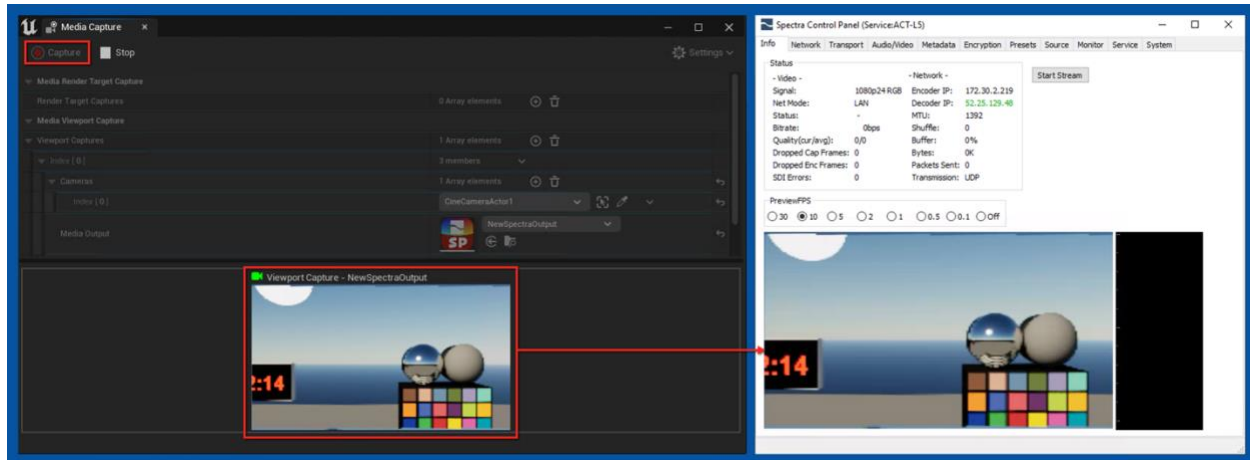


## Streambox Spectra for Unreal Engine (5.1)



## Streambox Spectra for Unreal Engine (5.1)

Note: This document reflects the current feature-set which may change without notice (April 2023). We will attempt to keep all users up to date on any such changes.

History 1.05. 04/29/2023 (update)

History 1.03a 02/09/2023 initial beta releases

History 0.9RC 04/29/2023 (RC02)

History 1.0 05/01/2023

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# Introduction

On-set Virtual Production (OSVP) with LED volumes is, in many productions, replacing the on-location and chromakey workflows. One of the changes in the industry that made this workflow feasible was the utilization of the **Unreal Engine** from Epic Games.<sup>1</sup> The Unreal Engine is a 3D gaming development environment that has been adapted for virtual production projects.

**Streambox Spectra**, real-time streaming encoder, plus the 3D computer graphics of the Unreal Engine make a powerful union for the virtual production workflow. With OSVP, it is essential to see, in real time, the video amalgamation to assess scene qualities like depth of field, parallax, lighting effects and reflections, etc.

**Streambox Spectra** is known for ultralow latency, 10- or 12-bit color, 4:2:2 or 4:4:4 subsampling, and up to 16-channel audio. It also sports security features like end-to-end 128- and 256-bit AES encryption. Spectra is designed to be used on-premises or with cloud services like AWS and Azure. It can stream point-to-point for reference monitoring or via the Streambox Cloud (AWS) for distributed reviewing.

**Streambox Spectra** has plugins for Adobe Premiere Pro and After Effects, Avid Media Composer, Blackmagic Design DaVinci Resolve, and can ingest video data from NDI, Autodesk Flame via AWS-CDI, Blackmagic Design video hardware, and of course from the Unreal Engine. Streambox Spectra for AWS CDI version supports CDI output for every supported source/plugin including Unreal Engine.

**Streambox Spectra** for the Unreal Engine supports multiple configurations for video output, including:

Current Viewport, Viewport capture, Media Render Target Capture, Composure Media Output, and nDisplay rendering.

Spectra for Unreal is supported for both Cloud and on-premises workflows.

---

<sup>1</sup> On-set Virtual Production (OSVP): [https://en.wikipedia.org/wiki/On-set\\_virtual\\_production](https://en.wikipedia.org/wiki/On-set_virtual_production)  
Unreal Engine by Epic Games: <https://www.unrealengine.com/>

# System Requirements

Unreal Engine side:

Windows: version 5.1 of Unreal Engine

macOS: version 5.1 of Unreal Engine

Client side:

Streambox Halo, Chroma+, Chroma X, Chroma 4K (hardware decoders)

Streambox Iris (player – macOS, Windows, output to Blackmagic Design hardware)

Streambox Media Player (player – Windows, macOS, iOS, tvOS)

## Installing Software (Windows)

### Spectra for Windows Installation

We recommend uninstalling previous version of Spectra for clean install.

Download Windows Installer (v1.83, plugin v1.05):

Version 1.83/1.05.: [https://streambox-spectra.s3-us-west-2.amazonaws.com/1.83.0.0/win/streambox\\_spectra\\_win\\_1.83.0.0.zip](https://streambox-spectra.s3-us-west-2.amazonaws.com/1.83.0.0/win/streambox_spectra_win_1.83.0.0.zip)

Latest Version: [https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/win/universal/spectra\\_universal\\_win.exe](https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/win/universal/spectra_universal_win.exe)

Manual (Win): [https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/win/universal/spectra\\_quickstart\\_win\\_universal.pdf](https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/win/universal/spectra_quickstart_win_universal.pdf)

### Unreal plugin for Windows

Windows64 Plugin (1.05 for Unreal 5.1 AMI G5 instances)

Plugin is included in the Window installer. The installed location is

C:\UE\_5.1\Engine\Plugins\Media\)

## Installing Software (macOS)

### Spectra for macOS Installation

Download macOS Installer (1.6.3 with plugin 1.05):

Version 1.6.3/1.05: <https://streambox-spectra.s3-us-west-2.amazonaws.com/macOS/Streambox%20Spectra%20for%20macOS.1.6.3A.pkg>

Latest version: <https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/macos/spectra.zip>

Manual: [https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/macos/spectra\\_quickstart\\_macos.pdf](https://streambox-spectra.s3-us-west-2.amazonaws.com/latest/macos/spectra_quickstart_macos.pdf)

Unreal plugin for macOS (1.05, Monterey or Ventura macOS) is included in the macOS installer.

The installed location is /Users/Shared/Epic\ Games/UE\_5.1/Engine/Plugins/Media/

