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iTX™ OUTPUT SERVER 2

NEXT GENERATION VIDEO ENGINE

Channel Configuration Guide

v2.12

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1 About Output Server 2

Output Server 2 is Grass Valley's next generation video playout engine for iTX systems. It has improved standards compliance, more flexibility and greater stability than our previous video engine and forms the backbone of the iTX system.

This guide describes the features and functionality of Output Server 2 (OS2), as well as the underlying principles of Output Server 2. It also explains how to install or upgrade to Output Server 2, how to create and configure channels using Output Server 2 and provides information about the day-to-day operation and maintenance of an Output Server 2 channel.

Summary

About the Output Server 2 Services *1*
About iTX Channel Playout *3*
About the Network Channels in the iTX Desktop *9*
About Regional and Sub Channels *11*
About Logical Audio Programs *11*
Upgrading from Output Server 1 to Output Server 2 ..... *13*
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About the Output Server 2 Services

Output Server 2 is a combination of services that work together to form the video engine that is responsible for the playout of a television channel.

The core services that make up the Output Server 2 system are:

- **TXPlay 2 -** automation engine

  An instance of the TXPlay 2 service runs for every channel in the iTX system. TXPlay2 is responsible for running the playout schedule and sending the appropriate commands to the Output Server 2 service. As well as interacting with the Media Cache 2 service.

  Additional instances of TXPlay 2 can be run that act as "edit channels", which can be used for off-air schedule manipulation. A special instance can also be run in "live channel" mode, which can send alternative playout commands for ad hoc operations.

- **Output Server 2 service** - playout communication and command interface

  An instance of the Output Server 2 service runs for every channel in the iTX system. Each one provides the communications interface for receiving playout commands for the channel from TXPlay 2. The Output Server 2 service also performs media transfers for caching operations, as instructed by the Media Cache 2 service.

  Supporting Output Server 2 is the GV Engine, which is the media application framework plugin that performs all video, audio and ancillary data processing operations. The operations have been separated into two processes to allow the video

engine to be reinitialized without the overhead of also re-initializing the network communications, allowing faster recovery from video/audio processing issues.

- **Channel Controller service** - schedule controller

  An instance of the Channel Controller service runs for every channel in the iTX system. The Channel Controller service acts as the controller for TXPlay channels, with all schedule changes and actions (Cue, Take) being performed through this service. All controlled TXPlay channels act as playout nodes in that they are supplied a schedule by the Controller, which they then playout.

  In conjunction with the iTX Desktop's Network channel, the Channel Controller is responsible for the control and schedule management/substitution of the channel schedule, while also allowing you to view the status of channel items. See About the Network Channels in the iTX Desktop on page 9 for more information.

- **I/O Device Controller** - AJA video/audio I/O card interface

  The I/O Device Controller service manages the configuration of the ports on the playout server's video and audio input/output card(s). It receives this configuration from TXPlay 2 on start up and then interfaces between the video/audio I/O card and the Output Server 2 service. It is also used to specify the input reference signal, frame rate family and the output timing for the channel.

  Only one instance of the I/O Device Controller is required per playout server.

- **Media Cache 2** - file caching mechanism

  The Media Cache 2 service manages all caching operations required for playout from the local machine. It also provides a channel view so that the current file caching queue can be monitored from within iTX Desktop. The actual media transfer is performed by the Output Server 2 service, which can throttle the transfer speed dynamically to ensure reliable playout.

  A single media cache can be shared by multiple channels running on the same playout server.

> Note: To support 4K input and output, 64-bit versions of the Output Server 2 service, GV Engine and I/O Device Controller are automatically installed when the Output Server 2 is selected for install.

These services, along with any other components installed on your playout server are launched and managed by another application, called the Server Controller. This means to start all of these services, you only need to start the Server Controller. See Starting Output Server 2 on page 95.

Output Server 2 integrates with the current iTX framework, allowing you to easily upgrade your existing channels. Whilst Output Server 2 supersedes the previous video engine, Output Server 1 is still supported and it is even possible to run both video engines in the same iTX system. See Transitioning to Output Server 2 on page 18.

About iTX Channel Playout

About Output Targets (SDI and IP)

There two methods by which a playout server can send and receive transmission signals:

- Via an SDI (Serial Digital Interface) card, such as the AJA Corvid 88,
- Over a computer network using IP (Internet Protocol), via a dedicated network adapter.

To maintain clarity through this document, both SDI card and the network adapter being using for streaming are referred to as **video/audio I/O cards**.

It is also possible to use a combination of SDI and IP targets on the same playout server. For example, for dual channel playout, one channel could be output to an SDI target, while the other could be sent to an IP target.

A single channel can even have a combination of up to two output targets (SDI or IP) depending on the availability of I/O cards on the system. Output targets allow for different branding levels or output quality settings to be used simultaneously on a given channel.

See Creating an Initial Channel During Installation, on page 41 and Configuring Channel Playout, on page 63 for instructions on setting and configuring Output Targets.

SDI card support

Output Server 2 supports the following models of SDI video/audio I/O card:

- AJA Kona 3G
- Single AJA Corvid LP
- Dual AJA Corvid LP
- AJA Corvid 44
- AJA Corvid 88

> Note:
> - Although iTX 2.x supports the AJA Kona 3G video/audio I/O card, it does not support the AJA Kona 3 card.

IP Playout Requirements

For IP playout, your iTX system must meet the following requirements:

- To maintain the integrity of the IP playout, the streaming network (used for the IP inputs and output) must be independent from the management network (used to control the equipment).
- Your playout server must have a minimum of two network adapters — one for the streaming network and one for management network.
- The streaming network adapter must have enough bandwidth to support the combined bit rates of all your simultaneous live IP inputs and the IP output.
- The iTX Router Service must be installed and the IP sources and IP destinations configured on the iTX Framework Server. See the *iTX System Administrator Guide* for more information about installing and configuring the IP Router Service.

About Playout Types

A playout type defines which input and output ports on the video/audio I/O card are active and require cabling. This dictates what kind of channel can be operated on the playout server. For example, the input and output ports required to operate a single channel are different to those required to operate dual channels. iTX Output Server 2 supports the following playout types:

- Single Channel Playout
- Single Channel (4K)
- Single Channel (4K 2SI)
- Single Channel + Fill & Key
- Dual Fill & Key
- Dual Channel Playout
- Dual Live Input
- Dual Live + Fill & Key
- Simulcast Playout
- Simulcast + Fill & Key
- On-Demand Playout

Single Channel Playout

Single channel playout means the channel has a single input and a single output. This playout type can be used for main channels and backup channels running on their own playout servers.

Single Channel (4K)

iTX supports playout of 4K media encoded as Quad Full HD (QFHD), which has a pixel resolution of 3840 x 2160 (four times the resolution of 1080p).

4K is only supported on AJA Corvid 44 and AJACorvid 88 SDI video/audio I/O cards and has the following cabling requirements:

- For 4K output, all four output spigots on the SDI video/audio I/O card must be connected to four inputs on a matrix router.
- For 4K input, your playout server must be equipped with a AJA Corvid 88. All four input spigots on the Corvid 88 must be connected to four destinations on a matrix router.

Single Channel (4K 2SI)

iTX supports the playout of 4K 2SI (two Sample Interleave), which allows a 4K picture to be split into four HD (1080p) pictures. Each picture is sampled to a quarter of the original resolution and thus can be recombined to reconstruct the original 4K picture. This methods is an alternative to sampling the 4K picture into square division quad split (top-left, top-right, bottom-left, bottom-right). For 2SI, any of the 4K outputs can be used for monitoring the 4K picture, rather than requiring to route and reassemble all four outputs.

4K 2SI is only supported on AJA Corvid 44 and AJACorvid 88 SDI video/audio I/O cards and has the following cabling requirements:

- For 4K 2SI output, all four output spigots on the SDI video/audio I/O card must be connected to four inputs on a matrix router.
- For 4K 2SI input, your playout server must be equipped with a AJA Corvid 88. All four input spigots on the Corvid 88 must be connected to four destinations on a matrix router.

Single Channel + Fill & Key

Single Channel + Fill & Key provides the identical functionality as a standard Single channel playout type, in that the channel has a single input and a single output on the playout server. Additionally, the Single Channel + Fill & Key playout type offers the ability to add one Fill and Key graphics overlay to the output from a single pair of Fill and Key inputs.

When using an Output Server equipped with a Corvid 44 card, the channel has a single input, a single output and there is no clean output. However, if it is equipped with a Corvid 88 card, then the channel has a single input, a single output and a clean output.

> Note: The resolution of the Fill & Key inputs must match the resolution of the output; otherwise the Fill & Key events will fail to go to air.

Dual Fill & Key

The **Dual Fill & Key** playout type provides a standard single channel playout using two live inputs and a single output on the playout server. Additionally, the Dual Fill & Key playout type offers the ability to add up to two independent Fill and Key graphics overlays to the output from two pairs of Fill and Key inputs. The Fill & Key graphics are overlayed during a crossfade between the two live inputs.

> Note: The resolution of the Fill & Key inputs must match the resolution of the output; otherwise the Fill & Key events will fail to go to air.

Dual Channel Playout

Dual channel playout means there are two independent channels running on a single playout server, each with its own inputs and outputs. This can be used to run a main channel and the backup of another channel on a single playout server (providing it is equipped with a compatible video/audio I/O card).

Dual Live Input

Dual live Input means the channel has two live input sources, but a single output. In an Output Server 2 system, both live inputs can be connected to and played out from a single playout server (providing it is equipped with a compatible video/audio I/O card).

Within ITX Desktop, the two live inputs appear on a single channel as program A and program B (PGM A and PGM B on the timeline). This allows you to switch between back-to-back live events using the internal iTX Master Control plugin. See Viewing Live Event Inputs on Channel Control Layouts on page 124.

Dual live input also allows for live-to-live cross fade transitions and picture-in-picture (PiP) effects, where one input is used for the main display and the other is used for a smaller frame with the main display.

The iTX Simulcast Playout also supports the use of Dual Live Inputs, which is configured as part of the standard simulcast playout. See Simulcast Playout below.

Dual Live + Fill & Key

Dual Live + Fill & Key playout type provides the identical functionality as a standard Dual Live channel playout type, in that the channel has two live inputs and a single output on the playout server. Additionally, the Dual Live + Fill & Key playout type offers the ability to add Fill and Key graphics overlays to the output from a single pair of Fill and Key inputs. The Fill & Key graphics are overlayed during a crossfade between the two live inputs.

> Note: The resolution of the Fill & Key inputs must match the resolution of the output; otherwise the Fill & Key events will fail to go to air.

Simulcast Playout

For **simulcast playout**, two channels share two inputs, but have independent outputs on the playout server (providing it is equipped with a compatible video/audio I/O card). A typical use case for a simulcast system is to have one high resolution transmission and one lower resolution transmission from a single schedule that is loaded on to the main channel. For example, HD as the main channel and SD the simulcast, or 4K as the main channel and HD the simulcast. Because the main and simulcast channels have different requirements for the resolution, aspect ratio control (ARC) and audio output, the two channels are configured independently.

To transmit appropriate branding for a simulcast channel, iTX allows you to configure event mapping rules. Using these rules, iTX is able to swap assets such as logos and CGs based on their names in the main channel's schedule before they go to air.

iTX manages the broadcasting of main and simulcast channels using a system of networked instances of TXPlay 2, known as a channel network. The main channel in any iTX system is identified as a leader channel. The controlling instance for the simulcast and network in general is known as the Channel Controller.

When TXPlay 2 is set to a simulcast playout type, iTX also supports dual live inputs for simulcast. As each live feed in a dual live input channel is connected to different input, when operating dual live inputs for simulcast, the Channel Controller selects which input it is going to use and informs the channels to use the same input.

For more information about the leader/follower model, see About Logical Audio Programs, on page 11.

Simulcast + Fill & Key

Simulcast + Fill & Key provides the identical functionality as a standard Simulcast playout type, in that two channels share two inputs and have independent outputs on a single playout server. Additionally, the Simulcast + Fill & Key playout type offers the ability to add

Fill and Key graphics overlays from two independent Fill and Key input pairs to one or both of the channel outputs.

> Note: The resolution of the Fill & Key inputs must match the resolution of the output; otherwise the Fill & Key events will fail to go to air.

On-Demand Playout

Unlike the conventional playout types, the On-Demand playout does not permit an output to a monitor. Instead, the output generates a master video file from the schedule and also transcode, proxy and metadata if needed.

Playout Type Support

The table below shows which playout types are available to each supported model of video/audio I/O card:

Playout Type	K3G	1x CLP	2x CLP	C44	C88	IP	Comment
Single channel	✓	✓	✓	✓	✓	✓	Default for all models of video/audio I/O card. Use for stand alone main or backup channels.
Single channel (4K)				✓	✓		Corvid 44 only supports 4K output. For 4K input, your playout server must be equipped with a Corvid 88.
Single channel (4K 2SI)				✓	✓		Corvid 44 only supports 4K output. For 4K input, your playout server must be equipped with a Corvid 88.
Single channel + Fill & Key				✓	✓		Corvid 44 card, the channel has a single input, a single output and there is no clean output. Corvid 88 card, the channel has a single input, a single output and a clean output.
Dual Fill & Key					✓		Select if you are configuring a single channel with two inputs and one output with graphics overlays from two pairs of Fill & Key inputs.
Dual channel			✓	✓	✓	✓	Select to configure two channels running on the same playout server (i.e. channel A main and channel B backup).
Dual live			✓	✓	✓	✓	Select if you are configuring a single channel with two inputs and one output.
Dual Live + Fill & Key					✓		Select if you are configuring a single channel with two inputs and one output with graphics overlays from a single pair of Fill & Key inputs.

Playout Type	K3G	1x CLP	2x CLP	C44	C88	IP	Comment
Simulcast				✓	✓	✓	Select if you are configuring a simulcast channel on a separate playout server or you are configuring a main channel and a simulcast on the same playout server.
Simulcast + Fill & Key					✓		Select if you are configuring a simulcast channel with graphics overlays from two independent pairs of Fill & Key inputs.
On Demand							The On-Demand playout type does not have an I/O Device Controller service since there is no I/O processing occurring through the video/audio I/O cards.

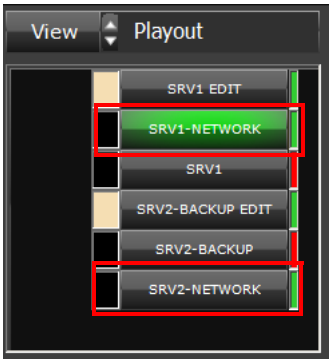
Key:

- K3G is AJA Kona 3G for SDI targets
- CLP is AJA Corvid LP for SDI targets
- C44 is AJA Corvid 44 for SDI targets
- C88 is AJA Corvid 88 for SDI targets
- IP is Internet Protocol playout using a network adapter.

About the Network Channels in the iTX Desktop

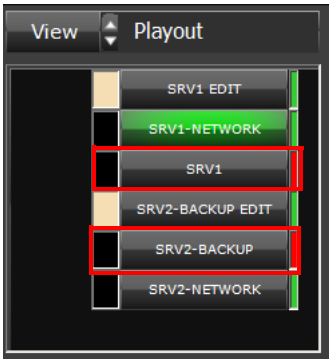
The introduction of the Channel Controller service in iTX 2.11 changed the way TXPlay channels are viewed, edited and controlled in the iTX Desktop.

Each main TXPlay channel now has an associated Network channel, which is represented in the iTX Desktop's Channel View by a button labeled with the name of the main channel with "-NETWORK" appended to it.



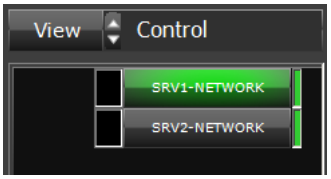
The Network channel is the control channel used to edit and control the content of its associated TXPlay channels (including regional/sub-channels and simulcast channels). All schedule changes, playout actions (Cue, Take) and other operator interventions are performed on the Network channel.

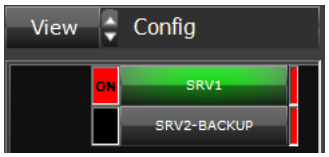
Existing TXPlay channels still appear in the iTX Desktop's Channel View, however these TXPlay channels are read-only and simply playout the schedule supplied by the Network channel. Schedule changes, playout actions (Cue, Take) and other operator interventions are not permitted on these TXPlay channels.



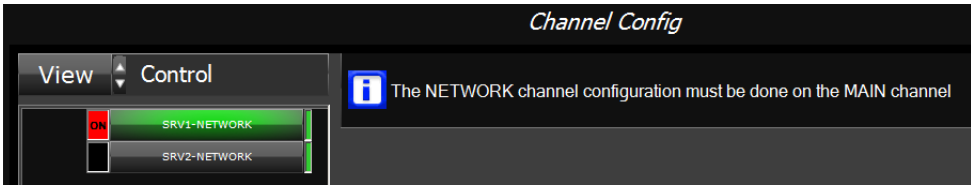
The purpose and functionality of the TXPlay EDIT channels remains the same in that they are not controlled by the Network channel and they are used to manually create or edit schedules.

To emphasize the functional difference between the Network channels and TXPlay channels, we recommend creating a Channel View containing only the new Network channels that will be used for control purposes and a separate View for the TXPlay channels for configuration purposes rather than having them all in one view.

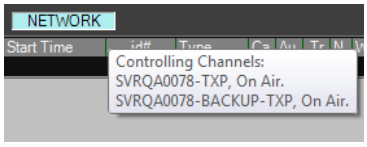




The channel configuration tasks that are normally performed in the iTX Desktop's Engineering > Channel Config can only be performed on the main TXPlay channels, not on the Network channels.

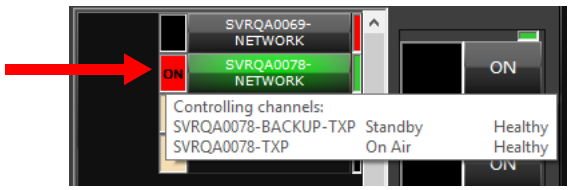


You can see which TXPlay channels the Network channel is controlling by hovering over the NETWORK icon located above the Network channel's schedule grid. The displayed message indicates which TXPlay channels are routed to air and which are on Standby.



The On Air status indicator to the left of the Network channel in the Channel Selector provides operators with a quick reference of which primary channel is On Air (main or backup). Note that the On-Air status is based on primary channels within the Channel network only. Other channels such as simulcast, regional and/or sub channels do not affect the On-Air status.

The color of the On-Air indicator is determined by the **Master On-Air** and **Backup On-Air** settings in the iTX Desktop's **Colour Configuration** settings. By default, the color of the Master and Backup channels is the same. For operators to quickly identify at a glance which primary channel is On-Air, we recommend that you change the Master On-Air and Backup On-Air settings to different colors. See "The Color Configuration pop-up layout" in the *iTX System Administrator Guide* for more information.



Hovering over the On-Air indicator displays a status overview of each channel within the Network channel.

About Regional and Sub Channels

Your iTX system may include a Main playout channel along with up to eight regional and/or sub channels.

> IMPORTANT
> Each regional or sub channel runs its own instance of Output Server 2, whose playout configuration must be consistent with the Main channel's playout settings.

Regional and sub channels may appear to be very similar, but there are notable differences in their purpose and configuration.

Regional channels play out the Main channel's content to several regions simultaneously via the Network channel's schedule with the ability to temporarily break away from the Main channel's content and playout its own scheduled content using unique primary and secondary items.

Using a configured Live asset, a sub channel plays out the primary channel's output, including any additional content or processing that has been applied by downstream hardware devices. The advantage of this is that each sub channel conserves the Main channel's output without needing to replicate the processing already performed by downstream devices. This eliminates the need to have a separate set of downstream devices for each sub channel.

> Note: Live logos and ALC are not applied by sub channels since they are already present in the Main channel's output.

See Adding and Configuring Regional and Sub channels on page 48 for instructions on how to add a regional channel or sub channel to an iTX playout server, and Assigning Channels to the Channel Network, on page 51for how to add regional and sub channels to the Channel Network.

About Logical Audio Programs

For video and voice over media, Output Server 2 provides the ability to define mapping rules for audio formats and languages, then apply those rules on a per-channel basis. This is achieved through the use of logical audio program labels.

When video and voice over media is imported via Delivery Manager, the audio track configuration and metadata are analyzed and divided into audio programs. Simple audio types, such as PCM stereo, PCM mono and Dolby D have just one audio program each, while the more complex Dolby E type can hold multiple audio programs (as defined in the asset's metadata).

Audio programs are given a unique label, which is stored in the iTX Opus database, so that it is available across the iTX system. Within the Output Server 2 user interface, you can define audio mapping rules to control the order of preference for applying the known labels to the output audio program group, as applied to each physical pair when the media is encoded. This is illustrated in Figure 1-1below.

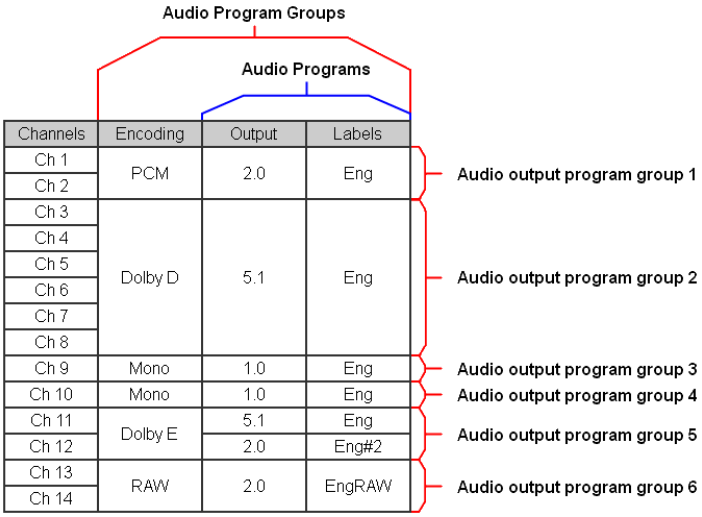


Fig. 1-1: Logical audio programs, brought together as groups along with an encoding method and how this relates to physical audio channels on output.

The audio output program groups you create are also associated with the configuration of Dolby metadata, automatic loudeness control (ALC), upmixing and audio watermarking.

> Note: Output Server 1 and Output Server 2 (up until iTX v2.8) supported **PCM (Auto)** mode for Audio Mapping. In this mode, the number of channels was determined by the source audio stream. Use of the PCM (Auto) output format could impact the track positioning of subsequent output streams and is not supported for media with logical audio programs.

On playout, operators can see which events have had their audio mapped and can override mappings where necessary. See Managing Audio from iTX Desktop on page 113.

iTX offers two ways of managing media that does not have an audio program that matches the audio mapping rules:

- If no match is found, the item shows an error status in the Audio Mapping column of the iTX Desktop's Schedule Grid. The operator can remedy this situation by changing the item's audio mapping directly from within iTX Desktop. See Managing Audio from iTX Desktop on page 113.
- A `Silence` label can be added to the end of an audio mapping rule, which tells iTX if no match can be found, play out silence. See Defining Audio Mapping Rules for Audio Programs, on page 75.

About Asset Management for Logical Audio Programs

Consider the following points about how Output Server 2 handles assets for logical audio programs:

- Video and voice over assets ingested prior to iTX 2.8 will not include logical audio programs and must therefore be updated using the Asset Fixer Service.

  See Updating Existing Assets to Use Logical Audio Programs on page 24.

- For audio programs to be extracted from new video assets by Delivery Manager, your iTX system must be configured to register video file types using the GV Engine.

  See Media Import Configuration Tool in the *iTX System Administration Guide*.
- By default, iTX groups mono tracks on import to create stereo programs. This behavior can be changed within the Delivery Manager configuration.

  See Separating Mono Tracks on Import on page 128.
- By default, iTX ignores language metadata on import. This behavior can be changed within the Delivery Manager configuration.

  See Including Language Metadata on Import on page 128.
- Audio import rules are an optional configuration setting that allow you group and label the audio tracks of video assets during the import stage so that they can be assigned to a specific output audio program during playout.

  See Creating Labels and Audio Import Rules for Logical Audio Programs, on page 20.
- As live events are not analyzed by GV Engine, they must have their audio program groups defined on a per asset basis. This is performed from the Property Editor, within the iTX Desktop Asset layout.

  See Adding logical audio programs and groups to live assets on page 89.

Upgrading from Output Server 1 to Output Server 2

iTX allows broadcasters to transition from an Output Server 1 system to an Output Server 2 system by running both video engines in parallel within the same iTX system during the upgrade. This is known as a “mixed Output Server system” and is only recommended during the upgrade and testing process, and not for prolonged day-to-day operation.

For more information see the *iTX Output Server 1 to Output Server 2 Playout Server Migration Guide*.

Known limitations of Output Server 2

Output Server 2 has the following known limitations:

- Output Server 2 does not currently support news flash. This functionality will be added in a future release.
- Raw audio mode is not supported for MPEG audio codecs.
- When using Dolby E (Auto) output, Dolby Metadata is not supported.
- Squeeze effects are not supported for CGs or logos in either Output Server 2 or Output Server 1.

2 Preparing for Output Server 2

This chapter discusses the hardware and software prerequisites for operating an Output Server 2 iTX system, including the additional licenses that may be required. It also provides an overview of the installation process for new iTX systems and upgrades from Output Server 1.

Summary

Prerequisites and Compatibility Requirements *15*
Process Overview - Output Server 2 Installation and Channel Configuration *17*
Preparing for Logical Audio Programs *19*

Prerequisites and Compatibility Requirements

Output Server 2 has both hardware and software prerequisites that must be met before the module is installed.

Required Software and Driver Versions

Software	Requirement
AJA video/audio I/O video card driver version	Output Server 2 requires AJA video card driver version 12.4.1.460 to be installed via Windows Device Manager before installing or upgrading iTX. If you have previously installed Output Server 1, the version 7.4.0.49 AJA drivers must be uninstalled and deleted from Device Manager before installing the latest drivers. IMPORTANT: Do not use drivers that are supplied with your AJA video/audio I/O card or any that have been downloaded from the AJA website. The required drivers for iTX are specially supplied by AJA and are included with the iTX Suite in the `Drivers` folder.
Framework component version	Your playout server and framework server must be running the same version of their respective iTX components for Output Server 2 to function.
Vertigo Suite version	If you are using Vertigo XG graphics, Output Server 2 requires Vertigo Suite v5.4 or later. If you have purchased the Vertigo Suite and require the installation software, contact Grass Valley Product Support. For more details visit: http://www.grassvalley.com/support/contact.

Required System Configuration

Feature	Requirement
Media registration method	Set the Media Import Configuration Tool to use GV Engine as the global import override for all of your video file types. See Configuring Your Delivery Manager Endpoint for Logical Audio Programs on page 23.
Dual channel playout Simulcast playout	To transmit dual channel or simulcast broadcasts, your playout server needs the following: • For output to SDI targets: an AJA Corvid 44 or Corvid 88 video/audio I/O card • For output to IP targets: either a networking adapter dedicated to the streaming network or a multi-port network adapter (from iTX v2.8 onwards). • The I/O Device Controller service (available from iTX v2.6 onwards).
Vertigo XG Inside	When XG Inside is enabled, Remote Desktop must be disabled on the playout server.

License Requirements

The modules that make up the iTX system are individually licensed and add-on components (such as XG Inside) require their own license to function.

Depending on your system architecture, the following licenses may be required to operate Output Server 2:

Component/feature	Required license
Video playback on Output Server 2 via the GV Engine	GV Engine
Vertigo XG Inside graphics	iTX Integrated XG graphics
SMPTE 2022-2 IP Input/Output Plugin, per Channel • Adds IP Input / Output support of SMPTE 2022-2 Compressed IP Transport Streams. • Output in MPEG2 or H.264 up to 50Mbs as MPTS, HLS or RTMP. Note: • Requires Output Server 2 Video Engine running on Appliance 2 or Approved HP Hardware.	ITX-TV-IP2022-2
SMPTE 2022-6 IP Input/Output Plugin, per Channel • Adds IP Input / Output support of SMPTE 2022-6 Uncompressed IP Streams. Note: • Requires Output Server 2 Video Engine running on Appliance 2 or Approved HP Hardware with Windows Server 2012 OS. • Requires a Mellanox® ConnectX®-4 Lx EN NIC Card must be purchased separately.	ITX-TV-IP2022-6
4K inputs and outputs	4K playout

Component/feature	Required license
Dolby metadata	Dolby
Audio watermarking	• Nielsen • Kantar Snap
Automatic Loudness Control (ALC)	ALC
Voice overs	Voice Over
Simulcast	Simulcast
Fill & Key input	Fill & Key

Licenses are stored in `.lic` files and require a Grass Valley license dongle to be inserted into a USB port on the playout server. For more information about purchasing software licenses and the Grass Valley license dongle, please contact: itxlicensing@grassvalley.com.

