



Whitepaper

SRT Input & Output

This document will explain how to use the SRT ingest feature
found on NewTek products.

NewTek Professional Services Group

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About this Document

This document will help to understand usage of the SRT protocol inside NewTek products. It will explain how to configure NewTek systems and provides example SRT workflows using non-NewTek applications.

It is assumed that you understand networking concepts like public & private IPs, routers, port forwarding and other networking aspects. If these concepts are not well understood, there are resources available on the Internet or you can work with NewTek Professional Services. These network concepts are required to setup a SRT connection between any two devices.

The SRT Protocol

Secure Reliable Transport is an open source protocol that is managed by the SRT Alliance. It can be used to send media over unpredictable networks, like the Internet. More information about SRT can be found here. <https://www.srtalliance.org/>

SRT can be used to bring source into a TriCaster system or be sent back out to another system. Both methods will be discussed in this document.

Before we get into specific about how this protocol operates in NewTek systems, lets cover some aspects of how SRT operates in general.

How does SRT make a connection?

SRT provides direct point to point communication between system.

SRT end points operate using different methods of communication or 'modes'. The modes are *caller*, *listener*, and *rendezvous*. Caller and Listener are the most common modes which are described in this document.

- 'SRT caller' will initiate a connection to an SRT listener.
- 'SRT listener' waits for a SRT caller as an incoming connection.

Call and Listener do not determine which system is generating the video feed and which system is receiving it. They determine how the two end points will establish a connection, once that connection is created the media will flow in the direction intended. For example, if an important message is to be communicated using a telephone, either person can make the call and the information can be shared. It doesn't have to be that the person with the important message must be the caller, the person wanting to hear the message has to answer phone.

To ultimately make SRT operate, you will have to make sure the path between the end points is setup correctly. You will need to know the IP address of the end points, what ports are going to be used and configure any routing or firewall to allow the signal into the network.

SRT Ingest System Requirements

SRT Ingest is available on the following NewTek systems.

- TriCaster 2 Elite, TC1, 410 Plus, Mini 4K
- TriCaster XD system with Advanced Edition 3 (Mini HDMI, Mini SDI, 410, 460, 860, 8000)
- NewTek VMC

For any of the systems, you need to be running Rev 7-3-200417 or higher software. On TriCaster systems, you can check the software version by going to the 'Help' button on the home screen, then clicking on 'About TriCaster' found on the right side. At the top of the window it will list the model TriCaster and software build number.

TriCaster Setup

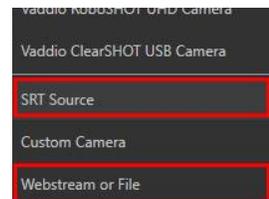
TriCaster system can accept an SRT input by adding the appropriate information into the 'NewTek IP Source Manager' tool. This tool can be accessed using two different methods.

All TriCaster system will find this tool contained in the Add-Ons section of the home screen, then click on NewTek IP Source Manager. If the TriCaster system is running Rev 7-4 software, you can also access this tool by clicking on the drop-down list of sources found in any input window. Then go to the Local group and choose 'Add IP Source...' at the bottom of the list.

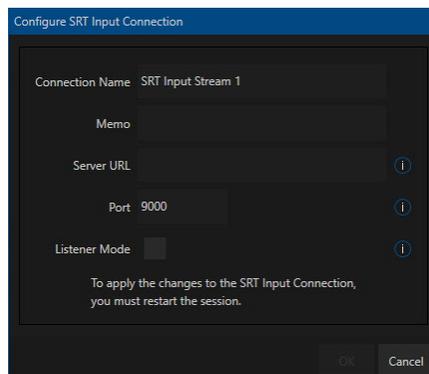
IP Source Manager tool

Once the tool opens, at the bottom right corner is an option called 'Add New IP Source'.

There are two selections from the list of sources that will accept SRT. The first is 'SRT Source' which is the one you will most often use. This selection has a simplified interface to fill in SRT options. The second selection, 'Webstream or File' is a bit more complex but does allow the use of additional SRT parameters. Both methods will be described in this document, but we will start with 'SRT Source' first. Some older versions of TriCaster software may not offer 'SRT Source', in that case you will have to use Webstream or File option.



From the list, choose 'SRT Source'.



At the top of this window, you can give the SRT source a name, this is the name you will use to select this source inside the TriCaster interface. Make it something that describes the source to be easy to find. The memo field is optional, which has no affect with the SRT connection.