# Licenses for Spectra

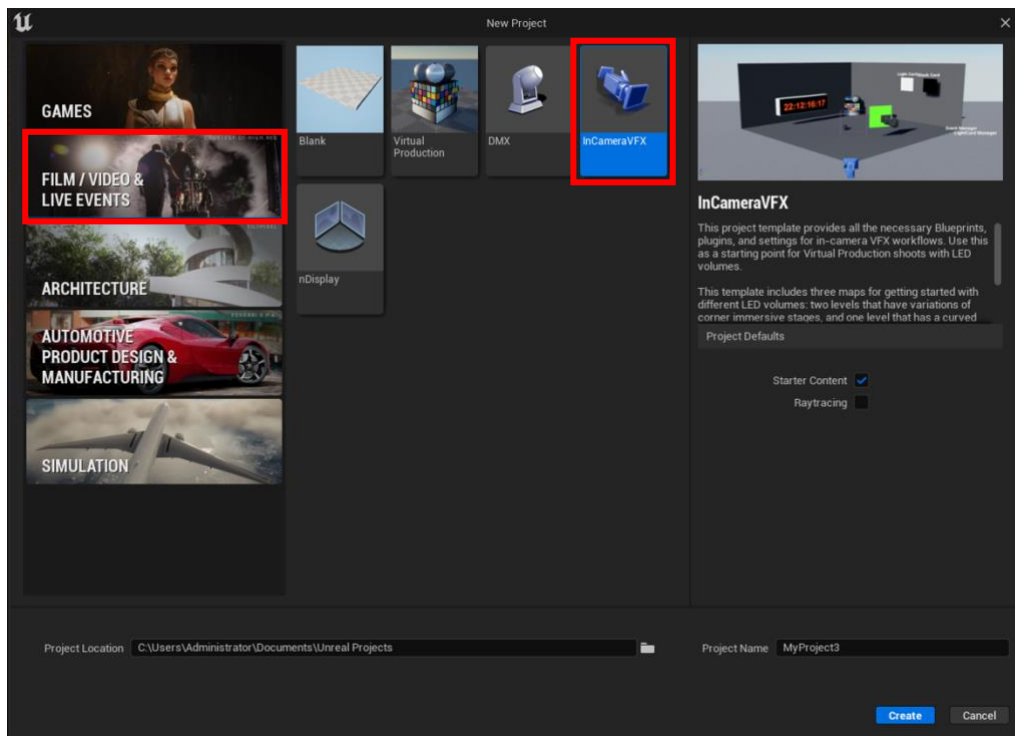
You will require license codes to activate various features on Spectra. Contact [sales@streambox.com](mailto:sales@streambox.com). The following licenses are available:

- Spectra4K license with 4:4:4 is recommended
- SpectraEPIC - to accept Unreal Engine I/O
- PullStream (optional for new Point-to-Point streaming)

See [Feature Activation in Spectra](#) section for feature activation.

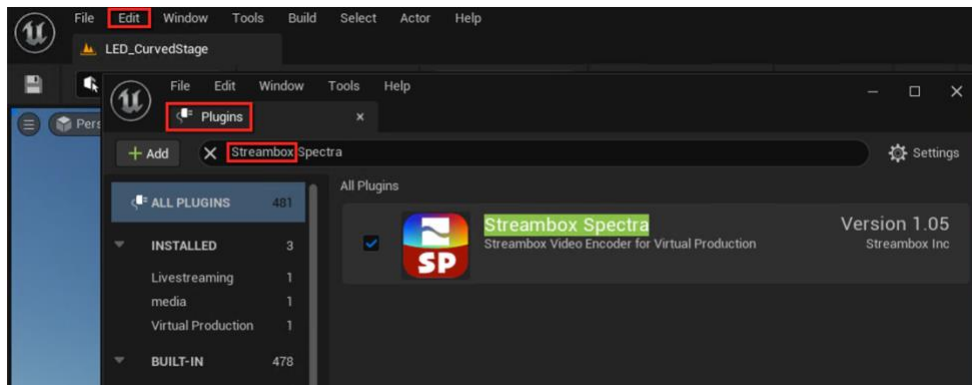
# Unreal Project Configuration

Start Unreal Engine editor, open your Project. You can 'Create' a test project using the **InCameraVFX** project from 'Film/Video & Live Events' (see red outlines), set a unique project name, and click Create.

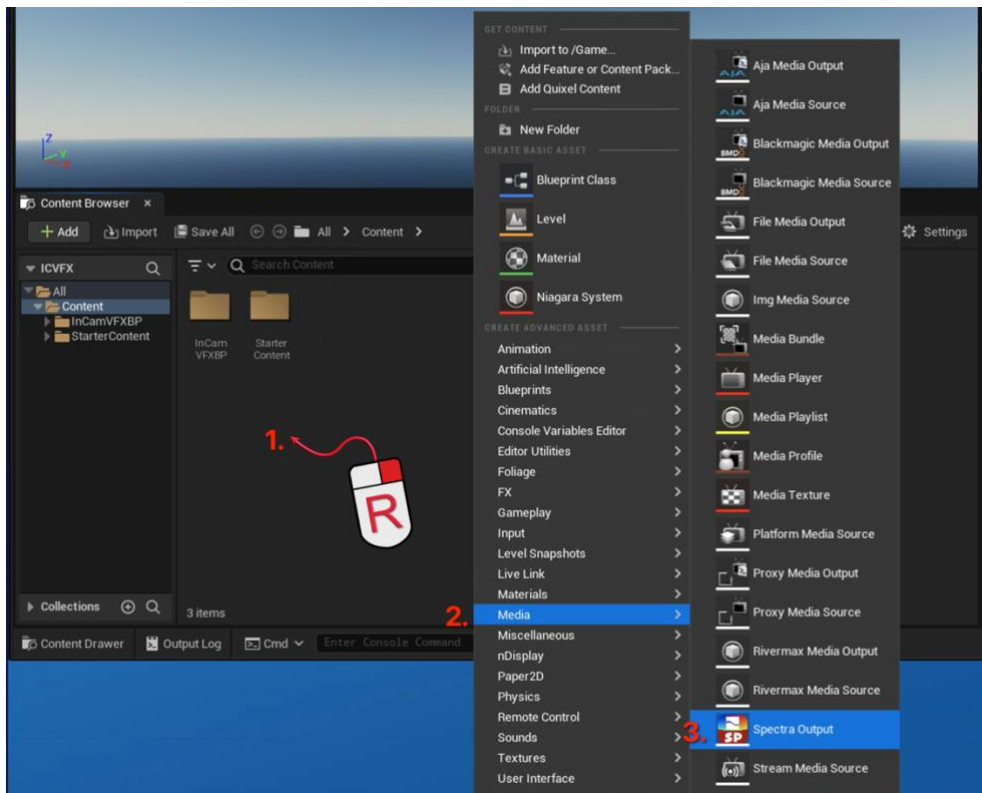


Open menu Edit/Plugins, search for Streambox, and Enable Streambox Spectra plugin (see red outlines) by clicking the checkbox for the plugin. You will need to Restart UE as prompted.

## Streambox Spectra for Unreal Engine (5.1)



In the empty region of the Content Folder, right-click and select Media/Spectra Output to add instance of Spectra Video Output to your project (see red 1., 2., 3.)



## Streambox Spectra for Unreal Engine (5.1)

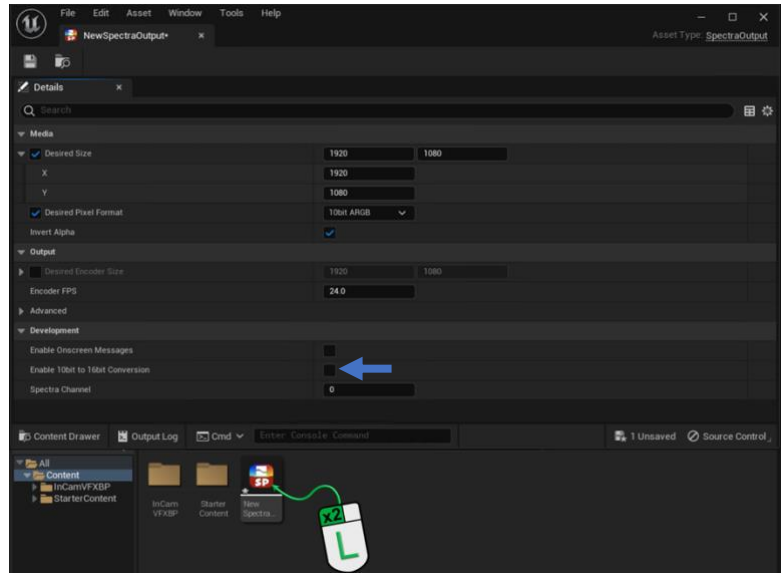
### Spectra for Unreal Plugin Setup.