Registering an iTX license file

To register a new license it must be imported via the System Service, which provides access to configuration data and system management and runs on your iTX Framework Server.

To import a license file using the System Service:

1. On your framework service, open and expand the **System Service**.
2. Click on the **Licensing** tab.
3. Click the **License Details** tab.
4. Click **Import License**.

   The **Import License File…** browse window appears.
5. Browse to the directory containing your `.lic` license file.
6. Select the license file and click **Open**.

   The license file is registered and appended to the list of licenses on the **Licence Details** tab.
7. When an updated version of an existing license file is imported, services (such as TX Play on playout servers), must be restarted to ensure they reflect the updated license.

   When TXPlay 2 restarts it will check that the required licenses have been installed. The status of the licenses can be checked by running diagnostics on TXPlay 2.

Process Overview - Output Server 2 Installation and Channel Configuration

The process of installing Output Server 2 and configuring a channel consists of the following actions:

1. Install the required licenses and drivers.

   See Prerequisites and Compatibility Requirements on page 15.
2. Install the Output Server 2 module on your playout server.

See Installing Output Server 2 on page 29.

> Note: If you have purchased a Grass Valley Playout Appliance 2 it will come pre-installed with Output Server 2.

3 Add your first channel, followed by any subsequent channels.

See Adding Channels to an ITX Playout Server on page 37.

4 Start Server Controller to launch Output Server 2 and its related services.

See Starting Output Server 2 on page 125.

5 Configure the routing and communication model for the channel. This involves the following steps:
   a Route the SDI channel sources to matrix destinations.
   b Configure the channel communication setup.
   c If you have a simulcast channel, define an Event Substitution Rule.

See About Channel Communication and Routing on page 53.

6 (Optional) IP Playout: Configure the IP routing and playout settings. This involves the following steps:
   a Assign IP Router Matrix Destinations to the channel inputs.
   b Configure the channel's IP output settings.

See About Channel Communication and Routing on page 53

7 Configure the basic channel playout settings. This involves the following steps:
   a Set a Reference source and Frame Rate Family, and adjust the output timing (if required).
   b Configure the timecode settings.
   c Configure the Active Format Description Insertion Lines.
   d Configure channel delay, if required.

See Configuring Channel Playout on page 63.

8 Configure your channel to process splice insert messages. There are two ways to configure this:
   • Using the legacy VANC plugin
   • Using the enhanced SCTE104 plugin

See Configuring Splice Insert Processing on page 91.

9 Configure any additional plugins or functionality you have licensed. This involves the following steps:
   a Configure Softel Inside for subtitle playout.
   b Select the channel to use for XG Inside graphics.
   c Define custom Aspect Ratio Control (ARC) modes.

See Configuring Optional Plugins and Functionality on page 97.

10 (New installations) Configure and import media to populate your Opus database with your audio program labels.

This involves the following steps:

a If using audio import rules to define audio groupings and labels, create the necessary language labels and audio import rules.

b Configure how audio within video files is registered in Delivery Manager.

See Preparing for Logical Audio Programs on page 19.

11 (Upgrades from iTX v2.7 or earlier) Update your existing live assets, media and registration rules to support logical audio program groups *before* configuring your audio setup in Output Server 2.

This involves the following steps:

a Set the media registration method to GV Engine for deep analysis. This is required to extract audio program labels from media as it is imported via Delivery Manager.

b If using audio import rules to define audio groupings and labels, create the necessary language labels and audio import rules.

c Configure how audio within video files is registered in Delivery Manager.

d Convert existing media and live assets to the logical audio program model using the Asset Fixer Server.

See Preparing for Logical Audio Programs on page 19.

12 Configure the audio output and mapping using the audio program labels extracted from your updated or recently imported assets. This involves the following steps:

a Create an audio mapping rule for each audio program.

b If required, configure which audio program(s) voice overs should be applied to.

c If required, configure Dolby metadata for each audio program.

d If required, configure audio upmixing for each audio program.

e If required, configure the audio watermarking, such as Nielsen or Kantar Snap, for each audio program.

f If required, configure Automatic Loudness Control (ALC) for each audio program.

g Assign audio program to audio output program groups.

See Configuring Audio Output on page 73.

13 If you have created a 4K channel and will be using the iTX CG or Logo plugins, you must also add the 4K Desktop environment variable to all of the iTX Desktop PCs that will be used to control the channel.

See Configuring iTX Desktop for 4K CGs and Logos on page 72.

Preparing for Logical Audio Programs

iTX 2.8 introduced the logical audio programs model for handling audio output and audio mapping. This fundamentally changed how video needs to be imported, so that audio program labels are extracted and registered in your Opus database. As a result of these changes, you need to change how new video assets are registered and also update your existing assets to ascertain their audio program labels.

To prepare your iTX system to use logical audio programs, you must:

1 Configure the Media Import Configuration Tool to use the GV Engine as the global import override for all of your video file types. See Configuring Your Delivery Manager Endpoint for Logical Audio Programs, on page 23.

2 Choose one of the following methods for defining the audio program grouping and language labels that will be applied to a video asset's audio upon ingest using the Delivery Manager endpoints.

- **Audio Import Rules**

  Audio import rules allow you to define the audio program groupings and language label assignments that will be applied to video asset's audio. To use audio import rules, you must:

  - Create audio import rules to define how the media's audio tracks will be grouped and labeled within the video asset upon being ingested. See Creating Labels and Audio Import Rules for Logical Audio Programs, on page 20.
  - Configure the Audio Options of your Delivery Manager endpoints to apply the audio import rules. See Configuring Your Delivery Manager Endpoint for Logical Audio Programs, on page 23.

- **Mono track grouping and/or default labeling**

  Configure the Audio Options of your Delivery Manager endpoints to specify whether mono tracks should be combined to create PCM stereo programs on import. See Configuring Your Delivery Manager Endpoint for Logical Audio Programs, on page 23.

3 Update the audio program groupings and/or labels of existing assets in your iTX system using the Asset Fixer Service. See Updating Existing Assets to Use Logical Audio Programs, on page 24.

Setting the Media Import Overrides to GV Engine

So that Delivery Manager can extract audio program labels from video and voice over assets and register them in the Opus database on import, the **Media Import Configuration Tool** needs to be configured to use the **GV Engine** as the global import override for all of your video file types. This provides deep analysis of the metadata in your video and voice over media when they are imported.

For more information on installing and configuring the Media Import Configuration Tool, see section *Media Import Configuration Tool* in the iTX System Administration Guide.

Creating Labels and Audio Import Rules for Logical Audio Programs

Audio import rules define the audio program grouping and language labels that will be applied to the video asset's audio upon ingest if the Delivery Manager endpoint is configured to **Use Audio Import Rules**.

The sections below provide instructions for creating labels and audio import rules using the iTX Desktop's Configuration layout.

Viewing and creating audio labels

Before creating an audio import rule, we recommend that you verify that the necessary language labels exist in the system. If a required label is not listed in the Configuration layout's Manage Audio Labels page, then you can create the label.

The instructions below describe how to create labels using the iTX Desktop's Configuration layout. Labels can also be created and managed using the Audio tab in the Output Server 2 Configuration user interface. See Editing Audio Program Labels on page 129.

Note: Please consider the following when naming a new label:
- The name should easily identify the language.
- The name can contain a maximum of 10 characters.
- The name should be unique. No two labels can have identical names.

To create a new audio label

1. Open the **iTX Central Configuration** page via the iTX Desktop's Configuration layout.
2. Click **Configure Labels**.

   All of the labels that currently exist in the system are listed.
3. If the required label does not already exist, click **Create a Label** to create a new label.
4. In the **Create a Label** dialog, type the name of the new label.
5. Click **OK**.

   The new label is added to the Manage Audio Labels page in the Configuration layout.

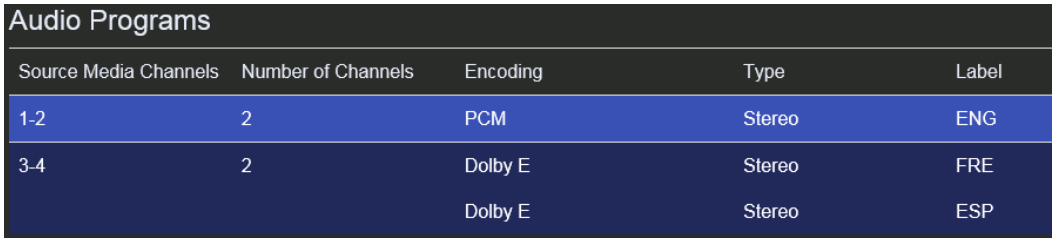
Creating a new audio import rule

An audio import rule allows you to define the audio program groupings and language label assignments that will be applied to video asset's audio.

Audio import rules consist of a number of audio programs which correspond to the audio channels within the incoming media file. Each of those audio programs is defined by a encoding type, audio channel type and language label(s).

If the audio pattern within the media file corresponds with a given audio rule, Delivery Manager groups and labels the audio channels as defined in the audio import rule.

For example, the following rule would be used for a media file that contains four channels of audio, where the first program defines channels 1 and 2 as PCM and channels 3 and 4 as Dolby E. The application of this rule would result in the label ENG being applied to the two PCM channels, label FRE being applied to the first Dolby E channel and label ESP being applied to the second Dolby E channel.



Audio Programs

Source Media Channels	Number of Channels	Encoding	Type	Label
1-2	2	PCM	Stereo	ENG
3-4	2	Dolby E	Stereo	FRE
		Dolby E	Stereo	ESP

Note: Please consider the following when creating a new audio import rule:

- The name should easily identify the audio rule type.
- The name can contain a maximum of 20 characters.
- The Pipe character | is not supported in the name.
- The name should be unique. No two rules can have identical names.
- Programs within a rule cannot be assigned the same label.
- The total channels in the audio import rule number must match the number of audio channels inside the media file.
- The audio encoding type for each of the source media channels in the rule must match the corresponding channel inside the media file. If not, the rule will not be applied.

To create a new audio import rule

1. Open the **iTX Central Configuration** page via the iTX Desktop's Configuration layout.
2. Click **Configure Audio Rules**.
3. To create a new rule:
   a. Click **Create A Rule**.
   b. Type a name for the new rule.
   c. Click **OK**.
4. Add audio programs to the rule:
   a. Click **Add Program**.

b In the **Add Audio Programs** dialog, complete the **Encoding Type**, **Audio Type** and **Label** fields according to the following associations:

Encoding Type	Audio Type	Label
PCM	• Mono • Stereo • 5.1 • 7.1	• Label
Dolby D	• Stereo • 5.1	• Label
Dolby D Plus	• 7.1	• Label
Dolby E	• 5.1	• Label
	• 5.1 + 2	• Label for 5.1 • Label for Stereo
	• 2 + 2	• Label for Stereo • Label for Stereo

Notes

- Labels must be unique and no two rule may share a common label. The only exception to this is the **Unused** label.
- Labels must already exist in the iTX system or be created separately using the iTX Desktop's Configuration layout or the Audio tab on the Output Server 2 Configuration user interface. See Viewing and creating audio labels, on page 20 or See Editing Audio Program Labels on page 129 for more information.

c If the audio in these channels is not required for playout, then select the **Ignore Program** checkbox and the Label setting will be automatically filled in with **UNUSED**.

d Click **OK**.

The program is added to the rule with its **Source Media Channels** and **Number of Channels** fields completed according to the program's settings.

5 Repeat step 4 for as many programs is necessary to cover all channels of audio of the media file.

6 Click **Save Rule** and the new rule is added to the list in the Manage Audio Rules page.

Configuring Your Delivery Manager Endpoint for Logical Audio Programs

The **Audio Options** setting on an endpoint's configuration page instructs Delivery Manager how to apply audio program groupings and/or language labels to a video asset's audio during ingest.

The **Audio Options** setting consists of the following three options:

- **Use Audio Import Rules**

  This option applies the selected audio import rule(s) (audio programs and labels) to the assets as the media is imported.

When checked, the two other Audio Options settings are replaced by the **Audio Import Rules** field. Clicking the Browse button, opens the **Set Audio Import Rules** dialog which allows you to select one or more audio import rules to apply. If the audio pattern within the ingested media file corresponds with one or more of the selected audio import rules, then Delivery Manager groups and labels the audio channels as defined in the audio import rule.

- **Group Mono Tracks**

  When checked (default), this option combines mono tracks to create PCM stereo programs on import. See See Separating Mono Tracks on Import on page 128 for more information.

- **Ignore Language Metadata**

  When checked (default), this option tells Delivery Manager to exclude any audio program language labels within the media (e.g. language tags) and use the default labels instead (i.e. P#1, P#2, etc). See See Including Language Metadata on Import on page 128 for more information.

These options are available to all endpoint types and need to be configured for each endpoint individually. See *iTX Delivery Manager Setup and Configuration Guide* for more information on creating and configuring Delivery Manager endpoints

Updating Existing Assets to Use Logical Audio Programs

Any video, voice over or live assets added to your database prior to iTX v2.8 will not include logical audio programs. However, iTX includes the Asset Fixer Service, which can be used to update these assets to use the logical audio programs model. The Asset Fixer performs a shallow analysis of all media on the media store, without performing a de-archive action. This means the size of your media does not affect the duration of the fixer job, only the quantity of files on the media store.

The following sections provide instructions for how to update existing assets:

- Installing the Asset Fixer Service, on page 24
- Updating existing media to use logical audio programs, on page 25
- Viewing Asset Fixer job progress, on page 26
- Checking for updated assets, on page 26
- Canceling an Asset Fixer job, on page 27

> Note: If you are migrating from Output Server 1, updated assets will continue to playout using its existing physical audio mapping.

Installing the Asset Fixer Service

The Asset Fixer Service must be installed on the database server, along with the Job Service Manager.

Within the Asset Fixer Service's Configuration, the options for setting logical audio programs and applying Audio Import Rules mirrors those of the Delivery Manager endpoint.

To install the Asset Fixer Service

1 Access and open the iTX Installer.

2 Right-click the **Setup.exe** file and select **Run as administrator.**

The iTX **Select Software to Install** window appears.

3 Expand the **Content Management** and select **Asset Fixer Service** section.

4 Click **OK**.

The **Select Software to Install** window closes.

5 On the iTX Installer window, click **CONTINUE**.

The selected components install.

6 Click **FINISH** to complete the installation.

Updating existing media to use logical audio programs

Once installed, the Asset Fixer plugin appears as an additional service on the database service. Unlike other services, the asset update jobs performed by the Asset Fixer Service need to be manually triggered.

Once started, the Asset Fixer Service updates all video assets as one job, then updates all voice over assets as a second job and finally updates live assets as a third job.

To update existing media to the logical audio program model

1 On the database server, expand the **Asset Fixer Service**.

The Asset Fixer Service user interface appears.

2 Click on the **Configuration** tab.

3 If you want to update video assets with an audio import rule:

a Select the **Apply Audio Import Rule** tab.

b From the **Audio Import Rule** list, select the option that best targets the circumstance of the video assets that you want to update:

- **No Matching Rule**: Video assets may have had an audio import rule applied to them, but that rule no longer exists in the system.
- **No Rule Applied**: Video assets that have never had an audio import rule applied to them.
- **<RuleName>**: Video assets that have had this exact audio import rule applied to them in the past, but you now want to update the asset with this rule. A common reason for doing this type of update is if the rule's name has not changed, but its settings have.

c From the to **Audio Import Rule** list, select name of the audio import rule that you want to apply when updating the video assets.

d Click **Update matching Video Assets**.

The Asset Fixer Service begins processing your existing assets.

4 If you want to update all video assets have grouped mono tracks and/or default labels:

a Select the **Set Logical Audio** tab.

b Set the following values, as required:

- **Group Mono Tracks** - When checked (default), this option combines mono tracks to create PCM stereo programs on import.

- **Ignore Language Metadata** - When checked (default), this option tells Delivery Manager to exclude any audio program language labels within the media (e.g. language tags) and use the default labels instead (i.e. P#1, P#2, etc).

c Click **Update Assets**.

The Asset Fixer Service begins processing your existing assets.

Note: To update both video and voice over assets in parallel, you can run the update jobs on two separate Opus servers at the same time. One instance of the Asset Fixer Service will update the video assets, while the other will update the voice over assets.

Viewing Asset Fixer job progress

Asset Fixer jobs appear in the Job Monitoring layout, along with other workflow jobs. The Job Monitor layout includes Type filters to show either the video asset update jobs or the voice over asset update job.

To view the progress of Asset Fixer jobs from iTX Desktop

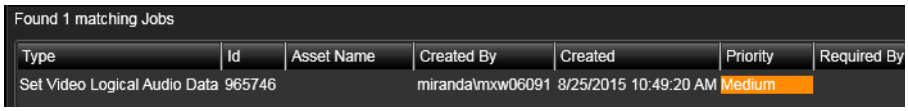
1 In iTX Desktop, select the **Job Monitoring** layout.

2 Set the filter at the top of the layout to one of the following:
- `Type | Is | Set Audio Logical Audio Data`
- `Type | is | Set Video Logical Audio Data`
- `Type | is | Set Live Logical Audio Data`

3 (Optional) Click to add an additional filter. This allows you to include both the `Set Video Logical Audio Data` and the `Set Audio Logical Audio Data` filters.

4 Press the Enter key or click to begin the search.

5 The Job Monitor layout updates to show only jobs that match the selected type(s).



Checking for updated assets

PinPoint includes a Category filter that allows you to search for assets that have been processed by the Asset Fixer Service.

To check for assets that have been updated

1 In iTX Desktop, select the **Asset** layout.

2 In **PinPoint**, select a filter to search for either a video or voice over assets:
- To restrict the search results to video assets, click .
- To restrict the search results to voice over assets, click .
- To restrict the search results to live assets, click .

3 Set the filter at the top of PinPoint to `Category | Is | Logical Audio Fixed`

4 Press the Enter key or click to begin the search.

5 The search results displays all of the assets that have been processed by the Asset Fixer Service.

> Note: The results from this search does not include assets that have had their logical audio programs processed by Delivery Manager. These assets can be searched using Media filter. See Viewing an Asset's Logical or Physical Audio Mapping on page 113

Canceling an Asset Fixer job

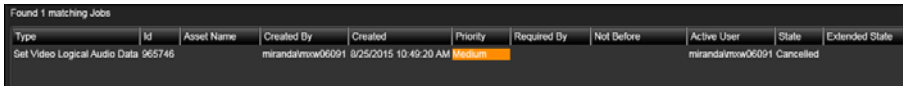
From within the Job Monitoring layout, you can cancel jobs that are in a **State** of either `Active` or `Waiting`.

To cancel an Asset Fixer job

1 In the Job Monitoring layout, filter the job list to show only the Asset Fixer job you want to cancel.

2 Select the job and click **Cancel**.

The **State** of the job changes to `Cancelled`:



3 Installing and Upgrading Output Server 2

This chapter discusses how to perform a new installation of Output Server 2 on your playout server, including how to configure your iTX domain and create a shared folder to use as a media cache. It also explains the differences when upgrading from one version of Output Server 2 to the latest version.

If you have a Grass Valley Appliance Server 2 playout server, it will be pre-installed with an earlier version of Output Server 2, which will need to be upgraded to the current version. See Upgrading an Existing Output Server 2 System on page 32.

If you intend to use IP playout, you will also need to install the IP Routing Service on the Framework server and configure its sources and destinations. See the *iTX System Administration Guide* for more information.

Summary

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Installing Output Server 2

Output Server 2 and its related services need to be installed on a playout server, equipped with a compatible video/audio I/O card. Of these services, the Media Cache 2 and TXPlay 2 services require user input before the installation is complete.

For more information on which video/audio I/O cards are supported and the services that make up an Output Server 2 system, see About Output Server 2, on page 1.

To perform a new installation of Output Server 2

1. Access and open the iTX Installer on the playout server.
2. Right-click the **Setup.exe** file and select **Run as administrator.**

   The iTX **Select Software to Install** window appears.
3. Expand the **Playout** section
4. Check **Output Server 2.**
5. Click **OK**.

   The **Select Software to Install** window closes.
6. On the **iTX Installer** window, click **CONTINUE**.

   The selected components installs on your playout server.
7. During the installation, the **iTX Domain Configuration** dialog appears. Enter the name of the required iTX Domain and Locator Service details, as described in Configuring ITX Domain and Locator Service Details, below.

Configuring ITX Domain and Locator Service Details

iTX services and clients (including iTX Desktops) on the same TCP/IP network can interact with each other if they are in the same iTX domain. An iTX domain is identified by a domain name assigned to machines on which iTX software runs. In general, iTX services and clients belong to the same iTX domain if they run on machines that have the same iTX domain name.

As part of a new Output Server 2 installation you are required to enter the details of the iTX domain to which the playout server and its channels belong, including the IP addresses of any Locator Services in the same domain.

To configure the required iTX Domain and Locator Service Details

1 During the installation of Output Server 2, the **iTX Domain Configuration** window appears.

2 In the **ITX Domain Name** field, type in the name of the required iTX domain.

> Note: Only lower case letters, numbers and a hyphen are allowed in the domain name.

3 If you have a Locator Service operating in the same domain, click **Add**.

An **Add Locator** dialog appears.

4 In the blank field, enter the IP address for your Locator Service.

5 Click **OK**.

6 If you have a group of load balanced Locator Services for the domain, you can enter additional IP addresses, then reorder them using the **Move Up** and **Move Down** buttons.

The order of Locator Services in the list determines the order in which iTX selects them to handle connection requests. A service that requires connection details contacts the Locator Service at the top of the list, if this one is busy, it contacts the next in the list and so on.

7 The **Advanced Options** button opens an additional dialog, containing a range of settings that should only be modified by Grass Valley engineers.

8 Click **Save**.

The iTX Domain Configuration dialog closes and the installation continues.

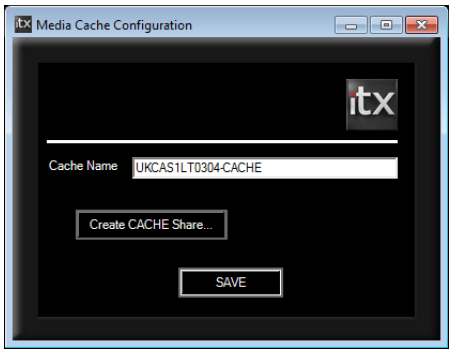
9 Before the installation completes, the **Media Cache Configuration** dialog appears. Enter the cache name and location, as described in Creating and Sharing a Media Cache Folder, below.

Creating and Sharing a Media Cache Folder

As part of a new Output Server 2 installation, you are required to create a folder on your playout server to use as the caching location for media as it transitions from your media store to playout.

To configure the Media Cache for your playout server

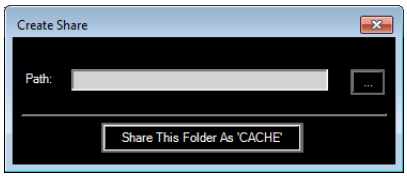
1 During the installation of Output Server 2, the **Media Cache Configuration** dialog appears.



2 By default, the **Cache Name** field will be populated with the playout server's Windows Computer Name followed by the suffix `-CACHE`.

You may enter a name of your choice, but you must ensure the name does not match any channel names in your iTX system. The name must also include the `-CACHE` suffix.

3 Click **Create CACHE Share**. The **Create Share** dialog appears.



4 Click the **Browse** button. The **Browse For Folder** dialog appears.

5 Select a location to create the caching folder (e.g. `Computer > C:`).

6 Click **Make New Folder** and enter the name `Cache`.

7 Click **OK**.

The **Browse For Folder** dialog closes and you are returned to the **Create Share** dialog.

8 Click **Share This Folder as 'CACHE'**.

9 Click the **Close** button. The **Create Share** dialog disappears, retaining your selection and you are returned to the **Media Cache Configuration** dialog.

10 Click **SAVE** to confirm your media cache configuration.

The installation continues.

11 After creating a media cache folder, the **iTX Channel Config** dialog for TXPlay2 appears. At this point you should add any channels that you require on this playout server. See Adding Channels to an ITX Playout Server on page 37.

12 Apply any additional configuration that is required for your channel.

This is covered in the following chapters:

- About Channel Communication and Routing, on page 53.
- Configuring Channel Playout, on page 63.
- Configuring Audio Output, on page 73.
- Configuring Splice Insert Processing, on page 91.
- Configuring Optional Plugins and Functionality, on page 97.

Upgrading an Existing Output Server 2 System

Since new releases of the iTX software often include new features and enhancements, it is possible that you may need to be aware of slight changes to the upgrade procedure when updating an existing Output Server 2 system.

While the Release Notes document that accompanies the new iTX Installer is the best source for general upgrade information and instructions, the sections below highlight particular changes that may directly affect the upgrade of your Output Server 2 system.

Upgrading from v2.5 Output Server 2 to v2.6 (or later)

Since the first release of Output Server 2 in iTX v2.5, additional playout types and the I/O Device Controller have been introduced. As such, during an upgrade from iTX v2.5 you are asked to confirm your basic channel configuration and required playout type.

To upgrade from v2.5 Output Server 2 to v2.6 or later:

1 Download and extract the required version of the iTX Suite.

2 Access and open the iTX Installer.

3 Right-click the **Setup.exe** file and select **Run as administrator.**

The **iTX Installer** appears listing all of the new modules and those that will be updated.

4 Click **CONTINUE**.

The updated software will install.

5 During the upgrade you may be asked to confirm your media cache configuration.

- For information on configuring the media cache, see Creating and Sharing a Media Cache Folder, on page 31.
- If no changes to the media cache configuration are required, click **Save**.

6 Before the upgrade completes, the iTX Channel Config dialog for TXPlay 2 appears.

To confirm your channel details:

a Select your required **Playout Type**.

For main or backup channels running on their own playout server, the **Playout Type** can be set to a single channel type. If another playout type is required, select it from the drop down list.

b In the **Root Name** field, re-enter the base channel name**.**

c Confirm the following fields are correct, as required:

- **Channel Name**
- **Backup** (This must be checked for backup channel upgrades)
- **Simulcast** (if present)
- **Plugin**
- **Edit channel** (if present)
- **Live channel** (if present)
- **Integrated XG**
- **Use Dedicate Softel Driver** (only required for external Softel subtitlers)
- **Use SMPTE ST 2059 (PTP)**
- **Configure for High Bit Rate**

Note: The combination of these fields that is available is determined by the selected playout type.

7 Click **SAVE**.

The **iTX Channel Config** window closes.

8 Complete the installation of any other iTX modules you have selected, as described in the *iTX System Administrator Guide*.

9 Apply any additional configuration that is required for your playout server.

This is covered in the following chapters:

- About Channel Communication and Routing, on page 53.
- Configuring Channel Playout, on page 63.
- Configuring Audio Output, on page 73.
- Configuring Splice Insert Processing, on page 91.
- Configuring Optional Plugins and Functionality, on page 97.

Upgrading Output Server 2 from 2.10 (or earlier) to v2.11 (or later)

iTX v2.11 introduces the Channel Controller service as part of the Output Server 2 software module. This new service allows for the replacement of the Leader/Follower model by a Network channel model, which provides a single interface from which to view and control multiple TXPlay channels. See About the Network Channels in the iTX Desktop on page 9.

The following sections provide guidelines for upgrading an iTX system with existing Output Server 2 channels from v2.10 (or earlier) to 2.11(or later).

Order of Upgrading iTX System Components

When upgrading the Output Server 2 from iTX v2.10 (or earlier) to v2.11, you are required to first run the upgrade installer on the iTX Desktop Client and then the Framework Server. The Output Server 2 channels are updated afterwards as described below.

> Note: This upgrade sequence only applies to the first-time you upgrade the system from 2.10 to 2.11. Subsequent updates (2.11 GA to 2.11 SP1+) or upgrades (2.11 GA to 2.12+) return to the usual installation order of Framework Server, Output Server 2 and then iTX Desktop.

Upgrading the Output Server 2 Channels

Often system administrators prefer to try a new version of the iTX software on a backup channel while still running an existing version on the main channel. In such cases, we require that the channel called -BACKUP be upgraded before the main channel; otherwise the two channels will not be able to communicate with one another.

After running the installer on the -BACKUP channel and the upgrade is complete, the server will be running an instance of the Channel Controller service called [channel name]-NETWORK and a TXPlay channel which will now be called [channel name]-BACKUP-TXP.