Now we need to know three pieces of information about the SRT connection. The Server URL, Port and if this input should be configured for Caller or Listener mode.

Let start with the Listener Mode checkbox. If this box is not-checked (default), then this SRT input will be setup in *caller* mode. If this other end of the SRT connection is setup as a listener, then this is mode you want. If you need the input to run as the *listener* because the other SRT device is setup as caller, then click on this box.

Now we need to enter the Server URL. What you put in this panel will depend on the status of the Listener Mode checkbox.

- If the checkbox is NOT checked (caller mode), type in the IP address of the system you want to connect to.
- If the checkbox IS checked (listener mode), type in the IP address used by the TriCaster system. This is not the IP of the other system, but the TriCaster's own IP. This configures the system to use its IP address for listening.

Finally, enter the port number, the same number is used on both sides of the SRT connection.

Webstream or File section

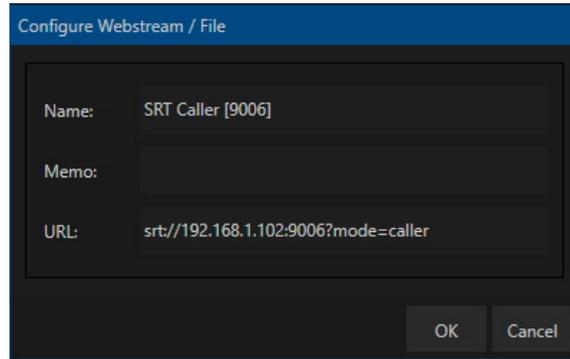
If your TriCaster doesn't have the *SRT Source* option available in the list or you need access to advanced SRT options, then use the 'Webstream or File' choice.

In the window that opens, enter the name you want for this connection. This name will be what the TriCaster operator will be choosing from the source selection list. It is recommended that you include the port number for the SRT connection in the name of the connection.

In the URL field enter the SRT information. You will need to determine what kind of SRT connection you are setting up, caller or listener. For a caller, you will need the IP address and port of the system creating the SRT stream. If you are configurating a listener, you only need to specify a port. The calling system will need to know the IP and port of the TriCaster, so it knows where to send the SRT stream data.

Call

The caller mode will use a configuration as shown.

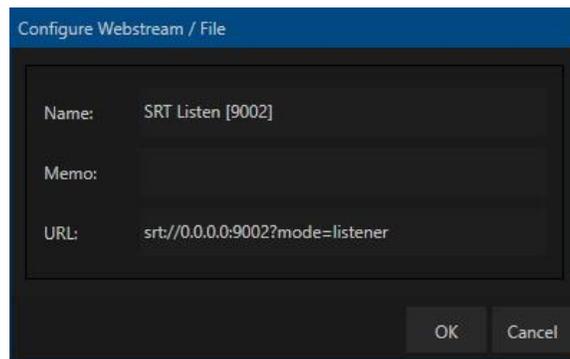


The screenshot shows a dialog box titled "Configure Webstream / File" with a dark background. It contains three fields: "Name:" with the value "SRT Caller [9006]", "Memo:" which is empty, and "URL:" with the value "srt://192.168.1.102:9006?mode=caller". At the bottom right, there are "OK" and "Cancel" buttons.

- The IP address '192.168.1.102' needs to be the IP address of the SRT listener device you are connecting to.
- '9006' is the port the SRT listener server will use.
- 'mode=caller' determines that the TriCaster will be initiating the connection to this remote SRT device. Caller is the default method of SRT communication, this query string is optional for this mode.

Listen

A listener mode will use a configuration as shown.

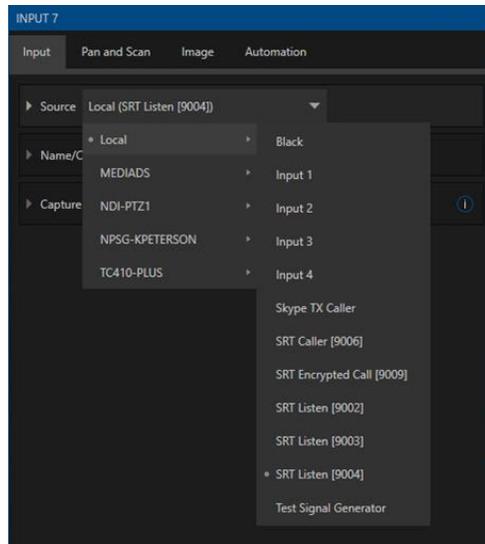


The screenshot shows a dialog box titled "Configure Webstream / File" with a dark background. It contains three fields: "Name:" with the value "SRT Listen [9002]", "Memo:" which is empty, and "URL:" with the value "srt://0.0.0.0:9002?mode=listener". At the bottom right, there are "OK" and "Cancel" buttons.