Double-click the NewSpectraOutput icon to setup or change settings. Default settings: 1920x1080, 10-bit color, at 24fps. Be sure to save your changes.

#### Desired Size:

This is the dimensions of the viewport Streambox Plugin will request from Unreal Engine.

We recommend using standard video resolutions like 1920x1080 or 3840x2160 when target output is a professional monitor.



#### Desired Pixel Format:

8-bit RGBA is the minimum pixel precision suitable for non-color critical reviews.

10-bit ARGB is recommended for color accurate video including HDR.

Float RGBA is recommended for 12-bit rendering or HDR workflows.

#### Desired Encoder size:

By default, Encoder size is the same as the Desired Media size, however, you can change this to a smaller/bigger size in cases where the source Media cannot be easily changed.

Note: If Media size and Encoder size do not match, we require pixel format to be set to Float RGBA or converted to 16-bit with “Enable 10bit to 16bit conversion” option (under Development category – see blue arrow).

Encoder FPS: is Frames per second for Spectra plugin

Enable Onscreen Messages: will output Spectra plugin diagnostic information to viewport.

Enable 10bit to 16bit Conversion, will force internal Plugin pipeline to 16-bit, even if 10- or 8-bit pixel format was selected.

Spectra Channel: is ID of the Spectra “virtual video input”. It can be used when you are running multiple instances of Unreal engine (i.e., containers) on the same Unreal Host system and multichannel Spectra encoder.

### Setup & Test Simple Viewport Capture

Streambox Spectra for Unreal Engine supports multiple configurations for video output, including Current Viewport, Viewport capture, Media Render Target Capture, Composure Media Output, and nDisplay rendering. The most common way to use Spectra is Custom Viewport capture.

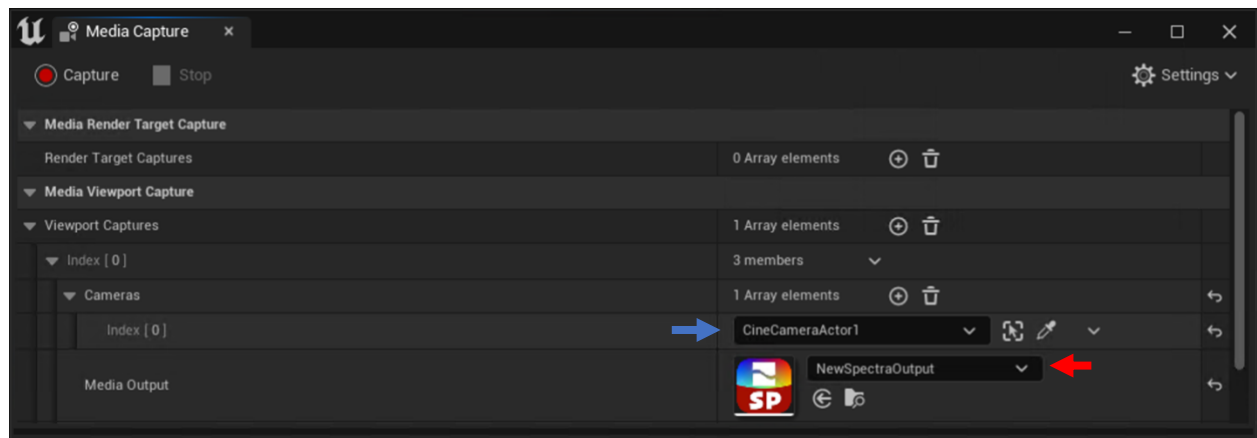
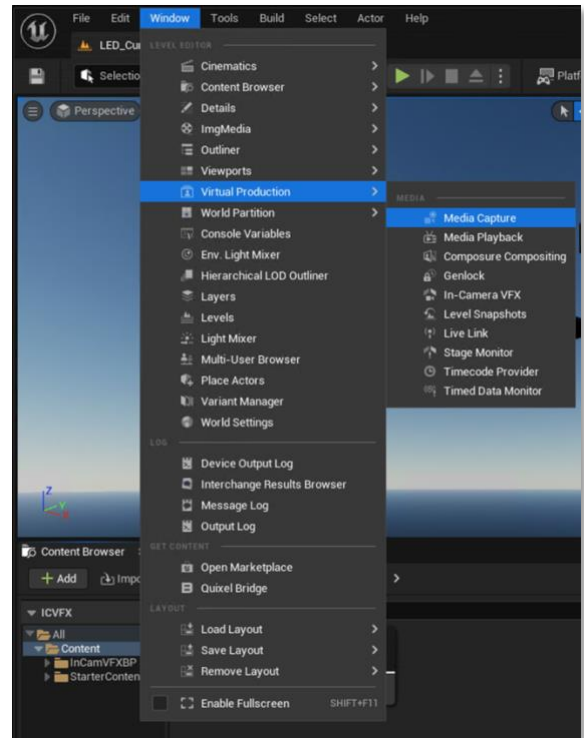
From the main menu, choose **Window > Virtual Production > Media Capture**. We will use the **Media Capture** window to control and send a camera output to your Streambox Spectra.

#### Media Capture dialog

Under Viewport Captures, click + to add element (see Index [0] in this example).

Expand desired index ([0] in this case) and select Spectra from the Media Output list (red arrow).

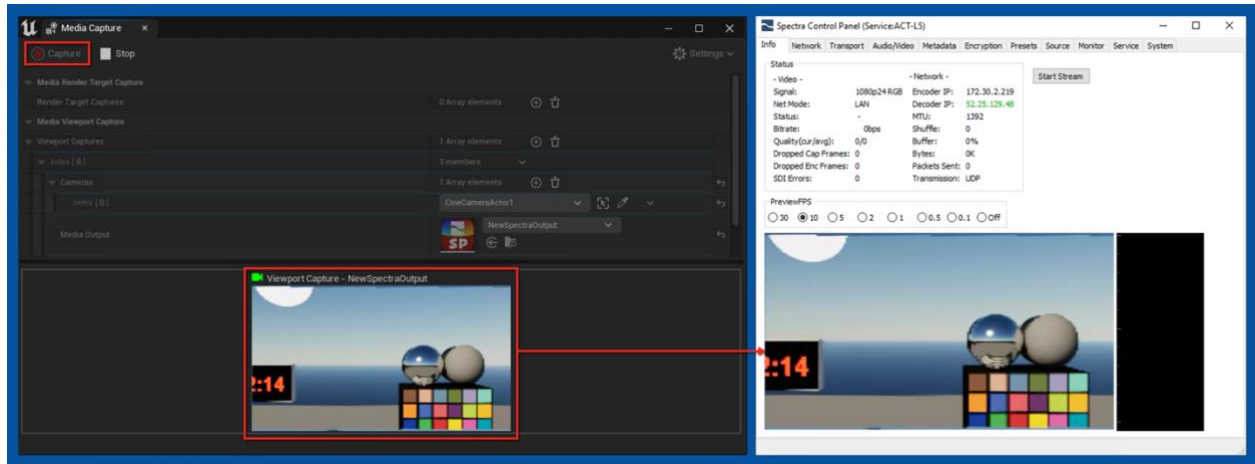
Then, select source (CineCam. in this case) for that Index (blue arrow).