There is no need to change the views used by the Channel Selector control in the iTX Desktop at this stage. Even though the -BACKUP TXPlay has been renamed, the commands that are sent from the iTX Desktop to [channel name]-BACKUP will all be handled by the new Channel Controller service.

At this point, the iTX Desktop's Channel Monitor control for the -BACKUP channel should be updated to monitor the channel called [channel name]-BACKUP-TXP (rather than [channel name]-BACKUP).

When you are ready to upgrade the main channel, failover to the -BACKUP channel and then run the installer on the main channel. As part of the upgrade, the TXPlay on the main channel will be renamed to [channel name]-TXP. This means that it can no longer be selected using the Channel Selector control in the iTX Desktop. Therefore the views in the iTX Desktop must be immediately updated as described below.

Updating the Channel Views

A new Upgrade Management Tool has been added to the iTX Framework Server to automate the updating of Channel Views to include the [channel name]-NETWORK channel and also to update any references within the views from [channel name] to [channel name]-TXP.

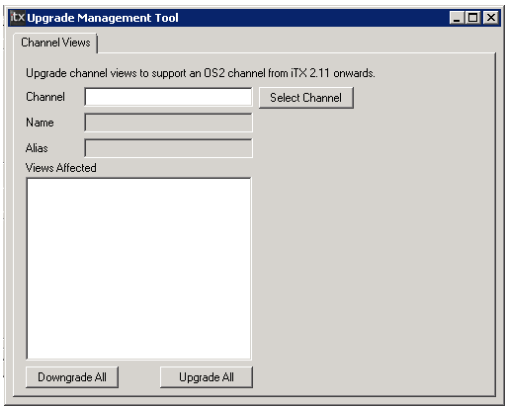
> Note: When a View is automatically updated to [channel name]-TXP, it updates the channel name that is stored within the View, not the alias for the channel. The list of channels will look the same in the Channel Selector after the tool has been run if the channel has an alias. However, if the channel does not have an alias, then the name will now have -TXP appended to it.

To update the Channel Views using the Upgrade Management Tool

1 Ensure that the iTX Desktop Client, Framework Server and Output Server 2 components have all been upgraded to a release version of iTX 2.11 (or newer).

2 On the Framework Server, open the Upgrade Management Tool from the Windows Start Menu > iTX 2.0 > Upgrade Management Tool.

The Upgrade Management Tool window appears.



3 In the **Channel** field, click the **Select Channel** button to navigate to and select an existing channel name.

After selecting the channel, the remaining fields Upgrade Management Tool are automatically filled in.

4 Click the **Upgrade All** button.

5 Click **Yes** to confirm that you want to proceed with the upgrading of the channel views.

All of the Views listed in the **Views Affected** field are automatically updated with the Network channel(s) and TXPlay channel names.

> Note: The **Downgrade All** button on the Upgrade Management Tool can be used to revert Channel Views that have been previously upgraded to 2.11.

Update Application Configurations

After completing the upgrade from iTX 2.10 (or earlier) to 2.11 (or later), there are some applications that require configuration updates. There is no need to change the TXPlay Config, even though the name of the TXPlay service has been changed to have -TXP appended to the name. If any of the following services are in use, then they require configuration updates:

- **Missing Materials**

  If the Missing Materials service is configured to monitor TXPlay channels, it must be changed to monitor the equivalent -NETWORK channels.

- **Channel Monitor Controls**

  The Channel Monitor controls in the iTX Desktop must be updated to monitor the -TXP channels.

- **GSM Gateway**

GSM Gateway must be configured to monitor the -TXP channels. Note that the channel names within the data sent out to iControl will not change (i.e. the -TXP is stripped off, so no changes are required in iControl).

- **Xml Adapter**

  The XmlAdapter configuration must be changed to reference [channel name]-TXP.

- **Preview Channel Desktop Layout**

  The Preview Channel layout in the iTX Desktop must be updated so that the channel used for preview is now -NETWORK channel.

- **Studio Countdown application**

  The Studio Countdown configuration must be updated to use the -NETWORK channel; except when monitoring a main and backup channels separately, in which case it should be updated to point to the main and backup -TXP channels.

4 Adding Channels to an ITX Playout Server

This chapter explains how to add each type of channel to an iTX system, via the iTX Channel Config dialog for TXPlay 2, and the basic rules for ensuring your combination of channels and playout servers provide a solid resilience model.

For detailed information on setting up an iTX system, refer to the *iTX System Administration Guide*.

Summary

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About the iTX Channel Config Dialog *38*
Creating an Initial Channel During Installation *41*
Adding a Backup Channel to an iTX System *42*
Adding a Simulcast Channel to an iTX System *43*
Adding a Simulcast Backup Channel to an iTX System *45*
Adding Extra Channels to a Playout Server *46*
Creating a Dual Channel iTX System *47*
Creating a Dual Live Channel *48*
Adding and Configuring Regional and Sub channels *48*

Channel Resiliency Guidelines

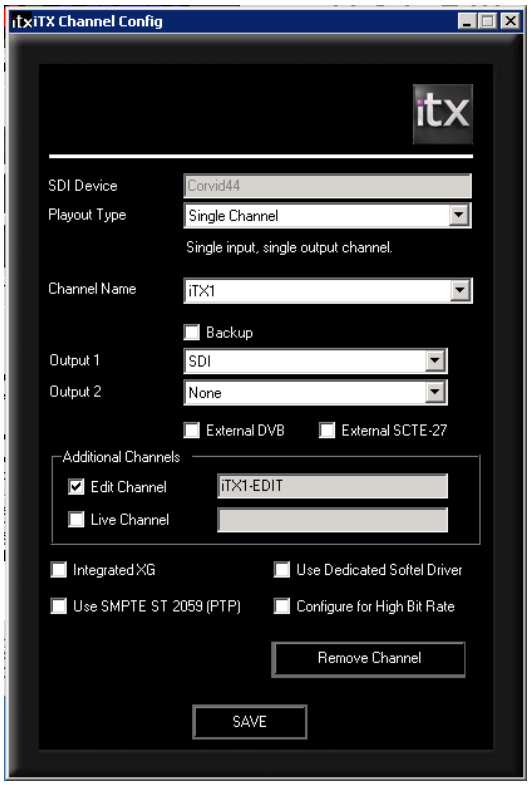
When adding channels to an iTX system consider the following guidelines:

- Backup channels should be kept on separate playout servers from their main channels.
- If your playout servers have Corvid 44 or 88 video/audio I/O cards or a dedicated streaming network adapter, a dual channel playout type can be used transmit the main for one channel and backup for a different channel. For example:
  - Playout Server 1 runs channel A main and channel B backup.
  - Playout Server 2 runs channel B main and channel A backup.
- A simulcast channel does not provide redundancy for a main channel. If a main channel fails, its simulcast follower also fails. Therefore, it is acceptable to run a main channel and its simulcast channel on the same playout server.

About the iTX Channel Config Dialog

The basic details for the channel (or channels) you want to run on a playout server are created using TXPlay 2's **iTX Channel Config** dialog. From here you can define the channel name, playout type, channel type and whether or not to use Vertigo XG graphics or the legacy Softel subtitle drivers for external Softel subtitlers.

This dialog appears during the installation of Output Server 2 and can also be accessed independently using the TXPlay 2 Config shortcut on your playout server's Windows desktop.



The table below describes the features of the iTX Channel Config dialog:

Field	Description
SDI Device	Read only field that displays the name of your current SDI video/audio I/O card.
Playout Type	This drop-down list contains the available playout types for the video/audio I/O card currently installed in the playout server. The available playout types are: • Dual channel • Dual Fill & Key • Dual live • Dual live + Fill & Key • Simulcast • Simulcast + Fill & Key • Single channel • Single channel (4K) — SDI only • Single channel (4K 2SI) • Single channel + Fill & Key • On-Demand For each playout type there is a version for combined SDI and IP targets and a version for IP only targets. The playout type you select here determines what other fields and options are displayed.
Channel Name	This field has two functions: When creating channels, use this field to enter a name to identify the channel. When entering names the following rules must be followed: • Each channel name must be unique. • You cannot enter hyphens or minus symbols (-). • Backup and Simulcast channels must have the same name as their main channel. • To define a channel as a region or sub channel, add the # character followed by the output ID, which must be a single digit from 1 to 8 (e.g. channelname#1). If one or more channels have already been created, this field becomes a drop-down list containing the names of the existing channels. These names include any suffixes that are applied when **Backup** or **Simulcast** are checked. Note: An alias for the Channel Name can be created in iTX Desktop to provide a user friendly channel name within the Channel Control layouts. For more information see the *iTX System Administration Guide*.
Backup	Checking this option identifies the channel as a backup channel and adds the suffix `-BACKUP` (in gray) to the name in the **Channel Name** drop-down list.
Simulcast	Checking this option identifies the channel as a simulcast channel and adds the suffix `-SIM` (in gray) to the name in the **Channel Name** drop-down list. This option is only available if a simulcast playout type is selected.
Output 1 Output 2	Sets the Output Target for each channel. • Output 1 can be set to SDI, IP 2022-2, IP 2022-6, Http Live Streaming (HLS) or Real-time Messaging Protocol (RTMP). • Output 2 can be set to None, IP 2022-2, IP 2022-6, Http Live Streaming (HLS) or Real-time Messaging Protocol (RTMP). See About Output Targets (SDI and IP), on page 3 for more information.

Field	Description
External DVB	Allows for output over IP TSNetwork 2 packets containing DVB compliant packets to External iTX SubMux. Using this route, iTX renders the subtitles into bitmaps before forwarding them to the Submux. This adds them to the DVB Subtitle PID using the PCR supplied to the Submux in the incoming GIGs Transport stream. The resulting PID is then forwarded onto the downstream multiplexer for inclusion in the full transport stream for broadcast.
External SCTE-27	Allows for output over IP TSNetwork 2 packets containing SCTE-27 compliant packets to External iTX SubMux. Using this route, iTX renders the subtitles into bitmaps before forwarding them to the Submux. This adds them to the SCTE-27 Subtitle PID using the PCR supplied to the Submux in the incoming GIGs Transport stream. The resulting PID is then forwarded onto the downstream multiplexer for inclusion in the full transport stream for broadcast.
Additional Channels • Edit channel	Check this option to create an edit channel alongside the current channel. Edit channels can be used for off air schedule management.
Additional Channels • Live channel	Check this option if you need to play out ad hoc schedule events using the Live Control on iTX Desktop
Integrated XG	Check this option if the playout server features integrated Grass Valley Vertigo XG graphics solution (often called XG Inside). For more information about configuring XG Inside, see the *Vertigo XG Inside User Manual*.
Use Dedicated Softel Driver	By default, Output Server 2 uses a legacy driver for external Softel subtitles. Check this option to enable the updated driver, which supports Softel Swift TX Classic, Softel Swift mTX and Softel Swift mTX Multi-Language external subtitlers.
Use SMPTE ST 2059 (PTP)	Select the **Use SMPTE ST 2059 (PTP)** check box if you wish to synchronize playout on your Output Server using SMPTE ST 2059 (PTP). When this option is selected, the PTP client is started and managed by the Server Controller on the Output Server (the PTP client is always automatically installed with Output Server 2).
Configure for High Bit Rate	To support high bitrate playout, the relevant network adapter is automatically configured to support a higher throughput when a IP-2022-6 option is selected as the Output Target Type in the server's iTX Channel Config dialog. This option can be disabled by unchecking the **Configure for High Bit Rate** checkbox. This option is unchecked by default for IP-2022-2. High bitrate playout also requires that the System Time be synchronised with a PTP master clock. As such, a PTP client is also automatically installed and started by the Server Controller when an IP option is the selected Output Target Type.
Add Extra Channel	If you have selected a playout type that supports multiple channels on a single playout server (such as dual channel or simulcast), click **Add Extra Channel** to create the additional channels.

Field	Description
Remove Channel	Remove the currently selected channel.
Save	Any changes you make to a channel are only applied when you click **Save**. This includes channel deletions.

Creating an Initial Channel During Installation

During a new installation of Playout Server 2, TXPlay 2's iTX Channel Config dialog appears so that you can create your first channel. Whether this is a main, backup or simulcast channel depends on how you wish to configure your iTX system.

To create an initial channel during installation:

1 Before the installation of Output Server 2 completes, the **ITX Channel Config** dialog for **TXPlay 2 Config** appears.

2 On the **Playout Type** drop-down list, select the required playout type.

For the main channel in any iTX system, the default single channel Playout Type can be used. If another playout type is required, select it from the drop down list.

3 In the **Channel Name** field, enter the a name to identify the channel.

4 In the **Output 1** drop down list, select one of the following output targets:

- SDI
- IP 2022-2
- IP 2022-6 (if IP 2022-6 is not already slected in Output 2 field)
- Http Live Streaming (HLS)
- Real-time Messaging Protocol (RTMP)

5 In the **Output 2** drop down list, select one of the following targets:

- None
- IP 2022-2
- IP 2022-6 (if IP 2022-6 is not already slected in Output 1 field)
- Http Live Streaming (HLS)
- Real-time Messaging Protocol (RTMP)

6 Check the following fields, as required:

- **Backup**
- **Simulcast** (if present)
- **Edit channel** (if present)
- **Live channel** (if present)
- **Integrated XG**
- **Use Dedicate Softel Driver** (only required for external Softel subtitlers)
- **Use SMPTE ST 2059 (PTP)**
- **Configure for High Bit Rate**

Note: The fields that are available are determined by the selected Playout Type.

7 Click **SAVE**.

The **iTX Channel Config** window closes.

8 Configure the channel's playout settings according to your playout requirements.

This is covered in the following chapters:

- About Channel Communication and Routing, on page 53.
- Configuring Channel Playout, on page 63.
- Configuring Audio Output, on page 73.
- Configuring Splice Insert Processing, on page 91.
- Configuring Optional Plugins and Functionality, on page 97.

Adding a Backup Channel to an iTX System

If you are creating a main/backup setup, you need to add the backup channel on a separate playout server from the main channel. This ensures the backup channel is unaffected in the event of the main channel failing.

To add a backup channel on its own playout server:

1 If is it not currently running, start **TXPlay 2 Config** by double-clicking on the **TXPlay 2 Config** icon on the Windows desktop.

The **iTX Channel Config** dialog appears.

2 The **Playout Type** drop-down list will default to a single channel type. For a backup channel in a typical main/backup setup a single channel type is recommended.

3 In the **Channel Name** field, enter the same channel name as the main channel.

4 In the **Output 1** drop down list, select one of the following output targets:

- `SDI`
- `IP 2022-2`
- `IP 2022-6 (if IP 2022-6 is not already slected in Output 2 field)`
- `Http Live Streaming (HLS)`
- `Real-time Messaging Protocol (RTMP)`

5 In the **Output 2** drop down list, select one of the following targets:

- `None`
- `IP 2022-2`
- `IP 2022-6 (if IP 2022-6 is not already slected in Output 1 field)`
- `Http Live Streaming (HLS)`
- `Real-time Messaging Protocol (RTMP)`

6 Check **Backup**.

The **Channel Name** field now displays the name you entered followed by `-BACKUP`, e.g. `ITX1-BACKUP`.

7 Check the following fields, as required:

- **Edit channel**
- **Live channel**
- **Integrated XG**
- **Use Dedicate Softel Driver** (only required for external Softel subtitlers)
- **Use SMPTE ST 2059 (PTP)**
- **Configure for High Bit Rate**

8 Click **SAVE**. The **iTX Channel Config** window closes.

9 If you are adding a backup channel as part of an installation, complete the installation as normal.

10 The configuration of a backup mirrors that of their main channel. Within the Output Server user interface, any configuration changes on the main channel are automatically applied to the backup and vice versa.

This is covered in the following chapters:

- About Channel Communication and Routing, on page 53.
- Configuring Channel Playout, on page 63.
- Configuring Audio Output, on page 73.
- Configuring Splice Insert Processing, on page 91.
- Configuring Optional Plugins and Functionality, on page 97.

11 In the iTX Desktop, open the iTX Central Configuration layout and add the Backup channel to the Network channel. See Assigning Channels to the Channel Network on page 51.

Adding a Simulcast Channel to an iTX System

A simulcast channel can be created for any existing channel, providing the playout server has a compatible video/audio I/O card installed. For more information see Playout Type Support, on page 7.

> Note: The steps below describe the process for creating a simulcast channel on its own playout server. To add a simulcast channel to a playout server that already has a channel configured on it, see Adding Extra Channels to a Playout Server, on page 46.

To add a simulcast channel to its own playout server:

1 If is it not currently running, start **TXPlay 2 Config** by double-clicking on the **TXPlay 2 Config** icon on the Windows Desktop.

The **ITX Channel Config** dialog appears.

2 On the **Playout Type**, select one of the following types:

- `Corvid 44, Simulcast` (allows both SDI and IP targets to be configured)
- `Corvid 88, Simulcast` (allows both SDI and IP targets to be configured)
- `Corvid 88, Simulcast + Fill & Key` (allows both SDI and IP targets to be configured)
- `IP Only, Simulcast`

3 In the **Channel Name** field, enter the same channel name as the main channel.

4 In the **Output 1** drop down list, select one of the following output targets:

- `SDI`
- `IP 2022-2`
- `IP 2022-6 (if IP 2022-6 is not already slected in Output 2 field)`
- `Http Live Streaming (HLS)`
- `Real-time Messaging Protocol (RTMP)`

5 In the **Output 2** drop down list, select one of the following targets:
   - None
   - IP 2022-2
   - IP 2022-6 (if IP 2022-6 is not already slected in Output 1 field)
   - Http Live Streaming (HLS)
   - Real-time Messaging Protocol (RTMP)

6 Check **Simulcast**.

   The **Channel Name** field now displays the name you entered followed by `-SIM`, e.g. `ITX1-SIM`.

7 Check the following fields, as required:
   - **Integrated XG**
   - **Use Dedicate Softel Driver** (only required for external Softel subtitlers)
   - **Use SMPTE ST 2059 (PTP)**
   - **Configure for High Bit Rate**

8 Click **SAVE**.

   The **iTX Channel Config** window closes.

9 If you are adding a simulcast channel as part of an installation, complete the installation as normal.

10 The configuration of a simulcast channel should match their main channel, with the following differences:
   - Set the main channel to a HD resolution (e.g. 1080i) and the simulcast channel to an SD resolution (e.g. 625).

     See Selecting the Channel Resolution and Frame Rate on page 64.
   - Configure the aspect ratio to the requirements of the main and simulcast channels independently. For example, being HD, the main channel may need an aspect ratio of 16:9, while the simulcast channel, which is SD, may only need an aspect ratio of 4:3.

     For more information see the *iTX System Administration Guide*.
   - On the simulcast channel, define event substitution rules to swap HD logos, stills and CGs for their SD counterparts.

     See About Event Substitution Rules for Simulcast Channels on page 60.
   - Configure the audio output to the requirements of the main and simulcast channels independently. For example, the main channel may use Dolby E 5.1, while the SD channel may only use PCM 5.1.

     See Configuring Audio Output on page 73.

11 In the iTX Desktop, open the iTX Central Configuration layout and add the Simulcast channel to the Network channel. See Assigning Channels to the Channel Network on page 51.

Adding a Simulcast Backup Channel to an iTX System

If you have a backup channel for your main channel, as well as a simulcast channel, it is recommended that you also add channel that is a backup of the simulcast channel.

> Note: The steps below describe the process for creating a simulcast backup channel on its own playout server. To add a simulcast backup channel to a playout server that already has a channel configured on it, see Adding Extra Channels to a Playout Server, on page 46.

To add a simulcast backup channel to its own playout server:

1. If is it not currently running, start **TXPlay 2 Config** by double-clicking on the **TXPlay 2 Config** icon on the Windows Desktop.

   The **ITX Channel Config** dialog appears.
2. On the **Playout Type**, select one of the following types:
   - `Corvid 44, Simulcast` (allows both SDI and IP targets to be configured)
   - `Corvid 88, Simulcast` (allows both SDI and IP targets to be configured)
   - `Corvid 88, Simulcast + Fill & Key` (allows both SDI and IP targets to be configured)
   - `IP Only, Simulcast`
3. In the **Channel Name** field, enter the same channel name as the main channel.
4. In the **Output 1** drop down list, select one of the following output targets:
   - `SDI`
   - `IP 2022-2`
   - `IP 2022-6` (if IP 2022-6 is not already selected in Output 2 field)
   - Http Live Streaming (HLS)
   - Real-time Messaging Protocol (RTMP)
5. In the **Output 2** drop down list, select one of the following targets:
   - `None`
   - `IP 2022-2`
   - `IP 2022-6 (if IP 2022-6 is not already slected in Output 1 field)`
   - `Http Live Streaming (HLS)`
   - `Real-time Messaging Protocol (RTMP)`
6. Check **Backup**.

   The **Channel Name** field now displays the name you entered followed by `-BACKUP`, e.g. `ITX1-BACKUP`.
7. Check **Simulcast**.

   The **Channel Name** field now displays the name you entered followed by `-BACKUP-SIM`, e.g. `ITX1-BACKUP-SIM`.
8. Check the following fields, as required:
   - **Integrated XG**
   - **Use Dedicate Softel Driver** (only required for external Softel subtitlers)
   - **Use SMPTE ST 2059 (PTP)**

- **Configure for High Bit Rate**

9 Click **SAVE**. The **iTX Channel Config** window closes.

10 If you are adding a simulcast backup channel as part of an installation, complete the installation as normal.

11 Simulcast backup channels should be configured in exactly the same way as the simulcast channel.

For more information see Configuring the Channel Communication Setup, on page 59.

12 In the iTX Desktop, open the iTX Central Configuration layout and add the Simulcast Backup channel to the Network channel. See Assigning Channels to the Channel Network on page 51.

Adding Extra Channels to a Playout Server

If are going to operate multiple channels from a single playout server (i.e. a simulcast channel on the same playout server as the main channel), the extra channel can be added to your iTX system from the iTX Channel Config dialog in TXPlay 2 Config.

To add an extra channel to a single playout server:

1 If it is not currently running, start **TXPlay 2 Config** by double-clicking on the **TXPlay 2 Config** icon on the Windows Desktop.

The **ITX Channel Config** dialog appears.

2 From the **Playout Type** drop-down list, select one of the following types:

- `Simulcast`
- `Simulcast + Fill & Key`
- `Dual Channel`

The **Add Extra Channel** button appears at the bottom of the dialog.

3 In the **Output 1** drop down list, select one of the following output targets:

- `SDI`
- `IP 2022-2`
- `IP 2022-6` (if IP 2022-6 is not already slected in Output 2 field)
- `Http Live Streaming (HLS)`
- `Real-time Messaging Protocol (RTMP)`

4 In the **Output 2** drop down list, select one of the following targets:

- `None`
- `IP 2022-2`
- `IP 2022-6` (if IP 2022-6 is not already slected in Output 1 field)
- `Http Live Streaming (HLS)`
- `Real-time Messaging Protocol (RTMP)`

5 Click **Add Extra Channel**.

The **Add Extra Channel** dialog appears.

6 In the **Channel Name** field, type the basic name for the extra channel, as per the rules defined in About the iTX Channel Config Dialog, on page 38.

7 Define the channel's function:

   a If you are creating a backup channel, check **Backup**.

   b If you are creating a simulcast channel, check **Simulcast**.

   c If you are creating a simulcast backup channel, check both **Backup** and **Simulcast**.

8 Click **OK**.

   The **Add Extra Channel** dialog closes.

9 On the **iTX Channel Config** dialog, the **Channel Name** field is now a drop down list, which includes the new channel name with the appropriate suffixes in gray (e.g. `-BACKUP` for a backup channel, `-SIM` for a Simulcast channel or both).

   You can select each channel from the **Channel Name** drop-down list and configure them individually, as required.

10 Click **SAVE**.

   The **iTX Channel Config** window closes.

11 If you are adding a channel as part of an installation, complete the installation as normal.

12 Apply any configuration that is required for your playout server.

   This is covered in the following chapters:

   - About Channel Communication and Routing, on page 53.
   - Configuring Channel Playout, on page 63.
   - Configuring Audio Output, on page 73.
   - Configuring Splice Insert Processing, on page 91.
   - Configuring Optional Plugins and Functionality, on page 97.

13 In the iTX Desktop, open the iTX Central Configuration layout and add the channel to the Network channel. See Assigning Channels to the Channel Network on page 51.

Creating a Dual Channel iTX System

iTX allows for two different channels to operate on a single playout server (for example channel A main and channel B backup), providing it is installed with a compatible audio/video I/O card. For more information see Playout Type Support, on page 7.

To create a dual channel system on a single playout server:

1 If is it not currently running, start **TXPlay 2 Config** by double-clicking on the **TXPlay 2 Config** icon on the Windows Desktop.

   The **ITX Channel Config** dialog appears.

2 From the **Playout Type** drop-down list, select `Dual Channel`.
3 Add the first channel, as described in Creating an Initial Channel During Installation, on page 41.
4 Click **Add Extra Channel**. The **Add Extra Channel** dialog appears.
5 Fill-in the **Add Extra Channel** dialog, as described in Adding Extra Channels to a Playout Server, on page 46.
6 Apply any playout configuration that is required for your playout server.

This is covered in the following chapters:

- About Channel Communication and Routing, on page 53.
- Configuring Channel Playout, on page 63.
- Configuring Audio Output, on page 73.
- Configuring Splice Insert Processing, on page 91.
- Configuring Optional Plugins and Functionality, on page 97.

Creating a Dual Live Channel

A dual live channel has two live inputs into a single playout server, which are then played out via a single output. For this, the playout server must be installed with a compatible audio/video I/O card. For more information see Playout Type Support, on page 7.

To create a dual live channel:

1 If is it not currently running, start **TXPlay 2 Config** by double-clicking on the **TXPlay 2 Config** icon on the Windows Desktop.

The **ITX Channel Config** dialog appears.

2 From the **Playout Type** drop-down list, select `Dual Live` or `Dual Live + Fill & Key`.
3 Create the channel, as described in Creating an Initial Channel During Installation, on page 41.
4 Apply any playout configuration that is required for your playout server.

This is covered in the following chapters:

- About Channel Communication and Routing, on page 53.
- Configuring Channel Playout, on page 63.
- Configuring Audio Output, on page 73.
- Configuring Splice Insert Processing, on page 91.
- Configuring Optional Plugins and Functionality, on page 97.

5 Configure the routing so the channel has two live inputs. See About Video Signal Routing on page 53.
6 From the Asset layout in iTX Desktop, create a live asset. This can then be scheduled for playout on the channel. For more information see the *iTX Desktop Operator* guide.

Adding and Configuring Regional and Sub channels

For a system that requires content to be played out to several regions simultaneously, you can include a combination of up to 8 regional or sub channels per channel network.

IMPORTANT
Each regional or sub channel must run on its own instance of Output Server 2 and must be configured relative to the Main channel.

To add and configure regional (including sub channels) to your iTX system

1 On the playout server hosting the main channel, add and configure a Main channel according to your playout requirements. See Process Overview - Output Server 2 Installation and Channel Configuration, on page 17.

   We recommend that you take note of the Main channel's playout configuration settings since you will need to replicate them when configuring the regional channel in step 3 below.

2 On each playout server hosting a regional, use the TXPlay2 Config (iTX Channel Config dialog) to add a channel to the system.

   Ensure that the **Channel Name** setting for each regional channel uses the main channel's name followed immediately by the # character and then the output ID, which must be a single digit from 1 to 8 (e.g. mainchannelname#1, mainchannelname#2). See About the iTX Channel Config Dialog, on page 38.

3 On the playout servers hosting the regional channels, configure each regional channel so that the channel configuration settings are identical to those of the Main channel.

   a In the **I/O Device Controller**'s Configuration page, set the **Reference**, **Frame Rate Family** and **MainInput** fields to exactly match the Main channel's settings. See Setting an SDI Reference Source and Frame Rate Family, on page 63.

   b On the **Channel** tab of the **Output Server 2** user interface, set the **Resolution** field to match that of the Main channel. See Selecting the Channel Resolution and Frame Rate, on page 64.

   c Configure the regionals channel to match the Main channel's playout configuration settings. Return to the configuration performed in step 1 above for the specific settings.

4 In the iTX Desktop, add the regional channel to a channel Views and specify an appropriate alias name for each of the regional channels. See "Setting up a channel view" and "Channel Config 1 – for all channel types" in the *iTX System Administrator Guide*.

5 In the iTX Desktop, select the **View** that lists the regional channels and configure the Routing settings for each of the regional channels. See Configuring the Channel Communication Setup on page 59 and "Channel Config 3 - for playout channels" in the *iTX System Administrator Guide*.

