

SMPTE-2110/NMOS

Support for SMPTE 2110-10/2110-20/2110-30/2110-40 video, audio and data capture and output on NVIDIA® Mellanox® added in version [2.6.58](#). Supported control by NMOS and from Status tab in Administrator Control Panel.

Support for SMPTE-2110 capture on any Ethernet-adapters and Mellanox without using Rivermax added in version [2.6.63](#). Using Mellanox/Rivermax API is more preferable as the central processor load is much lower.

Selecting Network Adapter

To work with SMPTE-2110 in Skylark SL NEO, use a discrete/integrated network adapter or NVIDIA® Mellanox®.

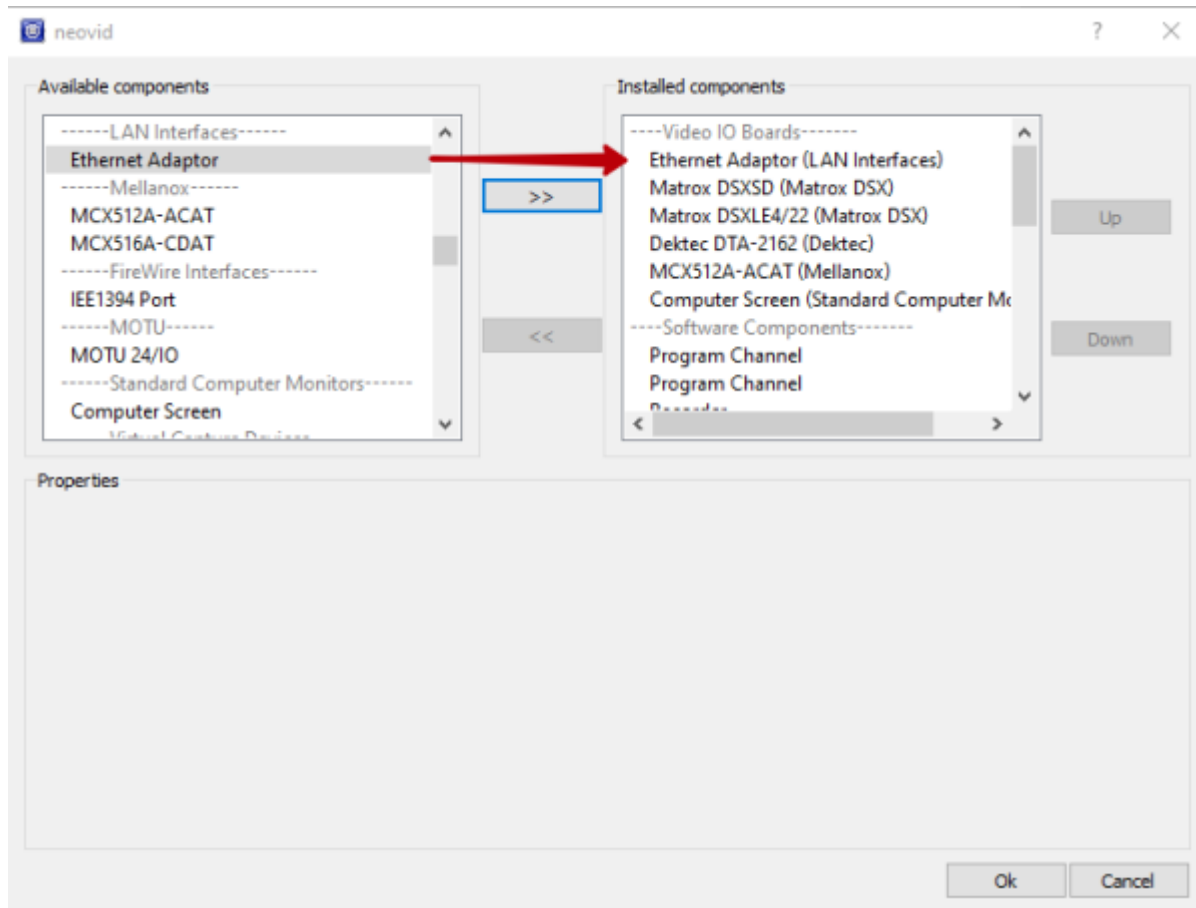
Board	CPU Coding		Rivermax Coding	
	Reception	Transmission	Reception	Transmission
Integrated network adapter	✓	✗	✗	✗
Discrete network adapter	✓	✗	✗	✗
NVIDIA® Mellanox®	✓	✓	✓	✓

Using NVIDIA® Mellanox® with Rivermax provides the best features and performance, which is why Capture and Playout setting will be further considered in this configuration.