- An IP address of '0.0.0.0' means that any IP address used by the TriCaster will be listened too. If you want to have the TriCaster listen at a specific IP address, enter it in this location.
- '9002' after the IP address indicates the port for the SRT connection. Any port can be specified, unless it is used by the TriCaster itself. If you can choose, use ports between 9000 and 9900, no ports in this range are used by the TriCaster. SRT uses UDP protocol.
- 'mode=listener' specifies that this SRT connection will be setup to listen for streams, the remote SRT device that will be connecting to the TriCaster will need to be using a calling mode.

TriCaster Operation

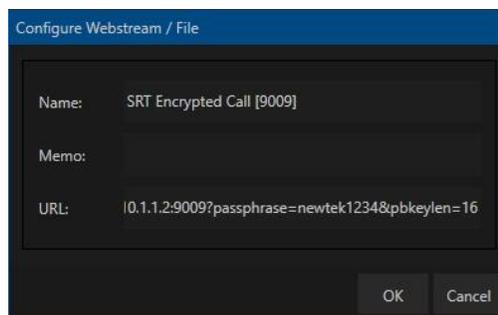
Once you have created the SRT connections, you can use them from the source dropdown in the TriCaster inputs. All SRT connections will appear in the 'Local' category.



Additional SRT settings

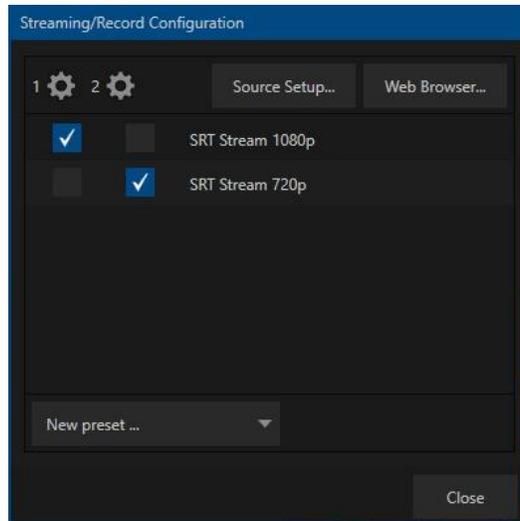
If you are using the 'Webstream of File' SRT option, there are additional parameters that can be appended to the URL. Enter these parameters after the main URL as shown above, each key/value pair is separated by an '&'.

- 'passphrase=string' encryption string from 10 to 79 characters. Not needed if pbkeylen is 0.
- 'pbkeylen=bytes' encryption key length. Values of 0, 16, 24 or 32 valid. Default value is 0.
- 'peerlatency=milliseconds' latency value that is established by the sender as minimum value for the receiver.
- 'rcvlatency=milliseconds' time that should elapse between the packet being sent and delivered. Value should be large enough to cover the RTT time and the time to send another packet if needed.
- 'streamid=string' needed if a stream id is specified for the SRT stream.
- 'hw_accel=false' GPU acceleration is typically used and preferred, in some rare instances the H.264/H.265 parameters might not be compatible with GPU decoding. While this detection is attempted to be automatic, there might be cases where manually disabling is required.



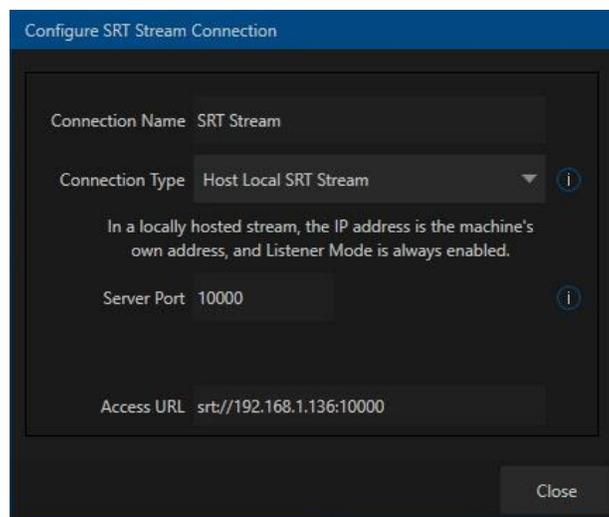
SRT Output Settings

TriCaster and VMC systems running 7-3-200818 or higher offer SRT Output by means of the integrated streaming system. SRT can be used along with any other streaming options found in the TriCaster. Click on the gear next to 'Stream/Encode' to open the streaming configuration panel.



