FlowCaster v7

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Your sole remedies under this limited warranty are as follows:
Hardware and Media—The Company will either repair or replace (at its option) any defective Hardware component or part, or Software Media, with new or like new Hardware components or Software Media. Components may not be necessarily the same, but will be of equivalent operation and quality.

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Drastic Technologies Ltd
523 The Queensway, Suite 201
Toronto, ON, M8V 1J7
Telephone: (416) 255-5636

2 Introduction

This manual is for FlowCaster 7.x software from Drastic Technologies, Ltd.

2.1 Conventions

This manual assumes the following:

That the user knows how to operate a mouse and keyboard and perform the basic functions of Microsoft Windows, macOS or Linux operating system.

That the user is familiar with the creative software in use.

That the user has access to technicians capable of placing the device on the network and setting up any SAN systems if necessary.

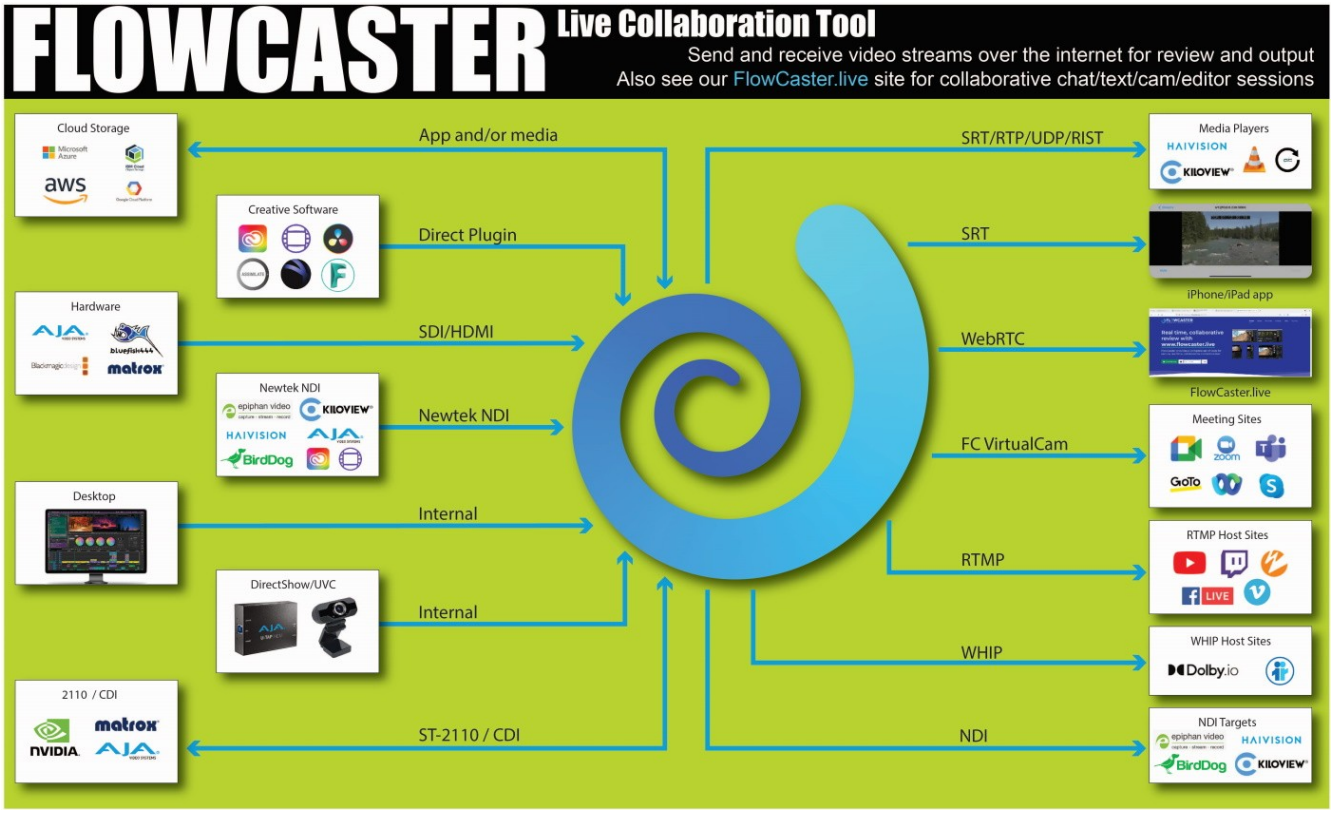
The name of a control or display present on the interface will be displayed in **bold** text.

Where a portion of the manual is referred to the name of section mentioned will be displayed in *italics*.

Certain images in this document may have been grayed out where it is useful or necessary to place indicator marks to show specific controls or displays above a darker background.

2.2 About FlowCaster

FlowCaster software provides a secure connection from your creative software to a local monitor, no matter where the software or the monitor is. FlowCaster lets you keep your creative software and media in your facility or cloud, while allowing your editors and artists working remotely to get the pixel perfect display they need to create their magic. FlowCaster provides direct plugins for most creative software, and convenient tools to share any other software they need.



Video may be transported via the Secure Reliable Transport (SRT) protocol, with full end to end encryption, low latency and excellent error recovery. FlowCaster also supports UDP, RTP, RTMP and WebRTC for alternate workflow sharing. Inside the secure pipe are up to 32 channels of high quality audio and your choice of lightly compressed video, using h.264, h.264/HEVC or JPEG-2000 up to 16 bits per pixel component. SDR and HDR/HLG signals are supported, as well as alternate color spaces like Rec 709, BT 2020 and P3. Any video resolution and frame rate is supported, and quality settings allow for even low bandwidth connections to take advantage of FlowCaster.

2.3 System Requirements

2.3.1 Recommended Environment

FlowCaster software must be installed on a system at least as powerful as the configurations listed below.

HD 1080p60
- A recent Intel, AMD or NVidia with at least 1G memory card is fine for the GPU
- A recent Quad Core i5/i7/AMD processor with at least 8G of ram

4K/QHD
- A gaming level NVidia or AMD (NVidia 1080 or better/AMD Vega 2 or better)
- Minimum 8 cores [16 virtual] Intel/AMD, recommended 8~12 cores with at least 8G ram

FlowCaster supports a wide variety of input devices. Here is a list:

- AJA: KONA LHe/plus, KONA LHi, KONA 3G, KONA 4, KONA IP, KONA 5, KONA HDMI, Io-XT, Io-4K, OEM2K, Corvid Series, U-TAP
- Blackmagic (version 11/12 drivers required): UltraStudio, DeckLink, Intensity Pro, Intensity, Mini Recorder, UltraScope™, HyperDeck, Ursa, BMPCC (32 bit software support is end of life at version 7)
- Bluefish444: Epoch Supernova, Epoch Neutron, KRONOS
- DekTec - SDI boards: DTA-2172, DTA-2174B, DTA-2175, DTA-2178-ASI, DTA-2178, DTA-2179, DTA-2195 (use latest drivers)
- Digitnow: HDMI USB Capture
- Elgato: Game device capture devices
- Epiphan: AV.io HDMI/SDI/4K
- Inogeni: 4K, 3G, DVI, VGA/CVBS
- Logitech: HDMI Screen Share
- Magewell: HDMI and SDI USB-3 devices
- Microsoft: USB Cameras
- Mokose: HDMI/SDI USB-3
- NewTek: NDI®
- Rybozen: HDMI USB Capture
- UVC: Most (USB Video Class) compliant video devices

To support ST-2110 sources, specific hardware and software are required:

Mellanox NVIDIA Bluefield-2/3 (requires a separate Rivermax software license plus one year of

support)
Mellanox NVIDIA Connect-X 6/7 (requires a separate Rivermax software license plus one year of support)
Temporary (duration limited) Rivermax licenses for testing can be made available on request
Details on setting up Rivermax can be found here.

3 Using IP Video Streaming

Drastic software supports a number of IP video standards in videoQC, Net-X-Code Server, FlowCaster and other products. To access these streams, a URL style string is used to describe them. For some sources, like RTSP, this string is fairly standard. For others, like NDI, a URL style has been developed to allow those streams to be specified. Currently, udp://, rtp://, srt://, rtsp://, ndi://, s2022:// and s2110:// are supported. This document describes the URLs' format in more detail. We have also added some application specific notes for connecting our software to other applications.

3.1 Basic IP Video URLs

An IP video URL will always start with the type of stream you are expecting. Some of the types include udp://, rtp://, rtsp://, ndi://, s2022:// and s2110://. This will be followed by an IP address or resolvable name for the address of the stream. For some streams there will be a port value, and then a description of the stream on that device. For videoQC, there is also a special form that can be used to launch videoQC, FlowCaster iOS Player or FlowCaster Android Player automatically from a browser link. For these, simply preface the link you want with videoqc:// and remove the extra colon from the link.

3.2 UDP and RTP

UDP [User Datagram Protocol] and **RTP** [Real-time Transport Protocol] streams can be elementary video or audio streams, or more commonly a transport stream with PMT/PAT (Program Association Table/Program Mapping Table) and a number of streams within it. For UDP and RTP, you can specify a TCP (direct) address, but normally it will be a multicast group address, and also a port is normally specified. Here are a few examples:

- udp://239.254.40.40:5004
- rtp://239.100.20.20:50004
- rtp://239.100.30:31:1234

3.3 SRT

SRT [Secure Reliable Transport] streams contain a transport stream with PMT/PAT and a number of streams within it. For SRT you can specify an address and a port. There are three modes for SRT: listener, caller and rendezvous. If you are a listener, you can only connect with a caller and vice versa. For Rendezvous, both the sender and receiver must be in rendezvous mode. A password for

encrypted service can also be set. Here is some information on the modes:

- **listener** - this has to be one of your local IP addresses, and acts as a server waiting for a connection, so it must be directly visible to the caller (not behind a firewall)
- **caller** - this calls out to a remote IP that is running as a listener. You must be able to reach the IP directly (e.g. no firewall)
- **rendezvous** - this connects bidirectionally, allowing it to connect through firewalls without extra configuration. Each side of the rendezvous uses the external (internet facing) IP address of their internet connection. This allows the signals to connect and pass through the firewall

Here are a few examples:

- srt://239.254.40.40:5004?mode=listener
- srt://172.12.25.20:5006?mode=caller
- srt://239.100.30:31:1234?mode=caller&password=thisisapassword&user=thisisauser

Possible parameters include:

- mode=
    - caller
    - listener
    - rendezvous
- password=<string>
- keylen=16|24|32
- username=<string>
- streamid=#
- latency=#
- buffering=#
- maxbw=#

3.4 RIST

RIST [Reliable Internet Stream Transport] streams are UDP based self correcting connections. RIST supports three profiles: Simple, Main, and Advanced. Both the sender and the receiver must be in the same mode. The receiver will be the server and listen for a connection. The sender will be the client and connect to the receiver to send the data. The protocol will use two ports, the lower of which is specified in the URL and the higher which is the lower plus one. The lower port must be even.

Here are a few examples:

- rist://10.0.0.123:5000?mode=listener&profile=main

- rist://192.168.1.22?mode=caller&profile=simple

Possible parameters include:

- mode: listener (for server/receiver), caller (for client/sender) - Required
- profile: simple. main or advanced
- password: encryption key
- buffering: amount of buffer in milliseconds

3.5 RTSP

RTSP [Real Time Streaming Protocol] streams require not only the device address, but also the description of the source of the stream you are accessing on that device. RTSP streams are also often user/password protected, so you may have to send a user/password in the form "<user>:<pass>@" just before the device identifier. Here are a few examples, and their sources:

- rtsp://192.168.100.10/axis-media/media.amp (an Axis camera)
- rtsp://192.168.199.11/user:pass@/video1+audio1 (a Marshall camera, with password)
- rtsp://192.168.160.20:/onvif/media.amp (an OnVIF source)
- rtps://192.168.150:11/video1?videocodec=h264 (a Marshall camera, video only, force h.264)

3.6 RTMP

RTMP [Real-Time Messaging Protocol] is normally used to stream one video and one stereo audio channel to a website for distribution to multiple watchers. In modern sites, the RTMP is actually re-wrapped into HLS, which is then viewed by the end user. To connect to an RTMP site, like flowcaster.live, youtube.com, and twitch.com, you will need the URL/Link and the key/secret. For YouTube, they are available after you 'go live' as the Stream URL and the Stream Key. Once you have them, you simply add a slash and the Stream Key to the Stream URL. For example:

Stream URL: rtmp://a.rtmp.youtube.com/live2
Stream Key: j2bg-a6ck-8t48-w2y2-aaaa
Final URL: rtmp://a.rtmp.youtube.com/live2/j2bg-a6ck-8t48-w2y2-aaaa

3.7 WebRTC

WebRTC [Web Real-Time Communication] is a browser native method of sharing video, audio and data. It is primarily used in chat programs, like Google Meet. When sending via WebRTC, FlowCaster

appears as a person in the chat, with whatever video and audio it is receiving being sent to the chat. Here is an example:

- webrtc://flowcaster.chat?meetingid=asre-dsec-asds-seff&name=flowcaster

3.8 WHIP (WebRTC – Millicast)

WHIP [WebRTC-HTTP ingestion protocol] is a simpler negotiation system for WebRTC. Currently in use by Millicast to receive streams for worldwide, low latency transmission, FlowCaster and Net-X-Code support sending video signals via WHIP. WHIP requires an authorization code (available from the Millicast config pages) and a stream name. The stream name is added to the end of whip://director.millicast.com/api/whip/ and the auth token is a parameter that starts with auth=. Here is an example

- whip://director.millicast.com/api/whip/kwky3g6g?auth=48ce3daa09cd8355f80fc0d37005f9422a62bebf9b6411b61cfb1cfb2fa

3.9 BLS (Bliss Protocol)

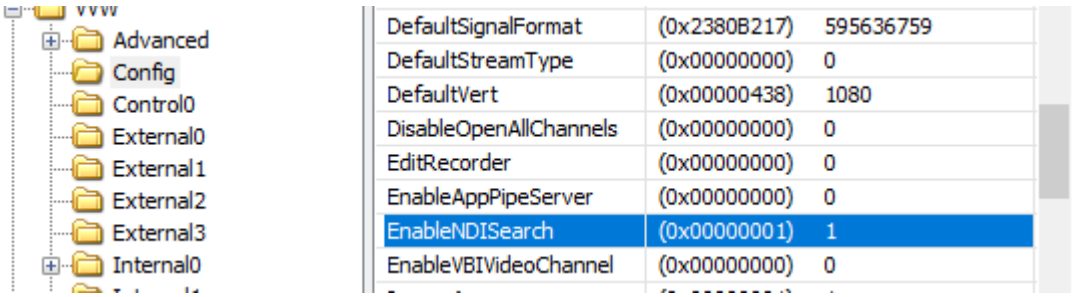
BLS [Browser Live Stream] is a protocol developed by Drastic to send live video, via an encrypted channel directly to a user's browser. It allows for much higher quality video than WebRTC, while still not requiring any plugins or special setup to present audio and video directly in a modern, HTML5 browser. Here are a couple examples:

- bls://10.0.0.234:5000
- blss://192.168.202.200:3000?password=kfiwgt84jsd&remoteip=120.32.54.6

3.10 NDI

NDI [Network Device Interface] is a video over IP protocol developed by NewTek®. It requires a device name and a source name to access NDI sources. NDI sources may also be searched on the local network. To enable the search, run DDRConfig and select the Advanced tab. Go to /VVW/Config and change EnableNDISearch = 1. If it does not exist, then create a new Numeric value for it.