6 Restart all the iTX services on each of the playout servers.

7 In the iTX Desktop, select the Network Channel in the channel View and click the **Select Tracks** button above the Timeline component to ensure that the **Output** tracks are displayed in the Timeline.

8 In the iTX Desktop, open the iTX Central Configuration layout and add the regional channel(s) to the Network channel. See Assigning Channels to the Channel Network on page 51.

5 Assigning Channels to the Channel Network

After the Main channel and its associated channels (backup, simulcast, regional, sub-channels) have been added to the iTX domain (see Adding Channels to an ITX Playout Server, on page 37), you must assign the channels to the Channel Network by adding them to the Channel Controller configuration. Adding the associated channels allows the Channel Controller to control and manage items to be played out on the associated TXPlay channels from a single schedule.

To assign channels to the Channel Network

1 Start the iTX Desktop on a client PC and login with an Administrator profile.

2 Open the **Configuration** layout.

3 Click **Configure Channel Controller**.

The **Manage Channel Controller** page appears and lists the channels currently registered with the Channel Controller.

4 Click **Edit** next to the channel to be configured.

The channel's current Channel Controller configuration is displayed.

5 Select the **Network** tab and perform the following as required:

- If the Main channel has a backup channel (see Adding a Backup Channel to an iTX System, on page 42), click **Add Backup** in the **Primary channels** section. A backup channel is added to the primary channel list.
- For a system that requires content to be played out in HD and SD formats simultaneously (see Adding a Simulcast Channel to an iTX System, on page 43), click **Add Simulcast** in the **Simulcast channels** section to add the simulcast channel to the channel network.

  If the simulcast channel has a backup channel (see Adding a Simulcast Backup Channel to an iTX System, on page 45), click **Add Backup** in the **Simulcast channels** section. A simulcast backup channel (-Backup-TXP) is added.
- For a system that requires content to be played out to several regions simultaneously, (see Adding and Configuring Regional and Sub channels, on page 48), click **Add Region** or **Sub Channel** in the **Regional channels** section to add the regional or sub channel to the channel network.

  For Sub channels, select a Live asset from the **Choose a Live Asset for Substitution** list. This setting identifies the name of the live asset that will be used to substitute for the primary channel content.

  If a regional or sub channel has a backup channel, click **Add Backup** to the right-side of the channel. A backup channel (-Backup-TXP) is added immediately below the regional/sub channel.

6 If you are configuring your iTX system for dual-site channel control, then select the **Dual Site** tab and perform the following:

a Check **Enable Dual Site**.

b Set the Main channel's **Location** field to the domain that is hosting the backup channel (Site B).

c Set the Backup channel's **Location** field to the domain that is hosting the Main channel (Site A).

Please refer to the "iTX Dual-site Channel Control Configuration Guide" for more information about configuring the controls on the Dual Site tab.

7 Click **Save**.

A message appears informing you that the configuration will only take affect after restarting the Channel Controller.

8 Click **OK**.

9 Restart the Channel Controllers on the Main and Backup channel and perform any playout configuration that is required for your playout server.

6 About Channel Communication and Routing

This section explains how to setup the routing for a playout server using an existing video/audio matrix router. It does not explain how to install or configure a matrix router or the supporting iTX services.

For more information on installing and configuring matrix routers, refer to the "Using iTX with a Matrix Router" section of the *iTX System Administrator Guide*.

The guidance in this section is for an iTX playout server with live inputs, however some information is also applicable to an iTX server running the Encode service for ingest or both the Encode service and Output Server 2 service for ingest and playout.

For more information on setting up an ingest server, refer to the "Preparing Encode Server machines" section of the *iTX System Administrator Guide*.

> Note: Some of the following configuration only applies to SDI output targets and some only applies to IP output targets. Where configuration is specific to an output target it is stipulated in the heading.

Summary

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Configuring the Channel Communication Setup *59*
About Event Substitution Rules for Simulcast Channels *60*
About GPI Devices and Simulcast Setups *62*

About Video Signal Routing

A video/audio router (also known as a matrix router or just matrix) allows a video signal source (such as a live satellite feed) to be connected to a destination, such as a playout server. The output from the sources are connected to inputs on the router and the outputs on the router are connected to inputs on the destinations. The router then allows any source to be routed to any destination and vice versa; these connections are known as crosspoints. An iTX server can act as a source (playout server), a destination (ingest server) or both (playout with live inputs), depending on your requirements.

For example, the live feed from a satellite would be a source and a transmission system would be a destination. In between you may want an iTX server (for example, so that the satellite feed can be recorded or breaks inserted), before being sent to the transmission system. In this scenario, the live satellite feed is routed to the inputs of a playout/ingest server (acting as a destination) via the matrix router and the output from the playout/ingest server (acting as a source) can then be routed to the transmission system via the same router.

Figure 6-1 on page 54 illustrates how source and destinations can be routed to one another, via crosspoints on the matrix router. The diagram also shows how the example above would be routed, with the live satellite feed being used as an input source to the playout/ingest server (ITX1),which is then routed to the transmission system.

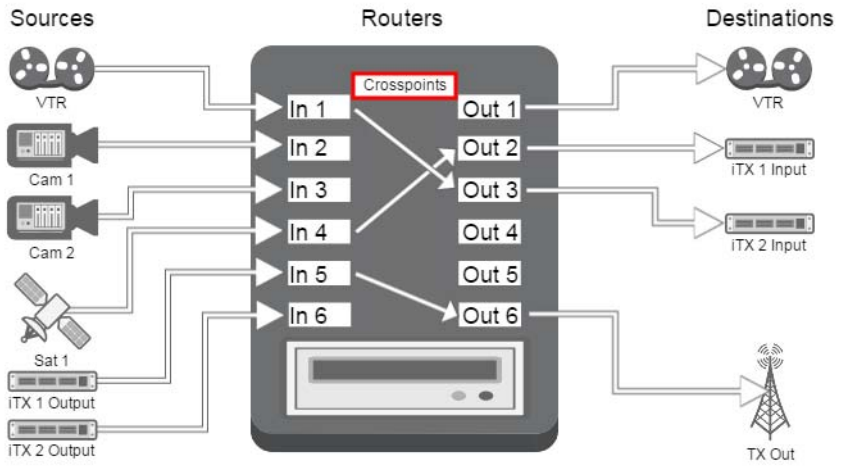


Fig. 6-1: How channel sources and destinations connect to a matrix router.

There can be multiple sources, destinations and even routers in an iTX system. To ensure a playout/ingest server is receiving and sending the correct signals, iTX needs to know the following:

- Which router to use
- The destinations (i.e. to which router outputs are the inputs on the video/audio I/O card connected)
- The channel outputs (i.e. to which router inputs are the outputs on the video/audio I/O card connected)

How a channel's routing is configured also depends on the playout type. For example, simulcast channels share an input, so the playout server acts as a single destination; dual live input requires two inputs, so the playout server acts as two destinations (i.e. two different outputs on the router connect to two different inputs on the video/audio I/O card).

The playout server's inputs are configured from within the Router Connections tab in the I/O Device Controller, while the channel outputs are configured in the Channel Config pop-up layout in iTX Desktop.

Assigning SDI Matrix Destinations to Channel Inputs

In the I/O Device Controller user interface, under Configuration > SDI is a Routing section, which is used to assign each channel input to a destination on a matrix router.

The inputs that are available correspond to the model of video/audio I/O card in your playout server and the playout type you selected in TXPlay2 Config. For example, a Corvid 88 video/audio I/O card shows the following inputs for each playout type:

Playout type	Inputs	Router configuration
Single channel	• Channel A Main Input	Single router, with a single destination
Single channel (4K)	• Channel A Main Input 1 • Channel A Main Input 2 • Channel A Main Input 3 • Channel A Main Input 4	Single router, with four destinations. Note: 4K input is only supported by AJA Corvid 88 SDI audio/video I/O cards.
Single channel 4K 2SI	• Channel A Main Input 1 • Channel A Main Input 2 • Channel A Main Input 3 • Channel A Main Input 4	Single router, with four destinations. Note: 4K input is only supported by AJA Corvid 88 SDI audio/video I/O cards.
Single channel + Fill & Key	• Channel A Main Input 1 • Channel A Fill & Key Input Fill • Channel A Fill & Key Input Key	Single router, with a single destination. Note: In addition to the standard SDI routing configuration, Fill & Key channels also require a paired destination comprised of the Fill & Key signals. This is configuration is performed on the router itself.
Dual Fill & Key	• Channel A Main Input • Channel A Secondary Input • Channel A Fill & Key Input Fill • Channel A Fill & Key Input Key • Channel A Fill & Key B Input Fill • Channel A Fill & Key B Input Key	Up to two routers, with two separate destinations. Note: In addition to the standard SDI routing configuration, Fill & Key channels also require two paired destinations comprised of the Fill & Key signals. This configuration is performed on the router itself.
Dual channel	• Channel A Main Input • Channel B Main Input	Up to two routers, with two separate destinations
Dual live	• Channel A Main Input • Channel A Secondary Input	Up to two routers, with two separate destinations
Dual live + Fill & Key	• Channel A Main Input • Channel A Secondary Input • Channel A Fill & Key Input Fill • Channel A Fill & Key Input Key	Up to two routers, with two separate destinations. Note: In addition to the standard SDI routing configuration, Fill & Key channels also require a single paired destination comprised of the Fill & Key signals. This configuration is performed on the router itself.
Simulcast	• Channel A Main Input / Channel B Main Input	Single router, with a single destination
Simulcast + Fill & Key	• Channel A Main Input / Channel B Main Input • Channel A Fill & Key Input Fill • Channel A Fill & Key Input Key • Channel B Fill & Key Input Fill • Channel B Fill & Key Input Key	Single router, with a single destination. Note: In addition to the standard SDI routing configuration, Simulcast Fill & Key channels also require two paired destinations comprised of the Fill & Key signals for each channel (A & B). This is configuration is performed on the router itself.

To assign matrix destinations to inputs on the SDI I/O card:

1 On the server running the Output Server 2 system, maximize the **I/O Device Controller** service.

2 Select the **Configuration** > **SDI** tab.

The routing configuration appears, with a set of controls for each active input on the video/audio I/O card.

3 For each input, use the **Matrix** field to select the matrix router (or router bridge) with the required destination.

4 For each input, use the **Destination** field to select the router destination to which the transmission system receiving the channel output is connected.

> Note: If you are using a hardwired router for testing purposes, you can only connect one destination to it and you cannot mix router systems.

The table below describes how different channel types and pairings should be routed. Note that the details below also apply to channels with + Fill & Key inputs.

Channel types	Matrix destination
Main and backup pair	Connect both channels to the same matrix and destination
Simulcast and simulcast backup pair	Connect both channels to the same matrix and destination
Main and simulcast pair	Connect both channels to the same matrix and destination
Backup and simulcast backup pair	Connect both channels to the same matrix and destination
Dual channel pair	Connect channel A main input and channel B main input to separate matrix destinations
Dual live channels	Connect channel A main input and channel A secondary input to separate matrix destinations
Dual live simulcast	Connect channel A/B main input and channel A/B secondary input to separate matrix destinations. TXPlay 2 controls which input to use at any given time.
Backups of dual channels or dual live channels.	Connect each backup to the same matrix and destination as their main channel (e.g. channel A backup should be routed to the same matrix destination as channel A).

5 Click **Save**.

6 If the channel type includes Fill & Key inputs, then configure the Fill & Key sources for each channel using the Fill & Key Plugin in the iTX Desktop. See Assigning Fill & Key Sources to a Channel on page 57.

7 Now configure the output for each channel from the iTX Desktop. See Assigning Matrix Sources to Channel Outputs on page 58.

Assigning IP Routing Matrix Destinations to Channel Inputs

Using the I/O Device Controller on the playout server, you must assign one or more destinations from the IP Router Matrix to each input channel.

The IP Routing tab on the I/O Device Controller provides a collapsible section for each of the device's input channels as determined by the Playout Type you selected in the TxPlay 2 Config.

Playout Type	Inputs
Single Channel (including 4K and 4K 2SI)	• Channel A
Dual Channel	• Channel A • Channel B
Simulcast	• Channel A/B
Dual Live	• Channel A • Channel A

The connection name and IP address of the available network adapter's connections is automatically detected and displayed.

To assign an IP Routing Matrix destination to the channel input on the playout server:

1. On the server running the Output Server 2 system, maximize the **I/O Device Controller** service.
2. Select the **Configuration** > **IP** tab.
3. In the input channel's panel (e.g. Channel A, Channel B or Channel A/B), click the Show/Hide button to display the channel's current IP Input assignments.
4. Click the **Add new IP Input** button and a new `IP-INPUT-#` line is added.
5. From the **Matrix** drop-down list, select **IP Matrix**.
6. Click the **Destination** button.
7. From the **Select Destination** window, select the destination from the IP Router Matrix that you would like to be delivered to the channel's input.
8. Click **OK** and the destination name is added to the channel's IP-Input's Destination text box.
9. Optional: Repeat step 4 to step 8 to add addition inputs to the streaming network adapter.
10. Click **Save**.

Assigning Fill & Key Sources to a Channel

As well as configuring the matrix router Fill & Key destinations from I/O Device Controller, you must assign the Fill & Key sources to the channel. This is performed in iTX Desktop, from the Channel Config pop-up on the Engineering layout.

To assign Fill & Key sources to the channel:

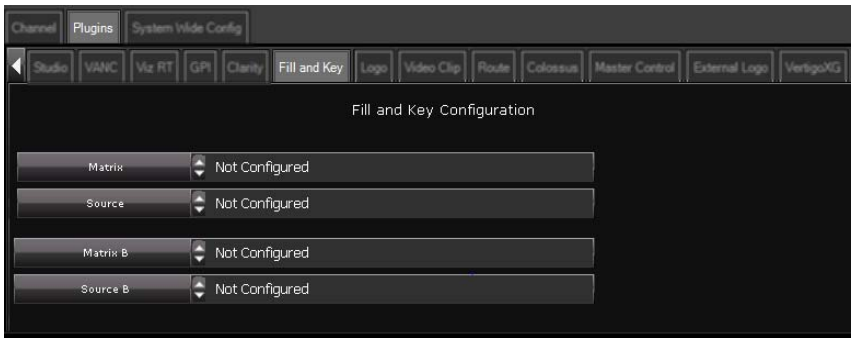
1. Start the iTX Desktop on a client PC and login with an Administrator profile.
2. Open the **Engineering** layout.
3. Click **Channel Config**.

The **Channel Config** pop-up layout appears.

4 From the **View** list, select the view with the channels to be configured.

5 Select a TXPlay channel to configure.

6 Click the **Plugins** tab and then the **Fill & Key** tab.



7 From the **Matrix** field, select the matrix router with the required Fill & Key source inputs.

8 From the **Source** field, select the paired source comprised of the Fill & Key signals.

9 If your channel is configured as a **Dual Fill & Key** playout type, then set the **Matrix B** and **Source B** fields. Otherwise leave these fields set to **Not Configured**.

10 Click **Save** and then **Close**.

Assigning Matrix Sources to Channel Outputs

As well as configuring the matrix router destinations from I/O Device Controller, you must assign the matrix router sources to channel outputs. This is performed in iTX Desktop, from the Channel Config pop-up on the Engineering layout.

To assign matrix sources to channel outputs:

1 Start the iTX Desktop on a client PC and login with an Administrator profile.

2 Open the **Engineering** layout.

3 Click **Channel Config**.

The **Channel Config** pop-up layout appears.

4 From the **View** list, select the view with the channels to be configured.

5 Select a TXPlay channel to configure.

6 Click the **Channel Config 3** tab, which contains the Routing panel.

7 From the **Matrix** field, select the matrix router (or router bridge) with the required source inputs.

This must be the router to which the transmission system receiving the channel output is connected and is typically the same matrix that is configured in the Router Configuration panel of the I/O Device Controller.

8 From the **Channel Output** field, select the router source input the channel output is fed into.

9 From the **Channel Output 2** field, select any router source input you want to monitor.

This option is useful for monitoring a live video signal for a pass-through channel that is being fed into a separate playout/ingest server.

10 Click **Save** and then **Close**.

Selecting the Default Live Asset for the Channel

Where a fixed router source is used for a number of different live assets that are unknown to iTX, a default live asset can be substituted in each case without changing the unique names of the original live assets. This is performed in iTX Desktop, from the Channel Config pop-up on the Engineering layout.

To select the default live asset for the channel:

1 Start the iTX Desktop on a client PC and login with an Administrator profile.
2 Open the **Engineering** layout.
3 Click **Channel Config**.

The **Channel Config** pop-up layout appears.

4 From the **View** list, select the view with the channels to be configured.
5 Select a channel to configure.
6 Click the **Channel Config 3** tab, which contains the Routing panel.
7 Click the **Default Live Asset** button and use Pinpoint to perform a Live Event search.
8 From the search results, select the name of the default live asset and click OK.
9 Click **Save** and then **Close**.

Configuring the Channel Communication Setup

In iTX Desktop you need to define the channel communication setup. This is critical for TXPlay2 to be able to identify its on air status.

As well as stating which channels are in a main/backup, simulcast or regional setup, the way in which the channels are routed is also critical to the configuration. This then allows a channel to be failed over using a downstream device equipped with a Grass Valley HCO change-over card. The way in which a pair of channels are configured depends on the channel types (i.e. the configuration for a simulcast channel is different to that for a dual live channel).

The communication setup is performed using the following options on the Channel Config pop-up, on the Engineering panel:

- Matrix selection field in the Routing section
- Channel Destination selection field in the Routing section
- Channel Output selection field in the Routing section

To configure the channel communication setup for a channel:

1 Start the iTX Desktop on a client PC and login with an Administrator profile.
2 Open the **Engineering** layout.
3 Click **Channel Config**.

The **Channel Config** pop-up layout appears.

4 From the **View** list, select the view with the channels to be configured.

5 Select a TXPlay channel to configure.

6 Click the **Channel Config 3** tab.

7 From the **Matrix** field, select the matrix router (or router bridge) with the required sources and destinations.

This must be the router to which the transmission system receiving the channel output is connected and is typically the same matrix as was configured in the Router Configuration panel of the I/O Device Controller.

8 From the **Channel Destination** field, select an output on the matrix router that delivers the output of the main channel. This typically matches the destination that was configured in I/O Device Controller.

The table below describes how different channel types and pairings should be routed.

Channel types	Channel destination
Main and backup pair	Route both channels to the same matrix and destination
Simulcast and simulcast backup pair	Route both channels to the same matrix and destination
Main and simulcast pair	Route both channels to the same matrix, but to different destinations
Regional/Sub channels	Each regional/sub channel should be set with an independent channel destination.
Regional/sub and regional/sub backup pair	Route both channels to the same matrix and destination
Dual live channels	Route to the matrix and destination specified in I/O device Controller.

9 For a main/backup setup, use the **Channel Output** to select the router input the channel output is fed into.

10 Click **Save** and then **Close.**

About Event Substitution Rules for Simulcast Channels

When using a simulcast channel, you can define a rule to determine when logo, CG and stills events scheduled on the main channel are substituted on the simulcast channel. For example, so that 4K or HD branded logos can used on higher resolution channels, without them appearing on the lower resolution simulcast channel. Only one rule can be defined for each simulcast pair and it is applied to all matching assets.

Substitutions are defined on the Simulcast Channel Config panel by the suffix of the higher resolution asset name, the suffix of the lower resolution asset name or both. For example, if `_HD` is entered into the **Original Suffix** field and `_SD` is entered into the **Substitution** field,

an asset called `iTX-Logo_HD` would be substituted for a file called `iTX-Logo_SD` before playing out on the simulcast channel.

Note:
- If Logo or CG are selected for substitution, live logos and live captions are also be subject to the same replacement rules.
- Both the original and the substitution assets must be available on the media store for the substitutions to take place.
- If you are operating a simulcast backup channel, you must apply the same substitution rules on the simulcast backup channel as its simulcast channel it is paired with.

Cascading Logo Replacement Rules

On playout, if a scheduled logo is defined in the **Logo Setup** plugin it will be substituted for its replacement before going to air.

If you are running a Simulcast channel and the replacement logo then meets the criteria defined in the **Simulcast Replacement Rules**, a further replacement will be performed.

This provides two levels of control for logo replacement, as illustrated by Figure 6-2.

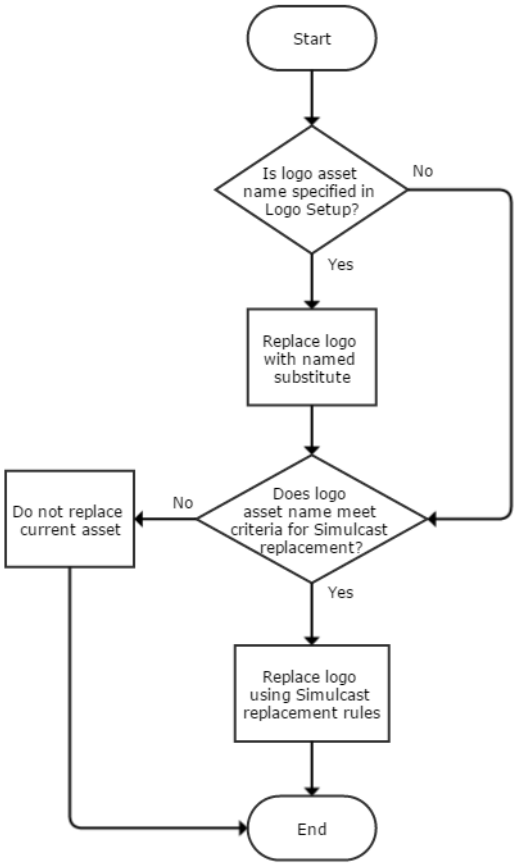


Fig. 6-2: How logo replacement rules cascade in iTX Desktop

For more information about logo replacement using the Logo Setup configuration, see the *iTX System Administration Guide*.

Defining an Event Substitution Rule for a Simulcast Channel

IMPORTANT
The required assets must be prepared with the appropriate suffixes prior to being scheduled.

To define an event substitution rule:

1. Open the iTX Desktop and click the **Engineering** layout.
2. Click **Channel Config**.

   The **Channel Config** pop-up layout appears.
3. From the **View** list, select the view containing the channels to be configured. The channels associated with that view appear.
4. Click the name of the channel to be configured.
5. Click the **Simulcast Channel Config** tab.
6. In the **Original Suffix** field, enter the characters used to identify the higher resolution events. For example, for a HD/SD pair, enter `_HD`, while for a 4K/HD pair, enter `_4K`.
7. In the **Substitution** field, enter the characters used to identify the lower resolution events. For example, for a HD/SD pair, enter `_SD`, while for a 4K/HD pair, enter `_HD`.
8. As you type in the **Original Suffix** or **Substitution** fields, the **For Example** text updates to demonstrate how the rules will be applied. For example:

Original Suffix text	Substitution text	For example text
(None)	(None)	`AssetName` *`Keep as`* `AssetName`
(None)	`_SD`	`AssetName` *`Append to Make`* `AssetName_SD`
`_HD`	(None)	`AssetName_HD` *`Remove to Make`* `AssetName`
`_HD`	`_SD`	`AssetName_HD` *`Replace with`* `AssetName_SD`

9. From the **Available Plugins** list, select which event types you want to substitute, then click >> to add them to the **Selected Plugins** list.
10. Click **Save**.

About GPI Devices and Simulcast Setups

As simulcast channels follow the Channel Controller's schedule and commands (including GPI commands), there is no requirement to configure GPI devices for simulcast or simulcast backup channels.

7 Configuring Channel Playout

There are essential configuration steps that must be followed for your channels to playout as expected. This includes the selecting the reference source and frame rate family, selecting the channel resolution, configuring timecode and Active Format Description settings, configuring the output target parameters and adjusting the channel timing and delay.

> Note: Some of the following configuration only applies to SDI output targets and some only applies to IP output targets. Where configuration is specific to an output target it is stipulated in the heading.

Summary

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Selecting the Channel Resolution and Frame Rate *64*
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Configuring SDI Timecode Settings (VITC, ATC, LTC, DVITC) *66*
Configuring SDI Active Format Description Insertion Lines *67*
Configuring Output Branding Levels for SDI and IP Output Targets *67*
Configuring IP Output Target Parameters *68*
Adjusting SDI Output Timing *72*

Setting an SDI Reference Source and Frame Rate Family

If you are using an SDI video/audio I/O card, before configuring Output Server 2 you should confirm your I/O Device Controller has the correct reference source and, if required, frame rate family. You set the reference source and frame rate family from the **Configuration** > **SDI** tab of the I/O Device Controller user interface.

> Note: The Reference and Frame Rate Family for the channel must be specified from the I/O Device Controller user interface *before* a Resolution can be selected in the Channel tab of the Output Server 2 user interface.

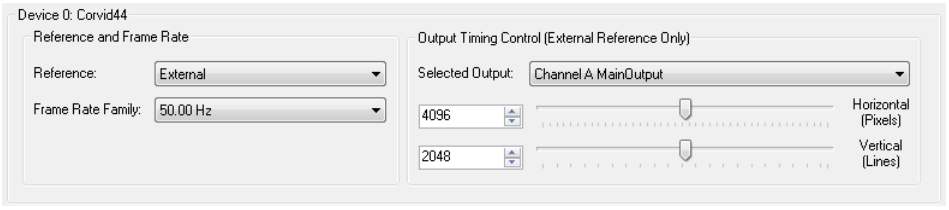
To set the reference source and frame rate family:

1. On the playout server running the Output Server 2 system, expand the **I/O Device Controller**.

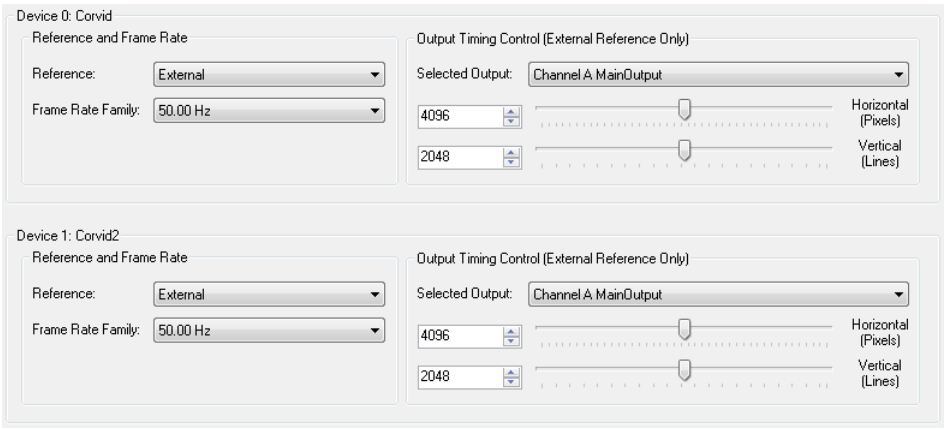
   The I/O Device Controller user interface appears.

2. Select the **Configuration** > **SDI** tab.

   The SDI configuration panel appears:



If your playout server is equipped with dual Corvid LP video/audio I/O cards, there is a separate Reference, Frame Rate and Output Timing Control section for each card:



3 If you are using an external reference input:
   a From the **Reference** drop-down list, select `External`.
   When the external reference input is connected to your video/audio I/O card, the frame rate family is locked to that of the reference.
   b Continue with Configuring IP Output Target Parameters, on page 68.
4 If you do not have an external reference:
   a From the **Reference** drop-down list, select `Freerun`.
   b From the **Frame Rate Family** drop-down list, select a frame rate (e.g. `50.00 Hz`).
   This determines the resolution you can set in the **Channel** tab of the Output Server 2 **Configuration** user interface. See Selecting the Channel Resolution and Frame Rate on page 64 for more information.
5 Click **Save** to store your changes.

Selecting the Channel Resolution and Frame Rate

The resolution and frame rate for a channel is configured from the **Channel** tab of the Output Server 2 user interface.

> Note: If you are *not* using an external reference input on your video/audio I/O card, you must set the Reference to `Free Run` and an appropriate Frame Rate Family for the playout server. Without a reference and frame rate family, the Output Server 2 service starts up in an error state. See Viewing the Output Server 2 Engineering Panel on page 138.

To configure the Resolution and Frame Rate for an Output Server 2 channel:

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

2 Go to **Configuration** > **Channel** tab.

The channel configuration options appear. The **Resolution** and **Frame Rate** controls are on the top left of the window.

3 The **Frame Rate** setting is determined by the **Frame Rate Family** setting I/O Device Controller configuration and cannot be changed from the Output Server 2 user interface.

4 Specify the **Resolution** for the channel using the drop-down list. For example, 1080p 59.95Hz for NTSC full HD or 4K(QFHD) 59.94 for NTSC 4K).

