frame rate	Bit depth	Chroma	Codec
1920 x 1080p	50 / 59.94 fps	8 / 10 bit	4:2:0 / 4:2:2	MPEG-2 H.264 H.265
3840 x 2160p	50 / 59.94 fps	10 bit	4:2:0 / 4:2:2	H.265

Configure video decoding

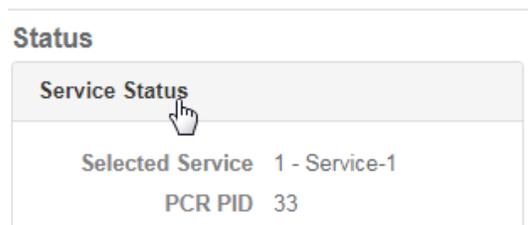
Prerequisites:

- Inputs are configured.
- At least one **Receiver** service is configured.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select the **Decoding** tab.
4. Optional: Select a service from the **Service** drop-down list to decode.
Result: The first video and audio as listed in the service PMT are automatically decoded.

5. Check **Service Status**.

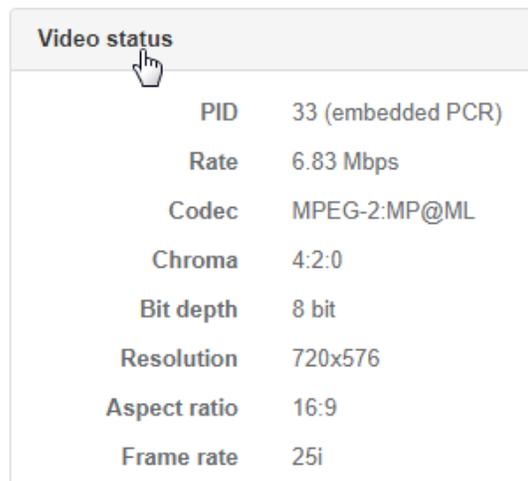
Example:



Result: The first video and audio as listed in the service PMT are automatically decoded. The service name and associated PCR PID are displayed in the Service status window.

6. Check the **Video Status**.

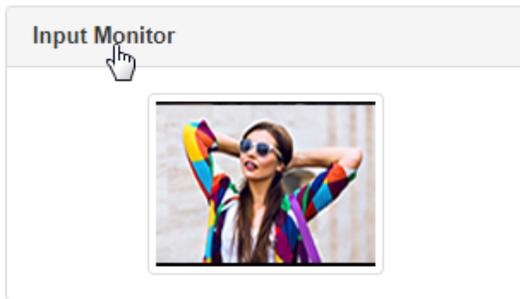
Example:



Result: The video PID, component bit rate, codec being used, resolution, picture aspect ratio and frame rate are displayed in the **Video Status** window.

7. Check the **Input Monitor**.

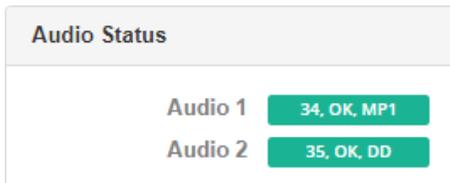
Example:



Result: A thumbnail of the decoded video is displayed in the **Input Monitor** window. The thumbnail is updated every 5 seconds.

8. Check the **Audio Status**.

Example:



Result: The audio PID, status and codec are displayed in the **Audio Status** window.

TIP Hover your cursor over the audio status to display the channel mode, language and component bit rate.

Audio decoding

Audio formats and decoding standards

Codec	Sample Rate	Bit Depth	Output format
MPEG1-LII	48kHz	n/a	Decode
Dolby Digital	48kHz	n/a	Decode
Dolby Digital +	48kHz	n/a	Decode
MPEG-H	48kHz	24	Contribution Decode
MPEG-H	48kHz	16	Pass-through
LPCM	48kHz	16 / 20 / 24	Pass-through
Dolby-E	48kHz	16 / 20 / 24	Pass-through
Dolby Digital	48kHz	16	Pass-through
Dolby Digital+	48kHz	16	Pass-through

Configure audio decoding

Prerequisites:

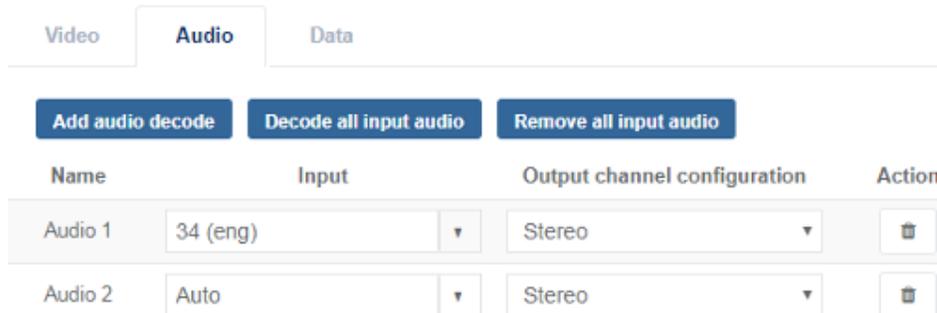
- At least one **Receiver** service is configured.
- [Video decoding](#) is configured.

IMPORTANT

- **A maximum of 8 audio components (stereo pairs)** can be decoded simultaneously for each **Receiver** service.
- Decoding MPEG-H audio requires using all 8 audio output components.

1. Display Services.
2. Click  to edit the service.
3. From the **Parameters** section, select the **Decoding** tab.
4. Select **Audio** to display audio decode settings.

Example:



Name	Input	Output channel configuration	Action
Audio 1	34 (eng)	Stereo	
Audio 2	Auto	Stereo	

Result: The first decoded audio is automatically given the reference name **Audio 1**. This reference is used when configuring the audio outputs.

5. Select an audio **Input** from the drop-down menu.
Result: The PID and language of the audio being decoded are shown in the **Input** column once the configuration is saved.
6. Enter a PID value to be decoded.

TIP You can choose to manually enter a PID.

Result: If the selected PID is present in the PMT then the RX1 attempts to decode any available audio on the PID.

7. Optional: [Add an audio](#) to decode.
8. Select an **Output channel configuration** for each audio.

NOTE If the audio being decoded is an **MPEG-H audio component** then the **output channel configuration must be set to 16**. Otherwise all audio channels associated with the audio component are output as silence.

Result: Setting the output channel configuration also sets the number of embedded channels required for the SDI output. You can see the incoming audio stereo or 5.1 layout from the **Audio Status** window

-
- IMPORTANT**
- 1 embedded channel for a Stereo pair.
 - 3 embedded channels for a 5.1 service.
 - If the audio being decoded is a **5.1 service** and **Stereo** is selected, then the audio will be down mixed to a Stereo pair.
-

Audio auto select decoding

Auto decode applies to audio components for a selected service. The audio components are automatically decoded and embedded into the output SDI that are configured as stereo channels. Components are decoded and embedded in the output in the order that they appear in the PMT.

IMPORTANT Audio auto decode can be **applied for a maximum of 16 audio components per service**.

Components are decoded and embedded in the output in the order that they appear in the PMT.

IMPORTANT Audio auto decode should not be configured when using SMPTE ST-2110 outputs, this may produce either too many or too few audio channels in the ST-2110 audio stream output.

New audio components

- New audio components appearing in the incoming service are decoded and embedded in the output in the order that they appear in the PMT.
- If a new component is presented in the PMT before any existing components then all existing components after the new component in the PMT are embedded into a different audio channel on the SDI output.
- If the number of channels exceeds 16, then the last existing component in the PMT is no longer be decoded and removed from the output SDI.

Removed audio components

- Any audio component that is removed from the incoming service will be deleted from the SDI output.
- Any audio components presented after a removed component in the PMT are embedded into a different audio channel on the SDI output.

Set "Auto Select" mode for audio decoding

1. Display Services.
2. Click  to edit the service.
3. Select the **Decoding** tab in the **Parameters** window.

4. Select the **Audio** tab.

Example:

Parameters

Input Decrypt **Decoding** Output

Service Auto (HDR HLG10 HDR in VUI)

Delay mode Standard

Video **Audio** Data

Add audio decode Decode all input audio Remove all input audio Auto Select

5. Select the **Auto select** check box.

Result: All audio components present on the incoming service are automatically decoded and output as stereo components.

Add an audio to decode (optional)

Prerequisites:

- At least one **Receiver** service is configured.
- [Video decoding](#) is configured.

IMPORTANT A maximum number of 8 audio components (stereo pairs) can be decoded simultaneously for a single receiver service. Across multiple receiver services a maximum of 20 total audio services are allowed.

1. Display Services.
2. Click  to edit the service.
3. From the **Parameters** section, select the **Decoding** tab.
4. Select **Audio** to display audio decoding parameters.

Example:

Video **Audio** Data

Add audio decode Decode all input audio Remove all input audio

Name	Input	Output channel configuration	Action
Audio 1	34 (eng)	Stereo	
Audio 2	Auto	Stereo	

Result: The first decoded audio is automatically given the reference name **Audio 1**. This reference is used when configuring the audio components.

NOTE See [Decoding parameters](#) descriptions for additional information.

5. Select an **Input**.
Result: The PID and language of the audio being decoded are shown in the **Input** column.
6. Select an **Output channel configuration**.

Decode all input audio (optional)

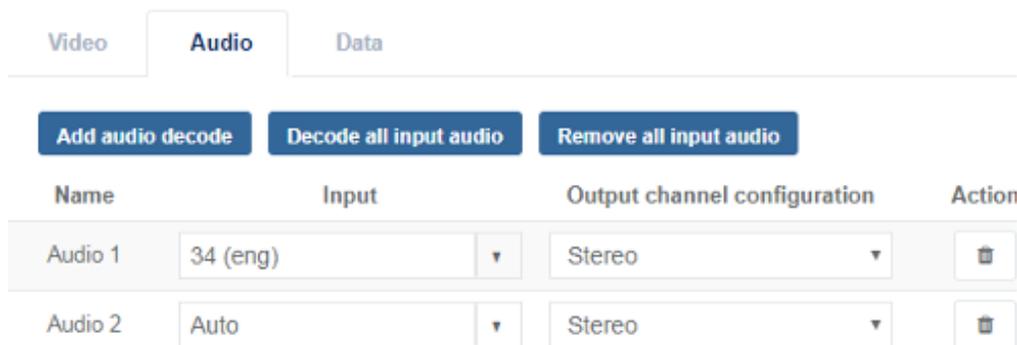
Prerequisites:

- At least one **Receiver** service is configured.
- At least one audio component is configured.

IMPORTANT A maximum number of 8 audio components (stereo pairs) can be decoded simultaneously for each decoded video service. Across multiple receiver services a maximum of 20 total audio services are allowed.

1. Display Services.
2. Click  to edit the service.
3. From the **Parameters** section, select the **Decoding** tab.
4. Select **Audio** to display audio decoding parameters.

Example:



Name	Input	Output channel configuration	Action
Audio 1	34 (eng)	Stereo	
Audio 2	Auto	Stereo	

5. Click **Decode all input audio**.

Result: The audio components that are not currently being decoded are added in the order that they are listed in the PMT (**up to a maximum of 16 decodes per service**). The defaults channel configuration is **Stereo**.

NOTE See [Decoding parameters](#) descriptions for additional information.

Delete an audio from a decode configuration (optional)

Prerequisites:

- At least one **Receiver** service is configured.
- [Video decoding](#) is configured.

IMPORTANT A maximum number of 8 audio components (stereo pairs) can be decoded simultaneously for each decoded video service. Across multiple receiver services a maximum of 20 total audio services are allowed.

1. Display Services.
2. Click  to edit the service.

3. From the **Parameters** section, select the **Decoding** tab.
4. Select the **Audio** tab to display audio decoding parameters.

Example:

Name	Input	Output channel configuration	Action
Audio 1	34 (eng)	Stereo	
Audio 2	Auto	Stereo	

5. Click to delete an audio component or click **Remove all decoded audio**.

Result: The audio decode is now removed from both the list of decoded components and from any output configurations.

Phase aligned audio

NOTE Currently the RX1 does not support GUI selection of phase aligned audio components from the input multi audios. Therefore, standard phased aligned audio language codes must be pre-configured for each audio group input into the RX1 (see note below for language codes).

To set up Phase aligned audio on the RX1, follow these steps:

1. Select the service and select the **Decoding** tab.
2. After selecting the decode service, select **Add audio decode** to add each audio component of the PAA group.

NOTE The ordering of decoding is not important but assists in getting the embedding order correct.

For the first group, the ordering is by language descriptor:

- aaa - Original channels 1-2
- aac - Original channels 3-4
- aae - Original channels 5-6
- Original channels 7-8 (if present)

For a second PAA group, the language descriptors are:

- bba - Original channels 1-2
- bbc - Original channels 3-4
- bbe - Original channels 5-6
- bbg - Original channels 7-8 (if present)

3. Select the **Output** tab.
4. Under the **Audio** tab, click **Add component** to add the audio components.

NOTE The components are numbered as per the ordering of the decode.

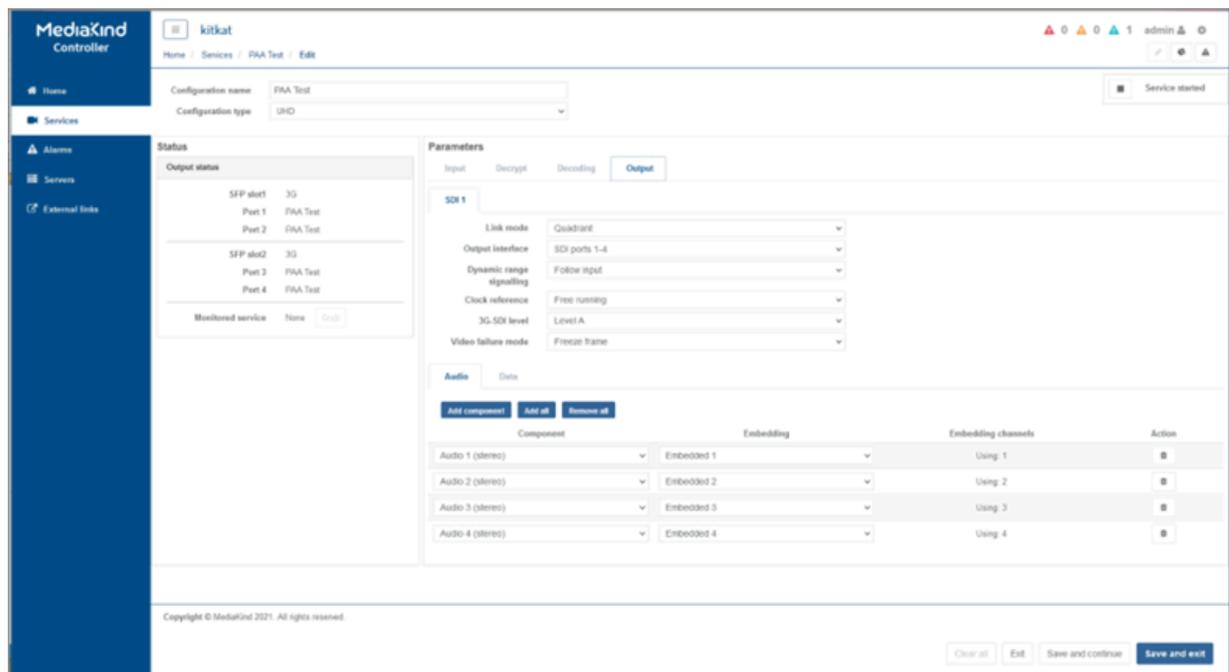
The order of the items in the list is unimportant, the assignment of Component to Embedding determines the output ordering. i.e., if **Audio 1** on the **Decoding** tab was assigned language **aaa**, then that is **Audio 1** on the **Output->Audio** tab.

Here the channel mapping should match the assigned decoders, for each language, to recreate the original channel ordering.

Table 3. Recommended mapping:

Decoding		Output	
Name	Input	Component	Embedding
Audio 1	Aaa	Audio 1	Embedded 1
Audio 2	Aac	Audio 2	Embedded 2
Audio 3	Aae	Audio 3	Embedded 3
Audio 4	Aag	Audio 4	Embedded 4
Audio 5	bba	Audio 5	Embedded 5
Audio 6	bbc	Audio 6	Embedded 6
Audio 7	bbe	Audio 7	Embedded 7
Audio 8	bbg	Audio 9	Embedded 8

Result:



Data decoding

Data formats

Format	Output format
AFD / BAR data	SMPTE 2016
Teletext	OP47 / SMPTE 2031
Closed Captions	SMPTE 334M for EIA-708-B
Time code	SMPTE 12M + RP188
Generic VANC	SMPTE 2038
SCTE-35	SCTE-104

The **Receiver** service currently supports the following data types:

- Closed Captions
- Teletext
- Time code
- AFD
- Generic data

Data is carried within the transport stream in 1 or 2 possible ways, depending on the type of data.

1. Encapsulated in the video component as SEI (H.264 / H.265) or USER data (MPEG2)
2. On a separate data PID

IMPORTANT A maximum of 8 data components can be decoded at any one time for each decode type **Receiver** service.

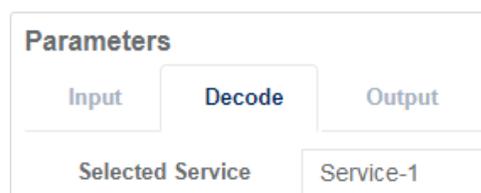
Configure data decoding

The section explains how to decode data in RX1 that is carried on a separate PID.

1. Display Services.
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select the **Decoding** tab.

Example:

NOTE See [Decoding parameters](#) descriptions for additional information.



4. Select **Data** to display data decoding parameters.

Example:

Parameters

Input **Decode** Output

Selected Service Service-1

Video Audio **Data**

Add data decode **Decode all input data** **Remove all input data**

Name	Input PID	Data Type	Action
Data 1	50	Teletext	

5. Optional: Add an additional data component to decode.
6. Select an **Input PID**.

TIP You can choose to manually enter a PID.

Result: If the selected PID is present in the PMT then the RX1 attempts to decode any data on that PID.

7. Select a **Data type**.

Add a data decoding

1. Display services.
2. Click to edit the Receiver service.
3. From the **Parameters** section, select the **Decoding** tab.

NOTE See [Decoding parameters](#) descriptions for additional information.

4. Select **Data** to display data decoding parameters.

Example:

Parameters

Input **Decode** Output

Selected Service Service-1

Video Audio **Data**

Add data decode **Decode all input data** **Remove all input data**

Name	Input PID	Data Type	Action
Data 1	50	Teletext	

5. Click **Add data decode**.
Result: A new data displays in the list.
6. [Configure data decoding](#) parameters.

Decode all input data

Prerequisites:

- At least one **Receiver** service is configured.
- [Video decoding](#) is configured.

IMPORTANT A maximum number of 8 audio components (stereo pairs) can be decoded simultaneously for each decoded video service.

1. Display services.
2. Click  to edit the service.

NOTE See [Decoding parameters](#) descriptions for additional information.

3. From the **Parameters** section, select the **Decoding** tab.

Example:

Parameters

Input **Decode** Output

Selected Service Service-1

Video Audio **Data**

Add data decode **Decode all input data** **Remove all input data**

Name	Input PID	Data Type	Action
Data 1	50	Teletext	

4. Select **Data** to display parameters.
5. Click **Decode all input data**.
Result: All the data components for the selected service that are not currently being decoded are added in the order that they are listed in the PMT (a **maximum of 8 decodes per service**). The default **Data type** is set to **Ancillary**.

Delete data from a decoding configuration

Prerequisites:

- At least one **Receiver** service is configured.
- At least one data input is configured for decoding.

1. Display Services.
2. Click  to edit the Receiver service.

3. From the **Parameters** section select the **Decoding** tab.

Example:

Parameters

Input **Decode** Output

Selected Service Service-1

Video Audio **Data**

Add data decode **Decode all input data** **Remove all input data**

Name	Input PID	Data Type	Action
Data 1	50	Teletext	

4. Select **Data** to display data decoding parameters.
5. Click to delete a data from the decoding or click **Remove all input data**.

Use of Multiple Receiver Service Types

Receiver services can be set to either an HD or a UHD service type (other service types also exist). Multiple Receiver services may be configured depending upon the requirement (e.g. Up to 4 for HD decode services).

IMPORTANT When decoding UHD only a single receiver service is possible.

Functional description:

- Each service is independently configured, and can be started, stopped, and edited without impacting other services.
- Any combination of HD video codec, frame rates or resolutions can be decoded (up to a maximum of 4 services).
- For a list of supported video standards see the [supported decoding formats](#) section of this document.

Set the Receiver service type for a new service

You can set the service type when you add a new Receiver service.

NOTE

- RX1 is capable of decoding either 1 UHD service, or up to 4 independent HD full bit rate services.
- If RX1 is running a UHD service it cannot decode anything else at that time, even if the incoming video being decoded is an HD resolution.

1. Create a new Receiver service.

2. Select the field for **Type** to display the menu options.

Example:

NOTE See [Decoding parameters](#) descriptions for additional information.

Name	<input type="text" value="NewService"/>
Type	<input type="text" value="UHD"/>
Server	<input type="text" value="SD/HD"/>
	<input type="text" value="UHD"/>

3. Select a type, then click **OK**.

Result: A new service is created with the selected service type.

Edit a service type for an existing service.

You can edit the service type for an existing Receiver service.

- NOTE**
- RX1 is capable of decoding either 1 UHD service, or up to 4 independent HD full bit rate services.
 - If RX1 is running a UHD service it cannot decode anything else at that time, even if the incoming video being decoded is an HD resolution.

1. Display Services.
2. Click  to edit the service.
3. From the **Configuration type** value, select an option.

NOTE If RX1 is running multiple HD services, and one of the services is changed to UHD, then the UHD service will be stopped and blocked from restarting until all of the other HD services have been stopped.

Configure the output

The RX1 is designed to output a decoded video component and related audio and data components.

Supported output formats

Format	Notes
1.5G / 3G SDI	4 x 3G is required for UHD
12G SDI	1 x 12G is required for UHD
SMPTE ST 2110	SMPTE ST 2022-7 also supported
SMPTE ST 2022-6	Maximum output rate of 10G per SFP

Output configuration Limitations

The RX1 currently provides two concurrent methods of output for component data:

Output	Notes
SDI or SMPTE ST 2022-6	Supplied via the SFP from the decoder card output. NOTE: Either SDI or SMPTE ST 2022-6 encap SFPs can be used.
SMPTE ST 2110	Supplied via NVIDIA / Mellanox MCX512A-ACAT network card.

RESTRICTION The RX1 can only support the following:

- **Not more than four**⁽¹⁾ baseband component outputs in **any combination** of SDI/ SMPTE ST 2022-6 output **or** SMPTE ST 2110 output.
- **One** baseband component output of **UHD**⁽²⁾ from either the SDI / 2022-6 output **or** SMPTE ST 2110 Ethernet output.

Output profile selection

The unit has a choice of output profiles which should be selected depending on the wanted configuration:

- For UHD video **with SMPTE ST 2110** output the output profile **SMPTE ST 2110 UHD**" must be selected.

1. An extra fifth output monitoring port can be used when the output is sources **only** from the decoder card and UHD is not being used.
2. 2 SMPTE ST 2110 UHD requires Output profile changes (see [Configure the output Profile](#) on page 63).

- For all other supported configurations, the output profile **SDI & SMPTE ST 2110 HD** must be selected. This covers HD decodes with combinations of HD SDI and SMPTE ST 2110 HD outputs

Configure the output Profile

To configure the output profile, follow these steps:

1. Display Servers.
2. Click the Detail icon,  to display Server information.
3. Go to the **RX1 Appliance > Output Profile** tab.



Result: The current output profile is displayed next to a short description of the profile. The output profile drop down list can be used to select an alternative profile. The description text updates to provide a brief description of the selected output profile.

IMPORTANT If you change the output profile, the unit will reboot and be offline until the reboot is complete.

4. Optional: Select an alternative output profile then click the **Apply and Reboot** button.

Result: This shows a confirmation pop-up window stating that the unit will need to reboot to apply the profile and offering the chance to cancel. If confirmed, the unit will apply the profile and reboot. Another pop-up menu is shown indicating that the unit is rebooting.

NOTE The web page must be refreshed following the reboot which may take a couple of minutes to complete.

Configure SDI output

The Receiver service has the ability to output baseband video as SDI, currently this is supported using the SFP outputs from the accelerator card.

Prerequisites:

- At least one receiver service is running.

- One of the following options is present:
 - MKP/HWO/SFP-M/SDI/3G/C
 - MKP/HWO/SFP-M/SDI/12G/C
 - MKP/HWO/SFP-M/SDI/12G/F
 - Or the equivalent UPH option

1. Display Services.
2. Click  to edit the service.
3. Select the **Output** tab in the **Parameters** window.
4. Select the **Output interface** required from the drop down menu in the SDI window.



NOTE Ports that are already in use by other running services are listed in the drop down menu with the name of the service which is currently using them.

NOTE When a new service is created the **SDI output interface** is always assigned to **SDI1**.

IMPORTANT If another service is already using this interface when you try to start the service then it will be blocked from starting until:

- An unused port is selected for the new service.
- The current running service is stopped.
- The service is reconfigured to avoid a clash.

If the service is blocked from starting for this reason, then the alarm icon displays the following alarm: Insufficient Resources – SD 1 port already in use.

Result: Output interfaces are configured.

Configure SMPTE ST 2022-6 output

SMPTE ST 2022-6 provides the ability to transmit SDI over IP.

Each SFP module has the capability to ingest up to 2 off 3G SDI inputs. The SFP module has a maximum output bandwidth of 10Gb/s and is capable of transmitting 4 independent IP streams.

Each SDI input can be encapsulated into up to 2 IP outputs streams depending on available bandwidth.

Examples of SMPTE 2022-6 output

Following is shown with a single SFP module fitted:

SDI Port	SDI input2	SFP Channel	SFP Flow	Total Bandwidth
1	720p	1	1 and 2	3Gb
2	720p	2	1 and 2	3Gb

Or

SDI Port	SDI input2	SFP Channel	SFP Flow	Total Bandwidth
1	1080p	1	1 and 2	6Gb
2	720p	2	1 and 2	3Gb

Or

SDI Port	SDI input2	SFP Channel	SFP Flow	Total Bandwidth
1	1080p	1	1 and 2	6Gb
2	1080p	2	1 only*	3Gb

RESTRICTION Only a single flow is possible on the second SDI input due to the 10Gb maximum output bandwidth.

Configure SMPTE 2022-6 output

Prerequisites:

- At least one Receiver service is configured.
- The following option is present: MKP/HWO/SFP-M/IP/22-6 or the equivalent UPH option.

To configure SMPTE 2022-6 output, follow these steps:

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** section, go to the **Output** tab.
4. In the **SDI** tab, select the **Output interface** from the drop down menu.
5. Set the output multicast or unicast address for the outgoing SFP flow.
6. Set the source address of the SFP flow if using unicast.

Result:

Output interfaces that are already in use by other running services are listed in the drop down menu with the name of the service which is currently using them.

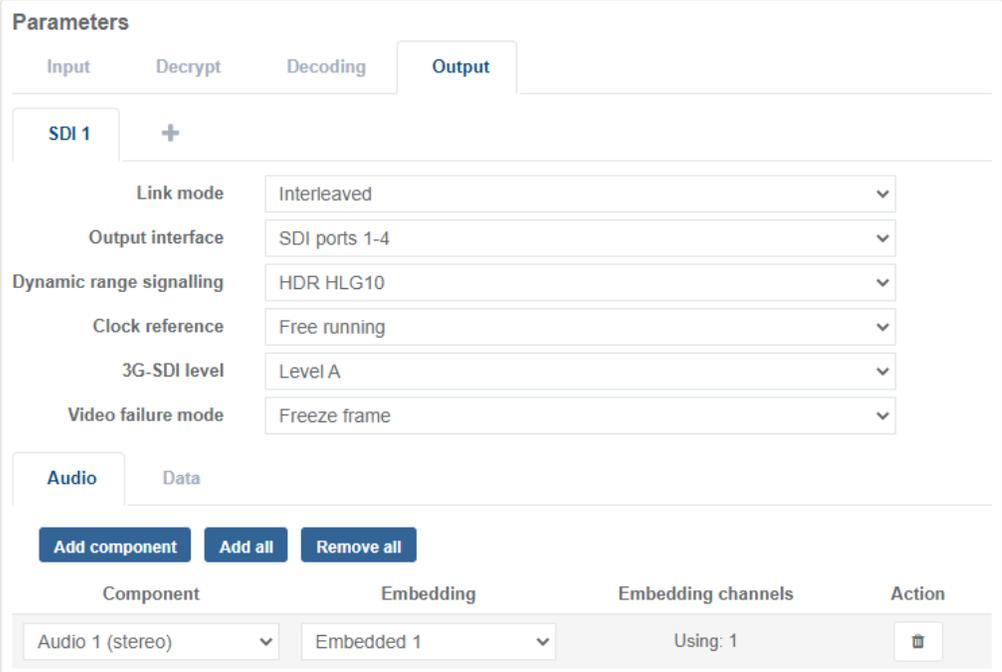
Configure UHD video output

UHD 4k video can be output in 2 different formats:

- Quadrant squared division (4 x 3G links only)
- 2 sample interleaved (4 x 3G or single 12G)

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** section, select **Output** to display options.

Example:



Component	Embedding	Embedding channels	Action
Audio 1 (stereo)	Embedded 1	Using: 1	

4. Select the **Link Mode** format required for the video output.
5. Set the **Clock Reference**.
6. Optional: [Configure audio](#) and [data output](#) accordingly.

Configure SMPTE ST 2110 output

The Receiver service on the RX1 can output uncompressed digital video signals and associated audio and data using SMPTE ST 2110 via the optional Mellanox X5 network interface card.

This allows the individual media essences normally encapsulated in an SDI bitstream to be transmitted as individual IP streams.

- NOTE**
- SMPTE ST 2110 requires the use of a PTP (Precision Time Protocol) clock. Currently, setup for this is only possible via the [front panel](#).
 - It may also be required to modify the server performance profile by setting an alternative output profile. See [Configure the output Profile](#) on page 63.

RESTRICTION At this time SMPTE ST 2110 is not supported via SFPs from the accelerator card.

Licensing Mellanox X5 card

When ordering the Mellanox X5 card for an existing RX1 it will need to be licensed.

NOTE The Mellanox license must be requested from support to enable this functionality.

To obtain and enable the license the following steps must be performed:

1. Connect to the RX1 unit using one of the following options:
 - Use an SSH connection.
 - Connect a mouse and keyboard directly to the unit.
2. Use the login credentials below:
Username: mfeng
Password: 2u4y&C

3. Type the command:

```
sudo lspci -vv | grep "Serial number"
```

Result: the unit serial number should be seen, for example: Serial number: MT2038K20657.

4. Provide the serial number to MediaKind supply, SW.Supply@mediakind.com.
Result: License key file is provided.
5. Rename the file to **rivermax.lic**.
6. SCP onto the unit and place the file into **/opt/mellanox/rivermax/rivermax.lic**.
Result: license is enabled, SMPTE ST-2110 is enabled.

Configure SMPTE ST 2110 output

Prerequisites:

- At least one Receiver service is configured.
- The following option is present: MKP/HWO/PCI/NIC/25GDUAL

To configure an SMPTE ST 2110 output, follow these steps:

1. Display Services.
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select the **Output** tab.
4. Optional: If an **SMPTE ST 2110** tab is not present under the **Output** tab, click the **+** to add an output. Select **SMPTE ST 2110** from the pull-down list in the **Add Output** pop-up box and click the **Add** button.

IMPORTANT If a UHD SMPTE ST 2110 output is created, then all other outputs must be deleted as the UHD service only supports a single output.

5. Complete the [video](#), audio, [data](#), and essence parameters.

6. Optional: When two or more output exists, additional outputs can be deleted using the **x** button on the **Output** tab.

Configure SMPTE ST 2110-20 video output

To configure SMPTE ST 2110-20 video output, follow these steps:

1. From the **SMPTE ST 2110** section, select the **Video** tab.
2. Select the required **Dynamic range signalling** and failure mode options.
3. Configure the output essence.

Related reference

[SMPTE ST 2110 output parameters](#)

Configure SMPTE ST 2110-30 audio output

To configure SMPTE ST 2110-30 audio output, follow these steps:

1. From the **SMPTE ST 2110** section, select the **PCM Audio** tab.
2. Use the **Add component**, **Add all** and **Remove all** buttons to add the required number of decoded audio components to the list of output components.
3. Use the pull-down list on each component to select the decoded audio component to be output as part of the SMPTE ST 2110-30 audio stream.
4. The SMPTE ST 2110 feature supports a single audio essence per output and so the Embedding option can only be set to a single essence.
5. Configure the output essence.

NOTE The maximum number of audio output channels per essence is eight (e.g. four stereo pairs or one 5.1 output plus a single stereo pair). Attempting to configure more audio channels than is possible will result in components at the bottom of the list being highlighted in red with the error message The essence is already full.

Related reference

[SMPTE ST 2110 output parameters](#)

Configure SMPTE ST 2110-40 data output

To configure SMPTE ST 2110-40 data output, follow these steps:

1. For each available data type, select either **OFF** or the line number that the data should appear on.
2. [Configure the output essence.](#)

Related reference

[SMPTE ST 2110 output parameters](#)

Configure SMPTE ST 2110 output essence

For each media type configured for the SMPTE ST 2110 output, configure the essence output by following these steps:

1. From the **Essence** tab, enable the output by ticking the **Output enable** checkbox.

NOTE If the essence is not enabled, then an SDP file is still generated for the essence, but no IP stream is created for the essence.

2. Set a value for the **Payload type**.
3. On the **Primary** tab enter the destination IP address and port for the stream.
4. Select the network interface from the options in the pull-down list.
5. Either leave the source port setting on **Auto** or enter a valid value.

IMPORTANT The Secondary source port will use the same value for source port as the Primary setting. This is due to a driver limitation that may be resolved in future releases.

6. Set a value for the **TTL** parameter.
7. To support SMPTE ST 2022-7, a secondary stream can be output that is a duplicate of the primary stream: Click + next to the **Primary** tab and set the values for the output on the **Secondary** tab.
8. Click **Save and continue** to save your modifications.

Related reference

[SMPTE ST 2110 output parameters](#)

Download SDP file

The SDP (Session Description Protocol) files that describe each SMPTE ST 2110 essence are generated each time the essence parameters and source input are changed. These SDP files can be used to configure the inputs of equipment that are required to receive the SMPTE ST 2110 essence streams.

The SDP file for each media type can be obtained by clicking the  icon in the **Output status** section. This appears on the **Stats** page and on the **Edit** page for the Output.

NOTE The SDP files are automatically regenerated whenever a change to the input source or essence parameters are detected. The initial SDP file generation may only contain the changes related to either the input source or the essence parameters.

It is advisable to wait 30 seconds after setting up an essence and providing a source stream before downloading the SDP files to ensure the SDP file is fully updated.

NMOS Support

Once the required service has been started, SMPTE ST 2110 outputs can be discovered using products that support the NMOS IS-04 Discovery and Registration standard. In addition, active SMPTE ST 2110 outputs can be managed using products that support the NMOS IS-05 Device Connection Management standard.

mDNS Configuration

The RX1 receiver service supports the ability to use multicast DNS (mDNS) protocol to resolve domain names within the attached SMPTE ST 2110 network.

IMPORTANT Do not enable this setting in unsupported networks, this may lead to memory issues within the RX1.

This can be enabled from the GUI of the RX1 via the NMOS tab on the appliance page:

1. Display Services.
2. Click the **RX appliance** tab.
3. Click the **NMOS** Tab.
4. Enable the checkbox as shown below:

The screenshot shows the NMOS configuration interface. At the top, there are navigation tabs: Dual Bank Software, Versions, Logs, BISS-CA Key Pairs, Output Profile, and NMOS. The NMOS tab is active. Below the tabs is the 'NMOS Basic Settings' section. It contains a checkbox labeled 'mDNS Enable' which is circled in red. Below this checkbox is a 'Label' field with the value 'mk-4e-000052'. Below the basic settings is the 'NMOS Advanced Settings' section. It contains several settings: 'mDNS multi-label domains' with an unchecked checkbox, 'DNS priority (pri)' with a value of 100, 'Registration server highest priority' with a value of 0, and 'Registration server lowest priority' with a value of 2147483647. At the bottom of the page are three buttons: 'Save', 'Revert to defaults', and 'Browse NMOS Node API' with an external link icon.

NMOS basic settings also include:

Label This is the label used for the device when used as an NMOS node.

Further advanced settings are available:

mDNS multi-label domains When selected, this allows the user to enable mDNS to support domains with multiple labels.
Example: en.mediakind.local, where en is subdomain of mediakind.local.

DNS priority (pri)	This is used for the 'pri' TXT record when advertising the node via mDNS. Specifying 2147483647 (maximum value) disables advertisement completely.
Registration Server highest Priority	This is used to specify the highest 'pri' value of discovered registration server, to avoid development and live systems colliding. Smaller numbers indicate higher priority; 0 is highest priority.
Registration Server lowest Priority	This is used to specify the lowest 'pri' value of discovered registration server, to avoid development and live systems colliding. Larger numbers indicate lower priority; 2147483647 is lowest priority.

Set SDR/HDR signaling

There are different industry standards for HDR. The standard to be transmitted must be signaled in the video output to display the output in the correct format, and for video monitoring purposes. The settings are either extracted from the data in the incoming transport stream, or configured manually in the User Interface.

NOTE These settings will not convert dynamic ranges and will only signal the format in the stream.

Applied standards:

Dynamic range type	Resolution	Industry standard applied
SDR	SD and HD	ITU-R recommendation BT.709
HDR	SDR UHD (3804 x 2160 pixels)	ITU-R recommendation BT.2020

NOTE The 2 main HDR standards used today are: PQ10 and HLG10.

To manually set the standard to be used for SDR or HDR signaling follow the steps below:

1. [Display Services](#).
2. Click  to edit the service.

3. Select the **Output** Tab in the **Parameters** window.

Result: The **Dynamic range signalling** control is displayed under the **SDI** tab.

The screenshot shows the 'Parameters' window with the 'Output' tab selected. Under the 'SDI 1' section, the 'Dynamic range signalling' dropdown menu is open, displaying the following options: 'Follow input' (which is highlighted in blue), 'SDR (BT.709)', 'SDR (BT.2020)', 'HDR HLG10', and 'HDR PQ10'. Other settings visible include 'Link mode' set to 'Interleaved', 'Output interface' set to 'SDI ports 1-4', 'Clock reference' set to 'Follow input', and '3G-SDI level' set to 'SDR (BT.2020)'. Below the SDI settings, there are 'Audio' and 'Data' tabs, and buttons for 'Add component', 'Add all', and 'Remove all'. At the bottom, a table shows the configuration for 'Audio 1 (stereo)', which is 'Embedded 1' and 'Using: 1' channels.

4. Select a signaling option:

- Select **Follow input** to extract the video format from the incoming transport stream and to signal into SDI output.

NOTE

- **If the incoming format cannot be decoded:** A new service is signalled as SDR (BT.709).
 - If the format is **successfully decoded and then is lost:** The last standard decoded is signaled into the SDI output.
 - **If the video input is lost:** The last standard decoded is signaled into the SDI output and the output switches to a freeze frame of the last decoded picture.
-
- Select an **SDR** or **HDR** standard to override the incoming format set in the transport stream.

Result: The selected SDR/HDR signalling is inserted into the SDI output.

NOTE See [Output parameters](#) descriptions for additional information.

Setting 3G SDI output level

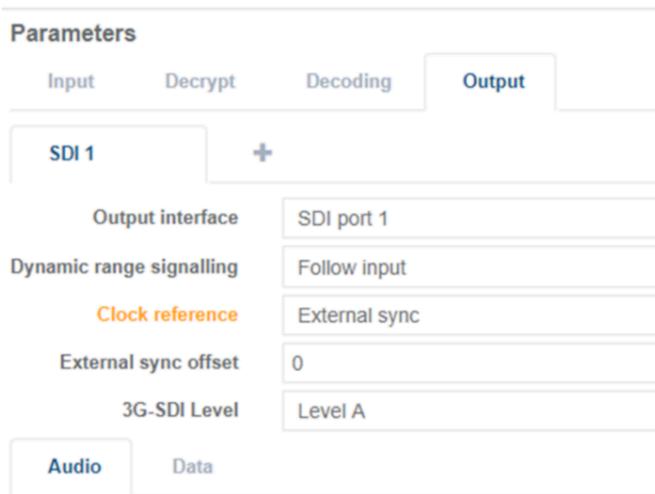
The 3G-SDI output level is only used when outputting 1080p video signals. Either as a single HD service or as part of a quad 3G 4K service.

Level A maps the SMPTE ST 274 video directly into a 3Gb/s serial digital interface. Level B Dual-Link divides the 1080p picture into SMPTE ST 372 Dual-Link video streams and maps them into a 3Gb/s serial digital interface.

Level B Dual-Link divides the 1080p picture into SMPTE ST 372 Dual-Link video streams and maps them into a 3Gb/s serial digital interface.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select the **Decoding** tab.
4. Select a 3G-SDI Level.

Example:



The screenshot shows the 'Parameters' section with the 'Output' tab selected. Under 'SDI 1', there is a '+' button to add more SDI outputs. The configuration for 'SDI 1' is as follows:

Output interface	SDI port 1
Dynamic range signalling	Follow input
Clock reference	External sync
External sync offset	0
3G-SDI Level	Level A

At the bottom, there are tabs for 'Audio' and 'Data'.

NOTE When **3G-SDI Level** is set to **Level B Dual Link** and the video format is 1080p or 2160p, the data will be inserted into the nth line of each field of the digital interface in Link A. For example, if set to Line 9, the data will be inserted into line 9 and line 572 of the digital interface of Link A.

Configure an SDI monitor on an HD service (Contribution decoder)

The SDI monitor port can be configured as a shared resource for all decoded HD services of the Contribution decoder. The monitor port has the same configuration options as a standard SDI output port. Each decoded service can configure the output port as required.

Prerequisites:

At least one Receiver service is configured.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select to **Output** tab.
4. Click + to add an SDI output.

5. Select the **SDI port 0 shared** for **Output interface**

Example:

Parameters

Input Decrypt Decoding **Output**

SDI 1 × +

Output interface	SDI port 0 (3G) shared	▼
Dynamic range conversion	SDI port 0 (3G) shared	
Dynamic range signalling	SDI port 1 (3G)	
	SDI port 2 (3G)	
	SDI port 3 (3G)	
	SDI port 4 (3G)	
Clock reference	Free running	▼
3G-SDI level	Level A	▼
Video failure mode	Freeze frame	▼

6. Configure the output port as required. .

NOTE See [Configure the output](#) on page 62 for how to set the output options.

7. The **Output status** panel displays the current service using the monitor port. Pressing the **Grab** button switched the monitor to output the currently viewed service.

Example:

Output status	
SFP Slot1	3G
SFP Slot2	3G
Monitored service	Service 1
	<input type="button" value="Grab"/>

8. The monitor port can be switched off by viewing the **Output status** of the service using it and pressing the **Release** button.

Configure multiple SDI outputs on an HD service

It is possible to add multiple HD SDI outputs to a single decode up to a maximum of 4 main outputs plus a single monitor port, if no other decode is currently running on the unit.

When a service is created a single SDI output is automatically assigned.

The screenshot shows the 'Parameters' section with the 'Output' tab selected. Under the 'SDI 1' header, there is a '+' icon to add more outputs. Below this, four configuration items are listed in a table-like format:

Output interface	SDI port 1
Dynamic range signalling	Follow input
Clock reference	Input transport stream
3G-SDI Level	Level A

1. Display Services.
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select to **Output** tab.
4. Click + to add an SDI output.

Example:

The screenshot shows the 'Parameters' section with the 'Output' tab selected. At the top, there are four SDI output buttons labeled 'SDI 1', 'SDI 2', 'SDI 3', and 'SDI 4', each with an 'x' icon to its right. To the right of these buttons is a '+' icon. Below this, the configuration for 'SDI 4' is shown in a table-like format:

Output interface	SDI port 3
Dynamic range signalling	Follow input
Clock reference	Free running
3G-SDI Level	Level A

5. Select the **Output interface**.

IMPORTANT If another service is already using this interface when you try to start the service then it will be blocked from starting until:

- an unused port is selected for the new service, or
- the current running service is stopped, or
- the service is reconfigured to avoid a clash, or
- the added Output interface is deleted. If the service is blocked from starting for this reason, then the alarm icon displays the following alarm: Insufficient Resources – SD 1 already in use.

Setting HDR to SDR conversion on the SDI monitor

It is possible to convert an incoming HD video standard coded with PQ10 or HLG10 to BT.709 color space.

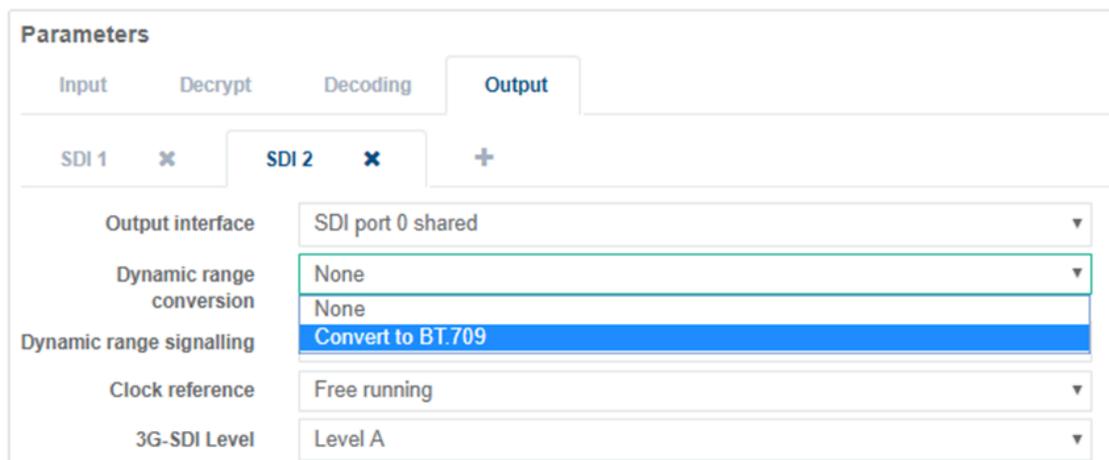
Prerequisites:

Service has been configured to contain an HD monitor output.

The playout timing of each SDI output frame can be adjusted (advanced or delayed) in single pixel increments relative to the external frame sync.

1. [Display Services](#).
2. Click  to edit the service.
3. Select the **Output** tab in the **Parameters** window.
4. Select the **SDI** tab configured as **SDI port 0 shared**.
5. Select **Convert to BT.709** from the **Dynamic range signalling** drop down menu.

Example:



NOTE If the incoming video is already BT.709, the signal will be passed through unaltered.

Configure audio output

The Receiver service supports a maximum of 16 channels (8 stereo pairs) of embedding for any baseband audio output.

Add an output audio component

Prerequisites:

- At least one Receiver service is configured.
- A video service and at least 1 audio component is configured to be decoded.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select **Output** to display options.

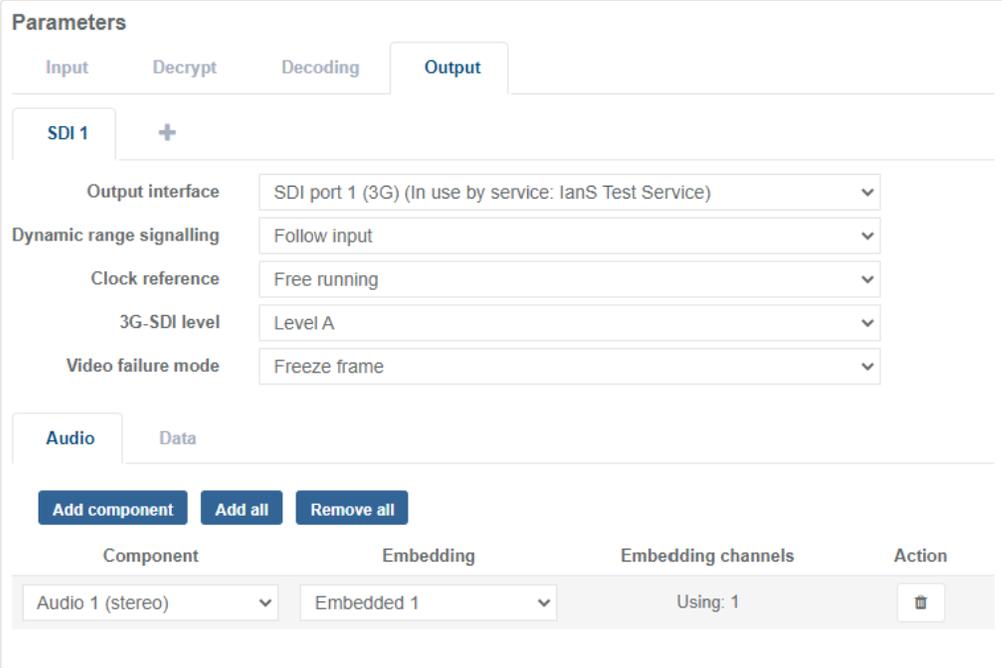
4. Select **Audio** to open the tab and display options.
5. Select **Add component**.
Result: An audio component displays.
6. [Configure audio output](#) parameters.