## Streambox Spectra for Unreal Engine (5.1)

Now you can click “Capture” to start the Viewport Capture (red outlines). If Spectra is not running, start Spectra. You should now see that Spectra is receiving the viewport output (right side).



### Media Capture Troubleshooting:

If you encounter an issue where Capture is grayed out, please check that other capture areas (e.g., Render Target or Current Viewport) have no incomplete configurations. You can use the “delete” icons to clean Capture configuration if this is the case. In case of Active view port capture you might need to enable additional options like “Resize source buffer” or “Convert to desired pixel format” since an Active view port can be of arbitrary sizes. You can also check Unreal Log for additional messages or enable on Screen Messages in Spectra configuration.

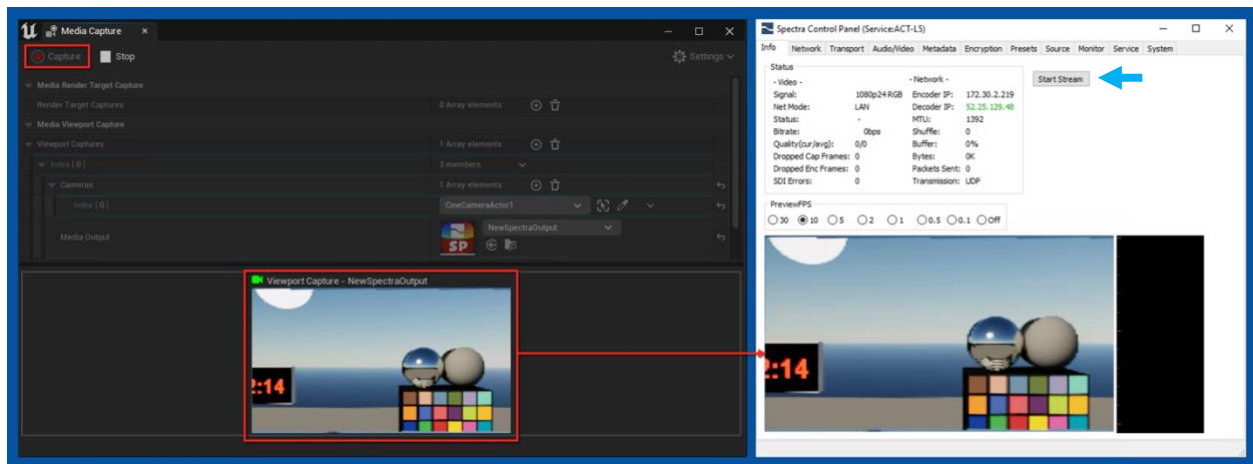
# Spectra Encoder Configuration

For more information on Spectra setup, see documents and videos on the [Streambox.com Resources](https://streambox.com/resources) page.

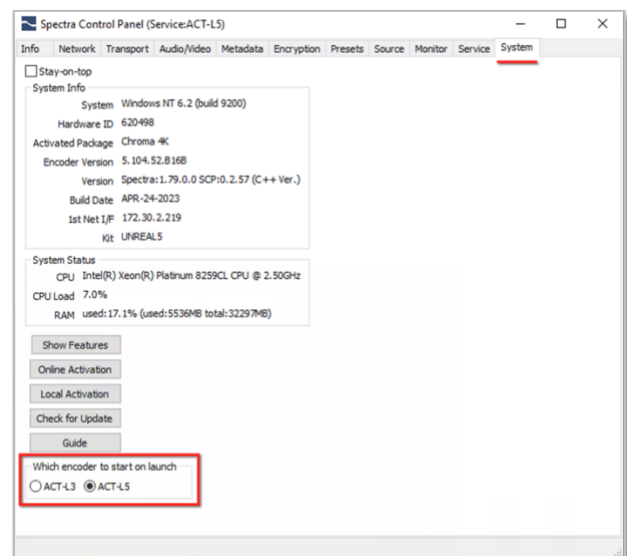
## Example Spectra Setup

We'll setup to receive a 4:2:2, 10-bit stream on a Streambox decoder/player.

- Open the Streambox Spectra application. It will open on the Info tab (image below).
- Using the previous settings, Spectra should display the video preview (red outline below).



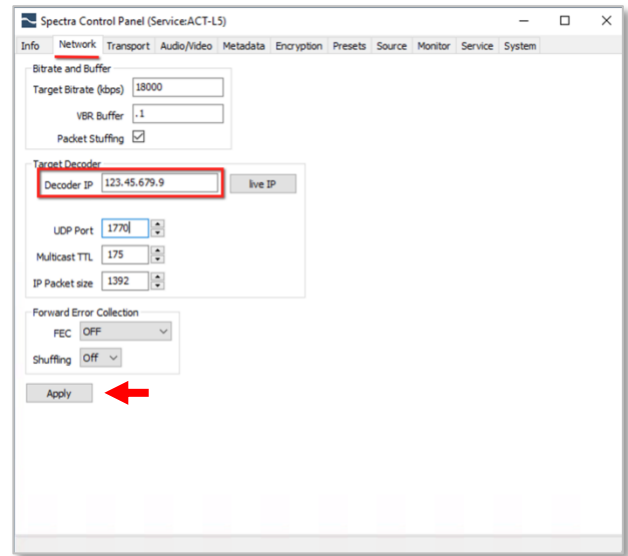
- Make sure the ACT-L5 codec is selected in the System tab (red highlights). If ACT-L5 is not selected, select ACT-L5, close Spectra, then re-open Spectra.



## Streambox Spectra for Unreal Engine (5.1)

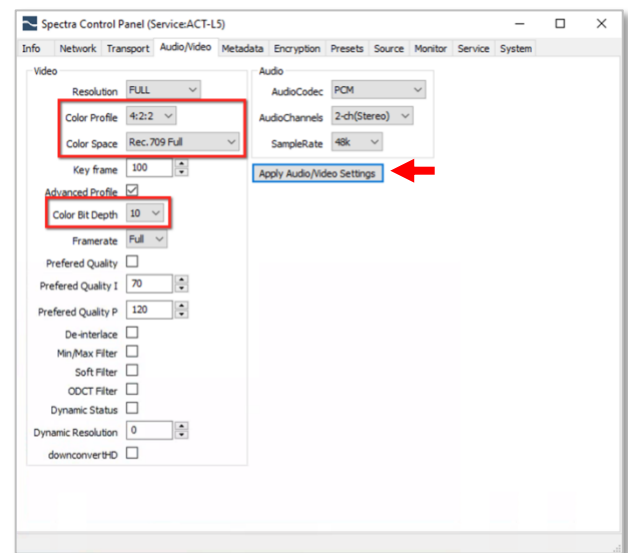
- Set the decoder's IPv4 address on the Network tab (red highlights). Use the IPv4 address associated with that decoder/player. Note: Make sure you have port forwarding setup if the decoder/player is behind a firewall.
- Now you can Start the stream from the Info tab (see blue arrow; image, top of page 9).

Note: Make sure you Apply any changes (red arrow)



- On the Audio/Video tab, select **4:2:2** (or 4:4:4), **Rec 709 Full** color, and **10-bit** (or 12-bit) depth (red outlines).