Note that the frame rates referenced within the Resolution settings are determined by the **Frame Rate Family** setting I/O Device Controller configuration.

5 If the Resolution setting is set to an SD resolution (525 or 625), then the **SD Aspect Ratio** setting is added to the **Channel** tab with a default value of 4x3.

The SD Aspect Ratio setting allows you to override the SD aspect ratio for compressed output when the channel's Output Target is set to either IP2022-2, RTMP, HLS or the channel is configured for secondary record.

- Select **4x3** if you want the picture aspect ration of your output to be 4x3. 4x3 clips will be played as-is and 16x9 clips will have a letterbox.
- Select **16x9** if you want the picture aspect ratio of your output to be 16x9. 16x9 clips will be played as-is and 4x3 clips will have a pillarbox.

6 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring Channel Delay

A channel delay may be needed to adjust the output timing for transitions, such as when switching the output of a national channel into and out of regional sub-channels. For accurate transitions, the internal processing may need adjusting to take account of the throughput time of a live source.

To configure the channel delay for an Output Server 2 channel:

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

2 Go to **Configuration** > **Channel** tab.

3 In the **Channel Delay (sec:ms)** field**,** enter a value in seconds and milliseconds or use the spinner button.

4 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring SDI Timecode Settings (VITC, ATC, LTC, DVITC)

So that media can be identified, synchronized and edited, timecodes are added to the ancillary data space of the television signal as media metadata. The way that timecodes are encoded and processed is different for SD and HD media and there are several formats, both current and legacy, for encoding timecodes.

iTX supports VITC (Vertical Interval Timecode) times for SD media and ATC (ancillary timecode) timecodes for HD media. Both are configured from the **Channel** tab of the Output Server 2 user interface.

To configure timecode settings for an Output Server 2 channel:

1. On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

   The Output Server 2 user interface appears.
2. Go to **Configuration** > **Channel** tab.

   The channel configuration options appear in the upper portion.
3. Expand the **VANC** heading to expose the timecode options.
4. If the channel broadcasts SD content and you are using a VITC (Vertical Interval Timecode) generator, select the line numbers to use for VITC timecodes.
   a. For **SD VITC Detection Line**, select the line number to indicate the presence of timecode information to downstream devices.
   b. For **SD VITC Insertion Line**, select the line number on which the timecode information is placed.
5. If the channel broadcasts HD content, for **HD ATC Source Type**, use the drop-down list to select the source input for ancillary timecodes. The options are:
   - `LTC` for linear timecode sources.
   - `DVITC` for Digital Vertical Interval Timecode sources.
6. The **HD ATC Output Type** field defaults to `LTC+DVITC`. Currently, this is the only available setting.
7. The **Time Code Mode** field is used in conjunction with the **Timecode Source** setting on the iTX Desktop's Channel Config 4 page. The **Timecode Source** setting determines if and how the Vertical Interval Timecode is inserted into media being played out on the channel. See the *iTX System Adminstrator Guide* for more information.

   The **Time Code Mode** field allows you to choose whether the time code should continue incrementing when the end of the primary event is reached.
   - **Clip**: Specifies that the time code will stop when the last frame of the video clip is reached. For live events, the time code stops when the end of the live event is reached, even though the live event continues to play out. Clip is the default setting.
   - **Continuous**: Specifies that the time code will continue increment even when frozen on the last frame of the video clip. For live events, the time code will continue to increment.

8 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring SDI Active Format Description Insertion Lines

Information about what area of a 16:9 HD video image should be preserved when it is downscaled to 4:3 SD is defined by Active Format Description (AFD) codes. These AFD codes are carried in the baseband signal coming into the video/audio I/O card and then interpreted by viewers' televisions and set top boxes to display the required frame for each item in the schedule. The standards for AFD are defined by the Society of Motion Picture and Television Engineers (SMPTE) and Output Server 2 supports SMPTE Standards 2016 and RP186 AFD codes.

You configure the lines on which AFD codes are inserted for each SMPTE standard from the **Channel** tab of the Output Server 2 user interface.

To configure AFD insertion lines for an Output Server 2 channel:

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

2 Go to **Configuration** > **Channel** tab.

The channel configuration options appear.

The channel configuration options appear in the upper portion.

3 Expand the **VANC** heading to expose the AFD options.

4 The values for the AFD insertion lines are determined by the selected **Resolution**. The default is typically the switch line +2 for all formats.

To change the default values, enter the new values into the following fields:

- **AFD S2016 Insertion Line**
- **AFD RP186 Insertion Line**

5 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring Output Branding Levels for SDI and IP Output Targets

Each output target (SDI main, SDI secondary, and IP) can be assigned an output branding level to determine the types of secondary events that can be included/excluded from the output. For example, one output target may be configured **Clean**, which will exclude any logos or voice overs, while another output may be set to **Complete** and include all branding.

Note that logos and CGs are rendered on top of any XG Inside branding.

To set the output target's branding level:

1 On the playout server, expand the instance of Output Server 2 for the channel to be configured (e.g. `iTX1 Output Server 2`).

2 Select the **Configuration** > **Channel** tab.

The channel configuration options appear.

3 Select the **Output 1** or **Output 2** sub-tab.

4 From the **Main Output Branding Level** drop-down list, select a branding level:

- **Clean**: Includes the primary event, DVEs and PIPs. Excludes logos, CGs or voice-overs.
- **XG**: Includes all items in the *Clean* level, and adds XG rendering.
- **Logo**: Includes all items in the *XG* level, and adds iTX logos and CGs .
- **Voice Over**: Includes all items in the *Logo* level, and adds voice overs.
- **Complete**: Includes all secondary events and open subtitles.

5 If the **Secondary Output Branding level** field appears, set the branding level for the secondary SDI output.
Note that this field only appears if the playout server's **video/audio I/O card** supports a secondary SDI output (refer to I/O Device Controller's Engineering tab).

6 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring IP Output Target Parameters

If you selected **IP 2022-2, IP 2022-6, HLS or RTMP** as either of the channel's Output targets, you must set the channel's IP parameters, which determine the encoding characteristics for IP playout.

Configuring the IP 2022-2 output target parameters

If you set one of the output targets (**Output 1** or **Output 2** fields) on the iTX Channel Config dialog (TXPlay2 Config) to **IP 2022-2**, then you must complete the following procedure to set the IP output target's parameters.

To configure the IP 2022-2 output target parameters:

1 On the playout server, expand the instance of Output Server 2 for the channel to be configured (e.g. `iTX1 Output Server 2`).

2 Select the **Configuration** > **Channel** tab.

The channel configuration options appear.

3 Select the **Output 1** or **Output 2** sub-tab associated with 2022-2.

4 If you have not done so already, set the output branding level. See Configuring Output Branding Levels for SDI and IP Output Targets, on page 67.

5 (optional) Enable **SAP Announcement** if you want the Output Server 2 to broadcast to downstream equipment Session Announcement Protocol (SAP) messages containing information about the stream it is generating.

6 From the **Preset** drop-down list, select an IP output preset.

If the desired preset is not displayed in the **Preset** drop-down list, click the Browse **(...)** button and then **Import** to locate and import a preset.

7 Specify the **Video Codec** and complete its settings:

a From the **Video Codec** drop-down list, select either **MPEG2**, **AVC** or **x264**.

b Click the Browse **(...)** button next to the **Video Codec** drop-down list.

c In the **General** section of the codec's settings dialog, complete the following setting:

- **Quality**: Select the desired output image quality level. Higher quality requires more CPU time.
- **Profile** and **Level**: Set the maximum image resolution and encoding bitrate possible. Refer to the H.262 and H.264 encoding standards.
- **Bitrate (kbits/s)**: Displays the constant bitrate to allocate to the video portion of the transport stream. Variable bitrate mode is not supported. Values are expressed in kilobits per second. Note that 1 kilobit = 1000 bits.

d Expand the **Advanced** heading and complete the remaining settings according to the codec's standards.

e Click **OK** to close the codec's settings dialog.

8 In the **Video PID** field, set a value to define the Packed Identifier of the channel in the output IP transport stream. Valid PID numbers range from 32 to 8186 and must be unique across a given IP output target.

9 Expand the **Destination** heading and set the following parameters:

- **IP Protocol**: Select **rtp** or **udp**.

  Note that **rtp** brings error correction on the IP communication link at the cost of some more bandwidth.
- **Address**: Specify the IP address of the destination for the IP stream (playout server).
- **Port**: Specify the port number of the playout server.
- **Sending Interface**: Specify the IP address of the network adapter carrying the IP stream.
- **TTL**: The time-to-live (TTL) is the number of hops that a packet is permitted to travel before being discarded by a router. This setting is read-only and defaults to 32.

10 Expand the **Transport Stream** heading and set the following parameters:

- **Combined kbps**: Specify the total constant bit rate bandwidth in kilobits per second allocated for the transport of audio, video and control structures of the IP Transport Stream. Set this value to your desired bandwidth.

  Note that 1 kilobit is defined as 1000 bits. The default value is 10000 kbps (or 10 megabits per second) and the maximum value is 50000 kbps.
- **PAT Rate (per sec)**: Specify how many Program Association Tables per second to transmit.
- **PMT Rate (per sec)**: Specify how many Program Map Tables per second to transmit.
- **PMT PID**: Specify the Packed Identifier to associate with the PMT. Valid PID numbers range from 32 to 8186 and must be unique across a given IP output target.
- **PCR Spacing (ms)**: Specify the interval in milliseconds between transmissions of a Program Clock Reference.
- **PCR on Every PES Packet**: Check this option to transmit a PCR on every elementary stream packet.

11 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Configuring the IP 2022-6 output target parameters

If you set one of the output targets (**Output 1** or **Output 2** fields) on the iTX Channel Config dialog (TXPlay2 Config) to **IP 2022-6**, then you must complete the following procedure to set the IP output target's parameters.

To configure the IP 2022-6 output target parameters:

1 On the playout server, expand the instance of Output Server 2 for the channel to be configured (e.g. `iTX1 Output Server 2`).

2 Select the **Configuration** > **Channel** tab.

The channel configuration options appear.

3 Select the **Output 1** or **Output 2** sub-tab associated with 2022-6.

4 If you have not done so already, set the output branding level. See Configuring Output Branding Levels for SDI and IP Output Targets, on page 67.

5 (optional) Enable **SAP Announcement** if you want the Output Server 2 to broadcast to downstream equipment Session Announcement Protocol (SAP) messages containing information about the stream it is generating.

6 (optional) In the **Timing Offset** field, set an adjustment value in microseconds against the SMPTE-2059 timings.

7 Expand the **Destination** heading and set the following parameters:

- **IP Protocol**: This parameter read-only and is set to **rtp**.
- **Address**: Specify the IP address of the destination for the IP stream (playout server).
- **Port**: Specify the port number of the playout server.
- **Sending Interface**: Specify the IP address of the network adapter carrying the IP stream.
- **TTL**: The time-to-live (TTL) is the number of hops that a packet is permitted to travel before being discarded by a router. This setting is read-only and defaults to 32.

8 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Configuring the Http Live Streaming (HLS) output target parameters

If you set one of the output targets (**Output 1** or **Output 2** fields) on the iTX Channel Config dialog (TXPlay2 Config) to **Http Live Streaming (HLS)**, then you must complete the following procedure to set the IP output target's parameters.

To configure the Http Live Streaming (HLS) output target parameters:

1 On the playout server, expand the instance of Output Server 2 for the channel to be configured (e.g. `iTX1 Output Server 2`).

2 Select the **Configuration** > **Channel** tab.

The channel configuration options appear.

3 Select the **Output 1** or **Output 2** sub-tab associated with HLS

4 If you have not done so already, set the output branding level. See Configuring Output Branding Levels for SDI and IP Output Targets, on page 67.

5 Specify the **Video Codec** and complete its settings:
   a From the **Video Codec** drop-down list, select either **AVC** or **x264**.
   b Click the Browse **(...)** button next to the **Video Codec** drop-down list.
   c In the **General** section of the codec's settings dialog, complete the following setting:
      - **Quality**: Select the desired output image quality level. Higher quality requires more CPU time.
      - **Profile** and **Level**: Set the maximum image resolution and encoding bitrate possible. Refer to the H.262 and H.264 encoding standards.
      - **Bitrate (kbits/s)**: Displays the constant bitrate to allocate to the video portion of the transport stream. Variable bitrate mode is not supported. Values are expressed in kilobits per second. Note that 1 kilobit = 1000 bits.
   d Expand the **Advanced** heading and complete the remaining settings according to the codec's standards.
   e Click **OK** to close the codec's settings dialog.
6 Expand the **Destination** heading and set the following parameters:
   - **Master Playlist File Name**: The local path where iTX saves the .M3U8 playlist file.
   - **Segment Duration (Sec)**: Specifies the length of each individual segment files.
   - **Max files in Playlist**: Specifies the number of segment files that will be kept on disk before being deleted.
7 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Configuring the Real-time Messaging Protocol (RTMP) output target parameters

If you set one of the output targets (**Output 1** or **Output 2** fields) on the iTX Channel Config dialog (TXPlay2 Config) to **Real-time Messaging Protocol (RTMP)**, then you must complete the following procedure to set the IP output target's parameters.

To configure the Real-time Messaging Protocol (RTMP) output target parameters:

1 On the playout server, expand the instance of Output Server 2 for the channel to be configured (e.g. `iTX1 Output Server 2`).
2 Select the **Configuration** > **Channel** tab.
   The channel configuration options appear.
3 Select the **Output 1** or **Output 2** sub-tab associated with RTMP
4 If you have not done so already, set the output branding level. See Configuring Output Branding Levels for SDI and IP Output Targets, on page 67.
5 Specify the **Video Codec** and complete its settings:
   a From the **Video Codec** drop-down list, select either **AVC** or **x264**.
   b Click the Browse **(...)** button next to the **Video Codec** drop-down list.
   c In the **General** section of the codec's settings dialog, complete the following setting:
      - **Quality**: Select the desired output image quality level. Higher quality requires more CPU time.

- **Profile** and **Level**: Set the maximum image resolution and encoding bitrate possible. Refer to the H.262 and H.264 encoding standards.
- **Bitrate (kbits/s)**: Displays the constant bitrate to allocate to the video portion of the transport stream. Variable bitrate mode is not supported. Values are expressed in kilobits per second. Note that 1 kilobit = 1000 bits.

d Expand the **Advanced** heading and complete the remaining settings according to the codec's standards.

e Click **OK** to close the codec's settings dialog.

6 Expand the **Destination** heading and set the following parameters:

- **RTMP Destination**: The endpoint at the streaming facility that will receive the RTMP stream.
- **Auto Retry Count**: The number of times iTX will try to reconnect to the server before actually failing.

7 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Adjusting SDI Output Timing

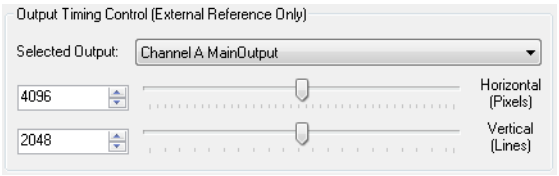
If you are using an external reference input into your SDI video/audio I/O card, but the video input signal and time reference signal are not synchronized, you can compensate by adjusting the horizontal and vertical output timing for each output on the video/audio I/O card(s). This is done using the controls in the **Output Timing Control (Ext. Ref. Only)** section and monitoring the results on a waveform analyzer.

To adjust the output timing:

1 On the playout server running the Output Server 2 system, expand the **I/O Device Controller**. The I/O Device Controller user interface appears.

2 Click the **Configuration** > **SDI** tab.

The SDI configuration panel appears, with a set of output timing controls for each I/O device in the playout server:



3 Click **Selected Output** and select the output to be adjusted (either A or B).

4 To set the horizontal output timing value in pixels, enter a value into the box or use the slider on the **Horizontal (Pixels)** field.

5 To set the vertical output timing value in lines, enter a value into the box or use the slider on the **Vertical (Lines)** field.

6 Use a waveform analyzer to ensure the signals are synchronized,

7 Repeat step 3 to step 6 for each output on the playout server.

For example, for a Corvid 44 in simulcast mode, set the timing for outputs A and B. For a dual Corvid LP system in dual channel mode, set Corvid 1 output A and Corvid 2 output A.

8 Click **Save** to store your changes.

8 Configuring Audio Output

For audio in video and voice over media, Output Server 2 allows you to configure the output channels, Dolby metadata, audio watermarking, upmixing to Dolby 5.1 and 7.1, ALC Profile, voice over handling and audio mapping rules for individual audio programs, then assign those audio programs to audio program output groups as required.

For live assets, this configuration has to be performed within iTX Desktop, from the property editor in the Asset layout.

Note:
- When using logical audio programs, the Audio Mapping configuration panel in iTX Desktop's Channel Config 4 layout can be ignored.

Summary

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About Default Audio Program Configurations

When you access the Audio tab for the first time it includes an initial audio program. How this initial audio program is configured depends on whether the instance of Output Server 2 is for a new channel or an existing channel that has been upgraded to iTX v2.8 or later, as well as which audio features you have licensed:

- For a new channel, an audio program called `Default` is created, with the following details:
  - The **Preferred Rule** cell contains a `P#1` audio label only.
  - The **Alternate Rule** cell is empty.
  - The **Apply VO** field is checked.
  - The **Dolby** metadata is configured with basic default settings for stereo output.
  - No upmixing is configured.
  - No audio watermark is defined.

  - Automatic Loudness Control (**ALC**) is set to the Default profile.
  - The **Output Channels** is set to `Stereo`
- For an existing channel:
  - The existing audio configuration (output channels, Dolby metadata, watermarking and upmixing) is converted into audio programs, with names derived from the previous configuration.
  - The **Apply VO** field is checked for the first audio program to be assigned to the first output group.

> IMPORTANT
> The following audio features require separate licenses:
> - Dolby metadata
> - Audio watermarking (Nielsen and Kantar Snap)
> - Voice overs
>
> If your playout server is not licensed to use one of these features, the corresponding user interface will be hidden and the functionality disabled.
> See License Requirements on page 16

Creating an Audio Program

Although Output Server 2 provides default and converted audio programs, you should create additional audio programs to support your required combinations of audio configuration, outputs, encoding and mapping rules.

For example, you may want to have English audio that plays out with the same mapping rules for both stereo and Dolby surround 5.1 outputs. In which case, you should create two separate audio programs, then configure them according to these requirements. Each audio program can then be assigned to separate audio output program groups or they could both be applied to a single Dolby E audio output program group (fulfilling the 5.1+2 criteria of Dolby E).

To create a blank audio program entry:

1 Open the Output Server 2 user interface:

   a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

   The Output Server 2 user interface appears.

   b Go to **Configuration** > **Audio** tab.

   The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, click on the blank cell in the **Name** column.

   The word `Name` appears in the cell.

3 Replace the word `Name` with a name to identify the audio program (e.g. `English5.1` for an English audio program in Dolby surround 5.1) and press **Enter**.

   The cell displays the new name and a new blank row appears below.

4 You should now select the output channels for your audio programs. See Selecting the Audio Output Channels on page 75.

   Alternatively, click **Save** to store your changes and automatically reboot the Output Server 2 service.

Selecting the Audio Output Channels

Audio programs can be configured to output as mono, stereo, Dolby surround 5.1 or Dolby surround Plus 7.1 channels. The audio output channel type you select for an audio program affects the following aspects of the audio configuration:

- How Dolby metadata is configured, for example which audio coding modes can be selected.
- If you select a surround output channel, you should also configure the upmixing from mono and stereo.
- If you have stereo voice overs and surround outputs, you will need to select how they are mapped.
- Your selected audio output channels dictates to which audio output program groups the audio program can be assigned.

To the output channels for an audio program:

1 Open the Output Server 2 user interface:

   a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

   The Output Server 2 user interface appears.

   b Go to **Configuration** > **Audio** tab.

   The Audio Programs and Audio Output Program Groups panels appear.

2 Click on the **Output Channels** drop down box for an audio program and select one of the following options:

   - `Mono`
   - `Stereo`
   - `5.1`
   - `7.1`

   Note: If you change the default output channel, a pop-up message appears asking if you would like to change the Dolby configuration to defaults that are appropriate for the output type.
   Click **Yes** to change your Dolby configuration to sensible defaults or **No** to leave the Dolby configuration as is.

3 You should now define the mapping rules for your audio programs. See Defining Audio Mapping Rules for Audio Programs on page 75.

   Alternatively, click **Save** to store your changes and automatically reboot the Output Server 2 service.

Defining Audio Mapping Rules for Audio Programs

Within the Output Server 2 user interface, you can define audio mapping rules to control the order of preference for which the audio channels from the media file are assigned to the given audio program.

Mapping rules for audio programs are created by assigning audio labels to the audio programs' **Preferred Rules** and **Alternate Rules** columns. The order of the labels in these columns

determines the order in which iTX attempts to map on playout. For example, the first label (from the left) is the first one iTX attempts to map on playout, then the second label on the left, then the third and so on. On playout, operators can quickly see which events have had their audio mapped by the color and state of the Audio Mapping icon in the iTX Desktop's schedule grid. See Monitoring the Audio Mapping status of scheduled video or live events on page 121.

The **Alternate Rules** column defines the audio labels that will be used if there are no matches within the Preferred Rules. If the match for a given clip is for a label with the Alternate Rule column, then a warning is produced to alert the operator. For example, a German broadcaster may set their Alternate label options to be ENG & ENG 5.1, as these will provide English language audio on the video/live outputs. When a match is made on either of these labels, the Audio Status icon in the Audio Mapping column alerts the operator of this alternative match. The operator may then need to perform an action, like ingest or assign subtitles or re-ingest the media with German language audio. See Monitoring the Audio Mapping status of scheduled video or live events on page 121.

Note: When defining mapping rules for audio programs consider the following points:

- The audio programs labels that appear in the Audio configuration tab of Output Server 2 are extracted from media that has been registered in the Opus database, either on import or following an update by the Asset Fixer service. Therefore you must prepare your media before configuring audio mapping rules. See Preparing for Logical Audio Programs on page 19.
- If you are going to create an audio output group with RAW encoding, you must create an audio program with unique audio labels that are not assigned to any other audio programs.
- Only create as many audio programs as you need to populate the output groups you create. You cannot have unassigned audio programs in your Output Server 2 configuration.
- If the output from your server is going to a downstream device, you may want iTX to play out silence when no matching label can be found in the media. This can be done by adding a Silence label to the end of your rule. If no Silence label is applied to a rule, when no matching label can be found in the media, iTX Desktop will display a warning to the operator. See See Monitoring the Audio Mapping status of scheduled video or live events on page 121.

To define the audio mapping rule for an audio program:

1 Open the Output Server 2 user interface:

   a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

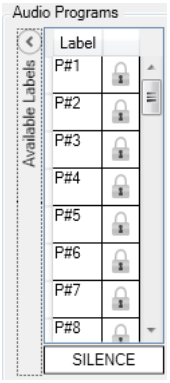
   The Output Server 2 user interface appears.

   b Go to **Configuration** > **Audio** tab.

   The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, click **Available Labels**.

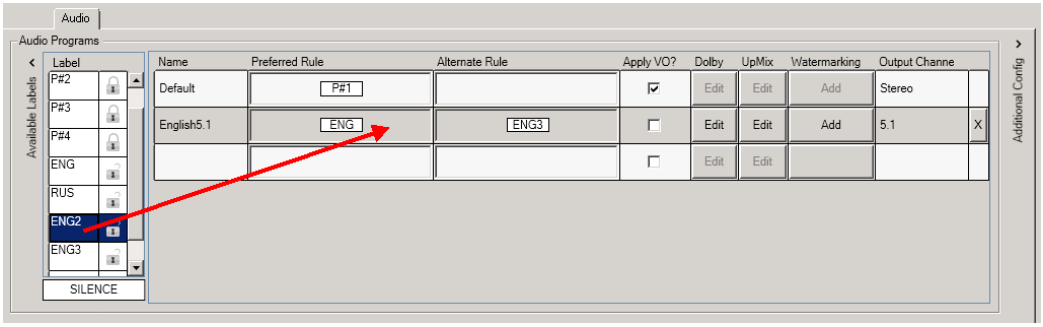
The list of labels expands, as shown below:



Note: If a required label is not displayed, you can add a new label to the system by entering a label name in an empty cell at the bottom of this Available Labels list, or by opening the iTX Desktop's Configuration layout and using the Configure Labels functionality (see Creating Labels and Audio Import Rules for Logical Audio Programs, on page 20).

3 In the **Label** column, select a label you want to use in the rule.

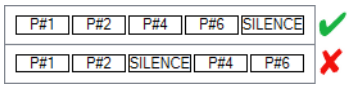
4 Drag and drop the selected label into the blank cell in the **Preferred Rule** column of an audio program.



5 Repeat step 3 and step 4 to add additional labels to the **Preferred Rule** cell in the order of preference (from left to right).

6 If silence is required when no matching audio label is found, drag the `SILENCE` label from the bottom of the **Available Labels** list and add it to the end of your Preferred Rule.

IMPORTANT
The `SILENCE` label should only be added to the end of the rule (last item on the right). If `SILENCE` is listed before an audio program label, that label will never be matched on play out.
In the examples below, the first rule is acceptable, but on the second rule audio with the labels `P#4` and `P#6` would never be matched, because the `Silence` label is before them in the rule.



7 Repeat step 3, step 4 and step 5, but add labels to the **Alternate Rule** cell.

8 You should now select if you want to apply voice overs to your audio programs. See Configuring Dolby Metadata on page 78.

Alternatively, click **Save** to store your changes and automatically reboot the Output Server 2 service.

Configuring Dolby Metadata

You can configure the Dolby metadata for each audio program you have defined by clicking the **Edit** button in the **Dolby** column. This displays a **Dolby Metadata** popup, where you can set specific values for each parameter and set a resolution rule.

Note: Dolby metadata configuration is a licensed feature. If your playout server does not have the required license the Dolby button will not be visible on your Output Server 2 service. See License Requirements on page 16.

To configure Dolby metadata for an audio program:

1 Open the Output Server 2 user interface:

a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

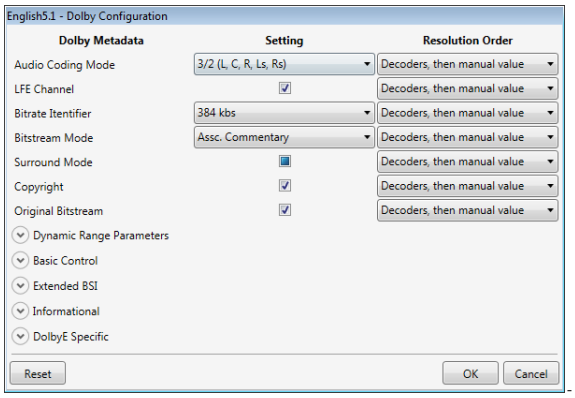
The Output Server 2 user interface appears.

b Go to **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, go to the **Dolby** column for the audio program you want to configure and click **Edit**.

The Dolby metadata pop-up dialog appears.



3 Review and/or set the metadata parameters that are listed in the **Setting** column.

Hovering over the metadata setting field displays a brief description of the metadata parameter.

4 For each metadata parameter, set the associated **Rule** field to one of the following values:

- **Manual Value** applies the set value as the constant default.
- **Decoders, then manual value** applies a conditional setting such that if the Dolby decoder provides a setting for that metadata parameter, then the decoder's setting takes precedent over the set value.

5 Click **OK** to store the metadata parameter settings and close the popup.

6 If you have created audio programs with surround channel outputs, you should now configure how Output Server 2 is to handle upmixing. See Configuring Audio Upmixing on page 79.

Alternatively, you can configure the watermarking for your audio programs. See Configuring Audio Watermarking on page 81 or click **Save** to store your changes and automatically reboot the Output Server 2 service.

Configuring Audio Upmixing

Audio upmixing is only required for channels where the audio input needs to be upmixed to Dolby 5.1 or Dolby 7.1; therefore the ability to edit the upmixing properties is only available to audio programs that are set to `5.1` or `7.1`.

Upmixing can be disabled by enabling the Passthrough (no mixing) setting, which enables Dynamic Audio Coding Mode (ACMOD) Switching where the Dolby Metadata configuration setting is ignored and default values according to the current ACMOD are used instead.