Adding Network Adapter

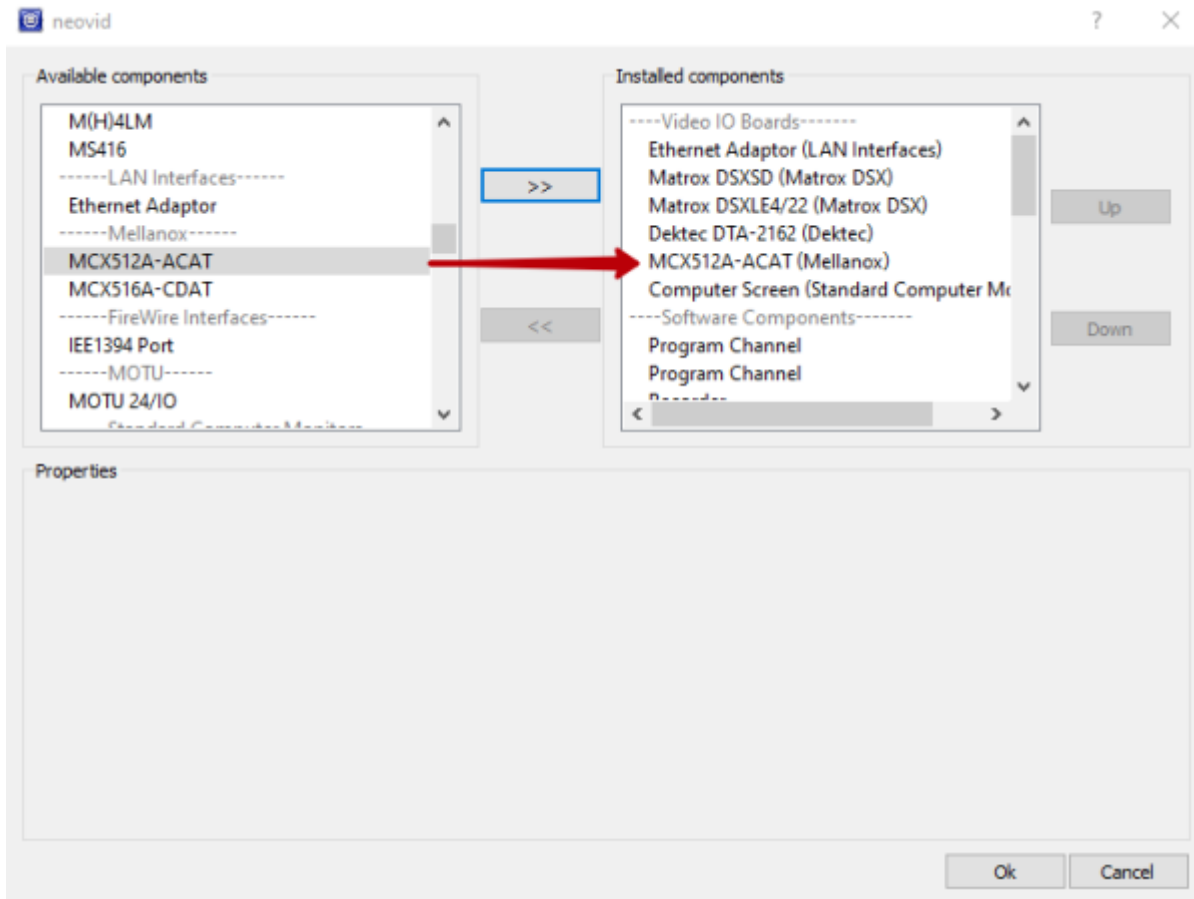
Integrated or Discrete Network Adapter

To capture video, audio and ANC data over SMPTE ST 2110-10/2110-20/2110-30/2110-40 with using an integrated/discrete network adapter or NVIDIA® Mellanox® without Rivermax, you'll have to add Ethernet Adapter into your configuration.