To specify an NDI stream, use the device name, followed by a space, and then the source name within brackets. Here are some examples:



- ndi://USER-PC (Desktop [2])
- ndi://TestCameraSource (ISO_1)
- ndi://PC2 (Google Chrome [1])

3.11CDI

CDI [Cloud Digital Interface] is an advanced, fully uncompressed, protocol for use within Amazon VMs. It transports video in a number of formats, as well as audio, time code and other metadata. While it is possible to use CDI with Amazon's enhanced network backbone, it is safest and most efficient, within their network stacks. The URL will include a local IP and port, with an optional remote IP, adapter and ID. Here are some examples:

- cdi://10.0.0.2:6000
- cdi://10.0.0.1:6000?remoteip=10.0.0.200&adapter=EFA&id=2

Possible parameters include:

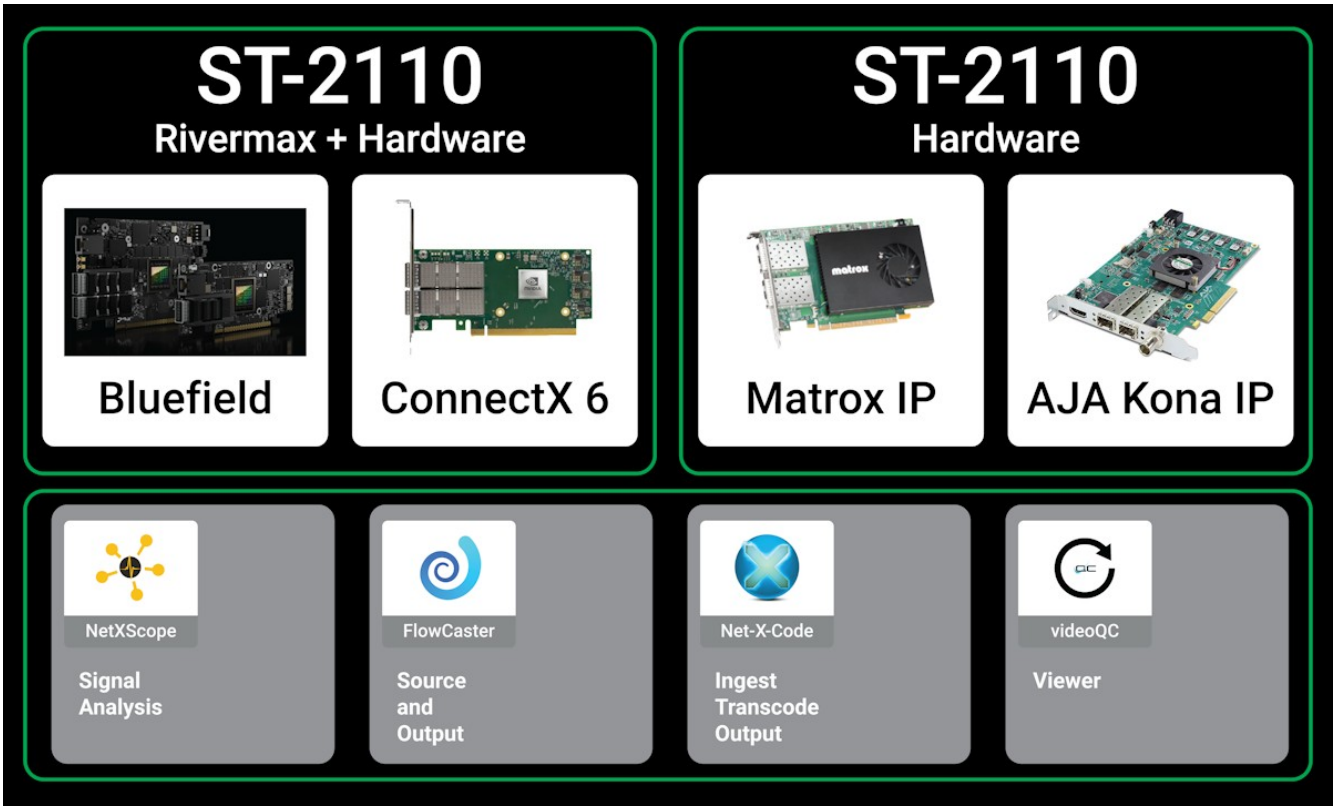
- remoteip: a remote computer to connect to exclusively
- adapter: the transport, EFA (Elastic Fabric Adapter) or socket. EFA is the default.
- id: a numeric value to specify the stream

3.12 ST-2022 and ST-2110

The SMPTE 2022-6 and SMPTE 2110 protocols can be accessed via SDP (Session Description Protocol) or manual setup. To access an SDP source:

- s2202://192.168.101.200/channel1.sdp
- s2110://mainsources.drastic.ca/crosspoint10.sdp

For some Drastic software, the source can be set up manually. For S2022, this is a single set of Source IP, Source Port, Destination IP, Destination Port and Interface address. One or any combination of these can be used to describe the source of the SMPTE 2022-6 stream, which contains all the video, audio and HANC/VANC channels. For SMPTE 2110, up to three sets of the same information are required to describe the video, audio and anc streams, which are all separate. A PTP (Precision Time Protocol) grandmaster may also be specified.



ST-2110 and ST-2022 require one of the following environments:

NVidia Hardware + Rivermax: Bluefield-2 or Connect-X 6 (requires Rivermax license)
View the Video Overview
Here is a page with some Great ST-2110 Links

Here is our Rivermax Setup page

SMPTE 2110 hardware

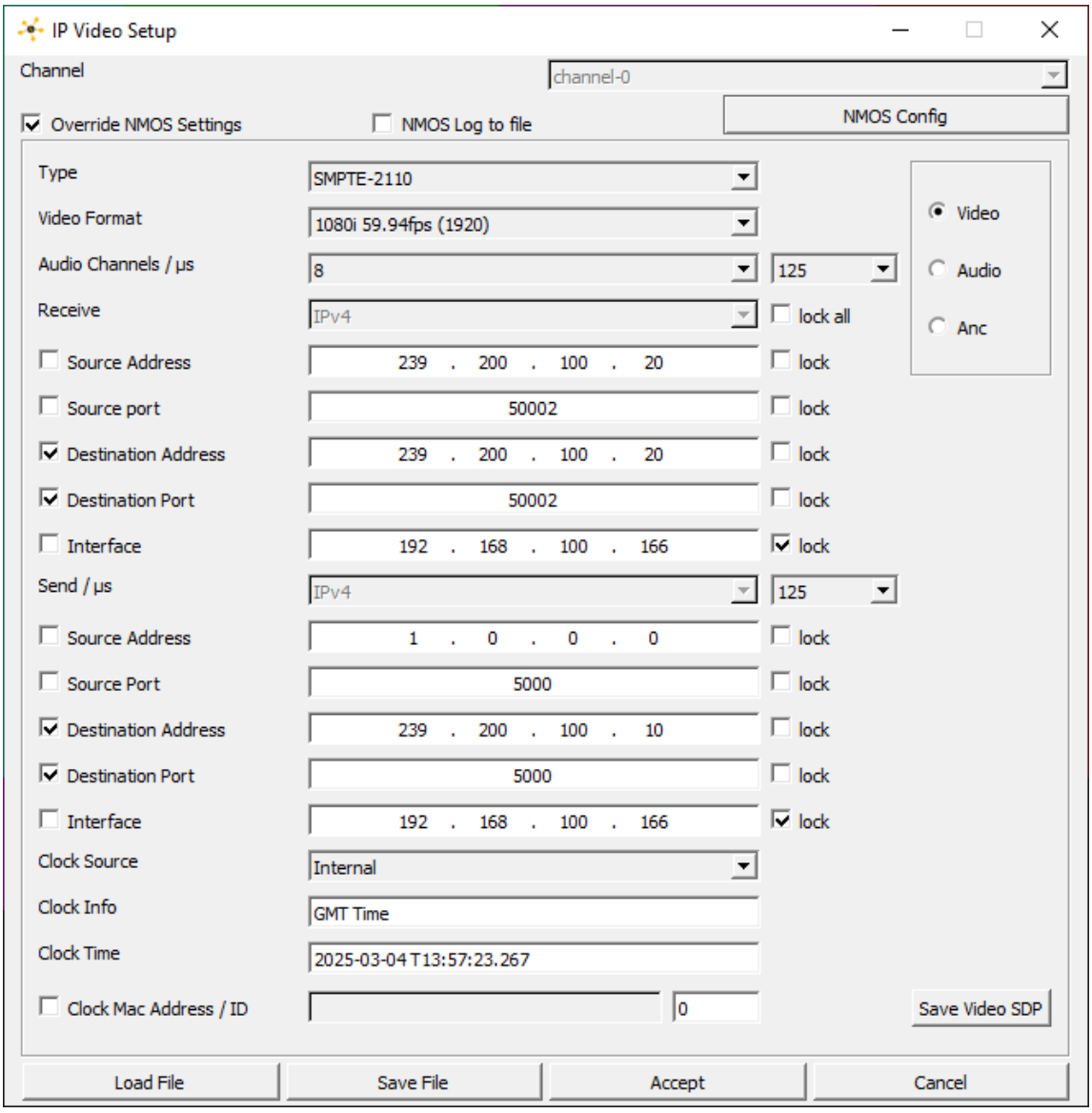
Matrox: ST 2110 Network Adapters

AJA: Kona IP

3.12.1 2110 Video Setup

Here is the ST-2110 setup dialog from NetXScope.

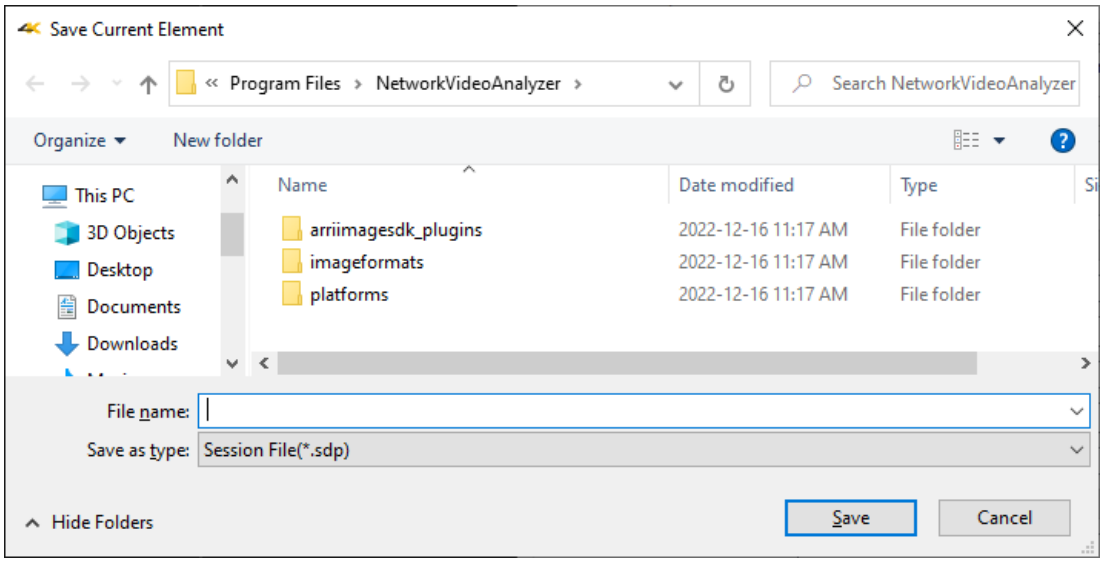
When set to ST-2110 or ST-2022 sources, the IP Setup button opens the **IP Video Setup** window, which allows the user to set up how IP video is handled, and to specify the source, destination, and interface addresses for the Receiver, and the Sender. Clock source, master, and domain settings are present. Settings are maintained separately for video, audio, and ancillary data.



Channel pulldown – select between channels.

Override NMOS Settings checkbox – select to automatically set up the configuration according to the source signal parameters.

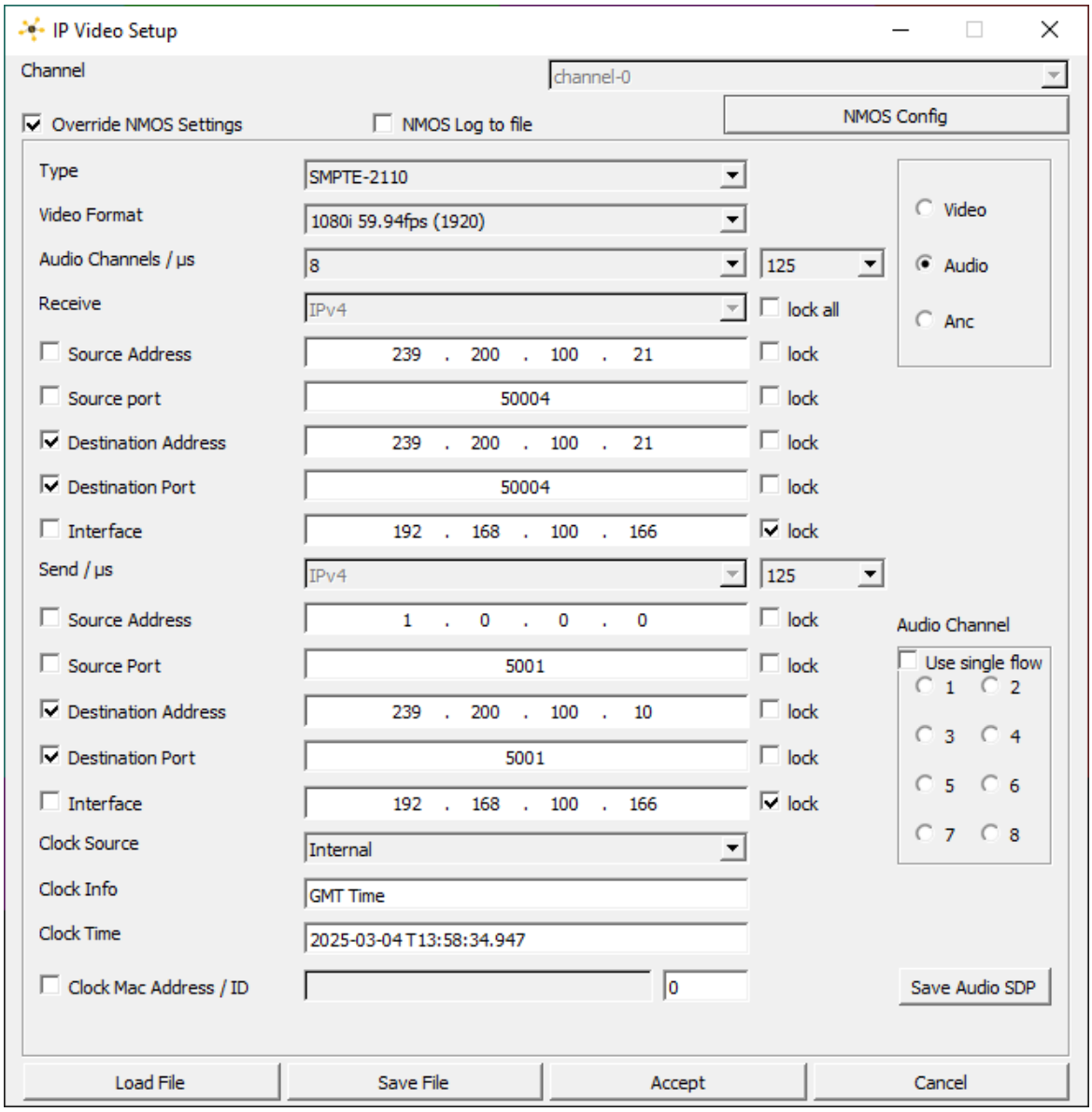
Type pulldown menu - select between SMPTE-2110, SMPTE-2022, or TR-01.
Video Format pulldown menu - select between available video standards.
Audio Channels / µs pulldown menu – allows the user to select the number of audio channels, and microseconds setting for audio packets. Audio in 2110/2022 is commonly split into packets of 125 microseconds or 1 millisecond, and this pulldown allows the user to set which one is used.
Receive pulldown menu / section – lets the user select the type of IP version used to receive IP video. Provides IP Address Settings for the Source Address, Source Port, Destination Address, Destination Port, and Interface are available. There is a Lock available for each setting, and a Lock All checkbox to set all the Receive addresses to the same address.
Send / µs pulldown menu / section – lets the user select the type of IP version used to send IP video, and adjust the setting for packet size in microseconds. Provides IP Address Settings for the Source Address, Source Port, Destination Address, Destination Port, and Interface are available. There is a Lock available for each setting, and a Lock All checkbox to set all the Receive addresses to the same address.
Clock Source pulldown menu – select the clock source. Choices include Internal, H/W SMPTE 2059/PTP, S/W SMPTE 2059/PTP, or Free Run.
Clock Info field – displays information about the clock setting.
Clock Time field – displays the current time in YYYY-MM-DD-THH-MM-SS-µs
Clock Mac Address / ID checkbox – click to activate the Mac Address boxes to the right, so you can enter the clock's Mac Address.
Save Video SDP button – opens the Save Current Element window, which allows the user to save all of the settings as a Session File (*sdp) for later retrieval.



Load File button – opens the Ini File window, which allows the user to save all of the settings as an Ini File (*ini) for later retrieval.
Save File button – opens the Ini File window, which allows the user to open an existing Ini File (*ini) to use the settings again.

Accept button – press to accept all changes and close the IP Video Setup window.
Cancel button – press to close the IP Video Setup window without making any changes.

3.12.2 ST-2110 Audio Setup



Channel pulldown – select between channels.

Override NMOS Settings checkbox – select to automatically set up the configuration according to the source signal parameters.

Type pulldown menu - select between SMPTE-2110, SMPTE-2022, or TR-01.

Video Format pulldown menu - select between available video standards.

Audio Channels / µs pulldown menu – allows the user to select the number of audio channels, and microseconds setting for audio packets. Audio in 2110/2022 is commonly split into packets of 125 microseconds or 1 millisecond, and this pulldown allows the user to set which one is used.

Receive pulldown menu / section – lets the user select the type of IP version used to receive IP video. Provides IP Address Settings for the Source Address, Source Port, Destination Address, Destination Port, and Interface are available. There is a Lock available for each setting, and a Lock All checkbox to set all the Receive addresses to the same address.

Send / µs pulldown menu / section – lets the user select the type of IP version used to send IP video, and adjust the setting for packet size in microseconds. Provides IP Address Settings for the Source Address, Source Port, Destination Address, Destination Port, and Interface are available. There is a Lock available for each setting, and a Lock All checkbox to set all the Receive addresses to the same address.

Clock Source pulldown menu – select the clock source. Choices include Internal, H/W SMPTE 2059/PTP, S/W SMPTE 2059/PTP, or Free Run.

Clock Info field – displays information about the clock setting.

Clock Time field – displays the current time in YYYY-MM-DD-THH-MM-SS-µs

Clock Mac Address / ID checkbox – click to activate the Mac Address boxes to the right, so you can enter the clock's Mac Address.