Note: Make sure you Apply any changes (red arrow)

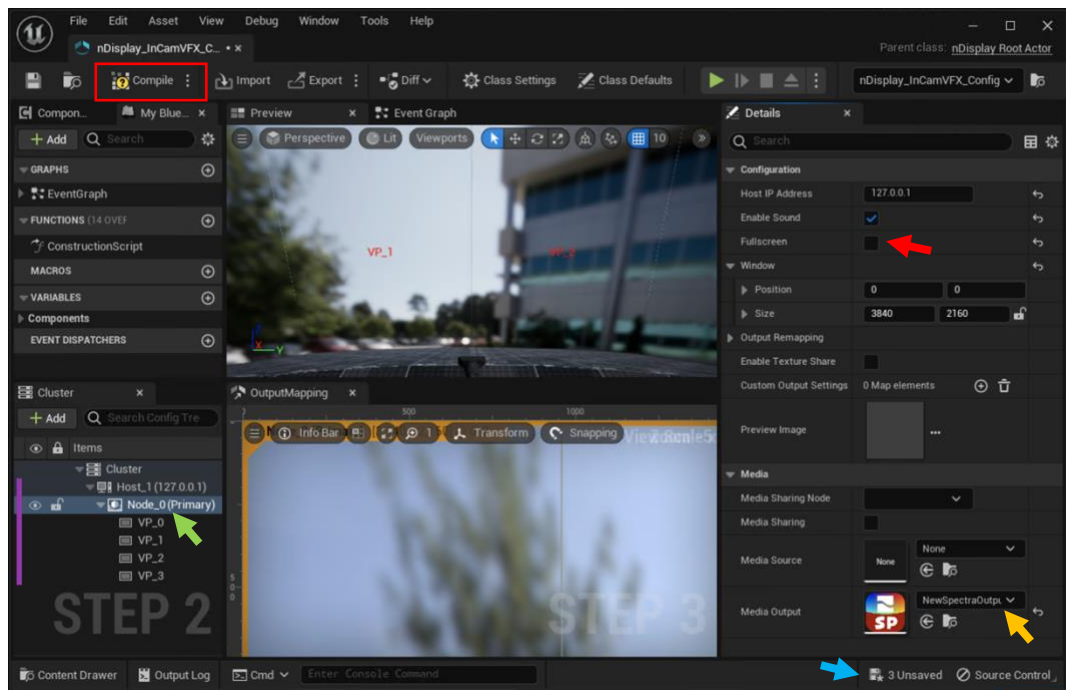
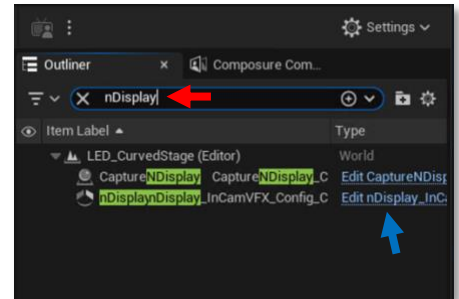


# Setup nDisplay Node & Switchboard

The setup procedure for nDisplay is similar to the Media Capture workflow described above.

- For in camera VFX example, search for nDisplay (red arrow) in the Outliners panel. Then click 'Edit nDisplay...' (blue arrow).
- Once the nDisplay edit page opens, click on 'Node\_0 Primary' in the Cluster panel (green arrow, on left – STEP 2).
- Now, scroll down in Details window (on right) to the Media section. Under Media Output, select the Spectra instance from the dropdown (orange arrow, lower right).

**NOTE: Uncheck the 'Fullscreen' option in nDisplay Node Configuration** (red arrow) or nDisplay capture pipeline will fail to connect nDisplay and Spectra.

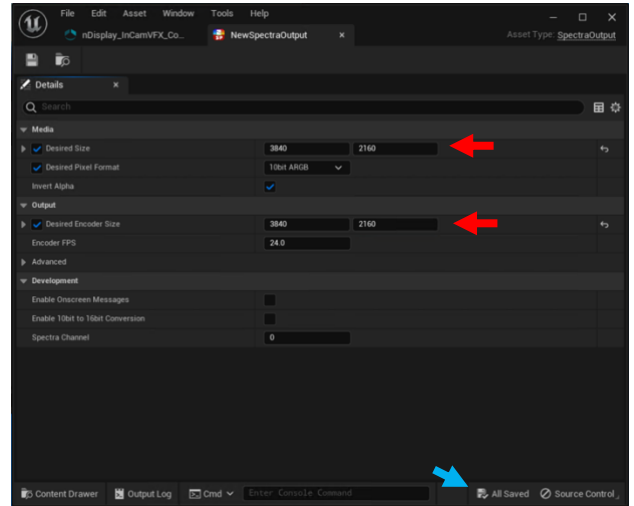


## Streambox Spectra for Unreal Engine (5.1)

- Now, double-click the Spectra icon (under Media Output above) to open its properties page.

Notice the resolution is 3840x2160 (red arrows). For nDisplay workflow, you need to manually set 'Desired Size' and 'Desired Encoder Size' to match nDisplay Output Size, 3840x2160 in this example.

- Remember to save any changes (blue arrow).

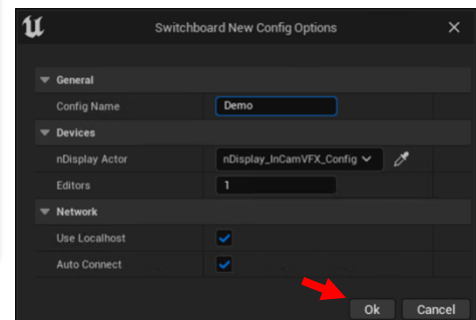
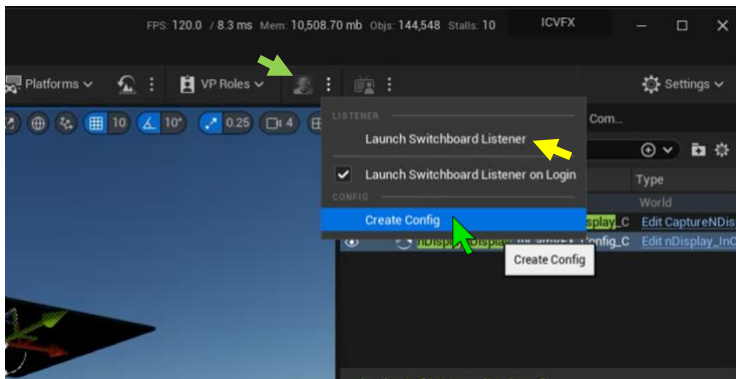


Note: If set incorrectly, capture will fail to start since nDisplay does not scale output size automatically. (See Logging section below for more information)

- Next, 'Compile' (red outline, nDisplay Edit Page above) the scene when all the above has been setup.

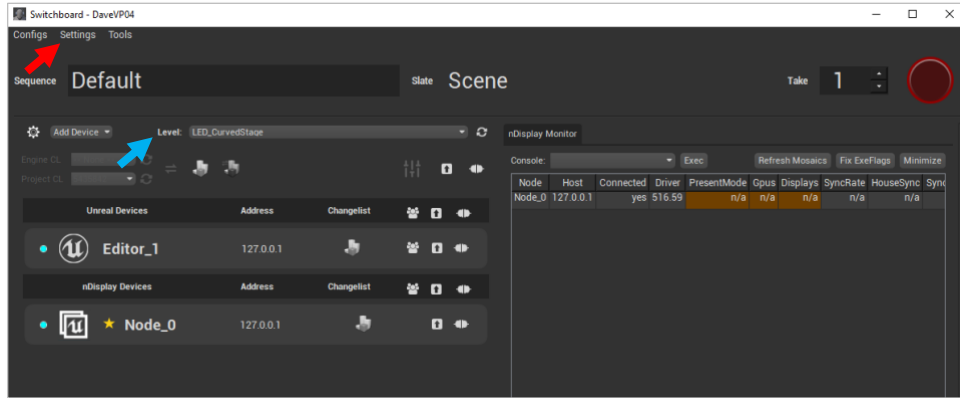
Note: Remember to save your assets – click the Unsaved icon to open the Save dialog (blue arrow).