NVIDIA® Mellanox® with Rivermax

To capture and output video, audio and ANC data over SMPTE ST 2110-10/2110-20/2110-30/2110-40, you must add NVIDIA® Mellanox® to your configuration (the board and Rivermax must be first installed to the server). [Read more...](#)



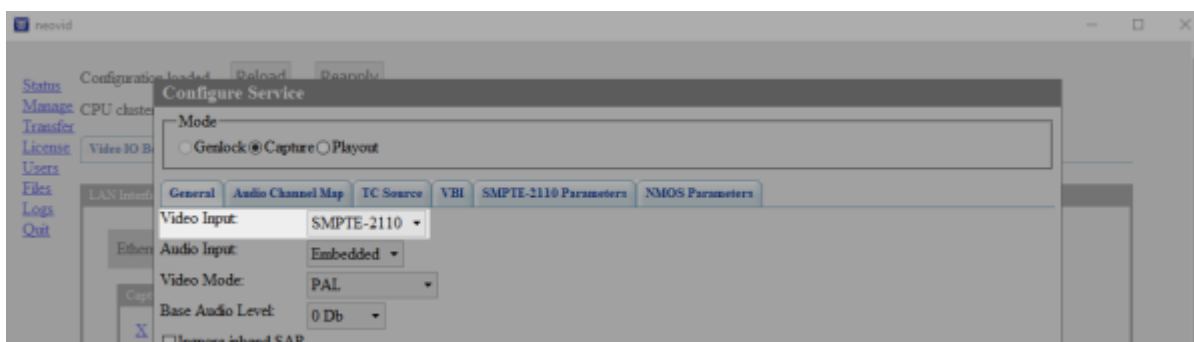
Configuring Stream Reception

Start preparing for SMPTE-2110 reception by adding a new IP Capture on Mellanox. To do so, go to Administrator Control Panel → Manage → Video IO Boards → Mellanox/MCX512A-ACAT and press Add Service.

Select Mode = Capture in the opened window.

If you configure capture on the integrated or discrete network adapter, start by adding a new IP Capture on Administrator Control Panel → Manage → Video IO Boards → LAN Interfaces/Ethernet Adaptor.

Then select Video Input = SMPTE-2110 in Capture settings.



Service settings for SMPTE-2110 are similar to regular IP Capture, except SMPTE-2110 Parameters and NMOS Parameters extra tabs.

SMPTE-2110 Parameters

Configure Service

Mode
☐ Genlock ☒ Capture ☐ Payout

General Audio Channel Map TC Source VBI SMPTE-2110 Parameters NMOS Parameters

Interface IP: 192.168.99.1

Option	Description
Interface IP	Specifying the IP address of the server network interface to be used for SMPTE-2110 capture.

NMOS Parameters

Configure Service

Mode
☐ Genlock ☒ Capture ☐ Payout

General Audio Channel Map TC Source VBI SMPTE-2110 Parameters NMOS Parameters

Host name:

Domain name:

Host Address:

HTTP Port: 15000

WebSocket Port: 15001

Label: Skylark_Captur

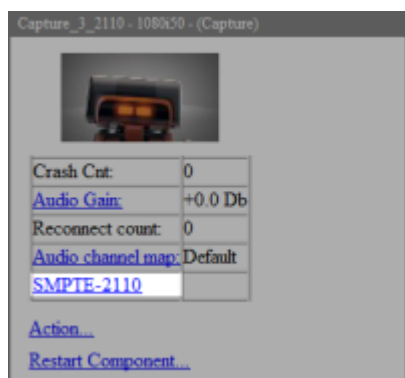
Registry address:

Option	Description
Host Name	Host name to be used for announcing nodes in the NMOS environment. Leave blank to use the server name.
Domain Name	Domain name to be used for announcing nodes in NMOS. Leave blank to use the domain configured in Windows. Type "local." to use the local domain.
Host Address	
HTTP Port	Number of the server port to be used by the built-in web server to provide NMOS HTTP REST API functioning (http://IP_ADDRESS:PORT/x-nmos/). If the port is not specified, NMOS will be disabled.
WebSocket Port	Number of the server port to be used for NMOS WebSocket connections. WebSocket is used to transfer parameters changing in real time. If the port is not specified, NMOS will be disabled.
Label	Short resource description displayed upon announcing nodes in NMOS.

Option	Description
Registry address	IP address of the Registry service that provides announcing NMOS nodes in the network. The service is required in networks with a large number of NMOS devices to provide stable work. If the Registry address is not specified, peer-to-peer announcing over mDNS (Multicast DNS) will be used. For mDNS to work properly, the firewall must allow UDP packets to pass through port 5353 at multicast address 224.0.0.251.