Audio Channel buttons – select specific channels, or Use Single Flow.

Save Audio SDP button – opens the Save Current Element window, which allows the user to save all of audio the settings as a Session File (*sdp) for later retrieval.

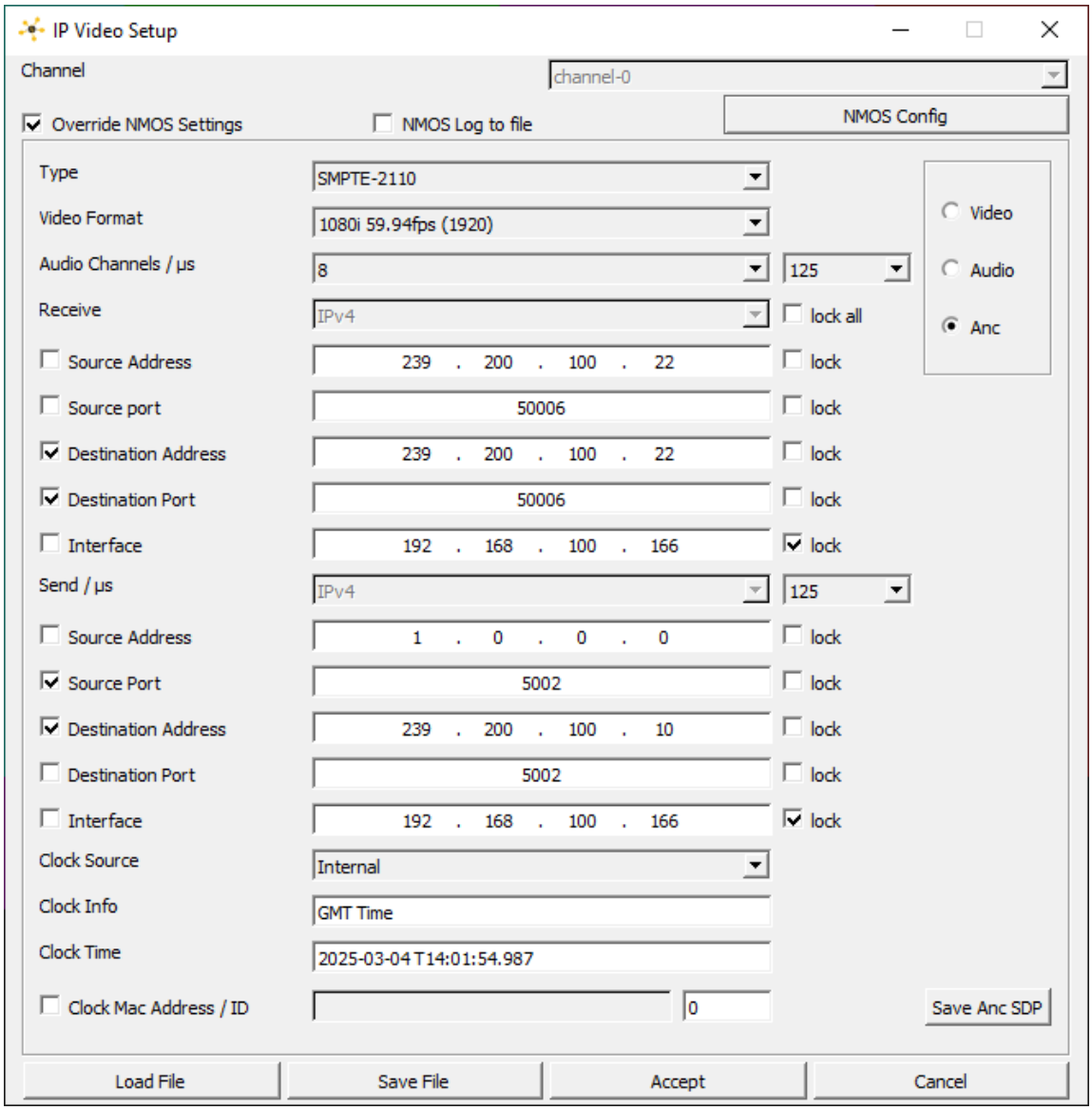
Load File button – opens the Ini File window, which allows the user to save all of the settings as an Ini File (*ini) for later retrieval.

Save File button – opens the Ini File window, which allows the user to open an existing Ini File (*ini) to use the settings again.

Accept button – press to accept all changes and close the IP Video Setup window.

Cancel button – press to close the IP Video Setup window without making any changes.

3.12.3 ST-2110 Anc Setup



Channel pulldown – select between channels.

Override NMOS Settings checkbox – select to automatically set up the configuration according to the source signal parameters.

Type pulldown menu - select between SMPTE-2110, SMPTE-2022, or TR-01.

Video Format pulldown menu - select between available video standards.

Audio Channels / µs pulldown menu – allows the user to select the number of audio channels, and microseconds setting for audio packets. Audio in 2110/2022 is commonly split into packets of 125 microseconds or 1 millisecond, and this pulldown allows the user to set which one is used.

Receive pulldown menu / section – lets the user select the type of IP version used to receive IP

video. Provides IP Address Settings for the Source Address, Source Port, Destination Address, Destination Port, and Interface are available. There is a Lock available for each setting, and a Lock All checkbox to set all the Receive addresses to the same address.

Send / µs pulldown menu / section – lets the user select the type of IP version used to send IP video, and adjust the setting for packet size in microseconds. Provides IP Address Settings for the Source Address, Source Port, Destination Address, Destination Port, and Interface are available. There is a Lock available for each setting, and a Lock All checkbox to set all the Receive addresses to the same address.

Clock Source pulldown menu – select the clock source. Choices include Internal, H/W SMPTE 2059/PTP, S/W SMPTE 2059/PTP, or Free Run.

Clock Info field – displays information about the clock setting.

Clock Time field – displays the current time in YYYY-MM-DD-THH-MM-SS-µs

Clock Mac Address / ID checkbox – click to activate the Mac Address boxes to the right, so you can enter the clock's Mac Address.

Save Anc SDP button – opens the Save Current Element window, which allows the user to save all of the Anc settings as a Session File (*sdp) for later retrieval.

Load File button – opens the Ini File window, which allows the user to save all of the settings as an Ini File (*ini) for later retrieval.

Save File button – opens the Ini File window, which allows the user to open an existing Ini File (*ini) to use the settings again.

Accept button – press to accept all changes and close the IP Video Setup window.

Cancel button – press to close the IP Video Setup window without making any changes.

3.13 videoQC URL/URI From Browser

videoQC supports being run from a browser, if installed on a Windows or macOS computer, with the special videoqc:// URL/URI. This will also work on Apple and Android devices with our FlowCaster Player apps (available free from the app store). In the case of videoqc://, it is not a protocol itself, but rather it loads the player and passes the rest of the protocol to it. So if you wanted an automatic link to bring up the srt stream: srt://239.100.30:31:1234?mode=caller&password=thisisapassword&user=thisisauser, you would add this to the videoqc:// start and remove its colon, as below:
videoqc://srt//239.100.30:31:1234?mode=caller&password=thisisapassword&user=thisisauser

3.14 Application Specific Notes

3.14.1 VLC (version 3.0.8 and greater)

VLC supports a number of streaming formats from the menu Media | Open Network Stream. Here you can read our UDP://, RTP:// and SRT://. If you are using multicast IP addresses (eg. 239.#.#.#), VLC prefers that you add an at sign (@) before the ip, like:

rtp://@239.240.30.30:5004

You can also use the @ sign to receive on any address using just the port:

udp://@:5004

For SRT, VLC only supports the being a 'caller', so our software needs to be set up as a listener. A typical setup would be

SMPTE2NET: srt://172.16.12.25:5000?mode=listener
VLC: srt://172.16.12.25:5000

Assuming the IP 172.16.12.25 was the IP of the machine SMPTE2NET is running on.

3.14.2 OBS - Open Broadcast System

OBS supports UDP, RTP and SRT using its FFMPEG media reader. It will support both listener and caller modes in the latest versions (26.0.2 or greater). The reconnect is not 100% reliable, so if connection is lost, then you may have to open the source again to have it set up. To add a UDP, RTP

or SRT source, click the + button in the Source panel and select MediaSource. In the Properties, unclick Local File, add the standard srt string, for listener or caller:

srt://172.16.12.25:5000?mode=listener

Set the input format to "mpegts" without the quotes, and set up the buffering and reconnect to taste.

3.14.3 Marshall and other Cameras

Most cameras we have tested operate as callers, so our software will have to be set up as a listener on the local IP the SRT stream is coming in on. Alternately, you can use the all addresses mode by using the 0.0.0.0 IP

srt://0.0.0.0:5000?mode=listener

4 Workflows

4.1 Work from home/cloud/remote monitoring

The main problem with using creative software remotely is the poor quality of the compressed/low bit rate/random frame rate output signal from shared desktop software. While FlowCaster uses desktop sharing for control of the software, the audio/video signal is transported separately, using low latency/high quality compression and matching frame rate to your project. This gives you the ability to monitor your work as if you were using a hardware output to an independent monitor. FlowCaster also supports HDR/HLG/WCG, any video resolution, up to 32 channels of high quality audio, and ancillary data including closed captions, active format description and v-chip information.

4.2 Production team sharing/collaboration

There are a number of ways FlowCaster's audio/video and desktops can be share to a group for collaboration:

- SRT Multicast or Haivision Gateway - maintain direct control of encrypted feeds by using SRT to all the collaborators. With the gateway, different users can be given different passwords and address/ports that can be fixed to a user’s IP address for further security
- RTMP - send your output and desktops to the **www.flowcaster.live** server, or any other RTMP compatible server like twitch/youtube/facebook, and use the server’s tools to share live

audio/video, host chats and handle authentication

- WebRTC – use **www.flowcaster.live**'s WebRTC compatible meeting rooms, or any other WebRTC compatible server, to support live A/V chat, authentication and text chat for one on one or multiuser collaboration

4.3 Cloud production or capture feed

Using SRT, signals from your creative software (Adobe/Avid/Assimilate/DaVinci/etc.) or from baseband feeds (SDI, HDMI, NDI, IP) can be sent directly to the cloud and captured to MXF, MOV, AVI, MP4 or others by the FlowCaster server. Optionally, a proxy file can also be generated.
All FlowCaster Server capture files support edit while record and playback while record, for local clipping or editing in Adobe Premiere. Signals can also be sent from the cloud, from Adobe/Avid/DaVInci/FlowCaster Server via SRT to be played locally as SDI or HDMI using a supported A/V device (AJA, Bluefish444, Blackmagic, Matrox).

4.4 IP format conversion

The FlowCaster Server can also be used to convert UDP, RTP, NDI and SRT to a new UDP, RTP, NDI or SRT stream. The server supports both re-wrapping of the compressed data and transcoding of the signal to a new compression type. As well as IP to IP, both baseband (SDI/HDMI) to IP and IP to baseband are also supported.

4.5 Cloud to Cloud

FlowCaster supports cloud to cloud transmission. Both compressed, via RTP, UDP and SRT, and uncompressed, via Amazon CDI, transports are supported. FlowCaster also has the ability to read and write directly from cloud object storage, like Amazon's S3 storage. File mode may also be used for guaranteed copies of media to be moved from one point to another.

5 Quick Start – SRT/RTP/UDP

Here is a quick start on setting up FlowCaster's SRT output:

Download and install FlowCaster

You will need at least a temp license to use all the features of FlowCaster. Please refer to the following page for info on how to license: http://license.drastictech.com

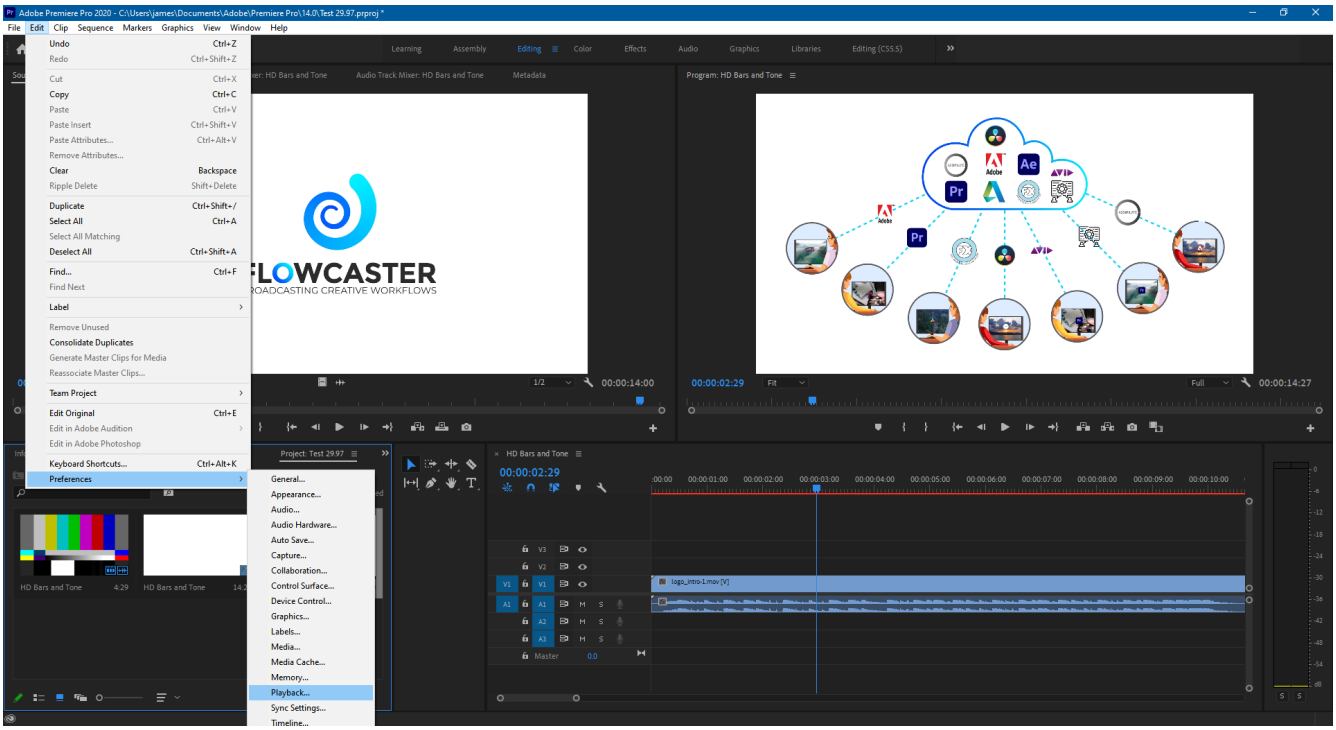
Download and install VLC (on the same machine to start with)

Optional: Install the Haivision Play Pro app on your phone

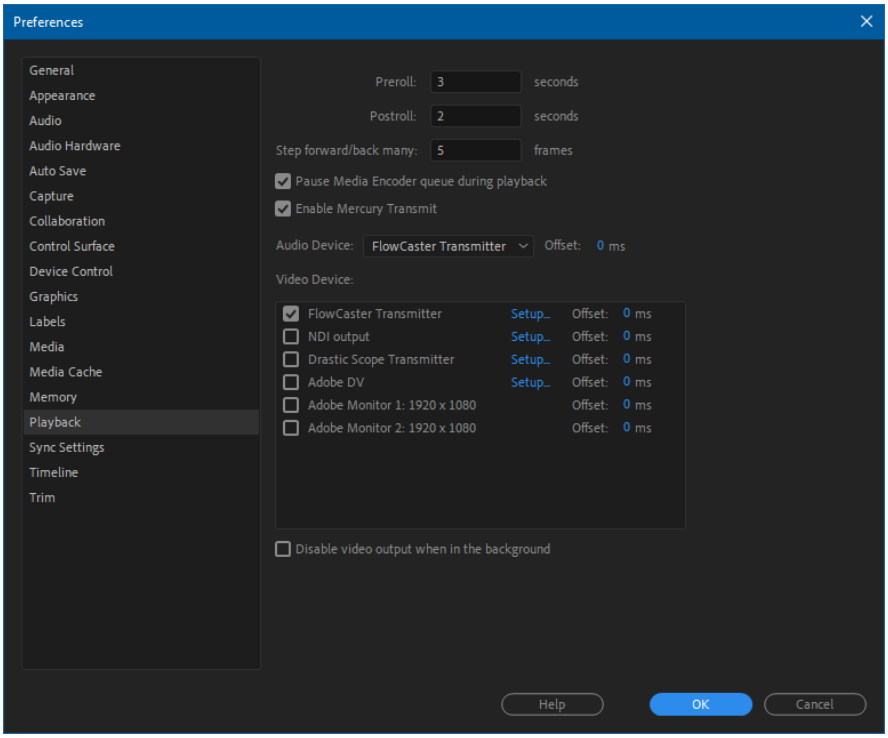
Determine your computer's IP address (ipconfig or ifconfig or control panel)

Run your creative software (Premiere in this example)

Open the FlowCaster configuration dialog. For Premiere, the menu Preferences | Playback. For Media Composer, the menu Tools | Video Output Tool, when enabled.