To enable and configure audio upmixing:

1 Open the Output Server 2 user interface:

a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

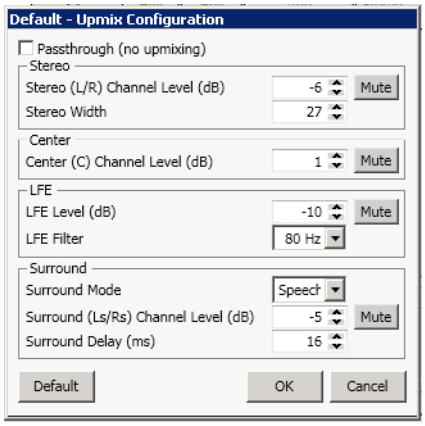
The Output Server 2 user interface appears.

b Go to **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, go to the **Upmixing** column for the audio program you want to configure and click **Edit**.

The **Upmixing Configuration** pop-up dialog appears for the selected audio program.



3 Leave the **Passthrough (no mixing)** unchecked (default) to force upmixing.

If however you want to disable upmixing and allow the audio to pass through as-is, check the **Passthrough (no mixing)** check box and the Upmix configuration options are greyed out.

Notes

- Passthrough behavior depends on the selected type of the audio output program group to which the audio program is assigned.
  When performing passthrough and the audio output program group is configured for PCM 5.1 or 7.1, the passthrough audio will be padded with silence to account for any difference in channel count. If the audio output program group type is configured for Dolby D or Dolby D Plus, then instead of using the ACMOD according to the audio program output channels setting (5.1 or 7.1), it will use an ACMOD matching the passed through audio (i.e. 2.0 for stereo).
- The Passthrough setting should not be used in conjunction with an audio output program group whose type is Dolby E.

4 In the **Stereo (L/R) Channels Level (dB)** field, enter the stereo input volume level in decibels.

The minimum value is -24 dB, the maximum is 6 dB and the default is -6 dB. Alternatively set the level to `Mute`.

5 In the **Stereo Width** field, enter a value from 0 to 31. The default is 27.

6 In the **Center (C) Channel Level (dB)** field, enter the center input volume level in decibels.

The minimum value is -24 dB, the maximum is 6 dB and the default is 1 dB. Alternatively set the level to `Mute`.

7 In the **LFE Level (dB)** field, enter the low-frequency effects input volume level in decibels.

The minimum value is -24 dB, the maximum is 6 dB and the default is -10 dB.

Alternatively set the level to `Mute`.

8 In the **LFE Filter** field, enter a value in hertz for low-frequency effects.

The default is 80Hz for 50Hz video formats and 66.7Hz for 59Hz video formats.

9 Click the **Surround Mode** field.

The **Select Item** dialog appears.

10 Select the required surround mode.

The options are:

- `Speech` (default)
- `Standard`
- `Movie`

11 In the **Surround (Ls/Rs) Channels Level (dB)** field, enter the surround sound input volume level in decibels.

The minimum value is -24 dB, the maximum is 6 dB and the default is -5 dB. Alternatively set the level to `Mute`.

12 In the **Surround Delay (ms)** field, enter the required delay in milliseconds. The default is 16.

13 Click **OK** to store the upmixing settings and close the popup.

Note: Clicking **Reset** reverts the values to the default profile.

14 You should now configure the watermarking for your audio programs. See Configuring Audio Watermarking on page 81.

Alternatively, click **Save** to store your changes and automatically reboot the Output Server 2 service.

Configuring Audio Watermarking

An audio watermark is an inaudible cue tone in the audio stream of the channel output signal. iTX offers two types of audio watermarking: **Neilsen** and **Kantar Snap**.

Note: Audio watermarking is a licensed feature. If your playout server does not have the required license the Watermark button will not be visible on your Output Server 2 service. See License Requirements on page 16.

In the USA and Canada, the Nielsen audio watermark is detected by devices that provide information for television audience measuring. The following Nielsen watermark formats are supported: version 2 (N2), version 6 (NW) and Critical Band Encoding Technology (CBET). Each of these formats can be inserted into the data stream individually or in combinations (e.g. NW+CBET).

To configure Neilsen watermarking on audio output:

1 Open the Output Server 2 user interface:

a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

b Go to **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, go to the **Watermarking** column for the audio program you want to configure and click **Add**.

The **Watermark** pop-up dialog appears for that audio program.

3 Using the **Watermark Type** drop-down list, select **Nielsen**.

The Nielsen watermarking pop-up dialog appears.

4 Using the **Process Type** drop-down list, select one of the following:

- **Disable**
- **N2**
- **NW**
- **N2+NW**
- **CBET**
- **NW+CBET**
- **N2+NW+CBET**

5 If the **Process Type** field is set to an option that includes N2 and/or NW, then set the following fields:

- In the **Service ID** field, enter the Nielsen service ID number.
- In the **Check Digit** field, enter the two-letter Nielsen check digit.

If the **Process Type** field is set to an option that includes CBET, then set the following fields:

- In the **CBet Service ID** field, enter the CBET service ID number.
- In the **CBet Check Digit** field, enter the two-letter CBET check digit.

6 Using the **Distribution Type** drop-down list, select one of the following:

- **Program Content**
- **Final Distributor**

Click **OK** to store the Nielsen settings and close the popup.

7 In the Audio Programs section, the Watermark column displays a **Nielsen** button for the edited audio program.

8 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

To configure Kantar Snap watermarking on audio output:

1 Open the Output Server 2 user interface:

a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

b Go to **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, go to the **Watermarking** column for the audio program you want to configure and click **Add**.

The **Watermark** pop-up dialog appears for that audio program.

3 Using the **Watermark Type** drop-down list, select **Kantar Snap**.

The Kantar Snap option is only available if a valid license installed and the Output Server 2's Frame Rate Family is set to 50 Hz in the I/O Device Controller.

4 The Kantar Snap watermarking pop-up dialog appears and the **Mode** field is read-only and set to **Live**, unless your Output Server 2 is configure for an On-Demand channel.
5 In **Channel Name** drop-down list, select the channel that you want to be inserted into the watermark.
6 In the **License Directory** field, verify that the directory path displayed identifies the location of where the Kantar license files are stored.
7 Click **OK** to store the Kantar Snap settings and close the popup.
8 In the Audio Programs section, the Watermark column displays a **Kantar SNAP** button for the edited audio program.
9 Click **Save** to store your changes and automatically reboot the Output Server 2 service.
10 Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring Automatic Loudness Control (ALC)

If licensed for Automatic Loudness Control (ALC), the iTX channel defaults to using the *Default* ALC profile. The settings of the ALC profile are applied to each audio program where it is assigned. ALC profiles are configured at the audio program level - allowing each audio program to have its own ALC profile selected.

The *default* profile can be updated to meet the ALC requirements of the channels using the profile. Alternatively it can be disabled using the **Disable ALC Processing** option.

When configuring an ALC profile, three predefined sets of ALC settings are available. **Factory Light**, **Factory Standard** and **Factory Heavy** have been designed to mirror the predefined settings in XVP-3901. **A/85 ITU** and **EBU R128** standards for loudness can also be selected as appropriate for the channel frame rate family.

Changing the profile updates the settings for channels using that profile, but only after a Output Server 2 restart. Operators are notified when channels need restarting in order to use the modified ALC profile settings.

Notes

- Settings for the Default ALC profile can be edited, but the Default ALC profile cannot be deleted from the iTX system.
- If a deleted ALC profile was configured to be used by a channel, then the channel reverts to the Default profile.

To configure the default ALC profile or create a new ALC profile

1 Open the Output Server 2 user interface:
   a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

   The Output Server 2 user interface appears.
   b Go to **Configuration** > **Audio** tab.

   The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Programs** section, go to the **ALC** column for the audio program you want to configure and click **Default**.

The **ALC Profile** pop-up dialog appears for that audio program.

3 If you want to disable ALC on all channels configured to use this profile, check the **Disable ALC processing** box.

If you want to apply the ALC profile to the on all channels configured to use this profile, uncheck the **Disable ALC processing** box. The remaining ALC profile settings become available for editing.

4 In the **Target (LFKS)** section, set the desired average output level.

- **EBU R128**: 50 Hz and 24 Hz will be defaulted to the EBU R128 target (-23 LUFS).
- **A/85 ITU**: 59.94 Hz and 23.98 Hz will be defaulted to A/85 ITU target (-24 LKFS).
- **Custom**: Select a Custom and use the slider to set any value between -31 LUFS and -10 LUFS.

5 In the **True Peak Limiter Threshold (LKFS)** section, use the slider or text box to set

6 In the Presets section, select one of the following three predefined sets of ALC settings or the Custom setting:

- **Factory Light**: The ALC applies low dynamic range compression on the audio program content. The overall response time is relatively slow, which reduces the ALC ability to tightly follow the target output loudness.

  Using this preset, the program content will sound a little more dense, while keeping most of the original program dynamic range.
- **Factory Standard**: The values provide an ALC profile which applies moderate dynamic range compression on the audio program content. The overall response time is also moderate,which allows the ALC to follow the target output loudness quite well. This preset is well-suited for most types of audio content. It is the factory preset loaded when loading the XVP-3901 card default parameters.
- **Factory Heavy**: The ALC applies high dynamic range compression on the audio program content. The overall response time is relatively fast, which improves the ALC ability to tightly follow the target output loudness.

  Using this preset, the program output content will sound much more dense, less dynamic.
- **Custom**: Selecting a Custom profile allows you to set any of the parameters to any valid value.

7 If you want to apply the new settings to the currently selected ALC profile, click **Save**.

However, if you want to create a new profile based on these edited settings, click **Save As** and provide a name for the new profile.

If both cases, the settings for channels using that profile are changed, but only after a Output Server 2 restart. As such, operators are notified that the channels need to be restarted in order to use the modified ALC profile settings.

Configuring Voice Overs Playback

You must select to which audio program you want scheduled voice overs to be applied. There are no language tags for voice over and only the first source program is used.

For each combination of channel types, source voice over programs are mapped to a specific mode on output. For example, a Dolby 5.1 voice over on a stereo output program is down mixed. The one exception is stereo voice overs to a Dolby 5.1 surround output, which can be mapped to one of four different modes by the user. Output Server 2 allows you to specify the stereo voice over to Dolby 5.1 output mapping at both a channel and a global level.

Figure 8-1 below illustrates how each mapping mode (both the fixed and the user selectable) handles the source and output audio:

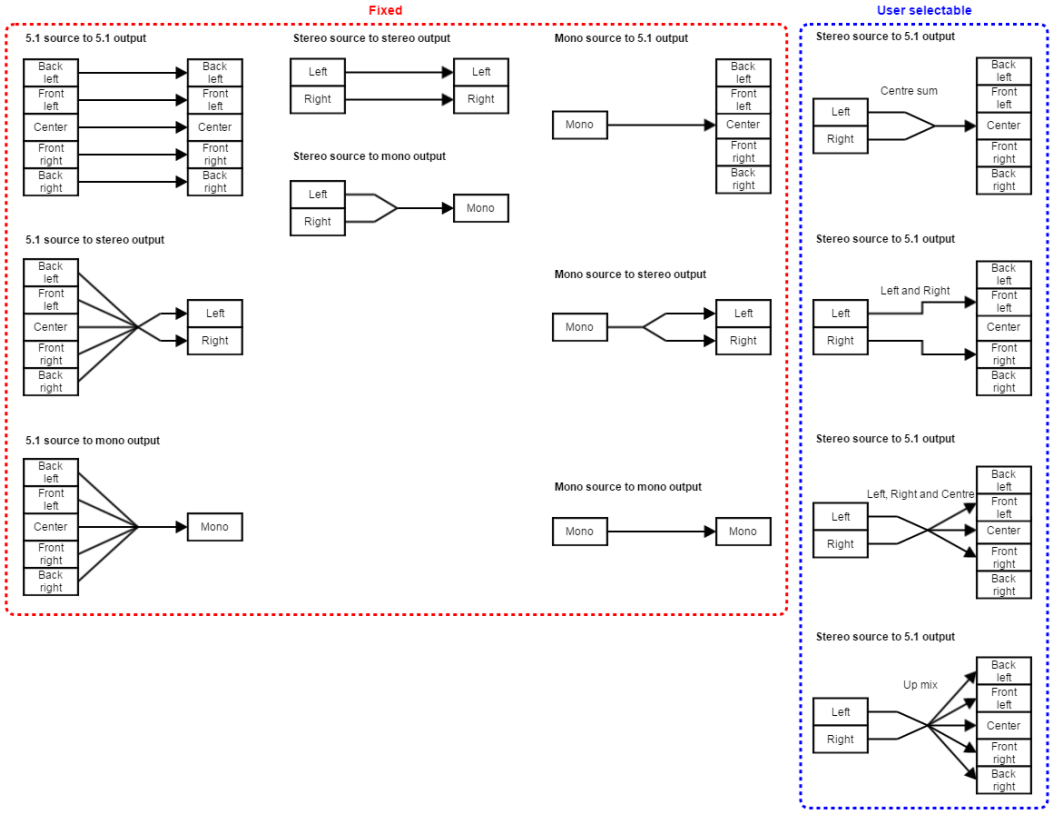


Fig. 8-1: The fixed and selectable voice over source and output mapping modes.

> Note: Voice over configuration, stereo to 5.1 mapping and playback are licensed features. If your playout server does not have the required license the Voice Over checkbox and will not be visible on your Output Server 2 service. See License Requirements on page 16.

Applying Scheduled Voice Overs to Audio Programs

To apply scheduled voice overs to audio programs:

1 Open the Output Server 2 user interface:

a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

b Go to **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

2 Check **Apply VO** for an audio program.

3 You should now configure Dolby metadata for your audio programs. See Configuring Dolby Metadata on page 78.

Alternatively, click **Save** to store your changes and automatically reboot the Output Server 2 service.

Mapping Stereo to Surround Outputs for Voice Overs

The Stereo to Surround mapping mode setting is a single configuration that applies to all audio programs configured for that channel, not individual audio programs. It can be applied at either a channel level or a global level from any Output Server 2 service within the same iTX domain.

To configure the Stereo to Surround mapping mode for voice overs:

1 Open the Output Server 2 user interface:

a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

b Go to **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

2 On the right hand side, click **Additional Config**.

The **Additional Config** panel appears.

3 Select a level at which to apply the configuration:

- The **Global** tab allows you to set the voice over mapping for all instances of Output Server 2 running in the same iTX domain.
- The **Channel** can be set to either use the global configuration or a channel-level override.

4 Use the drop down list to select a mapping mode from the following:

- `Global` (Channel tab only): If the Channel tab is set to Global it means the voice mapping for this instance of Output Server 2 is using the settings specified on the Global tab.
- `Centre sum`: The sum of the left and right channels are used produce a mono output on the center channel.
- `Left and Right`: The left and right channels from the source are mapped to the left and right channels on the output.
- `Left and Right and Center`: The stereo source is upmixed and spread among the left, right and center output channels.
- `Upmix`: The source audio is upmixed spread among all of the output channels (i.e. surround).

5 Now define the mapping rules for your audio programs. See Defining Audio Mapping Rules for Audio Programs on page 75.

Alternatively, click **Save** to store your changes and automatically reboot the Output Server 2 service.

Assigning Audio Programs to Audio Output Program Groups

Once the audio programs have been created, they must all be assigned to audio program output groups. The output channels of the selected rule must be compatible with the audio type of the destination output program group. For example, if the audio program is set to `5.1` or `7.1`, it cannot be assigned to an output group set to `RAW`, as RAW can only hold two (stereo) channels.

When you access the Audio tab for the first time it includes a default output, the configuration of which depends on whether the instance of Output Server is for a new channel or an existing one, which already had an audio configuration before being upgraded Output Server 2 v2.8 or later:

- For a new channel:
  - The `Default` audio program is assigned to an output group, using a type of `PCM`.
- For an existing channel:
  - Output groups are created using the audio programs that were created from the existing audio configuration.
  - The first audio program in the first output group will have **Apply VO** checked.

The steps below explain how to create a new output group.

To assign an audio program to an output group:

1 Open the Output Server 2 user interface:

  a On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

  The Output Server 2 user interface appears.

  b Go to **Configuration** > **Audio** tab.

  The Audio Programs and Audio Output Program Groups panels appear.

2 In the **Audio Output Program Group** section, appropriate **Output** tab.

3 Click the drop-down list in the blank **Type** cell and select one of the following:

- `RAW` passes audio to the output without any decoding/encoding and uses the 2.0 channel type only.
- `PCM` which has the channels 1, 2.0, 5.1 and 7.1 available.
- `DolbyD` which has the channels 2.0 and 5.1 available.
- `DolbyE` which has the channels 5.1, 5.1+2.0 (in that order) and 2.0+2.0 available.
- `Dolby D Plus` which has the channels 2.0, 5.1 and 7.1 available.
- `MPEG` which has the channels 1 and 2.0 available.
- `AAC` which has the channels 1, 2.0, 5.1 and 7.1 available.

Note: As RAW audio is output without being decoded or encoded, consider the following points before selecting this option:
- Compressed PCM audio cannot be output for RAW. Any media with PCM audio must be uncompressed to playout using RAW.
- RAW audio cannot be overlaid with voice overs, even if **Apply VO** is checked for the audio program.
- An audio output program group set to RAW must be assigned an audio program with unique labels that are not used by any other audio program.

4 (Optional) If you selected **PCM** as the type in the **Settings** column, the **Edit** button becomes available. This allows you to set the PCM bit depth for the audio output program group. By default, this is set to 24-bit.
   a Click **Edit**. The **PCM** dialog appears.
   b Click on the **Bit Depth** drop-down list to change the value: 16 or 24 bits.
   Alternatively, click **Reset** to restore the default value.
   c Click **OK** to confirm your settings and close **PCM Settings** dialog.
5 (Optional) If you have the Dolby metadata license and selected **Dolby E** as the type, in the **Settings** column the **Edit** button becomes available. This allows you to set the Dolby E bit depth for the audio output program group. By default, this is set to 20-bit.
   a Click **Edit**. The **Dolby E Settings** dialog appears.
   b Click on the **Bit Depth** drop-down list to change the value.
   Alternatively, click **Reset** to restore the default value.
   c Click **OK** to confirm your settings and close **Dolby E Settings** dialog.
6 (Optional) If you selected **MPEG** as the type in the **Settings** column, the **Edit** button becomes available. This allows you to set the MPEG Bitrate for the audio output program group. By default, this is set to 128 kbits/s.
   a Click **Edit**. The **MPEG Settings** dialog appears.
   b Click on the **Bitrate** drop-down list to change the value.
   Alternatively, click **Reset** to restore the default value.
   c Click **OK** to confirm your settings and close **MPEG Settings** dialog.
7 (Optional) If you selected **AAC** as the type in the **Settings** column, the **Edit** button becomes available. This allows you to configure several AAC settings for the audio output program group.
   a Click **Edit**. The **AAC Settings** dialog appears.
   b Click the **Version** drop-down list to change the value. The default value is `MPEG4 ISO 14496-3`.
   c Click the **Profile** drop-down list to change the value. The default value is `Low Complexity (AAC-LC)`.
   d Click the **Bitrate** drop-down list to change the value. The default value is `64 kbit/s`.
   e Click the **Header type** drop-down list to change the value. The default value is `ADTS`.
   f Click **OK** to confirm your settings and close **AAC Settings** dialog.
8 If the Audio Output Program Group is targeting an IP output, then the PID cell appears. You must enter a unique non-zero numerical value.
9 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

10 Click on an audio program Name cell, then drag and drop the selected audio program to the blank **Programs** cell in the **Audio Output Program Groups** section.

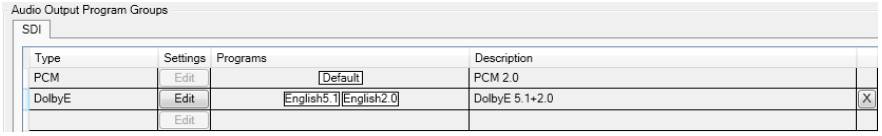
Note: Some downstream audio processors may require mono audio program groups to be assigned in pairs, as they expect to receive the audio signal in pairs.

Channels	Encoding	Output	Labels	
Ch 1	Mono	1.0	Eng	← Unpaired mono program
Ch 2	PCM	2.0	Eng	← Subsequent stereo pair start on channel 2 rather than 3
Ch 3				
Ch 4				

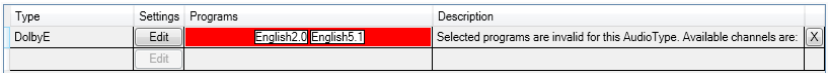
If your downstream audio processors are capable of handling individual mono audio program groups, this consideration can be ignored.

If you selected `DolbyE` as the audio type, you can add up to two audio programs (depending on their selected output channels).

When you have added audio programs to the output group, the Description cell updates to show the audio type and output channels of the output group.



Note: If the combination of the selected audio program's output channel and the output group's audio type are incompatible, the **Program** cell turns red and the **Description** cell displays an error, explaining why the selected combination cannot be used together.



To correct this error, either change the output group's audio type or the selected audio programs. See Managing Audio Registration, Output and Mapping on page 128.

11 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Adding logical audio programs and groups to live assets

As live events are not imported and analyzed by the GV Engine, they are not automatically assigned audio output program groups. Therefore, you must add logical audio program groups to each live asset in your system. This is performed from the property editor, within the Asset layout in iTX Desktop.

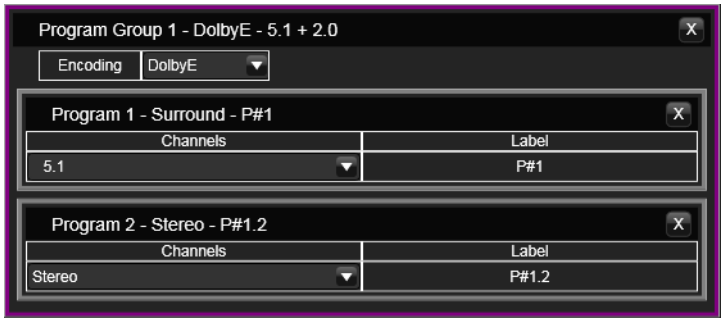
To add logical audio programs and groups to live assets:

1 Launch **iTX Desktop** and switch to the **Asset** layout.

2 From **PinPoint**, click to restrict the search results to live assets.

3 Type in the criteria for the live asset you want to update.

4 Press the Enter key or click to begin the search.
5 From the results grid, select the required live asset.
6 In the property editor, click on the **Asset** tab.
7 On the **Logical** tab, click **Edit**.
The **Audio Program Groups Editor** appears.
8 Click **Add Group**.
A new audio group appears at the bottom of the editor.



9 Click the **Encoding** drop-down list and select one of the following:
- `PCM` (Default)
- `Dolby D`
- `Dolby E`
- `Dolby D Plus`

10 Click on the **Channel** drop-down list and select one of the following:
- `Mono`
- `Stereo`
- `5.1`
- `7.1`

11 Double-click on the **Label** cell.
The **Label Selector** appears.
12 Select a label for the audio program and click **OK**.
13 (Optional) If you selected Dolby E as the encoding method, you can add multiple audio programs to the group until all of the channels are assigned (for example a surround 5.1 and a stereo 2.0 combination).
   a Click **Add Program** to insert an additional audio program.
   b Follow step 10 to step 12 to define the additional audio program.
14 (Optional) To add more audio program groups to the live asset, repeat step 8 to step 13.
15 Click **OK** to close the **Audio Group Editor** dialog.
Your live asset is now ready to be used in schedules.

9 Configuring Splice Insert Processing

The video signal to the video/audio I/O card in the playout server can contain splice inserts, such as SCTE messages (also known as digital cue tones). iTX can detect such messages and respond to them to start the playout of a sequence that is on hold in a schedule or end a sequence iTX is currently playing. SCTE refer to the time space provided by broadcasters to trigger these sequences as the "avail". Output Server 2 gives users the ability to enable and disable individual SCTE features independently, depending on their requirements. Note that SCTE104 is the protocol for embedding Splice markers in an SDI stream, while SCTE35 is the protocol for embedding Splice markers in an IP stream.

Summary

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Configuring Splice Insert Features *92*
Configuring the SCTE 104 Message Types *94*

About SCTE Splice Insert plugins

There are two sides to configuring SCTE splice inserts: the features you want to use need to be configured in the **Splice Insert** tab on the Output Server 2 **Configuration** panel, while the message types need to be configured via one of two different plugins in the iTX Desktop.

Plugin	Description
VANC plugin	The VANC plugin is the legacy SCTE104 solution, which supports the following features: • The ability to react to inbound splice request commands sent in a Multiple Operation Message, providing they are the only command in the Multiple Operation Message. • Pass-through of splice request commands to downstream services. Any unsupported commands are stripped from the message. • Insertion of outbound splice commands.

Plugin	Description

SCTE104 plugin	The SCTE104 plugin (for SCTE 104 and SCTE 35) supports the following enhanced features:
	• The ability to react to inbound Multiple Operation Messages containing more than one command, including:
	  • Splice request commands.
	  • Local and National Avail Insert Commands, either individually or both in the same Multiple Operation Message.
	  • Legacy DTMF triggers.
	• Enhanced message pass-through, which provides the following additional functionality:
	  • All inbound SCTE messages can be either passed through or blocked.
	  • When pass-through is enabled, iTX allows for the passing of "NULL" SCTE messages for heart-beating to downstream services.
	  • The ability to enable or disable pass-through for all commands within a Multiple Operation Message.
	Splice commands received outside of a configured available window are unchanged.
	• Insertion of outbound Multiple Operation Messages containing the following additional commands:
	  • Local and National Avail Insert Commands, either individually or both in the same Multiple Operation Message.
	  • Legacy DTMF triggers.

Configuring Splice Insert Features

To configure Splice Insert features for Output Server 2:

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

2 Go to **Configuration** > **Splice Insert**.

3 Check **Splice Insert Trigger Enabled**.

As well as enabling splice insert triggering, checking this options makes the following splice insert features available:

- Heartbeat
- Inbound Triggers
- Break Trigger Type
- Enabled (on the IP 2022-2 tab)

4 To enable the passing of null splice insert messages for heartbeating to downstream services, check **Heartbeat**.

This option is only supported by the SCTE104 plugin.

5 To enable pass-through to downsteam services, check **Pass-Through Enabled**.

This option is only supported by the SCTE104 plugin.

6 To have incoming messages passed through on the selected output line number, check **Pass-Through on Output Line.**

7 To perform partial or full replacement of splice event inbound splice inserts, enter a value in **Event Mask**.

The mask configuration allows for bit level "OR" masking. For example:

Incoming message (hex):	0x00005c7e
Inputted Event Mask string (dec):	1073741824
Actual Event Mask (hex):	0x40000000
Output (hex):	0x40005c7e

This option is only supported by the SCTE104 plugin.

8 To set the delay TXPlay 2 allows before it responds to Start Sequence and End Sequence messages, enter a value in **Delay (Frames)**.

9 Enable the required **Inbound Triggers** by checking any of the following options:

- If you want the channel to process `spliceStart_normal` insert commands, enable **Sequence Start**.
- If you want the channel to process `spliceEnd_normal` insert commands, enable **Sequence End**.
- If you want the channel to process `spliceStart_immediate` insert commands, enable **Immediate Sequence Start**.

  These commands can be used to start a sequence early, but their usage is not recommended by SCTE 35 [1] and may result in inaccurate splices.
- If you want the channel to process `spliceEnd_immediate` insert commands, enable **Immediate Sequence End**.

  These commands can be used to terminate a sequence early, but must include the correct event ID for the sequence that is to be canceled.

All message types can be enabled at once, if required.

10 Enable the required **Break Trigger Types** by enabling or disabling the following options:

- **National Breaks**
- **Local Breaks**

The table below describes the effects from various combinations of these two options:

Combination	Result
National Breaks disabled **Local Breaks** disabled	iTX will trigger in all cases, i.e. when it receives Multiple Operation Messages with: • Only a `splice_request_data` command (legacy SCTE104) • Both a `splice_request_data` and a `segmentation_descriptor_request` (for either local or national breaks). NOTE: If you are only using the legacy VANC plugin, both break trigger types must be disabled.
National Breaks enabled **Local Breaks** disabled	iTX will only trigger if a Multiple Operation Message is received with a `splice_request_data` and a `segmentation_descriptor_request` with the `segmentation_type_id` set to National (value 0x32).

Combination	Result
National Breaks disabled **Local Breaks** enabled	iTX will only trigger if a Multiple Operation Message is received with a `splice_request_data` and a `segmentation_descriptor_request` with the `segmentation_type_id` set to Local (value 0x30).
National Breaks enabled **Local Breaks** enabled	iTX will only trigger if a Multiple Operation Message is received with a `splice_request_data` and a `segmentation_descriptor_request` with the `segmentation_type_id` set to Local (value 0x30) or National (value 0x32).

11 On the **SDI** tab's **Output Line Number** field, enter the vertical ancillary (VANC) line number on which to output splice inserts. The default value is 10.