At the top left corner of this panel are gears next the numbers 1 and 2. Clicking on a gear will allow configuration of the H.264 encode settings. Configure these settings for the needs of your output stream. It is possible to use both encoders together if you need to send out two different signals, with individual encode settings for each.

To add a new SRT output stream, click on the 'New preset...' option found near the bottom of the Window. In the list of streaming presets, choose 'SRT Stream'. A window will appear with the settings you can configure.



The 'Connection Name' is a location for the name of this SRT stream.

Below that is a drop down with two options.

- Host Local SRT Stream
- Output to Remote Server

Changing this option will reveal different parameters in the lower part of the window.

Host Local SRT Stream

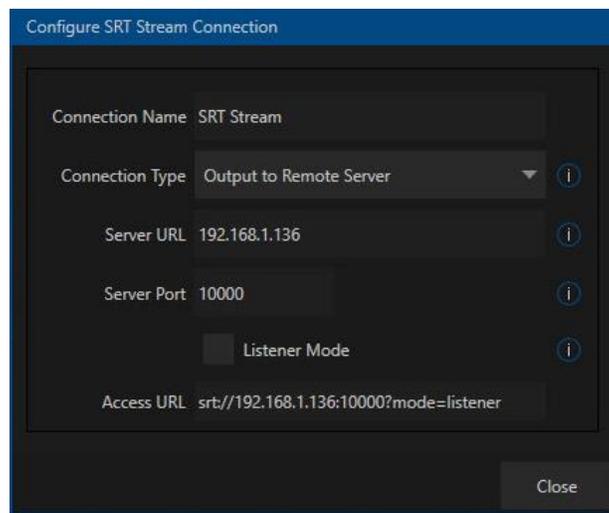
If you want to have the TriCaster generate the stream and another system will initiate the call to it, this is the mode you want to use. The TriCaster will always operate in the SRT listener mode.

There is only one option to set, which is the Server Port. Typical ports range between 9000 and 10000, but numbers outside this range are perfectly fine to use if available.

At the very bottom of the Window is the Access URL. This is the SRT URL that another system will use to access the TriCaster.

The IP address that appears in the Access URL will be the private IP of the TriCaster. If the system trying to connect to the TriCaster is located across the Internet, you will not use this IP directly as shown. Instead you need to replace the IP address with the public IP of your router. The port number needs to match what you have setup in the router to be forwarded to the TriCaster.

Output to Remote Server



If the TriCaster needs to generate the stream AND initial the call to another device, then you want to use the 'Output to Remote Server' option. This has more settings to configure.

This mode allows two methods of operation selected using the Listener Mode checkbox. With the box checked, then the operation will be identical to 'Host Local SRT Stream'. The TriCaster will run in listener mode and you need to enter a server URL which is an IP used by the this TriCaster system. Using

the 'Host Local SRT Stream' from the dropdown is probably a better option over using this mode, it is easier to configure.

The 'Output to Remote Server' mode with the Listener Mode checkbox deselected is the more common option. This will make the TriCaster operate in caller mode, allowing the TriCaster to initiate the connection to another system.

In the Server URL and Server Port, you need to enter the IP address and port of the remote SRT system that you want to connect with. If this remote system is located over the Internet, is it likely that you will need to enter the public IP of the router that is configured with port forwarding.

Once you have configured your SRT settings, close the window and make sure the checkbox under the #1 or #2 column is selected to match the encode setting you want the SRT connection to use. Then click on the 'Stream/Encode' button to start up the stream. If there is an error, a message will likely appear in the notification center letting you know which streaming profile exhibiting issues.