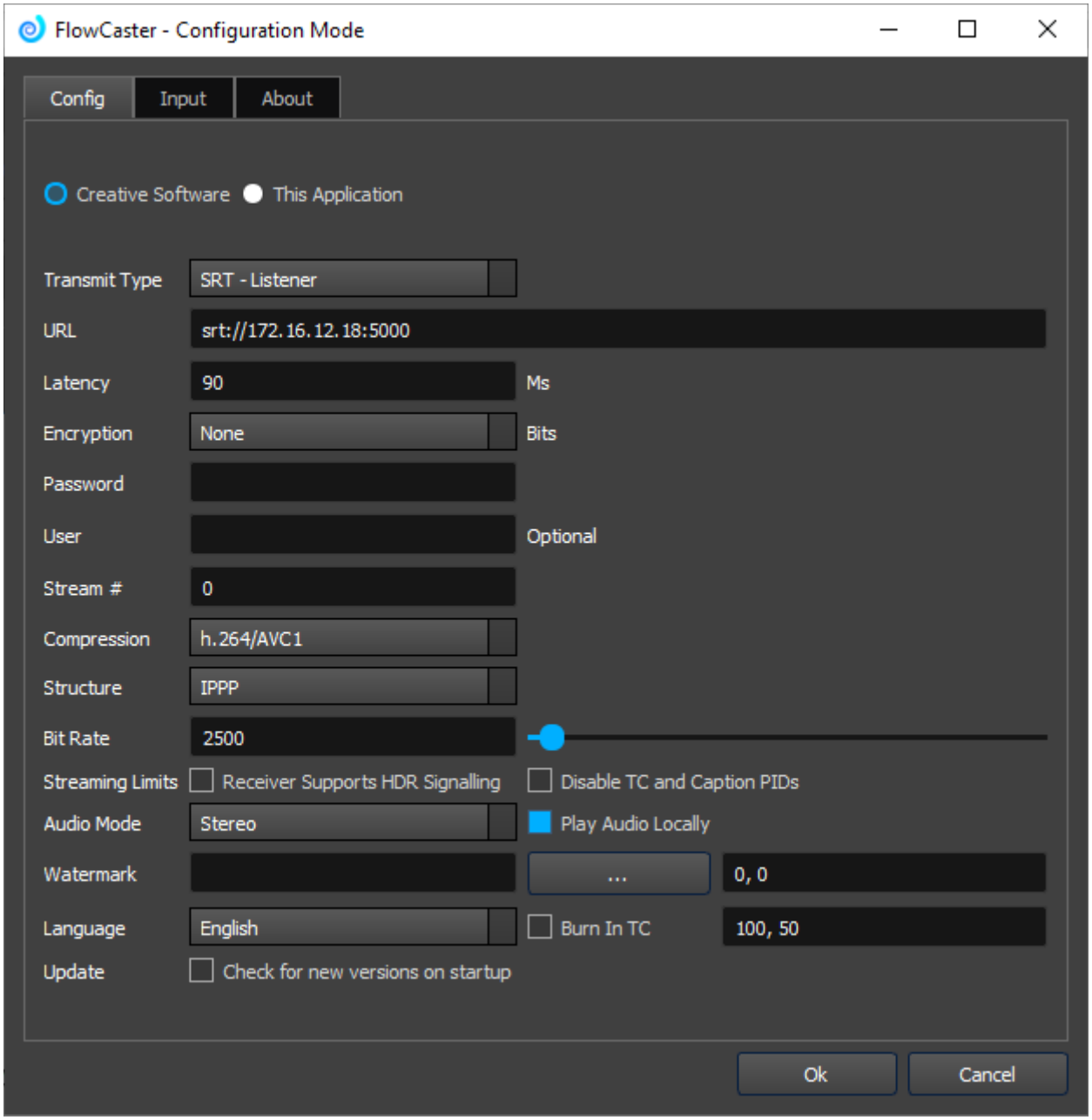


Click on the Preferences | Playback menu.



In the Adobe Preferences dialog, enable the checkbox next to FlowCaster Transmitter, and select FlowCaster Transmitter as your Audio Device.

Click the Setup link next to FlowCaster Transmitter to bring up the FlowCaster configuration dialog.



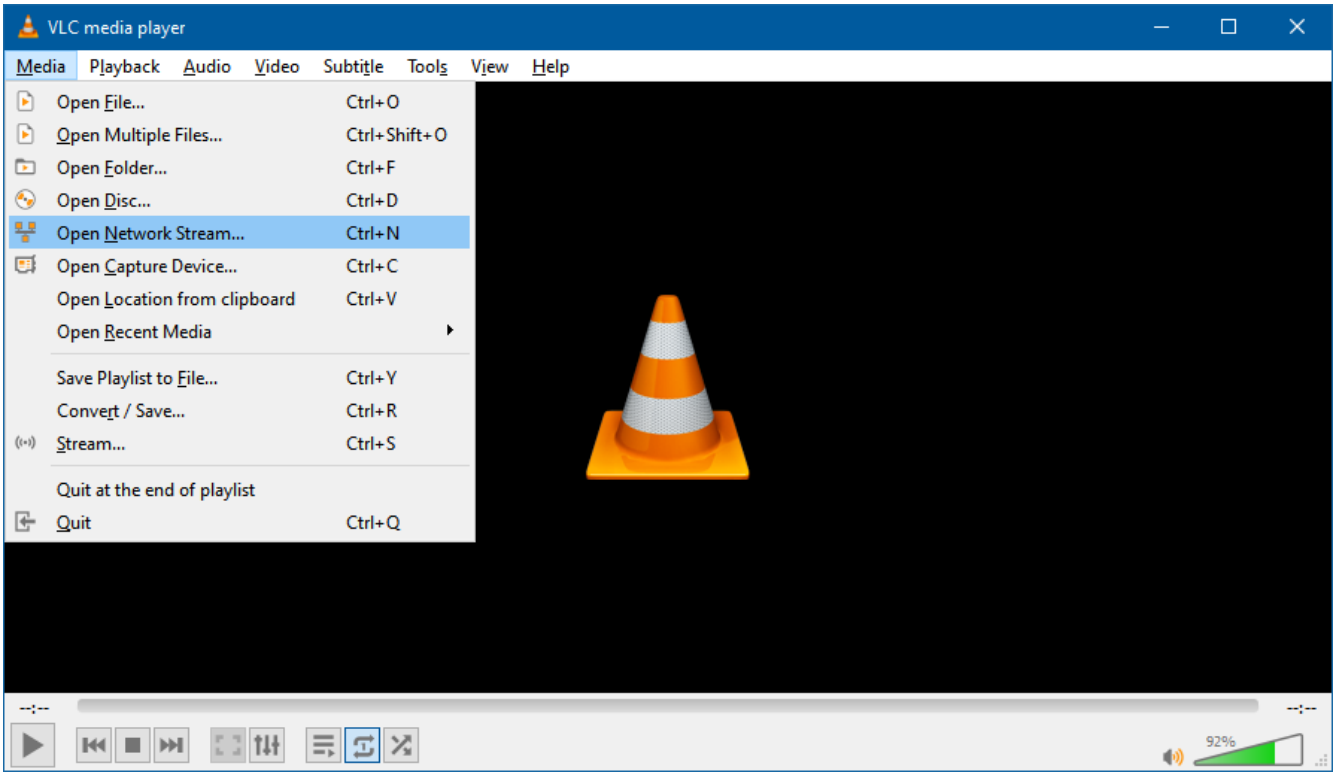
Set up the dialog as shown above

- Transmit Type: SRT Listener
- URL: srt://<your ip>:5000
- Latency: 90
- Encryption: None
- Password: Empty
- User: Empty
- Stream: 0

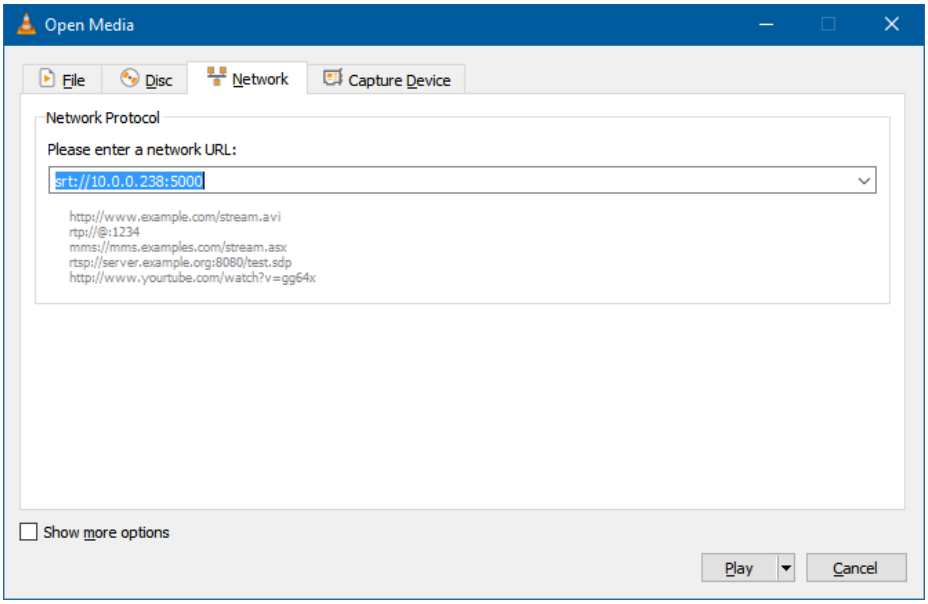
- Compression: h.264/AVC1
- Structure: IPPP
- Bit Rate: 2500
- Audio Mode: Stereo

Click Ok on the FlowCaster Config and Adobe Preferences and you will be transmitting Premiere's output.

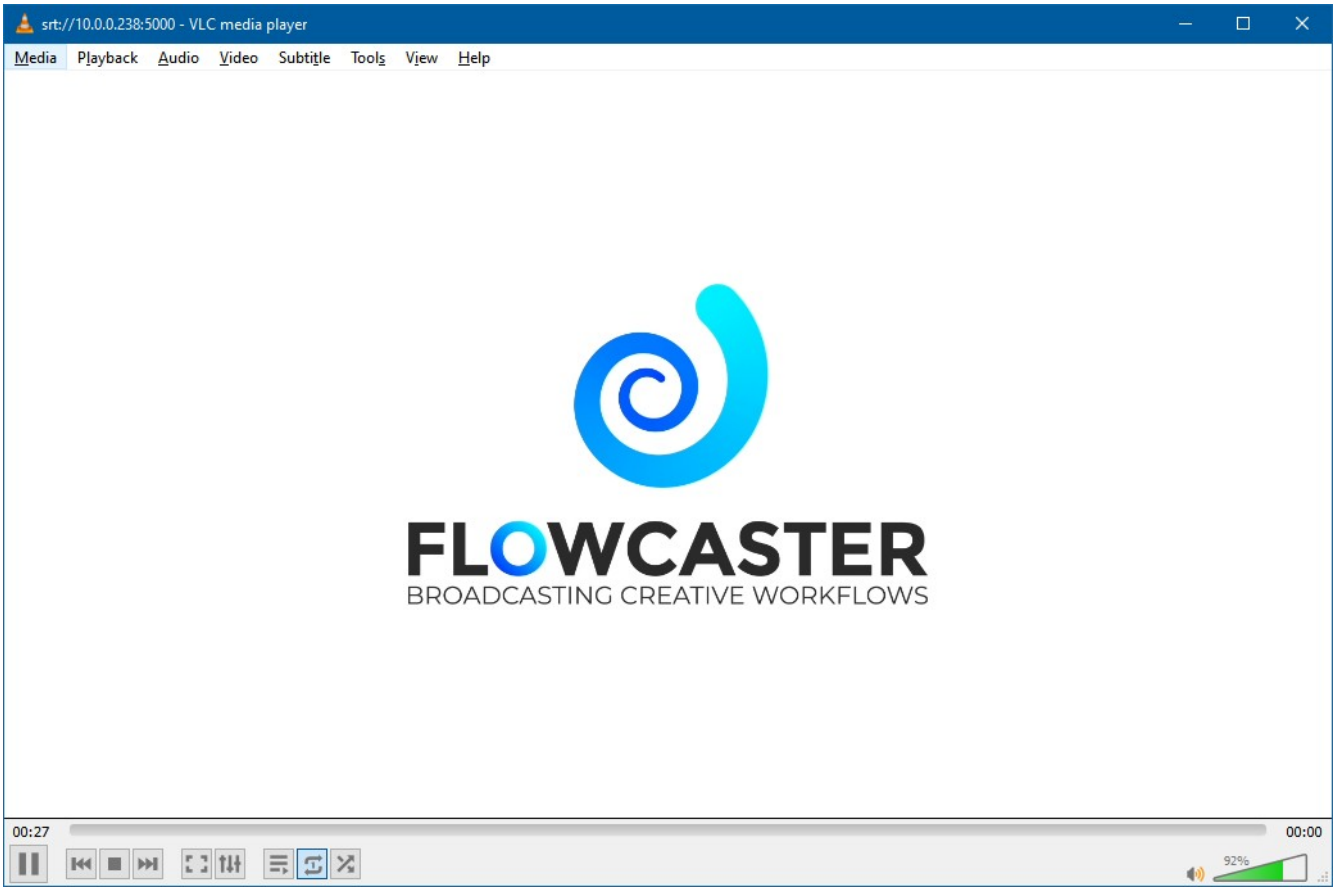
To receive the signal, run VLC and select the menu **Media | Open Network Stream**.



This will bring up the Network Open Media dialog

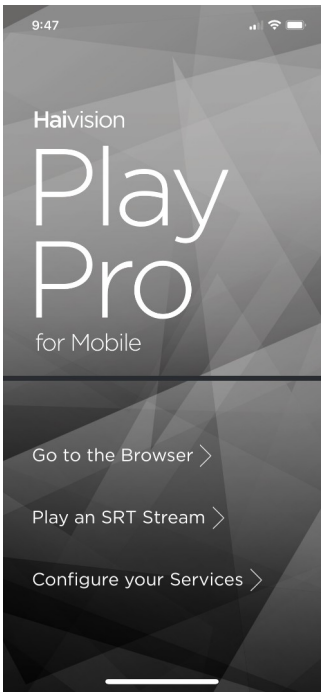


Enter
srt://<your ip>:5000

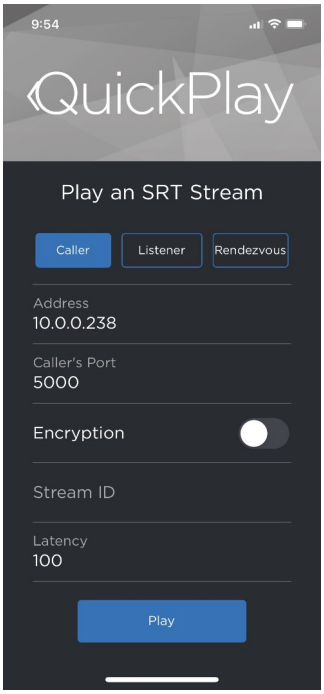


in the network URL text box and click Play and VLC will start receiving the SRT stream from Premiere.

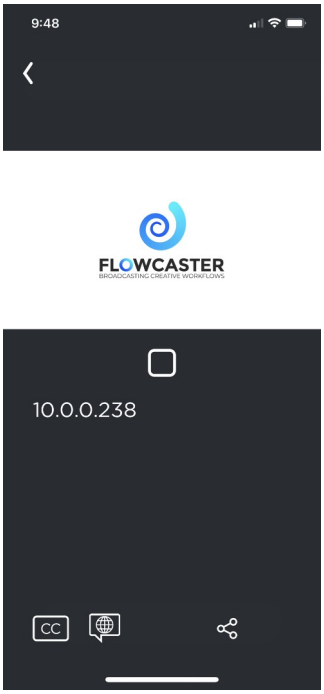
If you have the Haivision Play Pro app installed on your phone you can receive the SRT there as well. Close VLC and open Play Pro on your phone. After logging in, select Play an SRT Stream.



This will bring up the configuration screen.