12 On the **IP 2022-2** tab, check the **Enabled** checkbox and set the **Pid** field, which is the Packed Identifier of the channel in the output IP transport stream. Valid PID numbers range from 32 to 8186 and must be unique across a given IP output target. The default Pid value is 745.

13 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Configuring the SCTE 104 Message Types

In addition to the configuration that has to be performed in the Output Server 2 user interface, the following configuration needs to be performed within iTX Desktop. The required configuration is dependent on whether you are using just the legacy features or both the legacy and enhanced features.

Configuring the legacy VANC plugin

For channels that will only process legacy SCTE 104 messages:

- In **Engineering** > **Channel Config** > **Plugins** > **VANC** specify:
  - **Insert Type** (select `SPLICER`)
  - **Line Number**
  - **Automatic System Index**
  - **Duration (Frames)**

For more information, see the *iTX System Administration Guide*.

Configuring enhanced SCTE 104 plugin

For channels that will process both legacy and enhanced SCTE 104 features:

- In **Engineering** > **Channel Config** > **Plugins** > **SCTE104** specify:
  - **Insert Type**
  - **Automatic System Index**
  - **Duration (Frames)**

For more information, see the *iTX System Administration Guide*.

Configuring sequences for SCTE 104

A sequence is a small group of schedule events that iTX handles as a single event block. A typical sequence might contain a few video clip events and secondary events, with certain transitions or vision effects. As such, sequences can be used to schedule a block of advertisements or trails, triggered to start and stop by SCTE 104 messages.

- For sequence control via SCTE 104 messages, in the **Event Editor** for the sequence enable the **Allow External Takes**.
- For scheduled break sequences on the inbound channel:
  - In **Engineering** > **Channel Config** > **Channel Config 2**, the **Fixed Availability Windows** is used to control how the start and end times for a sequence are interpreted.

    When enabled, the **Start Window** and **End Window** times for sequences are applied as specified in the **Event Editor** for the item. The Start and End Window times include the time and date for the item.

    When disabled, the **Start Window** and **End Window** times for sequences are applied relative to the start time of the item.

    Note: Once an availability window has been set and applied it cannot be removed. If the availability window is changed, the new window will take effect, but the previous window will not be removed until the Output Server 2 service is restarted.

  - In **Event Editor** for the sequence item:
    - Specify the sequence's availability window by entering timecodes in the **Start Window** and **End Window** fields.

      How these times are interpreted is dependent on the **Fixed Availability Windows** option in **Channel Config 2**.
    - If required, enable **SCTE104 LocalAd**.

      iTX inserts an SCTE 104 message to trigger the insertion of local advertisement. It does this when it plays out a sequence as a result of receiving an SCTE message containing a delay.

      Unless you require this specific functionality, you should ensure the option is not selected.

For more information on configuring availability windows see the *iTX System Administration Guide*.

For more information on working with sequences see the *iTX Desktop Operator Guide*.

10 Configuring Optional Plugins and Functionality

Not all of iTX's functionality is mandatory and as such some aspects of Output Server 2 only need to be configured if you require the associated functionality or have purchased the corresponding software license and (if applicable) hardware. This section explains how to configure these optional plugins and functionality.

Summary

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Configuring iTX Desktop for 4K CGs and Logos *98*
Viewing the XG Inside Status *98*
About Custom Aspect Ratio Control (ARC) Modes *99*

Configuring Subtitle Playout

From v2.8 onwards, iTX includes the ability to playout subtitles using Grass Valley Softel Inside. This functionality is optional and therefore no basic configuration is required if you do not want to use Softel Inside for your subtitling solution.

If you are using Softel Inside, see the *iTX Softel Inside Configuration & User Guide* for more information.

Playing Out Legacy Subtitles or Closed Captions on iTX v2.8 or Later

If you had been playing out basic subtitles or closed captions on a previous installation of Output Server 2, you would have had to configure one stream and one service. As of iTX v2.8 or later, legacy subtitles and closed captions no longer require this baseline configuration and therefore it must be removed from the Output Server 2 user interface.

To remove the previous baseline subtitle configuration for legacy subtitles:

1. On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

   The Output Server 2 user interface appears.
2. Go to **Configuration** > **Subtitles** tab.
3. Expand the **Services** tab.
4. From the Service drop-down list, select each service you have configured and click **Remove**.
5. Expand the **Streams** tab.
6. From the **Streams** drop-down list, select each stream you have configured and click **Remove**.
7. Click **Save**. Output Server 2 will automatically shut down and restart to apply your changes.

Configuring iTX Desktop for 4K CGs and Logos

If you are operating a 4K channel and using the iTX CG or Logo plugin, you must instruct your iTX Desktop PCs to enable the 4K version of CG and Logo canvas. This is done by adding an environment variable to Windows.

This environment variable can be assigned to either the currently logged in user or to all users, as a system variable. The steps below explain how to add the 4K Desktop environment variable at a system level.

To create the Windows environment variable for the 4K Desktop:

1. On the iTX Desktop PC, press +R.

   The **Run** dialog appears.
2. In the **Open** field, type `sysdm.cpl`.

   The System Properties dialog appears.
3. Click **Advanced**, then **Environment Variables**.

   The Environment Variables dialog appears.
4. In the **System Variables** section, click **New**.

   The **Edit System Variable** dialog appears.
5. Enter the environment variable as follows:
   - In the **Variable Name** field, enter `ENABLE_4K_DESKTOP`.
   - In the **Variable Value** field, enter `1`.
6. Click **OK** to close the **Edit System Variable** dialog.

   On the Environment Variables dialog, the new variable is listed in the System Variables section.
7. Click **OK** to close the **Environment Variables** dialog.

Viewing the XG Inside Status

If you have XG Inside and multiple channels configured on the same playout server, you can view which XG Inside channel has been assigned to an instance of Output Server 2 from the **Channel** tab of the Output Server 2 user interface.

To view the XG Inside channel status:

1. On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

   The Output Server 2 user interface appears.
2. Go to **Configuration** > **Channel** tab.

   The **XG Inside Channel** parameter is listed among the other channel configuration settings.

   If this setting is grayed out it means you do not have the necessary software installed on your playout server.

For more information about configuring Vertigo XG Inside, see the *Vertigo XG Inside User Guide*.

About Custom Aspect Ratio Control (ARC) Modes

In the Channel Config layout of iTX Desktop, the **Advanced Aspect Ratio Control** panel allows you to map a scheduled item's field values to an output aspect ratio, ARC mode and Active Field Description (AFD). For channels that are operating on Output Server 2 you can also define custom ARC modes. When defining a custom ARC, you can alter the following properties in both the input and the output picture:

- Aspect ratio (default 16:9)
- Vertical size (default 100%)
- Horizontal size (default 100%)
- Tilt position (default 0.00%)
- Pan position (default 0.00%)

Reducing the input Vertical or Horizontal percentages crops the picture equally on each side, while reducing the output Vertical or Horizontal percentages zooms the picture out equally on each side. For example, a Horizontal input value of 80% will crop 10% from the left and right sides of the picture.

It is also possible to lock the aspect ratio to the values of your choice. For example, if Horizontal is set to 100% and Vertical is set to 54.05% (creating a 1.85:1 aspect ratio), checking **Lock Aspect Ratio** means if you change a Horizontal value to 90%, the corresponding Vertical value automatically changes to 48.65%, maintaining the 1.85:1 aspect ratio.

Reducing a Vertical value also allows you to adjust the corresponding Tilt value. The Tilt range is determined by the Vertical value. For example, if a Vertical value is reduced to 90%, the Tilt range will be -5.00% to +5.00%, with 0.00% being center.

Reducing a Horizontal value allows you to adjust the corresponding Pan value. The Pan range is determined by the Horizontal value. For example, if a Horizontal value is reduced to 75%, the Pan range will be -12.50% to +12.50%, with 0.00% being center.

As the percentages are changed, preview windows automatically update to show what area of the input picture will be used and the effect on the output picture. Figure 10-1 below to Figure 10-4 on page 100 show the preview windows for some example custom ARC modes.

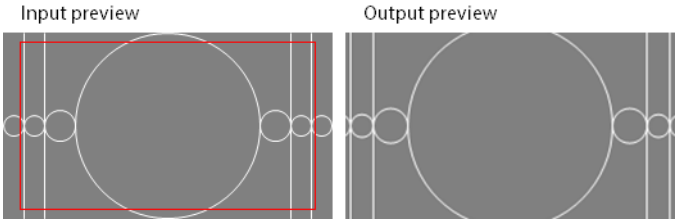


Fig. 10-1: The Input values are set to Vertical 90% and Horizontal 90%, as illustrated by the area within the red border. The Output values are set to default. The resulting output picture is cropped evenly on all sides.

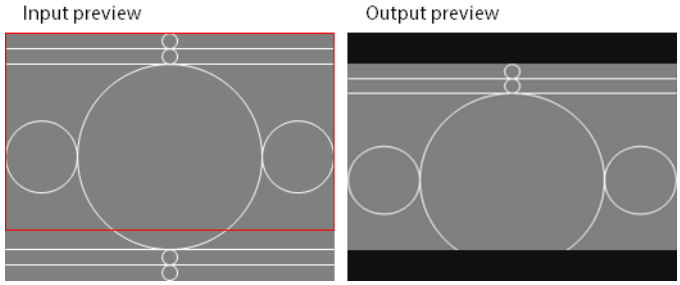


Fig. 10-2: The Input values are set to Vertical 80% and Tilt -10%, as illustrated by the area within the red border. The Output values set to default. The resulting output picture only shows the top 80% of the input picture.

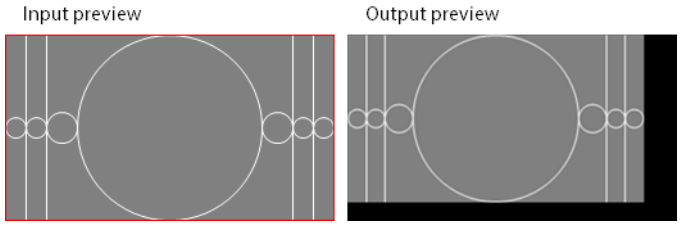


Fig. 10-3: The Input values set to default, so the whole picture is kept within the red border. The Output set to Vertical 90%, Horizontal 90%, Tilt -5% and Pan -5%. The resulting output picture is zoomed out and displayed in the top-left corner, with a border along the bottom and right.

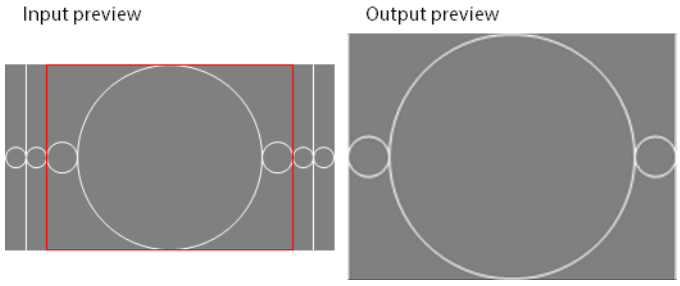


Fig. 10-4: The Input values are set to Horizontal 75%, as illustrated by the area within the red border; Output set to Aspect Ratio 4:3. The resulting output picture is horizontally cropped and displayed with a 4:3 aspect ratio.

Defining a Custom Aspect Ratio Control (ARC) Mode

Custom ARC modes are defined from the **Advanced Aspect Ratio Control - Mapping Configuration** pop-up layout, in the Channel Config layout. When you apply a custom ARC

mode, it takes effect on the next asset in the schedule with AFD settings that correlate to that mode.

Note:

- The Advanced ARC and AFD-insertion features are only available if your system has the necessary software license. Your system may be licensed to use the functionality for both of these in one license. Configuring the settings for unlicensed functionality does not affect the output video signal.
- The mapping configuration dialog is intended to provide the maximum flexibility for the setting up of ARC operations and AFD insertion. The dialog does not prevent you from setting unsuitable configurations (for example, selecting a 4:3 aspect ratio for an HD channel).

  To prevent problems with the display of the video image, ensure the configuration settings are correct for each channel in your iTX system.
- For information on editing and deleting custom ARC, see Maintaining Custom Aspect Ratio Control (ARC) Modes, on page 133.

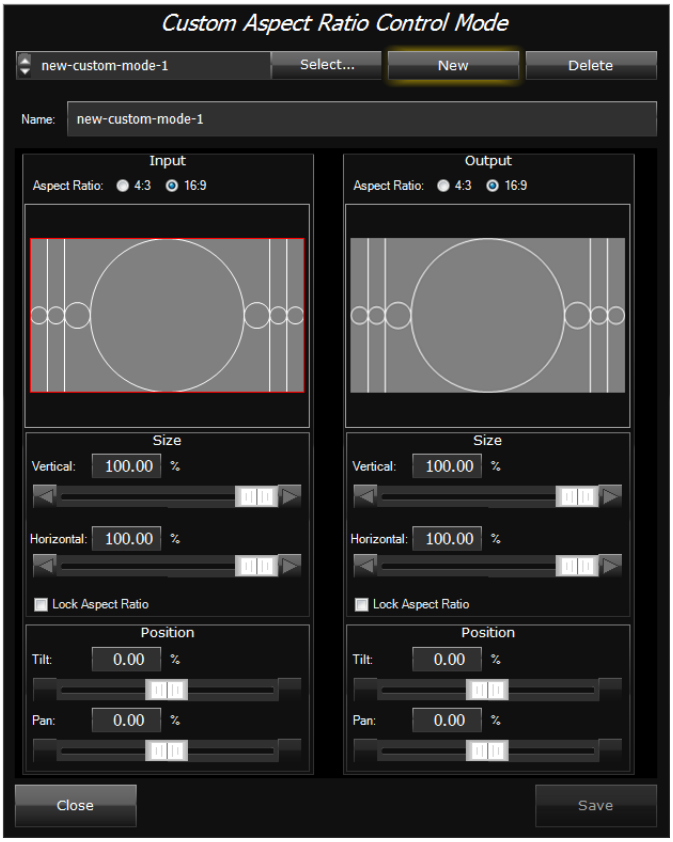
To access the Custom Aspect Ratio Control Mode dialog:

1. Start the iTX Desktop on a client PC and login with an Administrator profile.
2. Open the **Engineering** layout.
3. Click **Channel Config**.

   The **Channel Config** pop-up layout appears.
4. From the **View** list, select the view containing the channels to be configured. The channels associated with that view appear.
5. Click the name of the channel to be configured.
6. Click the **Channel Config 4** tab.
7. In the **Advanced Aspect Ratio Control** panel, click **Configure Mapping...**

   The **Advanced Aspect Ratio Control - Mapping Configuration** pop-up layout appears.
8. Click **Define Custom ARC Mode...**

   The **Customer Aspect Ratio Control Mode** dialog appears.



9 In the **Customer Aspect Ratio Control Mode** dialog, click **New**.

A new set of default ARC values appear with the name `new-custom-mode-(n)`, where `(n)` is a unique number.

10 In the **Name** field, enter a unique name to identify the new custom mode.

11 In the **Input** section. define the area to use from the input picture:

a Select an input **Aspect Ratio** from either 16:9 (default) or 4:3.

b Configure the size of the area to use from the input picture.

- For the **Vertical** size, enter a percentage or drag the slider to crop the picture vertically.
- For the **Horizontal** size, enter a percentage or drag the slider to crop the picture horizontally.
- If you want the two percentages to move in relation to each other, check **Lock Aspect Ratio**.

c Configure the position of the area to use from the input picture:

- If the Vertical percentage has been reduced, you can adjust the **Tilt** value by entering a percentage or dragging the slider.
- If the Horizontal percentage has been reduced, you can adjust the **Pan** value by entering a percentage or dragging the slider.

As the percentages are changed, both preview windows automatically update to show the effect.

12 In the **Output** section, define the ARC for the output picture:

a Select an output **Aspect Ratio**,

b Configure the size of the output picture.

- For the **Vertical** size, enter a percentage or drag the slider to zoom out the picture vertically.
- For the **Horizontal** size, enter a percentage or drag the slider to zoom out the picture horizontally.
- If you want the two percentages to move in relation to each other, check **Lock Aspect Ratio**.

c Configure the position of the output picture:

- If the Vertical percentage has been reduced, you can adjust the **Tilt** value by entering a percentage or dragging the slider.
- If the Horizontal percentage has been reduced, you can adjust the **Pan** value by entering a percentage or dragging the slider.

As the percentages are changed, the Output preview window automatically updates to show the effect.

13 Click **Save** then **Close**.

You are returned to the **Advanced Aspect Ratio Control - Mapping Configuration** pop-up layout. From here you can assign your new custom ARC to a set of field values. See Assigning a Custom Aspect Ratio Control (ARC) Mode below.

Assigning a Custom Aspect Ratio Control (ARC) Mode

Both standard and custom ARC modes are assigned to a ARC operation in the same way.

> Note: Once an ARC mode and AFD code is mapped to a set of field values, the very next scheduled item on the channel with matching field values will playout using the new ARC mode and AFD.

To assign a custom ARC mode:

1 Open the **Advanced Aspect Ratio Control - Mapping Configuration** dialog

2 Decide which set of field values you want to remap and click the corresponding ARC Mode button.

The **ARC Mode selection** dialog appears.

3 Select your new ARC mode from the **Custom ARC modes** list then click **OK**.

On the **Advanced Aspect Ration Control - Mapping Configuration** dialog, the name of the custom ARC mode appears in the **ARC Mode** column and the corresponding **Output Aspect Ratio** field will change a display only field showing the output aspect ratio of the custom ARC mode.

4 Select your required **Active Field Description** then click **OK**.

For more information see the *iTX System Configuration Guide*.

5 On the **Channel Config** pop-up layout, click **Save** and **Close**.

The examples below show the effect on the final picture using different custom ARC input and output settings and what happens when you change both the input and the ouput settings:

Source picture (4:3)

Output changed to Horizontal 70%

Inputs changed to Vertical 80%, Tilt 10%

Inputs changed to Vertical 80%, Tilt 10% and Output changed to Horizontal 70%

A I/O Card Connection Reference

This appendix discusses the I/O Device Controller Engineering Panel, which contains the schematics for every combination of video/audio I/O card and playout type. This can be used as a reference when connecting inputs and outputs to your video/audio I/O card.

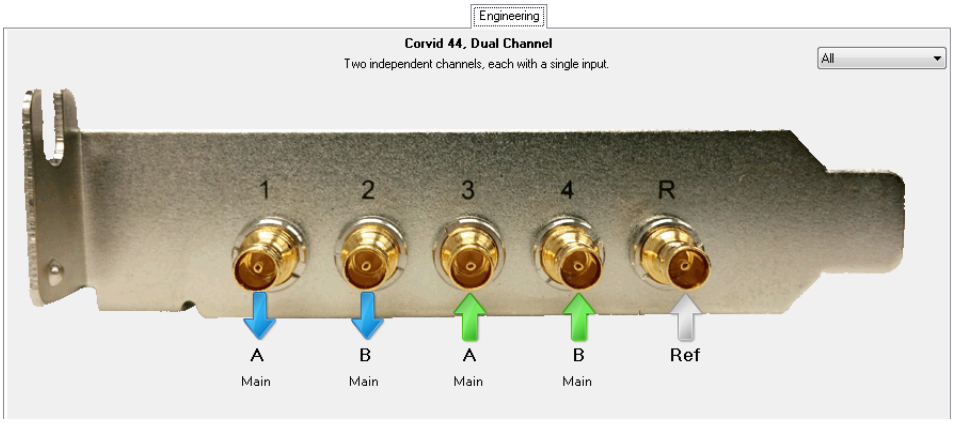
Summary

About I/O Device Controller Engineering Panel *105*
Corvid LP I/O Connections *107*
Kona 3G I/O Connections *107*
Corvid 44 I/O Connections *108*
Corvid 88 I/O Connections *109*
Corvid LP + Corvid LP I/O Connections *111*

About I/O Device Controller Engineering Panel

The I/O Device Controller Engineering Panel shows your video/audio I/O cards inputs and outputs for your currently selected playout type (in TXPlay 2 Config) and whether they are the main or secondary inputs and outputs for the selected playout type.

The image below shows the Engineering panel for a Corvid 44 set to the dual channel playout type:



The Engineering panel uses the following indicators:

Indicator	Description
	Output spigot
	Input spigot
	Reference input spigot

The drop-down menu on the bottom right can be used as a filter to show different inputs and outputs individually:

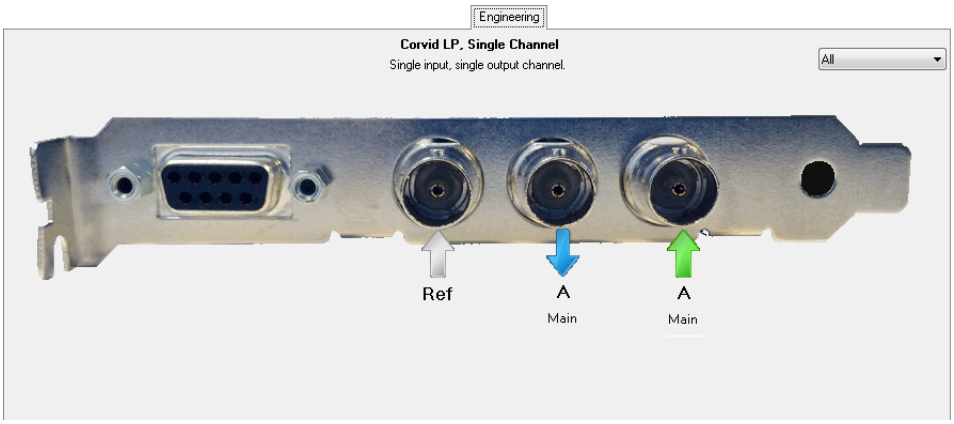
- **All**
- **None**
- **Channel A**
- **Channel B**
- **Inputs**
- **Outputs**
- **Reference**

Accessing the I/O Device Controller Engineering Panel

To access the I/O Device Controller Engineering panel:

1. On the playout server running the service, maximize the **Server Controller** application.
   If Server Controller is not running, it can usually be found in `Start>All Programs>iTX 2.0`.
2. Select the **Controlled Services** tab. All of the services running on that server are listed.
3. Double-click **I/O Device Controller**.
   The I/O Device Controller user interface appears. It includes tabs for **Service Details**, **Trace Logs**, **Installation Info**, **Configuration** and **Engineering**.
4. Click on the **Engineering** tab.
   The schematic for your video/audio I/O card appears.

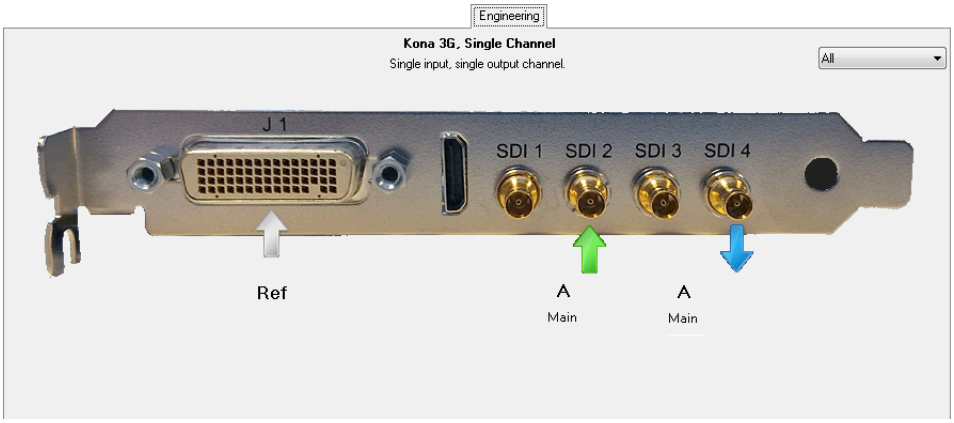
Corvid LP I/O Connections



Corvid LP video/audio I/O cards only support the single channel playout type and have the following inputs and outputs:

Playout type	Port RS-422	Port R	Port 1	Port 2
Single channel	-	Ref In	Ch A Output Main	Ch A Input Main

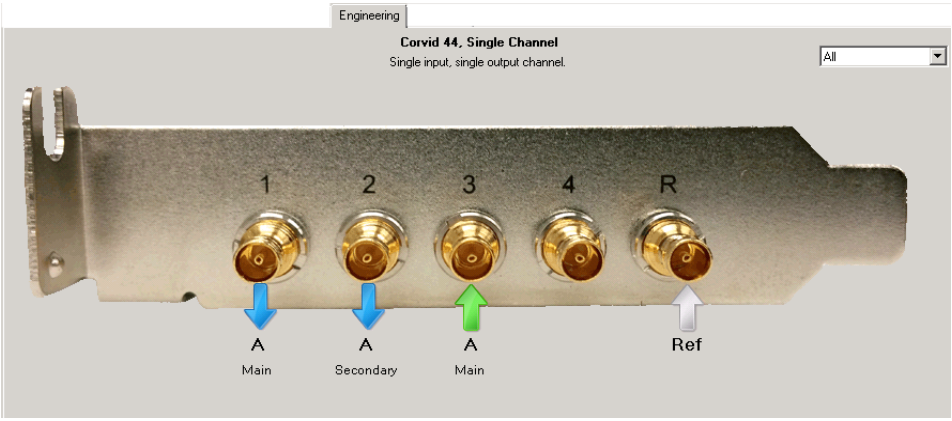
Kona 3G I/O Connections



Kona 3G video/audio I/O cards only support the single channel playout type and have the following inputs and outputs:

Playout Type	Port J1	HDMI	Port SDI 1	Port SDI 2	Port SDI 3	Port SDI 4
Single channel	Ref Input	-	-	Ch A Input Main	-	Ch A Output Main

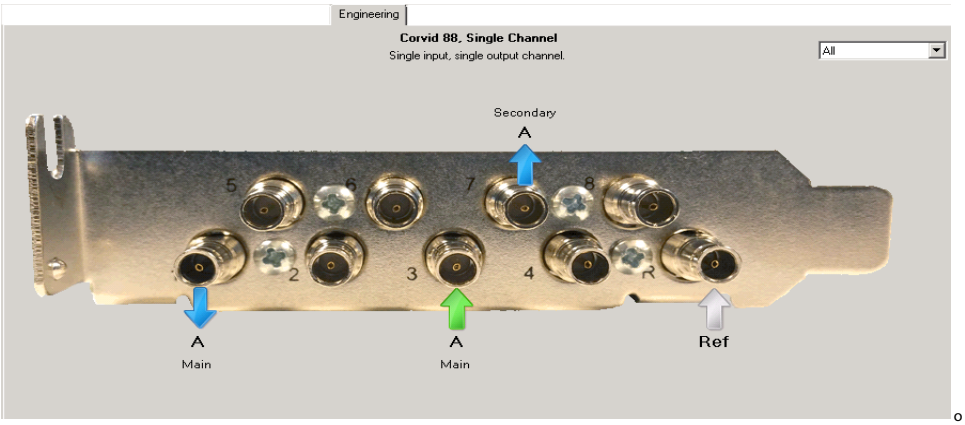
Corvid 44 I/O Connections



Depending on the selected playout type, Corvid 44 video/audio I/O cards uses the following inputs and outputs:

Playout Type	Port 1	Port 2	Port 3	Port 4	Port R
Single channel	Ch A Output Main	Ch A Output Sec	Ch A Input Main	-	Ref Input
4K Single channel	Ch A Output Main 1	Ch A Output Main 2	Ch A Output Main 3	Ch A Output Main 4	Ref Input
Single channel 4K 2SI	Ch A Output Main 1	Ch A Output Main 2	Ch A Output Main 3	Ch A Output Main 4	Ref Input
Single channel + Fill & Key	Ch A Output Main 1	Ch A Input Main 1	Ch A Input Fill & Key - Fill	Ch A Input Fill & Key - Key	Ref Input
Dual channel	Ch A Output Main	Ch B Output Main	Ch A Input Main	Ch B Input Main	Ref Input
Simulcast	Ch A Output Main	Ch B Output Main	Ch A/B Input Main	Ch A/B Input Second	Ref Input
Dual Live	Ch A Output Main	Ch A Output Sec	Ch A Input Main	Ch A Input Second	Ref Input