Add all output audio

Prerequisites:

- At least one Receiver service is configured.
- A video service and at least 1 audio component is configured to be decoded.

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** section, select **Output** to display options.



The screenshot shows the 'Parameters' section with the 'Output' tab selected. Under 'SDI 1', there are several dropdown menus for configuration: 'Output interface' (SDI port 1 (3G) (In use by service: lanS Test Service)), 'Dynamic range signalling' (Follow input), 'Clock reference' (Free running), '3G-SDI level' (Level A), and 'Video failure mode' (Freeze frame). Below this, there are two tabs: 'Audio' and 'Data'. Under the 'Audio' tab, there are three buttons: 'Add component', 'Add all', and 'Remove all'. At the bottom, there is a table with columns: 'Component', 'Embedding', 'Embedding channels', and 'Action'.

Component	Embedding	Embedding channels	Action
Audio 1 (stereo)	Embedded 1	Using: 1	

4. Select **Audio** to open the tab and display options.
5. Select **Add all**.
Result: All the decoded audio components that are not currently included in the output audio configuration are added to the component column (**up to a maximum number of embedded channels available for the output video format in use**).
Embedded channels are allocated in sequence until all available channels are filled.

Delete an output audio

Prerequisites:

- At least one Receiver service is configured.
- A video service and at least 1 audio component has been configured to be decoded.

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** section, select **Output** to display options.
4. Select **Audio** to open the tab and display options.
5. Select  in the **Actions** column.

Result: The audio component no longer displays.

Delete all output audio

Prerequisites:

- At least one service is configured.
- A video service and at least 1 audio input has been configured to be decoded.

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** section, select **Output** to display options.
4. Select **Audio** to open the tab and display options.
5. Select **Remove all**.

Result: All the audio components are now removed from the list of output configurations.

Configure Audio Embedding

Prerequisites:

- At least one Receiver service is configured.
- A video service and at least 1 audio component is configured to be decoded.

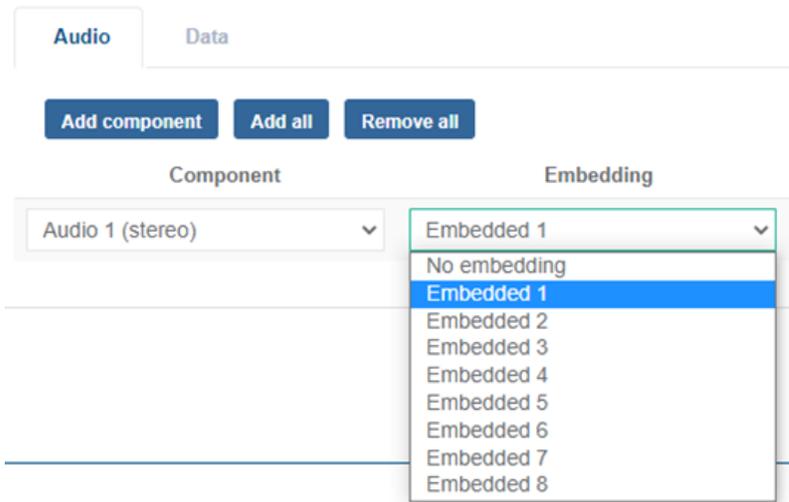
1. [Display Services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select **Output** to display options.
4. Select **Audio** to open the tab and display options.
5. Select **Add an audio**.
6. Select a **Component** from the drop-down list.

Result: Available audio components are based on the audio being decoded for the service.

7. Select an **Embedding** position from the drop-down list.

NOTE

- A single Embedded channel is required to output a stereo audio.
 - 3 Embedded channels are required to output a 5.1 audio.
-



Result: Each audio component is embedded into the output SDI at the selected position.

Output Format	Embedded options
1.5G SDI (720p / 1080i)	Embedded 1 to 8
3G SDI (1080p)	Embedded 1 to 16
4 x 3G SDI (2160p)	Embedded 1 to 16
12G SDI (2160p)	Embedded 1 to 16

Configure data output

Data is embedded into the VANC (Vertical Ancillary) lines of the SDI output. It is possible to embed more than one data type onto a single VANC line.

Prerequisites:

- At least one Receiver service is configured.
- The service to be decoded has been selected from the **Selected Service** list in the **Input** tab.

RX1 currently supports the following data types:

- VITC / Time code
- AFD / BAR
- Closed Captions
- OP-47 Teletext
- SMPTE 2031 Teletext
- Generic data

NOTE See [output parameters](#) descriptions for additional information.

1. [Display Services](#).
2. Click  to edit the Receiver service.

3. From the **Parameters** section, select **Output** to display options.
4. Select **Data** to open the tab and display options.

Example:

Audio	Data
VITC/Time code	Line 9
AFD/BAR	Line 11
Closed captioning	Line 11
OP-47 teletext	OFF
SMPTE 2031 teletext	OFF

5. Select the Line number from the drop-down menu.

Result: Each selected data component (if present on the incoming transport stream) is now either decoded from a data PID or is extracted from User data or SEI in the video elementary stream.

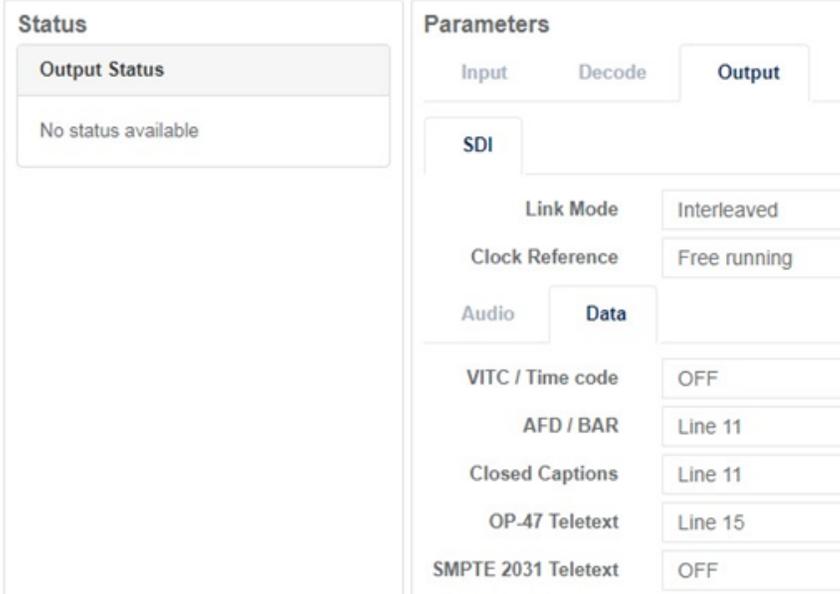
NOTE Generic data is automatically reinserted into the same line it came in.

Disable data output

Prerequisites:

- At least one Receiver service is configured.
- The service to be decoded has been selected from the **Selected Service** list in the **Input** tab.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select **Output** to display options.
4. Select **Data** to open the tab and display options.



The screenshot shows two panels. The left panel, titled 'Status', has a sub-section 'Output Status' which currently displays 'No status available'. The right panel, titled 'Parameters', has three tabs: 'Input', 'Decode', and 'Output'. The 'Output' tab is selected. Under the 'Output' tab, there are two sub-sections: 'SDI' and 'Data'. The 'Data' sub-section is active and contains several settings with drop-down menus: 'Link Mode' (Interleaved), 'Clock Reference' (Free running), 'VITC / Time code' (OFF), 'AFD / BAR' (Line 11), 'Closed Captions' (Line 11), 'OP-47 Teletext' (Line 15), and 'SMPTE 2031 Teletext' (OFF).

5. Select **OFF** from the drop-down menu for each data that you want to disable.
Result: Once disabled, the data is no longer embedded into SDI outputs.

Configure the clock reference

Prerequisites for using an External sync

- The studio feed must be of the same frequency as the video service being decoded by the RX1.
- If multiple services are being decoded they must all be of the same frequency:
 - 50 Hz (field timing for interlaced or frame timing for progressive)
 - 59.94 Hz (field timing for interlaced or frame timing for progressive)

Contribution decoder

The RX1 contains an external sync input BNC (located on the rear of the unit).

This allows you to select one of the following options:

- **External sync:** synchronize the unit to either a reference studio sync pulse so that the output video (either in UHD, HD or SD) aligns with the studio feed, or
- **External sync:** synchronize the SDI output clock frequency of the RX1 to an external 10MHz studio reference clock.
- **Input transport stream:** Synchronize the decode service to the PCR contained in the incoming transport stream, so that the output contains no dropped or repeated pictures.
- **Remote production:** Synchronize all decoded services to the PCR contained in one of the incoming transport streams, so that the output contains no dropped or repeated pictures, and all decode services are not only clock locked but also the start of each picture is also aligned. For further information see the Remote production application guide for how to set up an end to end system.

IMPORTANT The RX1 automatically detects the type of external-sync applied and attempts to lock the SDI output to the external reference supplied. **If the unit detects a signal mismatch** then frame sync will not be acquired and the unit will continue to run using its own internal sync.

Configure the clock reference

To configure the clock reference, follow these steps:

1. [Display services](#).
2. Click  to edit the Receiver service.
3. From the **Parameters** section, select to **Output** tab.
4. Select the **Clock reference** format required for the SDI output.

Possible options:

- **Free running**
- **External sync** ⁽³⁾
- **Input transport stream**
- **Remote production**

NOTE For further information on options, see [SDI output parameters and status](#) on page 229.

3. **External sync** requires a specific cable installation (see Installation Guide).

Configure the external sync offset

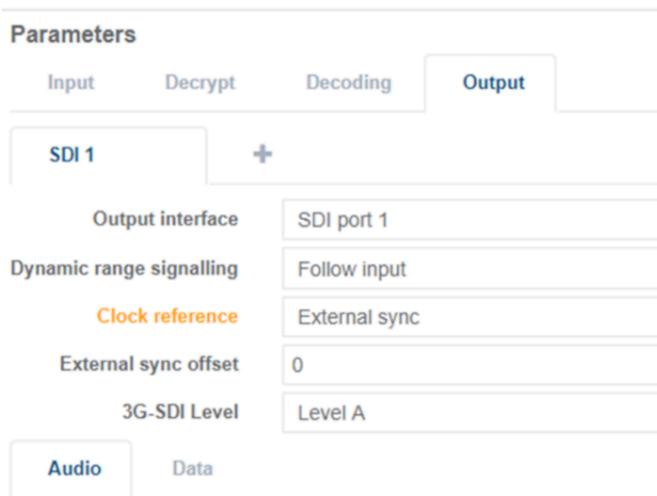
Prerequisites:

RX1 has been set to **External sync** with a valid reference studio clock applied to the Sync input. The playout timing of each SDI output frame can be adjusted (advanced or delayed) in single pixel increments relative to the external frame sync.

NOTE **External sync** requires a specific cable installation (see Installation Guide).

1. [Display services](#).
2. Click  to edit the service.
3. From the **Parameters** section, select to **Output** tab.

Example:



The screenshot shows the 'Parameters' configuration page for 'SDI 1'. The 'Output' tab is selected. The configuration is as follows:

Parameter	Value
Output interface	SDI port 1
Dynamic range signalling	Follow input
Clock reference	External sync
External sync offset	0
3G-SDI Level	Level A

At the bottom, there are tabs for 'Audio' and 'Data'.

4. Enter the offset required in pixels to be applied in the **External sync offset** field.

Configure the decryption

Decryption

If the encryption flag is set for a service which has been selected to be decoded then a locked padlock symbol will be displayed next to the service name.

Example:

The screenshot shows the RX1 configuration interface. At the top, the configuration name is 'IP2' and the type is 'SD/HD'. A 'Service started' indicator is present. The 'Status' section shows the 'Service status' with 'Selected service 152' and 'PCR PID 201'. A yellow padlock icon is next to the service name. The 'Video status' section shows 'PID 201 (embedded PCR)', 'Rate 0.00 Mbps', 'Codec mpeg2video', and 'Chroma 4:2:0'. The 'Parameters' section has tabs for 'Input', 'Decrypt', 'Decoding', and 'Output'. The 'Decoding' tab is active, showing 'Service Program Number: 152' with a locked padlock icon and 'Delay mode Standard'. Below are buttons for 'Add audio decode', 'Decode all input audio', and 'Remove all input audio', along with an 'Auto Select' checkbox. At the bottom, a table lists audio channels: 'Audio 1' with input 'Auto 202 (NAR)' and output 'Stereo'.

If the incoming service is successfully decrypted then an unlocked padlock will be displayed next to the service.

Example:

The screenshot shows the RX1 configuration interface. At the top, the configuration name is 'IP2' and the type is 'SD/HD'. A 'Service started' indicator is present. The 'Status' section shows the 'Service status' with 'Selected service 512 - E3' and 'PCR PID 201'. An unlocked padlock icon is next to the service name. The 'Video status' section shows 'PID 201 (embedded PCR)', 'Rate 5.56 Mbps', 'Codec hevcMain', and 'Chroma 4:2:0'. The 'Parameters' section has tabs for 'Input', 'Decrypt', 'Decoding', and 'Output'. The 'Decoding' tab is active, showing 'Service E3' with an unlocked padlock icon and 'Delay mode Standard'. Below are buttons for 'Add audio decode', 'Decode all input audio', and 'Remove all input audio', along with an 'Auto Select' checkbox. At the bottom, a table lists audio channels: 'Audio 1' with input 'Auto 202 (eng)' and output 'Stereo'.

BISS decryption modes

BISS decryption has the following modes:

BISS Protocol Version	Supported Modes	Notes
BISS v1	Mode 1	
	Mode E	
BISS v2	Mode 1	For notes about BISS-CA, see BISS-CA Decryption on page 88.
	Mode E	
	Mode CA (BISS-CA)	

NOTE BISS can refer to both BISS v1 or BISS v2 which use the fixed Control/Session Word for decrypting scrambled content. For BISS v2 Mode CA, this is more commonly referred to as BISS-CA. These modes are specified in the EBU Tech 3292. RX1 offers these standard BISS decryption modes.

Mode 1

This mode is recommended for short events, such as sports broadcasts. Mode 1 uses a fixed control word to encrypt the data in the Transport Stream using the DVB Common Scrambling Algorithm.

This control word or key, known as the *clear session word* (CSW), is entered into the receiver using the web interface. **If the same CSW has been entered into a BISS compliant encoder:** the unit decrypts the encrypted service.

The decryption workflow:

1. Generate a random 12 digit hexadecimal for BISS v1 or a 32 digit hexadecimal number for BISS v2
2. Enter the number into the encoder
3. Communicate the number securely to all decrypting decoders

Mode E

Mode E encrypts using an internal fixed 14-digit hexadecimal Injected ID for BISS v1 or an internal fixed 32-digit hexadecimal Injected ID for BISS v2. This mode is a more secure version of Mode 1. In this mode the *clear session word* (CSW) is encrypted to prevent clear keys from being used to access encrypted content.

NOTE The Encrypted CSW is also referred to as the ESW (Encrypted session word)

The decryption workflow:

1. Generate a random 16-digit hexadecimal number for BISS v1 or a 32-digit hexadecimal number for BISS v2.
2. Enter the number into the encoder.
3. Communicate the number securely to all decrypting decoders Mode E is used to provide a secure content link from one encoded source to the RX1 where the original CSW is hidden.

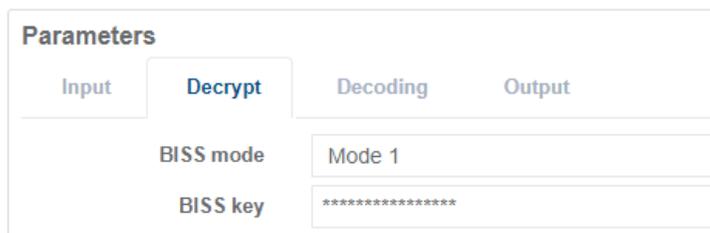
Mode E is used to provide a secure content link from one encoded source to the Content Processor where the original CSW is hidden.

Set BISS to mode 1

To set BISS to mode 1, follow these steps:

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Select the **Decrypt** tab in the **Parameters** window.
4. Select **Mode 1** for **BISS mode**.
5. Enter the 12-digit hexadecimal number for BISS v1 or the 32 hexadecimal number for BISS v2 provided for the transmission.

Example:



Parameters			
Input	Decrypt	Decoding	Output
	BISS mode	Mode 1	
	BISS key	*****	

Result: The **BISS key** is visible while the key is being entered. Once complete, then the value of the key displays as *********.

Result:

- If a service is received without decryption, or if a service is received with a service BISS encrypted with the key entered, then the service is be decrypted and all components are output from the Content Processor.
- If a service is received with any other type of encryption, or with BISS encryption generated with a different key, then the decoder cannot decode the service.

Set BISS to mode E

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Select the **Decrypt** tab in the **Parameters** window.
4. Select **Mode E** for **BISS mode**.

5. Enter the 16-digit hexadecimal number for BISS v1 or the 32 digit hexadecimal number for BISS v2 provided for the transmission.

Example:

Parameters			
Input	Decrypt	Decoding	Output
	BISS mode	Mode E	
	BISS key	*****	

NOTE The **BISS key** is visible while the key is being entered. Once complete, then the value of the key displays as *********.

Result:

- If a service is received without decryption, or if a service is received with a service BISS encrypted with the key entered, then the service is decrypted and all components are output from the Content Processor.
- If a service is received with any other type of encryption, or with BISS encryption generated with a different key, then the decoder cannot decode the service.

Setting the injector ID for BISS mode E

Prerequisites:

Retrieve the 14 digit injector ID number for BISS v1 or the 32 digit injector ID number for BISS v2 from your administrator.

IMPORTANT

- It is **impossible to read back the set value** once you configure the Injected ID number.
- For added security we recommended that the **Injected ID** is set by generating the ESW in the RX1 web interface. See [Set BISS to mode E](#).

1. Connect to the RX1 unit using one of the following options:
 - Use an SSH connection
 - Connect a mouse and keyboard directly to the unit
2. Use the login credentials below:
 - Username: **mfeng**
 - Password: **2u4y&C**
3. Using a command prompt, enter the following command: **SetBissInjectedID**
Result: The following message displays: Please enter the BISS injector ID.
4. Enter the 14 digit Injector ID provided for BISS v1 or the 32 digit Injector ID provided for BISS v2.

BISS-CA Decryption

IMPORTANT Trusted Platform Module (TPM) must be fitted. If not fitted, the BISS-CA functionality will be hidden. Please contact MediaKind Customer Support on how to check this (see [Contact information](#)).

BISS v2 mode CA, or BISS-CA (as specified in EBU Tech 3292-s1 Version 1.0 March 2018) is an extension to BISS v2 which replaces the fixed Session Word (SW) used to descramble an incoming feed with a cycling Session Word that is transmitted in the transport stream using Entitlement Control Messages (ECMs).

Receivers may be entitled by the headend to decrypt the cycling Session Words via an intermediary Session Key (SK) which are transmitted in the transport stream using Entitlement Management Message (EMMs).

Entitlement of the receiver is handled through public/private key cryptography where the public and private keys are both known to the receiver and only the public key is known to the headend. For each entitled receiver, the SK is encrypted using the receiver's public key.

The RX1 supports the following BISS-CA features:

- Self-generated key pair
- Injected key pair

RESTRICTION Buried key pairs will be supported in a future code release.

Key pairs

Multiple **Self-Generated Key Pairs** and/or **Injected Key Pairs** can be stored on a single RX1 unit. This allows the receiver operator to switch the unit between headend scramblers without having to reload or regenerate the key pairs.

For all key pair types, the RX1 permits the public key to be downloaded so that it can be communicated to the headend operator to allow the unit to be entitled.

Descrambling license tokens

For every service that is decrypted using BISS-CA, a single Descrambling License Token (FAT1023941/3) is consumed.

BISS-CA key pairs

There are two types of key pairs supported by the RX1 as described below.

The key pairs that are currently stored on the RX1 unit can be viewed from the **BISS-CA key pairs** table under **Server Information** (see [Display BISS-CA key pairs table](#) on page 89).

The BISS-CA key pairs table will list the following information:

- EKID** This is the Entitlement Key ID derived from the key pair stored on the RX1. It will be unique to the key pair and may be used to reference or identify the key pair when communicating with the content provider about what keys are present.

Key Pair Type	This indicates the Key Pair Type as either Self-Generated or Injected . RESTRICTION: Buried key pairs will be supported at a later date.
Creation Date	The date when the key pair was generated or imported on to the RX1.
Description	A text field that the operator can optionally fill to help identify what the key pair is used for such as, name of content provider, event name, etc. This field has no effect on the operation of BISS-CA decryption.
Download Actions	The Download Actions available for the key pair which vary according to the key pair Type: <ul style="list-style-type: none">• Public – Download the public portion of the key pair; All key pair types.• Attestation – Download attestation data for the key pair; Self-Generated key pairs only.• Delete – Remove the key pair from storage on the RX1; Self-Generated and Injected key pairs only.

Display BISS-CA key pairs table

To navigate to the key pairs table, follow these steps:

1. [Display Servers](#).
2. Click the Detail icon,  to display Server information.
3. Click the **RX1 Appliance** tab then click the **BISS-CA Key Pairs** tab.

Example:

Home / Servers / Receiver1

General System Settings Statistics Licenses **RX1 Appliance**

Dual Bank Software Versions Logs **BISS-CA Key Pairs**

[Add key pair...](#) Unique ID BRPP-FWJP-8AX8

BISS-CA Key pairs

The table below lists all the valid key pairs discovered on this device:

EKID	Key Pair Type	Creation Date	Description	Download Actions
41 BD 53 76 68 55 90 95	Injected	2021-09-03T10:06:54+00:00	<input type="text" value="Summer Event"/>	public

Result: Valid key pairs are displayed in a table.

Create a self-generated key pair

To create a self-generated key pair, follow these steps:

1. [Display BISS-CA Key Pairs Table.](#)
2. Click **Add key Pair.**
3. Select **Self-Generated Key Pair.**
Result: A pop-up window should appear stating **Success.**
4. Click **OK** to close the pop-up window.
Result: A new Key Pair entry should appear in the BISS-CA Key Pair table.
5. Enter a suitable descriptive title in the **Description** field to help identify what content provider this Key Pair will be registered to or the name of the event it will be used for.

Example:



The screenshot shows a web interface with a navigation bar containing 'Dual Bank Software', 'Versions', 'Logs', and 'BISS-CA Key Pairs'. Below the navigation bar is a button labeled 'Add key pair...' and a 'Unique ID' field with the value 'BRPP-FWJP-8AX8'. The main section is titled 'BISS-CA Key pairs' and contains the text: 'The table below lists all the valid key pairs discovered on this device:'. Below this text is a table with the following columns: 'EKID', 'Key Pair Type', 'Creation Date', 'Description', and 'Download Actions'. The table contains two rows of data.

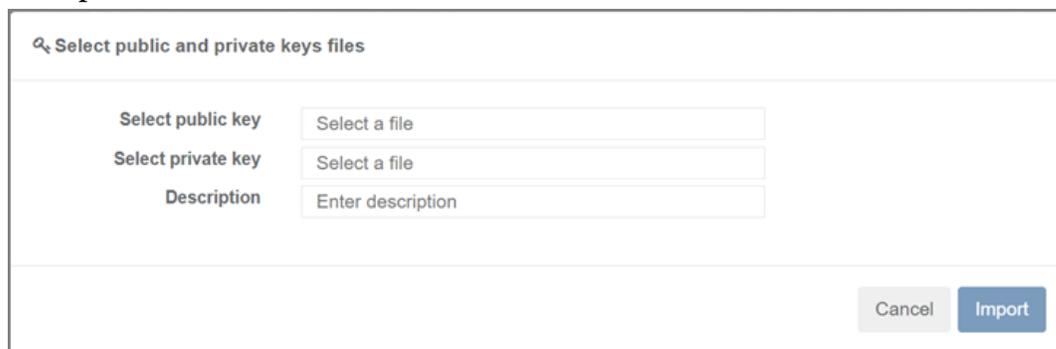
EKID	Key Pair Type	Creation Date	Description	Download Actions
41 BD 53 76 68 55 90 95	Injected	2021-09-03T10:06:54+00:00	Summer Event	public
48 EC A3 E8 4E 5F CA 41	Self-Generated	2021-10-12T10:26:48+00:00	Sports Event	public attestation delete

Import injected key pair

To import an injected key pair, follow these steps:

1. [Display BISS-CA key pairs table](#) on page 89.
2. Click **Add Key Pair.**
3. Select **Import Injected Key Pair.**

Example:



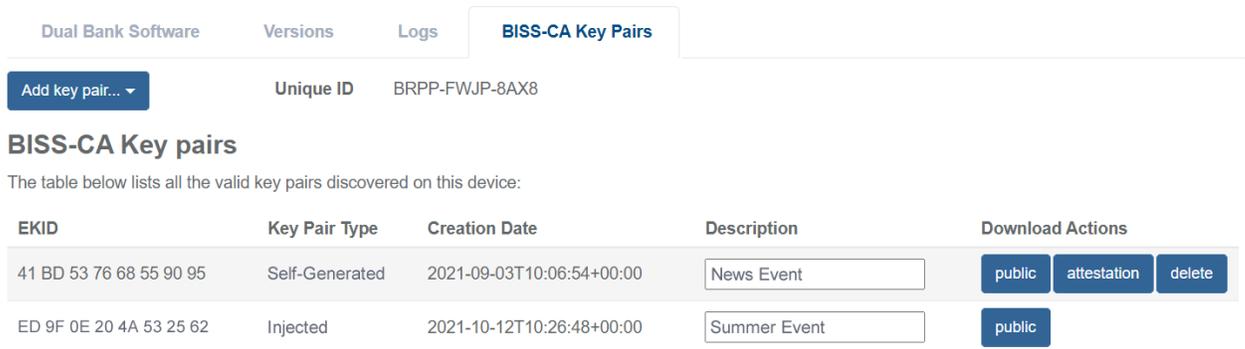
The screenshot shows a form titled 'Select public and private keys files'. It contains three input fields: 'Select public key' with a 'Select a file' button, 'Select private key' with a 'Select a file' button, and 'Description' with an 'Enter description' text input. At the bottom right of the form are 'Cancel' and 'Import' buttons.

Result: A pop-up browser window should appear showing the required fields necessary for importing an Injected key pair.

4. Click **Select a File** for the **Select Public Key** field, browse and select the file for the public portion of the key pair.

5. Click **Select a File** for the Select **Private Key** field, browse and select the file for the private portion of the key pair.
6. Enter a suitable descriptive title in the **Description** field to help identify what content provider this key pair will be registered to or the name of the event it will be used for.
7. Click the **Import** button.
Result: A pop-up window should appear stating Success.
8. Click **OK** to close the pop-up window.

Example:



The screenshot shows the 'BISS-CA Key Pairs' tab in a software interface. At the top, there are navigation tabs: 'Dual Bank Software', 'Versions', 'Logs', and 'BISS-CA Key Pairs'. Below these is a button 'Add key pair...' and a 'Unique ID' field containing 'BRPP-FWJP-8AX8'. The main section is titled 'BISS-CA Key pairs' and contains a table listing discovered key pairs. Below the table, there are buttons for 'public', 'attestation', and 'delete' for each row.

EKID	Key Pair Type	Creation Date	Description	Download Actions
41 BD 53 76 68 55 90 95	Self-Generated	2021-09-03T10:06:54+00:00	News Event	public, attestation, delete
ED 9F 0E 20 4A 53 25 62	Injected	2021-10-12T10:26:48+00:00	Summer Event	public

Result: A new key pair entry should appear in the BISS-CA key pair table.

Export the public key

Exporting the public portion of a key pair stored on the RX1 is available for **Self-Generated** and **Injected** key pair types.

To export the public key, follow these steps:

1. [Display BISS-CA key pairs table](#) on page 89.
2. Locate the row with the desired key pair.
3. From the **Download Actions** column, click the **Public** button.

Export attestation data

To authenticate that a Self-Generated key pair was created by the RX1, an **Attestation Package** can be exported for validation.

NOTE The RX1 does not provide attestation data in the form of a X.509 certificate.

NOTE There is no attestation data available for **Buried** or **Injected** Key Pairs.

To export attestation data, follow these steps:

1. [Display BISS-CA key pairs table](#) on page 89.
2. Locate the row with the desired key pair.
3. From the **Download Actions** column click the **Attestation** button.

Remove stored key Pair

RESTRICTION Only **Self-Generated** and **Injected** key pair types can be removed from the RX1.

IMPORTANT Once a key pair has been removed, it is impossible to undo or recover the lost key pair. A service that is dependent on the key pair removed can no longer be descrambled. New entitlements will need to be obtained from the content provider (see [Managing BISS-CA entitlements](#) on page 93).

To remove a stored key pair, follow these steps:

1. [Display BISS-CA Key Pairs Table](#).
2. Locate the row with the desired key pair.
3. From the **Download Actions** column click the **Delete** button.
Result: A pop-up window should appear confirming the action.
4. Select **Yes, Delete Key** to complete the action.
Result: A pop-up window should appear stating **Success**.
5. Click **OK** to close the pop-up window.

Enable BISS-CA decryption for service decode

Prerequisites:

See [Managing BISS-CA Entitlements](#) .

For a service that has been configured for **UHD** or **SD/HD**, enable BISS-CA with the following steps:

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** window, select the **Decrypt** tab.
4. Tick the **BISS-CA** checkbox to enable decryption (untick the checkbox to disable decryption).

Example:

Parameters

Input	Decrypt	Decoding	Output
	BISS mode	None 	
	BISS key	<input type="text"/>	
	BISS-CA	<input checked="" type="checkbox"/>	

5. Click **Save and continue** to save your modifications and go to another tab.

Enable BISS-CA decryption for TS passthrough

Prerequisites:

See [Managing BISS-CA Entitlements](#) .

For a service that has been configured for **TS Passthrough**, enable BISS-CA with the following steps:

1. [Display Services](#).
2. Click  to edit the service.

- From the **Parameters** window, select the **Decrypt** tab.
- Click **Add Decrypted Program** button.
Result: A new row will appear in the decryption table.
- Set the **Service** to be decrypted and set the **Decryption Type** to **BISS-CA**.

Example:

Parameters

Input	Decrypt	Output
BISS mode		None
BISS key		
Director hardware ID		None
Over air control enable	<input type="checkbox"/>	
Director secondary keys		Select a file Upload
Explore CAM in Slot 1	☰	Explore CAM in Slot 2 ☰
Reset CAM in Slot 1	⏻	Reset CAM in Slot 2 ⏻
Add decrypted program		Remove all

Name	Service	Decryption type	Action
Decrypt 1	CH 1	BISS-CA	🗑️

- Save settings to apply changes.

Managing BISS-CA entitlements

To successfully decrypt BISS-CA content, the RX1 must have the correct entitlements. The provider of the scrambled content will require a public key from the receiver, with the paired private key embedded within the receiver.

To get the correct entitlements, follow these steps:

- [Step #1 - Contact content provider](#) on page 93.
- [Step #2 - Exchange keys](#) on page 94.
- [Step #3 - Check authorization](#) on page 94.

Step #1 - Contact content provider

Contact the provider of the scrambled content and determine how they wish to exchange key pairs. They will require one of the following methods:

- Method 1:** The receiver operator must send a Public key to the content provider.
- Method 2:** The content provider will send a Public/Private key Pair to the receiver operator.

Post Requisite: The keys will need to be exchanged between the provider and the receiver operator using an out-of-band method chosen by the content provider (see [Step #2 - Exchange keys](#) on page 94).

Step #2 - Exchange keys

Method 1: Send public key to the content provider

The content provider may request that the receiver operator must send a **Public key** so that the receiver can be entitled by the scrambler.

This can be done using the **Self-Generated** key pair.

Method 2: Import public/private key pair received from the content provider

The content provider may send a public/private key pair to the receiver operator which must be imported in to the RX1. This can be done using **injected key pair**.

1. [Import injected key pair](#) on page 90.
2. Make a note of the EKID value that assigned to the key pair.
3. The injected key pair should already be registered with the scrambler from the content provider and entitled.

Step #3 - Check authorization

1. [Enable BISS-CA decryption for service decode](#) on page 92.
2. [Display Services](#).
3. Click the Alarms icon, .
4. Confirm that no alarms are raised.
5. If the raised alarm **Label** reports **BISS CA not decrypting** and the **Info** column states **not authorized** then this is due to one or more of the following conditions:
 - The EKID (Entitlement Key ID) recovered from the transport stream for the Service ID does not match the EKID of any of the key pairs stored on the RX1.
 - The content provider has not enabled entitlements.
 - The content provider has revoked entitlements.
6. Contact the content provider to confirm that the correct public key has been registered and that entitlements have been enabled.

NOTE It may be necessary to refer to the EKID value noted in [Step #2](#).

Decrypting incoming services with a Common Interface module

Common Interface (DVB-CI) provides a descrambling solution using integrated descrambling PCMCIA cards, sometimes referred to as a **Conditional Access Module** (CAM). CAMs are available in many different CA types and have varying advantages.

Consumer CAMs may only be able to descramble one service and this service may limited to no more than two components (PIDs). A Professional CAM may be able to decode multiple services and multiple components per service.

Analysis is required to define a suitable CAM for each system. The Content Processing module can be configured to provide 2 PCMIA slots to insert CAMs.

NOTE Content Processing currently only supports CI with Transport Streams up to 72 Mbps.

Mutli-service descrambling

The Receiver service has the ability to descramble multiple services from a single incoming MPTS and then decode up to 4 HD services, depending on the capabilities of the CAM fitted.

Example:

The screenshot displays the Receiver Services configuration interface. It is divided into several sections:

- Satellite:** A table listing four satellite services, all of which are 'Available'.

Satellite	Status
Satellite 1	Available
Satellite 2	Available
Satellite 3	Available
Satellite 4	Available
- SD/HD: IP2 E3:** A detailed view of a service. It shows a video thumbnail of a soccer game. The video stream is identified as '201, OK, hevcMain' and the audio as '202, OK, DD'. A yellow padlock icon indicates the service is locked.
- Output status:** A table showing the SDI outputs for the selected service.

SDI Outputs	
Port 1 (12G)	IP2 E5
Port 2 (3G)	IP2 E3
Port 3 (3G)	IP2 E3
Port 4 (3G)	IP2 E3
- IP:** A table listing IP services. One service is shown as 'Locked'.

IP	Status	Services
IP 239.58.120.8:5000	Locked	IP2 E5, IP2 E3
- SD/HD: IP2 E5:** A detailed view of another service. It shows a video thumbnail of a person cooking. The video stream is identified as '301, OK, hevcMain' and the audio as '302, OK, DD'. A yellow padlock icon indicates the service is locked.

Four CAM modules are required to descramble and decode 4 encrypted services from 4 independent incoming transport streams.

Configure service decryption

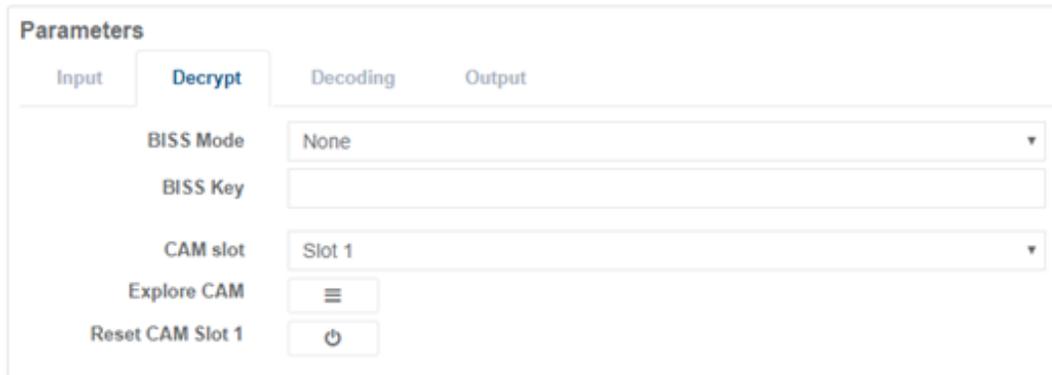
Prerequisites:

Content Processing must have a CI card must with the correct CAMs and viewing cards.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Select the **Decrypt** tab for the **Current Input**.

4. Select the **CAM slot** to be used to decrypt the incoming service.

Example:



The screenshot shows a configuration interface with a 'Parameters' section. It has four tabs: 'Input', 'Decrypt', 'Decoding', and 'Output'. The 'Decrypt' tab is selected. Under this tab, there are several fields: 'BISS Mode' is a dropdown menu set to 'None'; 'BISS Key' is an empty text input field; 'CAM slot' is a dropdown menu set to 'Slot 1'; 'Explore CAM' is a button with a hamburger menu icon; and 'Reset CAM Slot 1' is a button with a power icon.

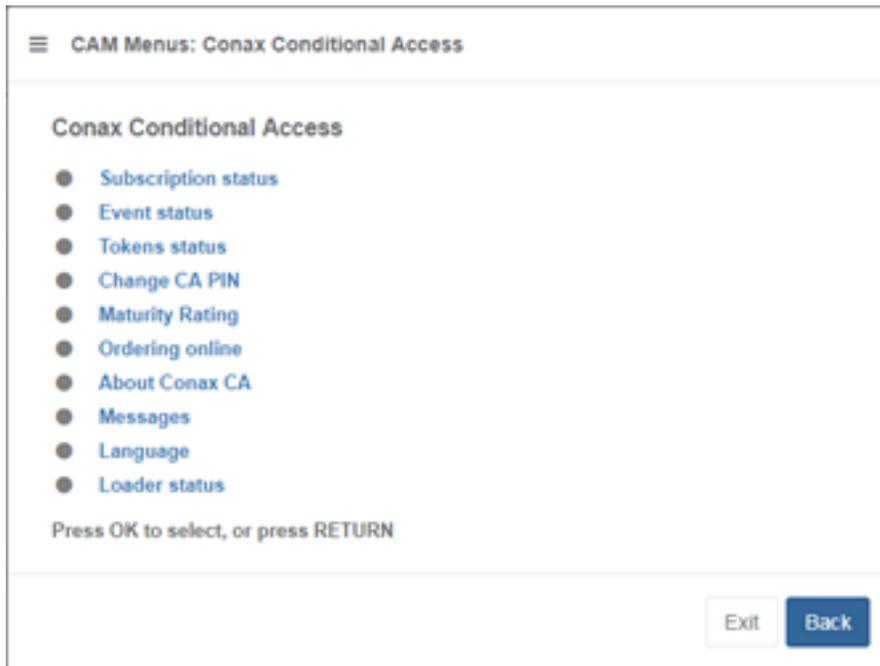
Result: The incoming service is decrypted using the selected CAM. An alarm is triggered if the CAM is unable to decrypt the incoming service.

Explore CAM information

CAM information varies per vendor and between different versions of the same CAM. You can set parameters such as the **CA PIN** or **Language**. You can see the model number, versions and CAM status.

1. [Display Services](#).
2. Click  to edit the Receiver service.
3. Select **Decrypt** for the **Current Input**.
4. Select the **Explore CAM** to see information for the selected **CAM slot**.

Example:



The screenshot shows a menu titled 'CAM Menu: Conax Conditional Access'. Below the title, there is a list of options, each preceded by a blue circle: 'Subscription status', 'Event status', 'Tokens status', 'Change CA PIN', 'Maturity Rating', 'Ordering online', 'About Conax CA', 'Messages', 'Language', and 'Loader status'. At the bottom of the menu, it says 'Press OK to select, or press RETURN'. There are two buttons at the bottom right: 'Exit' and 'Back'.

Reset the CAM

You can trigger a soft reboot of a selected CAM.

IMPORTANT Resetting the CAM **causes a brief outage in the output SDI.**

1. Display Services.
2. Click  to edit the Receiver service.
3. Select **Decrypt** for the **Current Input**.
4. Select  to reset the selected **CAM slot**.

Director Conditional Access (CA)

MediaKind Director provides a full Conditional Access system to secure delivery of digital content encrypted using rotating keys that are distributed within the transport stream.

The keys are encrypted and transmitted within the transport stream using Entitlement Control Messages (ECMs) so multiple keys can be transmitted to decrypt more than one service.

Director CA offers Access Control Management which is controlled at the Director headend so that an operator can authorize or deauthorize receivers. This allows the operator to easily manage or restrict which receiver can access the secure content.

Supplying the Director headend information

Receivers under control of the Director headend are addressed by a unique **Director Hardware ID** and receiver type. This information must be provided to the Director headend operator before the receiver can be authorized to decrypt secure content. A service must be assigned a **Director Hardware ID** in order to receive control messages from the Director headend.

Prerequisites:

At least one service is configured, and **Receiver Type** is **RX1**.

1. Display Services.
2. Click  to edit the Receiver service.

- From the **Parameters** window, select the **Decrypt** tab.

Example:

Parameters

Input	Decrypt	Decoding	Output
BISS mode	None		
BISS key			
BISS-CA	<input type="checkbox"/>		
Director hardware ID	247290715000		
Over air control enable	<input type="checkbox"/>		
Director secondary keys	Select a file		Upload
CAM slot	None		

- From the **Director hardware ID** drop down list, select an unused entry as shown in the example.

NOTE Setting the **Director Hardware ID** to **None** disables Director functionality for that service.

Loading a Director secondary key

The **Director secondary key** file is provided by the Director headend operator via a secure mechanism. The file must be placed in a location that is accessible by the machine being used to browse to the RX1. The Director secondary keys are paired with the **Director Hardware ID** and will follow that ID wherever it assigned to a service. If the secondary keys are required for a different **Director Hardware ID**, then the process of uploading the Director secondary key file must be repeated for each ID to pair against.

Prerequisites:

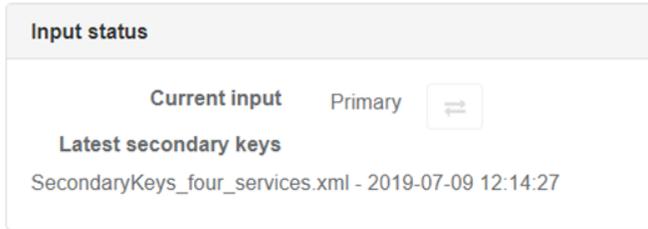
At least one service is configured, the **Director Hardware ID** is assigned and **Receiver Type** is **RX1**.

- Display Services.
- Click  to edit the service.
- Select the **Decrypt** tab in the **Parameters** window.
- Ensure the correct **Director Hardware ID** is selected before pairing with the secondary key file.
- Click on the **Select a file** input box and navigate to the secondary key file.
- Click the **Upload** button to upload the file.

Result: The **Director secondary key** file has been uploaded and paired against the **Director Hardware ID** assigned in the current service.

Post Requisite: To confirm the secondary key file that was uploaded last check the **Input status** window.

Example:



Configuration using Over Air Control

Director provides a list of Over Air Control (OAC) commands that can target an individual RX1, a group of RX1s or the entire population of decoders registered in the Director Headend database. This feature is often referred to as “Over Air In-Band” control. The OAC commands can be used to configure the RX1 settings remotely such as satellite tuning parameters and service selection.

Prerequisites: The unit MUST be tuned to the Director headend transport stream and MUST have [Over Air Control enabled](#) to respond to the commands.

The following general commands are supported by the RX1:

Command	Description
Force Service Selection	Retune the receiver to a service within the current carrier.
Force Carrier Retune	Retune the receiver to a service in a different carrier, the details of which are retrieved from a pre-stored configuration or from the command itself.
Store Carrier Data	Store service and carrier data within a configuration in the receiver.
Reset Carrier Data	Reset the stored data for a particular configuration.
Set Message	Configures the GUI and front panel messages, these are often used to debug if the RX1 is receiving over air commands: <ul style="list-style-type: none"> • display front panel message • hide front panel message • enable front panel messages • disable front panel messages

Command	Description
Set Receiver State	Sets the RX1 into one of the following states: <ul style="list-style-type: none">• reboot• OAC mode• local mode
Set BISS Data	Allows the user to set a number of BISS parameters on the receiver including the mode which BISS is to operate in.

NOTE Set Messages sent to the RX1 are displayed on the **Status** page of any of the running services as shown.

The following special commands are supported by the RX1:

Power Up Carrier:

The Power Up Carrier (PUC) is a feature of Director's over air control. The PUC can only be configured by a Director headend as it is not possible to do so locally or through any of the unit's other control interfaces.

When the PUC has been configured correctly, the next time the IRD is powered up or rebooted and the **Over Air Control** setting is enabled, the unit will ignore any previous input settings and immediately apply the input settings saved in the PUC.

If the **Over Air Control** setting was disabled, then there will be no change to the preserved input settings during boot up and the PUC is ignored.

It may be useful to configure the PUC so that every time the RX1 is powered up, it automatically tunes to the Director headend so that it can maintain over air control of the unit.

Emergency Home Carrier:

The Emergency Home Carrier (EHC) is similar to the Power Up Carrier described above. The EHC can only be configured by a Director headend as it is not possible to do so locally or through any of the unit's other control interfaces.

Once the EHC has been configured correctly and the Over Air Control setting is enabled, the IRD will continuously monitor its input status. If the RX1 loses transport stream lock on its input or the current Service being decoded is no longer present, after a pre-defined timeout (EHC Timeout), the unit will immediately apply the input settings saved for the EHC.

If the **Over Air Control** setting was disabled, then there will be no change to the input settings if transport stream lock or the selected Service is lost.

If a mistake is made when configuring a new carrier for the IRD resulting in a loss of lock, then there would be no access to over air control commands from the incoming transport stream and the headend would lose control. The EHC is a safe guard that allows the headend to regain over air control of the RX1.

The status of the **Power Up Carrier** and **Emergency Home Carrier** is available from the **Status** page of any of the running services.

Figure 3. Example:

The screenshot shows two panels. The top panel, titled "Director status", contains the following information:

Director hardware ID	None
Over air message	
Emergency home carrier	NO STORED SERVICE
Power up carrier	NO STORED SERVICE

The bottom panel, titled "Download status", contains the following information:

State	idle
Software version	-
Progress	0%

Enabling Over Air Control (OAC)

Prerequisites:

At least one Receiver service is configured.

1. [Display Services](#).
2. Click  to edit the service.
3. From the **Parameters** section, select the **Decrypt** tab.
4. Tick the **Over air control enable** check box.

Example:

The screenshot shows the "Parameters" section with the "Decrypt" tab selected. The parameters are as follows:

Input	Decrypt	Decoding	Output
BISS mode	None		
BISS key			
Director hardware ID	None		
Over air control enable	<input type="checkbox"/>		
Director secondary keys	Select a file		Upload
CAM slot	None		

Result:

Units added to the Director headend database and tuned to the Director headend transport stream will now respond to over the air commands.

Over Air Software Download (OASD) and configuration bundles

When the RX1 is part of a Director-controlled system, the headend can upgrade the software, or the configuration of the unit ‘over air’ via a downloadable bundle which will be ‘played out’ as part of the Director service.

Prerequisites: The unit MUST be tuned to the Director headend transport stream and MUST have [Over Air Control enabled](#).

The RX1 can store multiple of these bundles and any can be switched to at the operators convenience using an over air ‘switch to’ command.

The version to be switched to will be matched against the stored versions.

- When a switch command is actioned on a new software bundle the unit will reboot and the new software will be ‘switched to’.
- When a switch command is actioned on a configuration bundle, the current configuration will normally be removed, and the new configuration applied.

When a Director start download command is sent to an RX1, it checks if the requested software bundle version is already present on the RX1.