NewTek Connect SRT Setup

SRT can also be configured on NewTek Connect products like Connect NC1IO and Connect Pro. SRT sources can be ingested and turned into NDI or SDI outputs depending on the configuration of the Connect software. These are the minimum versions of Connect to support SRT input.

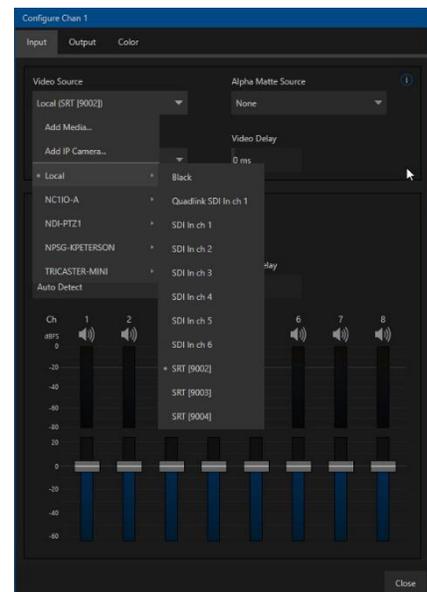
- Connect NC1 IO (version 7-3-200424 or higher)
- NewTek Connect Pro (version 1-5-200428 or higher)

Click on the source gear for any input. Under the 'Video Source' dropdown, select 'Add IP Camera'.

In the new window that appears, click on the dropdown near the bottom to 'Add New Camera', then select 'Custom Camera' near the end of the list.

You will configure the SRT information the same as shown in the steps below. After you have created or edited an IP Source, you will need to restart the Connect software for these changes to take effect. When the Connect software is restarted, you can select this source under the 'Local' category from the Video Source dropdown.

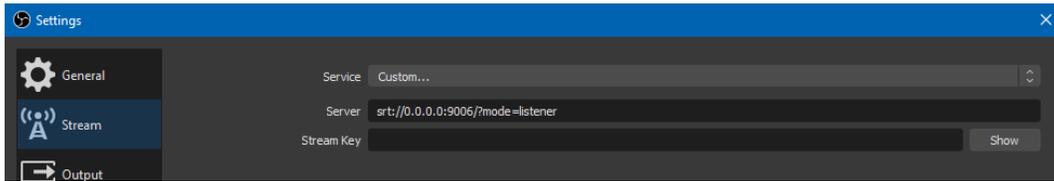
When an SRT source is active in the Connect interface, it will be converted into an NDI source that can be used by other applications on the network.



Application Examples – Ingest into TriCaster

Open Broadcast Server

You can create an SRT source in the stream settings of OBS v25, both caller and listener modes are supported. The Server URL is entered exactly as it would be on the TriCaster.



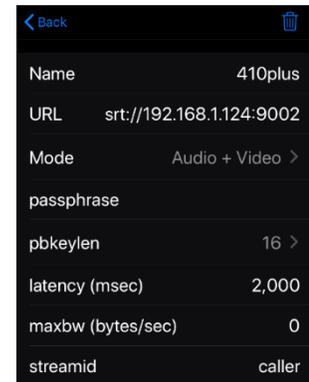
Once you have entered the streaming information, click on the 'Start Streaming' button in OBS to activate the connection.

Larix Broadcaster

You can perform an SRT caller (push) stream using Larix Broadcast on iOS and Android devices. Create a new connection in the app. Where the URL is listed, enter it in as shown.

Once configured, press the 'red' button in the Larix interface to start the SRT connection.

The IP address and port must match an SRT Listener that has been configured and is active on a NewTek product.

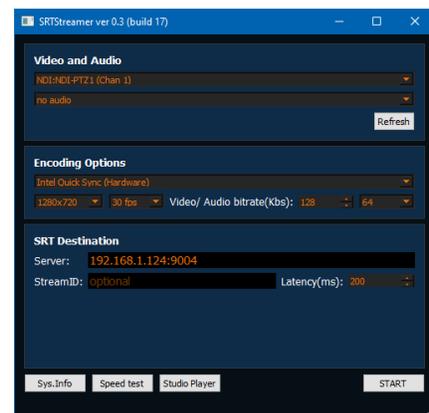


Garanin SRT Streamer

This software will let you take an NDI Source on the local network and perform an SRT caller (push) stream.

In the SRT Destination, enter the information as shown. Then press the 'Start' button to activate the connection.

The IP address and port must match an SRT Listener that has been configured and is active on a NewTek product.