Selecting Receiver Stream

You can configure parameters of the received stream for Capture by using NMOS through uploading SDP files or manually at Administrator Control Panel → Status → IP Capture → SMPTE-2110.



SMPTE-2110 Parameters						
☒ Video Enabled	Source IP:	192.168.99.1	Destination IP:	225.1.111.1	Destination Port:	2001
☒ Audio Enabled	Source IP:	192.168.99.1	Destination IP:	225.1.111.1	Destination Port:	2001
☒ ANC Enabled	Source IP:	192.168.99.1	Destination IP:	225.1.111.1	Destination Port:	2001
Video Packet Type:	96	Width:	1920	Height:	1080	
FPS Num:	25	FPS Den:	1	BPP:	10	
Interlace:	tf	Color Mode:	bt709			
Audio Packet Type:	97	Sample rate:	48000			
Audio BPS:	24	Channels:	2			
ANC Packet Type:	100					
Ok Cancel						

The window for control and setting new parameters of the Active configuration.

Option	Description
Video Enabled	The checkbox activates receiving the elementary video stream identified by three parameters: Source IP + Destination IP + Destination Port. As the elementary stream has no descriptive data, they must be entered below or specified via NMOS SDP.
Source IP	Source IP address
Destination IP	Destination IP address used by the source for broadcasting. As with regular IP streams, the addresses may be Unicast or Multicast.
Destination Port	Destination port used by the source for broadcasting.

Option	Description
Video Packet Type:	Payload format identifier for video data (RTP payload type). Normally, 96 is used.
Width:	Image width in pixels.
Height:	Image height in pixels.
FPS Num: and FPS Den:	FPS Num - output frame rate numerator. For example, 25000. FPS Den - denominator (For example, 1000). Resulting frame rate fps = num/den. Examples: • $24000/1001 = \sim 23.976$ • $24000/1000 = 24$ • $25000/1000 = 25$ • $30000/1001 = \sim 29.97$ etc
BPP:	Color depth (bits per pixel). Possible variants: 8, 10.
Interlace:	Interlacing mode. Possible variants: • none - progressive video • tff - interlaced video, Top Field First • bff - interlaced video, Bottom Field First
Color Mode:	Specifying the color space of the video. Possible variants: bt601, bt709, bt2020, p, hlg.
Option	Description
Audio Enabled	The checkbox activates receiving the elementary audio stream identified by three parameters: Source IP + Destination IP + Destination Port. As the elementary stream has no descriptive data, they must be entered below or specified via NMOS SDP.
Source IP	Source IP address
Destination IP	Destination IP address used by the source for broadcasting. As with regular IP streams, the addresses may be Unicast or Multicast.
Destination Port	Destination port used by the source for broadcasting.
Audio Packet Type:	Payload format identifier for audio data. Normally, 97 or 98 is used.
Sample Rate	Sample rate. Possible variants: 44100, 48000, 96000
Audio BPS:	Audio bit depth (bits per sample). Possible variants: 16, 24.
Channels:	The number of audio channels. Possible variants: 1, 2, 4, 6, 8, 10, 12, 14, 16
Option	Description
ANC Enabled	The checkbox activates receiving the elementary ANC data stream identified by three parameters: Source IP + Destination IP + Destination Port. As the elementary stream has no descriptive data, they must be entered below or specified via NMOS SDP.
Source IP	Source IP address
Destination IP	Destination IP address used by the source for broadcasting. As with regular IP streams, the addresses may be Unicast or Multicast.
Destination Port	Destination port used by the source for broadcasting.
ANC Packet Type:	Payload format identifier for ANC data. Normally, 100 is used.

Configuring Stream Reception

NMOS Parameters

Configure Service

Mode

☐ Genlock

☐ Capture

☒ Payout

General

Storages

Audio DRC

Audio Channel Map

EBU-R128 Loudness

Nielsen

Color

Caption Configuration

Open Captions Configuration

SMPTE-2110 Parameters

NMOS Parameters

Host name:

Domain name:

Host Address:

HTTP Port:

16000

WebSocket Port:

16001

Label:

Skylark_Playout

Registry address:

The setting process is described in details above, in the Capture description.