- Create new Switchboard config for this project. Click Switchboard icon (green arrow) and then select 'Create Config' from menu (green pointer). The Switchboard New dialog will open. You can give it a name, we used Demo in this example, and click OK (red arrow).



For simplicity, we'll demonstrate rendering on the same host, but you can configure and use other workstations. For the InCamera VFX project, Level should be set to LED\_CurvedStage (blue arrow, below).

## Streambox Spectra for Unreal Engine (5.1)

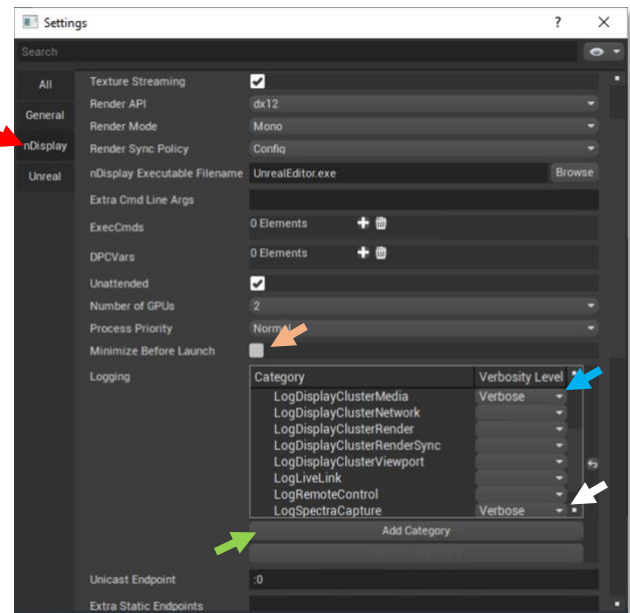
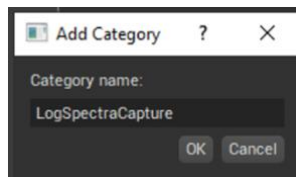


### Logging for nDisplay

(Optional for troubleshooting)

We recommend enabling Advanced Logging in nDisplay settings during initial setup. If nDisplay fails, you should enable logging to help ascertain likely issues. For example, a mismatch of 'Fullscreen' may result in the following logged error: "LogMediaIOCore: Warning: Can't capture frame."

- In Switchboard menu (image above), click Settings, then click nDisplay tab (red arrow)
- Add LogSpectraCapture Logging category – click 'Add Category' button (green arrow). Type in the category name and click OK.

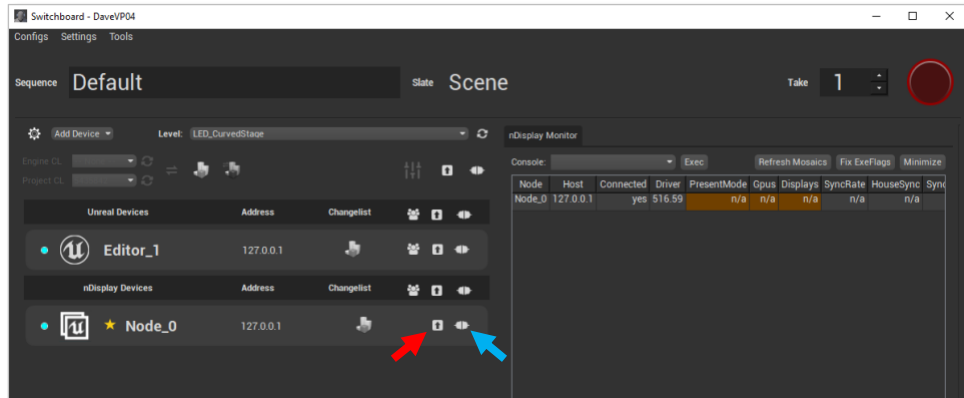


- Set Verbose logging for both:
- LogDisplayClusterMedia (blue arrow)
- LogSpectraCapture (white arrow)
- Also unselect 'Minimize before Launch' check box (orange arrow).
- Close the settings window when you have completed any changes.

## Streambox Spectra for Unreal Engine (5.1)

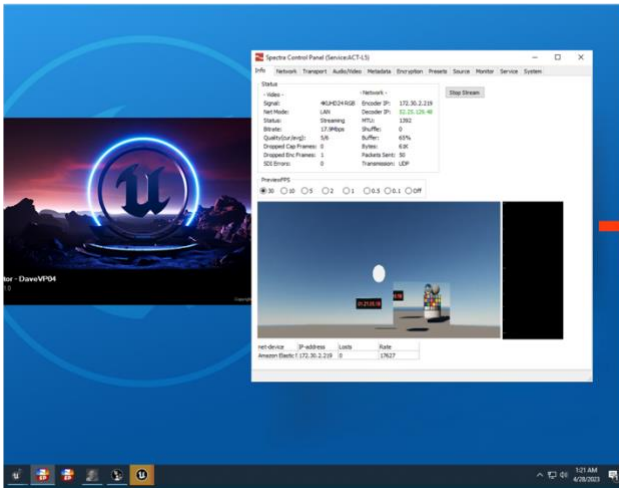
Note: If you don't have 'Switchboard listener' running, open Listener from the Switchboard tools menu (see yellow arrow, page 13).

- Click Connect icon for 'Node\_0' if connect icon is open (blue arrow). Note: icon shown here is closed, so you would skip this step.
- Click Start icon for 'Node\_0' (red arrow)

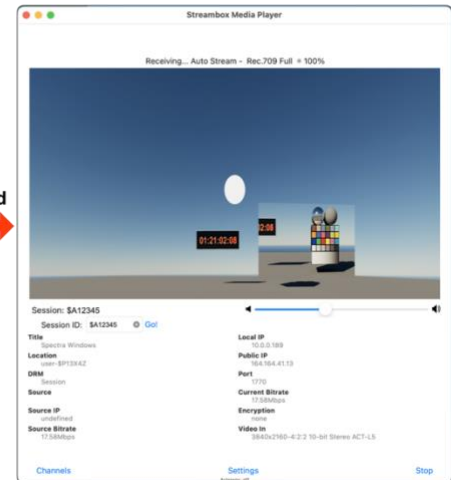


At this point, Unreal will close the Switchboard page and start to render the output. Open Spectra if it is not open. Spectra should show Video Preview and you can start streaming.

### Unreal Engine - nDisplay to Streambox Spectra



### Streambox Decoder/Player



## Troubleshooting nDisplay

From Tools menu, Open log folder. Open Node0 log file.

Search for Spectra to see if SpectraCapture was started or for any error messages.

If SpectraCapture log entries are missing, Add Editor to Switchboard and connect/open editor and confirm Spectra Output is assigned to nDisplay for the active nDisplay config.



## Streambox Spectra for Unreal Engine (5.1)

If you see mismatched size or pixel format in Log error messages, configure Spectra sizes and pixel formats.