Select Caller and set the Address to <your ip> and the Caller's Port to 5000. Click Play to start receiving the SRT stream



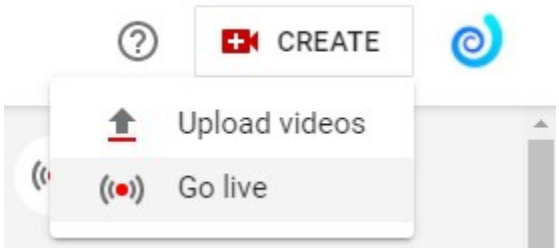
Once you have FlowCaster set up, configuring it for various scenarios will be a combination of transmission type, address and port, to match the sender and receiver. Here are some of the basic rules to follow:

- If FlowCaster is a Listener, then the receiver must be a Caller
- If FlowCaster is a Caller, then the receiver must be a Listener
- If FlowCaster is in Rendezvous mode, the receiver must also be in Rendezvous mode
- VLC only supports Caller mode (so FlowCaster must be a receiver)
- Whoever is the Listener must use a local address on the machine to listen on
- The Caller’s address and port should match the Listener’s address and port
- Rendezvous address will be the ones outside your firewall, on the actual network/internet

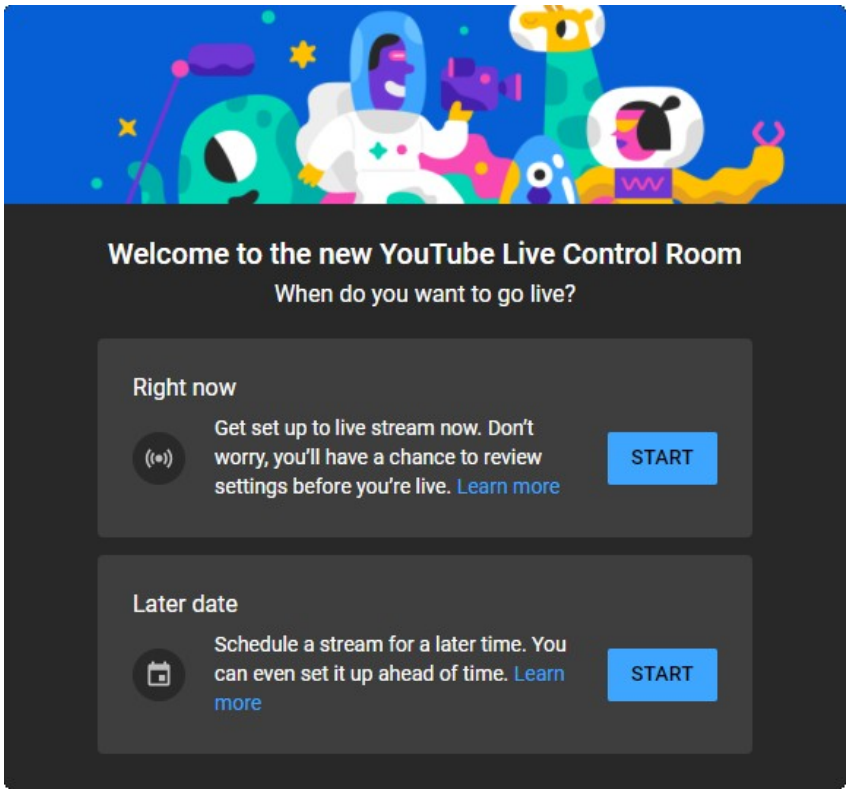
6 Quick Start – RTMP

FlowCaster supports local and internet based RTMP sharing sites like flowcaster.live, youtube.com, twitch.tv and many others. This quick start will connect Avid Media Composer's output to youtube.com.

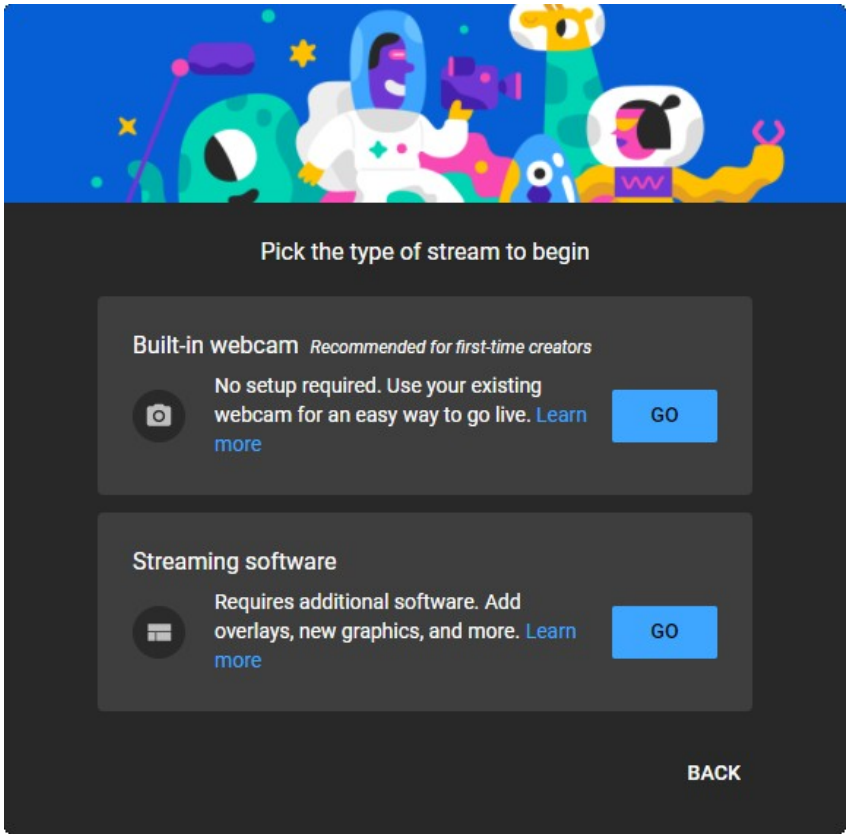
Start by logging into youtube and selecting Go Live from the upper right



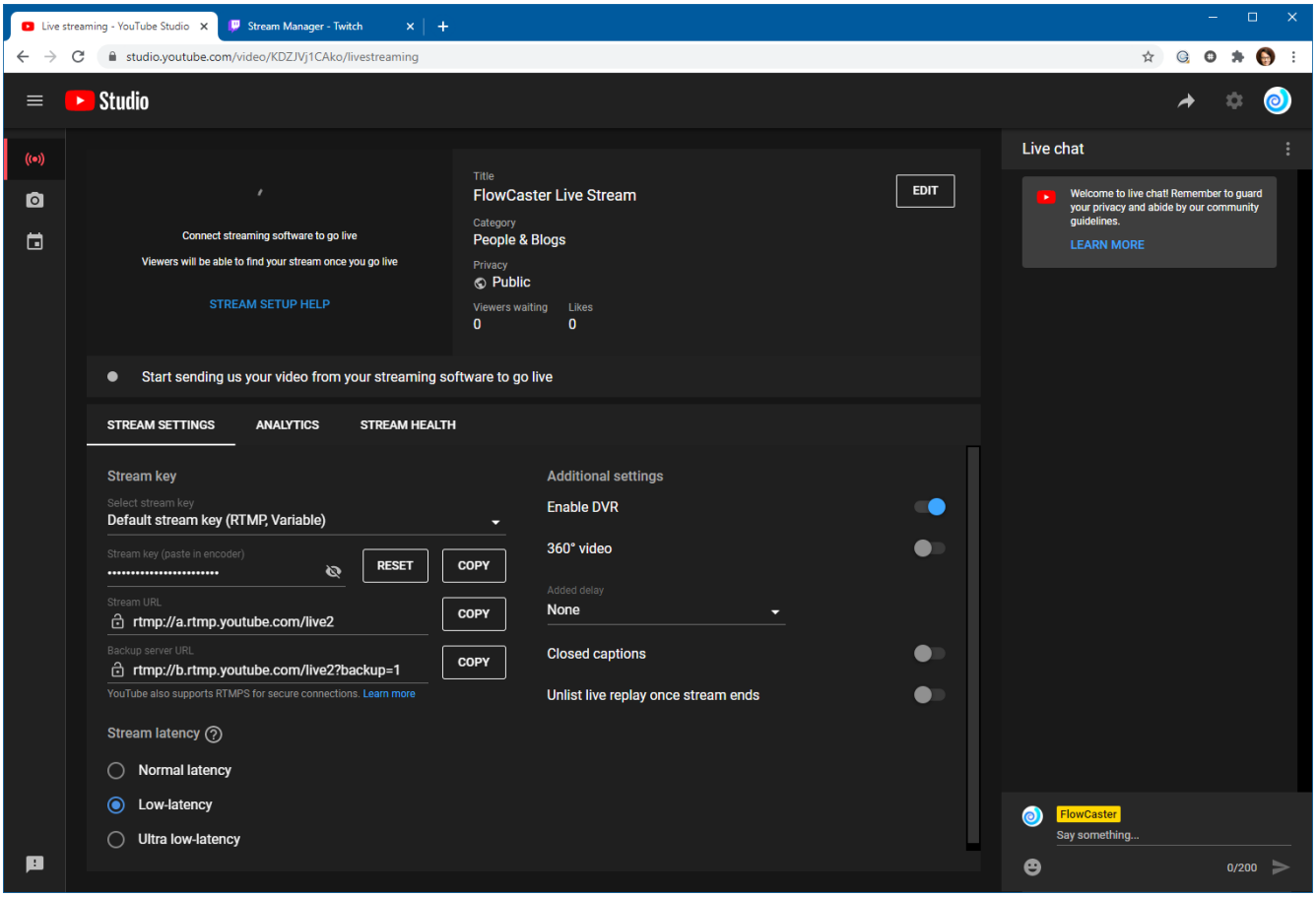
That will bring up the time to stream dialog



Select Right now's START button. That will bring up the source selection dialog.



Select Streaming software and click GO. This will bring up the live streaming page.



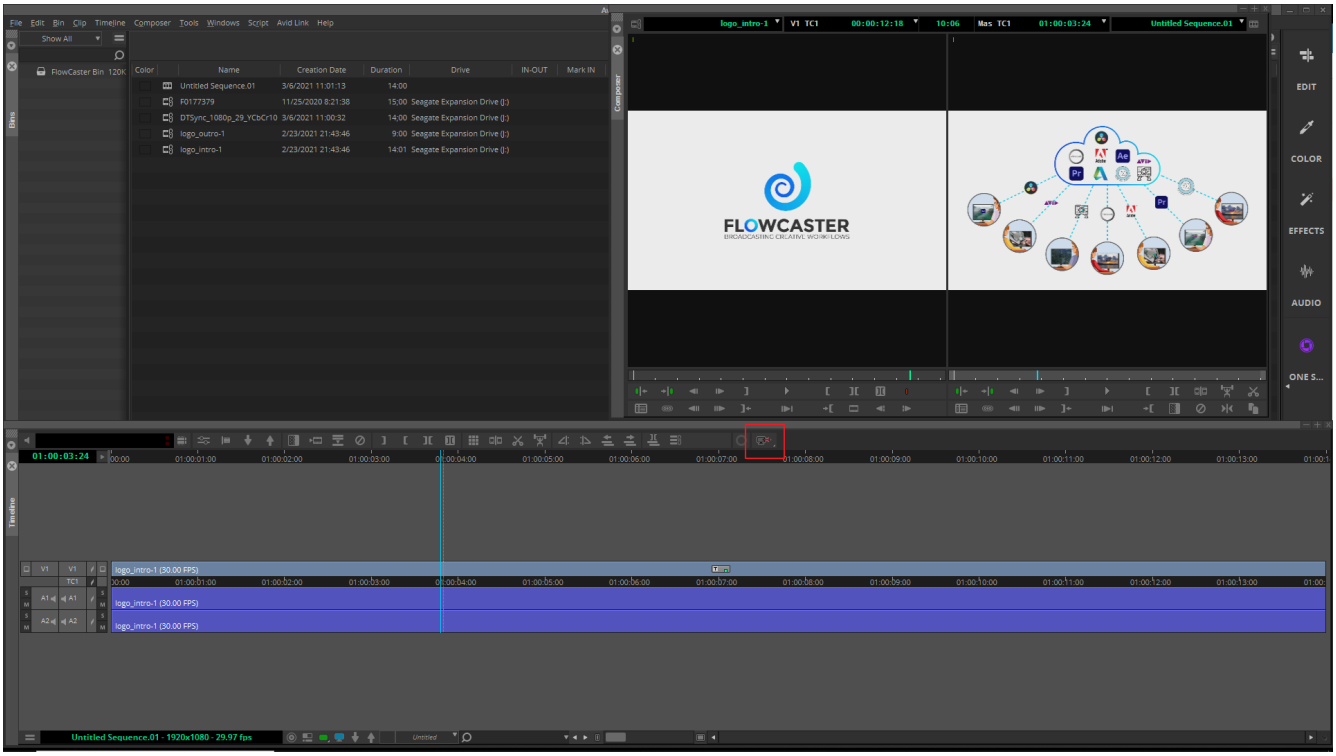
To connect your stream, you will need two things

1. The server URL (rtmp://a.rtmp.youtube.com/live2)
2. The secret Stream Key (hidden under the dots)

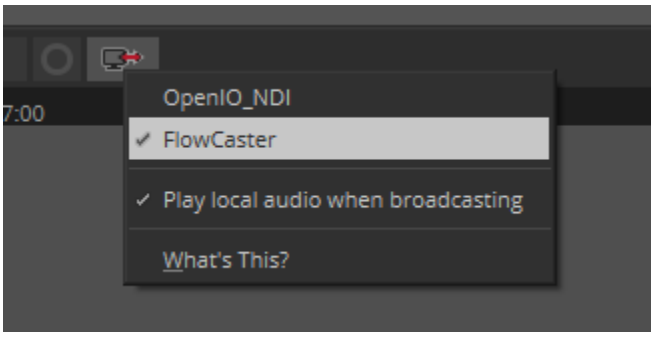
To create the URL for FlowCaster, take the server URL, add a / to it and append the stream key, for something like this:

rtmp://a.rtmp.youtube.com/live2/z746-80k2-2vxd-vcv8-0pzx

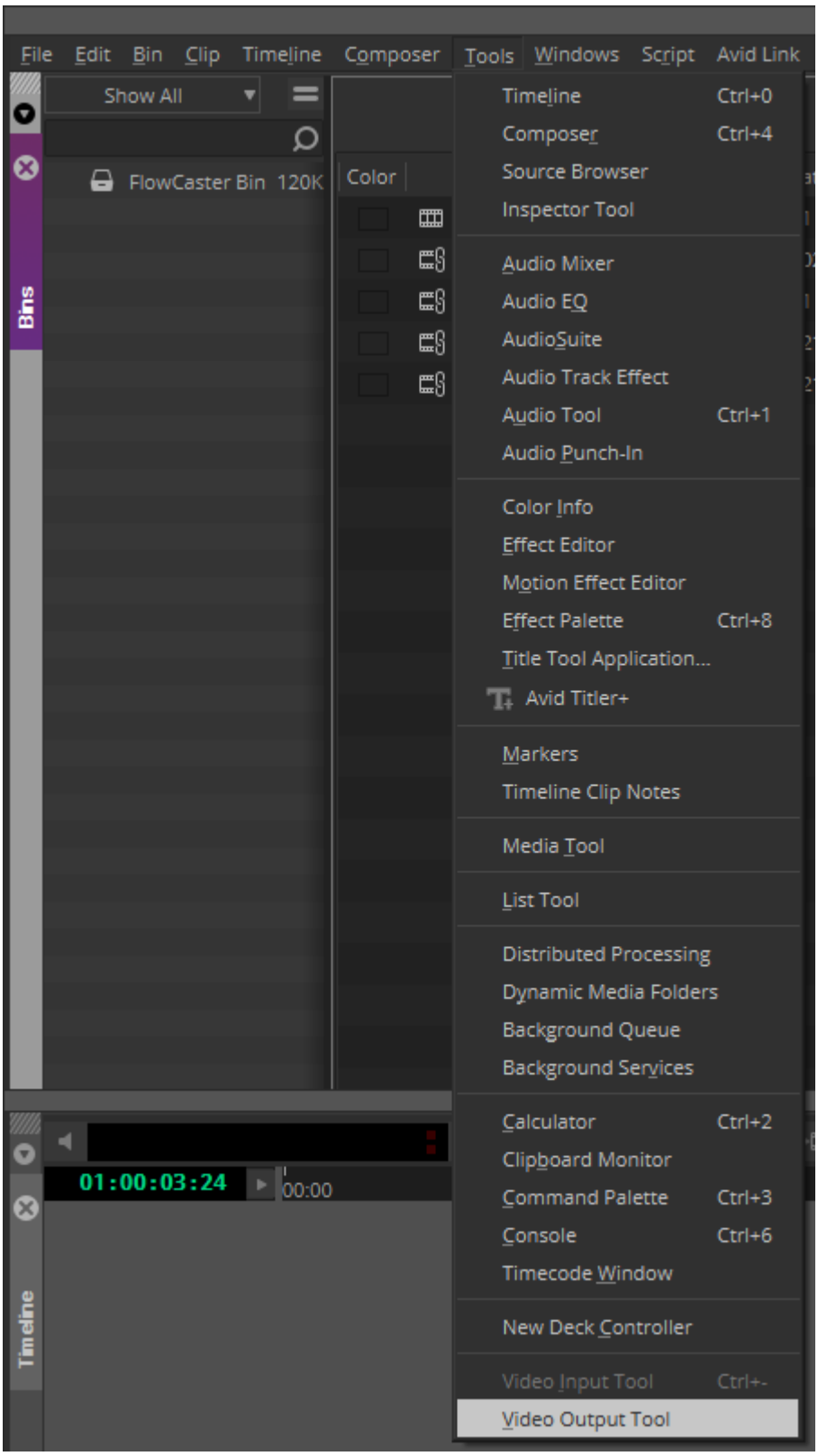
To start streaming, run Media Composer and load your project. To enable digital outputs, click on the button in the red box, so that it flashes red.