- If the bundle is present, the bundle is actioned immediately.
- If the bundle is not present on the RX1, the unit looks for the requested download version in the incoming stream and starts downloading when found.

Download Status Table

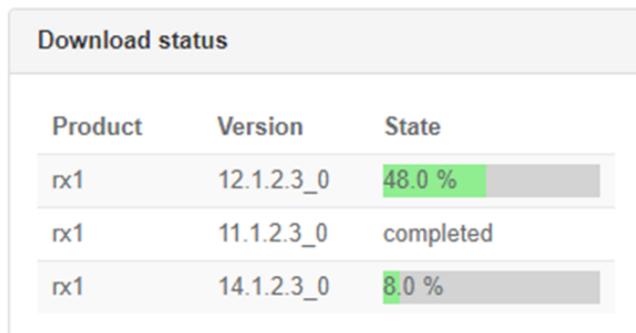
The download status table is a part of the **Director status** contained within the service status page.

The download status table indicates any current or previous downloads.

It has ordered entries showing the most recent current downloads at the top of the list. As new downloads are requested, they are added to the download status list.

The status list shows the last 10 downloads, removing any older downloads from the reported download status.

Figure 4. Example of download status table showing one complete and in progress downloads



Product	Version	State
rx1	12.1.2.3_0	48.0 %
rx1	11.1.2.3_0	completed
rx1	14.1.2.3_0	8.0 %

Each download status table row contains the following information:

Information displayed	Description
Product	This indicates the type of download: <ul style="list-style-type: none">• rx1 denotes an RX1 product software download• config denotes are configuration bundle download• For other products i.e. RX1 solution builds, rx1 may be replaced with, for example, rx1Sol.
Version	This is a text label that indicates the software or configuration bundle version. The version is of the form a.b.c.e_f where: <ul style="list-style-type: none">• a,b,c,d are numbers in range 0-255 inclusive.• f is a number in range 0-4292967295 inclusive.
State	This shows: <ul style="list-style-type: none">• progress percentage as a bar and a text percentage when downloading• the text completed once the download has finished

CHAPTER 5

Configure the SRT service

Add a Reliable Transport service

To configure SRT, follow these steps:

1. From the **Services** page, click **Add service** then select **SRT**.
2. Enter a name for this service.
3. In the **Input** section, set the **Input Mode** to **UDP**.
4. Configure the same **Network Interface**, **Stream Address** and **Port** with the same information as the output Mux (see [Configure the Mux](#) on page 108).

Figure 5. SRT configuration example

The screenshot displays the 'Add SRT' configuration page. At the top, the breadcrumb 'Home / Services / Add SRT' is visible. The 'Name*' field is set to 'SRT10'. The configuration is split into two main columns: 'Input' and 'Output'.

Input Section:

- Mode:** Input Mode* is set to 'UDP'.
- Connection:** Network Interface* is 'tap0', Stream Address* is '235.10.1.1', and Port* is '5000'.

Output Section:

- Mode:** Output Mode* is set to 'SRT Caller'.
- Connection:** Listener Address* is '10.1.0.1', Listener Port* is '1024', and Caller Port* is '5001'.
- Encryption:** Encryption* is set to 'AES-128' and Pass Phrase* is 'OrangesAndBananas'.
- Predicted Worst Case Link Characteristics:** Latency* is '300' ms and Maximum Bandwidth Overhead* is '20' %.

A 'Calculate' button is located at the bottom right of the predicted characteristics section.

CHAPTER 6

Configure the Multiplexing service (multiplexing, demultiplexing and PID re-mapping)

Add a basic Multiplexing service

The following sections explain the basic configuration.

For advanced configuration, especially BISS-CA output transport stream, see [Configuring a BISS-CA output transport stream](#).

To add a basic service, follow these steps:

1. From the **Services** page, click **Add service** then select **Multiplexing**.
2. Enter a name for this service.
3. Click **Save and continue** to save your modifications.

Configure the Mux

To configure the Mux, follow these steps:

1. From the **Stream Processing** tab, click **Transport stream**.
2. Go to the **Properties > Mux** sub-tab:
 - a. Check the **Total Bitrate**. If needed, you can modify it.
 - b. To minimize the delay through the chain, set the following parameters in the **Advanced settings** section:
 - **Input jitter buffer latency** to **40 ms**
 - **Scrambling latency** to **10 ms**
3. From the **Properties > Output** sub-tab, check the pre-defined parameters.
4. Click **Save and continue** to save your modifications and go to another tab.

CHAPTER 7

Configure the Encoder

Configure the input

Configure the input stream general parameters

1. Display services.
2. Click  to edit the service.
Result: The **General parameters** display.
3. Select **Input** tab to display parameters.
4. Enter the appropriate value for each [parameter](#).
NOTE Parameters may differ depending on the selected input type, especially SDI or SMPTE ST 2110 that have a limited number of parameters.
5. Optional: You can configure the [source error management](#).
6. Configure the primary and optionally the secondary source(s). See [Configuring the input stream source\(s\)](#).
7. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configure switch on ES data loss

You can activate the **Switch on ES data loss** to backup the source if video or audio input is lost.

In case of video or audio input loss of both sources, the option selected with frame freeze management applies (see [Configuring image on frame freeze](#) on page 119).

NOTE Works both in Active/Active and in Active/Passive redundancy mode.

1. Display services.
2. Click  to edit the service.
Result: The **General parameters** display.
3. Select **Input** tab to display parameters.
4. In the **Switch on ES data loss** section, tick the **Activate** check box.
5. Specify the delay between the video or audio loss and the switch to the backup source. See [Input - Source error management](#) on page 240.

Configure the input stream source(s)

You can configure two multicast sources. To configure a first source, complete the parameters in the **Primary** tab. If you want to configure a second source, you just have to click the **Add** button in the top right corner then complete the parameters in the **Secondary** tab.

NOTE For more information on SDI/IP redundancy, see [Configuring an SDI/IP redundancy](#) on page 111).

1. Display services.
2. Click  to edit the service.
Result: The **General parameters** display.
3. Select **Input** tab to display parameters.
4. Go to the **Sources** section then enter and/or select the appropriate values for each **input source**.
5. Depending on the input type, you can add:
 - **video input(s)**
 - **audio input(s)**
 - **subtitles input(s)**,
 - **VANC data input(s)** (*SMPTE ST 2110 input only*)
 - **in-band metadata input(s)**
 - **out-of-band metadata**
 - **cross stream prevention**
6. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configuring an SDI/IP redundancy

You can configure two SDI/IP input sources to allow the management of losses on the input of the encoder. The redundancy works in active/passive mode. On primary input signal loss, the secondary input is used as source, if the backup input is lost, the primary input switches back to the primary source.

To activate the redundancy, follow these steps:

1. Set the input type to **SDI/IP**.
2. Set the timeout before switching, **Input loss timeout**.
3. Complete the parameters in the **Primary** and **Secondary** tabs:
 - **Network interface**
 - **Stream address**
 - **Port**
 - **IGMPv3 source filtering**

Configure the input video stream

To select a video stream, follow these steps:

RESTRICTION Only configurable if PID locked mode.

1. Display services.
2. Click  to edit the service.
Result: The **General parameters** display.
3. Select the **Input** tab to display parameters.

4. In the **Sources > Input streams selection** section, enter the **video PID**.

NOTE In case of **SMPTTE ST 2110** input type, enter the **SDP File Location** and **Stream Index**.

5. Optional: In **IPTV export type**, you can delete the video input to get an audio-only service.
6. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Related reference

[Video input parameters](#) on page 243

Configure the input audio stream

1. Display services.
2. Click  to edit the service.
Result: The **General parameters** display.
3. Select **Input** tab to display parameters.
4. In the **Input streams selection** section, click **Add** to configure a new audio stream or click  to edit an existing one.
Result: A new window is displayed.
5. Enter the appropriate value for each **audio stream parameter**.
NOTE Parameters differ depending on the selected input type.
6. Click **OK**.
Result: The audio input is added to the list of audio inputs.
7. Optional: You can click the **Cancel** button to close the window without saving.
8. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Related reference

[Audio input parameters](#) on page 244

Configure input subtitle selection

To configure the input stream subtitle parameters, follow these steps:

1. [Display Services](#).
2. Click  to edit the service.
3. In the **Input** tab, scroll to **Input stream selection > Subtitle ID** and click **Add**.
4. [Set Subtitles options](#), then click **OK** to save.
Result: Subtitles are automatically added to the **Encoding** tab in pass-through only.

Post Requisite:

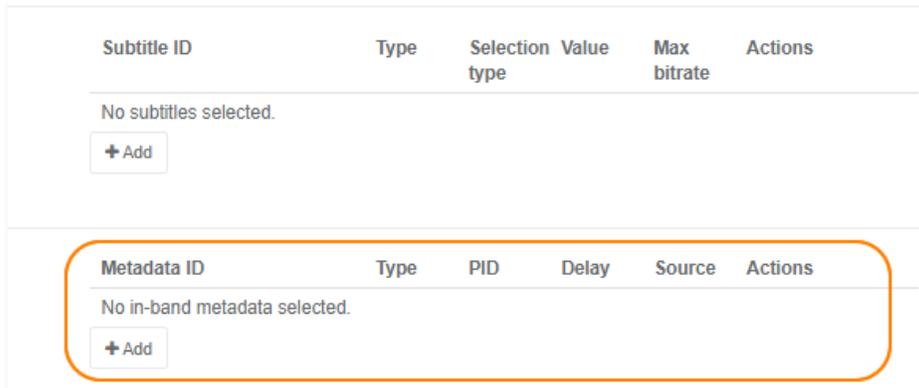
- You can [configure subtitle encoding parameters](#).
- You can [configure subtitle burn-in](#).
- You can [add subtitles](#) to output streams.

Configure in-band metadata input stream

To configure in-band metadata input stream, follow these steps:

NOTE In our example, we consider that you have selected an MPEG-2 TS input.

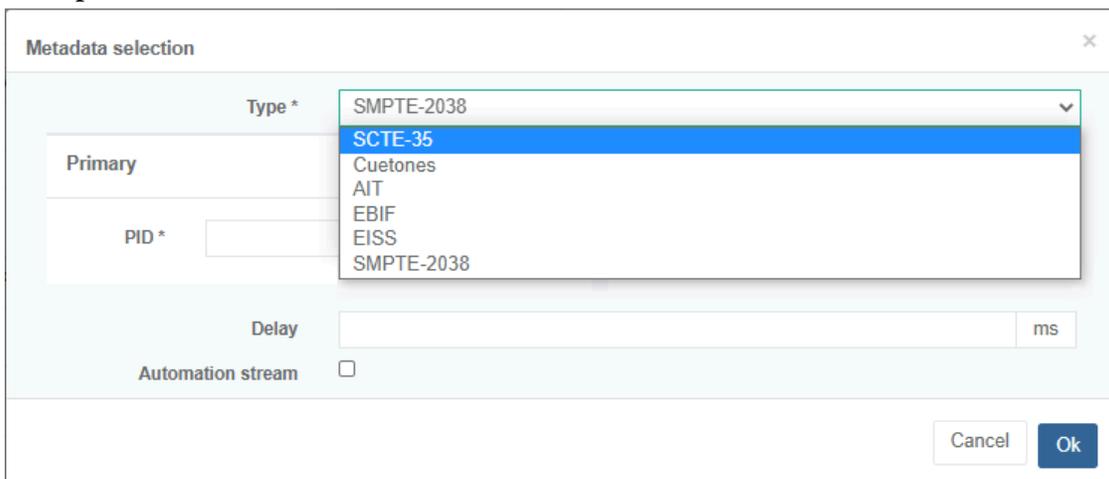
1. From the **Input** tab, go to the **Input streams selection > Metadata ID** section then click the **Add** button.



Result: The **Metadata selection** window displays.

2. Select a **Type**.

Example:



3. Enter or select the following information depending on the selected type:
 - a. Enter a **PID**.
 - b. Optional: If you selected **SCTE-35** type, you can apply a **Delay**.
 - c. If you selected **Cuetones** type, select the audio source that you previously created.
4. Click **Ok** to save.

Result:

- The in-band metadata stream is added to the list of metadata.
 - The in-band metadata is automatically added to the **Encoding** tab.
5. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Post Requisite:

- You can [configure the metadata encoding](#).
- You can [add the metadata to the output stream](#).

Related reference

[In-band metadata input parameters](#) on page 250

Configure out-of-band metadata input stream

There are different types of out-of-band metadata:

- The ESAM out-of-band signal interface allows an external module (typically a POIS) to send splice information to Encoding Live. The splice information is used by Encoding Live to generate SCTE-35 signals and/or ad markers in the output.
- The SCTE-104/IP out-of-band interface allows an external server to send SCTE-104 over IP messages to Encoding Live that converts them in SCTE-35 to enable stream conditioning actions.
- The ID3 out-of-band allows extracting the Nielsen watermark from the input audio stream, translate it to ID3 tags and output it enabling the monitoring of the audience of each channel distributed over the Internet.

To configure out-of-band metadata input stream, follow these steps:

NOTE In our example, we consider that you have selected an **MPEG-2 TS** input type.

1. From the **Input** tab, go to the **Out-of-band streams** section, click the **Add** button.
Example: **Edit service > Input > Out-of-band streams > +Add**
Result: The **Metadata selection** window displays.
2. Select a **Type**.

Figure 6. Example of configuration for SCTE-35 OOB metadata



NOTE **SCTE-35 OOB** can be used for automation () or when there is no SCTE-35 in the input.

3. Enter the appropriate values for the following parameter:
 - **Network name**
 - **Zone identity**
 - **ESAM server network interface**

4. Click **OK** to save settings and return to the service edition options.

Result: The metadata stream is added to the list.

NOTE If you selected **SCTE-35 OOB** metadata, Encoding Live ESAM out-of-band signal interface is now accessible from **http://<controller.ip>:8080/api/esam/LiveEncodings/<network_name>**.

5. Save your settings to continue or click **Exit** to quit without saving.
6. Optional: You can [configure the metadata encoding](#) and [add the metadata to the output stream](#).

Post Requisite:

For ESAM out-of-band, the POIS should perform an HTTP POST request to the following URL: **http://<controller.ip>:8080/api/esam/LiveEncodings/<network_name>**

where:

- controller.ip is the [IP address used to connect to the Controller](#).
- network_name is the unique acquisition point network name corresponding to the Encoding Live configuration to the input stream metadata.oob you create.

- NOTE**
- The body of the HTTP request should be an XML document containing a SignalProcessingNotification element as defined in the CableLabs Real-time Event Signaling and Management (ESAM) API (OC-SP-ESAM-API-I03-131025).
 - The acquisitionPointIdentity attribute of the SignalProcessingNotification element and/or the ResponseSignal element should match the **Network name** parameter.
 - If the ResponseSignal contains an AlternateContent element to trigger alternate content switching, the zoneIdentity attribute of the AlternateContent element should match the **Zone identity** parameter.

Related reference

[Out-of-band metadata input parameters](#) on page 251

Configure SCTE-35 out-of-band metadata input stream

To configure SCTE-35 out-of-band metadata input stream, follow these steps:

NOTE In our example, we consider that you have selected an MPEG-2 TS input.

1. From the **Input** tab, go to the **Out-of-band streams** section, click the **Add** button.

Example: **Edit service > Input > Out-of-band streams > +Add**

Result: The **Metadata selection** window displays.

2. Set the **Type** to **SCTE-35 OOB**.

Figure 7. Example of configuration for SCTE-35 OOB metadata

The screenshot shows a 'Metadata selection' dialog box with the following fields:

- Type ***: SCTE-35 OOB
- Network name**: SCTE-35 OOB
- Zone identity**: ID3 OOB
- Automation stream**:

Buttons: Cancel, Ok

NOTE SCTE-35 OOB can be used for automation () or when there is no SCTE-35 in the input.

3. Enter the appropriate value for the following parameters:
 - **Network name**
 - **Zone identity**
 - **ESAM server network interface**
4. Click **OK** to save settings and return to the service edition options.

Result: The metadata stream is added to the list.

NOTE If you selected SCTE-35 OOB metadata, Encoding Live ESAM out-of-band signal interface is now accessible from: http://<controller.ip>:8080/api/esam/LiveEncodings/<network_name>.

5. Save your settings to continue or click **Exit** to quit without saving.
6. Optional: You can [configure the metadata encoding](#) and [add the metadata to the output stream](#).

Related Information

[Configure blackout](#) on page 126

Configure SCTE-104/IP out-of-band metadata input stream

To configure SCTE-104/IP out-of-band metadata input stream, follow these steps:

NOTE In our example, we consider that you have selected an MPEG-2 TS input.

1. From the **Input** tab, go to the **Out-of-band streams** section, click the **Add** button.

Example: Edit service > Input > Out-of-band streams > +Add

Result: The **Metadata selection** window displays.

2. Set the **Type** to **SCTE-104 / IP OOB**.

Figure 8. Example of configuration for SCTE-104/IP out-of-band metadata



The screenshot shows a dialog box titled "Metadata selection" with a close button in the top right corner. The dialog contains the following fields and controls:

- Type ***: A dropdown menu with "SCTE104 / IP" selected.
- DPI PID index ***: A text input field containing "82".
- SCTE104 server network interface ***: A text input field containing "enp0s9".
- Automation stream**: A checkbox that is currently unchecked.

At the bottom right of the dialog, there are two buttons: "Cancel" and "Ok".

3. Enter the appropriate value for the following parameters:
 - **DPI PID index**
 - **SCTE-104 server network interface** (if not already configured in the **General** tab).
4. Click **OK** to save settings and return to the service edition options.
Result: The metadata stream is added to the list.
5. Save your settings to continue or click **Exit** to quit without saving.
6. Optional: You can [configure the metadata encoding](#) and [add the metadata to the output stream](#).

Related Information

[Configure SCTE-104/IP out-of-band metadata](#) on page 133

Configure the media processing

Configuring the video processing parameters

Configuring the video prefiltering

To configure the video prefiltering parameters, follow these steps:

1. From the **Media Processing** tab, click the arrow at the right of the **Video Pre Filtering** section.
Result: The video prefilters are displayed.
2. You can [configure the video prefilters](#).
3. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configuring the video adjustment parameters

To configure the video adjustment parameters, follow these steps:

1. From the **Media Processing** tab, click the arrow at the right of the **Video Adjustment** section.
Result: The video adjustment parameters are displayed.
2. You can configure the [video adjustment parameters](#).
3. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configuring the video colorimetry parameters

To configure the video colorimetry parameters, follow these steps:

1. From the **Media Processing** tab, click the arrow at the right of the **Video Pre Filtering** section.
Result: The video prefilters are displayed.
2. You can configure the video [colorimetry parameters](#).
3. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configuring image on frame freeze

To configure a default image that will be displayed in case of frame freeze, follow these steps:

1. From the **Media processing** tab, go to the **Freeze frame management** section.
2. Tick the **Activate** checkbox.
3. Set the appropriate value for each parameter:
 - **Type**
 - Depending on the selected **Type**, **Image** or **Image URL**
 - **Insertion delay**

4. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configuring the audio processing parameters

1. From the **Media Processing** tab, go to the **Audio processing** section.
Result: The audio processing parameters are displayed for each audio input.
2. Select the audio tab stream you want to configure then [set the appropriate value for each parameter](#).
3. Optional: You can [configure Watermarking](#).
4. Optional: You can [configure DTMF extraction](#).
5. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Related Tasks

[Configuring audio watermarking](#) on page 120

[Configuring DTMF extraction](#)

Configuring audio watermarking

1. From the **Media Processing > Audio processing** tab, go to the **Watermarking** section.
2. Select the watermarking type you want to activate by clicking .
3. Activate **Insertion** and/or **Extraction** by ticking **Enable**.
4. [Set the appropriate value for each parameter](#).
5. Click **Ok** to validate.
6. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configure the encoding

Configure the general encoding parameters

Before configuring the input stream general parameters, you must select the export type:

1. Select either **IP TV** or **Internet TV**.

The main purpose of **IP TV** is interlaced encoding, dedicated to TV (Progressive encoding is also a configuration to leverage true motion feature).

Codec presets are different between **Internet TV** and **IP TV** export types. Video quality is better with IP TV. We use closed GOP for chunking in Internet TV and open GOP in IP TV. These are the 3 main differences.

Result: Video, audio and metadata parameters and values may differ depending on the selected export type.

2. You can configure the video (see [Configuring the video encoding parameters](#)) and audio (see [Configure the audio encoding parameters](#) on page 124) encoding parameters.

Configure the video encoding parameters

To configure the video encoding parameters, follow these steps:

1. From the **Encoding** tab, go to the **Video encoding** section.
2. Select the export type: either **IP TV** or **Internet TV**.

NOTE Parameters and values may differ depending on the selected export type.

3. Click the **Add** button to create a video profile or click the edit button,  in the **Actions** column to configure an existing profile.
4. Enter the appropriate value for **Video encoding** parameters.
5. Expand the **Codec settings** section then enter the appropriate value for each parameter.
6. Expand the **Video processing** section then enter the appropriate value for each parameter.
7. Expand the **GOP settings** section then enter the appropriate value for each parameter.
8. Expand the **Aspect ratio** section then enter the appropriate value for each parameter.
9. Expand the **Stream metadata settings** section then enter the appropriate value for each parameter.
10. Expand the **Subtitle settings** section then enter the appropriate value for each parameter.
11. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Related Tasks

[Create a child encoding \(factorization\)](#) on page 122

[Configure HDR signaling conversion \(HEVC\)](#) on page 123

Editing the video encoding parameters

To edit the video encoding parameters, follow these steps:

1. Select the video stream you want to configure.
2. Click  in the **Actions** column.
3. You can start editing the [video encoding parameters](#).
4. You can create a [child encoding](#).
5. You can configure [HDR signaling conversion \(HEVC\)](#).
6. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Create a child encoding (factorization)

Prerequisites:

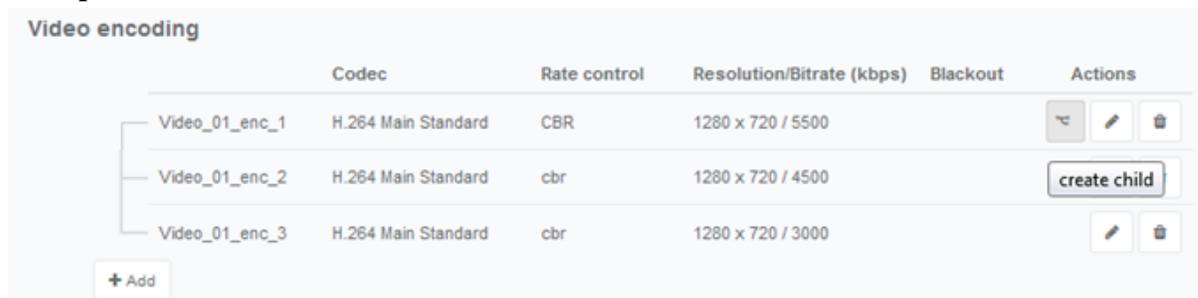
[You have created a video encoding stream](#). This main video stream will be considered as parent. MediaKind Encoding Live can factorize the encoding of ABR profiles that have the same resolution and frame rate: processing for parent and child encodings is mutualized to optimize CPU usage.

To create a child video encoding, follow these steps:

NOTE Child stream bitrates must be more than half of the parent bitrate.

1. Select the parent video stream you want to factorize.
2. Click  in the **Actions** column to create and configure a child encoding with the corresponding [target bit rate](#).

Example:



	Codec	Rate control	Resolution/Bitrate (kbps)	Blackout	Actions
Video_01_enc_1	H.264 Main Standard	CBR	1280 x 720 / 5500		 
Video_01_enc_2	H.264 Main Standard	cbr	1280 x 720 / 4500		create child
Video_01_enc_3	H.264 Main Standard	cbr	1280 x 720 / 3000		 

 + Add

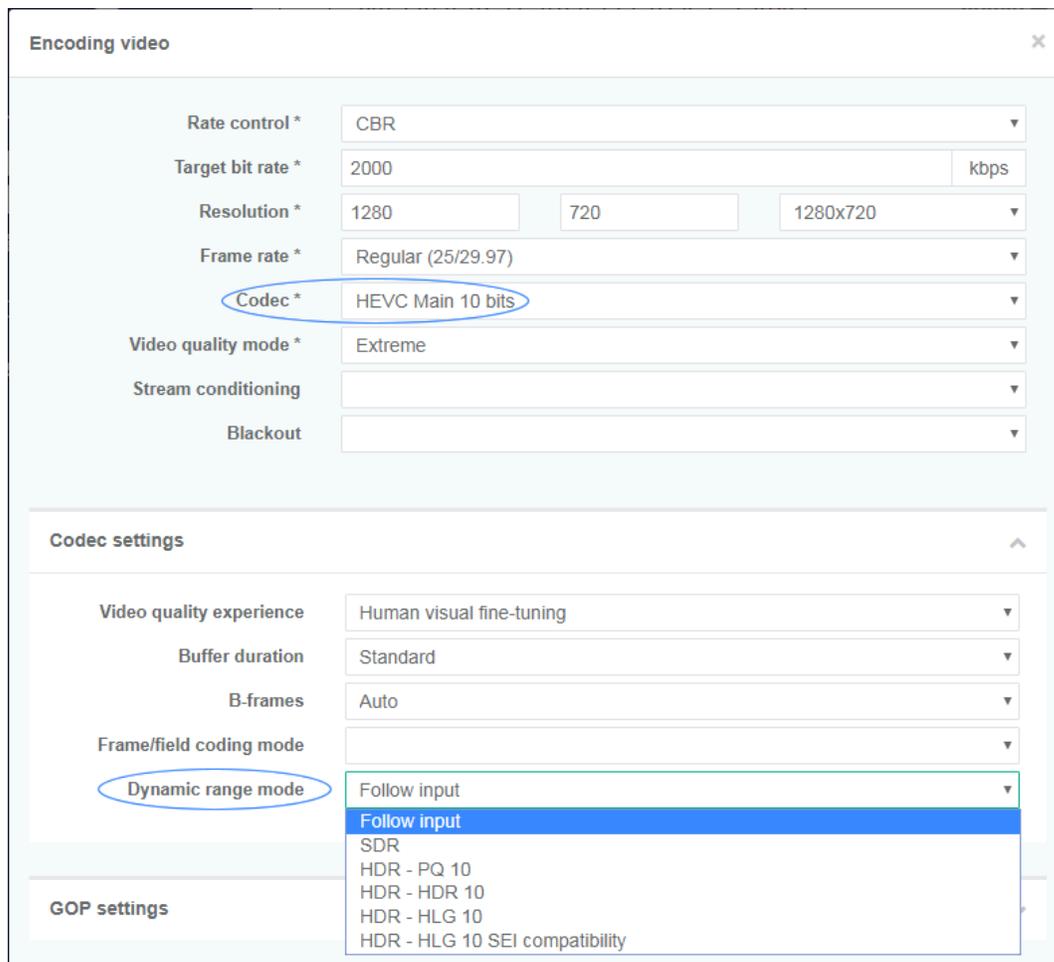
3. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configure HDR signaling conversion (HEVC)

You can configure HDR signaling conversion in the encoding options, or choose to keep the initial input 'as is' using the **Follow input** option.

1. [Display services](#).
2. Click the  icon to edit the service.
3. Open the **Encoding** tab then go to the **Video encoding** section and click **Add** to create and configure a video encoding or click  to edit an existing video stream.
4. Set the video codec to **HEVC main 10 bits**.
5. Expand the **Codec settings** section.
6. Configure the **Dynamic range mode** depending on your conversion requirements.

Result:



The screenshot shows the 'Encoding video' configuration window. The 'Codec' dropdown is set to 'HEVC Main 10 bits' and is circled in blue. The 'Dynamic range mode' dropdown is also circled in blue, and its menu is open, showing 'Follow input' as the selected option. Other settings include Rate control: CBR, Target bit rate: 2000 kbps, Resolution: 1280x720, Frame rate: Regular (25/29.97), Video quality mode: Extreme, and Video quality experience: Human visual fine-tuning.

7. Click **Ok**.
Result: **Encoding** page is displayed.
8. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configure the audio encoding parameters

Prerequisites:

Audio encoding parameters are only available if you defined an audio input from the **Input** tab.

1. Click **Add** to create a new audio encoding, or click  to edit an existing one.

Result: The **Encoding audio** window displays.

2. Select your audio **Codec** in the drop-down list.

IMPORTANT **Pass-Throughlets you receive an already encoded stream and forward it to the output.**

Result: Depending on the selected audio codec, different parameters may display.

3. Enter the appropriate value for [Audio encoding parameters](#) on page 271.
4. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configure subtitle encoding

Prerequisites:

You must have configured a subtitle input stream (see [Configure input subtitle selection](#) on page 112).

1. From the **Encoding** tab, go to the **Subtitle encoding** section.

2. Click **Add** to create a new subtitle processing configuration or click  to edit an existing one.

Result: The **Subtitles encoding** window is displayed.

3. Select the **Codec** to define how metadata is processed:⁽⁴⁾

- **Pass-through**
- **DVB subtitles**
- **DVB-Teletext**
- **Closed caption CEA 608**⁽⁵⁾
- **DVB-TTML**⁽⁶⁾

4. Depending on the selected codec, [specific parameters](#) must be configured.
5. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.
6. Optional: Add the conditioned metadata to the output stream (see [Selecting the output streams](#)).

Configure metadata encoding

Prerequisites:

You must have defined metadata encoding parameters (see [Configure in-band metadata input stream](#) on page 114 or [Configure out-of-band metadata input stream](#) on page 115).

1. From the **Encoding** tab, go to the **Metadata encoding** section.

4. Possible values depend on [subtitle type](#).

5. Only valid with both IP TV export type and 25i/50p to 29.97i/59.94p frame rate conversion.

6. Only valid with Internet TV export type.

- Metadata created from the **Input** tab has been already automatically created. You can click  to edit an existing one or click **Add** to create a new metadata encoding configuration.
Result: The **Encoded metadata selection** window displays.
- Select the **Codec** to define how metadata is processed.

Metadata input type	Possible values for Codec
<p>SCTE-35</p> <p>SCTE-35 OOB</p> <p>Cuetones</p>	<p>Pass-through or Conditioning</p> <ul style="list-style-type: none"> Select Pass-through to forward SCTE-35 information in dedicated output metadata track without video conditioning. <p>NOTE: For Automation (), metadata must be Pass-through.</p> <ul style="list-style-type: none"> Conditioning allows video stream conditioning and lets you define a POIS server. It can also be used in Blackout.
<p>AIT</p> <p>EBIF</p> <p>EISS</p>	<p>Pass-through</p>
<p>SMPTE-2038</p>	<ul style="list-style-type: none"> Pass-through Timecode ID3 Tissot clock metadata ID3 <p>NOTE: In Pass-through mode, you can specify the Max Bitrate on output. If the bitrate target is exceeded, an alarm is raised.</p> <p>NOTE: The Tissot metadata present in the SMPTE-2038 stream contains several game metadata (shot clock, scores, team names,...) sent individually in distinct PES packets. To ensure that the Tissot metadata is available for the clients/players, Encoding Live carries them into one ID3 stream (see Convert SMPTE 2038 to ID3).</p>

- Optional: If metadata is set to **Conditioning**, and if you want to define a POIS server, tick the **Use POIS** checkbox then set the appropriate value for each parameter:
 - [URL](#)
 - [Network interface](#)
 - [Network name](#)
 - [Zone identity](#)
- Optional: If metadata is set to **Conditioning** with a POIS server, and if you want to adjust the PTS to ensure that the SCTE-35 marker is equal to the PTS of the corresponding video frame, tick the **PTS insertion compensation** checkbox.

6. Optional: If metadata is set to **Conditioning** and if you want the encoder to retrieve the conditioning status after a failover thus ensuring internal POIS resiliency, tick the **Recover conditioning state if failover** checkbox.
7. Click **OK** to validate.
8. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.
9. Optional: You can specify the conditioned metadata in the video stream parameters (see [Video encoding parameters](#) on page 258).
10. Optional: You can add the conditioned metadata in the output stream (see [Selecting the output streams](#)).

Configure blackout

Configure an automated blackout

Encoding Live can blackout a program on SCTE-35 trigger and replace the video with a still image.

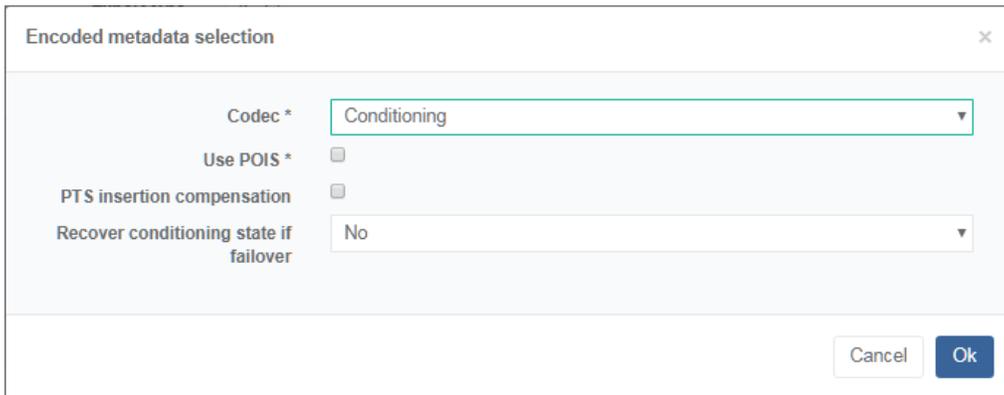
Prerequisites:

You must have configured the SCTE-35 metadata in the input stream. SCTE-35 metadata can be:

- either [in-band](#)
- or [out-of-band](#)

Creating a scheduled blackout requires multiple steps:

1. Go to the **Encoding** tab.
2. Configure the metadata encoding:
 - a. Go to the **Metadata encoding** section.
 - b. For each SCTE-35 metadata, click the edit button,  in the **Actions** column then set the **Codec** to **Conditioning**.



The dialog box titled "Encoded metadata selection" contains the following fields:

Codec *	Conditioning
Use POIS *	<input type="checkbox"/>
PTS insertion compensation	<input type="checkbox"/>
Recover conditioning state if failover	No

Buttons: Cancel, Ok

- c. Click **OK** to validate.

3. Configure the blackout encoding.
 - a. Go to the **Blackout configuration** section.
 - b. Click **Add** then configure a blackout configuration by selecting and setting the adequate [parameters](#).

Example:

Figure 9. Example of blackout configuration with SplieOutSpliceIn



The screenshot shows a dialog box titled "Blackout configuration" with a close button (X) in the top right corner. The dialog contains the following fields:

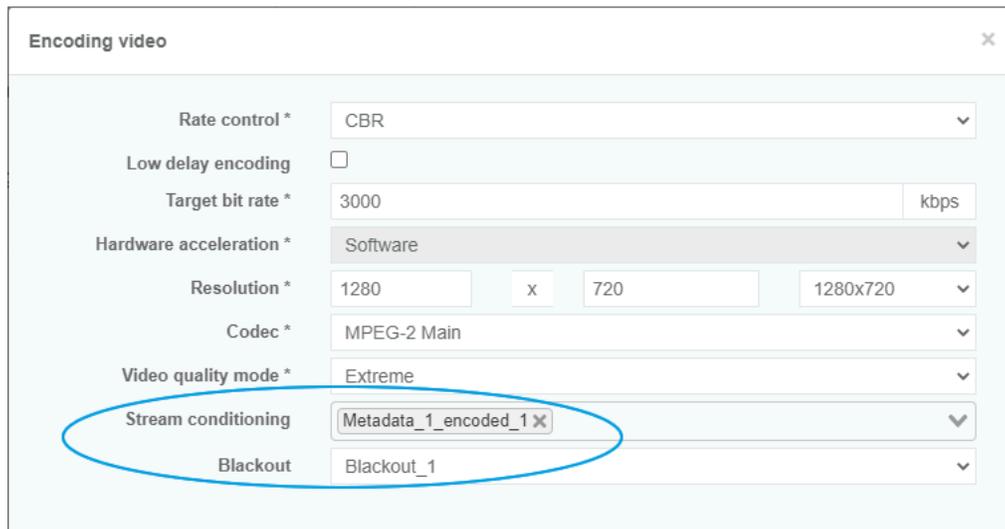
- Track SCTE-35 *: Metadata_1_encoded_1 (dropdown menu)
- Trigger *: spliceOutSpliceIn (dropdown menu)
- Timeout: 5000 ms (text input)
- Image URL: (empty text input)

An "Ok" button is located at the bottom right of the dialog.

- c. Click **OK** to validate.
4. Configure the video encoding:
 - a. Go to the **Video encoding** section.
 - b. For each video stream, select the associated [Stream Conditioning](#) and [Blackout](#) configuration.

Example:

Figure 10. Example of video configuration



The screenshot shows a dialog box titled "Encoding video" with a close button (X) in the top right corner. The dialog contains the following fields:

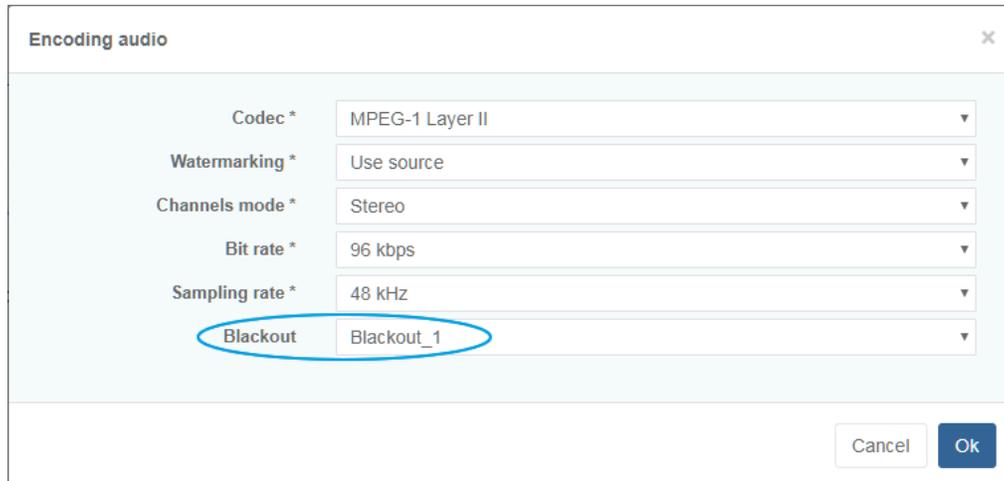
- Rate control *: CBR (dropdown menu)
- Low delay encoding:
- Target bit rate *: 3000 kbps (text input)
- Hardware acceleration *: Software (dropdown menu)
- Resolution *: 1280 x 720 (text inputs)
- Codec *: MPEG-2 Main (dropdown menu)
- Video quality mode *: Extreme (dropdown menu)
- Stream conditioning: Metadata_1_encoded_1 (dropdown menu, circled in blue)
- Blackout: Blackout_1 (dropdown menu)

- c. Click **OK** to validate.

5. Configure the audio encoding:
 - a. Go to the **Audio encoding** section.
 - b. For each video stream, select the associated **Blackout** configuration.

Example:

Figure 11. Example of audio configuration



The screenshot shows a dialog box titled "Encoding audio" with a close button (X) in the top right corner. It contains several configuration options, each with a dropdown menu:

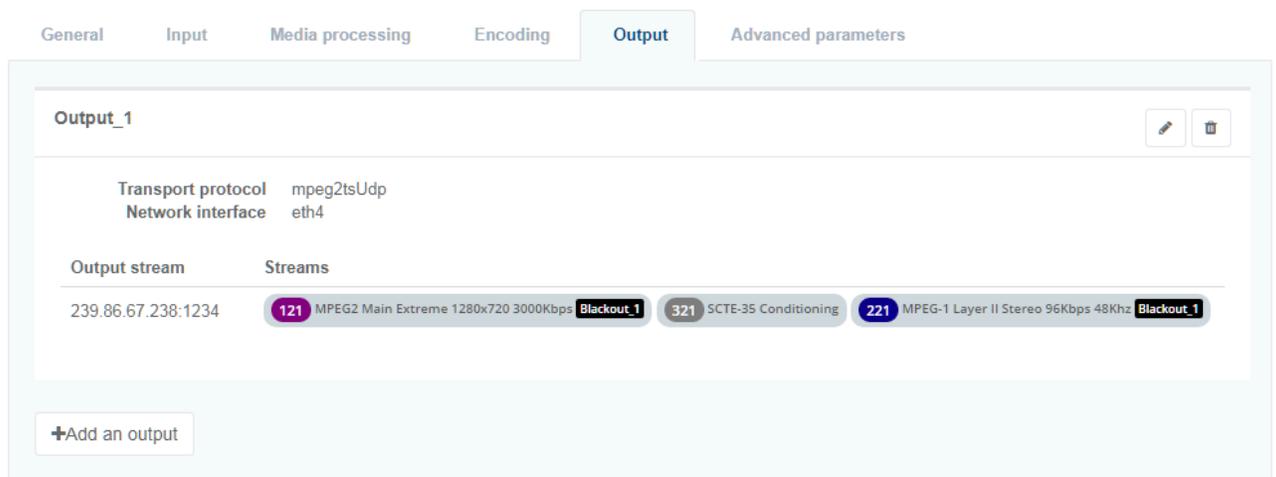
- Codec *: MPEG-1 Layer II
- Watermarking *: Use source
- Channels mode *: Stereo
- Bit rate *: 96 kbps
- Sampling rate *: 48 kHz
- Blackout: Blackout_1 (This dropdown is circled in blue)

At the bottom right, there are two buttons: "Cancel" and "Ok".

- c. Click **OK** to validate.
6. Optional: Open the **Output** tab to ensure that blackout is present in the output.

Example:

Figure 12. Example of output with blackout configured



The screenshot shows the "Output" configuration tab. At the top, there are tabs for "General", "Input", "Media processing", "Encoding", "Output" (selected), and "Advanced parameters".

The "Output_1" section has edit and delete icons. It shows:

- Transport protocol: mpeg2tsUdp
- Network interface: eth4

Below is a table of output streams:

Output stream	Streams
239.86.67.238:1234	121 MPEG2 Main Extreme 1280x720 3000Kbps Blackout_1 321 SCTE-35 Conditioning 221 MPEG-1 Layer II Stereo 96Kbps 48Khz Blackout_1

At the bottom left, there is a button labeled "+Add an output".

7. [Manually activate or deactivate a blackout](#) on page 132.

Create a scheduled blackout configuration

Encoding Live can blackout a program and replace the video with a still image. First create the blackout configuration, then configure to apply to video encodings.

Prerequisites:

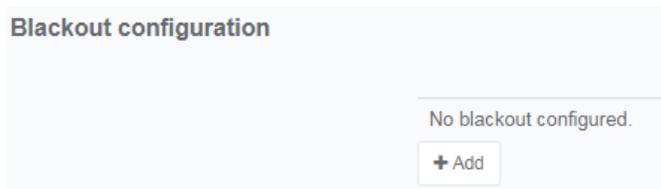
- A **Metadata input stream** must exist.

- Metadata processing must be set to **Conditioning** in **Metadata encoding** parameters.

NOTE Audio plays during blackout, unless you configure the blackout to mute audio.

1. [Display services](#).
2. Click  to edit the service.
3. Click the **Encoding** tab to display encoding options.
4. Scroll to **Blackout configuration** and click **+Add** to display parameters.

Example:

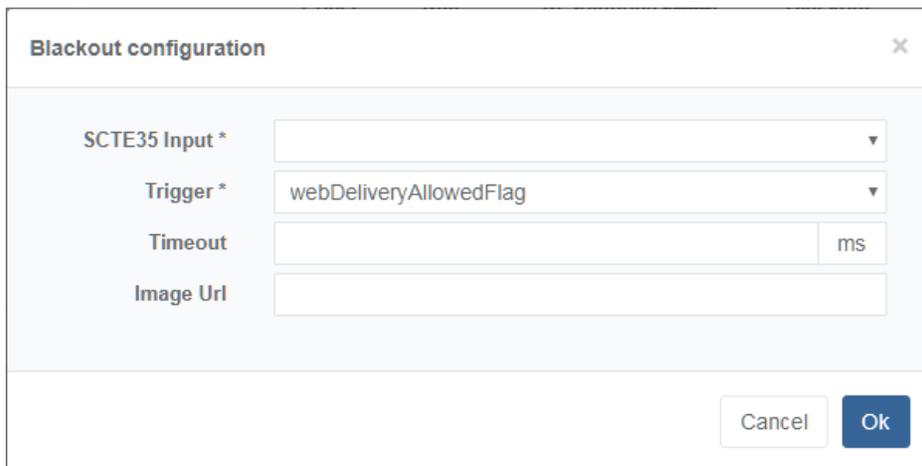


NOTE You can create multiple blackout configurations for a single service.

Result: The **Blackout configuration** options display.

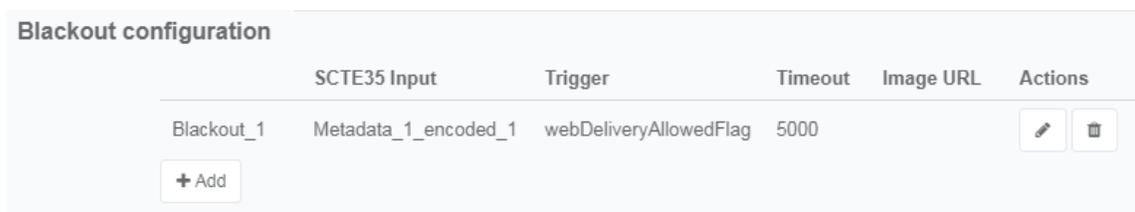
5. Configure the parameters, then click **OK** to save.

Example:



IMPORTANT If no **SCTE-35 Input** options display in the list then [reconfigure inputs](#).

Result: Blackout configurations display in the list.



6. Use the save options to save configurations.
7. Apply the blackout configuration to a [video](#) and/or [audio](#) encoding.

Apply a blackout configuration to video encodings

You can apply a blackout configuration per video encoding.

Prerequisites:

You have previously [created at least 1 blackout configuration](#).

RESTRICTION Blackout is **not supported in Pass-through**.

1. [Display services](#).
2. Click  to edit the service.
3. Open the **Encoding** tab, then click  to edit the video stream.
4. Select the blackout option.

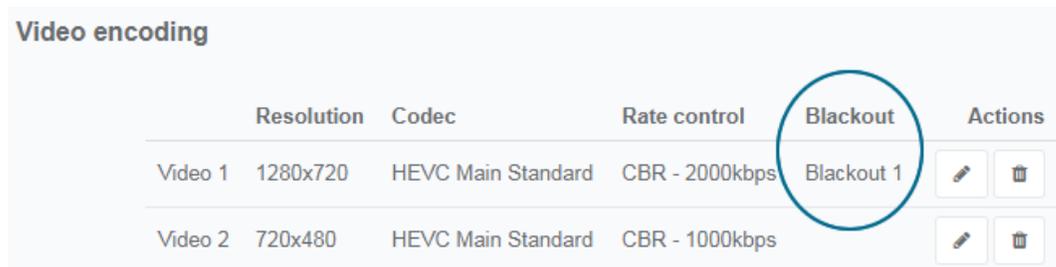
Example:



Result: All [previously created blackout configurations](#) display.

5. Check that the applied Blackout option displays for video encodings.

Example:



6. [Apply the blackout configuration to audio streams](#).
7. Optional: [Add encodings to output](#).
8. Use the save options to save configurations.
9. Ensure that [Blackout configurations are configured and applied](#) as expected.

Apply a blackout configuration to audio encodings

You can apply a blackout configuration per audio encoding.

Prerequisites:

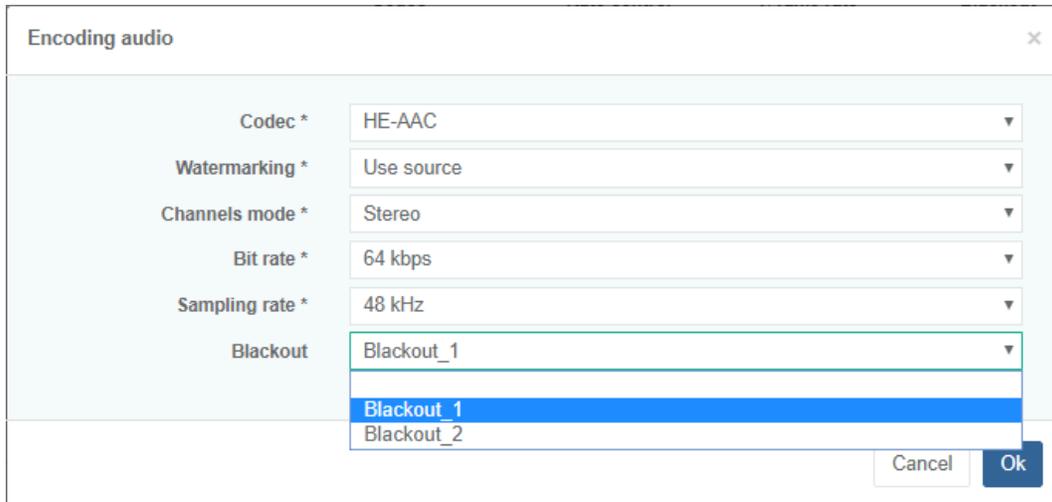
You have previously [created at least 1 blackout configuration](#).