Example of correct Node log file with LogSpectraOutput entries.



```
Node_0 - Notepad
File Edit Format View Help
[2023.02.09-16.39.46:895] [0]LogDisplayClusterGame: Found root actor - nDisplay_InCamVFX_Config_2
[2023.02.09-16.39.46:895] [0]LogDisplayClusterInterception: Display: New scene event
[2023.02.09-16.39.46:895] [0]LogDisplayClusterEngine: Display: CheckGameStartBarrier - we are no longer out of sync. Restoring Play.
[2023.02.09-16.39.46:950] [0]LogViewport: Scene viewport resized to 3840x2160, mode Windowed.
[2023.02.09-16.39.47:005] [0]LogSlate: Took 0.000107 seconds to synchronously load lazily loaded font '../Engine/Content/Slate/Fonts/Roboto-Regular
[2023.02.09-16.39.47:010] [0]LogSlate: InvalidateAllWidgets triggered. All widgets were invalidated
[2023.02.09-16.39.47:112] [0]LogSlate: Took 0.000170 seconds to synchronously load lazily loaded font '../Engine/Content/Slate/Fonts/Roboto-Regular
[2023.02.09-16.39.47:640] [0]LogNDisplayLiveLinkSubjectReplicator: Registering sync object.
[2023.02.09-16.39.47:640] [0]LogDisplayClusterCluster: Registered sync object: NDisplayLiveLinkSyncObject
[2023.02.09-16.39.47:651] [0]LogInit: Display: Engine is initialized. Leaving FEngineLoop::Init()
[2023.02.09-16.39.47:651] [0]LogLoad: (Engine Initialization) Total time: 12.57 seconds
[2023.02.09-16.39.47:651] [0]LogLoad: (Engine Initialization) Total Blueprint compile time: 0.00 seconds
[2023.02.09-16.39.47:652] [0]LogDisplayClusterInterception: Display: Node 'Node_0' received synchronization settings event
[2023.02.09-16.39.47:672] [0]LogDisplayClusterMedia: Initializing backbuffer media capture for node 'Node_0'...
[2023.02.09-16.39.47:672] [0]LogSpectraOutput: Error: USpectraOutput::CreateMediaCaptureImpl: #2
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: ValidateMediaOutput
[2023.02.09-16.39.47:672] [0]LogSpectraOutput: Error: GetRequestedSize: 3840x2160
[2023.02.09-16.39.47:672] [0]LogSpectraOutput: Warning: SpectraOutput::GetRequestedPixelFormat
[2023.02.09-16.39.47:672] [0]LogSpectraOutput: Warning: SpectraOutput::GetConversionOperation
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: Spectra Capture initialized
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: Spectra Capture initialized
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: OVERRIDE : EncSize:1 , 3840x2160
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: OVERRIDE : Msg:0, 10to16: 0
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: Check: Spectra NOT connected
[2023.02.09-16.39.47:672] [0]LogSpectraCapture: Warning: Spectra Capture initialized
[2023.02.09-16.39.47:672] [0]LogDisplayClusterMedia: Started media capture: 'nDisplay_InCamVFX_Config_2_Node_0_backbuffer_capture'
[2023.02.09-16.39.47:672] [0]LogDisplayClusterInterception: Display: Sync received! Starting interception!
[2023.02.09-16.39.47:672] [0]LogDisplayClusterInterception: Display: Starting interception of bus messages
[2023.02.09-16.39.47:672] [0]LogDisplayClusterInterception: Display: Intercepting message type: '/Script/Concert.ConcertSession_CustomEvent' with annotat
[2023.02.09-16.39.47:675] [0]LogDisplayClusterMedia: VeryVerbose: New latency is 0
[2023.02.09-16.39.47:676] [0]LogSlate: Took 0.000160 seconds to synchronously load lazily loaded font '../Engine/Content/Slate/Fonts/Roboto-Regular
[2023.02.09-16.39.47:679] [0]LogContentStreaming: Texture pool size now 1000 MB
[2023.02.09-16.39.47:715] [1]LogEngine: Onscreen warnings/messages are now DISABLED
[2023.02.09-16.39.47:718] [1]LogDisplayClusterMedia: VeryVerbose: New latency is 0
```

For more information on Spectra setup and streaming to Streambox decoders like Streambox Halo, Iris, or Media Player, see documents and videos on the [Streambox.com Resources](#) page.

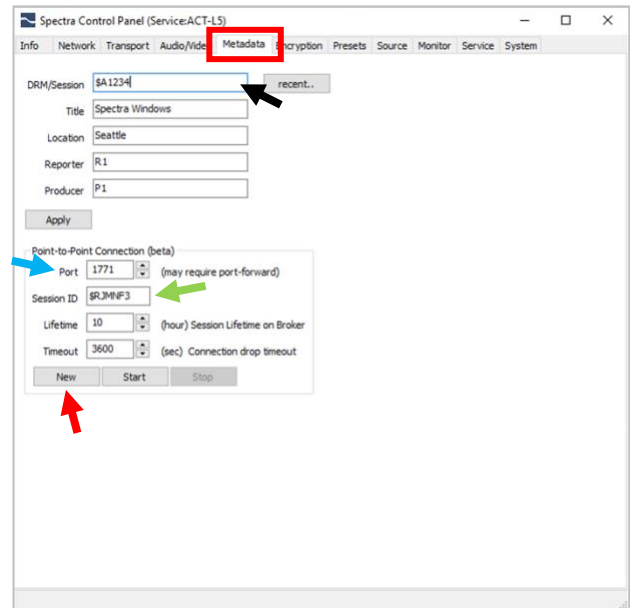


# Point-to-Point (P2P) Streaming

Point-to-Point streaming allows to stream directly to a single user including cases when user is behind firewall or NAT. P2P primary use case is reference monitoring from Spectra to Streambox decoder client without use for Cloud data. It is especially handy when Spectra is located on the Cloud instance. Spectra Encoder is required to have public IP or port forward for the client to receive vide stream.

Create a P2P Session in Spectra:

- Click Metadata tab (red outline)
- Enter Point-to-Point Port\* (e.g., 1771. blue arrow).
- \*Note: May require port-forwarding if Spectra Encoder is behind firewall.
- Click 'New' button to create new P2P Session (red arrow).
- Note: You can use the Start and Stop buttons to pause/restart the P2P stream
- Click the current Session ID to copy it to the clipboard (green arrow). You can then share that Session ID for the receiving Streambox decoder/player.



# Streambox Cloud Streaming

## Setting up a Session

Create a distributed Session ID on Streambox Cloud (supports up to 20 external connections).<sup>2</sup>

- Make sure Point-to-Point is stopped on the Metadata page.
- Enter the desired Encoder DRM (from the Streambox.com, Sessions page, Sessions page, red arrow) in the DRM/Session field (black arrow, above).

Name	Connections	Created	Creator	Group	Encoder DRM	Session ID	Mode	Expires In	
Unreal 42 Review	1 <span>US</span>	2023-04-28 09:23:05	Dave (SBX)	Streambox	\$A1234	\$A4321	Hourly	3.2 hours	<a href="#">Edit</a> <a href="#">Share</a> <a href="#">Dashboard</a> <a href="#">Chat (Beta)</a> <a href="#">Delete</a>

- You will share the Session ID (blue arrow) for the receiving remote decoders/players (up to 20 at a time). Clicking the Session ID will copy the Session link to the clipboard for easy sharing.