Configure Service

Mode

☐ Genlock

☐ Capture

☒ Payout

General

Storages

Audio DRC

Audio Channel Map

EBU-R128 Loudness

Nielsen

Color

Caption Configuration

Open Captions Configuration

SMPTE-2110 Parameters

NMOS Parameters

Source IP:

192.168.99.2

IP TTL:

2

Time Reference Type:

Local

Time Reference:

Option	Description
Source IP	Specifying the IP address of the server network interface to send SMPTE-2110.
IP TTL	Setting the lifetime of IP packets.
Time Reference Type	Selecting the type of time synchronization of packets: - Local - using the PC local clock, - PTP - using PTP Grandmaster time provider on your network.

Option	Description
Time Reference	Specifying the time provider. If Time Reference Type = Local is selected: • Leave the field blank for automatic detection • Enter the MAC address in the format: "XX-XX-XX-XX-XX-XX" If Time Reference Type = PTP is selected: • Leave the field blank for automatic detection • Enter Grandmaster ID in the format "XX-XX-XX-XX-XX-XX-XX-XX:NNN"

Setting Stream Parameters for Broadcasting

Addresses and ports used for broadcasting may be configured in the Administrator Control Panel→Status→IP Payout→SMPTE-2110 window.



The option shows the setting window for broadcasting parameters.

SMPTE-2110 Parameters	
☒ Video Enabled	Destination IP: 225.1.111.1 Destination Port: 2001
☒ Audio Enabled	Destination IP: 225.1.111.1 Destination Port: 2001
☒ ANC Enabled	Destination IP: 225.1.111.1 Destination Port: 2001
Ok Cancel	

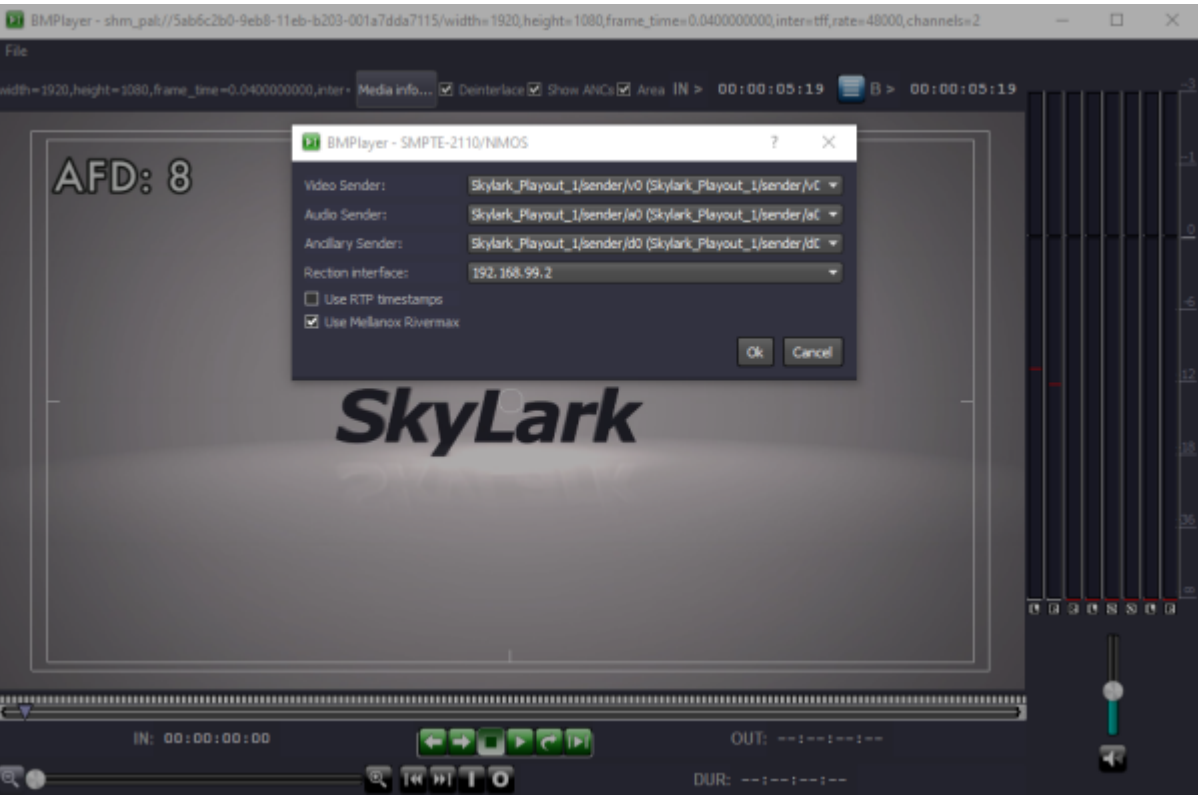
Option	Description
Video Enabled, Audio Enabled, ANC Enabled	The checkbox activates sending the elementary video, audio or ANC data stream identified by two parameters: "Destination IP + Destination Port". Since the elementary stream has no descriptive data, in order to receive it, the information about the stream must be retrieved and uploaded to the receiver via NMOS in SDP format.