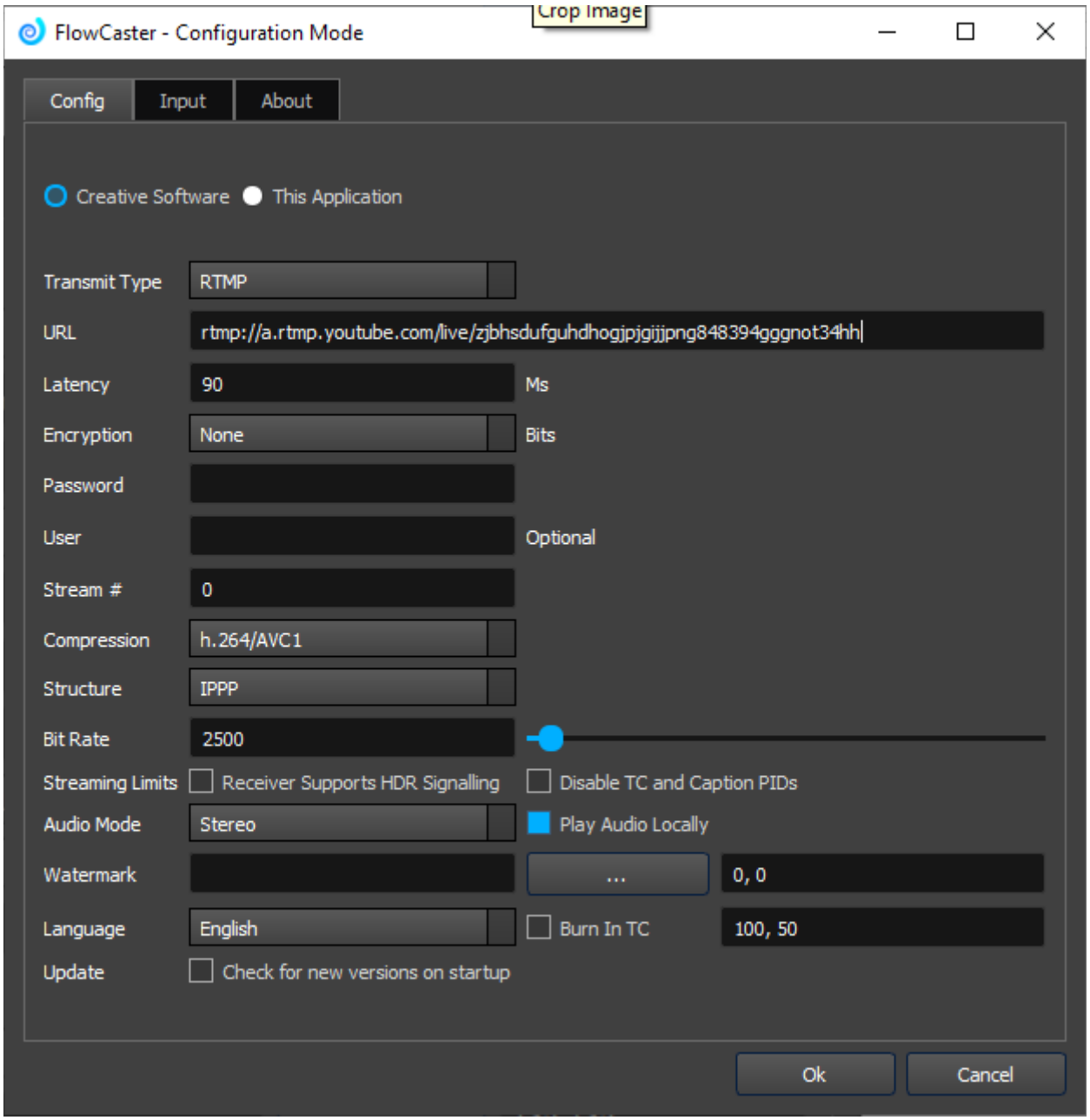
To make sure you are transmitting using FlowCaster, left click on that same button and make sure FlowCaster is selected in the popup menu.



To configure FlowCaster, select the menu Tools | Video Output Tool (please note, this menu is only present when the video output is enabled with the button above).



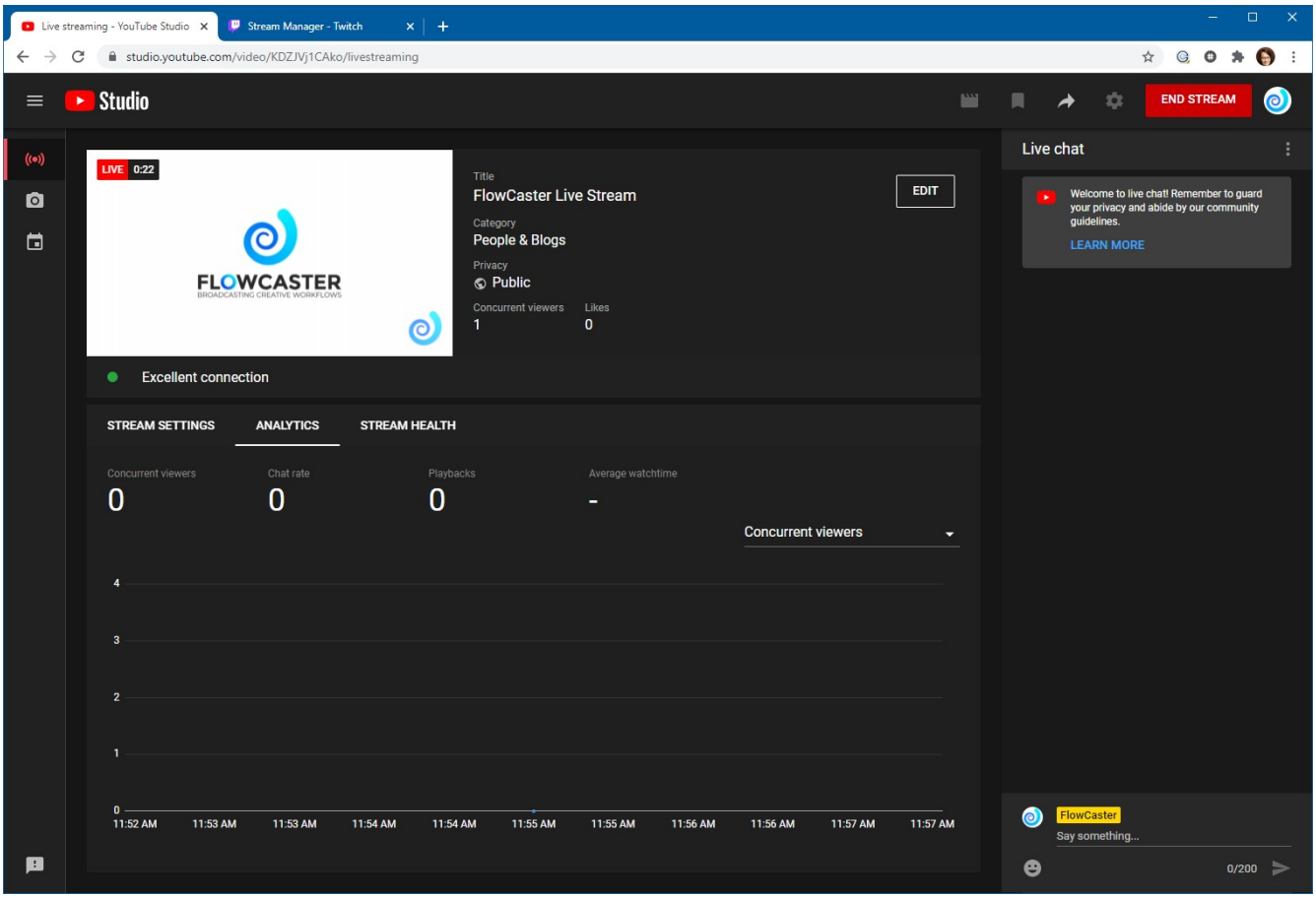
This will bring up the FlowCaster configuration dialog.



Set the following settings:
Transmit Type: RTMP
URL: rtmp://a.rtmp.youtube.com/live2/<your secret key>
Compression: h.264/AVC1
Structure: IPPP
Bit Rate: 2500
Audio Mode: Stereo

Click Ok to close the configuration dialog, and then click the record button (below) twice to turn it off and then back on, so it will pick up the new configuration.

After a short while, the stream should appear on YouTube.



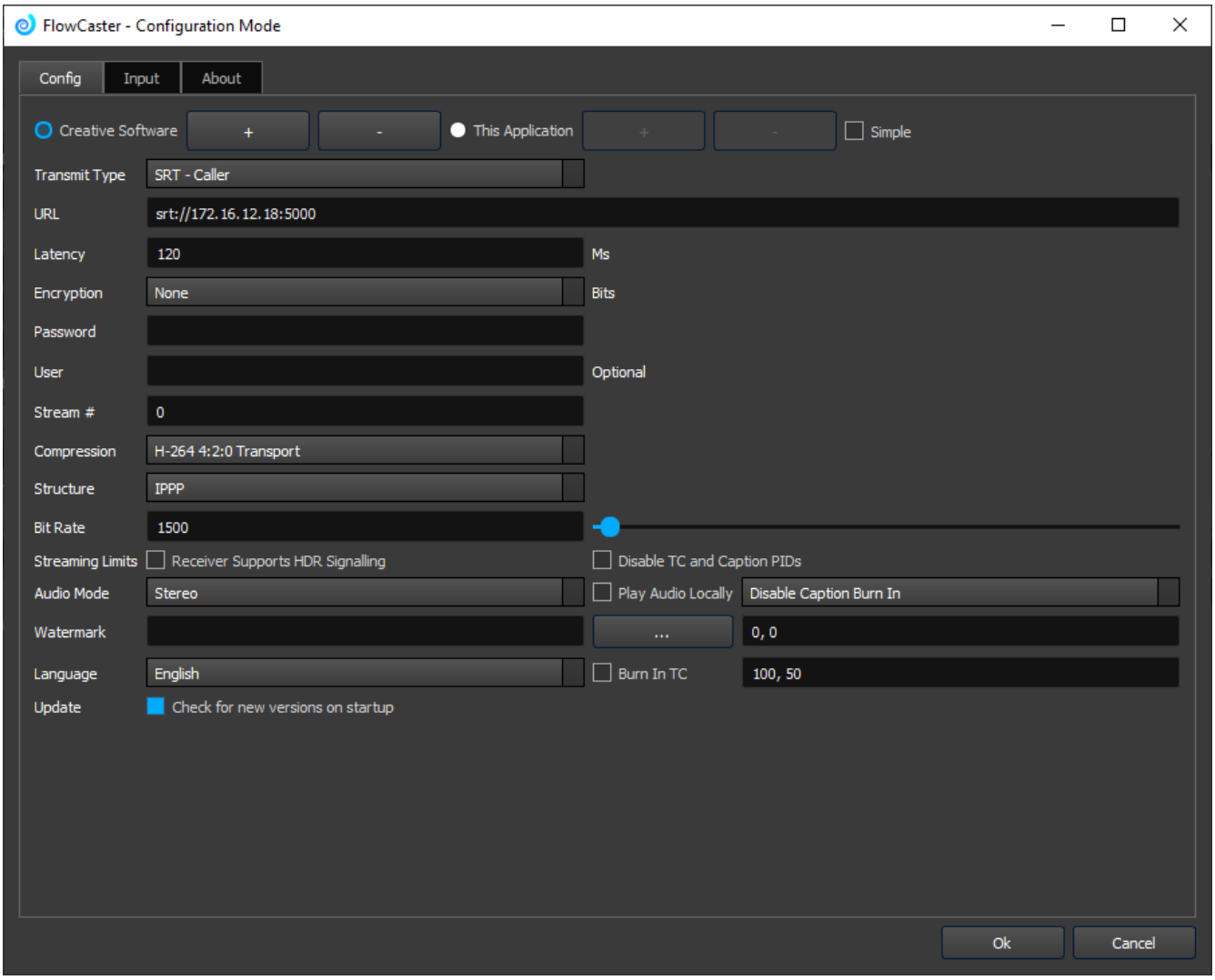
The stream can now be shared publicly or privately to as many people as you wish.

To transmit to Twitch.tv is similar, except they have dedicated servers for each region that you can find here:

https://stream.twitch.tv/ingests/

to be combined with your secret twitch key as described above.

7 FlowCaster Configuration



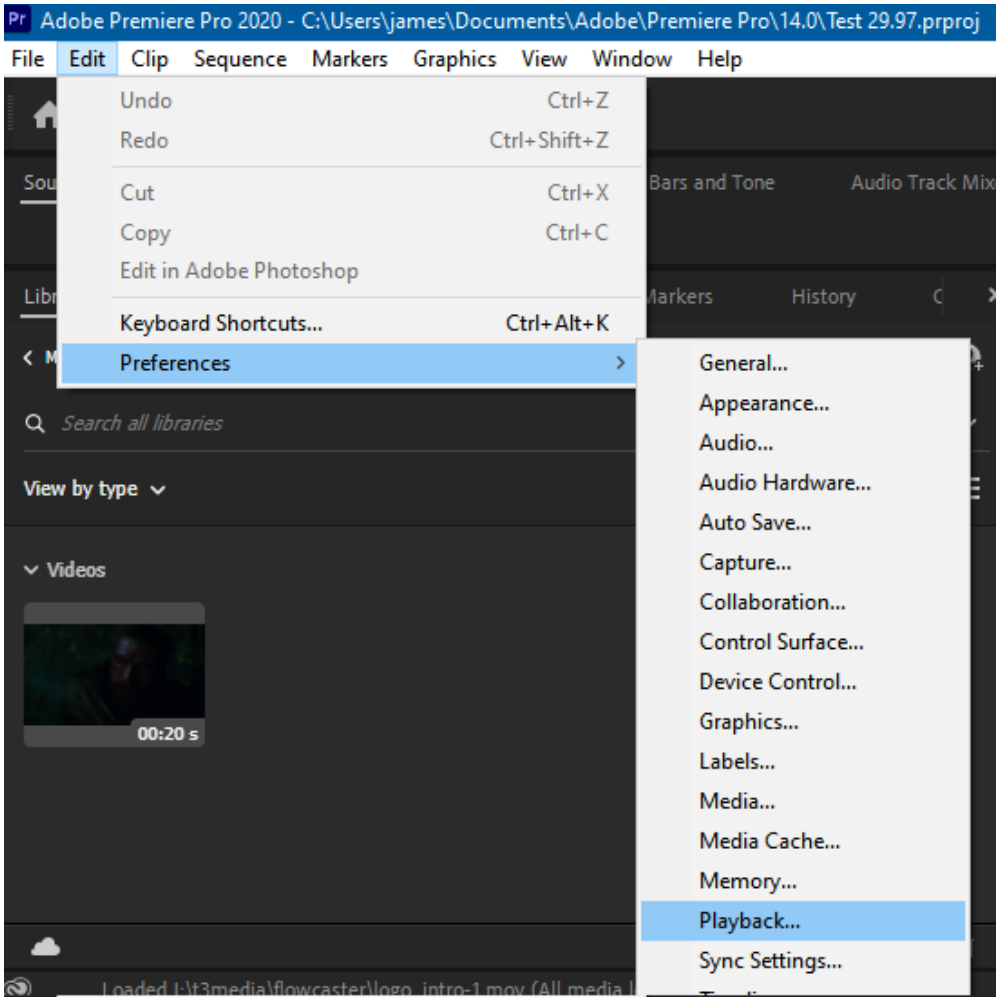
The FlowCaster config dialog is used to configure the output of your creative software (Adobe, Avid, Assimilate, DaVinci, etc) as well as any secondary output from SDI, HDMI, NDI or your desktop.