<sup>2</sup> Sessions Setup Guide: [https://s3.amazonaws.com/support.streambox.com/Collected%20Manuals/Sessions/Streambox-Sessions\\_Setup-Guide\\_3.0a.pdf](https://s3.amazonaws.com/support.streambox.com/Collected%20Manuals/Sessions/Streambox-Sessions_Setup-Guide_3.0a.pdf)

## Streambox Spectra for Unreal Engine (5.1)

- On the Network page in Spectra, select the 'Live IP' that matches the Encoder DRM code. For example, if the Encoder DRM is \$A1234, you would select LiveUS.streambox.com (from the table below):

Live Server	Code \$	IP Address	Region
LiveUS.streambox.com	A	52.25.129.48	USA (Oregon)
LiveUSEast.streambox.com	B	54.83.19.155	USA (Northern Virginia)
LiveAU.streambox.com	C	52.62.2.246	Asia Pacific (Sydney)
LiveDE.streambox.com	E	54.93.179.19	Europe (Frankfurt)
LiveEU.streambox.com	F	54.247.100.52	Europe (Ireland)
LiveJP.streambox.com	G	52.69.71.156	Asia Pacific (Tokyo)
LiveSA.streambox.com	H	54.233.86.10	South America (Sao Paulo)
LiveSG.streambox.com	I	52.76.243.157	Asia Pacific (Singapore)
LiveIN.streambox.com	J	52.66.83.26	Central Asia (India)
LivePost.streambox.com	P	52.8.239.106	USA (California)

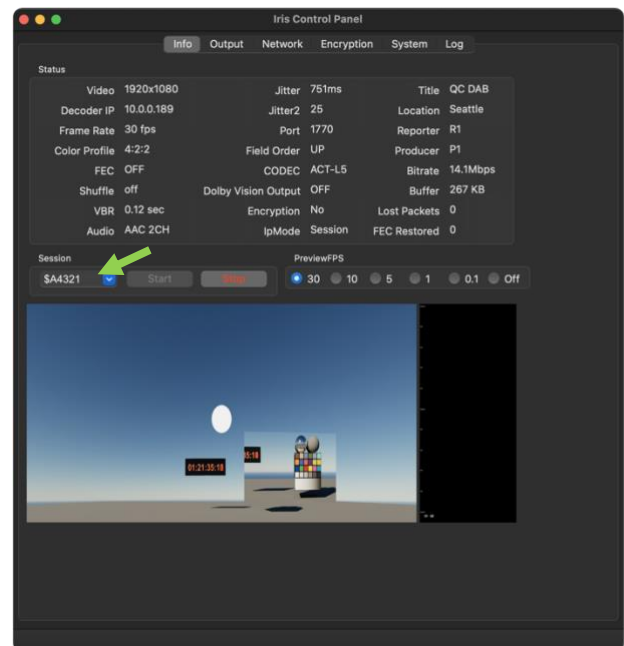
- Remember to 'Apply' any changes.
- From the 'Info' page, click the Start button to start the stream. Share the matching Session ID for connection with remote decoders/players.

## Receiving a Session

You can receive a Session with the matching Session ID provided by the host encoder, e.g., Streambox Spectra.

### Streambox Players (Iris, Media Player)

- Open the player
- Enter the Session ID provided by the host in the Session field (green arrow)
- Click Start/Go button



## Streambox Spectra for Unreal Engine (5.1)

### Streambox Decoders (Halo, Chroma, Chroma X, Chroma+)

- Open web interface of the decoder (image below)
- Select the Network tab (red outline)
- Select the matching Live Server (Mode) based on the table above (red arrow)
- Enter the Session ID in the Group/DRM field (green arrow)
- Click the 'Pull/P2P mode' button to start the stream



# Appendix

## Feature Activation in Spectra

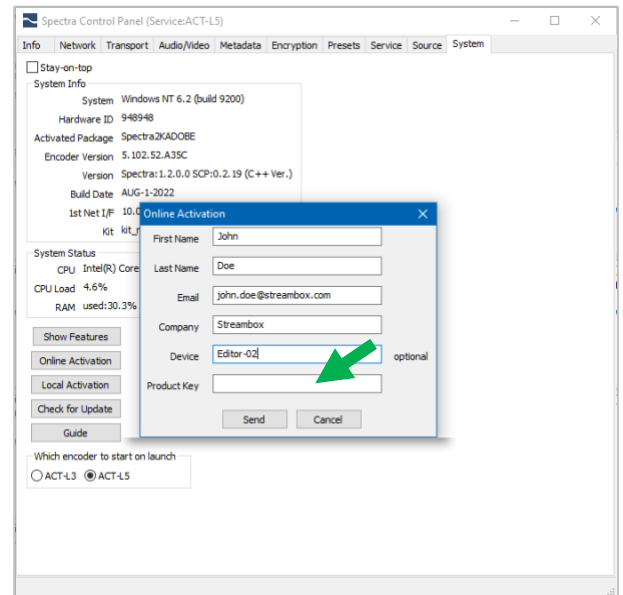
There are two methods to activate Spectra, its plugins, and additional features under the System tab. Once activated, you can click 'Show Features' to see what features were activated.

1. **Online Activation** requires an online-type license code 7 digits long, and the Spectra installation has internet connection.

*Note 1: You may skip this step if Spectra is already activated*

- Obtain Activation Code/Serial Number from your system administrator (this can be setup through Streambox Sales or Support).
- Fill-in user information
- Enter each applicable Activation/Serial code (green arrow), one at a time (hyphens are ignored), and click 'Apply' for each.

*Note 2: You may click the 'Show Features' button to see what has been activated.*

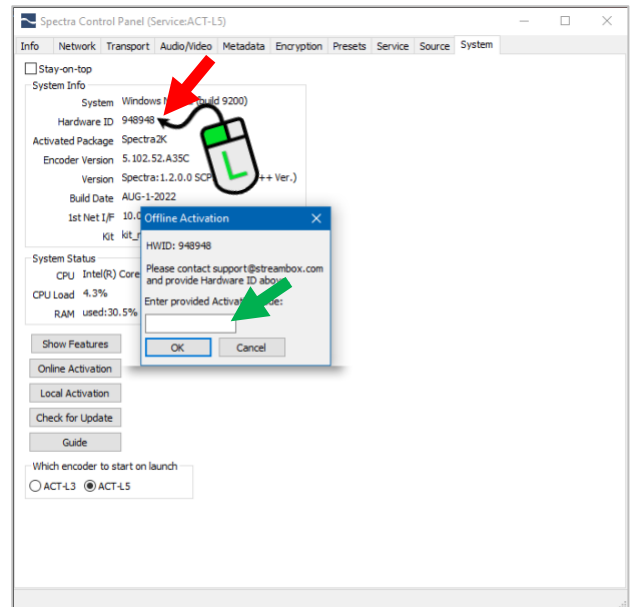


2. **Offline/Local Activation** supports single activation for each instance of Spectra. Activation codes are 9 or 16 digits in length.

*Note 1: You may skip this step if Spectra is already activated*

- Obtain Hardware ID: open 'System' tab (look under System Info, red arrow, click to copy to clipboard)
- Email Hardware ID to: sales@streambox.com
- Please ask to activate as: "Chroma4K" or "ChromaHD"
- Click Local Activation and enter the Activation Code (green arrow) (hyphens are ignored), then click 'OK'

*Note 2: You may click the 'Show Features' button to see what has been activated.*



## AWS CDI Output with Spectra for Unreal

Please contact [beta@streambox.com](mailto:beta@streambox.com) for AWS CDI output from Unreal.

## Limitations

Streambox Spectra for Unreal plugin current does not support following features:

- Audio capture
- Video ingest into Unreal (Media source)
- Only one active Media Output per Unreal editor (capture channel) is supported.

*We are constantly working on adding features to Streambox Spectra. Please email your suggestions to [beta@streambox.com](mailto:beta@streambox.com)*

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