Wowza Streaming Engine/NewTek MediaDS

Wowza v4.7.3 and higher can output as an SRT caller using the 'Stream Targets' feature in a live application.

Choose 'Add Stream Targets', then SRT. Fill out the information and enable the stream target feature. You will also need to restart the live application to have the settings take effect.

The IP address and port must match an SRT Listener that has been configured and is active on a NewTek product.

NewTek's MediaDS product needs to be updated to version 200218 to support SRT stream targets, this updates Wowza Streaming Engine to a version with Stream Targets support.

live > TC (srt)
Live Single Server or Origin
Return to Stream Targets

* = Required field Hide Help >

Save Cancel

Source Stream Name *
Channel04

Destination Host *
192.168.1.124

Destination Port *
9004

Recovery Buffer
400

Secure SRT
 Use secure SRT

Save Cancel

live > Stream Targets
Live Single Server or Origin

Configure delivery of live source streams to stream target destinations for redistribution. Disabling this feature will deactivate all existing stream targets. Hide Help >

Status: Enabled

+ Add Stream Target Disable Stream Targets Refresh Auto-refresh

Stream Target	Status	Actions
SRT	Active	

TC (srt)

Haivision Play for Mobile

This mobile app for iOS or Android will let you use the camera as a source and perform an SRT output as a caller or listener.

From the main menu, add a 'Local Lineup' and enter a name for it. In the lineup, press the '+' button in the lower right corner and choose the 'Stream' function. Configure the other settings in the application as shown. Once configured, press 'Start Streaming' in the application.

The IP address and port must match an SRT Caller or Listener that has been configured and is active on a NewTek product.

Edit URL Save

Description TriCaster 9004 >

Icon >

FUNCTION

Play Stream

ENCODER SETTINGS

Basic Advanced

SD HD-720 HD-1080 UHD

PROTOCOL

SRT UDP

MODE

Caller Listener Rendezvous

Local Address 192.168.1.88

Port 9004 >

Application Examples – Output from TriCaster

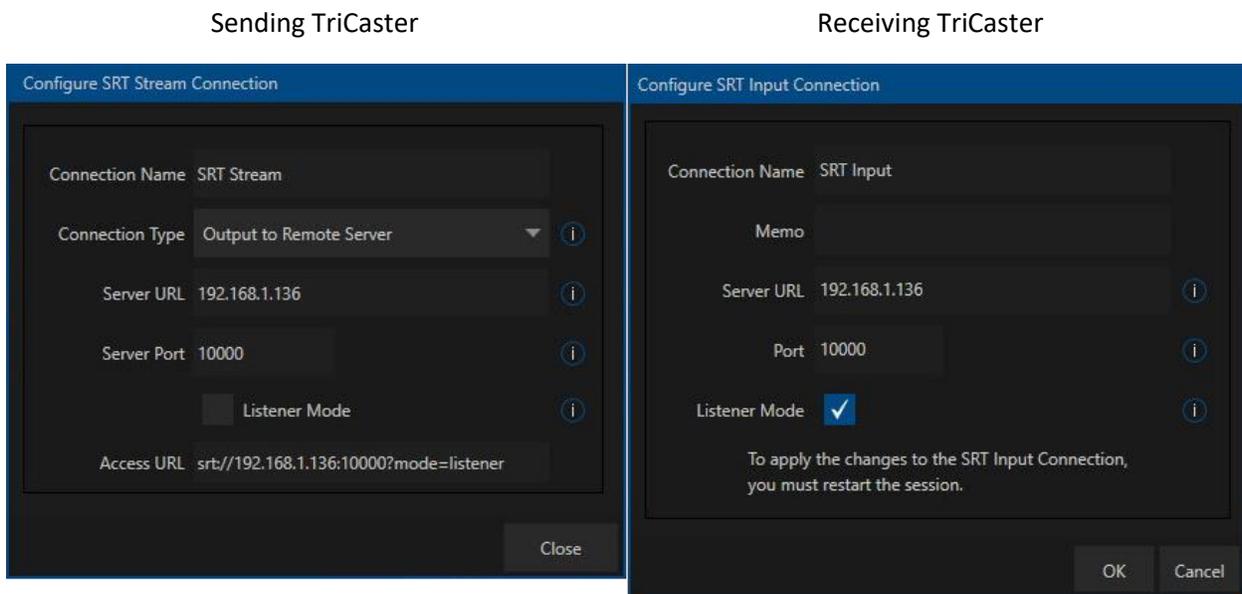
TriCaster to TriCaster connection

You can use SRT to feed one TriCaster into another. In the explanation below, we have the sending TriCaster be the caller and the receiving TriCaster be the listener, this can be configured to operate with the caller and listener modes reversed if needed.