8 Adobe

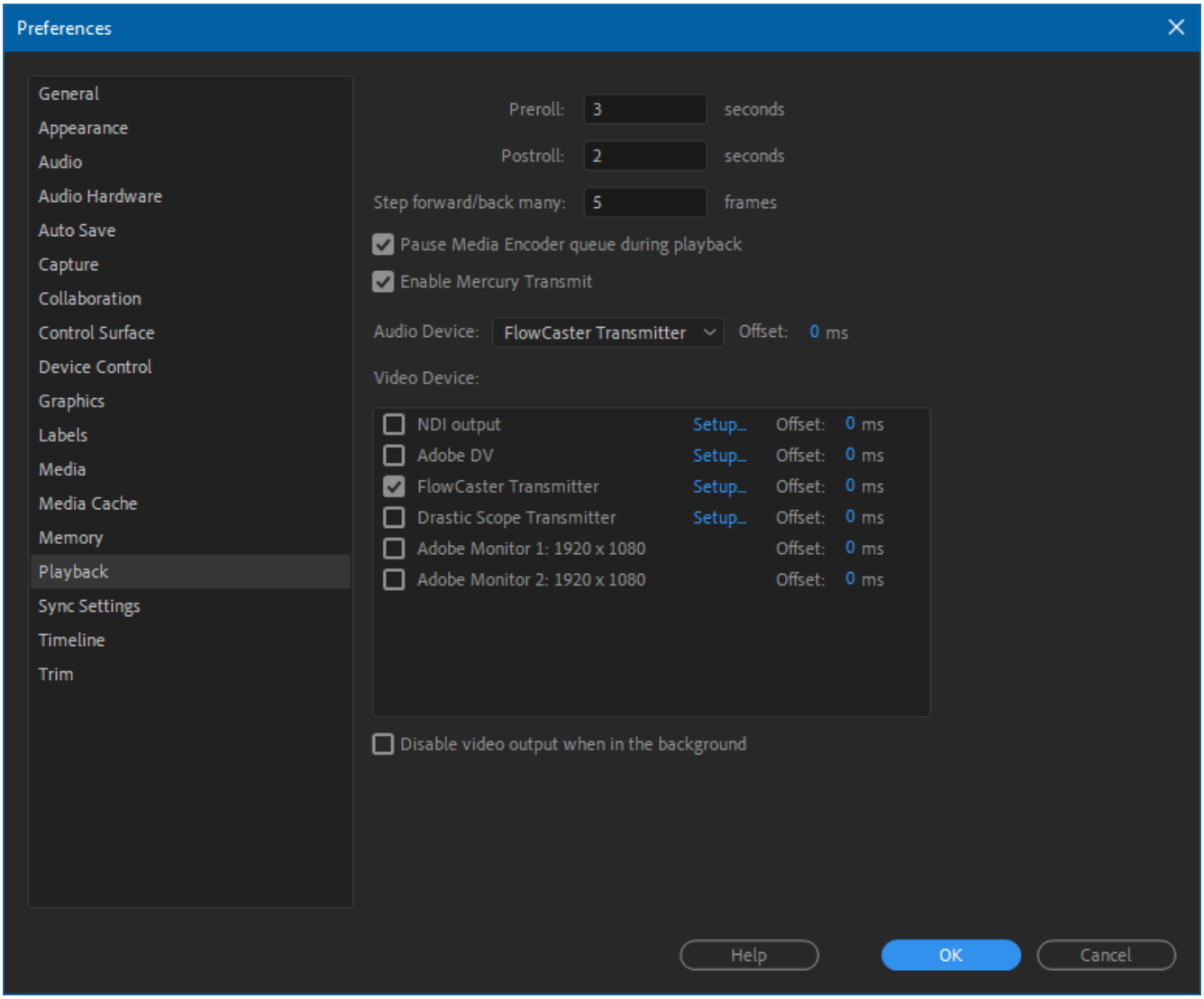
FlowCaster creates a virtual I/O board as a transmitter for Adobe creative software like Premiere and After Effects. As a virtual video board, it can send the same high quality audio, video and captions from a real or virtual machine to wherever you are doing your creative work for output on a 'third monitor'. This signal can be received by free software, like VLC and the Haivision Pro Player, or by dedicated Drastic receivers for more features, like FlowCaster for IOS and Android, videoQC for Windows, macOS and Linux or even a variety of hardware decoders from AJA, Haivision and others. This article demonstrates configuring FlowCaster in Adobe creative software.

8.1 Adobe Premiere

To configure FlowCaster in Adobe Premiere, access the Playback area or Preferences. On Windows, it is the **Edit | Preferences | Playback** menu. For macOS, it is the **Main | Preferences | Playback** menu

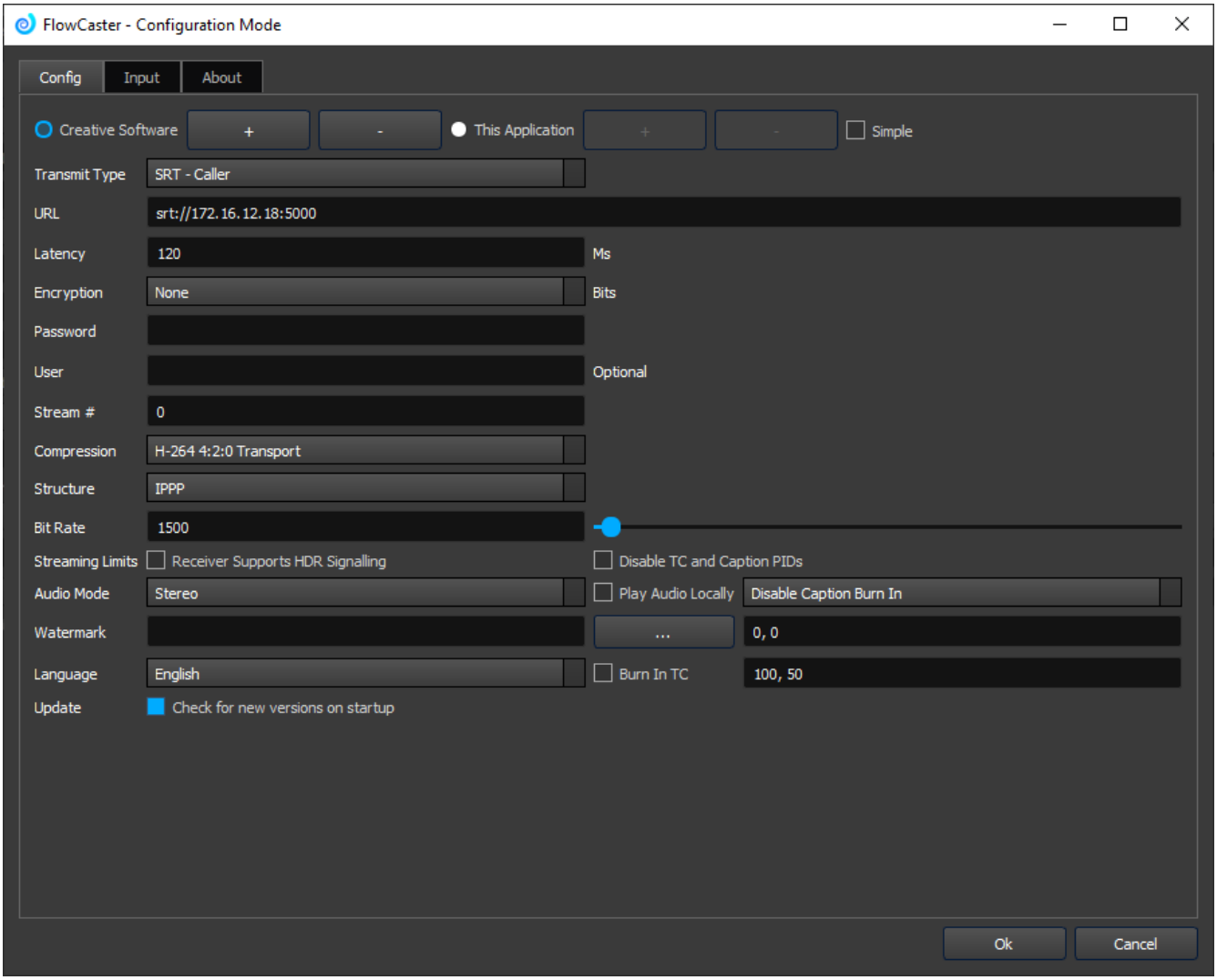


This will bring up the Playback settings in the Preferences panel. To use FlowCaster, you will want to set the Audio Device to FlowCaster Transmitter, as well as checking the checkbox next to FlowCaster Transmitter in the Video Device list.



This will cause Adobe to use FlowCaster as its video board. To configure FlowCaster, click on the Setup link in the Video Device list next to the FlowCaster Transmitter entry. That will bring up the FlowCaster Configuration dialog

8.2 FlowCaster Configuration Dialog



8.2.1 Transmit Type

SRT Caller - this uses SRT to call out to a remote device. The IP and port for this protocol in URL should be the remote device's IP address and selected port

SRT Listener - this uses SRT to listen on your local machine. The IP must be one of the IPs on your machine, and you must select a port to receive on

SRT Rendezvous - this mode uses the external, internet IP to connect through local NAT routers. Here it should be the internet facing IP of the remote device. On that device's config, it should be your internet facing remote IP. To get those IPs from each network, use **https://whatismyipaddress.com/**

RTP - the IP and Port for this mode can be the remote device, or a multicast address (239.x.x.x) that both the sender and receiver are set to

UDP - the IP and Port for this mode can be the remote device, or a multicast address (239.x.x.x) that both the sender and receiver are set to

RTMP - the URL for this mode will consist of the remote server, followed by the remote key. For instance, with YouTube.com, the address would be rtmp://a.rtmp.youtube.com/live2, and the key would be provided by YouTube and look something like this j2br-3t45-b6ck-s9h9-5dcy, so the URL would be rtmp://a.rtmp.youtube.com/live2/j2br-3t45-b6ck-s9h9-5dcy

NDI - for NDI, the URL would be a unique name, that NDI will combine with the computer name, to create a fully qualified name you can use to connect to the stream

8.2.2 URL

Normally the IP and Port or a fully qualified URL, depending on the Transmit Type setting. Below are some typical examples

SRT Caller: 10.0.0.60:5000
SRT Listener: 10.0.0.238:5000
SRT Rendezvous: 108.174.19.198:5000
RTP : 239.254.30.30:1234
UDP: 10.0.0.60:5004
RTMP: rtmp://a.rtmp.youtube.com/live2/j2br-3t45-b6ck-s9h9-5dcy
NDI: FlowCaster1Out

8.2.3 Latency

Latency is the number of milliseconds to give the signal to recover packets. This is for SRT. The lower this number, the closer to real time the monitor will be. The larger, the more room it will have to recover any lost packets. It is recommended this be the RTT (round trip time) between the two devices plus 20 milliseconds

8.2.4 Encryption

SRT supports end to end encryption. Setting this to 128 or 256 will cause all the data to be encrypted, use the Password below.

8.2.5 Password

If encryption above is set to 128 or 256, then this password will be used to encrypt the signal, and it must be used on the receiving device for it to be able to decrypt the signal

8.2.6 User

If your protocol/transmit type requires authentication, this is the user name that will be used in that authentication

8.2.7 Stream

If your protocol/transmit type supports multiple stream sets, this will specify which one you are sending

8.2.8 Compression

What compression to use to send the stream. FlowCaster supports h.264, h.265/HEVC and JPEG 2000, but the receiver must also support them for the monitor to work. If you are unable to see the signal in the receiver, start with h.264 8 bit 4:2:0 and then work up from there to see what the receiver supports. videoQC supports all the codecs.

8.2.9 Structure

This is the internal structure of the compression. Three modes are supported

- **IBBP** - this has the highest quality, but the longest latency (Long GOP: I frame, 2 bipredictive frames, predictive frame)
- **IPPP** - this has the best compromise between quality and latency (Long GOP: I frame, 3 predictive frames)
- **IIII** - this has the shortest latency, but the worst quality (temporal, or Intraframe only)

8.2.10 Bit Rate

The kilobit rate used to encode the video. For instance, 2 mbs (megabits) would be 2000 kbs (kilobits)

8.2.11 Receiver Supports HDR Signaling

If your receiving software supports HDR Signaling, checking the checkbox will enable sending any

local HDR signaling to the remote monitor

8.2.12 Audio Mode

FlowCaster supports 5 audio modes

- Stereo - just the first stereo pair
- Stereo Mix - mix all available channels to a stereo pair
- 4 channels - send the first four channels
- 8 channels - send the first eight channels
- 16 channels - send the first sixteen channels

8.2.13 Watermark

A path and filename to a file to place on the output as a watermark. This would normally be a 32 bit PNG file with Alpha. The "..." button will bring up a file browse dialog to allow you to select a file from your local file system. The two numbers separated by a comma and the x and y start position of the watermark on the output signal in pixels.

Once the OK button is clicked, FlowCaster will reset its output to match the new setup. This may take a few seconds before you see the changes on the receiver.

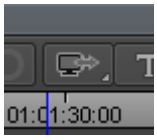
9 Avid

9.1 Using FlowCaster with Avid Media Composer

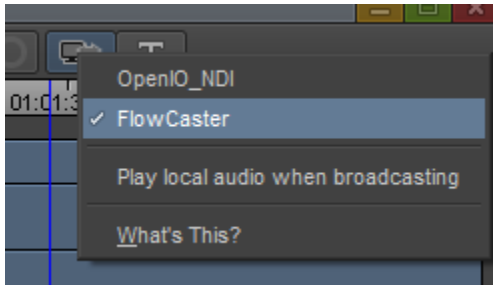
FlowCaster creates an Open I/O board Avid creative software like Media Composer. As a virtual video board, it can send the same high quality audio, video and captions from a real or virtual machine to wherever you are doing your creative work for output on a 'third monitor'. This signal can be received by free software, like VLC and the Haivision Pro Player, or by dedicated Drastic receivers for more features, like FlowCaster for IOS and Android, videoQC for Windows, macOS and Linux or even a variety of hardware decoders from AJA, Haivision and others. This article demonstrates configuring FlowCaster in Avid Media Composer.

9.2 Avid Media Composer

To configure FlowCaster in Avid Media Composer, you first have to enable it on the timeline. Find the Open IO output button just above the timeline



To enable it, right click on it and select FlowCaster. If FlowCaster is already selected, you can just left click on the button.

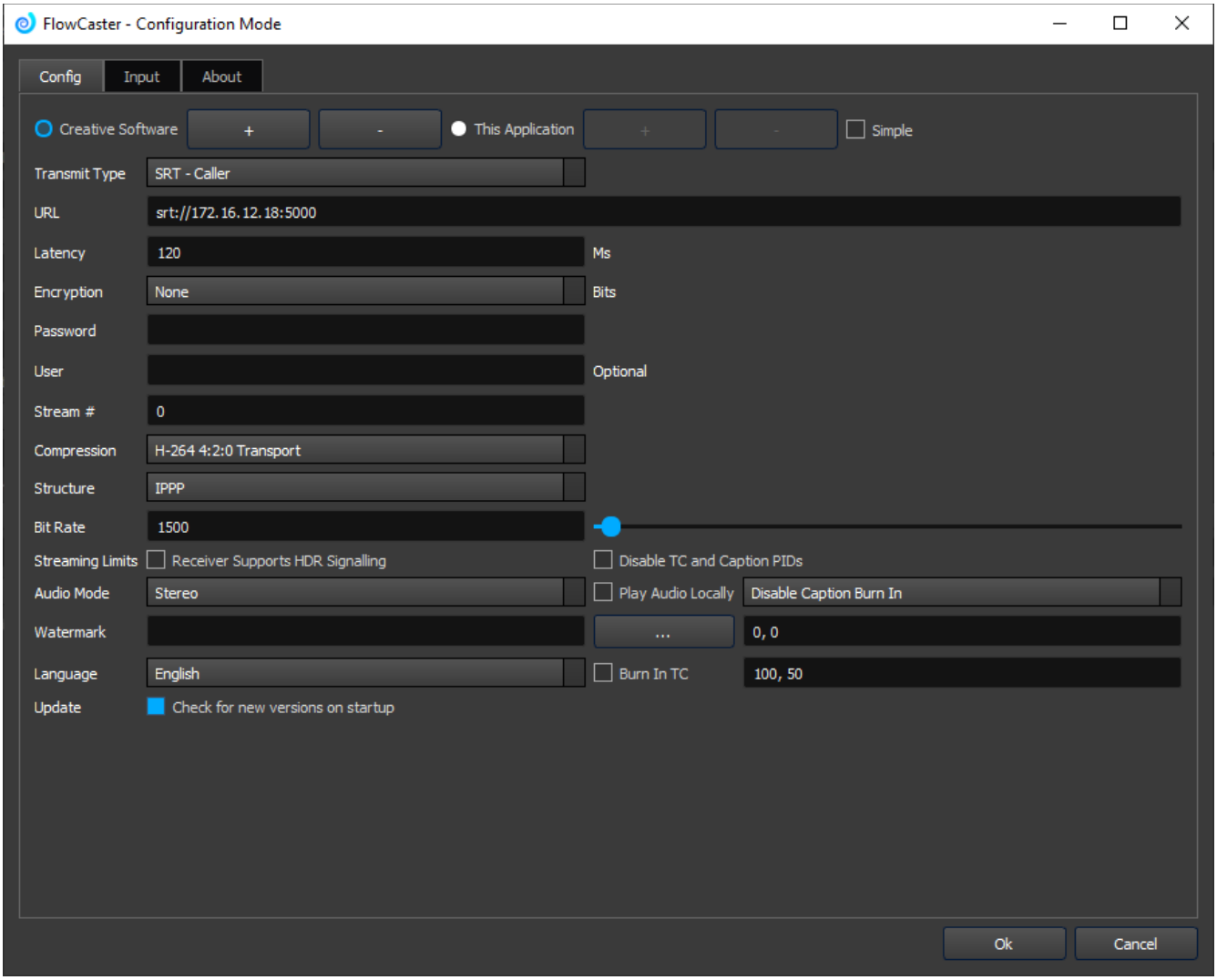


Once enabled, the button will flash a red double arrow to indicate it is sending to FlowCaster.

When enabled, a new menu under Tools will be available called Video Output Tool

Clicking on this will bring up the FlowCaster Configuration Dialog

9.3 FlowCaster Configuration Dialog



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RTMP - the URL for this mode will consist of the remote server, followed by the remote key. For instance, with YouTube.com, the address would be rtmp://a.rtmp.youtube.com/live2, and the key would be provided by YouTube and look something like this j2br-3t45-b6ck-s9h9-5dcy, so the URL would be rtmp://a.rtmp.youtube.com/live2/j2br-3t45-b6ck-s9h9-5dcy

NDI - for NDI, the URL would be a unique name, that NDI will combine with the computer name, to create a fully qualified name you can use to connect to the stream

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SRT Listener: 10.0.0.238:5000
SRT Rendezvous:108.174.19.198:5000
RTP : 239.254.30.30:1234
UDP: 10.0.0.60:5004
RTMP: rtmp://a.rtmp.youtube.com/live2/j2br-3t45-b6ck-s9h9-5dcy
NDI: FlowCaster1Out

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9.3.5 Password

If encryption above is set to 128 or 256, then this password will be used to encrypt the signal, and it must be used on the receiving device for it to be able to decrypt the signal

9.3.6 User

If your protocol/transmit type require authentication, this is the user name that will be used in that authentication

9.3.7 Stream

If your protocol/transmit type supports multiple stream sets, this will specify which one you are sending

9.3.8 Compression

What compression to use to send the stream. FlowCaster supports h.264, h.265/HEVC and JPEG 2000, but the receiver must also support them for the monitor to work. If you are unable to see the signal in the receiver, start with h.264 8 bit 4:2:0 and then work up from there to see what the receiver supports. videoQC supports all the codecs.