RESTRICTION Blackout is **not supported in Pass-through**.

1. [Display services](#).

2. Click  to edit the service.
3. Open the **Encoding** tab, then click  to edit the audio stream, or **Add** a stream.
4. Click **Blackout** to display the list of [previously created blackout configurations](#), then select a blackout configuration to apply.

Example:



Encoding audio

Codec * HE-AAC

Watermarking * Use source

Channels mode * Stereo

Bit rate * 64 kbps

Sampling rate * 48 kHz

Blackout Blackout_1

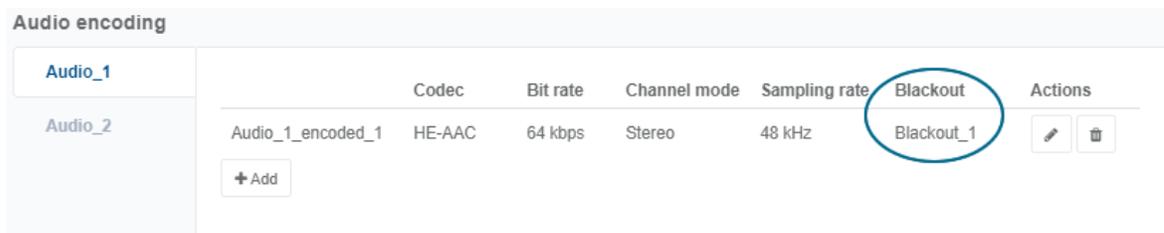
Blackout_1

Blackout_2

Cancel Ok

5. Click **OK** to save.
6. Check that audio encodings display in the list with the blackout tag displayed.

Example:



Audio encoding

Audio_1	Codec	Bit rate	Channel mode	Sampling rate	Blackout	Actions	
Audio_2	Audio_1_encoded_1	HE-AAC	64 kbps	Stereo	48 kHz	Blackout_1	 

+ Add

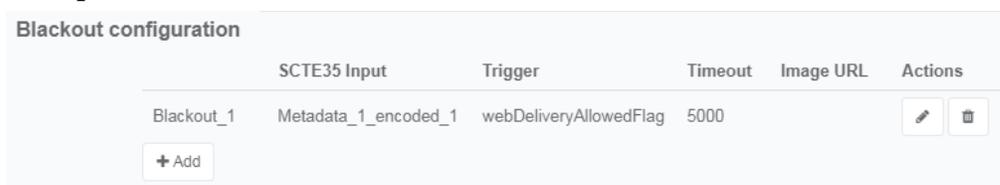
7. Optional: [Add encodings to output](#).

Check blackout configurations

Blackout configurations are first created, then applied to video and/or audio encodings. The encodings are then configured in an output stream. Check the overviews to ensure that blackouts are configured and applied.

1. [Display services](#).
2. Click  to edit the service.
3. Open the **Encoding** tab and ensure that any expected blackout configurations display in the list.

Example:



Blackout configuration

SCTE35 Input	Trigger	Timeout	Image URL	Actions
Blackout_1	Metadata_1_encoded_1	webDeliveryAllowedFlag	5000	 

+ Add

4. Check video and audio encodings to ensure that blackout configurations are applied as expected.
5. Open the **Output** tab to ensure expected video and audio encodings display in the list.

Example:

Output streams

Output stream	Streams
239.19.19.1:1234	121 HEVC Main - 1280x720 - 2000kbps Blackout 1
	122 HEVC Main - 720x480 - 1000kbps Blackout 2
	123 H.264 Main - 1280x720 - 3000kbps
	124 H.264 Main - 720x480 - 1500kbps
	221 HE-AAC v2 - 16kbps Blackout 2

6. Return to the list of services, or edit any parameters and then save.
7. From the list of services, click  to view statistics.
8. Ensure that blackout configurations display as expected in the **Statistics** page.

Example:

Blackout status	Blackout_1
Content occultation image status	loaded
Last web delivery allowed flag	true
Web delivery allowed count	0
Timeout count	0

Manually activate or deactivate a blackout

Once you have configured a [manual](#) or an [automated blackout](#) and started a service, you can manually activate or deactivate it.

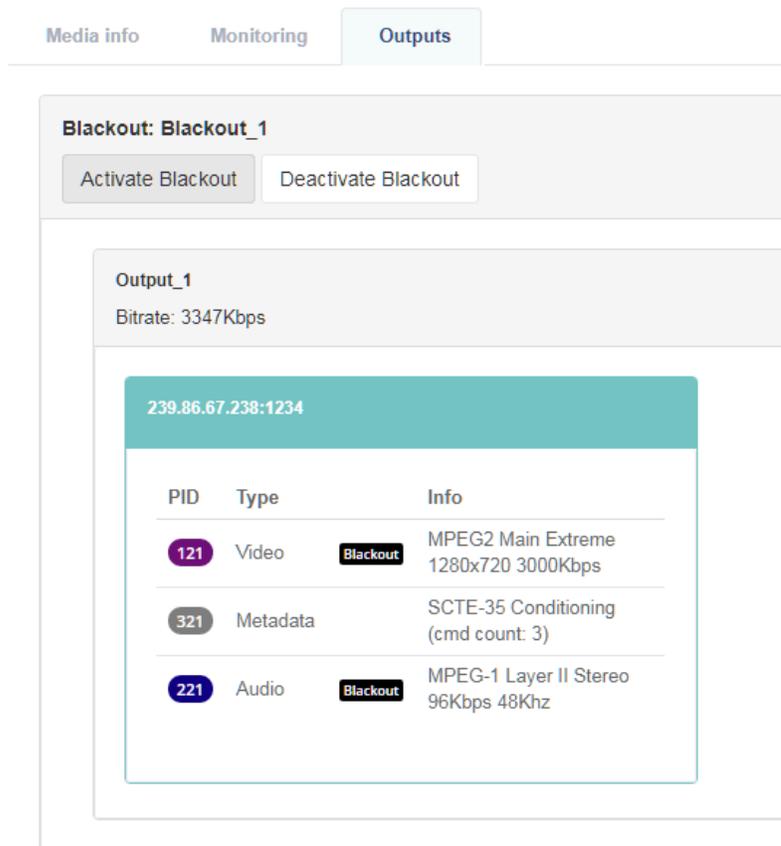
RESTRICTION Manual blackout activation/deactivation is only available if **Trigger** parameter is set to **spliceOutSpliceIn**.



The screenshot shows a 'Blackout configuration' dialog box with the following fields:

- Scte35 Input *: scte35_1
- Trigger *: spliceOutSpliceIn (circled in blue)
- Timeout: 5000 ms

1. Display statistics on **Outputs**.



2. Click the **Activate Blackout** button.
Result: A message informs you that the command has been sent.
3. Click **OK**.
Result: The current video is blacked out:
 - until the specified **Timeout** (if configured),
 - or by clicking the **Deactivate Blackout** button.

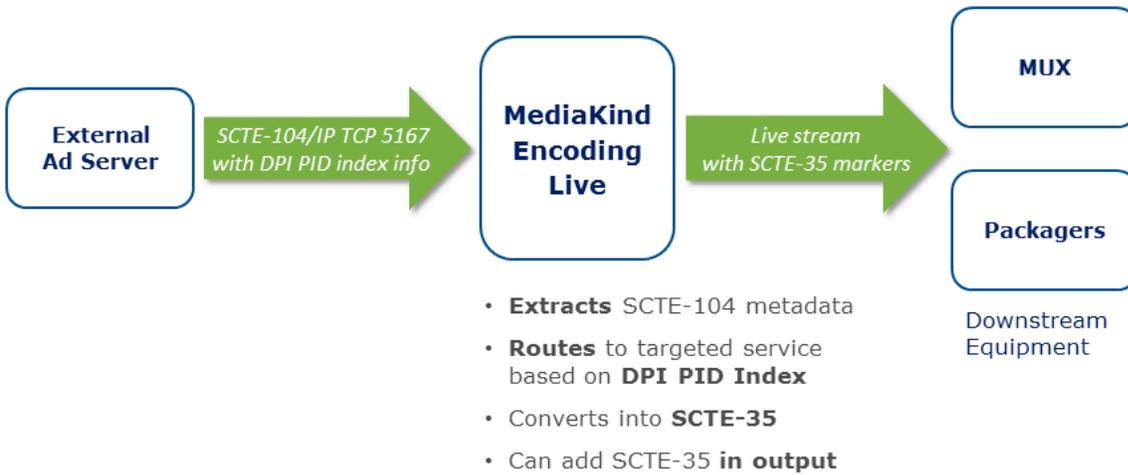
Configure SCTE-104/IP out-of-band metadata

Encoding Live supports out-of-band conditioning via SCTE-104/IP, on the same principle as ESAM.

- Encoding Live can receive conditioning triggers from an external server, using SCTE-104 over IP messages.

- Once received, SCTE-104 messages are decoded, sent to the targeted channel (based on DPI PID index) and converted in SCTE-35 in order to enable stream conditioning actions.

Figure 13. SCTE-104 out-of-band IP conditioning



Related Tasks

[Configure SCTE-104/IP out-of-band metadata input stream](#) on page 117

Related Information

[Configure SCTE-104/IP out-of-band metadata](#) on page 133

Configure SCTE-104/IP out-of-band metadata

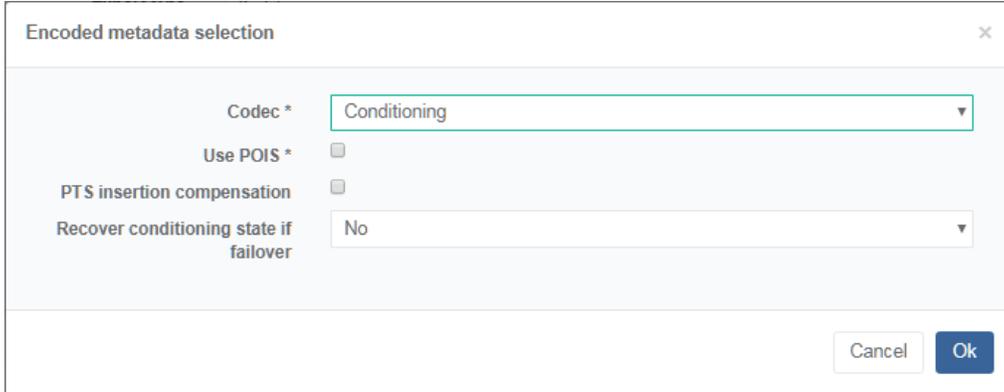
Prerequisites:

You must have added and configured the SCTE-104/IP out-of-band metadata in the input stream (see [Configure SCTE-104/IP out-of-band metadata input stream](#) on page 117).

Configuring SCTE-104/IP out-of-band metadata requires multiple steps:

1. Go to the **Encoding** tab.

2. Configure the metadata encoding:
 - a. Go to the **Metadata encoding** section.
 - b. For each SCTE-104/IP metadata, click the edit button,  in the **Actions** column then set the **Codec** to **Conditioning**.



Encoded metadata selection

Codec * Conditioning

Use POIS *

PTS insertion compensation

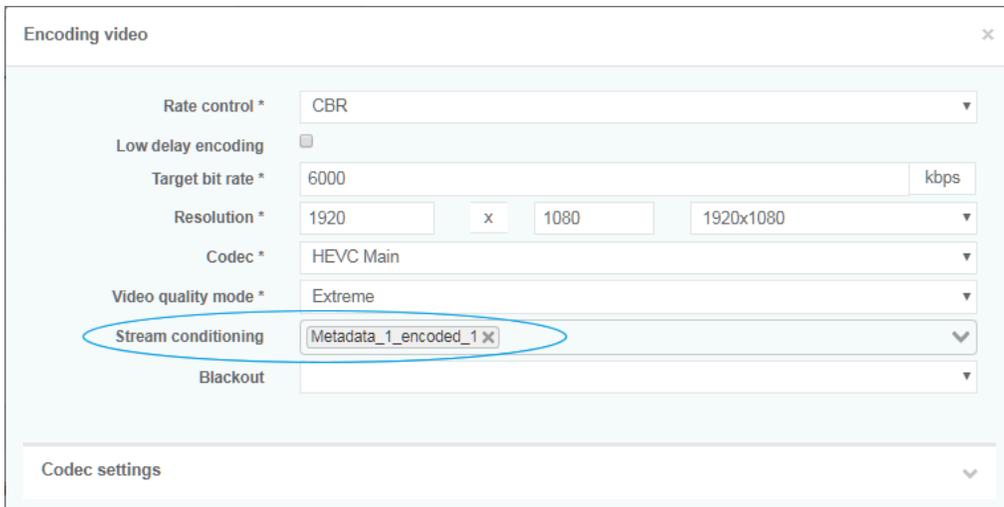
Recover conditioning state if failover No

Cancel Ok

- c. Click **OK** to validate.
3. Configure the video encoding:
 - a. Go to the **Video encoding** section.
 - b. For each video stream, select the associated **Stream Conditioning**.

Example:

Figure 14. Example of video configuration



Encoding video

Rate control * CBR

Low delay encoding

Target bit rate * 6000 kbps

Resolution * 1920 x 1080 1920x1080

Codec * HEVC Main

Video quality mode * Extreme

Stream conditioning Metadata_1_encoded_1

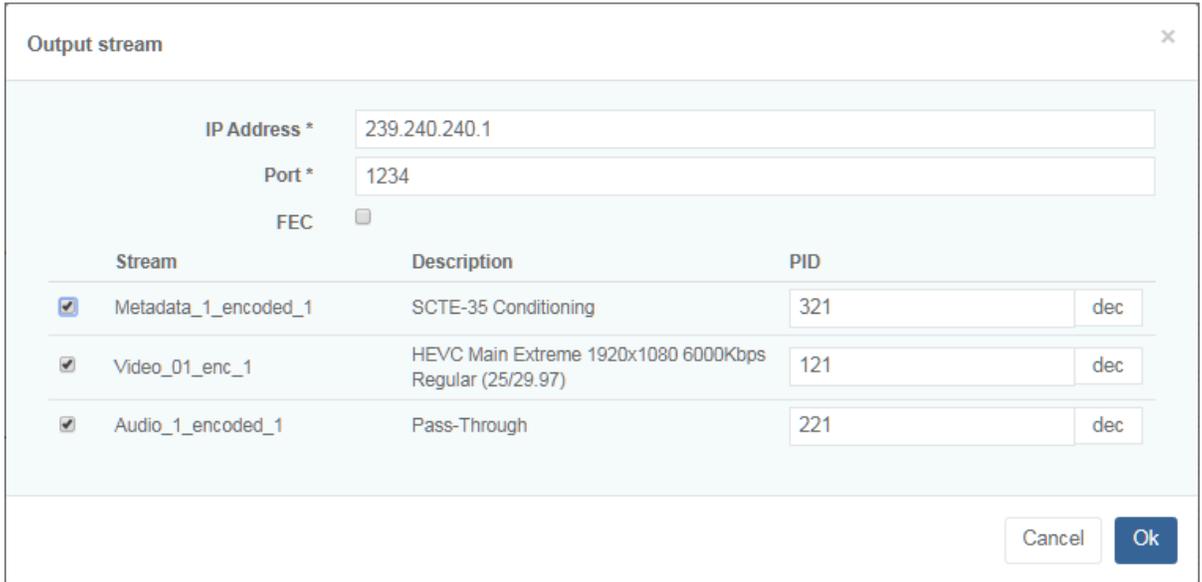
Blackout

Codec settings

- c. Click **OK** to validate.

4. Add the SCTE-35 conditioned stream related to the SCTE-104/IP to the output.
 - a. Go to the **Output** tab.
 - b. Go to the **Output streams** section, then click either the **Add** button (if no stream has been selected) or the edit button,  in the **Actions** column.
 - c. For each video stream, tick the associated **Stream Conditioning**.

Example:



Stream	Description	PID	
<input checked="" type="checkbox"/> Metadata_1_encoded_1	SCTE-35 Conditioning	321	dec
<input checked="" type="checkbox"/> Video_01_enc_1	HEVC Main Extreme 1920x1080 6000Kbps Regular (25/29.97)	121	dec
<input checked="" type="checkbox"/> Audio_1_encoded_1	Pass-Through	221	dec

- d. Click **OK** to validate.

Result: You should see the selected streams in the list of output streams.

Configure the output

Managing the output

You can configure several outputs.

Adding an output

To create an output you can either:

- Create a new one (see [Creating a new output from scratch](#)).
- Duplicate an existing one (see [Duplicating an existing output](#)).

Creating a new output from scratch

When connecting for the first time or if you want to add an output, you can create a new one from scratch.

To create an output, follow these steps:

1. From the **Output** tab, click the **Add** button.
Result:
A new output section is created.
2. Edit the general parameters (see [Configuring the output stream general parameters](#)), configure the MPEG-2 TS parameters (see [Configuring the output stream MPEG-2 TS parameters](#)) and select the output streams (see [Selecting the output streams](#)).
3. Click **OK** to save your modifications.
Result:
The new output is added in the output tab.

Duplicating an existing output

You can create an output by duplicating an existing one.

To duplicate an output, follow these steps:

1. Click the duplicate icon,  in the top right corner of the reference output.
Result:
A new output section is created with the same parameters as the reference output.
2. If needed, you can edit the output parameters (see [Configuring the output stream general parameters](#), configure the MPEG-2 TS parameters (see [Configuring the output stream MPEG-2 TS parameters](#)) and select the output streams (see [Selecting the output stream](#)).

Editing an output

Prerequisites:

An output exists.

NOTE If no output exists see [#unique_228](#).

1. [Display services](#) on page 168.
2. Click  to edit the service.
3. Click **Output** to open the tab and display outputs.
4. Click the  to display parameters and edit the output.

Result: The output parameters display.

NOTE Depending on your configuration type and settings, additional parameters may display.

5. Configure [General parameters](#).
6. Configure [MPEG-2 TS parameters](#).
7. Configure [Output streams](#): you can edit existing streams or click **Add** to create a new stream configuration.

Deleting an output

NOTE If deleted the stream is automatically removed from any outputs.

1. [Display services](#) on page 168.
2. Click **Output** to open the tab and to display options.
3. Click .

Result: A message asks you to confirm the deletion.

Configuring the output general parameters

1. [Display services](#).
2. Click  to edit the service.
3. Open the **Output** tab to display outputs.
4. Click  to edit the output parameters.
Result: The Output parameters display.
5. Configure the [General parameters](#).
6. Optional: With MPEG-2 TS output, you can configure the [Common MPEG-2 TS parameters](#).
7. Configure the [output streams](#).
8. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Configuring the output stream MPEG-2 TS parameters

To configure the output stream MPEG-2 TS parameters, follow these steps:

1. From the **Output** tab, click the arrow at the right of the **Common MPEG-2 TS parameters** section.
Result: The MPEG-2 TS parameters are displayed.
2. Enter the appropriate values for each [MPEG-2 TS parameter](#).
3. You can specify the streams that will be included in the output stream (see [Selecting the output streams](#)).
4. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

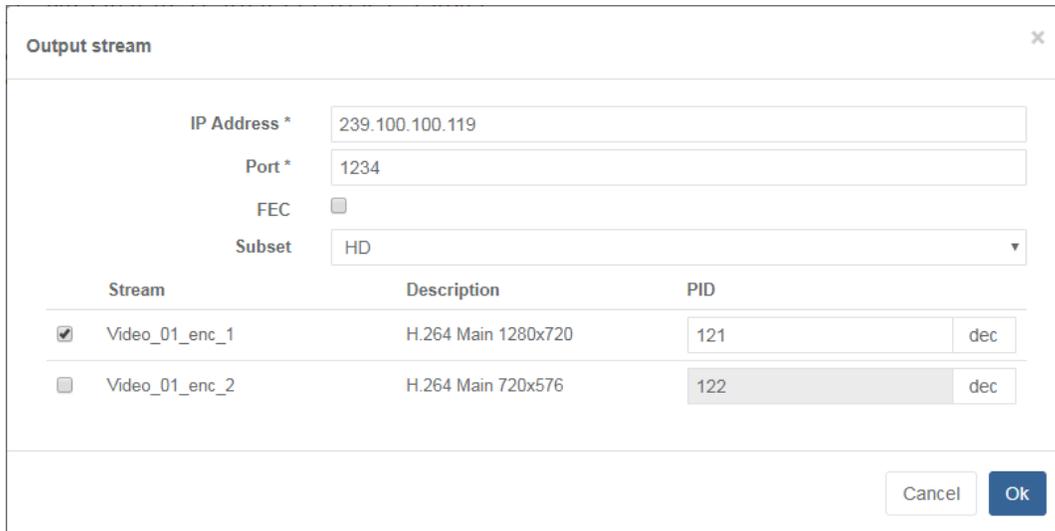
Create output streams

Prerequisites:

Input streams are configured.

1. [Display services](#).
2. Click  to edit the service.
3. Open the **Output** tab to display outputs.
4. Go to the **Output streams** section then click the **Add** button.

Result: Output stream parameters are displayed.



Stream	Description	PID
<input checked="" type="checkbox"/> Video_01_enc_1	H.264 Main 1280x720	121 dec
<input type="checkbox"/> Video_01_enc_2	H.264 Main 720x576	122 dec

5. Configure settings and select streams.
6. [Activate FEC](#) to display additional FEC options.
7. [Link the output to a predefined subset](#) to synchronize streams or to distribute the streams across multiple servers .
8. Select any video, audio or subtitle streams to [add to the output](#).
9. Click **Ok** to save.

Defining the output stream composition

Prerequisites:

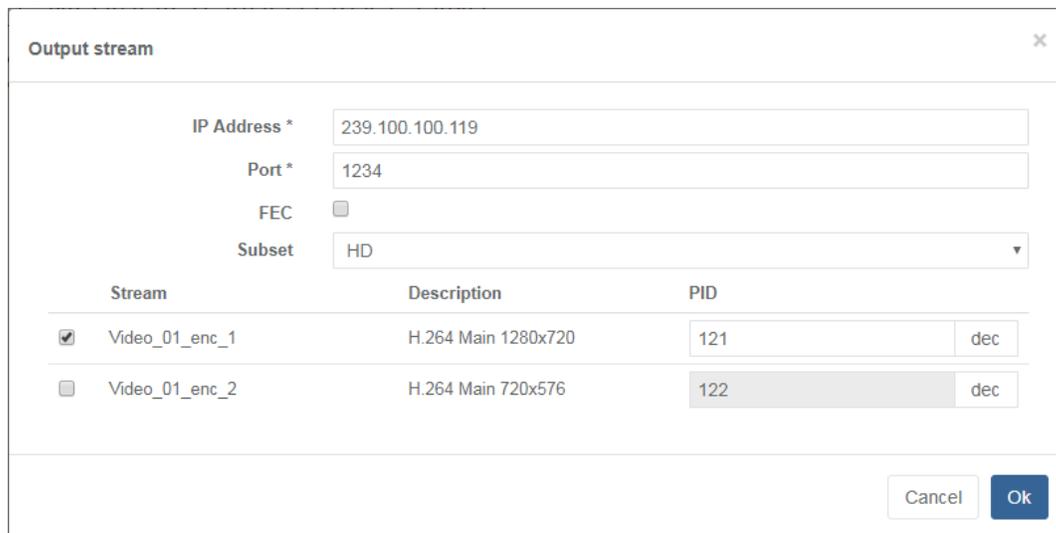
Input stream configurations are set.

You can specify the composition of the output stream by selecting the video, audio and private streams that will be sent to the output.

1. Display Services.
2. Click  to edit the service.
3. Click **Output** to open the tab and display output parameters.
4. Click  to edit the output.
5. Go to the **Output streams** section then click  to edit the output stream.

Example:

Figure 15. Output stream configuration



Stream	Description	PID
<input checked="" type="checkbox"/> Video_01_enc_1	H.264 Main 1280x720	121 dec
<input type="checkbox"/> Video_01_enc_2	H.264 Main 720x576	122 dec

6. Tick the check boxes to select the streams to include in the output:

- video
- audio
- subtitle
- metadata
- etc

NOTE

- Available streams depend on configured Inputs, Processing, and Encoding options.
- By default, one transport stream is defined using the first video stream and the first audio stream.

7. Click **Ok** to confirm.

Result: The output stream configuration is displayed in the output stream IP address and stream composition.

8. Click **Save and continue** to save your modifications and go to another tab or click **Save and exit** to save and finalize your service configuration.

Activate FEC on existing output streams

Prerequisites:

- A service exists.
 - Output [streams are configured](#).
1. [Display services](#).
 2. Click  to edit the service.
 3. Click **Output** to open the tab and display outputs.
 4. Click  to edit the output streams.
 5. Select the **FEC** check box to activate.
Result: Additional FEC parameters display.
 6. Enter [FEC parameters](#) and click **OK** to save.

Linking an output stream to a predefined subset

You can link an output stream to a subset. Once linked, these subsets can be used to synchronize streams or to distribute the streams across multiple servers.

Prerequisites:

- A service exists.
 - Output [streams are configured](#).
 - [Server subsets](#) are created.
1. [Display services](#).
 2. Click  to edit the service.
 3. Click **Output** to open the tab and display outputs.
 4. Click  to edit the output streams.
 5. From the **Subset** parameter, select an existing preset in the drop-down list.
Result: The output stream is linked to the selected subset.
 6. Click **Ok** to save.

CHAPTER 8

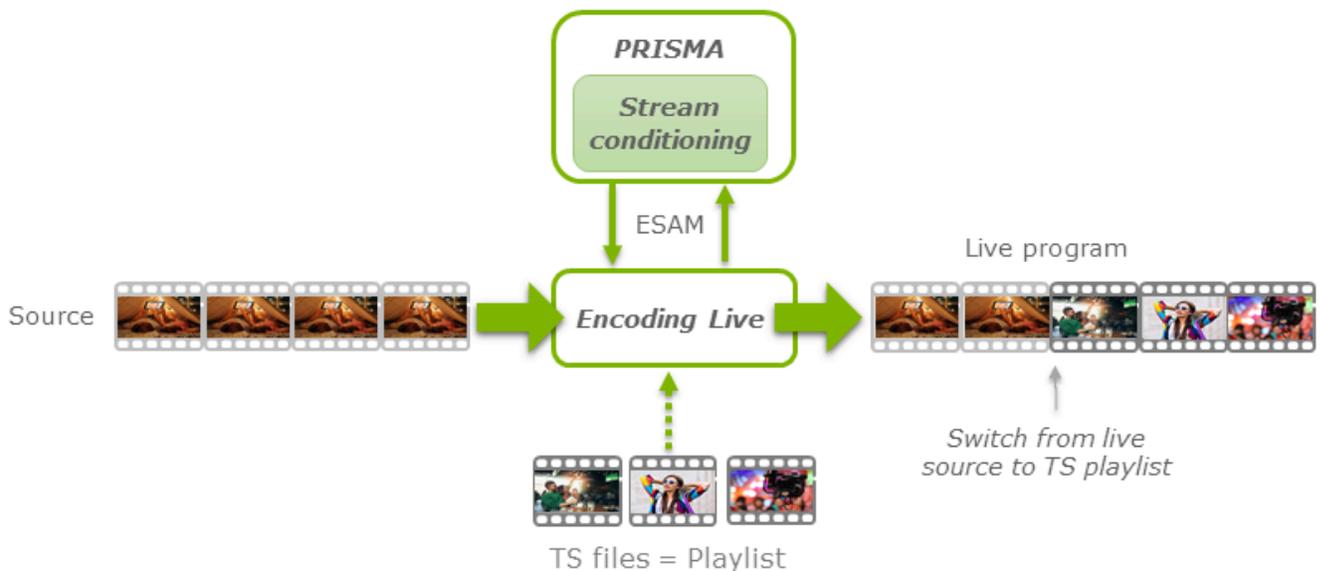
Configure switch to TS playlist

Overview and Scope

This use case is an example of how to configure the Encoder and PRISMA>Stream Conditioning to switch from a live source to a TS playlist.

The workflow is done according to the following principles:

1. PRISMA triggers alternate content/media composing actions to the Encoder using ESAM request.
2. Once performed, the Encoder returns a status back to PRISMA.
The configuration of expected actions is done within PRISMA.



The configuration of this use case is a 4-step procedure:

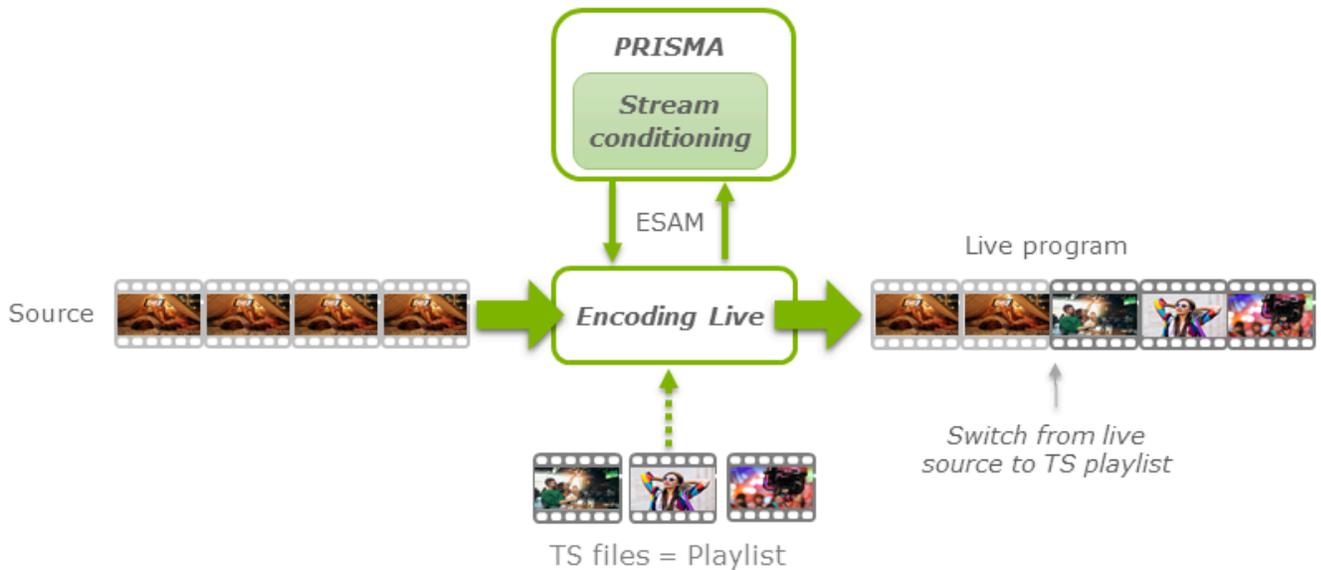
1. You copy your assets to the encoder in the **home/assets** directory.
2. You configure PRISMA to communicate with Encoding Live.
3. You configure an Encoding Live service.
4. You configure the switch event via PRISMA timeline.

NOTE This use case is an example configuration but you can fine tune these configurations as necessary.

Overview

This use case is an example of how to configure Encoding Live and PRISMA>Stream Conditioning to switch from a live source to a TS playlist.

The workflow is done according to the principles described in [Overview & Scope](#).



The configuration of this use case is a 4-step procedure:

1. You copy your assets to the encoder in the **home/assets** directory.
2. You configure PRISMA to communicate with Encoding Live.
3. You configure an Encoding Live service.
4. You configure the switch event via PRISMA timeline.

Copy your assets

Prerequisites:

You have created an asset directory on the encoder.

Copy the TS files to the following directory: **/tmp/mfvpel/assets**.

NOTE TS file format: MPG-2 TS files with only one program in the PMT, no MP4 files.

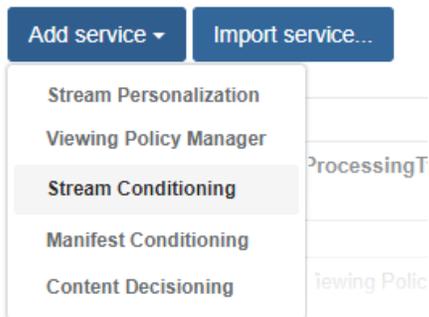
Prisma>Stream Conditioning configuration

The following section explains how to configure PRISMA>Stream Conditioning.

Prerequisites:

- You copied the assets to the encoder.
- You are connected to PRISMA with the necessary access rights.

1. Select **Services > Add service > Stream Conditioning**.



2. Enter a service name.
Result: Three tabs are displayed but we only need to configure the **Connections** tab.
3. Configure the **Connections** parameters:

Parameter	Value	Description
Type	ESAM	Protocol used to communicate with Encoding Live.
Version	2013	ESAM version: <ul style="list-style-type: none">• 2016 corresponds to specification OC-SP-ESAM-API-C01-161021• 2013 corresponds to specification OC-SP-ESAM-API-I03-131025• 2012 corresponds to specification OC-SP-ESAM-API-I01-120910
Expect notifications	Tick this checkbox.	When enabled, allows PRISMA to receive notifications from ESAM devices processing.

4. Create the end points:
 - a. From the **End points** section, click **Add**.
Result: A new window is displayed.
 - b. Enter the appropriate value for each parameter:

Parameter	Value	Description
ID	Auto	<p>Set to Auto by default. You can switch to Manual and specify and ID.</p> <p>Encoders or TS processors that will submit received SCTE-35 trigger to PRISMA must also configure the ESAM (PRISMA) endpoint. The general syntax is defined as follows: http://[prisma.controller.ip]:[prisma.controller.port]/api/esam/streamConditionings/[endPointID]</p> <p>Assuming that the controller managing PRISMA is located at the following IP/port: 192.168.1.10:8080, with a endPoint configured at PRISMA level named GAMEHD100, then, the ESAM endpoint to configure will be: http://192.168.1.10:8080/api/esam/streamConditionings/GAMEHD100.</p>
Network name	SwitchToTS	<p>Identifies the signal acquisition system at a specific site on a specific channel/network feed for all of the contained ResponseSignal.</p> <p>This information will be shared with Encoding Live.</p> <p>Must be the same value as the POIS network name in Encoding Live Automation parameters.</p>

Parameter	Value	Description
Zone identity	Zone1	<p>Allows receiving ESAM status notifications from Encoding Live. Encoding Live uses the ESAM status notification to tell PRISMA whether the operations were successfully applied or not.</p> <p>Must be the same value as the POIS zone identity in Encoding Live Automation parameters.</p>
Signal acquisitions	<code>http://10.86.78.207:8080/api/esam/LiveEncodings/SwitchToTS</code>	<p>This URL is the Encoding Live URL that will carry ESAM message for the specified encoder service.</p> <p>Syntax: http://[enc.controller.ip]:[enc.controller.port]/api/esam/LiveEncodings/[enc:network_name].</p> <p>The Listening path is used by the SAS End Point to return status notifications when signals are received from multiple acquisition points. it allows identifying which systems issued the response.</p> <p>Default value: listening path = / , <i>Example:</i> listening path = / encoder1</p>

Parameter	Value	Description
Attributes	Leave empty.	EndPoint attributes can be used for additional filtering in SCTE-224 input translations. It allows to apply the translation actions to specific endPoint(s). <i>Example: name = VIRD, value= NY</i>

NOTE Once you have defined the **Network name** and the **Zone identity**, you can now copy the ESAM end point.

- c. Click **Ok** to validate.

Result: The configured end point is added to the list of configured end points.

Create end point ✕

ID Auto

Network name *

Zone identity

Signal acquisitions *

URL	Listening path	Actions
<input type="text" value="http://10.86.78.207:8080/api/esam/Live"/>	<input type="text" value="/"/>	
+ Add		

Attributes

Name	Value	Actions
No attributes defined		
+ Add		

ESAM end point

Cancel
Ok

5. You should have the following configuration:

Home / Services / Sandrine

Connections | Input | Timings | Notification | Variables

Connection type * ESAM

Version * 2013

Expect notifications

End points *	ID	Network name	Zone identity	URL	Attributes	Actions
	st2110-eas_Zone1	st2110-eas	Zone1	http://10.86.78.207:8080/api/esam/LiveEncodings/SwitchToTS		

+ Add

Exit Save and continue Save and exit

6. Click **Save and exit** to save and finalize your service configuration and go back to the **Services** page.

7. Continue to [Encoding Live configuration](#) on page 151.

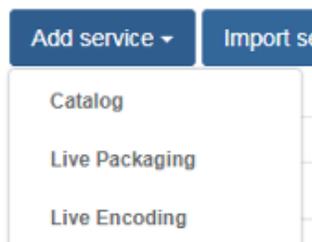
Encoding Live configuration

Configuring a Live encoding service is a 3-step procedure:

1. [Step #1: Create a Live encoding service](#) on page 151.
2. [Step #2: Configure the Live Encoding service](#) on page 151
3. [Step #3: Assign a server to run the service](#) on page 159

Step #1: Create a Live encoding service

1. Select **Services > Add service > Live encoding**.



Result: The service **General** tab is displayed.

2. Go to [Step #2: Configure the Live Encoding service](#) on page 151.

Step #2: Configure the Live Encoding service

To configure Encoding Live, follow these steps:

1. [Configuration of advanced parameters](#)
2. [Configure service general parameters](#) on page 151.
3. [Configure input parameters](#) on page 153.
4. [Configure encoding parameters](#) on page 158.
5. [Configure output parameters](#) on page 158.

Configure service general parameters

Prerequisites:

You have [created a Live encoding service](#).

1. From the **General** tab, enter a service name.
2. Enter the name of the **ESAM network interface** (in our example, we are using the management interface, **eno16780032**).

3. Tick the **Activate** checkbox to enable the **Automation** features then configure the parameters:

Parameter	Value	Description
Interface Type	ESAM	Protocol used with automation system.
POIS URL	<pre>http://10.86.89.140:8080/ api/esam/ streamConditionings/ SwitchToTS_Zone1</pre>	<p>URL on which Encoding Live will return status to PRISMA.</p> <p>http://<controllerVIP>:[prisma.controller.port]/api/esam/streamConditionings/[endPointID]</p> <p>[endPointID] corresponds to the ID of the Stream Conditioning service that you previously created on PRISMA.</p>
POIS network name	SwitchToTS	<p>ID shared with the POIS for the current channel.</p> <p>Same as the POIS network name in PRISMA Automation parameters.</p>
POIS zone identity	Zone1	<p>The area ID for this channel distribution. Commonly used for regionalization.</p> <p>Same as the Zone identity in PRISMA Automation parameters.</p>

Parameter	Value	Description
Assets directory	/tmp/mfvpel/assets	You can specify the directory where assets are stored. Must be an absolute directory path (starting by "/"). For logo and blackout files, an http url is also possible.

Result: You should have the following configuration:

The screenshot shows a configuration interface with several tabs: General, Input, Media processing, Encoding, Output, and Advanced parameters. The 'General' tab is active. Under the 'General' section, there are fields for 'Name *' (SwitchToTS), 'Template' (dropdown), 'Hardware acceleration (Intel QSV)' (checkbox), 'ESAM server network interface' (eno16780032), and 'SCTE-104 server network interface'. Under the 'Automation' section, there are fields for 'Activate' (checkbox), 'Interface Type *' (ESAM dropdown), 'POIS URL' (http://10.86.89.140:8080/api/esam/streamConditionings/SwitchToTS_Zone1), 'POIS network name' (SwitchToTS), 'POIS zone identity' (Zone1), and 'Assets directory' (/home/assets). A 'Synchronization' section is partially visible at the bottom.

4. Continue to [Configure input parameters](#) on page 153.

Configure input parameters

Prerequisites:

- [You have created a Live encoding service.](#)
 - [You have configured the General parameters.](#)
1. Open the **Input** tab to configure input according to your network configuration.
 2. Configure **General parameters**: Select **MediaComposer** for **Type**.

3. Configure the **Live source management** parameters:

REMEMBER You need to activate the **Live source management** parameters via advanced parameters (see [Configuration of advanced parameters](#)).

Parameter	Value	Description
Default service ID	TF1	<p>ID of the live content that will be used at the start of the service. The ID can be:</p> <ul style="list-style-type: none"> an existing ID: the live content can be selected from the list of existing IDs. If required, it can be directly modified via the 'Edit' button. a new ID: in this case, the live content can be created and configured either immediately via the 'Create' button, or later from the 'Settings>Live service lineup' menu. <p>NOTE: This ID is defined in the json file (see Create a lineup configuration file from the user interface).</p>
Default frame rate	24p	Default frame rate used when live input is not yet detected.

4. Configure the **File source management** parameters:

Parameter	Value in our example	Description
Auto Return to Live	Tick this checkbox.	<p>If checked, returns to live at end of the offline source playlist.</p> <p>NOTE: Unused in Switch to Live use case.</p>
Return to Live on error	Tick this checkbox.	<p>If checked, returns to live if offline source playlist cannot be loaded.</p> <p>NOTE: Unused in Switch to Live use case.</p>

5. Configure the **Sources**.

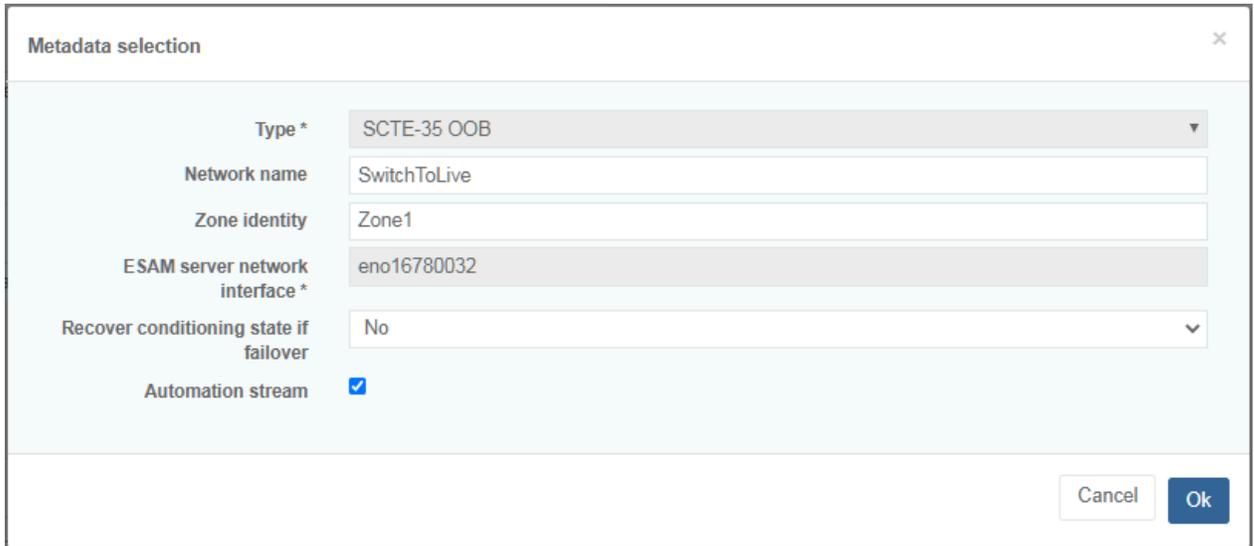
Parameter	Value	Description
Input redundancy	Select Active/Passive	Choose the redundancy settings: two modes can be set when two multicast sources (primary and secondary) are available. In active/passive mode, the passive source is idle and doesn't even join the multicast address or capture UDP packets. In active/active mode, both sources capture in parallel, provide statistics on transport and demux layers, but only one source is fully decoded at any given time.
Primary interface	eno16780032	Name of the input interface used to capture the input stream. NOTE: In our example, we are using the management interface.
Secondary interface	Leave empty.	Name of the input interface used to capture the input stream (secondary source). NOTE: Only necessary in case of Active/Active redundancy.

- a. Configure Audio and Video inputs.
- b. Configure the **Out of band stream** to receive information from PRISMA.

Parameter	Value	Description
Type	SCTE-35 OOB	Select the type of metadata.
Network name	SwitchToTS	Corresponds to the Acquisition Point Identity defined in the ESAM specification.
Zone identity	Zone1	Corresponds to the Zone Identity defined in the ESAM specification.
ESAM server network interface	Automatically filled with value specified in general parameters.	Network interface used for ESAM out-of-band messages applied to the entire service.
Recover conditioning state if failover	Leave to No	If "POIS" is selected, this options enables to keep the conditioning status after an encoder failover by asking to an external system NOTE: If "POIS" is selected, enter the POIS URL and network interface name.

Parameter	Value	Description
Automation stream	Tick this checkbox.	Activates Encoding Live out-of-band interface to communicate with PRISMA.

Result: You should have the following configuration for the metadata:



The screenshot shows a dialog box titled "Metadata selection" with a close button (X) in the top right corner. The dialog contains the following fields and controls:

- Type ***: A dropdown menu with "SCTE-35 OOB" selected.
- Network name**: A text input field containing "SwitchToLive".
- Zone identity**: A text input field containing "Zone1".
- ESAM server network interface ***: A text input field containing "eno16780032".
- Recover conditioning state if failover**: A dropdown menu with "No" selected.
- Automation stream**: A checkbox that is checked.

At the bottom right of the dialog, there are two buttons: "Cancel" and "Ok".

6. Click **OK** to validate.

Result: You should have the following configuration for the **Input** tab:

General **Input** Media processing Encoding Output Advanced parameters

General parameters

Type * MediaComposer

Input loss timeout 1000 ms

Source error management

Switch on ES data loss

Live source management

Default service ID TF1 +

Default frame rate * 24p

File source management

Auto return to live

Return to live on error

Sources

MPEG2 TS/UDP ^

Input redundancy * Active/Passive

Primary network interface * eno16780032

Secondary network interface

+ Add SMPTE ST 2110 source

Input streams selection ^ x

Video ID	Type	PID	Actions
Video_01	Video	auto	

Audio ID

Audio ID	Type	Selection type	Value	Actions
No audio selected.				

+ Add

Subtitle ID

Subtitle ID	Type	Selection type	Value	Max bitrate	Actions
No subtitles selected.					

+ Add

Metadata ID

Metadata ID	Type	PID	Delay	Source	Actions
No in-band metadata selected.					

+ Add

Out-of-band streams ^ x

Id	Type	Network name	Zone identity	Actions
Metadata_1	SCTE-35 OOB	SwichToTS	Zone1	

+ Add

7. Click **Save and continue** to save your modifications.
8. Leave the **Media processing** parameters unchanged.
9. Continue to [Configure encoding parameters](#) on page 158.

Configure encoding parameters

Prerequisites:

- You have [created a Live encoding service](#).
 - You have [configured the General parameters](#).
 - You have [configured the Input parameters](#).
1. From the **Encoding** tab, create the following streams:
 - ABR video stream
 - Audio stream
 - Metadata stream
 2. Click **Save and continue** to save your modifications.
 3. Continue to [Configure output parameters](#) on page 158.

Configure output parameters

Prerequisites:

- You have [created a Live encoding service](#).
 - You have [configured the General parameters](#).
 - You have [configured the Input parameters](#).
 - You have [configured the Encoding parameters](#).
1. Open the **Output** tab then click **Add an output**.
 2. Configure the **General parameters** according to your network configuration:

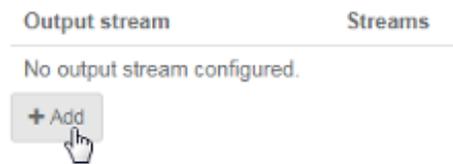
NOTE Certain Live Encoding parameters are related to the configuration of Live Packaging services.

 - a. Check that **GOP signaling** is set to **EBP based** to be compliant with Live Packaging.
 3. Leave the **Common MPEG-2 TS parameters** unchanged.