Option	Description
Destination IP	Destination IP address used by the for broadcasting. As with regular IP streams, the addresses may be Unicast or Multicast. It is allowed to broadcast different types of streams (Video, Audio, ANC) within one Playout to the same Destination IP + Destination Port.
Destination Port	Destination port used for broadcasting.

NMOS Software

Broadcast Media Player

You can use [Skylark BMPlayer](#) to view sources announced in your network and play SMPTE-2110 streams.

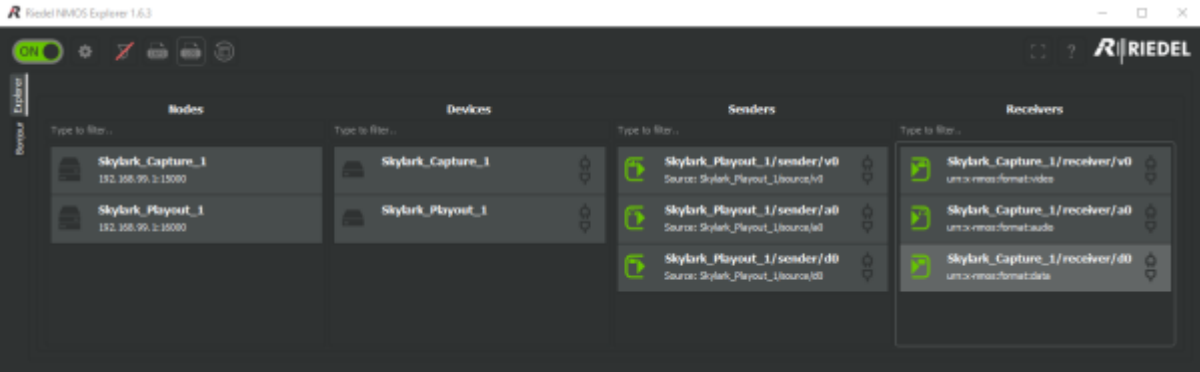


NMOS Explorer

You can use NMOS Explorer freeware to view sources and SMPTE-2110 stream receivers announced in your network.

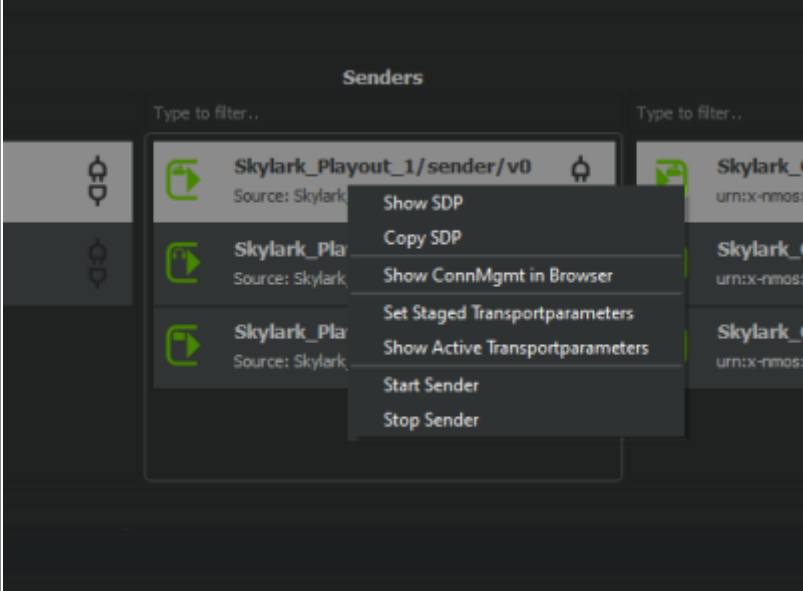
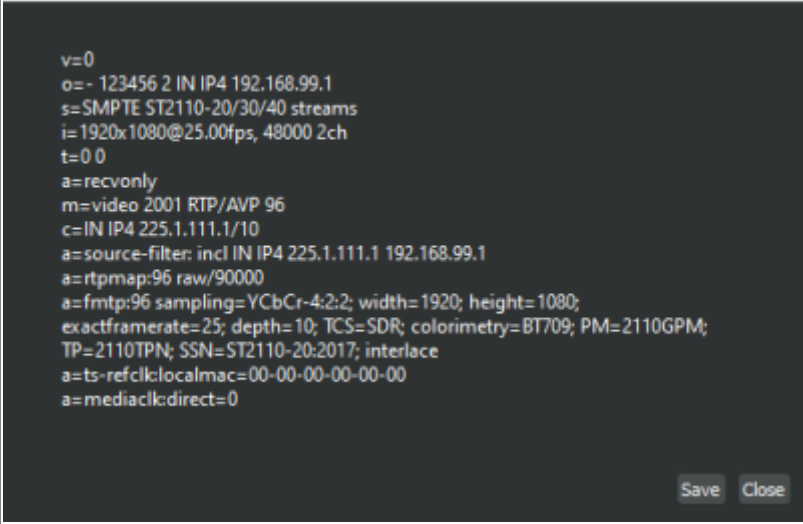
NMOS Explorer allows:

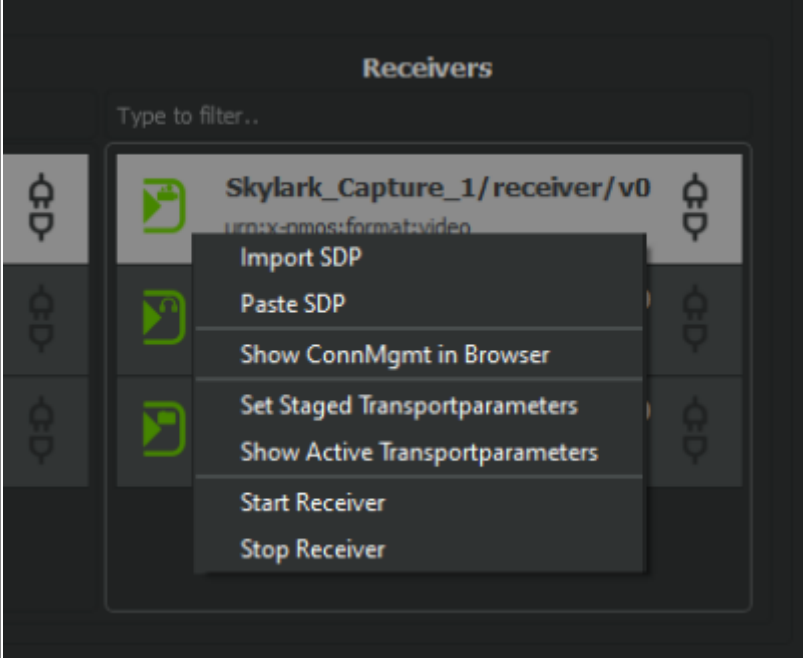
- view nodes, devices, senders and receivers of streams in the selected network,
- view and download SDP files with sender configuration,
- load and apply SDP Files with configurations to receivers,
- view REST API structure.



NMOS Explorer displays in four columns:

Entity	Description	Skylark
Nodes	Nodes announced in the network.	Each Skylark SMPTE-2110 service creates a separate node. The displayed node name is set by the Label field in service settings. Additionally, the IP address and port used to communicate with the node through NMOS HTTP REST API are displayed.
Devices	Devices announced in the network.	Each Skylark SMPTE-2110 service creates a separate device. The displayed device name is set by the Label field in service settings.

Entity	Description	Skylark
Senders	The list of senders.	Each Playout has three senders announced: • LABEL/sender/v0 - video data stream, • LABEL/sender/a0 - audio data stream, • LABEL/sender/d0 - ANC data stream. 
		Every stream has a unique configuration of parameters of sent data that may be viewed or downloaded in the SDP format. 

Entity	Description	Skylark
Receivers	The list of receivers.	Each Capture has three receivers announced: • LABEL/receiver/v0 - video data stream, • LABEL/receiver/a0 - audio data stream, • LABEL/receiver/d0 - ANC data stream.  Every receiver may be remotely disabled, enabled and configured by sending it an SDP configuration. NMOS has two receiver configurations: Active and Staged. When SDP is uploaded, the Staged configuration is changed. Staged is applied and becomes Active by the Start Receiver command.

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