9.3.9 Structure

This is the internal structure of the compression. Three modes are supported

- **IBBP** - this has the highest quality, but the longest latency (Long GOP: I frame, 2 bipredictive frames, predictive frame)
- **IPPP** - this has the best compromise between quality and latency (Long GOP: I frame, 3 predictive frames)
- **IIII** - this has the shortest latency, but the worst quality (temporal, or Intraframe only)

9.3.10 Bit Rate

The kilobit rate to encode the video within. For instance, 2 mbs (megabits) would be 2000 kbs (kilobits)

9.3.11 Receiver Supports HDR Signaling

If your receiving software supports HDR Signaling, checking the checkbox will enable sending any local HDR signaling to the remote monitor

9.3.12 Audio Mode

FlowCaster supports 5 audio modes

- Stereo - just the first stereo pair
- Stereo Mix - mix all available channels to a stereo pair
- 4 channels - send the first four channels
- 8 channels - send the first eight channels
- 16 channels - send the first sixteen channels

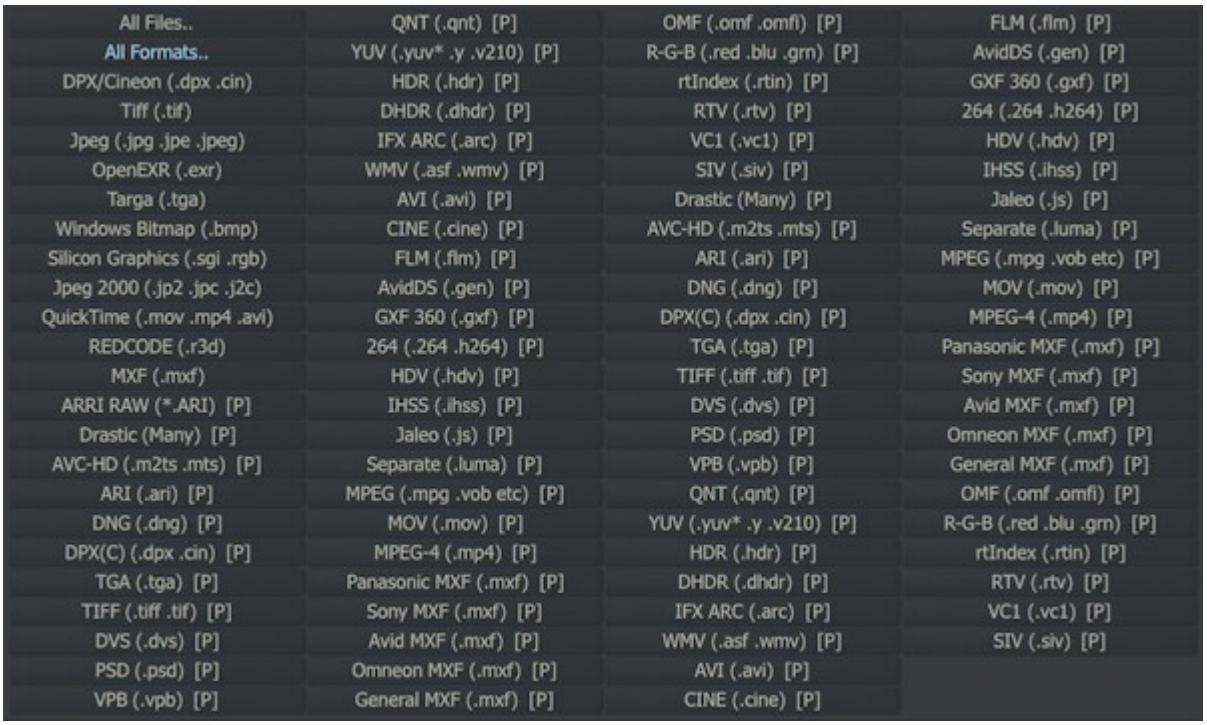
9.3.13 Watermark

A path and filename to a file to place on the output as a watermark. This would normally be a 32 bit PNG file with Alpha. The "..." button will bring up a file browse dialog to allow you to select a file from your local file system. The two numbers separated by a comma and the x and y start position of the watermark on the output signal in pixels.

Once the OK button is clicked, FlowCaster will reset its output to match the new setup. This may take a few seconds before you see the changes on the receiver.

10 Assimilate SCRATCH

FlowCaster includes an Assimilate direct and OpenFX monitor plugin, allowing monitoring of any software that supports OpenFX. For Assimilate SCRATCH, high quality audio and video monitoring is supported. For OpenFX software, like DaVinci Resolve, only high quality video monitoring is support, due to the limitations of the OpenFX standard. In both cases, RGB, as well as YCbCr, signals are supported with up to 12 bits per component, using JPEG2000, or 10 bits per component, using HEVC.



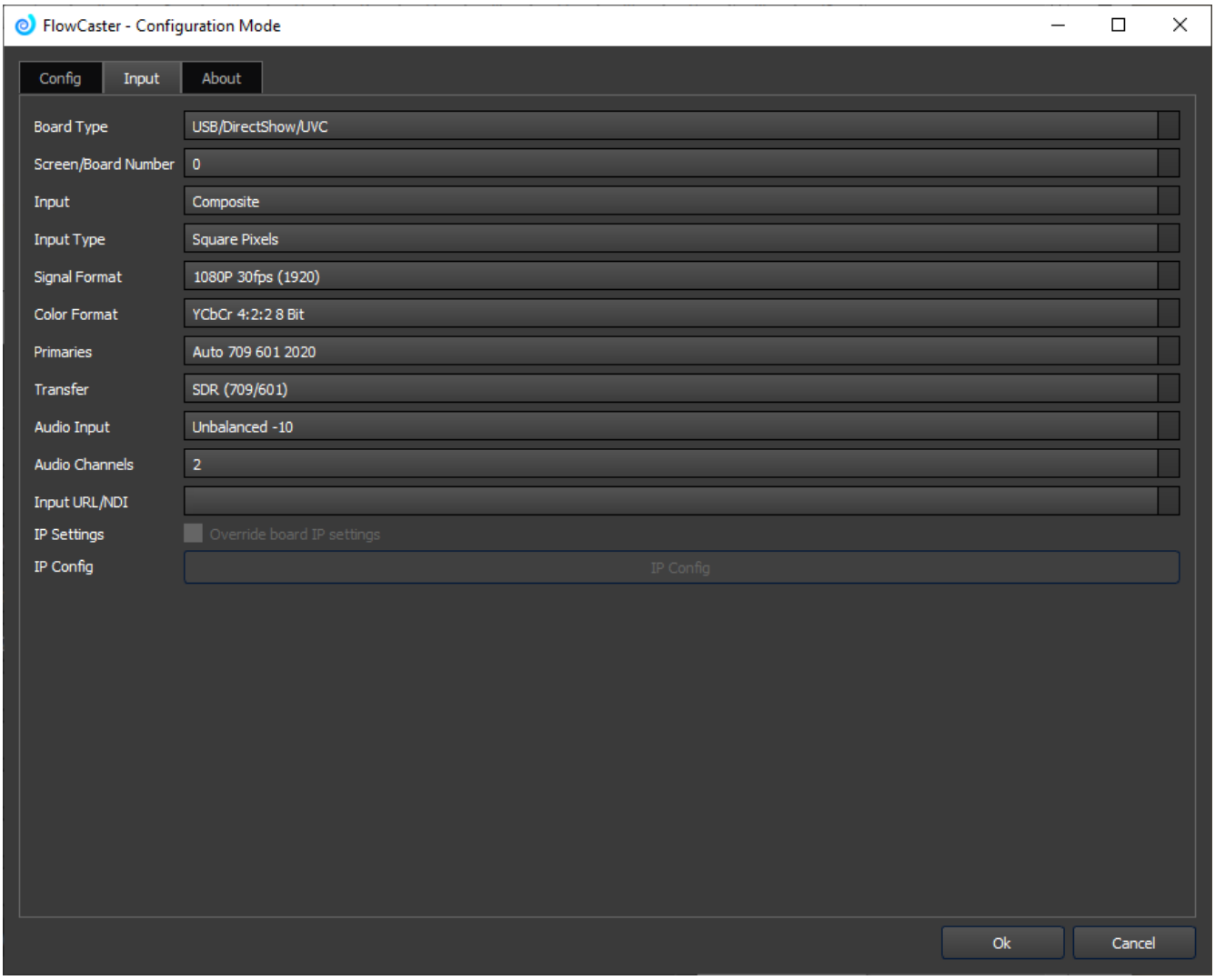
11 DaVinci Resolve

FlowCaster includes an Assimilate direct and OpenFX monitor plugin, allowing monitoring of any software that support OpenFX. For Assimilate SCRATCH, high quality audio and video monitoring is supported. For OpenFX software, like DaVinci Resolve, only high quality video monitoring is support, due to the limitations of the OpenFX standard. In both cases, RGB, as well as YCbCr, signals are supported with up to 12 bits per component, using JPEG2000, or 10 bits per component, using HEVC.

12 OpenFX Compatible Software

FlowCaster includes an Assimilate direct and OpenFX monitor plugin, allowing monitoring of any software that supports OpenFX. For Assimilate SCRATCH, high quality audio and video monitoring is supported. For OpenFX software, like DaVinci Resolve, only high quality video monitoring is supported, due to the limitations of the OpenFX standard. In both cases, RGB, as well as YCbCr, signals are supported with up to 12 bits per component, using JPEG2000, or 10 bits per component, using HEVC.

13 SDI/HDMI/NDI/Desktop Input



Board Type pulldown – select between available hardware boards. Supported inputs include:

Auto Select
NIC SMPTE 2110
AJA
AJA Shared
Bluefish444
Blackmagic
UltraScope
Matrox
USB/DirectShow/UVC
NDI In

Desktop
Adobe ScopeDirect
Avid ScopeDirect
OpenFX ScopeDirect
Assimilate ScopeDirect
AvVr3D ScopeDirect

Screen/Board Number pulldown – in a system with a multiple input board, select the input you want to use.

Input pulldown – select between available input types. Choices may include: Composite, S-Video, Composite 2, Component YUV, Component M2, Component SMPTE, Component RGB, SDI, D1 Parallel, SDTI, S-Video 2, SDI 2, Composite (Japan), S-Video (Japan), XVid RGB, HDMI, HDMI RGB, HDMI YCbCr, DVI, SDI 3G A, SDI 3G B, SDI 4K 425, SDI 12G/6G A, SDI 12G/6G B.

Input Type pulldown – select between available Input types. Choices may include: Square Pixels, 2 Pixel Interleave.

Signal Format pulldown – select between available signal formats. FlowCaster supports standard broadcast signal formats from NTSC/PAL to 4K 4096x2160 60fps.

Color Format pulldown – select between available color formats. Choices may include YCbCr 4:2:2 8 bit, YCbCr 4:2:2 10 bit.

Primaries pulldown – select between available primaries. Choices may include: Auto 709 601 2020, CCIR 601, CCIR 601 Full, Rec.709, Rec.709 Full, BT.2020, BT.2020 Full

Transfer pulldown – select between available transfer types. Choices may include: SDR (709/601), PQ/HDR 10, HLG.

Audio Input pulldown – select between available audio inputs. Choices may include: Unbalanced -10, Unbalanced +4, Balanced -10, Balanced +4, SPDIF, AES/EBU, Embedded, AES/EBU Pro, HDMI, Silence.

Audio Channels pulldown – select the number of audio channels. FlowCaster supports 2, 8, 10, and 32 channels of audio.

Input URL/NDI field – displays the current input input URL or NDI, if one is present. The user may need to input a URL specific to their input format in this field.

IP Settings Override checkbox – check to ignore the board's IP input settings, and use the ones being entered here.

IP Config button – opens the IP Configuration dialog.

13.1 SDI/HDMI

13.2 NDI

13.3 Desktop

14 Controlling/Configuring

14.1 Command Line Parameters

Usage: d:\drastic.trunk\bin64\flowcaster.exe [options]

Options:

-n, --ndisource NDI Source
-u, --urldestination URL to send to
-N, --name User name
-p, --password SRT password (min 10 char)
-I, --sourcenumber Source ID number
-s, --source <0-12 See Docs> A/V Source
-t, --transport <0-5: NDI,UDP,RTP,TR01,SRT,RTMP> Output Transport Type
-x, --extrastreams <0-allow, 1-disable> Extra streams that Haivision Player can't handle
-a, --audchan <1 (st mix), 2, 4, 8, 16, 24, 32> Number of output audio channels
-c, --codec <0-4: h264,h264_10,HEVC,HEVC_10,J2K> Codec
-i, --iframeorder <0-IBBP, 1-IPP, 2-III> Frame order
-b, --bitrate <# kilobits per second> Kilobits per second
-l, --latency <# milliseconds> Latency in milliseconds
-e, --encryption <0-none, 1-128, 2-256> Encryption level
-B, --board <# kilobits per second> Source 0-All, 2-AJA, 3-AJA Shared, 4-Bluefish444, 5-Blackmagic, 6-UltraScope, 7-Matrox, 8-USB, 11-NDI, 12-Screen
-f, --format Signal format
-P, --playlocally Play audio locally
-V, --screen <# kilobits per second> Screen or board to send 0..n
-X, --watermarkx X position of the watermark
-Y, --watermarky Y position of the watermark
-W, --watermark Path and name of the watermark file
-z, --netx Parent Net-X-Code
-m, --minimized Start app minimized
-C, --config <0-All, 1-CS, 2-FCApp> Just display config page
-S, --saveconfig <0-NC, 1-CS, 2-FCApp> Save to settings
-L, --license Run for licensing
-?, -h, --help Displays this help
-v, --version Displays version

14.2 Configuring

Windows (registry)
Creative Software Settings:
HKEY_CURRENT_USER\Software\Drastic\FlowCaster
Applications (SDI/HDMI/NDI/Desktop)

Settings:
HKEY_CURRENT_USER\Software\Drastic\FlowCaster1

macOS (~\Library\Preferences\)
Creative Software Settings:
/Library/Application\ Support/Drastic/com.drastictech.flowcaster.plist
Applications (SDI/HDMI/NDI/Desktop)
Settings:
/Library/Application\ Support/Drastic/com.drastictech.flowcaster1.plist

Linux (~\.config\)
Creative Software Settings:
FlowCaster.conf
Applications (SDI/HDMI/NDI/Desktop)
Settings:
FlowCaster1.conf

Settings:
- AudioMode - what audio channels to send
  - Stereo - 0
  - Stereo Mix - 1
  - 4 channels - 2
  - 8 channels - 3
  - 16 channels - 4
- ColorSpace
- Compression - compression for stream as a fourcc code
  - h264 - 875967080
  - h264 10 Bit - 1630680628
  - HEVC - 1752589105
  - HEVC 10 Bit - 1752589153
  - JPEG 2000 - 1598501450
- DataRate - in kilobits per second (megabits per second divided by 1000)
- Email - email address for licensing
- Enabled - enable transmission of SDI/HDMI/NDI
- Encryption - type of encryption to use
  - 0 - None
  - 1 - AES 128
  - 2 - AES 256
- FPS
- IBP - the IBP structure of the compressed stream
  - IBBP - 0
  - IPPP - 1
  - IIII - 2

Latency - the number of milliseconds to use to recover packets
Password - password to use for the encryption (must be at least 10 characters)
SDR_HDR
SendHDRSignals - 1 if it should send HDR signals to the receiver
StreamNo - stream number to set for this send
TransferType
Type - protocol to send the stream as
- SRT - Caller
- SRT - Listener
- SRT - Rendezvous
- RTP
- UDP
- RTMP
- NDI
- CDI
- RIST
- WebRTC
- SMPTE 2110

URL - the target address (eg. srt://199.0.0.123:5000?mode=caller)
User - the user name to use with the URL you are sending to (optional)
UserName - user name for licensing
Watermark - a path to a watermark file (normally PNG 32 bit)
WatermarkX - the horizontal offset at which to display the watermark image
WatermarkY - the vertical offset at which to display the watermark image

Drastic Technologies Ltd. does not assume responsibility for loss or damage resulting from errors, omissions, or inaccuracies herein. This document is subject to change, and revisions may be made and issued to include such changes.

This manual has been compiled to assist the user in their experience using **FlowCaster** software. It is believed to be correct at the time of writing, and every effort has been made to provide accurate and useful information. Any errors that may have crept in are unintentional and will hopefully be purged in a future revision of this document. We welcome your feedback.

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