4. Configure the **Output stream** for this service:
 - a. Scroll to **Output streams**, then click **Add**.

Example:

Output streams



- b. Configure the output stream:
 - **IP Address:** Address to output the stream
 - **Port:** Port number to stream on
- c. Select the encodings to include in the output stream:
 - Video encoding for this output stream
 - At least one audio encoding
 - Metadata encoding

Result: You should have the following configuration:

Output stream ×

IP Address *

Port *

FEC

Stream	Description	PID	
<input checked="" type="checkbox"/> Metadata_1_encoded_1	SCTE-35 Pass-Through	<input type="text" value="321"/>	<input type="text" value="dec"/>
<input checked="" type="checkbox"/> Video_01_enc_1	HEVC Main Extreme 1920x1080 6000Kbps Regular (25/29.97)	<input type="text" value="121"/>	<input type="text" value="dec"/>
<input checked="" type="checkbox"/> Audio_1_encoded_1	Pass-Through	<input type="text" value="221"/>	<input type="text" value="dec"/>

- d. Click **OK**.
5. Click **Save and exit** to save and finalize your service configuration and go back to the **Services** page.
 6. Continue to [Step #3: Assign a server to run the service](#) on page 159.

Step #3: Assign a server to run the service

1. Display services.
2. Click the field in the **Mandatory** column to display available servers.

3. Enter a server name or select a server from the list, then repeat for each service to run.
4. Start the service.
5. Optional: Click  to display service details and to monitor the service.
6. Continue to [Create a switch to TS playlist operation via the timeline](#) on page 161.

Create a switch to TS playlist operation via the timeline

Once you have configured PRISMA>Stream Conditioning and Encoding Live, you can configure the switch to TS operation(s) that can be applied to the timeline.

In our example, we will now create an operation with a playlist that includes three video clips.

1. From PRISMA, display the Stream Conditioning service that you created.
2. Click  in the **Actions** column.
3. From the **Video clip** tab, click **Add**.

4. Configure the operation:

- a. Enter a name and set the **Scheduling mode** to **All**.
- b. Click **Add** then enter the **Material ID** (name of the TS file), the **Duration** and optionally the **Start offset**.
- c. Repeat the previous step to add the additional video clips to your playlist.

Example:

Create video clip operation ✕

Name *

Scheduling mode * All ▾

Operation ESAM properties

Type * Video clip ▾

Clips *

Material ID	Duration		Start offset		Actions
<input type="text" value="Myvideo.TS"/>	<input type="text" value="40"/> sec		<input type="text" value=""/>	sec	
<input type="text" value="Myvideo2.TS"/>	<input type="text" value="50"/> sec		<input type="text" value=""/>	sec	
<input type="text" value="Myvideo3.TS"/>	<input type="text" value="50"/> sec		<input type="text" value=""/>	sec	

+ Add

Cancel Save

- d. Click **OK** to validate.

Result: The operation is added to the list of video clips:

Alternate content SCTE-35 Slate Image overlay Animation Video clip

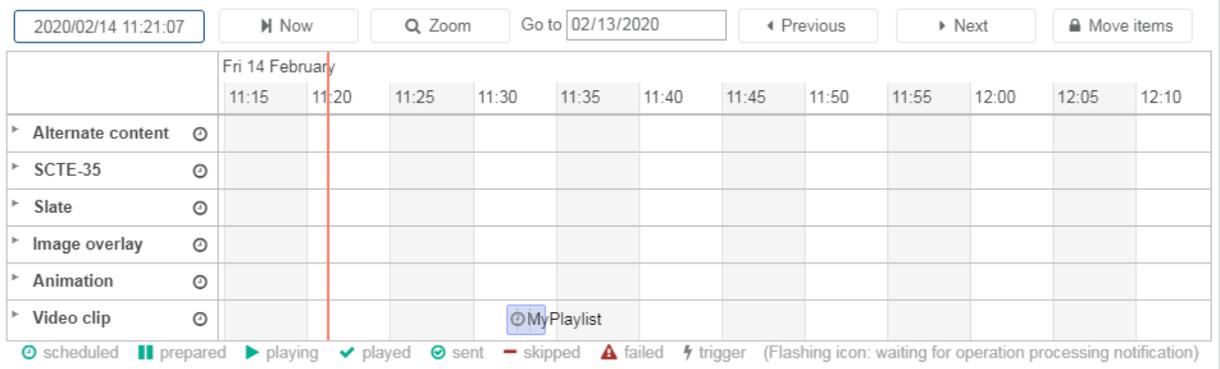
Name	Description	Actions	Schedule
MyPlaylist			

+ Add

- Click  in the **Schedule** column next to the **MyPlaylist** operation to set the date and time from the **Scheduling** tab.

NOTE You can also just drag and drop the  in the timeline.

Result: The operation is added to the timeline.



2020/02/14 11:21:07 Now Zoom Go to 02/13/2020 Previous Next Move items

	Fri 14 February											
	11:15	11:20	11:25	11:30	11:35	11:40	11:45	11:50	11:55	12:00	12:05	12:10
▶ Alternate content 												
▶ SCTE-35 												
▶ Slate 												
▶ Image overlay 												
▶ Animation 												
▶ Video clip 												

 scheduled
  prepared
  playing
  played
  sent
  skipped
  failed
  trigger
 (Flashing icon: waiting for operation processing notification)

At the scheduled time, the live channel will switch to the TS playlist.

- Optional: You can double click the event in the timeline to view of modify it.

CHAPTER 9

Manage Solutions

Manage input redundancy

Configure secondary transport stream input

For each service it is possible to set up a 'Primary' and 'Secondary' (backup) input.

Switching to secondary (backup) servers is controlled via the Redundancy Mode GUI element.

The following redundancy modes are supported:

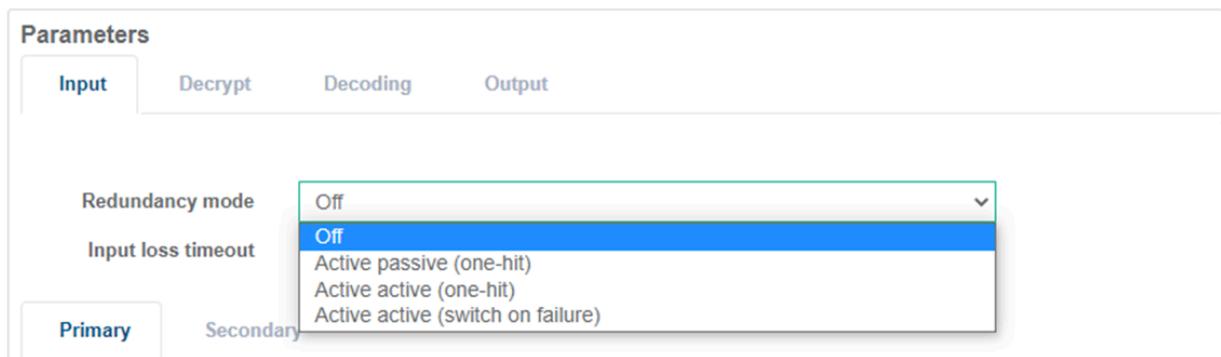
Redundancy mode	Description
Off	<p>The service only uses the primary input.</p> <p>It is not possible to use the secondary input automatically or manually.</p>
Active passive (one-hit)	<p>If the primary input fails, the service will make a one-shot switch to the secondary input.</p> <p>If the secondary input is required, it must be started so an automatic switch to secondary input is slower than Active active (one-hit) mode.</p> <p>The switch to secondary input will occur regardless of whether the secondary input is valid. Once switched to secondary input manual intervention is required to revert to primary input.</p> <p>The user may manually switch between primary and secondary inputs at any time.</p>
Active active (one-hit)	<p>If the primary input fails, the service will make an automatic one-shot switch to the secondary input.</p> <p>The secondary input runs continuously in active active (one-hit) mode, so a switch to the secondary input is faster than active passive (one-hit) mode.</p> <p>The automatic switch to secondary input will occur regardless of whether the secondary input is valid. Once switched to secondary input manual intervention is required to revert to primary input.</p> <p>The user may manually switch between primary and secondary inputs at any time.</p>

Redundancy mode	Description
Active active (switch on failure)	<p>If the current input (primary or secondary) fails, the service will switch to the alternate input.</p> <p>Both primary and secondary inputs are always running so an automatic switch between inputs is as fast as active active (one-hit).</p> <p>The automatic switch to the alternate input will occur regardless of whether the alternate input is valid.</p> <p>Once a valid input is found no automatic input switching will occur unless the current input becomes invalid.</p> <p>The user may manually switch between primary and secondary inputs at any time.</p>

NOTE Depending on the hardware installed, the same input options (IP, ASI or Satellite) with the same configuration parameters are available for the secondary input as the primary input.

1. [Display Services](#).
2. Click the Edit icon, .
3. Set the **Redundancy mode** to **Off**, **Active Passive (one hit)**, **Active active (one hit)**, **Active active (switch on failure)**.

Example:



4. Set the **Signal loss timeout** to the amount of time from when an input error is detected before the RX1 attempts to switch to the secondary.

NOTE If the input error is cleared before the end of the signal timeout, the redundancy switch is aborted and the service will continue to use the primary input.

5. Select the **Secondary** tab to configure the parameters.
6. Click **Save and continue** to save your modifications.

Result: A secondary input is configured to provide a backup input source if the primary source fails.

NOTE A 20-second delay occurs from the moment you save in order to initialize the redundancy configuration. Any loss of input or alarms raised on the primary input during this time does not cause a switch.

Manually switch between primary and secondary inputs

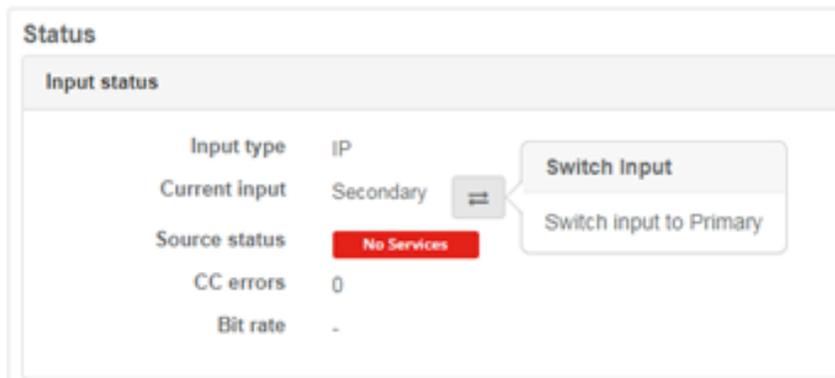
You can trigger a switch manually between the primary and secondary inputs if the input status shows good health.

Prerequisites:

The service is configured with **Redundancy Mode** set to **Active Passive**.

1. [Display Services](#).
2. Click the Edit icon, .
3. Click  to switch the input source.

Example:



Manage services

Display services

Services are listed in a table and are associated to a specific processing type. Service parameters and options depend on the processing type.

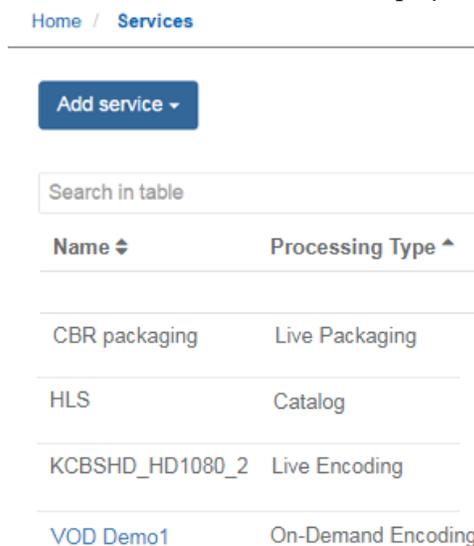
Prerequisites:

At least one service is configured.

1. Click [Services](#) in the left-side menu panel.

TIP The **Services** page is also available from **Home > Services**.

Result: The table of services displays.



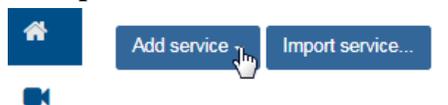
2. Optional: Edit the number of [rows displayed](#) or use the [search bar](#) to filter the display.

Create a service

Service configurations vary per processing type. See the specific product user guide for detailed information about service creation.

1. [Display services](#).
2. Click **Add Service**.

Example:



3. Select a [processing type](#).

Result: The service parameter options display.

4. Configure the service parameters.

IMPORTANT Parameters vary per [processing type](#).

5. [Assign a server](#) to the service.

NOTE Multiple servers may be assigned to a same service.

6. Use the buttons in the action column to [start](#) or [stop](#) the service.

Assign a server to run the service

Services require a server to run. Select a server for each service before starting the service.

NOTE For failover configurations:

- Failover only applies to certain processing types and configurations.
- Inactive backup servers (in a failover group) cannot be assigned to run a service.
- A primary server (in a failover group) that is in failover, meaning that a backup server has taken over and it is no longer running services, cannot be assigned to run services.

1. [Display services](#).
2. Click the field in the **Mandatory** column to display available servers.
3. Enter a server name or select a server from the list, then repeat for each service to run.
4. Optional: Enter a server name or select a server from the list for each **Optional** resource.

Example: This configuration below is an example and may not apply to all processing types.

Processing Type	Stats	Alarms	Resources		
			Split	Mandatory	Optional
Catalog					
Live Packaging				<input type="text" value=""/>	<input type="text" value="Choose a server to run ..."/>
Catalog				<ul style="list-style-type: none">mfvpp-mkt-el6mfvpp-mkt-el7	
Vod Packaging					

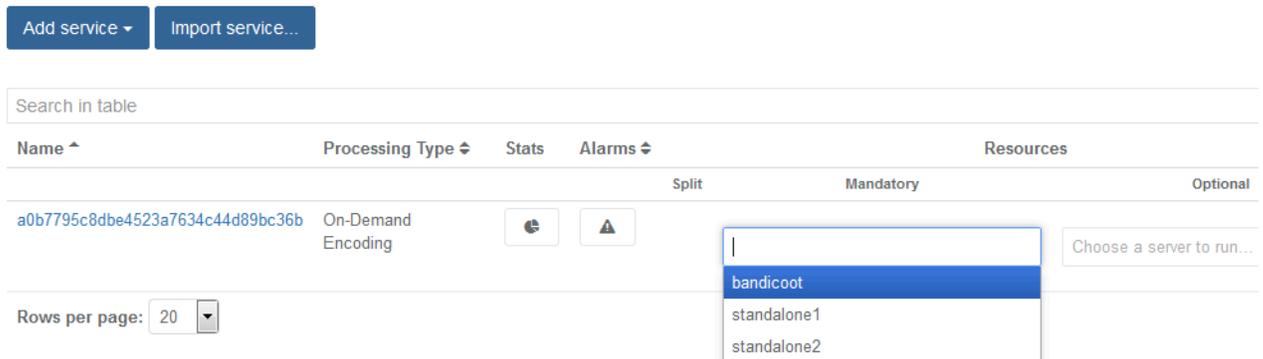
NOTE The service first attempts to run on the server resource defined in the mandatory column. The optional resource is used if server failure occurs, or if specific processing conditions require additional servers. For example, an optional resource may be used if a Live Encoding service type is configured for ABR split.

5. Optional: Click to display service details and to monitor the service.
6. Optional: Start the service.

Assign additional servers to a service

You can assign additional servers to a service to help with load balancing. Encoding services are launched on the primary server. When used with multiple servers, job are allocated on servers depending on their CPU usage.

1. [Display services.](#)
2. Enter a server name or select a server from the list, then repeat for each service to run.
Example: This configuration below is an example and may not apply to all processing types.



NOTE The service runs processes on the first server in the pool. Then, uses any additional resources in the pool job depending on their CPU usage.

3. Optional: Click to display service details and to monitor the service.
4. Optional: Start the service if it is not currently running.

Unassign a server from a service

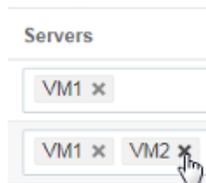
Services require a server to run. Select a server for each service before starting the service.

NOTE For failover configurations:

- Failover only applies to certain processing types and configurations.
- Inactive backup servers (in a failover group) cannot be assigned to run a service.
- A primary server (in a failover group) that is in failover, meaning that a backup server has taken over and it is no longer running services, cannot be assigned to run services.

1. [Display services.](#)
2. Click X to remove.

Example:



Result: The server is removed and is unassigned from the service.

Export a service configuration

Exported service configurations are for importing onto a **different MediaKind** system. This is useful for product or production support, or testing (parameters and expected function).

IMPORTANT Export is available for Live Encoding services, On-Demand Encoding services, Live Packaging services, On-Demand Packaging services and Catalogs.
Exports **exclude** the service state (started or stopped).
Importing service configurations may require manually starting or stopping other services.

1. [Display services](#).

2. Click  to export.

Result: A file downloads to the Web browser default location.

IMPORTANT The download date in the file name is in the following format: **YYYY/MM/DD**

Import a service

Import a single service to a **different server where the service is not currently configured**. Import files must match expected formatting requirements.

Prerequisites:

A .json for the service is available. (see the [Export a service configuration](#) on page 171 section)

IMPORTANT

- **Services on a same server require unique service names.**
- Only import the service to a server where the service DOES NOT currently exist.

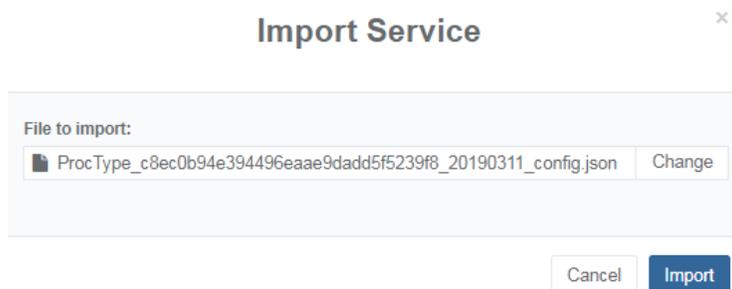
1. [Display services](#).

REMEMBER Files for import are retrieved from [a service export from a different server](#).

2. Click **Import service...**

3. Click **Select file** to browse for the .json file previously exported for this service.

Example:



4. Click **Import**.

Result: The service imports and appears in the list of services.

Start a service

Services can be started and stopped manually from the **Services** page.

Prerequisites:

At least one service has been created and is available in the list of services.

1. [Display services](#).
2. Click the field in the **Server** column to assign the service to a server.

NOTE Multiple servers may be added for a same service.

3. Click ▶ to launch the service.

Result: The **Status** is **started**.

NOTE If an alarm is raised:

- Click ⚠ to display all alarms.
- Alarm colors are based on severity.

Stop a service

IMPORTANT Stopping a service cancels any jobs in progress.

1. [Display services](#).

TIP Use the [rows per page](#) or the [search bar](#) to filter multiple services and to find a specific service.

2. Click ■ in the **Actions** column to stop the service.

Result: You are prompted to confirm.

3. Click **Yes, Stop it!**

Result: The service stops running and the service status displays **stopped**.

Stats	Alarms	Servers	Status
		controller1 x	stopped

Delete a service

Deleting a service removes a service from the list of available services.

Prerequisites:

A service exists.

1. [Display services.](#)
2. Click  in the **Actions** column to delete the service.
3. Click **Yes, delete it!** to confirm.

Result: The service is now removed from the services table and is no longer available.

Manage servers

Display servers

Servers are listed in a table. You can view server settings and usage statistics per server.

1. Click **Servers** from the left-side **Menu** panel.
Result: The table of servers displays.
2. Optional: Edit the number of [rows displayed](#) or use the [search bar](#) to filter the display.

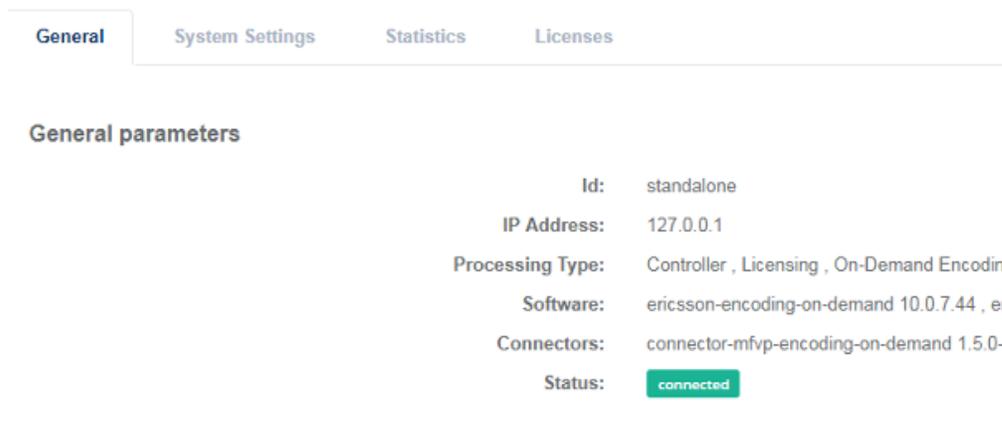
Display server information (system)

Check server functions and performance to manage server and service allocation, or to view license information. System settings and information displays for each server.

1. [Display servers](#).
2. Click  in the **Actions** column to view server information.
Result: Information based on the server type displays.
3. Click the tabs to display server information.

- **General**
- **System Settings**
- **Statistics**
- **Licenses**

Example:



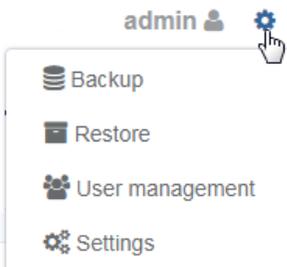
The screenshot shows a user interface with four tabs: **General**, **System Settings**, **Statistics**, and **Licenses**. The **General** tab is selected. Below the tabs, the text "General parameters" is displayed. A list of server parameters is shown:

Id:	standalone
IP Address:	127.0.0.1
Processing Type:	Controller , Licensing , On-Demand Encoding
Software:	ericsson-encoding-on-demand 10.0.7.44 , eric
Connectors:	connector-mfvp-encoding-on-demand 1.5.0-1'
Status:	connected

System administration

System center

Management and administration features for system settings such as SNMP, SDI routers, external links and LDAP configuration, as well as users, backup and restore, are available in the **System Settings** menu (⚙️).



System name customization

Administrators have rights to edit and customize system name displayed in the user interface. Depending on deployed solutions or environment, multiple systems including distinct controller(s) managing separate servers and services may be necessary. Customizing the system name allows you to easily identify from the home page the system you need to access.

1. Click ⚙️ in the upper right corner of the window.
2. Select **Settings**.
Result: The **Settings** page displays 5 tabs: **General** , **SNMP notifications**, **External links**, **Router Settings** and **LDAP**.
3. In the **General** tab, enter the name to display for this system and click **Save** to apply changes.
Result: The new system name displays on the top left side of the system user interface.

LDAP management

LDAP configuration

By default, accessing the Controller user interface is restricted to people that have a user account defined through the MediaKind system center. You can also configure the user access by retrieving user credentials from an existing LDAP server directory.

1. Log in as a user with Administrative privileges.
2. Click ⚙️ in the upper right corner of the window.
3. Select **Settings**.
Result: The **Settings** page displays 5 tabs: **General** , **SNMP notifications**, **External links**, **Router Settings** and **LDAP**.

4. In the **LDAP** tab, configure the LDAP settings to integrate with the local LDAP

server.

Result:

After changing the LDAP settings, for changes to take affect, the authentication service must be restarted. Either restart the Controller, or consult MediaKind Services for guidance on restarting the correct services for your deployment.

Loading LDAP certificates

If LDAP certificates are being loaded, configure LDAP on the settings page, then load the certificates.

NOTE For HA deployment, the following procedures must be done on both controller servers.

1. On the controller server, place the LDAPS certificates in `/etc/pki/ca-trust/source/anchors/`
2. Run the following command:

```
update-ca-trust extract
```

Result: This will extract it to the standard OS trust store location (default path used in the controller UI):

```
/etc/pki/ca-trust/extracted/pem/tls-ca-bundle.pem
```

3. Edit the config file to set the right values:

```
/opt/mediakind/utility/bin/controller/ldaps.conf
```

The conf file must contain the fully qualified domain name for the LDAP server (same as in the certificate) and the IP address of that server.

```
#####
#
# Config file used by add-ldaps-certs.sh
# Needs to be populated by the customer specific parameters
#
#####

newLDAPServerName=ldaps.sou.net      #must me fully resolvable FQDN that matches the provided root ca
newLDAPServerIP=10.1.1.1
deployment=unified-ui
```

LDAP Field	Description	Example value
server	Address of the LDAP server to communicate with	ldap://fr-my.companydomain.com:389
Bind DN	Distinguished name to use when binding to the LDAP server; leave empty (default) for an anonymous bind	CN=apache, OU=COM, OU=Sites, DC=companydomain, DC=com
Bind password	Password to use for binding with protected binding; leave empty (default) for anonymous binding	Password123
Search base DN	DN to use when binding to the server in order to perform searches. leave empty for anonymous binding	OU=COM, OU=Sites, DC=companydomain, DC=com
Username field	Name of the field to use in the LDAP search, for username matching (against LDAP attributes)	sAMAccountName
Firstname field	Name of the field (from LDAP attributes) holding the user's first name	givenName

LDAP Field	Description	Example value
Lastname field	Name of the field (from LDAP attributes) holding the user's last name. firstname_field & lastname_field shall be used together, or they will be ignored. firstname_field & lastname_field can be used to retrieve the user's full name. This will then be displayed instead of the username once the user is logged in.	sn
CA certificate file	Location of the CA certificate file used to verify the LDAP server's certificate when using TLS or LDAPS	/etc/pki/ca-trust/extracted/pem/tls-ca-bundle.pem
Cipher suite	Open SSL-format string defining the list of ciphers to use for TLS communication	kEECDH+aECDSA+AES:kEECDH+AES+aRSA:kEDH+aRSA+AES:-SSLv2:-SSLv3:-TLSv1:-TLSv1.1
Required group	The LDAP group required for a user to be able to log in	cn=lcl.cnt.dfw.di.mediakind.allowlogon, ou=Resources,ou=Groups, ou=MediaKind,ou=CP, dc=example,dc=org
Group search	The filter used to search for required group	dc=example, dc=org
Default group	A Controller group assigned to a user that has logged in via LDAP. Mutually exclusive with ldap_group_mappings section.	Monitoring
Group type	The type of group used to search through LDAP. NestedActiveDirectoryGroupType and GroupOfNames are supported if anything other than NestedActiveDirectoryGroupType it will default to GroupOfNames	NestedActiveDirectoryGroupType

LDAP Field	Description	Example value	
LDAP group mappings	A section that can be used to control authorisation through LDAP groups. Configure group_search (and don't use "default group"). In the example, any user that belongs to the LDAP group "MK_Configuration" will be given the privileges for the Controller group "Configuration".	LDAP group	Controller group
		MK_Admin	Admin
		MK_Configuration	Configuration
		MK_Monitoring	Monitoring

4. Run the script:

```
/opt/mediakind/utility/bin/controller/add-ldaps-server.sh
```

Running the script will restart the required containers.

Router configuration

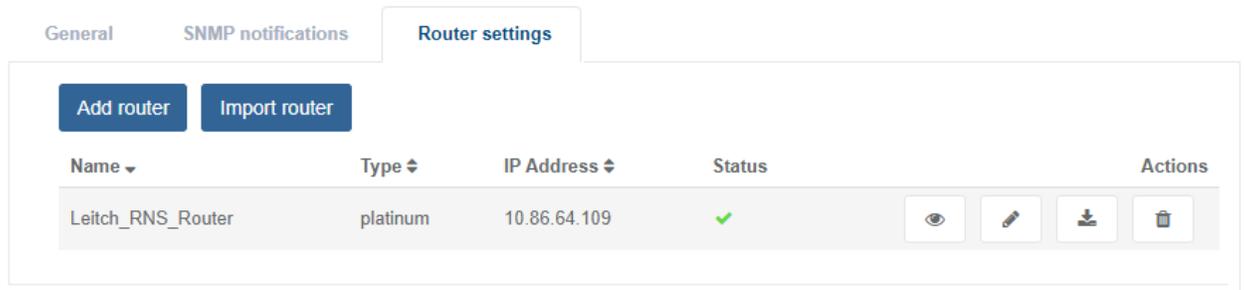
The **Router settings** window enables users to configure the router parameters by establishing the connection and control of the SDI Router. This is performed by setting the input labels and using these labels to map the inputs for the Encoding Live services.

The output connections must be configured to map the router outputs to the input SDI ports of the encoder servers.

Display the router configuration settings

1. Click  to display the system center menu.
2. Click **Settings > Router settings**.
Result: The **Router settings** display.

[Home](#) / [Settings](#)



The screenshot shows the 'Router settings' tab in a web interface. At the top, there are three tabs: 'General', 'SNMP notifications', and 'Router settings'. Below the tabs are two buttons: 'Add router' and 'Import router'. A table lists the routers with columns for Name, Type, IP Address, Status, and Actions. One router is listed: 'Leitch_RNS_Router' with type 'platinum', IP '10.86.64.109', and a green checkmark status. The Actions column contains icons for view, edit, download, and delete.

Name	Type	IP Address	Status	Actions
Leitch_RNS_Router	platinum	10.86.64.109	✓	   

Add a new router configuration

1. Click  to display the system center menu.
2. Click **Settings > Router settings**
Result: The **Router settings** display.
3. Click **Add router**.
Result: The **Router Configuration** parameters display.
4. Enter the parameters to configure the router.

NOTE For further details on the parameters below, refer to [Router parameters](#).

Example:

Router Configuration

Router Properties

Name*	<input type="text"/>
IP Address*	<input type="text"/>
Username*	<input type="text"/>
Password	<input type="password"/>
Type	Panacea 

Input Labels

Input Count	<input type="text" value="0"/>
-------------	--------------------------------

Output Connections

Output Count	<input type="text" value="0"/>
--------------	--------------------------------

5. Click **Create** to save the configuration and return to list of routers.

Edit an existing router configuration

1. Click  to display the system center menu.
2. Click **Settings > Router settings**
Result: The **Router settings** display.
3. Click  to edit the router configuration.

NOTE For further details on the parameters below, refer to [Router parameters](#).

Example:

Router Configuration

Router Properties

Name*	<input type="text" value="Leitch_RNS_Router"/>
IP Address*	<input type="text" value="10.86.64.109"/>
Username*	<input type="text" value="leitch"/>
Password	<input type="text" value="leitchadmin"/>
Type	<input type="text" value="Platinum"/>

Input Labels

Input Count	<input type="text" value="2"/>
#	Label
1	<input type="text" value="BBC1"/>
2	<input type="text" value="BBC2"/>

Output Connections

Output Count	<input type="text" value="3"/>		
#	Server Name	Server Board	Board Connector
1	<input type="text" value="Server#1"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
2	<input type="text" value="Server#2"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
3	<input type="text" value="Server#3"/>	<input type="text" value="1"/>	<input type="text" value="1"/>

4. Click **Update** to save the configuration and return to list of routers.

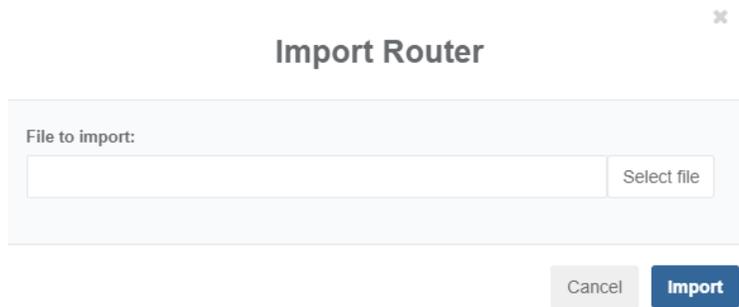
Import a router configuration

1. Click  to display the system center menu.
2. Click **Settings > Router settings**.

Result: The **Router settings** display.

3. Click **Import router**.

Example:



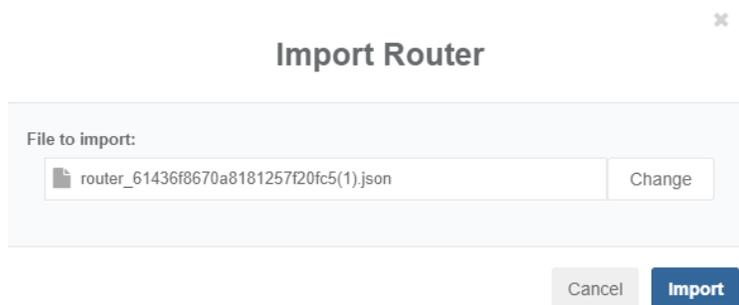
Result: The **Import Router** display appears enabling you to import a router configuration file (json) from another system.

4. Click **Select file**.

Result: The **Open** window displays enabling you to select the file to import.

5. Select the required file then click **Open**.

Result: The file appears in the **Import Router** window.



6. Click **Import**.

Result: The imported file is displayed in the list in the **Router settings** tab.

Export a router configuration

1. Click  to display the system center menu.

2. Click **Settings > Router settings**.

Result: The **Router settings** display.

3. Click .

Result: The **Downloads** window display appears showing the location of the exported router from which can now be used in another system.

View router crosspoints

1. Click  to display the system center menu.

2. Click **Settings > Router settings**.

Result: The **Router settings** display.

3. Click .
- Result:** The **Router Crosspoints** display showing the crosspoints set on the router.
4. Select the **Show uncontrolled** checkbox to view the state of the entire router, including the inputs and outputs that have not been labelled or connected.
5. Toggle between **Auto refresh** to **No refresh** to enable or disable an automatic refresh

Example:

Router Crosspoints for "Leitch_RNS_Router" Show uncontrolled Auto refresh

#	Output Details	BBC1	BBC2	N12	MTV	CNN
1	Server#1 Board: 1, Connector: 1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Server#2 Board: 1, Connector: 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Server#3 Board: 1, Connector: 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	Server#4 Board: 1, Connector: 1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	Server#5 Board: 1, Connector: 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Click **Back** to return to **Router settings** tab.

Backup and restore

Backup and restore configurations

Backups include services, server definitions, and locally defined users. You can back up your configurations to restore a previous configuration (for upgrades or rollbacks or after a server crash, etc.)

- NOTE**
- Access to configurations is blocked while a backup or restore is in progress.
 - Up to 30 backup files are supported for local backups.
 - The oldest backup is deleted once 30 backups are detected.

Backup database configurations

Create a backup of MediaKind configurations to save a version locally or on a remote server.

Display backup MediaKind database options

Back up the MediaKind configuration to a local or remote server. Backups include services, servers, and users. Backups are time-stamped.

1. Click  in the upper-right corner of the screen.
Result: The **System Center** menu displays.

2. Select **Backup**.

Result: The **Backup Controller Database** options display.

Related Tasks

[Create a local backup](#) on page 184

[Create a remote backup](#) on page 185

[Schedule an automatic backup \(periodic\)](#) on page 186

Related Information

[Downloading the Controller database file](#) on page 187

Create a local backup

Local backups of MediaKind settings are still accessible even when no remote access is possible. Backups only include the list of servers, services, and user configurations.

1. [Display backup options](#).

Example:

Backup Controller Database

This menu backs up the Controller configuration database including services, servers, templates, failover groups and user configuration. Backups are time-stamped and can be restored from the Restore menu.

Local backup is only suitable for short term non-critical backups. e.g. creating a database dump file before copying it somewhere for storage (when remote backup is not possible).

The screenshot shows a web interface for configuring backups. At the top, there are three tabs: 'Backup Location' (selected), 'Scheduled Backup', and 'Download File'. Under 'Backup Location', there are two radio buttons: 'Local Backup' (selected) and 'Remote Backup (FTP)'. Below these are five input fields: 'Host*', 'Port*' (with '21' entered), 'Path*', 'Username*', and 'Password*'. At the bottom left is a 'Backup Now' button with a refresh icon. At the bottom right are three buttons: 'Exit', 'Save and continue', and 'Save and exit'.

-
- NOTE**
- The **Host**, **Port** and **Path** are only required for a [remote backup](#).
 - FTPS is also authorized.

Result: **Local Backup** is selected by default.

2. Click **Backup now**.

Result: The backup is stored on the local drive.

Related Tasks

[Display backup MediaKind database options](#) on page 183

[Create a remote backup](#) on page 185

[Schedule an automatic backup \(periodic\)](#) on page 186

Related Information

[Downloading the Controller database file](#) on page 187

Create a remote backup

Create remote backups to restore MediaKind settings from a remote server using FTP or FTPS.

1. [Display backup options.](#)
2. Select **Remote backup**.
Result: [Required fields](#) are highlighted.
3. Enter the required remote backup settings information.

NOTE FTPS is also authorized.

Example:

Backup Controller Database

This menu backs up the Controller configuration database including services, servers, templates, failover groups and user configuration. Backups are time-stamped and can be restored from the Restore menu.

Local backup is only suitable for short term non-critical backups. e.g. creating a database dump file before copying it somewhere for storage (when remote backup is not possible).

The screenshot shows a web interface for configuring backups. At the top, there are three tabs: 'Backup Location' (selected), 'Scheduled Backup', and 'Download File'. Below the tabs, there are two radio button options: 'Local Backup' (which is selected) and 'Remote Backup (FTP)'. Under the 'Remote Backup (FTP)' option, there are five input fields: 'Host*', 'Port*' (with the value '21'), 'Path*', 'Username*', and 'Password*'. At the bottom left of the form is a blue button labeled 'Backup Now'. At the bottom right, there are three blue buttons: 'Exit', 'Save and continue', and 'Save and exit'.

IMPORTANT Editing the backup file storage location impacts scheduled backups.

4. Click **Backup Now**.
5. Click **Save and exit** to save your modifications.

Related Tasks

[Display backup MediaKind database options](#) on page 183

[Create a local backup](#) on page 184

[Schedule an automatic backup \(periodic\)](#) on page 186

Related Information

[Downloading the Controller database file](#) on page 187

Schedule an automatic backup (periodic)

Set a schedule to back up the MediaKind database on a regular basis: weekly, daily or hourly. Backup guard times may impact backup availability.

1. [Display backup options.](#)
2. Select the **Scheduled Backup** tab to define the scheduled backup.
3. Select the **Enable scheduled backup.** checkbox
4. Select the backup schedule time (hourly, weekly, daily and so on).

NOTE The time stamp is based on the current time on the Controller server.

Example:

Backup Controller Database

This menu backs up the Controller configuration database including services, servers, templates, failover groups and user configuration. Backups are time-stamped and can be restored from the Restore menu.

Local backup is only suitable for short term non-critical backups. e.g. creating a database dump file before copying it somewhere for storage (when remote backup is not possible).

Backup Location | **Scheduled Backup** | Download File

Enable scheduled backup

Every Hour
 Every Day
 Every Week

Days: Sunday | Hours: 0 | Minutes: 0

Current time on the Controller server: Oct. 12, 2021, 3:44 p.m.

Warning: The Backup Location settings are used for both scheduled and punctual backups. Editing *Backup Location* settings impacts scheduled backups.

Exit | Save and continue | Save and exit

5. Open the **Backup Location** tab to set the backup file storage settings, if they are not currently configured.
6. Click **Save and exit** to save your modifications.

Related Tasks

[Display backup MediaKind database options](#) on page 183

[Create a local backup](#) on page 184

[Create a remote backup](#) on page 185

Related Information

[Downloading the Controller database file](#) on page 187

Downloading the Controller database file

This tab enables users to download the Controller database file. This file includes Services, Servers, Templates, Failover Groups and Users and indicates the backup of the Controller database at the time stamped date.

1. [Display backup options.](#)
2. Select the **Download File** tab to download the Controller database file.
3. Select **Local Backup** to download the locally backed up database.
NOTE Downloading remote backups is not currently available.
4. Use the **Year/Month/Backup** drop down lists to select the backup instances to download, as follows:
 - a. From the **Year** drop down list, select the year when the required backup was created .
 - b. From the **Month** drop down list, select the month when the required backup was created .
 - c. From the **Backup** drop down list, select the required backup which includes the time stamp with the time and date.

Example:

Backup Controller Database

This menu backs up the Controller configuration database including services, servers, templates, failover groups and user configuration. Backups are time-stamped and can be restored from the Restore menu.

Local backup is only suitable for short term non-critical backups. e.g. creating a database dump file before copying it somewhere for storage (when remote backup is not possible).

The screenshot shows a web interface for downloading the Controller database. At the top, there are three tabs: 'Backup Location', 'Scheduled Backup', and 'Download File'. The 'Download File' tab is active. Below the tabs, there is a text box stating: 'This allows you to download a file of the Controller database including its Services, Servers, Templates, Failover Groups and Users. The download will be the backup of the Controller database at the time-stamped date.' Below this, it says: 'To proceed, please select a backup from the list below and confirm:'. There are two radio buttons: 'Local Backup' (selected) and 'Remote Backup'. Below the radio buttons are three dropdown menus: 'Year' (2021), 'Month' (October), and 'Backup' (2021-10-11 10:00:15). At the bottom left is a 'Download Now' button with a download icon. At the bottom right are three buttons: 'Exit', 'Save and continue', and 'Save and exit'.

5. Click **Download Now** to begin downloading the file locally.
6. Click **Save and exit** to save your modifications.

Related Tasks

[Display backup MediaKind database options](#) on page 183

[Create a local backup](#) on page 184

[Create a remote backup](#) on page 185

[Schedule an automatic backup \(periodic\)](#) on page 186

Restore configurations

Restore configurations for recovery or troubleshooting. You must have already created a local or remote backup in order to restore. Backups are selected based on the backup time stamp.

-
- IMPORTANT**
- The Database is **inaccessible until the restore completes**.
 - Only one restore can be launched at a time.
 - Alarms and statistical data are not restored because they are dynamic.
 - The alarms banner is not displayed until the restore completes.
-

Display restore options

You can restore the MediaKind database configuration from existing local or remote backups.

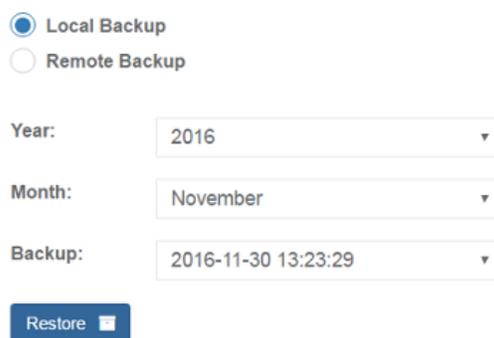
1. Click  in the upper-right corner of the screen.
Result: The **System Center** menu displays.
2. Select **Restore**.
Result: The **Restore Controller Database** page displays.

Restore configurations from a remote backup

1. [Display restore options](#).
2. Select **Remote Backup**.
3. Select a **Year** > **Month** > **Backup**.

-
- NOTE**
- Available backups are **time-stamped**.
 - Be aware of backup guard time configurations to ensure availability.
-

Example:



The screenshot shows a web interface for restoring configurations. At the top, there are two radio buttons: "Local Backup" (selected) and "Remote Backup". Below this, there are three dropdown menus: "Year" (set to 2016), "Month" (set to November), and "Backup" (set to 2016-11-30 13:23:29). At the bottom of the form is a blue "Restore" button with a right-pointing arrow.

4. Click **Restore**.

IMPORTANT The Controller is unavailable to all users until the restore completes.

Restore configurations from a local backup

1. [Display restore options.](#)

Result: **Local Backup** is selected by default.

2. Expand the **Backup** drop-down list to display available backups, then select a backup to restore.

NOTE

- Available backups are **time-stamped**.
- Be aware of backup guard time configurations to ensure availability.

3. Click **Restore**.

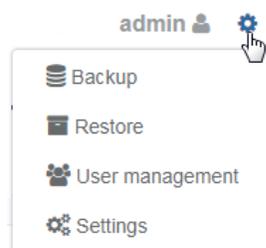
Result: All users are temporarily assigned to the [Monitoring user group](#) until the restore completes or is terminated.

User management

Manage users

Administrators have rights to create users and assign groups. User groups reflect different user roles with specific permissions. Permissions authorize access to applications, menus and features.

IMPORTANT Menu options depend on your processing type and product installation.



User groups

A user group is a set of access rights and permissions. Permissions authorize users to either display or edit configurations. Users are assigned to at least 1 user group. A user can be assigned to multiple groups.

NOTE New users are automatically assigned to the **Monitoring** group.

User group permissions

There are 3 default user groups. Permissions are either Read (R), Write (W), or Read and Write (R/W). Yes means the user group can carry out the action, but may be limited to specific options.

IMPORTANT User group options depend on your processing type and product installation.

	<i>Admin</i>	<i>Configuration</i>	<i>Monitoring</i>	<i>API</i>
Services	R/W	R/W	R	R/W

	<i>Admin</i>	<i>Configuration</i>	<i>Monitoring</i>	<i>API</i>
Servers	R/W	R/W	R	R/W
Templates	R/W	R/W	R	R/W
Failover	R/W	R/W	R	R/W
Alarms and Stats	R	R	R	R
Settings	R/W	N/A	N/A	R/W
Restore	Yes	Yes	No	R/W
Backup	Yes	Yes	Yes	R/W
User Management	R+W	N/A	N/A	N/A

Failover default user rights per user group

NOTE Admin users have all rights.

Monitoring users can (based on Failover control privilege):

- View groups
- View group details
- View failover audit history
- Trigger manual failover
- Trigger a manual revert
- Trigger a maintenance mode

Configuration users (based on Failover configuration privilege):

- View groups
- View group details
- Trigger manual failover
- Trigger a manual revert
- Trigger a maintenance mode
- Create groups
- Edit groups
- Delete groups
- Edit default failover mode
- Edit timeout period

Display the list of users

1. Click  in the upper right corner of the window.
2. Select **User Management**.

Result: The **User Management Administration** page displays.

3. Select **Users**.

Result: The list of users displays.

TIP Scroll to the end of the list to display the total number of users.

Adding a New Group

1. Click  in the upper right corner of the window.

2. Select **User Management**.

Result: The **User Management Administration** page displays.

3. Select **Groups**.

Result: The list of groups is displayed.

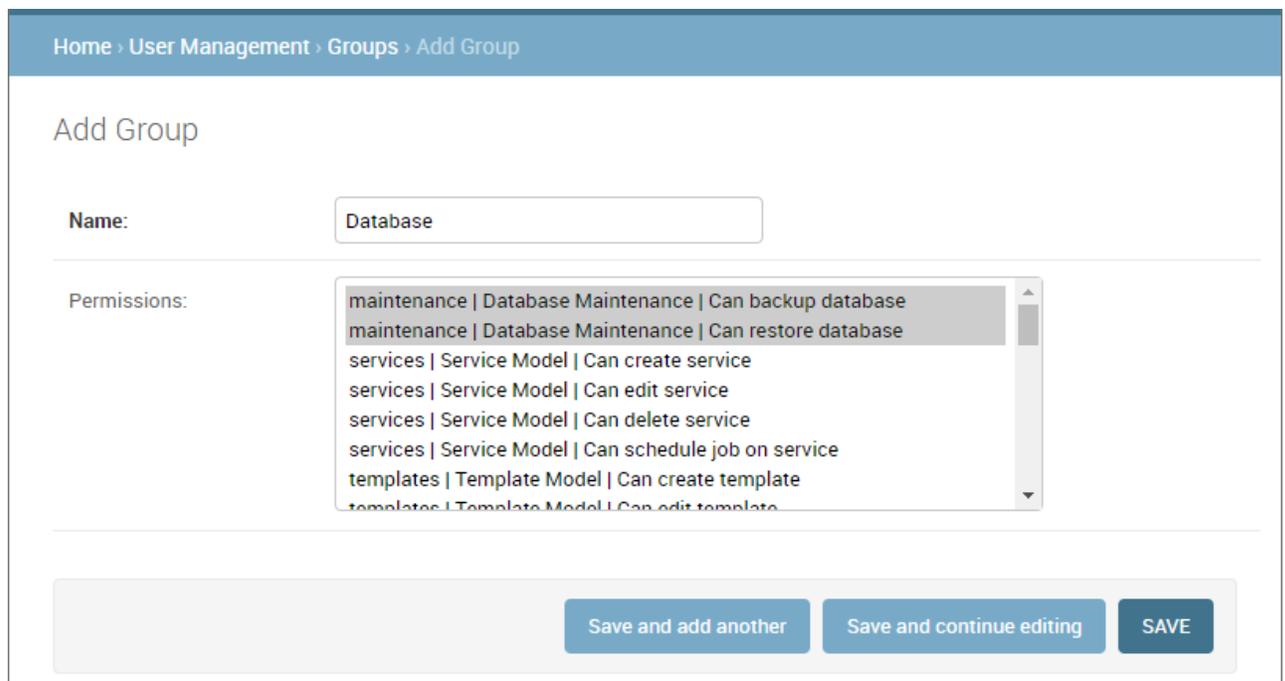
TIP Scroll to the end of the list to display the total number of groups.