On the sending TriCaster, add a SRT Stream preset to the Stream/Encode panel. In the stream panel, choose 'Output to Remote Server', enter the IP address and port of the receiving TriCaster system. Leave the Listener mode box unchecked.

On the receiving TriCaster, add a SRT Source using the NewTek IP Source Manager tool. Enter the IP address of the receiving TriCaster (its own IP address), the port number and check the Listener Mode box.

Once both TriCaster systems are configured, click on the Stream/Encode button on the sending system to start the connection.

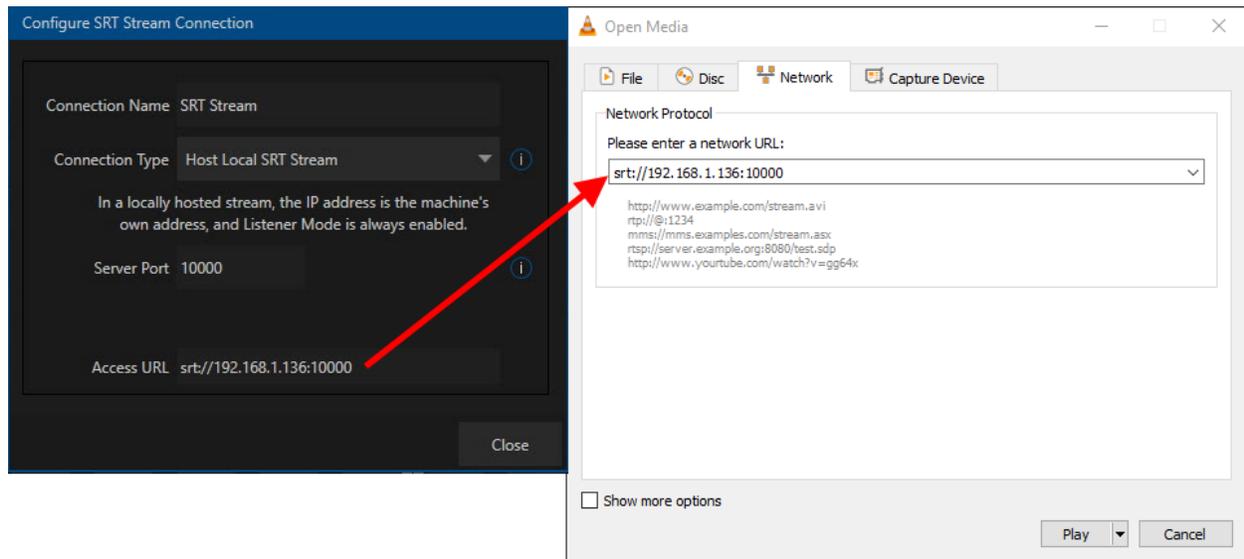


VLC Player

Using the 'Open Network Stream...' option in VLC Player, you can accept the output of a TriCaster configured with SRT on your local network.

Setup the TriCaster with a SRT Stream in the Encode/Stream panel. Use the 'Host Local SRT Stream' option in the TriCaster. Take the 'Access URL' found at the bottom of the configuration Window, and enter that as shown into VLC Player.

Start the stream on the TriCaster and click on the play button in VLC Player. In a few moments you will see the video appear.



Additional SRT Resources

Ffmpeg SRT protocol information: <https://ffmpeg.org/ffmpeg-protocols.html#srt>

Garanin SRT Streamer: <https://garaninapps.com/srt>

Haivision Play for Mobile: <https://www.haivision.com/products/player-set-top-boxes/haivision-play/>

Larix Broadcaster: <https://softvelum.com/larix/>

OBS Studio: <https://obsproject.com/>

SRT Cookbook: <https://srtlab.github.io/srt-cookbook/>

VLC Player <http://www.videolan.org>

Wikipedia's SRT page: https://en.wikipedia.org/wiki/Secure_Reliable_Transport

Wowza: <https://www.wowza.com/docs/how-to-use-srt-to-distribute-live-streams>