4. Select **Add Group**.

Result: You are prompted to enter group information.

5. Enter the **Name** and define the **Permissions** for the group, as shown in the example below:

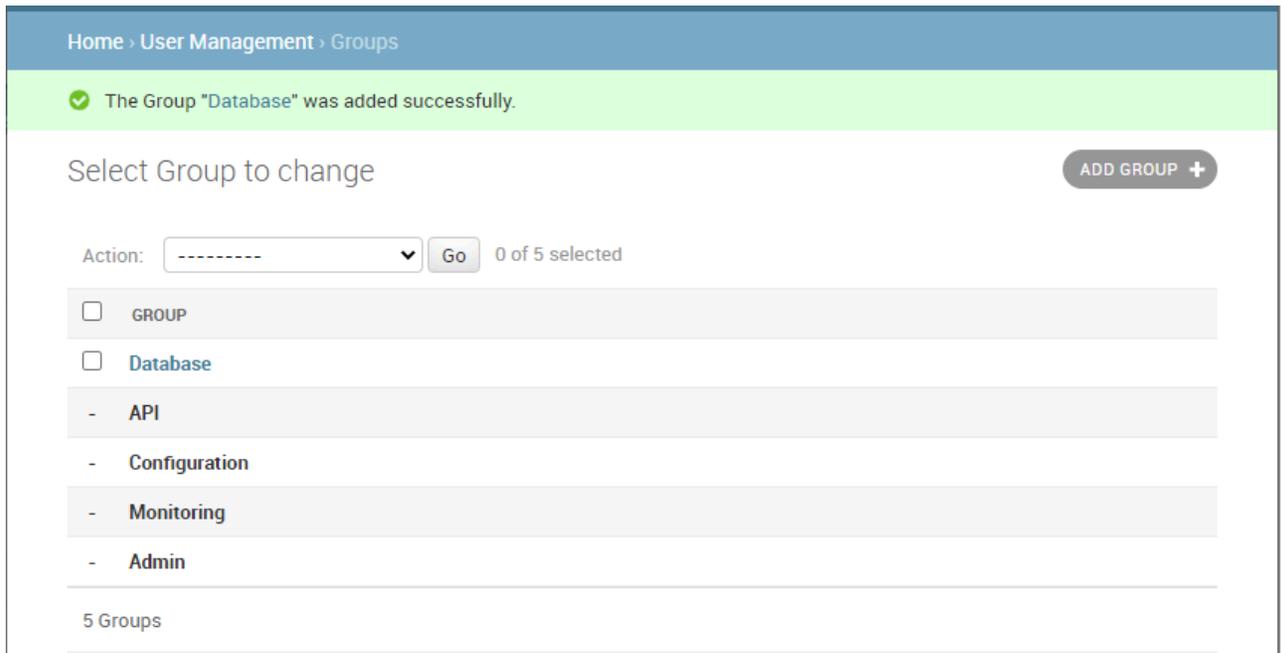
Example:



The screenshot shows the 'Add Group' form in the User Management Administration interface. The breadcrumb navigation at the top reads 'Home > User Management > Groups > Add Group'. The form title is 'Add Group'. There are two main sections: 'Name' and 'Permissions'. The 'Name' field contains the text 'Database'. The 'Permissions' field is a dropdown menu with a scrollable list of options. The visible options are: 'maintenance | Database Maintenance | Can backup database', 'maintenance | Database Maintenance | Can restore database', 'services | Service Model | Can create service', 'services | Service Model | Can edit service', 'services | Service Model | Can delete service', 'services | Service Model | Can schedule job on service', 'templates | Template Model | Can create template', and 'templates | Template Model | Can edit template'. At the bottom of the form, there are three buttons: 'Save and add another', 'Save and continue editing', and 'SAVE'.

6. Select a **Save** option.

Result: The new **Group** appears in the list of groups.



The group permissions for **Monitoring**, **Configuration**, **Admin** and **API** are listed below (permissions for these groups cannot be modified by the user):

Monitoring : The users with **Monitoring** access can perform the following actions in the code:

- Access the GUI
- Backup databases
- Manually perform a revert and failover of servers

Configuration: The users with **Configuration** access can perform the following actions in the code, in addition to the permissions described in the **Monitoring** group above :

- Restore databases
- Create, edit and delete services
- Create, edit and delete templates
- Create and edit servers
- Modify licenses
- Create, edit and delete failover groups
- Access settings
- Modify SNMP configurations
- Schedule jobs on services
- Edit alarm overrides
- Generate catalogs, outputs and assets

API: The users with **API** privileges have the right to access the API.

Admin : The users with **Admin** privileges can perform the following actions in the code, in addition to the permissions described in the **Monitoring**, **Configuration** and **API** groups above (meaning, these users have the rights to perform everything in the system):

- Modify external links and general settings
- Delete licenses and servers
- Reboot Servers

Create a new user

The Controller is a single access point for products. Administrators manage users, groups and permissions from the system center.

1. [Display users](#).

2. Select **Add User**.

Result: You are prompted to enter User information.

3. Enter the User information.

- **Username**
- **Password**

IMPORTANT

- An Admin user can edit or create other Admin users and profiles, including passwords and permissions.
- **Password** is case sensitive.

4. Select a **Save** option.

5. [Assign a user to a group](#) to manage user access [rights and permissions](#).

Result: By default, new users are assigned to the **Monitoring** group.

Assign a user to a group

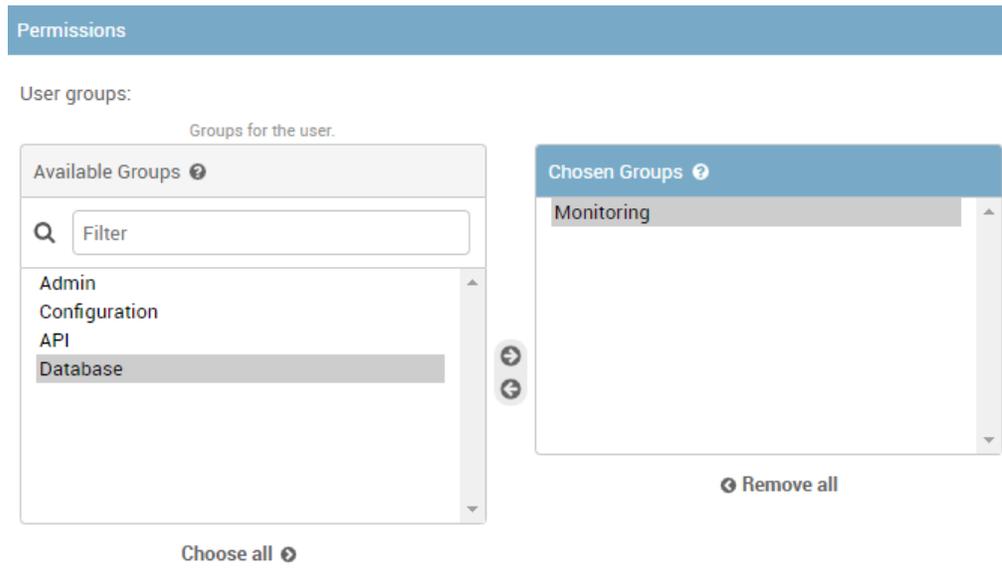
Groups are a set of access rights and permissions. Permissions authorize users to either display or edit configurations. Give a user access rights by assigning the user to a group.

1. [Display users](#).

2. Click the user in the list to display user information and permissions.

3. Scroll to **Permissions** and use the arrows to add the group to the list of **Chosen groups**.

Example:



TIP You can add multiple groups, or click **Choose all** to assign the user to all available groups.

4. Click **Save**.

Link LDAP or Active Directory

The MediaKind Controller can be linked with an external server (LDAP or *ActiveDirectory*) to identify and authenticate users. If activated, the authentication page displays before granting access to the **Home** page.

- NOTE**
- The LDAP connection parameters are defined in a dedicated configuration file.
 - If using LDAP, then the MediaKind Controller neither stores nor manages user passwords that are managed by the external LDAP server.
 - Users defined on the external server can coexist with locally defined users.

See [LDAP configuration](#) on page 175 for LDAP configuration procedures.

Result: When users are first installed from the LDAP or *ActiveDirectory* server, they are by default, automatically assigned to the Monitoring group. The default group can be configured. Alternatively, LDAP can be configured to assign groups based on LDAP group membership. Administrators can [edit user groups](#) to [manage permissions](#) and access rights.

Edit user information

1. [Display users](#).
2. Select a **User**.

3. Edit the user information:

NOTE An Admin user can edit or create other Admin users and profiles, including passwords and permissions.

- **Username**
- **Password**
- **Personal information**
- [Permissions](#)

4. Select a save option to continue or exit.

Edit a user password

Any user can edit their password, but only users with admin or configuration permissions can edit passwords for other users.

1. [Display the list of users](#) in the System Center.
2. Click the current **Admin** user from the list to edit.
3. Click the **this form** link as shown in the example below to change the password.

Example:

4. Optional: Edit user profile settings, then **Save**.

Save options for user management

Save Option	Result
Save	The user is added to the list.
Save and continue	Additional user information displays (groups and permissions).
Save and add another	User is added to the list and the add user page is refreshed to add another new user.

License management

Manage licenses

MediaKind solutions offer flexible licensing models. Each model depends on your solution and installation options. A service can be configured but can only be processed for a limited period of time without a license (grace period).

License servers and installation

The license manager is a micro-service application installed on a server, or on 2 servers if in redundancy mode. By default, the Controller hosts this application that is identified by a *Licensing* processing type.

The license manager may also run on dedicated servers for very large configurations.

-
- TIP** View [license details per feature](#) to display:
- [license usage per feature](#)
 - [license codes](#)
 - [license expiry dates in Universal Time](#) (UTC)
-

Display license details

There is a license code per feature. Licenses are required for features and options in the MediaKind solution and have expiry dates.

- IMPORTANT**
- Licenses are managed by a License Manager.
 - The License Manager is a micro-service application installed by default on the Controller server or a dedicated license server.
 - There may be more than one license server if your solution is installed in redundancy.
-

1. [Display servers](#).

Result: The servers display.

2. Click  for the server with the **Licensing processing type**.

NOTE The *Licensing* processing type may display for the Controller server if the licensing manager is installed on the same machine as the Controller.

3. Select the **Licenses** tab.

Example:

General System Settings Statistics **Licenses**

Import licenses Delete licenses Revert to previous licenses Export licenses

License server

Licensing server status **started**

Server license-manager-0 locking code *14GS978S3Q8J6PJ

Server license-manager-1 locking code *158WKUH95BJ4XJX

License pool status

Search in table

Feature	Code	Expiry	Type	Usage
MFELms Media Conditioning	FAT1023464/85	Never	Aggregate	0/15
MFELms Video Processing	FAT1023464/88	Never	Exclusive	3/10
MFELms Dolby Dec 2 0	FAT1023464/89	Never	Additive	0/5
MFSms Video Processing	FAT1023975/1	Never	Exclusive	3/4000
MFS-CA PER SVC	FAT1023975/2	Never	Exclusive	0/4000

Rows per page: 20

Result: The license information displays.

NOTE All time stamps are in Universal Time (UTC).

Request license file

This is your first time connecting to your MediaKind user interface and you want to request a license file.

1. [Display license details.](#)

Result: The licensing information displays for the specific server.

2. Copy the version of Controller and the locking code, including the asterisk (*) and paste into the email or file you plan to send to MediaKind.

Example:

General System Settings Statistics **Licenses**

Import licenses Delete licenses Revert to previous licenses

License server

Licensing server status **started**

Server controller1 lockina code *1H6R3AEP5SHMLB7

Server controller2 locking code *1L85347KU4JUAB6

IMPORTANT In redundant solutions:

- Multiple locking codes display per server.
- Provide both locking codes.

3. Copy and paste the LAC reference number for your Software Handling Community to the same file or email and send to your MediaKind representative.

NOTE The LAC reference number and the Software Handling Community details are in the software Delivery Note. See software installation package.

Import license file

New license files are available from the support center.

Prerequisites:

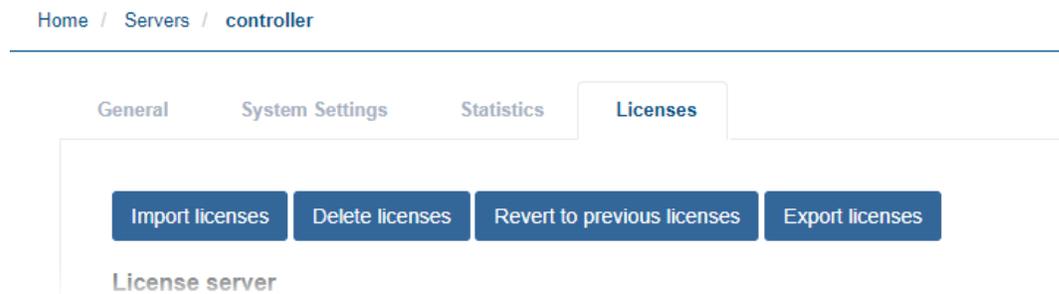
- The new license file needs to be available on the machine.
- Only configuration and admin users can import license files.

1. [Display the license details.](#)

Result: The licensing information displays for the specific server.

2. Click **Import license** > **Select file** to browse and select the file to import.

Example:



Result: A summary displays.

TIP If an error occurs, keep a copy of the error number and contact support.

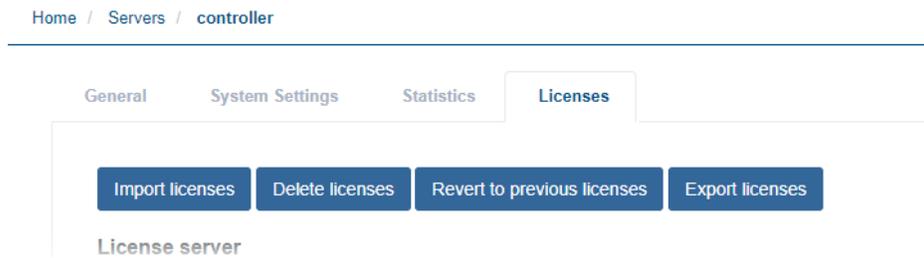
Revert to the previous license file

This feature is helpful when solving import errors that restrict license use. **Only use if MediaKind support staff approves a revert.**

1. [Display the license details.](#)

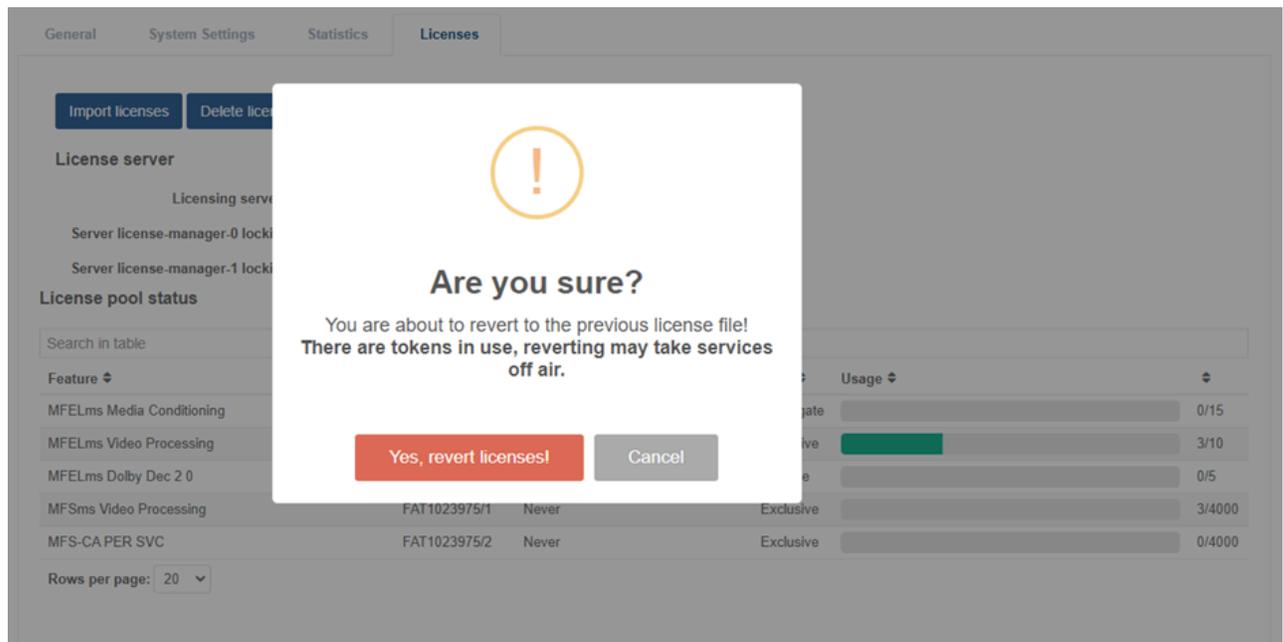
2. Click **Revert to previous licenses**.

Example:



Result: You are prompted to confirm.

NOTE If any tokens are in use, you will be warned that services may go off air.



3. Click **Yes, revert licenses** to confirm.

Result: The last license file import is discarded and the previous file is used.

License information details

License information displays in a table. View information on license usage and availability per feature. Find license codes (FAT codes) for administration and support.

Each feature has a **type** of license that can be Exclusive or Aggregate.

- Exclusive licenses override licenses and the newest license takes priority.
- Aggregate licenses are cumulative.

As more license token are added, the total quantity increases. You can not mix Aggregate and Exclusive licenses for a feature. **For example:**

Exclusive: An exclusive license code completely replaces any older licenses with a new license, as described in the following example use cases:

- For an **Exclusive** license of **100** licenses, loading a new **Exclusive** license of **120** licenses, results in **120** licenses.
- For an **Exclusive** license of **100** licenses, loading a new **Exclusive** license of **80** licenses, results in **80** licenses.
- For an **Aggregate** license of **100** licenses, loading a new **Exclusive** license of **80** licenses, results in **80** licenses.

Aggregate : An **Aggregate** license co-exists with multiple **Aggregate** licenses of the same feature and version. The hard and soft limit of the **Aggregate** licenses are aggregated, yet the start and expiry dates of the individual license strings are maintained in an independent manner, as described in the following example use cases:

- For an **Aggregate** license of **100** licenses, loading a new **Aggregate** license of **120** licenses, results in 220 licenses.
- For an **Aggregate** license of **100** licenses, loading a new **Aggregate** license of **80** licenses, results in **180** licenses.
- For an **Aggregate** license of **100** licenses, loading a new **Trial Aggregate** license of **40** licenses, will temporarily result in **140** licenses. When the trial expires, you will revert to **100** licenses.

NOTE All time stamps are in Universal Time (UTC).

The screenshot shows the 'Licenses' tab in a management interface. At the top, there are navigation tabs: 'General', 'System Settings', 'Statistics', and 'Licenses'. Below the tabs are four buttons: 'Import licenses', 'Delete licenses', 'Revert to previous licenses', and 'Export licenses'. The 'License server' section shows 'Licensing server status' as 'started'. Below this, two locking codes are listed: 'Server license-manager-0 locking code *14GS978S3Q8J6PJ' and 'Server license-manager-1 locking code *158WKUH95BJ4XJX'. The 'License pool status' section features a search bar and a table with columns: Feature, Code, Expiry, Type, and Usage. The table contains five rows of license data. The 'Usage' column includes progress bars and numerical values. At the bottom left, there is a 'Rows per page' dropdown set to 20.

Feature	Code	Expiry	Type	Usage
MFELms Media Conditioning	FAT1023464/85	Never	Aggregate	0/15
MFELms Video Processing	FAT1023464/88	Never	Exclusive	3/10
MFELms Dolby Dec 2 0	FAT1023464/89	Never	Additive	0/5
MFSms Video Processing	FAT1023975/1	Never	Exclusive	3/4000
MFS-CA PER SVC	FAT1023975/2	Never	Exclusive	0/4000

Display license token usage

Use the **Reports** menu to review the Encoding On-Demand license usage.

Delete licenses

This feature should only be used to clean up a system with erroneous licenses (accidental mix of aggregate and exclusive), or after a trial period, to clean up the database. **Only use if MediaKind support staff approves a revert.**

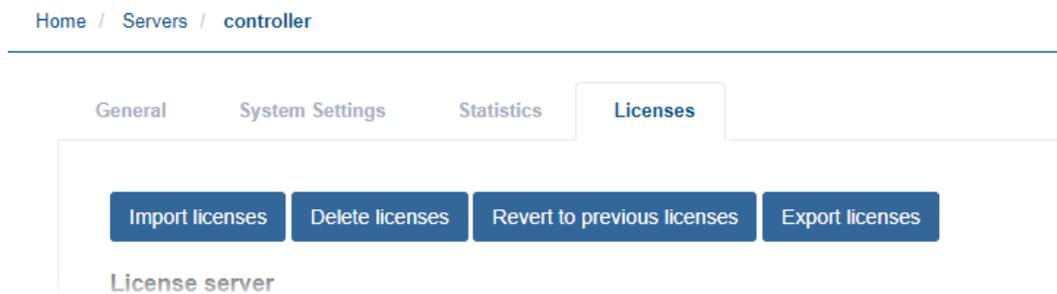
By default, only admin level users have the privilege to delete the licenses. A delete action can be undone by clicking **Revert to previous licenses**.

1. [Display license details](#).

Result: The licensing information displays for the specific server.

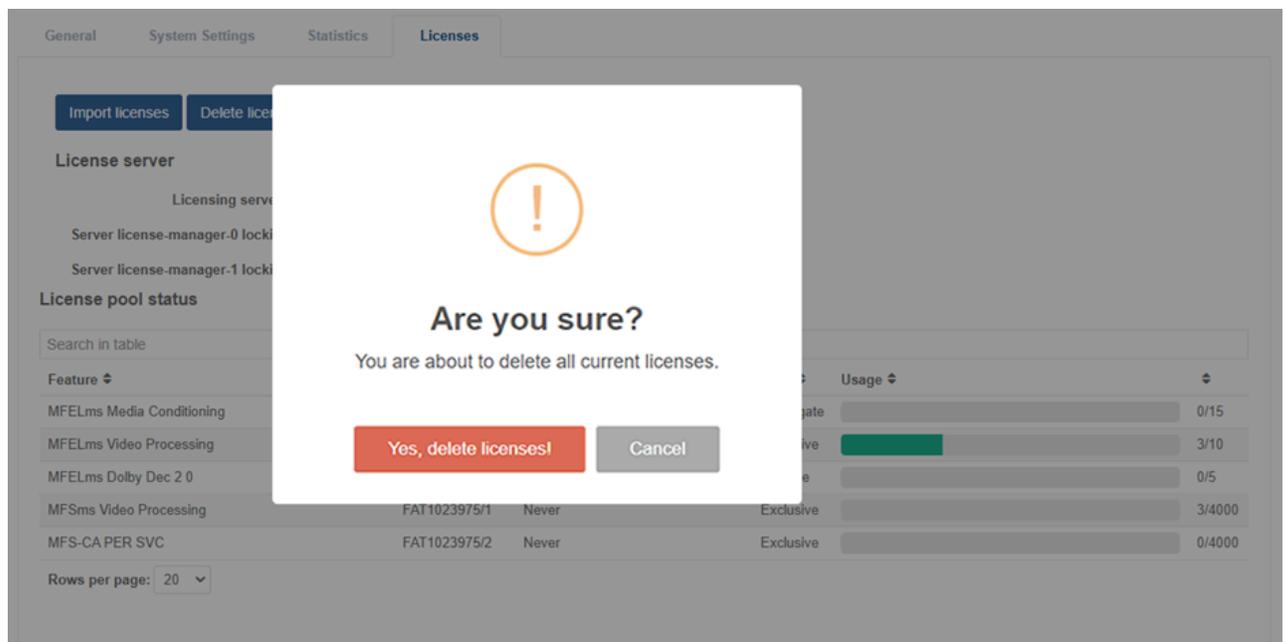
2. Click **Delete licenses**.

Example:



Result: You are prompted to confirm.

NOTE If any tokens are in use, you will be warned that running services will stop.



3. Click **Yes, delete licenses!** to confirm.

Result: The delete action may take a few seconds. The current licenses are deleted. No licenses should remain visible in the UI.

Export licenses

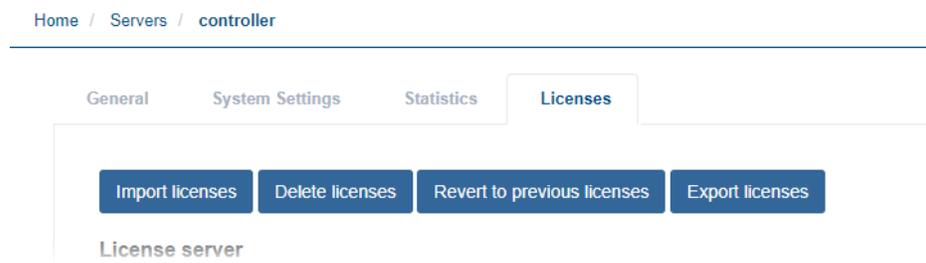
Exporting the current licenses can be useful to troubleshoot license issues, or remove trial licenses. The licenses are exported in the same text format as the file expected for license import.

1. [Display license details](#).

Result: The licensing information displays for the specific server.

2. Click **Export licenses**.

Example:



Result: A file downloads to the Web browser default location. The download date in the file name is in the format: YYYY-MM-DD

Manage alarms and events

Alarm icons and alarm state descriptions

Alarm icons use a color code to indicate levels of severity. Alarms may trigger different automatic system responses, like failover. Certain intended, manual actions may trigger a notification event, like when you manually start or stop a service.

Color codes for alarm and event states

- Alarms
 -  critical
 -  major
 -  minor
 -  information
- States

State	Description
	An alarm is active and triggered. Service may be stopped or the server is down. A backup server may be used if assigned in a failover group
	The issue related to the alarm is resolved. This includes restoring services after a failover to a backup server, even if the primary server is down.

Types of alarms

Different pages are dedicated to specific alarm displays. For example, the **Alarms** page is a centralized alarm overview, the **Service alarms** page displays alarms for the specific service, and the **Failover alarms** page displays alarm and event overviews.

- NOTE**
- The alarm display is automatically refreshed every few seconds.
 - All **time stamps are in Universal Time (UTC)**.

Alarms page

The alarms page centralizes all alarms and events into a table. The Alarms page is a general alarms overview. See Service alarms or Failover alarms for more specific alarm information.

- NOTE**
- The [alarm display](#) is automatically refreshed every few seconds.
 - All **time stamps are in Universal Time (UTC)**.

Display Alarms page for all alarms and events

The Alarms page is an overview of all alarms and events.

NOTE See **Service alarms** page or the **Failover alarms** page for specific alarm information.

1. Display alarms from the menu panel to access all **Active alarms** and the **Alarm history**.

Example:

Date	Label	Severity	
2022-07-11 09:47:29 UTC	Input video signal lost	major	c
2022-07-11 09:47:21 UTC	Capture not receiving	major	c

2. Display **Services** and click to display alarms for a specific service.

NOTE The Alarm icon is the color of the active alarm with the highest level of severity.

Example: If the highest level of severity for all active alarms for the service is *major*, then the icon is yellow:

3. Use the **shortcuts in the banner** to display alarms for a specific severity.

Example:



4. Use the sort options in the table headers or the search bar to filter on specific alarms, services or servers.

Display alarm history

The alarm history for all alarms displays in a tab in the **Alarms** page.

NOTE By default, the alarm history is stored for approximately 7 days, or a maximum of 100,000 alarm events.

1. Click **Alarms** from the left-side menu.

Example:

Date	Label	State	Severity	Server	Service Name	Info
2022-04-21 15:48:07 UTC	Connection to server lost	cleared	critical	controller		Server controller cannot be reached by controller. Please check connection and/or check if server is alive
2022-04-21 15:48:04 UTC	Connection to server lost	raised	critical	controller		Server controller cannot be reached by controller. Please check connection and/or check if server is alive

2. Click **Alarm History** to view the history for all alarms.
3. Use the sort options in the table headers or the search bar to filter on specific alarms, services or servers.
4. The **Auto refresh** button can be used to control whether new alarms automatically appear in the table. This can be useful to disable on a busy system to stop the screen scrolling.
5. Click the **Download history** button to download a .csv file containing the alarm history.

Service alarms page

You can access the alarms for a specific service from the **Services** page. An icon in the **Alarms** column indicates that there is at least one alarm for the service. Alarm icons use a color code. The color of the alarm icon in the Alarms column is based on the highest severity alarm known for that service.

An alarm status icon displays per service in relation to the alarm with highest severity for that service. More than one alarm may exist for a single service.

- NOTE**
- The [alarm display](#) is automatically refreshed every few seconds.
 - All **time stamps are in Universal Time (UTC)**.

Display service specific alarms page

The service specific alarms display in a dedicated page that also displays the alarm history for the service.

1. Display **Services**.
2. Click the alarm icon in the **Alarms** column.
Result: The service alarms display and the alarm history displays in a table below the list of active alarms.

Active alarms

controller 2			
major 2			
Date ▼	Label ↕	Severity ↕	Info
2022-07-11 09:47:29 UTC	Input video signal lost	major	Video input lost for service=FMTS black str
2022-07-11 09:47:21 UTC	Capture not receiving	major	Source capture for service=FMTS black str

Alarm history

Date ↕	Label ↕	State ↕	Severity ↕	Server ▼	Info
2022-07-11 09:47:21 UTC	Capture not receiving	raised	major	controller	Source capture for service:
2022-07-11 09:47:29 UTC	Input video signal lost	raised	major	controller	Video input lost for service:
2022-07-11 09:47:29 UTC	Input video signal lost	cleared	major	controller	Video input lost for service:

Failover alarms page

If a failover group exists, then certain critical alarms may trigger a failover. You can check alarms for failover groups, and then drill down to alarms to investigate servers and related services.

In the [Failover group page](#), the alarm with the highest severity (in relation to the servers in the failover group) displays in the **Alarm Status** column.

- NOTE**
- The [alarm display](#) is automatically refreshed every few seconds.
 - All **time stamps are in Universal Time (UTC)**.

Display failover alarms page

The failover alarms page displays alarms and the alarm history for servers in a failover group.

1. Display the **Failover** page from the left-side menu panel.
2. Click the alarm icon in the **Alarm Status** column.

Example:

Name	Processing Type	Alarm Status	Running State
Demo_group	Live Encoding		Backups in use

Rows per page: 20

Result: The alarms for the failover group displays. You can use failover alarms to determin if a server in the failover group has an alarm, and then if there are service alarms for services running on that server.

Alarm forwarding (SNMP)

SNMP alarm forwarding requires you to define a destination where alarms are sent.

Display the list of SNMP destination configurations

1. Click  to display the system center menu.
2. Click **Settings > SNMP notifications**
Result: The **SNMP destinations** display.
3. Optional: Use the search options or column filters to browse the SNMP notification configurations.

Example:

SNMP Notifications

[Add destination](#)

Search in table

Name	Destination address	Port	Active
Trap destination 1	192.168.1.1	162	<input checked="" type="checkbox"/>
Trap destination 2	137.69.58.2	162	<input type="checkbox"/>

Rows per page: 20

Add a new SNMP destination

1. Click  to display the system center menu.
2. Click **Settings**
3. Click **Add destination**
Result: The SNMP destination parameters display.
4. Enter the parameters to configure the destination and the SNMP version.

Example:

SNMP destination setup

Destination properties

Active	<input checked="" type="checkbox"/>
Notification type	Trap
Name*	<input type="text"/>
IP address*	<input type="text"/>
Port*	<input type="text"/>
SNMP version	2c

Version properties

Community name*	public
-----------------	--------

5. Optional: Select **active** to activate the SNMP notification, or clear to deactivate.

NOTE The **active** option also displays in the table where SNMP configurations are listed.

Example:

SNMP Notifications

[Add destination](#)

Search in table

Name ▾	Destination address ⇅	Port ⇅	Active
Trap destination 1	192.168.1.1	162	<input checked="" type="checkbox"/>
Trap destination 2	137.69.58.2	162	<input type="checkbox"/>

Rows per page: 20 ▾

6. Save settings to return to the list of SNMP configurations.

Edit SNMP destination configurations

1. Click  to display the system center menu.
2. Click **Settings**
3. From the **SNMP notification** tab, click  to display SNMP destination parameters.

4. Edit the parameters and save.

NOTE The parameters that display depend on the SNMP version.

Example of an SNMP v3 configuration

The parameters that display to edit SNMP destinations depend on the version of the SNMP.

SNMP destination setup

Destination properties

Active	<input checked="" type="checkbox"/>
Notification type	Trap
Name*	SNMP Dest 1
IP address*	137.58.8.96
Port*	162
SNMP version	3

Version properties

Mode	authPriv
Security name*	SecureName
Authentication algorithm	HMAC-SHA
Authentication key*	SecureKey
Encryption algorithm	AES-128
Encryption key*	EncryptK

Activate/deactivate SNMP notifications

1. Click  to display the system center menu.
2. Click **Settings**
3. From the **SNMP notification** tab, click  to display SNMP destination parameters.

Example:

SNMP Notifications

[Add destination](#)

Search in table

Name ▾	Destination address ⇅	Port ⇅	Active
Trap destination 1	192.168.1.1	162	<input checked="" type="checkbox"/>
Trap destination 2	137.69.58.2	162	<input type="checkbox"/>

Rows per page: 20 ▾

4. Select the check box to activate or clear to deactivate.

Delete an SNMP destination server

1. Click  to display the system center menu.
2. Click **Settings**
3. From the **SNMP notification** tab, click  to delete the SNMP destination configuration.
Result: You are prompted to confirm and delete.

Alarm override

You can manually override alarm severity levels. You can also view the alarms that trigger failover. You can filter the alarms using the search bar.

NOTE Changing the **Triggers failover** value impacts the possibility of a failover occurring.

Display alarm override options

The alarm override feature requires specific user rights.

1. Click **Alarms** in the left-side menu panel.
2. Click **Alarm overrides** to display options.

Result: The following page displays.



Label ^	Default severity ⇅	Current severity ⇅	Trigger failover ⇅
Connection to router lost	critical	major	no
Connection to server lost	critical	unchanged	yes

Rows per page: 20

Override an alarm severity

You can change the alarm severity to either critical, major, minor, notice or ignore. The initial default severity displays in the **Alarm overrides** tab if you need to revert to the initial default severity setting. Setting an alarm to "ignore" will exclude that alarm type from displaying in the active and historical alarm views. It will also be excluded from the API responses and SNMP traps. The only evidence of "ignored" alarms will be in log files.

IMPORTANT Changes to severity are only applied to future occurrences. Any current or previously existing alarms are unchanged.

1. Click **Alarms** in the left-hand menu panel.

2. Click **Alarm override** to display options.

Result: The following page displays.

Label ^	Default severity ⇅	Current severity ⇅	Trigger failover ⇅
Connection to router lost	critical	major	no
Connection to server lost	critical	unchanged	yes

Search in table

Rows per page: 20

« < 1 > »

3. Click the **Current severity** for the specific alarm to display options.

Example:

Processing type All

Search in table

Label ^	Current severity ⇅
Connection to server lost	major

Result: A list of severity options displays.

4. Select a severity from the list.

WARNING Changing the severity may increase or decrease the possibility of failover occurrence.

Example:

Active alarms 1 Alarm history Alarm overrides

Processing type All

Search in table

Label ^	Current severity ⇅	Default
Connection to server lost	major	notice
Input audio silent	notice	minor
Network input is backed up	notice	major
		critical

Rows per page: 20

Result: The **Current severity** changes.

Reset the alarm severity to the default setting

Alarm severity can be manually changed. You can reset the alarm severity to the default setting. Changing the **Triggers failover** value impacts the possibility of a failover occurring.

IMPORTANT Changes to severity are only applied to future occurrences. Any current or previously existing alarms are unchanged.

1. Click **Alarms** in the left hand menu.

2. Click **Alarm override** to display options.

Result: The following page displays.

Label ^	Default severity ⇅	Current severity ⇅	Trigger failover ⇅
Connection to router lost	critical	major	no
Connection to server lost	critical	unchanged	yes

Rows per page: 20

3. Click the **Current severity** for the specific alarm to display options.

Example:

Processing type: All

Label ^	Current severity ⇅
Connection to server lost	major

Result: A list of severity options displays.

Example:

Processing type: All

Label ^	Current severity ⇅	Default
Connection to server lost	major	notice
Input audio silent	notice	minor
Network input is backed up	notice	major
		critical

Rows per page: 20

4. Select a severity from the list.

WARNING Changing the severity may increase or decrease the possibility of failover occurrence.

Result: The **Current severity** changes.

Events

Events are displayed in the **Alarms** page. Events notify you of actions that do not impede proper functioning.

An example of an event when you intentionally start or stop a service.

Alarm history

Date ▾	Label ⇅	State ⇅	Severity ⇅	Server ⇅	Info
2018-01-10T15:16:15.443000	Network input signal loss	raised	critical	mfel101	Source for service=VideoNde;inputNetwork:
2018-01-10T15:16:14.501000	License in start period	cleared	minor	mfel101	Service starts for a short period without che
2018-01-10T15:16:14.422000	License in start period	raised	minor	mfel101	Service starts for a short period without che
2018-01-10T15:16:14.347000	Encoding started	event	notice	mfel101	Encoding is started for service=VideoNde
2018-01-10T15:15:41.339000	Capture buffer is empty	cleared	notice	mfel101	Capture buffer is empty for service=VideoNde
2018-01-10T15:15:41.339000	Network input signal loss	cleared	critical	mfel101	Source for service=VideoNde;inputNetwork:
2018-01-10T15:15:41.226000	Input video still image	cleared	minor	mfel101	Input video still image for service=VideoNde
2018-01-10T15:15:41.207000	Input video signal lost	cleared	major	mfel101	Video input lost for service=VideoNde;input
2018-01-10T15:15:41.199000	Encoding stopped	event	notice	mfel101	Encoding is stopped for service=VideoNde
2018-01-10T15:14:31.650000	Input video still image	raised	minor	mfel101	Input video still image for service=VideoNde

Display alarms

Check alarm details for services or failover groups.

1. Display the list of items that have an alarm.

Example:

- [Services](#)
- [Failover groups](#)

Name ⇅	Processing Type ⇅	Alarm Status ⇅	Running State ⇅
Demo_group	Live Encoding		Backups in use

Rows per page:

2. Click the alarm symbol in the **Alarm Status** column.

NOTE The alarm icon is only clickable for service alarms.

Result: The [Alarms](#) page displays. [Alarm information](#) may vary depending on service type.

NOTE All **time stamps are in Universal Time (UTC)**.

License management

Manage licenses

MediaKind solutions offer flexible licensing models. Each model depends on your solution and installation options. A service can be configured but can only be processed for a limited period of time without a license (grace period).

License servers and installation

The license manager is a micro-service application installed on a server, or on 2 servers if in redundancy mode. By default, the Controller hosts this application that is identified by a *Licensing* processing type.

The license manager may also run on dedicated servers for very large configurations.

-
- TIP** View [license details per feature](#) to display:
- [license usage per feature](#)
 - [license codes](#)
 - [license expiry dates in Universal Time](#) (UTC)
-

Display license details

There is a license code per feature. Licenses are required for features and options in the MediaKind solution and have expiry dates.

- IMPORTANT**
- Licenses are managed by a License Manager.
 - The License Manager is a micro-service application installed by default on the Controller server or a dedicated license server.
 - There may be more than one license server if your solution is installed in redundancy.
-

1. [Display servers](#).

Result: The servers display.

2. Click  for the server with the **Licensing processing type**.

NOTE The *Licensing* processing type may display for the Controller server if the licensing manager is installed on the same machine as the Controller.

3. Select the **Licenses** tab.

Example:

General System Settings Statistics **Licenses**

Import licenses Delete licenses Revert to previous licenses Export licenses

License server

Licensing server status **started**

Server license-manager-0 locking code *14GS978S3Q8J6PJ

Server license-manager-1 locking code *158WKUH95BJ4XJX

License pool status

Search in table

Feature	Code	Expiry	Type	Usage
MFELms Media Conditioning	FAT1023464/85	Never	Aggregate	0/15
MFELms Video Processing	FAT1023464/88	Never	Exclusive	3/10
MFELms Dolby Dec 2 0	FAT1023464/89	Never	Additive	0/5
MFSms Video Processing	FAT1023975/1	Never	Exclusive	3/4000
MFS-CA PER SVC	FAT1023975/2	Never	Exclusive	0/4000

Rows per page: 20

Result: The license information displays.

NOTE All time stamps are in Universal Time (UTC).

Request license file

This is your first time connecting to your MediaKind user interface and you want to request a license file.

1. [Display license details.](#)

Result: The licensing information displays for the specific server.

2. Copy the version of Controller and the locking code, including the asterisk (*) and paste into the email or file you plan to send to MediaKind.

Example:

General System Settings Statistics **Licenses**

Import licenses Delete licenses Revert to previous licenses

License server

Licensing server status **started**

Server controller1 lockina code *1H6R3AEP5SHMLB7

Server controller2 locking code *1L85347KU4JUAB6

IMPORTANT In redundant solutions:

- Multiple locking codes display per server.
- Provide both locking codes.

3. Copy and paste the LAC reference number for your Software Handling Community to the same file or email and send to your MediaKind representative.

NOTE The LAC reference number and the Software Handling Community details are in the software Delivery Note. See software installation package.

Import license file

New license files are available from the support center.

Prerequisites:

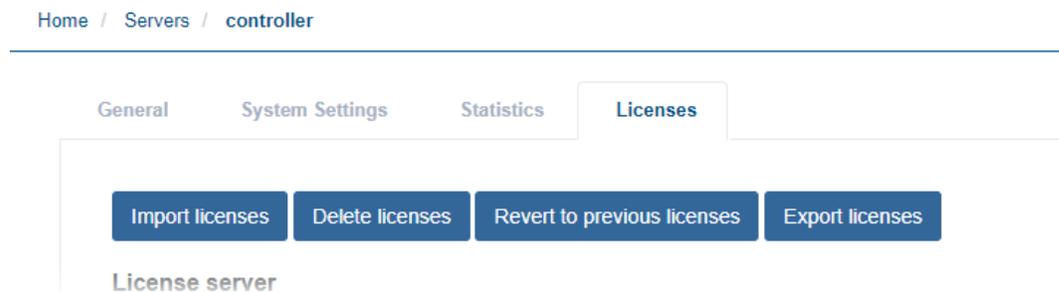
- The new license file needs to be available on the machine.
- Only configuration and admin users can import license files.

1. [Display the license details.](#)

Result: The licensing information displays for the specific server.

2. Click **Import license** > **Select file** to browse and select the file to import.

Example:



Result: A summary displays.

TIP If an error occurs, keep a copy of the error number and contact support.

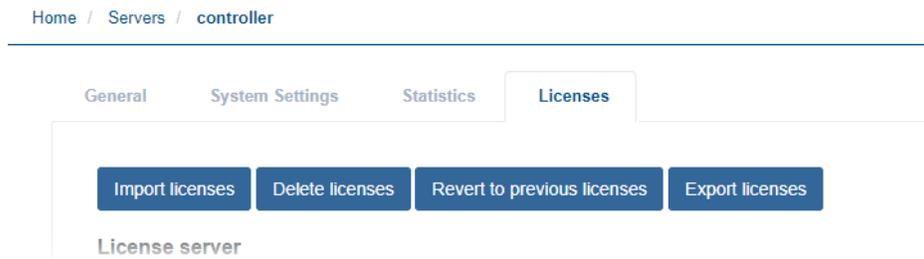
Revert to the previous license file

This feature is helpful when solving import errors that restrict license use. **Only use if MediaKind support staff approves a revert.**

1. [Display the license details.](#)

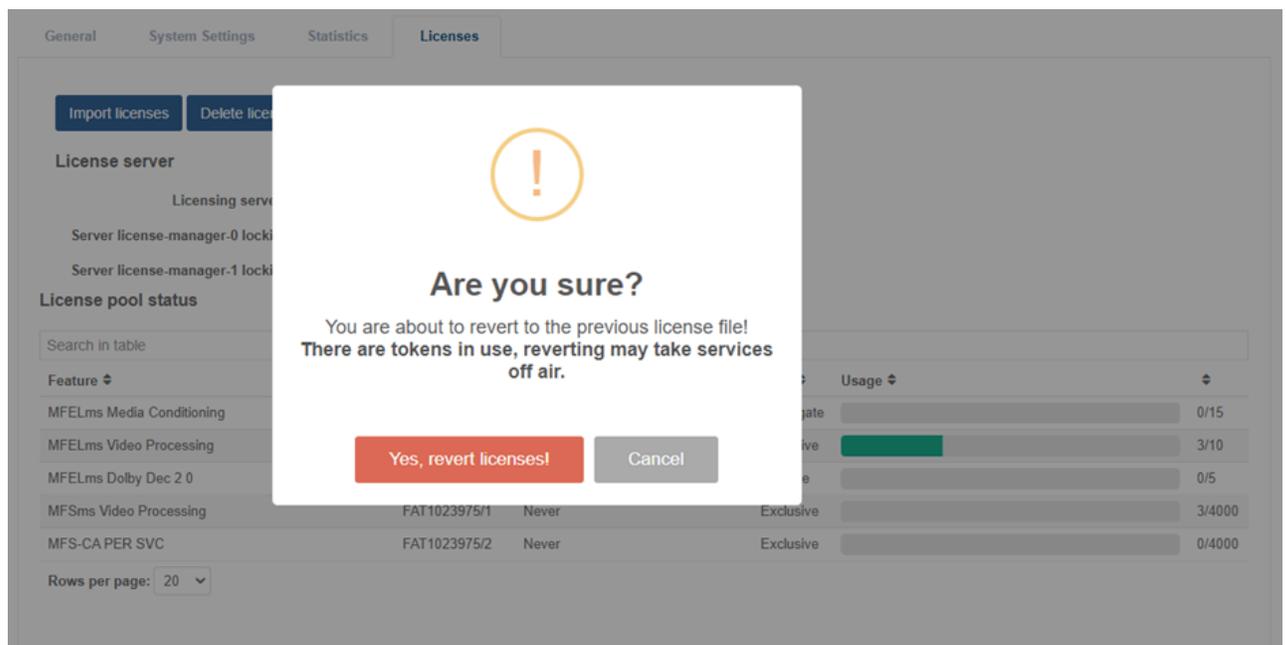
2. Click **Revert to previous licenses**.

Example:



Result: You are prompted to confirm.

NOTE If any tokens are in use, you will be warned that services may go off air.



3. Click **Yes, revert licenses** to confirm.

Result: The last license file import is discarded and the previous file is used.

License information details

License information displays in a table. View information on license usage and availability per feature. Find license codes (FAT codes) for administration and support.

Each feature has a **type** of license that can be Exclusive or Aggregate.

- Exclusive licenses override licenses and the newest license takes priority.
- Aggregate licenses are cumulative.

As more license token are added, the total quantity increases. You can not mix Aggregate and Exclusive licenses for a feature. **For example:**

Exclusive: An exclusive license code completely replaces any older licenses with a new license, as described in the following example use cases:

- For an **Exclusive** license of **100** licenses, loading a new **Exclusive** license of **120** licenses, results in **120** licenses.
- For an **Exclusive** license of **100** licenses, loading a new **Exclusive** license of **80** licenses, results in **80** licenses.
- For an **Aggregate** license of **100** licenses, loading a new **Exclusive** license of **80** licenses, results in **80** licenses.

Aggregate : An **Aggregate** license co-exists with multiple **Aggregate** licenses of the same feature and version. The hard and soft limit of the **Aggregate** licenses are aggregated, yet the start and expiry dates of the individual license strings are maintained in an independent manner, as described in the following example use cases:

- For an **Aggregate** license of **100** licenses, loading a new **Aggregate** license of **120** licenses, results in 220 licenses.
- For an **Aggregate** license of **100** licenses, loading a new **Aggregate** license of **80** licenses, results in **180** licenses.
- For an **Aggregate** license of **100** licenses, loading a new **Trial Aggregate** license of **40** licenses, will temporarily result in **140** licenses. When the trial expires, you will revert to **100** licenses.

NOTE All time stamps are in Universal Time (UTC).

The screenshot shows the 'Licenses' tab in a management interface. At the top, there are navigation tabs: 'General', 'System Settings', 'Statistics', and 'Licenses'. Below these are four action buttons: 'Import licenses', 'Delete licenses', 'Revert to previous licenses', and 'Export licenses'. The 'License server' section shows the 'Licensing server status' as 'started'. Below this, two server locking codes are listed: 'Server license-manager-0 locking code *14GS978S3Q8J6PJ' and 'Server license-manager-1 locking code *158WKUH95BJ4XJX'. The 'License pool status' section features a search bar and a table with columns for Feature, Code, Expiry, Type, and Usage. The table contains five rows of license data. At the bottom, there is a 'Rows per page' dropdown set to 20.

Feature	Code	Expiry	Type	Usage
MFELms Media Conditioning	FAT1023464/85	Never	Aggregate	0/15
MFELms Video Processing	FAT1023464/88	Never	Exclusive	3/10
MFELms Dolby Dec 2 0	FAT1023464/89	Never	Additive	0/5
MFSms Video Processing	FAT1023975/1	Never	Exclusive	3/4000
MFS-CA PER SVC	FAT1023975/2	Never	Exclusive	0/4000

Display license token usage

Use the **Reports** menu to review the Encoding On-Demand license usage.

Delete licenses

This feature should only be used to clean up a system with erroneous licenses (accidental mix of aggregate and exclusive), or after a trial period, to clean up the database. **Only use if MediaKind support staff approves a revert.**

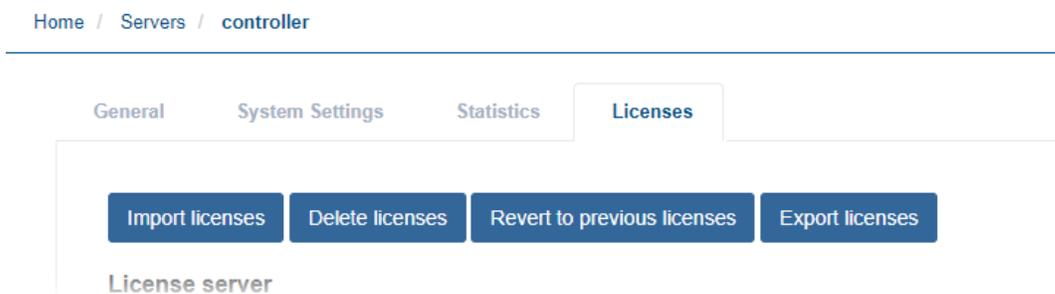
By default, only admin level users have the privilege to delete the licenses. A delete action can be undone by clicking **Revert to previous licenses**.

1. [Display license details](#).

Result: The licensing information displays for the specific server.

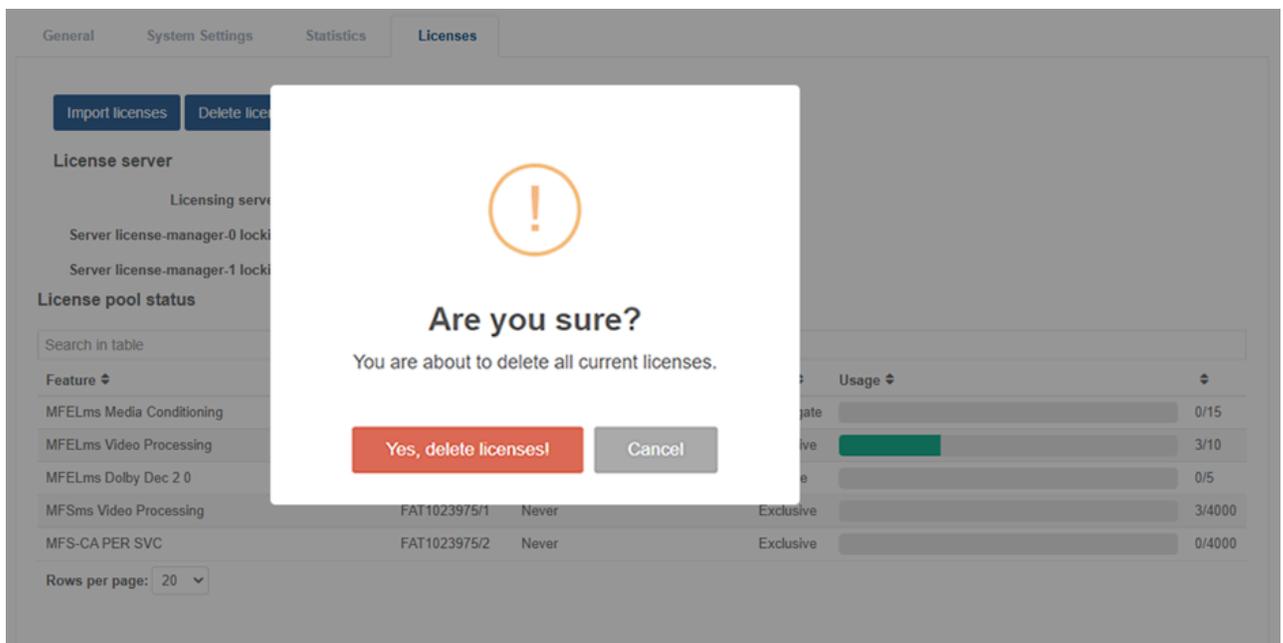
2. Click **Delete licenses**.

Example:



Result: You are prompted to confirm.

NOTE If any tokens are in use, you will be warned that running services will stop.



3. Click **Yes, delete licenses!** to confirm.

Result: The delete action may take a few seconds. The current licenses are deleted. No licenses should remain visible in the UI.

Export licenses

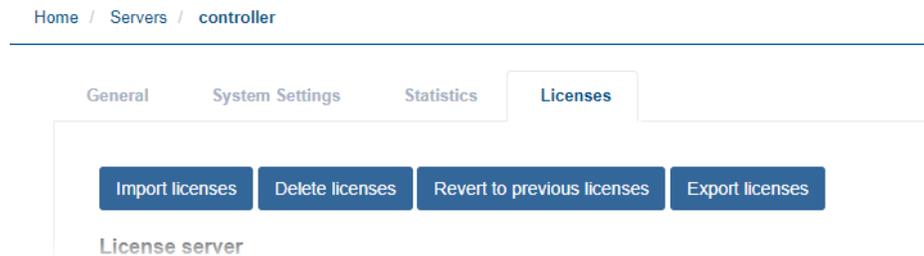
Exporting the current licenses can be useful to troubleshoot license issues, or remove trial licenses. The licenses are exported in the same text format as the file expected for license import.

1. [Display license details.](#)

Result: The licensing information displays for the specific server.

2. Click **Export licenses.**

Example:



Result: A file downloads to the Web browser default location. The download date in the file name is in the format: YYYY-MM-DD

Front panel

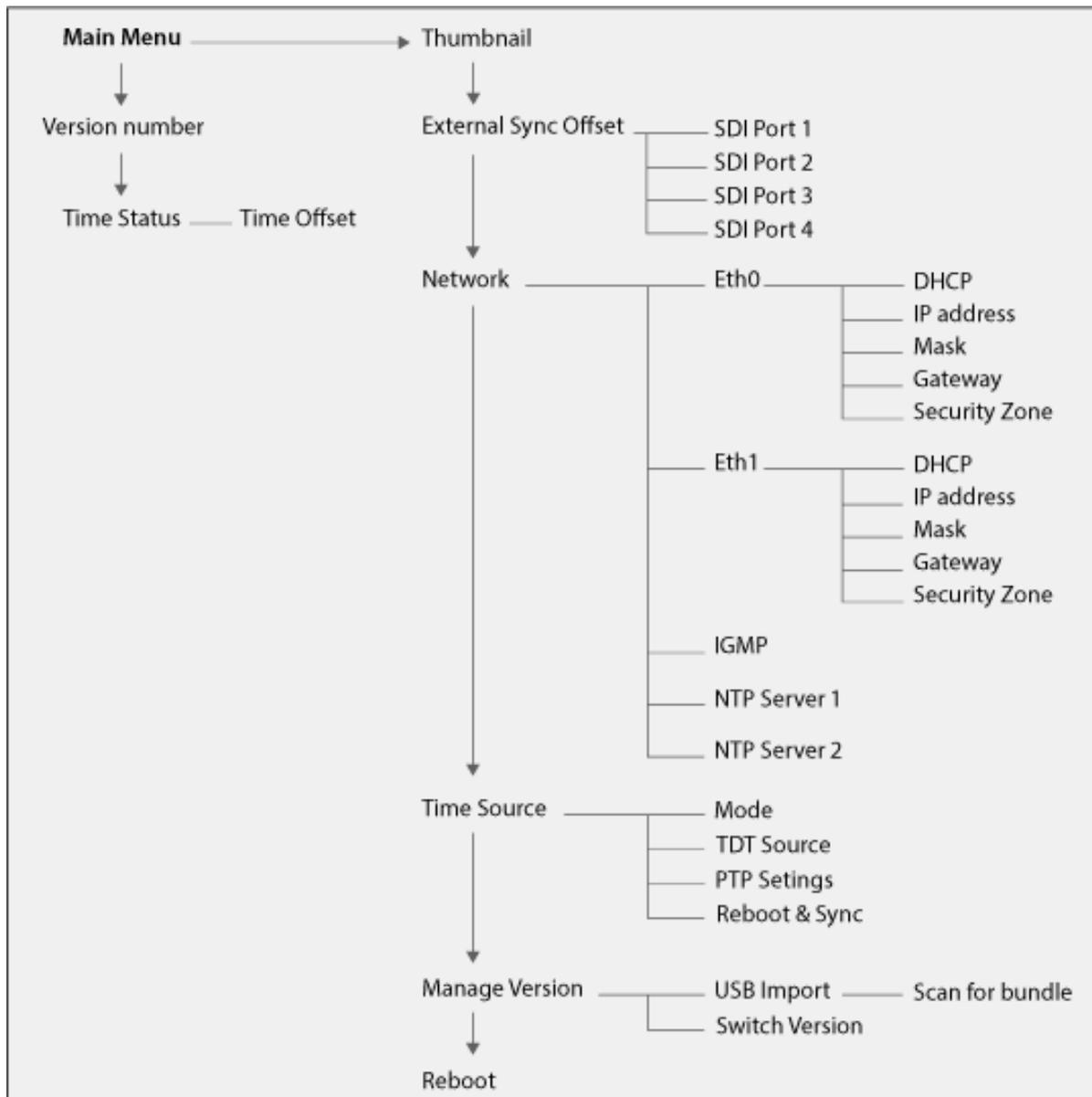
Front Panel LED

At this time, the front panel LED is not used by the software within the server. As such this only shows issues detected by the BIOS at boot.

NOTE Currently this will show an amber warning if one of the power cables is not connected at power up.

Front Panel Menus

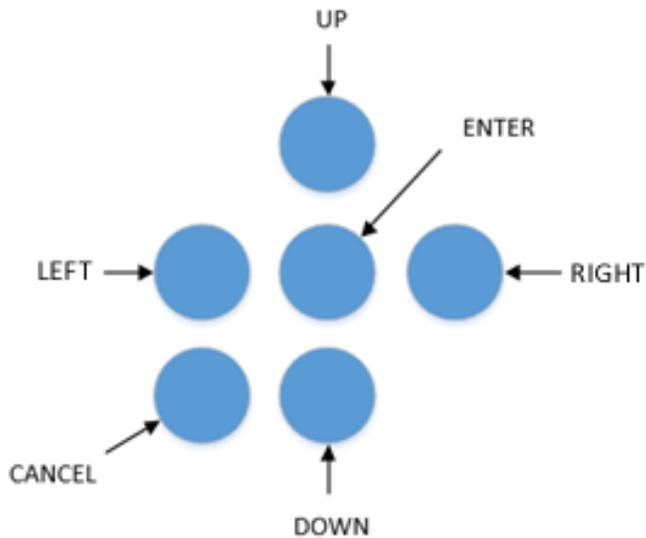
The RX1 contains a front panel which can be used for basic setup procedures, the front panel menu is as shown in the diagram below:



Use of the Front Panel

The following buttons on the front panel can be used to navigate into the menus, make selections, and configure the IP addresses.

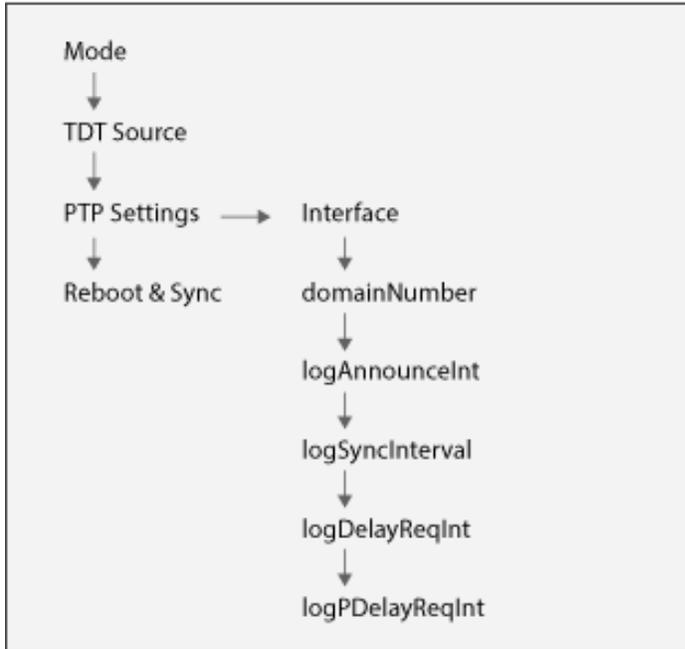
1. Use the **UP**, **DOWN**, **LEFT** and **RIGHT** buttons to navigate and select the parameter to be changed.
2. Use the **UP** and **DOWN** buttons to adjust the value.
3. Press **ENTER** to apply the new value.



Configuring PTP

As part of the setup of SMPTE ST 2110 on the RX1 the location PTP source (master) **MUST** be configured on the RX1.

Currently, this is only possible via the front panel. PTP is available from the **Main menu > Thumbnail > Time Source > PTP Settings** sub-menu on the front panel as shown below:



CHAPTER 10

Parameters Description

Receiver parameters description

Input parameters and statuses

Input parameters vary depending on the **Current input** type.

IP

Current input	Select an input type: IP, ASI, Satellite
Unicast	Set input stream to be unicast NOTE: In Unicast mode, the control is read only.
Stream address	Input stream unicast or multicast IPv4 address
IGMPv3 source filtering	IGMP source IPv4 address. List of addresses using a comma to separate, or leave empty to disable source-specific multicast
UDP Port	Port used to capture the input stream
Network interface	Name of the network interface used to capture the input stream

ASI

Current input	Select an input type: IP, ASI, Satellite
TS packet size	Set 188 or 204 byte packets
Port	Port used to capture the input stream

Satellite

Current input	Select an input type: IP, ASI, Satellite
Status	Status indicating if the source input is shared with other services
Source	Select RF input
LNB frequency	The LNB frequency (low noise block down-converter) in MHz input up to 3 decimal places used with the satellite dish. Typically a value of 9750 MHz or 10600 MHz would be used to cover the satellite KU band frequency range 11.70 GHz-12.75 GHz. With this value correctly entered and with the satellite frequency entered the IRD can calculate the frequency of the wanted signal at L-band present on the input connector.

LNB voltage	<p>Voltage supplied to LNB. Allows the user to turn the voltage off or to set the LNB or to set the following different LNB voltages:</p> <ul style="list-style-type: none">• 13v (Vertical polarization)• 18v (Horizontal polarization)
22kHz	<p>LNB band select. Check to select LNB high band. Clear the check box to select LNB low band.</p> <p>This check box enables the LNB 22 kHz signal to be activated. Enabling the 22 kHz tone will command the LNB to switch to its high band local oscillator frequency.</p>
Frequency	<p>The satellite input downlink frequency. This will normally be within the C-band or KU band frequency range.</p> <p>Alternatively, if the LNB LO Frequency was entered as 0 MHz the user can manually calculate and directly enter the wanted L-band frequency.</p>
Symbol rate	<p>The symbol rate in MSymbols/sec. This field should be entered with the symbol rate of the wanted signal.</p>
Search range	<p>The search range in KHz. Owing to frequency inaccuracies of the transmission system (mostly LNB inaccuracies) the wanted carrier may not be exactly on frequency. This option provides the satellite input with the maximum frequency search limits within which to attempt to acquire the wanted signal. A typical search range is 5000 kHz.</p>
C/N Margin Alarm	<p>Carrier to noise margin alarm threshold in dB.</p>
MIS Enable	<p>Enable multiple input stream (MIS) filtering using the configured MIS stream ID. Multiple Input Stream (MIS) filtering and is not applicable to DVB-S mode.</p> <p>Multiple Input Streams allows multiple independent transport streams in one satellite carrier. When enabled a single transport stream is filtered out of the baseband frames based upon the MIS Stream ID (ISI). This should be disabled for single stream carriers.</p>
MIS Stream ID	<p>The input stream ID (ISI) to be used when MIS is enabled. Defines the Input Stream ID (ISI) filter value when the MIS filter is enabled.</p> <p>Only streams with this ISI value will be output, thus a non-matching ISI value will result in zero bit rate being detected by the unit and will raise TS Unlock alarms.</p>

Gold Code The Gold code sequence seed. The gold sequence code is the seed for a randomizing sequence which can be used to uniquely identify the owner of the transmission. The satellite input will only lock to the incoming signal when the gold code entered into the IRD matched the code set in the up-link modulator. For this reason, the Gold Sequence will often be used as a form of fixed key CA.

Status

Source status Shows whether the input has a transport stream present and the number of services present on the incoming transport stream

CC errors Number of transport stream packets that had continuity count (CC) errors. Each CC error indicates one or more missing transport stream packets for a particular PI

FEC corrected packets Number of transport stream packets that have been corrected by forward error correction (FEC) on the input interface

FEC lost packets Number of transport stream packets that were detected by forward error correction (FEC) as lost on the input interface

Bit rate Total bit rate of the incoming transport stream

Signal strength Input signal strength dBm

Bit error ratio Number of bit errors divided by total number of bits

FEC errors

Delivery system Satellite delivery system

Roll off Enables the selection of a roll-off rate from a drop-down menu.
The DVB-S modulation standard is fixed to 35%.
The DVB-S2 modulation standard provides the options: 20%, 25%, 35%.
Tighter roll-offs (20%, 25%) allow a higher symbol rate to be used within a given allocated bandwidth.
The DVB-S2X modulation standard provides the options: 5%, 10%, 15%, 20%, 25% and 35%.

Pilot Pilot tone presence

Inversion Spectral inversion

Modulation

Decoding parameters and statuses

Decoding

Service	Select the service to decode
Delay mode	The delay mode of the service, one of Compatibility Default: Standard

Video

Input	Select a PID to decode from the incoming stream or manually enter a PID value to decode
--------------	---

Audio

Auto Select	Auto select audio streams. This disables manual selection
Input	Select a PID to decode from the incoming stream or manually enter a PID value to decode
Output channel configuration	Select the output audio format from the decoder Possible values: Stereo, 5.1, 16 or Pass-through

Data

Input	Select a PID to decode from the incoming stream or manually enter a PID value to decode
Data type	Select the data format to be decoded Possible values: Ancillary or Teletext

Service status

Selected service	Program number (and service name if present)
PCR PID	Numeric value PCR PID being used for the reference clock to decode the selected service

Video status

PID	Numeric value of the PID being used to decode the video from the incoming transport stream
Rate	Elementary stream rate of the video being decoded
Codec	Video codec being used to decode the video
Chroma	Format of chrominance samples Example: 4:2:2 or 4:2:0

Bit depth	Number of bits precision in each luminance/chrominance sample
Resolution	Video resolution being decoded
Aspect ratio	Signalled aspect ratio of the video being decoded Example: 4:3 or 16:9
Frame rate	Frame rate of the video being decoded Example: 25Hz / 29.97Hz / 50Hz / 59.94Hz

Audio Status

Audio X	Displays status as OK or Error the audio PID being decoded, the audio codec being used, the channel mode and the bitrate
----------------	--

Status

SFP Slot1	Displays SFP type
SFP Slot2	Displays SFP type

Decrypt parameters

BISS Mode	The BISS decryption mode Example: Mode 1 or Mode E
BISS Key	The BISS key to decrypt the service Range: 0-9 or A-F
BISS-CA	Enable or disable BISS-CA decryption.
Director Hardware ID	Unique ID that will be provided to the Director headend operator before the receiver can be authorized to decrypt secure content. NOTE: Setting the Director Hardware ID to None disables Director functionality for that service.
Director secondary keys	Director secondary key file provided by the Director headend operator via a secure mechanism.

Related Tasks

[Set BISS to mode 1](#) on page 86

[Set BISS to mode E](#) on page 86

[Supplying the Director headend information](#) on page 97

[Loading a Director secondary key](#) on page 98

Related Information

[Managing BISS-CA entitlements](#) on page 93

CAM parameters

CAM slot	Selects the CAM to be used for decrypting the incoming service to be decoded.
Explore CAM	Extracts the status information and allows setting CAM manufacturer parameters.
Reset CAM	Resets the CAM in the selected spot.

SDI output parameters and status

General parameters

Link mode	Select SDI format for UHD video output. <ul style="list-style-type: none">• Quadrant and Interleaved use 4 x 3G outputs.• 12G SDI replicates the output on all 12G ports, falling back to Interleaved if there are no 12G ports available.
Output interface	The SDI output port
Dynamic range signalling	Transfer characteristics and colorimetry
Clock reference	Clock reference of the SDI output. <ul style="list-style-type: none">• Free running uses an internally generated reference clock.• Input transport stream synchronizes to incoming PCRs.• External sync synchronizes to externally provided framesync pulses.• Remote production is as External sync but also enables SDI output buffer level synchronization across appliances.

Dynamic range conversion	If incoming stream contains high dynamic range video content, convert it to standard dynamic range video on this output. If the incoming stream is already SDR, then conversion is silently bypassed.
3G-SDI level	Select SMPTE mapping scheme for 3G-SDI.
Video failure mode	Defines the behavior of the SDI output when the video decode fails.

Audio

Component	Select which decoded audio to embed in the SDI output.
Embedding	Select the position where the audio component will be embedded in the SDI output.
Add component	Add a single entry to the list of audio components.
Add all	Add all decoded audio components to the list of embedded audio components.
Remove all	Remove all entries from the list of embedded audio components.

Data

VITC/Time code	If present at the input, VITC/time code information will be inserted in the output SDI at the selected line number.
AFD/BAR	If present at the input, AFD (Active Format Description) information will be inserted in the output SDI at the selected line number.
Closed captioning	If present at the input, closed captions information will be inserted in the output SDI at the selected line number.
OP-47 teletext	If present at the input, OP-47 teletext information will be inserted in the output SDI at the selected line number.
SMPTE 2031 teletext	If present at the input, SMPTE 2031 teletext information will be inserted in the output SDI at the selected line number.

Status

SFP Slot1	Displays SFP type Example: 3G / 12G / HDMI
SFP Slot2	Displays SFP type Example: 3G / 12G / HDMI

Backup parameters

Host	Remote server Hostname or IP address. Possible values: 32 characters max
Port	IP Port for the secure FTP or FTPS connection. Possible values: 1 to 65535 Recommended value: 21
Path	Backup file storage directory on the remote server. This path is a relative path , and must exist on the remote server. Possible values: 128 characters max
Username	For the secure FTP connection. Must be a valid secure FTP or FTPS server user. Possible values: 16 characters max
Password	Allows the configured username to connect to the secure FTP server. Possible values: 16 characters max

Related Concepts

[Backup and restore configurations](#) on page 183

Backups include services, server definitions, and locally defined users. You can back up your configurations to restore a previous configuration (for upgrades or rollbacks or after a server crash, etc.)

Failover parameters

Group name	Enter a unique failover group name for your selected primary and backup servers.
Group processing type	Select the processing type to display compatible servers.
Group mode	In Automatic mode, the system triggers a server failover when a critical alarm occurs (manual triggers are still possible).

Related Tasks

[Create a failover group](#)

License parameters

Licensing server status **started:** the server is running and available.

Licensing version License software version installed on the license server.

Feature Processing options per processing type.

Code The license code used to identify the feature.

Expiry The date when the feature is no longer available unless the license is renewed.

Usage The current use of licenses in relation to the total of available licenses.

Count The total licenses currently used in relation to the total of available licenses.

Related Concepts

[Manage licenses](#) on page 196

Multiplexing parameters description

Multiplexing services parameters

All Parameters followed by an asterisk (*) in the UI are mandatory.

Default values, if any exist, are already supplied in the UI.

Table 4. Common parameters

Parameter name	Description	Possible values
Name	Used to identify multiplexer service.	String of max 32 characters

Output parameters

Primary

Stream address	Destination IP address for Transport Stream packets.
Port	The destination port for Transport Stream packets.
Network Interface	Specifies the interface (as seen by the operating system) used to communicate with members of the statmux group.
Time to Live	Output Time To Live represents the maximum number of routers a multicast packet can reach before being discarded. Possible values: 0 to 255
Mode	The secondary has the same parameters available as the primary. Some parameters may be greyed because they use the parameters set for primary.
Enable FEC	When enabled, FEC packets are generated to protect the media packets.
Server filter	Pattern used to direct output to specific servers in 1+1 redundancy use cases. Use * as a wildcard to substitute characters in server names. NOTE: *_PRIMARY. Output is handled by all assigned servers respecting the defined pattern (SERVER1_PRIMARY).

Secondary

Stream address	Destination IP address for Transport Stream packets.
Port	The destination port for Transport Stream packets.
Network Interface	Specifies the interface (as seen by the operating system) used to communicate with members of the statmux group.
Time to Live	Output Time To Live represents the maximum number of routers a multicast packet can reach before being discarded. Same as primary. Possible values: 0 to 255
Mode	The secondary has the same parameters available as the primary. Some parameters may be greyed because they use the parameters set for primary.
Server filter	Pattern used to direct output to specific servers in 1+1 redundancy use cases. Use * as a wildcard to substitute characters in server names. NOTE: *_PRIMARY. Output is handled by all assigned servers respecting the defined pattern (SERVER1_PRIMARY).

Add input parameters

Add input

Name Input name is used to identify the multiplexer input

Sources (Primary and Secondary)

Stream address	Destination IP address used to capture Transport Stream packets.
Port	Destination UDP used to capture Transport Stream packets.
Network Interface	Input network interface name specifies the one (as seen by the operating system) used to capture Transport Stream packets.
FEC Enabled (Requires RTP)	When enabled the FEC packets can be used to try to recover missing media packets.
Source addresses	List of comma separated IPv4 addresses used to filter the sources of the current input (based on IGMPv3 protocol).

Example

172.18.2.39 or 172.18.2.39,172.18.2.40

Stream processing

Service

Name A user friendly name for the service. Note that this is not the Service Name, which must be configured via the Service Descriptor.

Program number The program number of the output service, present in the PAT and SDT.

Live Encoding parameters description

General Parameters

General parameters

Name	Service name
Template	Live encoding template that used to create a new service. If no template is selected, service is created from scratch.
Hardware acceleration (Intel QSV)	Activate Intel QSV to accelerate decoding and encoding. If enabled some parameters are unavailable. This option is used for Input types MPEG2 TS/UDP and SDI. NOTE: When selected, some parameters are grayed out in the other tabs.
QSV Device	Define the QSV/SG1 device to run service. If running on QSV previous generation (Intel E3 CPU), select device 1. For QSV new generation (SG1/GPU), select the suitable number.
ESAM server network interface	Network interface used for ESAM out-of-band messages applied to the entire service. NOTE: To configure the ESAM out-of-band, go to the Input tab.
SCTE-104 server network interface	Network interface used for SCTE-104 out-of-band messages applied to the entire service. To modify, open the General tab.

Automation

Activate	Define an automation system to trigger events with the encoder. The Automation system can be any external Automation System. The Automation System can use either SCTE 104 and SCTE 30 interfaces or ESAM interfaces.
Interface Type	Protocol used with automation system.
POIS URL	RESTRICTION: Only available with ESAM . URL for the POIS (Placement Opportunity Information Service) (if any).
POIS network name	RESTRICTION: Only available with ESAM . ID shared with the POIS for the current channel.

POIS zone identity	RESTRICTION: Only available with ESAM . The area ID for this channel distribution. Commonly used for regionalization.
Assets directory	You can specify the directory where assets are stored. Must be an absolute directory path (starting by "/"). For logo and blackout files, an http url is also possible.

Services synchronization

Activate	Define network parameters for the synchronization between two encoders. The synchronization is used either for 1+1 availability or split encoding (distribution of one ABR channel over several HW resources).
Mode	Specifies which streams will be synchronized. Only "All" (audio + video + subtitles + metadata) is available.
Pool name	Unique ID to identify the services that need to be synchronized together.
Network interface(s)	List of names of the network interfaces used for synchronization. Use a comma to separate. Only one is mandatory. Two maximum can be set.
Address	Multicast address used for synchronization.
Port	Port used for synchronization.
Output source address	IP address specified as source in the IPv4 header for synchronization communication. If empty, source address of network interface from which packets are sent is used.
IGMPv3 source filtering	IGMP source IP address. List of addresses allowed in IGMPv3. Use a comma to separate.

Dual output prevention

Network interface	The name of the network interface used for dual output prevention.
Address	Multicast address used for dual output prevention.
Port	Port used for dual output prevention.
Group name	A group gathers a pair of encoders for which dual output prevention is managed. The group name field identifies the group. Format: String respecting the following rules [a-zA-Z0-9-_{1,32}

Input parameters

Input - General parameters

- Type** Input streams are either compressed or uncompressed, over a variety of interfaces.
- If IP: supports compressed MPEG2 TS with MPEG-2, H.264 and H.265 codec up to UHD.
 - If SDI: supports uncompressed inputs with SD, HD and UHD resolutions depending on the SDI board.
 - If SDI/IP: supports uncompressed input over IP, up to HD resolution, following SMPTE ST 2022-6 standard.
 - If RTMP: supports H.264 up to HD resolution and AAC only.
 - If SMPTE ST 2110: supports uncompressed input over IP, up to HD resolution, following SMPTE ST 2110 standard.
 - If MediaComposer : specific input to manage dynamic sources use cases via interface with an ESAM Signal Processing System (as MediaKind PRISMA).

Encoder can ingest SMPTE-2022-6 and encode it to any format with any codec.

As for SDI, video and audio are extracted from the input stream.

SD and HD formats are supported up to 1080p60. Any HD format will require a 10GB network and a hardware with a 10 GbE input port.

MPEG-2 TS/UDP parameters

- Input redundancy** Choose the redundancy settings: two modes can be set when two multicast sources (primary and secondary) are available. In active/passive mode, the passive source is idle and doesn't even join the multicast address or capture UDP packets. In active/active mode, both sources capture in parallel, provide statistics on transport and demux layers, but only one source is fully decoded at any given time.

Input loss timeout The time between the loss of input (full stream or elementary stream) and the switch to another source
Possible values: From 1000 to 9999 ms

SDI parameters

Ingest UHD Select to enable UHD capture. UHD capture uses the first four input connectors on the SDI card for quad 3G-SDI (2 sample interleave or square division) or the first input connector for 12G-SDI format.

Connector SDI port used to capture this specific service

SDI card number Select the SDI card number to use.

Input label Input label used for SDI input router, mandatory in case of failover configuration. The label is case sensitive and should match with router settings.

Format: String of 32 characters maximum. Allowed characters: letters (lower and upper case), digit, _ and -

NOTE: See [Router configuration](#) on page 179.

SDI/IP parameters

Input loss timeout The time between the loss of input (full stream or elementary stream) and the switch to another source

RTMP parameters

Network interface Name of the network interface used to capture the input stream

Stream name Name of the stream to request from RTMP server.

Connection retry period Period to wait between source reconnection retries.
Possible values: From 1 to 10 seconds.

Input buffer length Period of input material to buffer before starting decode. A longer buffer will be more tolerant to input network issues, but will introduce more delay.
Possible values: From 1 to 10seconds.

SMPTE ST 2110 parameters

Input redundancy Choose the redundancy settings: SMPTE ST 2022-7 aims at providing against data loss at the IP packet level when two identical streams are received. Mellanox ConnectX-6 card is required to select this mode. None provides no redundancy in the event of failure.

NOTE: When **SMPTE ST 2022-7** is selected as **Input redundancy** then only the primary source is displayed. You can create a secondary source and specify the network interfaces, as well as the stream indices independently within the SDP file and a single SDP file location or URL for both sources.

NOTE: Thanks to the Mellanox card connectX-6 Dx, Encoding Live benefits from the Rivermax library for ST 2110 ingest. It supports:

- ST 2110-20: HD Video-only
- ST 2110-30, ST 2110-31: Audio
- ST 2110-40: Data

This requires a specific license which is being bought alongside the cards. The default path where Rivermax expects to find the license file is: **/opt/mellanox/rivermax/rivermax.lic.**

NMOS Enabled Enables NMOS for EL service.

Max Skew Define the maximum acceptable timestamp difference between the two input streams, beyond which an alarm will be raised and/or stats updated to indicate skew.

Possible values: From 10 to 450 ms ms

MediaComposer parameters

Input loss timeout The time between the loss of input (full stream or elementary stream) and the switch to another source

Related Information

[Configuring the input stream general parameters](#)

Input - Source error management

Switch on ES data loss Switch to backup source if video or audio is lost.

Delay **NOTE:** Needs to be defined if **Switch on ES data loss** is activated.

The amount of time between the video or audio loss and the switch to the backup source.

SDI/IP parameters

- Network interface** Name of the network interface used to capture the input stream.
- Slate if no source at start** Display an image when live input is not yet detected. The replacement image can be defined in Video processing>Freeze frame management section (Media Processing tab).
- Default frame rate** **NOTE:** Needs to be defined if **Slate if no source at start** is activated.
Default frame rate used when live input is not yet detected..

Sources parameters

MPEG-2 TS/UDP parameters

- Network interface** Name of the network interface used to capture the input stream.
- Stream address** Input stream unicast or multicast IPv4 address
NOTE: Only defined source addresses can be used to retrieve the multicast stream.
- Port** Port used to capture the input stream
Example:1234
- IGMPv3 source filtering** IGMP source IP address. List of addresses allowed in IGMPv3 using a comma to separate.
Example:239.2.3.123

FEC port(s) Port(s) used to activate FEC (Forward Error Correction) and resolve RTP packet loss issues due to network transport. Use a comma to separate in case of dual mode. One port (column) or two ports (combined row and column) can be set, in any order. Data is retrieved from these ports. Note: Leave this field empty if you want to disable the FEC support.

- NOTE:**
- In case of mono FEC mode, only column is used. In case of dual FEC mode, both column and rows are used.
 - In dual FEC modes, statistics are displayed for both the column and row.

FEC quality indicator		Primary receiving
Corrected packets		0
Discarded FEC packets		1
Status		enabled
Missing FEC packets		0
Total FEC bit rate (bps)		1064832
Unrecovered packets		20
Streams		
Type		row, column
Status		enabled, enabled
Port		1238, 1236
Missing FEC packets		0, 0
Bit rate (bps)		210560, 854272

Input synchronization mode Input can be synchronized based on PMT program ID or on VCT major and minor channel numbers or the stream PIDs. Make a selection based on the information present on the input stream.

Program ID Select the correct program from the MTPS input stream.
Possibles values: From 1 to 65535

Major channel The major channel number present in the VCT
Possible values: From 1 to 99

Minor channel The minor channel number present in the VCT
Possible values: From 1 to 999

PCR PID Enter the packet identifier of the Program Clock Reference. This clock is used to synchronize audio and video packets. If left blank, the PCR PID is set to the output Video PID.
Possible values: From 16 to 8190

Stream address	Input stream unicast or multicast IPv4 address
NOTE:	Only defined source addresses can be used to retrieve the multicast stream.
Port	Port used to capture the input stream <i>Example:1234</i>
IGMPv3 source filtering	IGMP source IP address. List of addresses allowed in IGMPv3 using a comma to separate. <i>Example:239.2.3.123</i>

SMTPE ST 2110 parameters

Network interface Name of the network interface used to capture the input stream.

RTMP parameters

Server URL URL of RTMP server to connect to.

Media Composer parameters

Input redundancy	Choose the redundancy settings: two modes can be set when two multicast sources (primary and secondary) are available. In active/passive mode, the passive source is idle and doesn't even join the multicast address or capture UDP packets. In active/active mode, both sources capture in parallel, provide statistics on transport and demux layers, but only one source is fully decoded at any given time.
Primary interface	Name of the input interface used to capture the input stream.
Secondary interface	Name of the input interface used to capture the input stream (secondary source).

Related Tasks

[Configuring the input stream source\(s\)](#) on page 110

Video input parameters

Video PID	Numerical identifier of the video track. Enter "auto" to capture the video present in the input stream. Possible values: From 1 to 65535
Decoding capability	Select codec(s) to be decoded. Specific licenses are required for AVS+ and AVS2 decoding.

SMPTE ST 2110 parameters

SDP File Location	Location of SDP file describing the input stream. Either a URL or a file location.
Stream Index	Index of stream within the SDP file. 1 is the first stream.

Related Tasks

[Adding a video stream](#) on page 111

Related Information

[SMPTE ST 2110 SDP file](#)

Audio input parameters

MPEG-2 TS/UDP parameters

Audio ID Type	Choose the audio stream type used to identify the input audio stream. Possible values: PID , Language
PID	Numerical identifier of the audio track. Or auto to use any language in the stream.
Language	Audio track languages in ISO 639 format (3-letter code, lowercase). This can be defined using a comma to separate, or enter 'auto' to use any language.
Decoding capability	Select Dolby if you decode Dolby Digital or Dolby Digital Plus. Select Dolby E if Dolby E decoding is required (SDI or SDI/IP only). Specific licenses are required for Dolby decoding.

SDI parameters

Type	Type of audio to create (1) Audio (2) Aggregated audio: Used to extract up to 5.1 audio tracks from the SDI audio pairs
Audio Pair	NOTE: Only available with Audio type. Select the stereo audio pair (Group/Pair).
Audio format	NOTE: Only available with Audio type. Select if the audio format should be automatically detected or forced. For uncompressed/Dolby E Pass-through select either "AES Uncompressed audio" or "Dolby E" as the input format, and "SMPTE-302/Dolby E Pass-through" from the encoding menu. Dolby E input will not work with Dolby AC-4. To decode/re-encode Dolby E select Auto or SMPTE-337 compressed input as the input format.

Decoding capability **NOTE:** Only available with **Audio** type.

Select Dolby if you decode Dolby Digital or Dolby Digital Plus. Select Dolby E if Dolby E decoding is required (SDI or SDI/IP only). Specific licenses are required for Dolby decoding.

Dolby E program **NOTE:** Only available with **Dolby E** decoding capability.

The Dolby E algorithm is optimized for handling discrete multichannel audio programs and multiple audio programs. Encoded audio channels are grouped as programs that are typically mono (one channel), stereo or matrix surround (Lt/Rt) encoded (two channels), or discrete six-channel audio with five full-range channels and a bass-only Low-Frequency Effects (LFE) channel (5.1 channels).

Dolby E makes use of the available data space only for the number of audio channels that are present, so requiring less space if fewer than eight audio channels are used. The channel configuration is determined at the time of encoding, allowing users to choose the best mode for the specific application.

Possible values: See [table below](#).

Mode **NOTE:** Only available with **Aggregated audio** type.

Defines the number of channels to configure. In case of 5.1 audio, 6 channels need to be configured: Left, Right, Center, LFE, Left surround and Right surround.

PCM audio mapping **NOTE:** Only available with **Aggregated audio** type.

You can aggregate multiple SDI audio pairs to have up to 5.1 streams. Associate the Group/pairs **SDI (Gn Pn)** with **Left** and **Right** as needed by scrolling the menus.

Channel	Device	Track
Left	SDI (G1P1)	Left
Right	SDI (G1P1)	Right
Center	SDI (G1P2)	Left
LFE	SDI (G1P2)	Right
Left surround	SDI (G2P1)	Left
Right surround	SDI (G2P1)	Right

Table 5. Dolby E Program Configurations

Program	Configuration Program	Channel count	Sequence	Channel Sequence
0	2	8	5.1+2	0L, 0C, 0Ls, 1L, 0R, 0LFE, 0Rs, 1R
1	3	8	5.1+1+1	0L, 0C, 0Ls, 1C, 0R, 0LFE, 0Rs, 2C
2	2	8	4+4	0L, 0C, 1L, 1C, 0R, 0S, 1R, 1S
3	3	8	4+2+2	0L, 0C, 1L, 2L, 0R, 0S, 1R, 2R
4	4	8	4+2+1+1	0L, 0C, 1L, 2C, 0R, 0S, 1R, 3C
5	5	8	4+1+1+1+1	0L, 0C, 1C, 3C, 0R, 0S, 2C, 4C
6	4	8	2+2+2+2	0L, 1L, 2L, 3L, 0R, 1R, 2R, 3R
7	5	8	2+2+2+1+1	0L, 1L, 2L, 3C, 0R, 1R, 2R, 4C
8	6	8	2+2+1+1+1+1	0L, 1L, 2C, 4C, 0R, 1R, 3C, 5C
9	7	8	2+1+1+1+1+1+1	0L, 1C, 3C, 5C, 0R, 2C, 4C, 6C
10	8	8	1+1+1+1+1+1+1+1	0C, 2C, 4C, 6C, 1C, 3C, 5C, 7C
11	1	6	5.1	0L, 0C, 0Ls, 0R, 0LFE, 0Rs

12	2	6	4+2	0L, 0C, 1L, 0R, 0S, 1R
13	3	6	4+1+1	L, 0C, 1C, 0R, 0S, 2C
14	3	6	2+2+2	0L, 1L, 2L, 0R, 1R, 2R
15	4	6	2+2+1+1	0L, 1L, 2C, 0R, 1R, 3C
16	5	6	2+1+1+1+1	0L, 1C, 3C, 0R, 2C, 4C
17	6	6	1+1+1+1+1+1	0C, 2C, 4C, 1C, 3C, 5C
18	1	4	4	0L, 0C, 0R, 0S
19	2	4	2+2	0L, 1L, 0R, 1R
20	3	4	2+1+1	0L, 1C, 0R, 2C
21	4	4	1+1+1+1	0C, 2C, 1C, 3C
22	1	8	7.1	0L, 0C, 0Ls, 0Bsl, 0R, 0LFE, 0Rs, 0Bsr
23	1	8	7.1 screen	0L, 0C, 0Ls, 0Lc, 0R, 0LFE, 0Rs, 0Rc
24-63	Reserved	Reserved	Reserved	Reserved

SDI/IP parameters

Audio Pair Select the stereo audio pair (Group/Pair).

Audio format Select if the audio format should be automatically detected or forced. For uncompressed/Dolby E Pass-through select either "AES Uncompressed audio" or "Dolby E" as the input format, and "SMPTE-302/Dolby E Pass-through" from the encoding menu. Dolby E input will not work with Dolby AC-4. To decode/re-encode Dolby E select Auto or SMPTE-337 compressed input as the input format.

Decoding capability Select Dolby if you decode Dolby Digital or Dolby Digital Plus. Select Dolby E if Dolby E decoding is required (SDI or SDI/IP only). Specific licenses are required for Dolby decoding.

Dolby E program **NOTE:** Only available with **Dolby E** decoding capability.

The Dolby E algorithm is optimized for handling discrete multichannel audio programs and multiple audio programs. Encoded audio channels are grouped as programs that are typically mono (one channel), stereo or matrix surround (Lt/Rt) encoded (two channels), or discrete six-channel audio with five full-range channels and a bass-only Low-Frequency Effects (LFE) channel (5.1 channels).

Dolby E makes use of the available data space only for the number of audio channels that are present, so requiring less space if fewer than eight audio channels are used. The channel configuration is determined at the time of encoding, allowing users to choose the best mode for the specific application.

Possible values: See [table above](#).

Stream Index	Index of stream within the SDP file. 1 is the first stream.
SDP File Location	Location of SDP file describing the input stream. Either a URL or a file location.
Channel Group Index	Index of channel group within the SDP audio stream. 1 is the first channel group.
Audio format	Select if the audio format should be automatically detected or forced. For uncompressed/Dolby E Pass-through select either "AES Uncompressed audio" or "Dolby E" as the input format, and "SMPTE-302/Dolby E Pass-through" from the encoding menu. Dolby E input will not work with Dolby AC-4. To decode/re-encode Dolby E select Auto or SMPTE-337 compressed input as the input format.
Decoding capability	Select Dolby if you decode Dolby Digital or Dolby Digital Plus. Select Dolby E if Dolby E decoding is required (SDI or SDI/IP only). Specific licenses are required for Dolby decoding.

Channel Order Select if the audio channel groups should be automatically read from the SDP file or manually specified.

Possible values: M, DM, ST, LtRt, 51, 71, 222, SGRP ⁽¹⁾

For multi-channel audio, Encoding Live relies on the SDP file to specify how audio channels are grouped, but the channel order parameter that specifies the quantity and order of audio channels is optional in the SDP file. If the channel order is not specified, you can manually specify it.

1. See table below.

Table 6. Channel Order Convention Grouping Symbols

Channel Grouping Symbol	Quantity of Audio Channels in group	Description of group	Order of Audio Channels in group
M	1	Mono	Mono
DM	2	Dual Mono	M1, M2
ST	2	Standard Stereo	Left, Right
LtRt	2	Matrix Stereo	Left Total, Right Total
51	6	5.1 Surround	L, R, C, LFE, Ls, Rs
71	8	7.1 Surround	L, R, C, LFE, Lss, Rss, Lrs, Rrs
222	24	22.2 Surround	Order shall be per SMPTE ST 2036-2, Table 1
SGRP	4	One SDI audio group	1, 2, 3, 4

Channel Grouping Symbol	Quantity of Audio Channels in group	Description of group	Order of Audio Channels in group
U01...U64	As indicated by Grouping Symbol (Unn where nn is the number of channels in the group)	Undefined	None specified, the order of channels in this group is Undefined.

NOTE The Channel Order described above was developed such that phase-coherent multichannel audio groups (or simply mono channels) can have their channels clearly defined within SDP. It does not attempt to provide any “higher level” description of the purpose of the audio channels (such as “secondary language”). It only addresses fixed multichannel audio groups commonly used at the time of publication of this document, and does not attempt to deal with object-based audio.

NOTE The 5.1 Surround and 7.1 Surround channel orders defined in Table 1 are based on typical ordering of those channels found in SMPTE ST 2035, EBU R 123, and SMPTE ST 429-2.

Related Tasks

[Adding an audio stream](#) on page 112

Related Information

[SMPTE ST 2110 SDP file](#)

In-band metadata input parameters

Type Input metadata expected format.
NOTE: Once metadata is created, its type cannot be edited as it may impact a stream configured in Encoding > Metadata encoding. To change the type, delete the metadata and create a new one.

MPEG-2 TS input type

PID Corresponds to the stream identifier in the MPEG-2 TS stream. Otherwise use the "auto" setting for automatic detection.
 Possible values: From 16 to 8190 or "auto"

Delay If metadata stream is SCTE-35, a delay adjusts the trigger time value.
 Possible values: From -30000 to 60.000 ms

Automation stream Stream used for automation.

SDI or SDI over IP input type

DPI PID index Specifies the index to the DPI PID which will carry the resulting splice_info_sections.
 Possible values: From 0 to 65535

Delay If metadata stream is SCTE-35, a delay adjusts the trigger time value.
Possible values: From -30000 to 60.000 ms

Related Tasks

[Adding Metadata](#) on page 114

Out-of-band metadata input parameters

SCTE-35 00B

Network name	Corresponds to the Acquisition Point Identity defined in the ESAM specification.
Zone identity	Corresponds to the Zone Identity defined in the ESAM specification.
ESAM server network interface	Network interface used for ESAM out-of-band messages applied to the entire service.
Recover conditioning state if failover	If "POIS" is selected, this options enables to keep the conditioning status after an encoder failover by asking to an external system. NOTE: If "POIS" is elected, you have to enter the POIS URL and the POIS network interface name. : Configuration of POIS to recover is mandatory if: <ul style="list-style-type: none">• live service is restarted during EAS,• or input dual source redundancy.• or live service failover. Else let the filed to No .

Automation stream Stream used for automation.

SCTE-104/IP 00B

DPI PID index	Specifies the index to the DPI PID which will carry the resulting splice_info_sections. Possible values: From 0 to 65535
SCTE-104 server network interface	Network interface used for SCTE-104 out-of-band messages applied to the entire service. To modify, open the General tab. NOTE: Can be modified from this field if not yet set in the General tab, otherwise the field is grayed out.
Automation stream	Stream used for automation.
Splice countdown insertion	Insert splice countdown field in adaptation field around splice points.Insert splice countdown field in adaptation field around splice points.

Splice countdown insertionSplice null period	Insert splice countdown field in adaptation field around splice points. Possible values: From 400 to 3600000
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Related Tasks

[Add out-of-band Metadata](#) on page 115

[Configure input parameters](#)

Cross-stream prevention metadata input parameters

When multiple channels are broadcast on the network, operators need to ensure that the distributed content actually corresponds to the expected channel. MediaKind Encoding Live proposes a cross-stream prevention mechanism. This feature allows the operator to add an ID to a stream. This ID can then be read and checked by all the systems downstream.

NOTE The cross-stream prevention feature relies on ANSI/SCTE35 2016 (Digital Program Insertion Cueing Message for Cable standard).

Stream ID Stream ID value inserted in SCTE-35 messages for cross-stream prevention.

Period Time period between SCTE-35 messages.

Related Tasks

[Configure cross stream prevention](#)

Subtitle input parameters

Type Input subtitles expected format..

Teletext

Subtitles ID type Subtitles can be captured using either the stream PID or the subtitles language..

PID Numerical identifier for subtitles track
Possible values: From 1 to 65535

SCTE-27

Subtitles ID type Subtitles can be captured using either the stream PID or the subtitles language..

PID Numerical identifier for subtitles track .
Range: From 1 to 65535

DVB-Subtitles

PID Numerical identifier for subtitles track .
Range: From 1 to 65535

ARIB B24

PID Numerical identifier for subtitles track .
Range: From 1 to 65535

Media processing parameters

Video processing parameters

Video prefiltering

Deblocking filter Removes the MPEG-2 blocking artifacts. This filter is fully automated to remove the blocking and ringing effects.

Cross-talk filter Removes noise by processing noise in the source frame by frame. If activated, reduces cross-color and cross-luminance artifacts remaining in the input video.

The cross-color processing is only visible on "rainbows" in PAL and NTSC sequences. If the video has been scaled beforehand, the filter is not efficient. That's why the cross-color processing is deactivated on HD sequences.

The cross-luminance artifact is a temporal effect; it is not transformed after upscale. The filter is still efficient on HD sequences.

Sharpening filter Filter applied on all output profiles with a resolution lower than the selected resolution. Used to increase image sharpness. Example: Enhance text readability on lower resolutions.

Spatial denoising filter Removes noise by processing noise in the source frame by frame.
Possible values: Off, Low, Medium, High

Diamond filter Removes noise by processing noise in the source frame by frame. The adaptive mode uses both edges and noise detection filters to choose the areas to filter, and to adapt the filtering strength.
Possible values: Off, Medium, High, Adaptive

MCTF Removes noise by processing noise in the source with a temporal factor. Has a 7 -frame rolling window. The "Adaptive" mode uses a noise detection filter to adapt the filter strength.
Possible values: Off, Low, Medium, High, Adaptive

Related Tasks

[Configuring the video prefiltering](#) on page 119

Video adjustment

Crop overscan	Removes the input video overscan area from each edge (left, top, right and bottom).
Adaptive inverse telecine	NTSC content is encoded at 30 fps unless the filter is selected.
Frame rate conversion	You can convert the frame rate from PAL to NTSC or NTSC to PAL. Video frame rate can be converted from PAL to NTSC (25i to 29.97i / 50p to 59.94p) or NTSC to PAL (29.97i to 25i / 59.94p to 50p). Subtitles, closed captions or timecode are not converted.
Aspect ratio	Aspect ratio can be pass-through from WSS and AFD information. You can also force the aspect ratio to 16/9 or 4/3. Possible values: Auto , Force 16/9 , Force 4/3 NOTE: See Picture aspect ratio handling on page 268 for more information.
Noise edge removal	Number of lines removed from the top of the video (up to 6 in SD and 14 in HD) Possible values: From 0 to 6 for SD, from 0 to 14 for HD NOTE: 0 means no adjustment.

Related Tasks

[Configuring the video adjustment parameters](#) on page 119

Related Information

[Output aspect ratio and cropping management](#) on page 268

Video colorimetry

Brightness, Contrast, Saturation, Temperature, Hue, Gamma	You can adjust these parameters by dragging the sliders back and forth or enter a value. Possible values: from -100 to +100 in whole digit increments. NOTE: A value of 0 has no effect.
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Related Tasks

[Configuring the video colorimetry parameters](#) on page 119

Freeze frame management

Activate	Display a replacement image when an input freezes (due to input loss or image freeze), if this option is deactivated, then the last decoded image is displayed.
Type	The replacement image can be predefined or custom.
Image	Replacement image displayed when input freezes (due to input loss or image freeze)
Image URL	The path to the replacement image (GIF, PNG or JPEG file). Syntax can be HTTP://path or /path.
Insertion delay	The time between the loss of input (full stream or elementary stream) and the switch to another source

Related Tasks

[Configuring image on frame freeze](#) on page 119

Audio processing parameters

Mute	Tick the checkbox to mute the audio volume.
Forced language	Overwrites the language of the audio track. If not set the original language is kept. Possible values: 3 alphanumeric characters

Advanced

Force audio type	Indication set in audio type. <ul style="list-style-type: none">• Clean effects: indicates that the referenced program element has no language.• Hearing impaired: indicates that the referenced program element is prepared for the hearing impaired.• Visual impaired commentary: indicates that the referenced program element is prepared for the visually impaired viewer.• Primary: indicates the default recommended language.• Native: indicates the language in which the program was produced.• If not set, no override is performed.
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Using audio description When present in the source, this signals the use of audio description. It carries mono audio on the left channel and modulated pan/fade data on the right channel of an AES stereo pair.

Audio delay Adjust the delay between audio and video. Example: helps resolve lip sync issues.

Possible values: From -300 to 300

Downmix compression mode Select a mode for Dolby input stream downmixing from 5.1 to stereo.
Possible values: **Line mode**, **RF mode**

Target loudness

Mode Select the required target loudness mode:

- "Static gain" to set a fixed gain.
- "Loudness control" to use a pre-defined standard or set a target loudness.
- "Advanced Loudness control" for country specific regulatory (requires specific licenses).

Profile Select a pre-defined standard or "Custom" (only available in "Loudness control" mode) to define a target loudness

Target loudness Maintains the audio level at the level defined by the Target loudness parameter.

Gain Amplify or attenuate the incoming signal.
Possible values: From -100 to 20

Dolby E to PCM fallback

Audio Select a fallback audio input stream to switch on if Dolby E is no more available on this stream. A fallback audio input stream must have been previously defined.

Watermarking

See [Audio watermark parameters](#) on page 257.

Cue tones

Extract DTMF Enable DTMF extraction for detecting cuetones.

Related Tasks

[Configuring the audio processing parameters](#) on page 120

Audio watermark parameters

Nielsen Linear watermarking

Insertion

Process type	Linear watermarking insertion process type
SID	RESTRICTION: Only available with NAES watermarking. Linear watermarking insertion source ID One or more SIDs (Source Identification) are assigned to each content provider or distribution source. Included as a component of each watermark, the SID uniquely identifies the distribution source.
CBET SID	RESTRICTION: Only available with CBET watermarking. Linear watermarking insertion CBET source ID
Check digits	RESTRICTION: Only available with NAES watermarking. Two upper-case alpha characters, corresponding to the SID that are assigned by Nielsen. If the check-digit string does not match the SID, the authenticator does not permit watermarking with the SID.
CBET Check digits	RESTRICTION: Only available with CBET watermarking. Two upper-case alpha characters, corresponding to the CBET SID that are assigned by Nielsen. If the CBET check-digit string does not match the SID, the authenticator does not permit watermarking with the CBET SID.
Enable CBET Step-aside mode	RESTRICTION: Only available with CBET watermarking. Activate the CBET step-aside mode. Determines the method of CBET insertion mode when prior encoding is detected on the same layer. The default mode is overwrite but you can enable the step-aside mode.
Distribution type	Linear watermarking insertion distribution type Typically Program Content watermarks are assigned to syndication content or to content providers (i.e. broadcast networks etc.), while Final Distributor watermarks are assigned to local broadcast affiliates or to cable network content.

Existing N2 Watermarks

RESTRICTION: Only available with NAES watermarking.

Linear watermarking NAES II insertion mode

Specifies whether the watermark engine overwrites existing NAES audio watermarks of the same type as the watermark that is currently proposed for insertion.

- If the mode is set to **Refrain**, then preexisting watermarks are left intact; new watermarks are inserted only in portions of the audio stream where there are no preexisting watermarks.
- If the mode is set to **Overwrite**, then the watermark engine replaces the original watermarks with the new one.

Extraction

Watermark	Type of watermark that must be extracted from this audio track.
Distributor ID	DNS domain name of the company or entity operating the device. NOTE: This value must be identical for each watermarking within the same service.
Breakout code	Type of content that must be extracted..

Nielsen RTVOD

Extraction

Distributor ID	DNS domain name of the company or entity operating the device..
Breakout code	Type of content that must be extracted..

Encoding parameters

Video encoding parameters

- [General parameters](#)
- [Codec settings](#)
- [Video processing](#)
- [GOP settings](#)
- [Aspect ratio](#)
- [Stream metadata settings](#)
- [Subtitle settings](#)
- [Shared encoding](#)

General parameters

Rate control	<p>Define how the bitrate is managed for this stream. Trick Play only applies to CBR.</p> <p>Possible values: VBR, CBR, CVQ (Constant Video quality), Statmux</p> <p>NOTE: In case of H.264, the stream remains compliant with the normative HRD.</p> <ul style="list-style-type: none">• With CBR (Constant bit rate), you can stream content over a limited bit rate channel such as a network. The output stream fits in one bit rate, which you specify as a parameter. Constant bit rate means that the bit rate is constant according to the leaky bucket concept.• For more information on Statmux, see Statmux, Statistical rate control.
Trick play	<p>Provides a low frame rate video stream that can be used for Trick play. This option requires CBR and is not compatible with shared encoding.</p>
Low delay encoding	<p>RESTRICTION: Only available with CBR rate control.</p> <p>This mode decreases latency by forcing the encoder to use a simplified codec analysis. The video quality is impacted, and only CBR mode is allowed.</p> <p>NOTE: If activated, Buffer duration in Codec settings section is limited to Short and Custom values.</p>
CVQ mode	<p>RESTRICTION: Only available with CVQ rate control.</p> <p>Define how to manage bandwidth in CVQ rate mode. Select Average bit rate to define Target bit rate in kbps. While keeping homogeneous quality, this mode guarantees the Target bitrate over a long period of time (several hours). Select Quality level to define a Target quality using a decimal number on a scale from 1.0 to 5.0.</p>
Target quality	<p>RESTRICTION: Only available with CVQ rate control.</p> <p>Define the Target quality of the CVQ encoding using a decimal number on a scale from 1.0 to 5.0. 5.0 is the highest quality.</p>
Network interface	<p>RESTRICTION: Only available with Statmux rate control.</p> <p>Name of the network interface used to exchange the statmux messages</p>
Pool name	<p>RESTRICTION: Only available with Statmux rate control.</p> <p>Each statmux stream is included in a pool that defines the global multiplex bitrate. This parameter defines the pool this stream must be attached to.</p>
Minimum bit rate	<p>RESTRICTION: Only available with Statmux rate control.</p> <p>In statmux each stream is encoded in VBR. Minimum bit rate defines the lowest bit rate limit.</p> <p>NOTE: This bit rate can be changed on-the-fly.</p>

Maximum bit rate **RESTRICTION:** Only available with **Statmux** or **VBR** rate control.
In statmux, VBR or CVQ mode, each stream is encoded with variable bitrate. Maximum bit rate defines the highest bit rate limit.

NOTE: This bit rate can be changed on-the-fly.

Target bit rate Bandwidth used to encode the video stream.
Possible values: From 100 to 60000 kbps

NOTE: the limit is set to 150000 kbps when **Hardware acceleration** is set to **Vega** and when **Resolution** is set to **UHD**.

NOTE: Video bit rate corresponds to "raw" video bit rate, and does not include bit rate overhead due to encapsulation (such as PES headers, MPEG-2 TS headers).

NOTE: This bit rate can be changed on-the-fly.

Hardware acceleration Activate hardware acceleration using optional Vega card or QSV to accelerate encoding. If enabled some parameters are unavailable. QSV can be selected in the General tab

Vega card allows 4:2:2 encoding (H.264 or HEVC).

RESTRICTION: **Vega** is only available in IPTV.

NOTE: If you select **Vega**, you must select the **Hardware Device** and the **Hardware Channel**.

Hardware Device **NOTE:** Only available when **Hardware acceleration** is set to **Vega**.

Hardware device on optional Vega card used for acceleration of encode.
Possible values: 1 or 2

Hardware Channel **NOTE:** Only available when **Hardware acceleration** is set to **Vega**.

Hardware channel used on device for acceleration of encode/decode (HD only).

Possible values: 1 to 4

Resolution Define the output size of each image (length x height).

NOTE: Resolutions are sorted by the total number of pixels per frame.

You can either choose a value from the drop-down list or enter a custom resolution.

Codec The different codecs (MPEG-2, H.264, HEVC) can be used to encode the content. Select a codec and its profile for each video stream.

Video quality mode Different tradeoffs between video quality and density. UP! and UP!+ provide the highest video quality. With Adaptive quality mode the codec leverages ACT (AI Compression Technology) to ensure the best video quality while using all the available resources to process the channel. Adaptive (ACT) is an option if the service runs on constrained resources (like a Kubernetes POD with limited vCPU resources).

- NOTE:**
- The list of available video quality modes depends on codec, rate control, export type and resolutions values.
 - For Internet TV, output a mix of these presets is recommended to optimize both the VQ and the density.

Stream conditioning Conditions stream encoding based on the metadata stream.

- NOTE:** You can select several SCTE-35 streams (either in-band or out-of-band) to condition video streams.

Blackout This blackout configuration will be applied to the related audio/video stream.

Chunking policy Select the policy to apply when a splice occurs (ad insertion, ad replacement, blackout management, etc). The policy applies for both stream conditioning and blackout to ensure relevant chunk sizing.

- **Distribute:** chunks before the splice point are adapted to have the same duration. Subsequent GOP boundaries are modified.
- **Merge:** chunks before or after the splice point are merged. Subsequent GOP boundaries are unchanged.

Figure 16. Chunking policy: Distribute

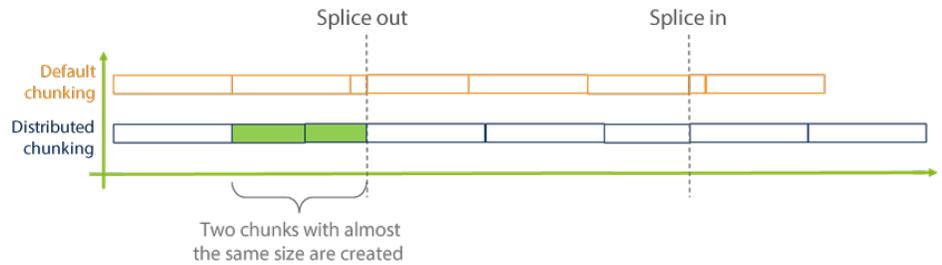
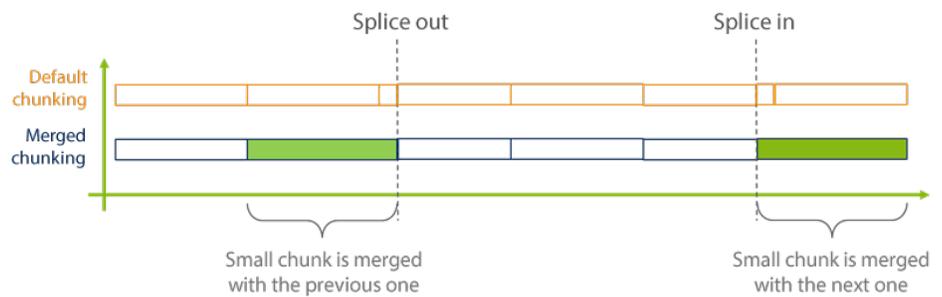


Figure 17. Chunking policy: Merge



Switch to CBR parameters

NOTE Only available when **Rate control** is set to **Statmux**.

Switch to CBR	<p>Enable switching from Statmux to CBR based on SCTE-35 splice triggers. The switch relies on SCTE-35 splice commands: a Splice out is used to exit Statmux rate control and switch to CBR then a Splice in is used to switch back to Statmux.</p> <p>If enabled and configured, when you start the service new buttons are available in the Services > Statistics > Outputs menu:</p> <ul style="list-style-type: none">• Switch to CBR to manually switch from Statmux to CBR.• Switch to Statmux to manually switch back from CBR to Statmux.
Constant bit rate	Bandwidth used to encode the video stream
Triggering stream	Select the SCTE-35 metadata stream used to trigger the switch between Statmux and CBR. Note that SCTE-35 metadata stream codec must be set to conditioning.
Timeout	Timeout in milliseconds for switching back to Statmux. Disabled if not filled. Possible values: from 1s to 24h

Related Tasks

[Configuring the video encoding parameters](#) on page 121

Codec settings

Video quality experience	<p>Select the codec configuration for subjective or objective measurement. If you have a proprietary probe then select MS-SSIM fine-tuning.</p> <p>The last algorithms integrated in our codec improve the subjective video quality: the quality of experience of the end user is increased. However, these specific fine-tuning in the encoder may decrease objective scores measured by automatic metrics such as PSNR, SSIM, MS-SSIM. If the customer wants to evaluate the video quality with one of these metrics, he can select a fine-tuning of the encode to keep high scores. If the customer uses proprietary probes, we recommend choosing MS-SSIM.</p> <p>Possible values: Objective: Human visual fine-tuning or Subjective: SSIM fine-tuning, MS-SSIM fine-tuning, or PSNR fine-tuning</p>
---------------------------------	--

Buffer duration Define the size of the video buffer. Delay increases with buffer size. Encoding quality improves with buffer size. The default values offered correspond to: Short = 500ms, Standard = 1000ms, Long=2000ms. Customizable value in ms is also an option.

NOTE: The video buffer is the standard VBV ([Video Buffering Verifier](#)), it guarantees the encoded stream doesn't overflow or underflow the decoder's buffer.

Possible values: **Short**, **Standard**, **Long**, or **Custom**

- If **Low delay encoding** is activated, **Short** = 500 ms (for both Internet TV and IP TV)
- If **Low delay encoding** is not activated, **Short** = 500 ms, **Standard** = 1000 ms, **Long** = 2000 ms (for both Internet TV and IP TV)

B-frames Select the number of B-frames that will be inserted between two I/IDR or P frames.

B-frames are used to increase quality. They can be considered as interpolated frames between reference frames (I or P), interpolation is done using forward and backward motion vectors used to select pieces of pictures in reference frames.

Modes: (1) Auto: allows the encoder to choose the number of B-frames depending on the source. (2) OFF: If no B-frames are required. (3)(4) 2/3: If the number of B-frames must be fixed.

Coding mode **NOTE:** Only available with **Internet TV** export type.

Modes: (1) Progressive. (2) Interlaced: only available with framerate "regular" and resolution "height" 480, 576 or 1080. In case of shared encoding, only progressive is available.

Frame/field coding mode Video encoding options: (1) Frame only: each image is considered progressive. (2) Field only: each image is considered interlaced. (3) Frame MBAFF: each image is encoded as progressive with a interlaced/ progressive choice at the macroblock level. (4) Auto: recommended setting to automatically detect the best encoding option for each frame.

A picture to be encoded may have interlaced structure (2 fields) or progressive structure. Even though a picture may be interlaced, video quality may be improved with frame coding when the correlation between odd and even fields is very strong.

Dynamic range mode Follow input leaves input format unchanged. Otherwise, the format is converted if necessary: color space, tone mapping (HDR to SDR) or inverse tone mapping (SDR to HDR). HDR formats are only available with HEVC main 10 codec. Dolby Vision formats are only available with progressive outputs (internet TV or UHD).

RESTRICTION: HDR conversions are only available with **HEVC Main 10 bits** codec.

RESTRICTION: **Dolby Vision** is only available with **Progressive** coding mode (Internet TV or UHD).

RESTRICTION: **Dolby Vision** streams are not supported at the input of the encoder.

- **SDR:**
 - Transfer characteristic : BT 709
 - Colorspace: BT 709
- **Dolby Vision 8.1 & 5 :**
 - Backward compatibility to HDR 10

NOTE: If the input source is not HDR 10 (expected format to convert to DV 8.1 or DV 5), a pre-conversion is performed.

- **PQ 10:**
 - Transfer characteristic : EOTF SMPTE ST-2084
 - Colorspace: BT 2020
- **HDR 10**
 - PQ 10 +
 - optional metadata
- **HLG 10**
 - Transfer characteristics: Hybrid Log Gamma
 - Static metadata
 - Colorspace: BT 2020
- **HLG-10 SEI compatibility:** HLG10 SEI compatibility is another way to signal HL-G10 through an SEI message instead of the default VUI parameters. This mode provides backward compatibility with UHD TV/decode system only compatible with version 1 of HEVC (not supporting HLG); that would discard the SEI and interpret the signal as SDR BT.2020.

Related Tasks

[Configuring the video encoding parameters](#) on page 121

Video processing

- Detail enhancement filter** This filter boosts frequencies for improved sharpness. Use this filter when input is downscaled. Example: when converting 1080i to 720p. This filter is applied to the source before encoding starts.
- NOTE:** Compliant with the EIA-608 standard.

Related Tasks

[Configuring the video encoding parameters](#) on page 121

GOP settings

- GOP policy** The GOP policy defines the way GOPs are finished.
- Values: (1) Open: reference frames can be picked across the GOPs. (2) Closed: all the reference frames must be in the same GOP. Impact depends on player capabilities.
- **Open** mode provides the best video quality.
 - **Closed** mode is often used for interoperability.

- Key frame period** Enter the maximum time between two key frames. Key frames are inserted into the video stream periodically to synchronize the decoder and enable it to recover from errors. In an OTT use case, the key frame period defines the chunk duration. Setting the value at 2 seconds will generate a chunk duration of 2000 ms for a PAL/DVB output and 2002 ms for a ATSC/NTSC output.
- Possible values for IPTV: 500 to 10000
- Possible values for Internet TV: 1000 to 10000

Key frame period policy

Enter the maximum time between two key frames. Key frames are inserted into the video stream periodically to synchronize the decoder and enable it to recover from errors. In an OTT use case, the key frame period defines the chunk duration. Setting the value at 2 seconds will generate a chunk duration of 2000 ms for a PAL/DVB output and 2002 ms for a ATSC/NTSC output.

Possible values:

- **Auto:** adjusts the number of B-frames to have a complete sub-GOP before the key frame period, round key frame period to superior GOP size
- **Maximum:** adjusts the number of B-frames to have a complete sub-GOP before the key frame period but round key frame period to inferior GOP size
- **Strict:** not below key frame period (in ms)

Related Tasks

[Configuring the video encoding parameters](#) on page 121

Aspect ratio

Whatever the original stream aspect ratio, the best compromise is always performed by the encoder using the AFD, Video Index information. But you can use a specific aspect ratio scaling (anamorphic, letterbox, center cut or stretching.) to adapt the output to 4:3 or 16:9 aspect ratios for terminal not supporting the dynamic changes.

Aspect ratio adjustment is coupled with cropping when necessary: different modes are available depending of your needs.

Cropping can be used to remove black bars on the sides of the video, remove scrolling banners that are not readable on a handset screen or focus on a specific area of the video.

NOTE See [Output aspect ratio and cropping management](#) on page 268 for more information.

AFD If present at the input, AFD (Active Format Description) information is added in the output stream.

Scaling Method applied to the video when rescaling. The Anamorphic type dynamically adapts the pixel aspect ratio (width x height) per frame. Letterbox inserts black stripes to fit the target aspect ratio. Center cut adjusts the video to keep the subject in the center of the frame and removes the black stripes, Stretching adapts the pixel aspect ratio (width x height) per frame, AFD from input follows the AFD information present in the input. Note: some options are not available with hardware acceleration

Cropping **RESTRICTION:** Only available with **Anamorphic** and **Stretching**.

Specify the cropping value in % of video from Top, Bottom, Right and Left.

Output aspect ratio **RESTRICTION:** Only available with **Letterbox** and **Stretching**.

Targeted output aspect ratio.

Zoom adjustment **RESTRICTION:** Only available with **Letterbox**.

Adjust the zoom level to remove the black bars at the top and bottom of the picture (% of black stripes)

Fallback option **RESTRICTION:** Only available with **AFD from input**.

Fallback value when scaling is based on AFD information and AFD is not present in the stream.

Related Tasks

[Configuring the video encoding parameters](#) on page 121

Related Information

[Picture aspect ratio handling](#) on page 268

[Cropping management](#) on page 269

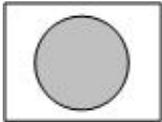
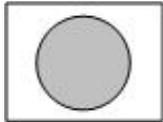
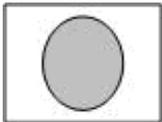
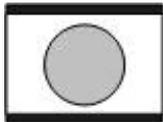
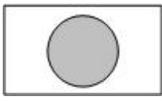
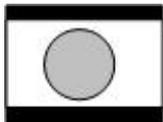
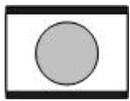
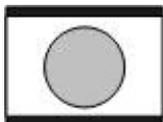
Output aspect ratio and cropping management

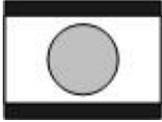
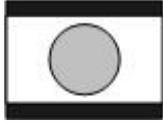
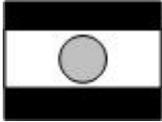
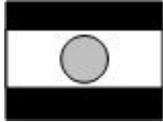
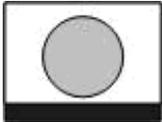
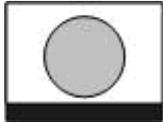
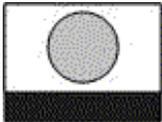
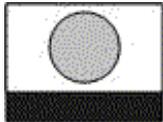
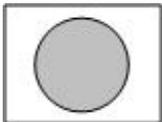
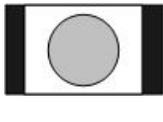
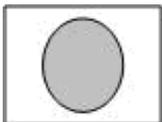
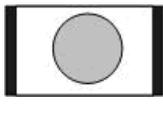
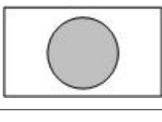
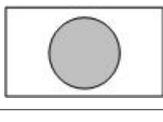
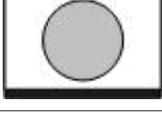
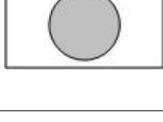
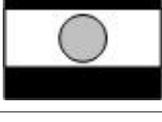
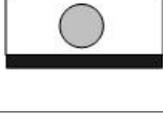
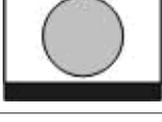
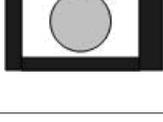
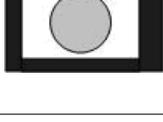
Picture aspect ratio handling

“Auto” aspect ratio handling

If the input video signal embeds WSS information and if the **Aspect ratio** parameter is set to **Auto**, MediaKind Encoding Live can extract the picture aspect ratio (PAR) information and transforms the input video as follows.

NOTE The signal always comes as 4:3, but the picture could be 16:9 anamorphic.

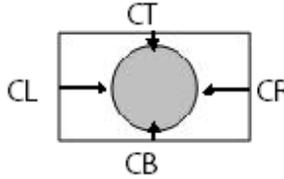
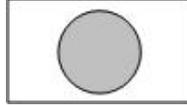
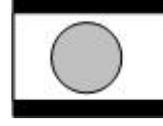
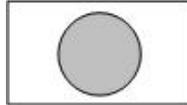
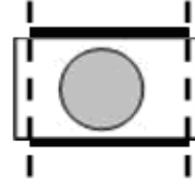
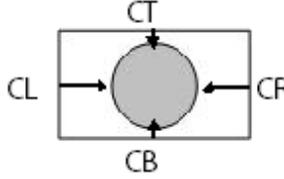
Video Input	WSS Flag	Processing	4:3 Video Output
	4:3 Full	Nothing	
	14:9 Full ⁽¹⁾	Restore PAR and fit in letterbox	
	16:9 Full	Restore PAR and fit in letterbox	
	14:9 Letterbox (center) ⁽¹⁾	Nothing	

Video Input	WSS Flag	Processing	4:3 Video Output
	16:9 Letterbox (center) ⁽¹⁾	Nothing	
	> 16:9 Letterbox (center) ⁽¹⁾	Nothing	
	14:9 Letterbox (top) ⁽¹⁾	Nothing	
	16:9 Letterbox (top) ⁽¹⁾	Nothing	
	4:3 Full	Nothing	
	14:9 Full ⁽¹⁾	Restore PAR and fit in letterbox	
	16:9 Full	Restore PAR and fit in letterbox	
	14:9 Letterbox (center) ⁽¹⁾	Nothing	
	16:9 Letterbox (center) ⁽¹⁾	Nothing	
	> 16:9 Letterbox (center) ⁽¹⁾	Nothing	
	14:9 Letterbox (top) ⁽¹⁾	Nothing	

1. Only available in PAL.

Cropping management

Cropping is managed in a different way depending on the output aspect ratio management.

Cropping method	Parameters	Input display	Output display
Dynamic	Crop Left, Right, Top, Bottom and keep Aspect ratio		
Letter Boxing	Adaptation of input 16:9 to output 4:3 zoom level 0%		
	Adaptation of input 16:9 to output 4:3 zoom level 50%		
Stretch to fit	Crop Left, Right, Top, Bottom and Stretch		

Stream metadata settings

- Timing and VUI insertion** The output streams contains the Timecode and Video Usability Information (VUI), and inserts this information in SEI data and PPS/SPS data.
- Timecode insertion** Passthrough the source timecode located within the NAL SEI (H.264/HEVC) or within the User Data (MPEG-2).
- SCTE-20** If present at the input, SCTE-20 closed captions are added in the output stream or converted to SCTE-20 if input is closed caption (EIA-608 or EIA-708)
 - RESTRICTION:** This option is only available with **IPTV** export type, with **Resolution #720**, **MPEG-2 Main** codec with **Frame/field coding mode** set to **Frame only**.

Related Tasks

[Configuring the video encoding parameters](#) on page 121

Shared encoding (factorization)

This feature aims to share the encoding process of ABR profiles with the same resolution and frame rate. The information is re-used to simplify lower bitrates encoding.

RESTRICTION Shared encoding is only available if **Coding mode** is set to **Progressive** (see [Codec settings](#) on page 263).

Parent encoding The name of the parent encoding stream configuration used to pre-configure this child encoding. Processing for parent and child encodings is mutualized to optimize CPU usage.

IMPORTANT: Parent and child stream will have the same rate control mode (CBR or CVQ).

Target bit rate Bandwidth used to encode the video stream.

NOTE: Configure the parent stream with the highest bitrate, then configure child stream bitrates to be more than half of the parent bitrate.

Related Tasks

[Configuring the video encoding parameters](#) on page 121

Audio encoding parameters

Codec Specify the codec for the audio encoding. "Pass-through" is not supported when audio input is uncompressed. For PCM or Dolby E Pass-through, select "SMPTE-302 / Dolby E Pass-Through". Dolby AC-4 can only be used for demo.

Pass-through specific parameters

Insert silent frames on Signal Loss Generate silent audio when the input source is lost.
NOTE: If you activate this option, associated monitoring statistics are available from the [Service statistics](#) (see [example](#) below).

Glitch supression **RESTRICTION:** Only available if **Insert silent frames on Signal Loss** is checked.

Repeat 3 audio frames before enabling silent audio generation.

Generate silence if no source at start

RESTRICTION: Only available if **Insert silent frames on Signal Loss** is checked.

If the audio service is missing at startup, generate silent frames. Silent frames may be encoded in a different codec to the real audio.

NOTE: Applies to both use cases where Encoding Live is configured either with SDI or as IP input.

Figure 18. Example of audio silence generation statistics

Audio Silence Generation			
Audio_1_encoded_1		Audio_2_encoded_1	
Silence start time	09/04/2021, 16:09:00 (pts=2166617)	Silence start time	N/A
Silence end time	09/04/2021, 16:09:08 (pts=2961497)	Silence end time	N/A
Silent frames since last real frame	0	Silent frames since last real frame	0
Total silent frames	675	Total silent frames	0
Total real frames	651	Total real frames	1350
Audio_1_encoded_2			
Silence start time	09/04/2021, 16:09:00 (pts=2166617)		
Silence end time	09/04/2021, 16:09:08 (pts=2961497)		
Silent frames since last real frame	0		
Total silent frames	276		
Total real frames	651		

SMPT-302 Pass-trough additional parameters

Data Width Data width of AES audio sample to be encoded.
Possible values: **Follow input, 16-bit, 20-bit, or 24-bit**

MPEG-1 Layer II, Dolby Digital, Dolby Digital Plus, Dolby AC-4 parameters

- Watermarking** Type of watermarking insertion to use
- Channels mode** Number of audio channels in the encoded audio track
- Bit rate** Bandwidth used to encode the audio stream
- Sampling rate** Number of audio samples per second defined in Hz
- Frame rate** Frame rate as defined in video input
- Blackout** This blackout configuration will be applied to the related audio/video stream.

Dolby Digital additional parameters

Table 7. Basic parameters

Dialog normalization	Metadata parameter that controls playback gain. Possible values: Auto or, from -1 dB to -31 dB Auto means that no processing will be done on the input.
Dolby Surround mode	Decoders can use this flag to automatically switch on Pro Logic decoding.

Table 8. Advanced parameters

DRC Line Mode Profile	The Dynamic Range Control restricts the signal's absolute peak level for a decoder using the line mode.
DRC RF Mode Profile	The Dynamic Range Control restricts the signal's absolute peak level for decoder using the RF mode.
DC highpass filter	A DC-blocking 3Hz highpass filter applied on the main Dolby channel. Used to remove DC offsets in the program audio. Only switch off in exceptional circumstances.

Dolby AC-4 additional parameters

Language	ISO 639-2 language code (3-letter code) or "auto" to set the language as defined in the input.
Content classifier	Set the content classifier as defined in ETSI TS 103 190. Dolby recommends setting the editorial classification based on this value.

Related Information

[Configuring the audio encoding parameters](#)

Subtitle encoding parameters

General parameters

Codec	Select the codec used to convert the subtitles. DVB-TTML is only valid when ITV export type is used. Closed caption CEA 608 is only valid when both IPTV export type and 25i/50p to 29.97i/59.94p frame rate conversion are used.
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SDI Teletext Pass-through

RESTRICTION Only available with SDI and SDI/IP input.

Adjust display height

RESTRICTION: Only available with **DVB-Subtitles** input subtitles.

Adjust the display height for NTSC resolution. If not checked, optimized for PAL resolution.

Teletext Pass-through

RESTRICTION Only available with **SMPTE ST 2110** input.

Codec	Select the codec used to convert the subtitle, in this case, Pass-Through .
Type	Select Initial Teletext page or Teletext subtitle page .
Language	ISO 639 language
Magazine	1-digit magazine number (1-8) used to identify the Teletext service.
Page	Page number (0-99) used to identify the Teletext service.

DVB-Subtitles

RESTRICTION Only available with **SCTE-27** and **Teletext** subtitles input.

Codec	Select the codec used to convert the subtitles, in this case, DVB-Subtitles .
Magazine	1-digit magazine number (1-8) used to identify the Teletext service.
Page	Page number (0-99) used to identify the Teletext service.
Field	Closed caption field as defined by the standard. Only one of each value is allowed.

DVB-Teletext

RESTRICTION Only available with **ARIB B24** subtitles input.

You should define the following parameters:

- **Codec**
- **Selected stream** section: Selection of the stream to encode in the input subtitle. One subtitle encoding section must be defined per language.
- **Teletext encoding**: Configuration of the encoding of the teletext stream.
- **Teletext descriptor**: Configuration of the descriptor of the teletext stream.

Codec Select the codec used to convert the subtitles, in this case, **DVB-Teletext**.

Table 9. Selected stream

Language Input language to encode in ISO 639 format (3-letter code, lowercase). If not present in the input stream, the subtitles will not be transcoded.

Table 10. Teletext encoding

Magazine 1-digit magazine number (1-8) used to identify the Teletext service.

Page Page number (0-99) used to identify the Teletext service.

Table 11. Teletext descriptor

Codec Select the codec used to convert the subtitles, in this case, **DVB-Teletext**.

Language Input language to encode in ISO 639 format (3-letter code, lowercase). If not present in the input stream, the subtitles will not be transcoded.

Magazine 1-digit magazine number (1-8) used to identify the Teletext service.

Page Page number (0-99) used to identify the Teletext service.

Field Closed caption field as defined by the standard. Only one of each value is allowed.

Closed caption CEA 608

RESTRICTION Only available with **Teletext** subtitle input, **IPTV** export type and **25i/50p to 29.97i/59.94p** frame rate conversion.

Codec Select the codec used to convert the subtitles, in this case, **Closed caption CEA 608**.

Magazine 1-digit magazine number (1-8) used to identify the Teletext service.

Page Page number (0-99) used to identify the Teletext service.

Field Closed caption field as defined by the standard. Only one of each value is allowed.

DVB-TTML

RESTRICTION Only available with **Teletext** input subtitles and **Internet TV** export type.

Codec Select the codec used to convert the subtitle, in this case, **DVB-TTML**.

Magazine 1-digit magazine number (1-8) used to identify the Teletext service.

Page Page number (0-99) used to identify the Teletext service.

Profile Specify the DVB TTML processor profile.

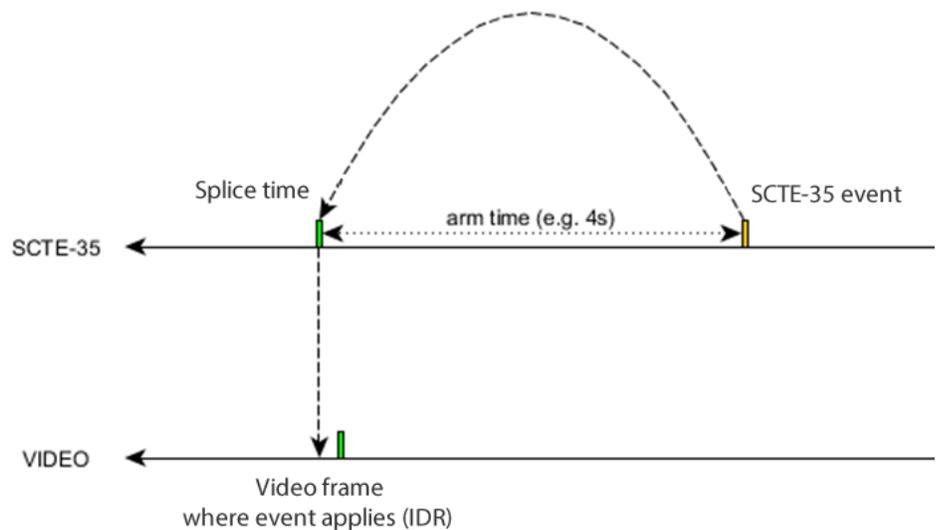
Purpose	Purpose of the subtitle service.
Suitable for TTS	Boolean value that indicates whether the subtitles are suitable for text-to-speech (TTS). If the value is not set, this means unknown suitability.
Forced language	Overwrite the language of the track. If not set the original language is kept (language retrieved from the PMT for MPEG2-TS over UDP sources).3 alphanumerical characters (ISO-639)

Related Tasks

[Configure subtitle encoding](#) on page 124

Metadata encoding parameters

Codec	Select the codec used to refine the stream object type.
Use POIS	NOTE: Only available with Conditioning . Tick this checkbox if you want to define a POIS server.
PTS insertion compensation	NOTE: Only available with Conditioning . Enable pts insertion compensation. If checked, the pts_adjustment of an SCTE-35 event will be adjusted so that the splice_time + pts_adjustment corresponds to the PTS of the video frame, as illustrated below:



NOTE: Arm time is the time that separates the SCTE-35 event from its execution.

Recover conditioning state if failover	If "By Controller" is selected, this option enables to keep the conditioning status after an encoder failover without the need of any external system.
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POIS parameters

Delay	If metadata stream is SCTE-35, a delay adjusts the trigger time value. Possible values: From -30000 to 60.000
URL	URL for the POIS (Placement Opportunity Information Service) (if any)
Network interface	Name of the network interface used to communicate with the POIS
Network name	ID shared with the POIS for the current channel
Zone identity	The area ID for this channel distribution. Commonly used for regionalization.

Tissot clock metadata ID3 parameters

Period	Target frequency of sending encoded metadata. If higher than the key frame period, encoded metadata will only be present on key frames. Possible values: From 0 to 65535 ms
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Timecode ID3 parameters

Origin	Type of the timecode used to filter SMPTE 2038 input.
Period	Target frequency of the Timecode ID3 in ms. Possible values: From 0 to 65535 ms

Blackout parameters

General parameters

Tracks SCTE-35	Select tracks to trigger blackout.. NOTE: Options for this parameter depend on metadata configured in Input .
Trigger	Select the command to trigger blackout.. Possible values: <ul style="list-style-type: none">• spliceOut/SpliceIn: blackout triggered on reception of an SCTE 35 splice out, end of blackout on splice in.• webDeliveryAllowedFlag: blackout triggered on reception of an SCTE 35 containing a web delivery flag set to false.• alternateContent: alternate content triggered on reception of an SCTE 35 message.

Timeout Maximum duration of the blackout. If 0, there will be no maximum duration set.

NOTE: If no "alternate content off" command is received, the blackout will be removed at the end of this timeout.

Range: From 0 to 60000 ms

Specific webDeliveryAllowedFlag & spliceOutSpliceIn parameters

Image URL Enter the path to the replacement image file to display. If empty, a black frame is used..

NOTE: Image URL can be a web URL (**http://server/image**, **https://server/image**) or a local file defined with an absolute path (such as **/directory/filename.png**).

NOTE: Authorized file type are .gif, .png or .jpg.

Specific alternateContent parameters

Default image URL Enter the path to the default alternate content to display. If empty, a black frame is used.

NOTE: Default image URL can be empty, but if an alternate content image with an **Id** and **Image URL** is added, both fields are mandatory.

Id Define an ID used to identify the alternate content to apply. This ID should be passed in the SCTE-35 message triggering the blackout condition. If no alternate content is configured, the default image is used.

Image URL Enter the path to the alternate content to display. The default image is used if no alternate content is configured.

NOTE: Image URL can be a web URL (**http://server/image**, **https://server/image**) or a local file defined with an absolute path (such as **/directory/filename.png**).

NOTE: Authorized file type are .gif, .png or .jpg.

Output parameters

Output general parameters

Transport protocol RTMP, RTMPS or MPEG-2 TS output are possible. Mpeg-2 TS output can use either UDP or RTP transport protocol. Choose RTMP(S) to push content to an external RTMP origin server. The RTMP variant is identified within the publishing point (no mix of variant possible between primary and secondary publishing points)

General MPEG-2 TS parameters

Synchronize	Output stream to be synchronized.
Stream synchronization signaling	Activate to signal downstream equipment the status of stream synchronization. Requires EBP signaling.
Network interface	Name of the network interface used to distribute the output stream
TTL	Time To Live: defines the number of routers an UDP/RTP packet can go through before being discarded. Possible value: From 1 to 255
ToS	Type of Service: information added in the IPv4 header to specify service priority on the network. Used to specify that a service requires low delay and/or high reliability. Possible value: From 0 to 224
GOP signaling	Specifies signaling for stream synchronization. When encoding ABR outputs, the GOPs need to be synchronized across all the lineup streams.
Source address	IP address specified as source in the IPv4 header
Source port	Port specified as source in the IPv4 header Possible values: From 1 to 65535

General RTMP parameters

Encoding Live can push content to an external RTMP origin server so that the operator can contribute to social media such as youtube, facebook or periscope. The H.264 encoding video stream and the optional audio stream are packaged and written to a given defined publishing point.

Publishing point URL of the primary Flash Media Server (FMS) publishing point for live streaming. Configuration shall be done the following way: `rtmp://{Primary FMS IP Address}/live` or `rtmp://{Primary FMS host name}/live`. Complete the URL with the stream key defined for each stream in the configuration below. Use `rtmps` server for RTMPS variant: it is not possible to mix RTMP and RTMPS servers between primary and secondary publishing points.

Secondary publishing point	URL of the secondary Flash Media Server publishing point.
Network interface	The name of the network interface used for dual output prevention.

Related Information

[Configuring the output stream general parameters](#)

MPEG-2 TS common parameters

Standard	MPEG-2 TS information is encapsulated to fit the ATSC or the DVB standard.
PMT PID	Enter the packet identifier of the Program Map Table. This table defines the structure of the MPEG2-TS stream.
PCR PID	Enter the packet identifier of the Program Clock Reference. This clock is used to synchronize audio and video packets. If left blank, the PCR PID is set to the output Video PID.
Target PCR period	The target time between two PCR information
Target PSI period	The target time between two PSI information
Program number	Associated to a specific program. Commonly used in MPTS to differentiate programs within the same MPEG-2 TS stream.
Service name	Service added to the service description table (SDT)
Service provider	Service provider name added to the service description table (SDT)
Maximum bitrate insertion in PMT	The PMT can provide the maximum bitrate information for each elementary stream.
Video stream dropped on input loss	If the input video elementary stream is lost, the corresponding packets are dropped and replaced by stuffing.
Video frames alignment on PES packets	Each new frame starts with a new PES packet. If a frame finishes before the end of a PES packet then it is filled with stuffing information. Bandwidth is increased if activated. NOTE: This parameter often needs to be activated for interoperability purposes. When activated, it will increase the bandwidth used by null packets.
LATM encapsulation for AAC	Support for both ADTS and LATM encapsulation are available for AAC audio tracks.
Broadcast ID insertion	The VCT information (if present in the source content) is translated to the broadcaster ID format and inserted in the output stream.

Encoding info insertion	<p>The output stream contains the number of black frames, freeze frames, the average bit rate, and the target bitrate between 2 encoding information structures.</p> <p>These encoding statistics present in the output TS stream can then be used by downstream equipment for monitoring and error detection purposes.</p>
Splice countdown insertion	<p>Insert splice countdown field in adaptation field around splice points.</p>
One AU per PES on audio splices	<p>Enforce a single access unit per PES packet around splice points on audio PIDs.</p>
Direct Path for low latency	<p>Activates the optimized data transmission between MK Live Encoding and MK Packaging for OTT latency. It is required to activate this mode on both encoding and packaging sides.</p>

Related Information

[Configuring the output stream MPEG-2 TS parameters](#)

Output stream parameters

MPEG-2 TS, SDI, SDI/IP or SMPTE ST 2110 output stream parameters

IP Address	Unicast or multicast output stream IPv4 address
Port	Port used to distribute the output stream Range: From 1 to 65535
FEC	Activate FEC (Forward Error Correction) along with the output transport stream to resolve RTP packet loss issues due to network transport..
FEC port(s)	RESTRICTION: Only available is FEC is activated. Port used to transport FEC information Range: From 1 to 65535
Column count	RESTRICTION: Only available is FEC is activated. Defines the horizontal size of the FEC matrix. Range: From 1 to 20
Row count	RESTRICTION: Only available is FEC is activated. Defines the vertical size of the FEC matrix.. Range: From 1 to 20

RTMP(S) output stream parameters

Stream name/key Stream name, also known as stream key, that identifies the live stream.

Related Information

[Selecting the output streams](#)

CHAPTER 11

Unit Handling

Unit Installation

The RX1 is designed as rack mount equipment, i.e., it is designed to be mounted within a 19-inch rack. The RX1 should be mounted into that rack using rack rails available:

- MKP/UPH/RACKRAILS

If rack rails cannot be used, rack shelves will be required (one per RX1).

IMPORTANT RX1s should not be stacked (either in racks or free standing), this may cause damage to the chassis.

Unit Transportation

The RX1 chassis is designed to be supported during transportation, as such, it is recommended that the RX1 is transported in its original packing.

If the original packaging is no longer available, it is recommended that the chassis has additional support within the flight case or other transportation packaging used. For example, a supporting metal shelf should be added along the underside of the chassis of the RX1 to support the main body when using a flight case.

IMPORTANT Failure to improperly support an RX1 during transport may result in damage to the chassis and/or cards within the unit.