Corvid 88 I/O Connections

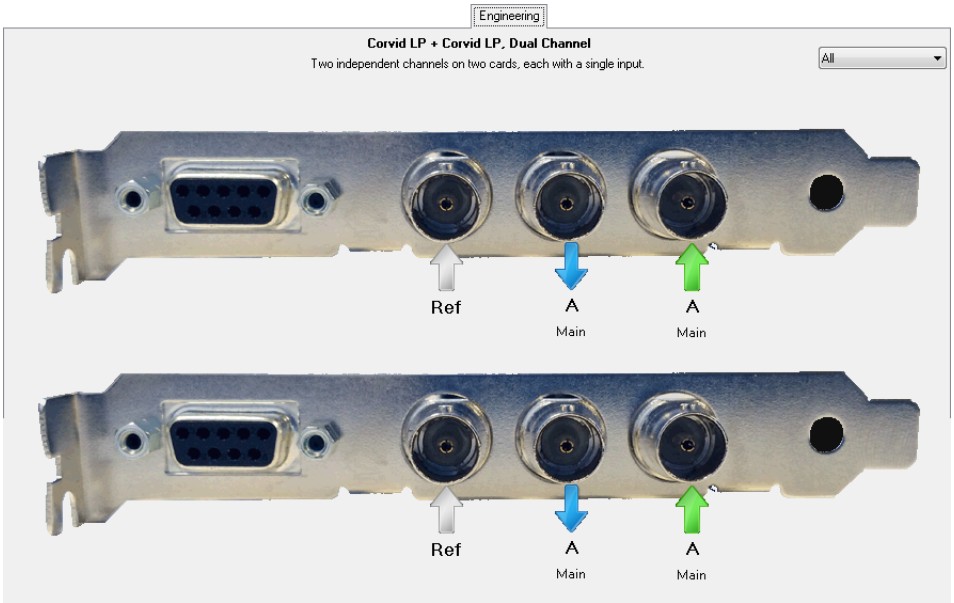


Depending on the selected playout type, Corvid 88 video/audio I/O cards use the following inputs and outputs:

Playout Type	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	Port 8	Port R
Single channel	Ch A Output Main	-	Ch A Input Main	-	-	-	Ch A Output Sec	-	Ref Input
4K Single channel	Ch A Output Main 1	Ch A Output Main 2	Ch A Output Main 3	Ch A Output Main 4	Ch A Input Main 1	Ch A Input Main 2	Ch A Input Main 3	Ch A Input Main 4	Ref Input
4K 2SI Single channel	Ch A Output Main 1	Ch A Output Main 2	Ch A Output Main 3	Ch A Output Main 4	Ch A Input Main 1	Ch A Input Main 2	Ch A Input Main 3	Ch A Input Main 4	Ref Input
Fill & Key Single channel	Ch A Output Main	-	Ch A Input Main	-	Ch A Input Fill & Key - Fill	Ch A Input Fill & Key - Key	Ch A Output Sec	-	Ref Input
Dual channel	Ch A Output Main	Ch B Output Main	Ch A Input Main	Ch A Input Second	Ch B Input Main	Ch B Input Second	Ch A Output Sec	Ch B Output Sec	Ref Input
Simulcast	Ch A Output Main	Ch B Output Main	Ch A/B Input Main	Ch A/B Input Second	-	-	Ch A Output Sec	Ch B Output Sec	Ref Input
Fill & Key Simulcast	Ch A Output Main	Ch B Output Main	Ch A/B Input Main	Ch A/B Input Second	Ch A Input Fill & Key - Fill	Ch A Input Fill & Key - Key	Ch B Input Fill & Key - Fill	Ch B Input Fill & Key - Key	Ref Input

Playout Type	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	Port 8	Port R
Dual Live	Ch A Output Main	-	Ch A Input Main	Ch A Input Second	-	-	Ch A Output Sec	-	Ref Input
Fill & Key Dual Live	Ch A Output Main	-	Ch A Input Main	Ch A Input Second	Ch A Input Fill & Key - Fill	Ch A Input Fill & Key - Key	Ch A Output Sec	-	Ref Input
Dual Fill & Key	Ch A Output Main	Ch A Output Sec	Ch A Input Main	Ch A Input Second	Ch A Input Fill & Key - Fill	Ch A Input Fill & Key - Key	Ch A Input Fill & Key B - Fill	Ch A Input Fill & Key B - Key	Ref Input

Corvid LP + Corvid LP I/O Connections



Depending on the selected playout type, a playout server with dual Corvid LP video/audio I/O cards use the following inputs and outputs:

Playout type	Device 0				Device 1			
	Port RS-422	Port R	Port 1	Port 2	Port RS-422	Port R	Port 1	Port 2
Single channel	-	Ref Input	Ch A Output Main	Ch A Input Main	-	-	-	-
Dual channel	-	Ref Input	Ch A Output Main	Ch A Input Main	-	Ref Input	Ch B Output Main	Ch B Input Main
Dual live	-	Ref Input	Ch A Output Main	Ch A Input Main	-	-	Ch A Input Second	-

B Operating an Output Server 2 System

This appendix contains information about the day-to-day operation an Output Server 2 channel, including simulcast and dual live channel.

Summary

Managing Audio from iTX Desktop *113*
About Output Server 2 Channel Status Indicators *124*
Viewing Live Event Inputs on Channel Control Layouts *124*

Managing Audio from iTX Desktop

From within iTX Desktop, you can manage the audio configuration of video, voice over and live assets in the following ways:

- For video assets:
  - View both the logical audio program groups and physical track configuration
  - Preview the playout of the video asset's logical and physical audio programs
  - View and apply a different Audio Import Rule to the asset
  - Manage the asset's physical audio tracks
  - Monitor and/or override the audio mapping status of a scheduled video event
- For Live assets:
  - View both the logical audio program groups and physical track configuration
  - Reconfigure or remove a logical audio program or group from a Live asset
  - Edit physical audio tracks for a live asset
  - Monitor and/or override the audio mapping status of a scheduled Live event
- For Voice over assets:
  - View both the logical audio program groups and physical track configuration
  - Override which audio programs a Voice Over event is applied to

Viewing an Asset's Logical or Physical Audio Mapping

Both the logical audio program groups and the physical audio mapping for video, voice over and live assets can be viewed from the property editor's Logical and Physical tabs on the Asset layout. For video and voice over assets, these tabs can be found on the Locations tab, while for live assets they are on the Asset tab.

Figure B-1 on page 114 shows the Logical tab of a video asset and Figure B-2 on page 114 shows the Physical tab of the same asset.

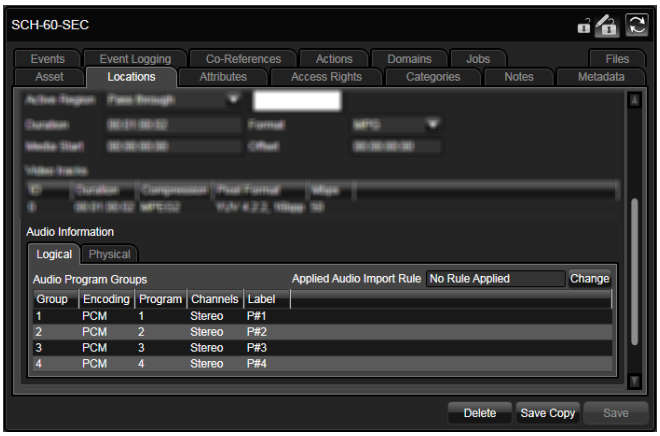


Fig. B-1: The Logical sub-tab shows the structure of the audio program groups for the selected asset.

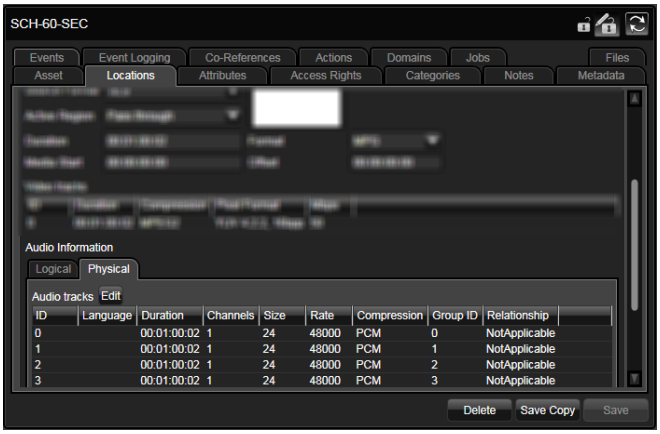


Fig. B-2: The Physical sub-tab shows the arrangement of audio tracks within the media file.

To view an asset's Logical or Physical audio mapping

1. In iTX Desktop, switch to the **Asset** layout.
2. From **PinPoint**, select one of the following filters:
   - To restrict the search results to video assets, click .
   - To restrict the search results to voice over assets, click .
   - To restrict the search results to live assets, click .
3. (optional) - Set additional filters to narrow the search to specific characteristics of logical audio mapping. For example:
   - (Video and voice over assets only) From the filter at the top of PinPoint select **Media** > **Has Logical Audio.** The filter's setting can be set to:
     - Has Logical Audio: Yes | No
     - Location Type: ITX | Proxy
   - (Video assets only) From the filter at the top of PinPoint select **Media** > **Audio Import Rule.** The filter's setting can be set to:
     - Audio Import Rule: Is | Is Not
     - Location Type: No Matching Rule| No Rule Applied | Manually Overridden | <SpecificAudioImportRuleName>

4 Type in the criteria for the asset you want to update.
5 Press the Enter key or click to begin the search.
6 From the results grid, select the required asset.
7 For video and voice over assets, go to the property editor on the right and select the **Locations** tab.

   For live assets, go to the property editor on the right and select the **Assets** tab.
8 Click the **Logical** and **Physical** tabs to swap views.

Previewing the playout of a video asset's Logical Audio Programs

When a video asset selected in the Asset layout has multiple audio programs, clicking the **Audio Mixing Configuration** button in the Media Viewer opens a two-tabbed dialog that displays the asset's logical and physical audio configurations.

The **Logical View** tab shows a list of the logical audio programs present in the clip. You can select the program to be used during the preview the clip in the Media Viewer.

Listening to a preview of each of the programs is a valuable way to verify the quality and language of the audio track. If after previewing the audio, you need to change the logical audio mapping, you can try fixing the problem by defining and/or reapplying the audio import rule to the asset (see Viewing and changing the Audio Import Rule of a video asset, on page 115).

To preview an asset's logical audio program

1 Use the iTX Desktop's PinPoint search to locate and select the video asset. See Viewing an Asset's Logical or Physical Audio Mapping, on page 113.
2 Verify that the Media Viewer is in GV Engine Viewer mode:
   a Click the **Asset Properties** button in the Media Viewer controls.
   b Ensuring that the **Player mode** field is set to **GV Engine Viewer**.
3 Load the video asset in the Media Viewer.
4 Click the **Audio Mixing Configuration** button in the Media Viewer controls.
5 Select the **Logical View** tab to view a list of the asset's logical audio programs.

   The blue audio button indicates the currently selected audio program that will playout when previewing the clip in the Media Viewer.
6 To change to another audio program, click the gray audio button associated with the audio program and then click off the dialog.

   The selected audio group's label is displayed next to the Audio Mixing Configuration button and that program's audio will be heard when the clip is played in the Media Viewer.

Viewing and changing the Audio Import Rule of a video asset

Using the asset property editor, it is possible to view the current audio import rule applied to the video asset, as well as re-apply another audio import rule to the asset.

To view and change the audio import rule applied to a video asset:

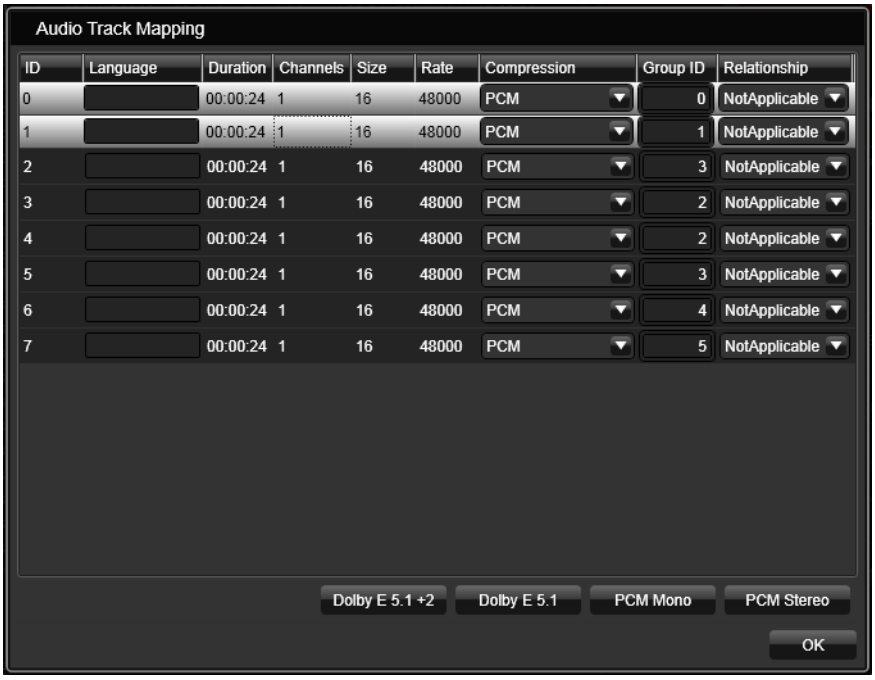
1 In iTX Desktop, switch to the **Asset** layout.
2 From **PinPoint**, click . to restrict the search results to video assets.
3 (optional) - Restrict the search results to only assets whose audio import rule is in a specific state.
   a Set the filter at the top of PinPoint to **Media** > **Audio Import Rule.**
   b Set the filter's setting to:
      • Audio Import Rule: Is | Is Not
      • Location Type: No Matching Rule| No Rule Applied | Manually Overridden | <SpecificAudioImportRuleName>
4 Press the Enter key or click to begin the search.
5 From the results grid, select the required asset.
6 In the property editor on the right and select the **Locations** tab.
7 Scroll down the Locations tab until the Audio Information section is displayed.
   The **Applied Audio Import Rule** field displays the rule that is currently applied to the asset.
8 To change the applied audio import rule, click the **Change** button.
9 In the Change applied Audio Import Rule dialog, select the rule from the **Compatible Rules** section that you want applied to the video asset.
   If the Compatible Rules section does not list an appropriate rule, you may consider creating a new audio import rule and then try again. See Creating Labels and Audio Import Rules for Logical Audio Programs, on page 20.
10 Click **OK** to close the Change applied Audio Import Rule dialog.
11 Click **Save** in the property editor.

Managing physical audio tracks for a video clip

The Physical audio tab displays details of the individual physical audio tracks of a selected video clip, which includes two properties that you can modify:

- The group to which a mono track belongs. iTX can use mono tracks in the same group to produce a PCM stereo or Dolby E output signal.
- A language tag, which identifies the language of the audience the track is intended for.

To modify the properties, you use the Audio Track Mapping dialog, which is access from the Edit button on the Physical tab.



Grouping mono tracks

Usually iTX automatically adds track grouping information to an asset when it ingests the broadcast quality file. This can be controlled in Delivery Manager within the end point configuration. See the *iTX Delivery Manager Setup Guide* for more information.

The following procedure is only applicable when this has not happened.

To manually group mono tracks:

1. Search for a video asset, as described in Viewing an Asset's Logical or Physical Audio Mapping.
2. Open the **Locations** tab, select the **Physical** tab.
3. Click **Edit**.

   The **Audio Track Mapping** dialog appears.
4. Select tracks you want to group.
5. Click the button that denotes the output format that the mono tracks can be used to produce (i.e **Dolby E 5.1 + 2**, **Dolby E 5.1**, or **PCM Stereo**).
6. Click **OK** to close the dialog.

> Note: You can use the Audio Track Mapping dialog to reverse the automatic grouping iTX performs on ingest; to do so, you change a track marked as PCM Stereo or Dolby E to mono.

Adding language tags to tracks

Add a language tag to a track

1. In iTX Desktop, switch to the **Asset** layout.

2 Search for and select an asset using PinPoint.
3 Open **Locations** tab, then select the **Physical** tab.
4 Click **Edit**.
The **Audio Track Mapping** dialog appears.
5 Click on a **Language** box.
The Language Selection dialog appears:

6 You can change the selected languages in the following ways:
- To add a language to the audio track, select a language from the **Available Language Codes** column, then click the right arrow button to add it to the **Selected Language Codes**.
- To remove a language from the audio track, select a language from the **Selected Language Codes** column, then click the left arrow button to return it to the **Available Language Codes**.

7 Click **OK** to close the **Language Selection** dialog.
8 The **Audio Track Mapping** dialog now displays the name of the selected language in the **Language** box.
9 Click **OK** to close the Audio Track Mapping dialog.

Editing the logical audio programs and groups for a live asset

Using the asset property editor, it is possible to edit the logical audio program groups assign to a live asset. Editing the logical audio programs does not affect the physical audio configuration.

To edit the logical audio of a live asset:

1 Search for a live asset, as described in Viewing an Asset's Logical or Physical Audio Mapping.
2 On the **Logical** tab, click **Edit**.

The **Audio Program Groups Editor** appears.

3 To change how the asset is encoded, click the **Encoding** drop-down list and select one of the following:

- PCM
- Dolby D
- Dolby E
- Dolby D Plus
- MPEG
- ACC

> Note: If you are changing a Dolby E program group to either Dolby D, Dolby D Plus or PCM, you should remove the unwanted audio program before selecting a different method of encoding. See Removing a logical audio program or group from a live asset on page 119.

4 To change which channels the audio is output on, click on the **Channels** drop-down list and select one of the following:

- Mono
- Stereo
- 5.1
- 7.1

5 To change the current audio program label:

a Double-click on the **Label** text.

The **Label Selector** appears.

b Select the label for the audio program and click **OK**.

6 (Optional) If you selected Dolby E as the encoding method, you can add multiple audio programs to the group until all of the channels are assigned (for example a surround 5.1 and a stereo2.0 combination).

a Click **Add Program** to insert an additional audio program.

b Follow step 3 to step b to define the additional audio program.

7 Click **OK** to close the **Audio Group Editor** dialog.

Removing a logical audio program or group from a live asset

Using the asset property editor, it is possible to remove unwanted logical audio programs and groups from a live asset.

To configure the logical audio of a live asset:

1 Search for a live asset, as described in Viewing an Asset's Logical or Physical Audio Mapping.

2 On the **Logical** tab, click **Edit**.

The **Audio Program Groups Editor** appears.

3 To remove a program from an audio group, click on the **X** next to the program name, as shown in Figure B-3 on page 120.

4 To remove an audio group (and all of its programs), click on the **X** next to the audio group name, as shown in Figure B-3 on page 120.

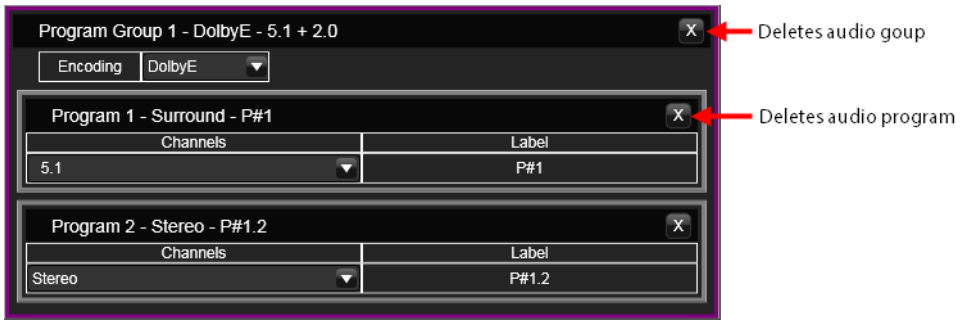


Fig. B-3: Removing audio programs and groups via the Audio Group Editor dialog.

5 Click **OK** to close the **Audio Group Editor** dialog.

Editing physical audio tracks for a live asset

The Physical audio tab displays details of the individual physical audio tracks of a selected live asset, which includes two properties that you can modify: the language tag and the compression method.

To edit the physical audio tracks for a live asset:

1 Search for a live asset, as described in Viewing an Asset's Logical or Physical Audio Mapping.

2 On the **Physical** tab, click **Edit**.

The **Audio Tracks Mapping** dialog appears.

3 To add an audio track, click +.

A new row appears, with the next available ID number.

4 Double-click on the **Language** cell.

The **Language Selection** dialog appears.

5 To add a language tag, select the language tag you require from the **Available Language Codes** column the click ▶.

The selected language is added to the **Selected Language Codes** column.

6 To remove the language tag, select the language tags you require from the **Selected Language Codes** column the click ◀.

The selected language is added to the **Available Language Codes** column.

7 Click **OK** to close the **Language Selection** dialog.

8 Click on **Compression** and select one of the following from the drop-down list:

- PCM mono
- PCM stereo
- Dolby D 5.1
- Dolby D 2.0
- Dolby E 5.1+2
- Dolby E 5.1
- Dolby D Plus 2.0
- Dolby D Plus 5.1
- Dolby D Plus 7.1

9 (Optional) To add more audio tracks, repeat step 3 to step 7.

10 (Optional) To remove an existing audio track, select the track then click .

11 Click **OK** to confirm your settings and close the **Audio Track Mapping** dialog.

Monitoring the Audio Mapping status of scheduled video or live events

Audio mapping rules control the order of preference for which the audio channels from the media file are assigned to the given audio program. (see Defining Audio Mapping Rules for Audio Programs, on page 75).

On playout, operators can use the Audio status icon in the schedule grid's Audio Mapping column to see which events have had their audio mapped. If required, the operator can override the current audio mapping.

The color of the Audio status icon indicates what kind of audio program match has been found.

- **Green**: Indicates that there is a Preferred match for all the audio output programs specified in the audio configuration. The clip will play out with the label specified in the rule.
- **Orange**: One or more of the audio output programs did not match the labels in the Preferred labels specified in the audio configuration, but there was a match in the Alternate labels.
- **Red**: One or more of the audio output programs did not match the labels in both the Preferred and Alternate Rule in the audio configuration. The operator may need to override the event's current audio program mapping (see page 122 and page 123).
- **Mute (crossed out speaker)**: One or more of the audio programs has matched on the Silence label in either the Preferred rule or Alternate rule.
- **Blue**: All programs are matched to a preferred tag and a manual intervention was already performed.

> Note: If there are any audio mapping issues on an available/ready schedule item, an alert is also raised and displayed within the channel Health and on the iControl interface.

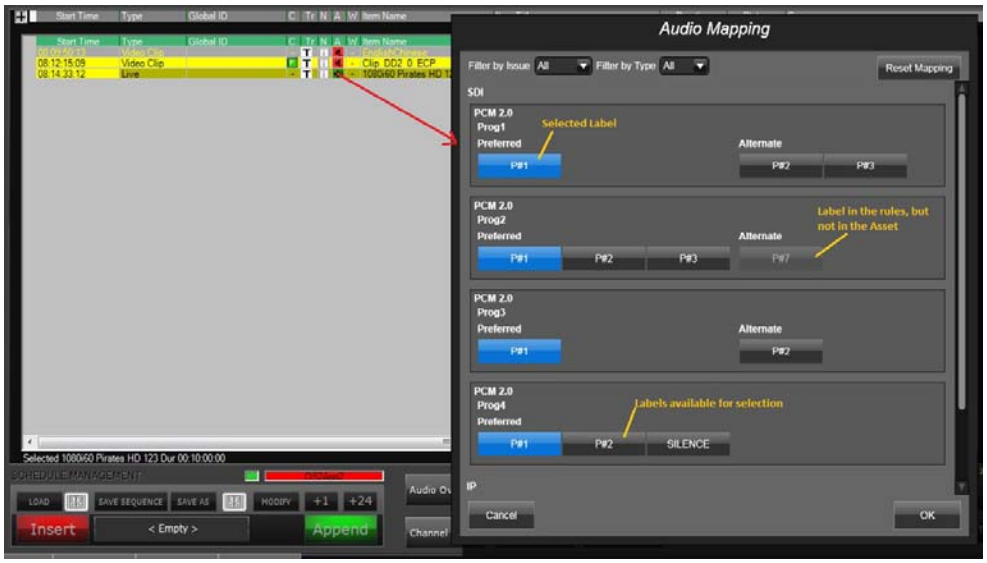
Overriding the audio mapping of a scheduled video or live event

The initial audio mapping of a scheduled video or live event is determined by the mapping rules specified in the Output Server 2 Audio Configuration (see page 74). Similarly, the default audio mapping for live events is determined by the audio tracks configuration in the asset's Logical Audio Tracks in the Asset Property Editor (see page 118).

You can manually override the current audio mapping of a video or live scheduled event by clicking the event's Audio Status icon in the **Audio Mapping** column of the schedule grid.

The Audio Mapping dialog displays the audio rule options for each Audio Output Program Group. As demonstrated below, for each Audio Output Program Group:

- The currently selected label is highlighted in blue.
- Labels that are included in the rules but not in the asset are displayed but disabled.
- Labels in the asset which are also in the rules are shown as available for selection.
- Labels in the asset, but not in the rules are not displayed.



The Audio Output Program Groups listed in the Audio Mapping dialog can be filtered by Issue (e.g. show only items that have resulted in a red or orange status) and/or by Type (e.g. show only IP or SDI Program Groups).

Operators can view the currently selected labels in blue, which indicate which logical audio tracks will be played out. Operators can manually override the current label assignment by selecting another available label in the Audio Output Program Group and clicking OK. Once the override is applied, the change is reflected on the Audio Mapping status icon on the schedule grid.

> Note: For changes to be applied to the audio mapping, the event must not have been committed or reach the on-air state.

To override the audio mapping of a scheduled video or live event

1 In the iTX Desktop's schedule grid, click the **Audio Mapping** cell of the scheduled video or Live event.

The Audio Mapping dialog appears.

2 If you want to override an Audio Output Program Group's current label assignment (highlighted in blue), click one of the available labels in the program group.

3 Click **OK** to close the Audio Mapping dialog and apply the changed audio mapping to the event.

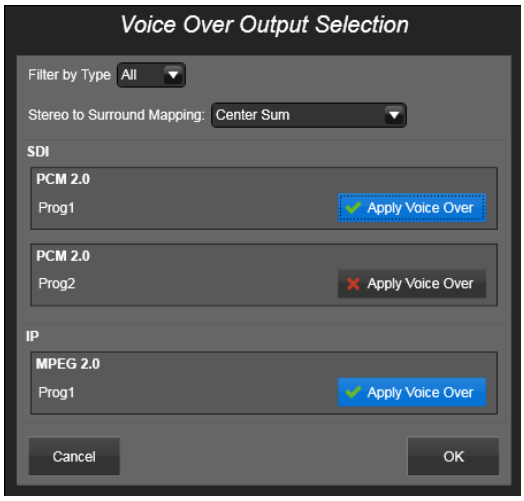
If all programs in the event's new audio mapping are matched to a Preferred rule tag, then the Audio status icon associated with the event turns blue.

Overriding which audio programs a Voice Over event is applied to

When a Voice Over event is added to a primary event in a schedule, which audio programs the voice over will be applied to is initially determined by how the audio programs were configured using the **Apply VO** setting in the Output Server 2 Configuration dialog (see Applying Scheduled Voice Overs to Audio Programs, on page 85).

As a quick visual reference, if the Audio Status icon in the Audio Mapping column schedule grid is white, then this indicates that the "Apply VO" is set on at least one audio program within the configuration. If the Audio status icon is purple, this indicates that the audio output program was specified through traffic.

After the Voice Over event is scheduled in the ITX Desktop, you may want to verify exactly which audio program(s) the voice over will be applied to. Additionally, you want to override the Apply VO setting (enable or disable) for one or more of the audio programs. Clicking the Audio Status icon in the Audio Mapping column opens the Voice Over Output Selection dialog, which displays the current state of the **Apply Voice Over** setting for each program.

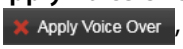


To view and/or override the Apply VO settings a scheduled Voice Over event

1 In the iTX Desktop's schedule grid, click the **Audio Mapping** cell of the scheduled voice over event.

The Voice Over Output Selection dialog appears.

2 To override the current setting, click the **Apply Voice Over** button to change the state from enabled

to disabled 

, or disabled to enabled.

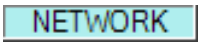
3 Optional: If you want to change the event's mapping of Stereo to Surround setting (see page 86).

4 Click **OK**.

The event's Audio Status icon turns blue to reflect that a manually intervention has been performed on the voice over event's audio program mapping.

About Output Server 2 Channel Status Indicators

The table below describes the indicators that may appear on top of the Schedule Grid for an Output Server 2 system:

Indicator	Description
	This indicator appears when a network channel (Channel Controller) is currently selected. Hovering over this indicator displays the controlled channels and their on air status.
	In an simulcast system, this indicator appears on simulcast and simulcast backup channels, alongside the **Follower** label.
	In a system with a matrix router, this indicator appears when the channel output is routed to a destination to which the transmission system is connected.

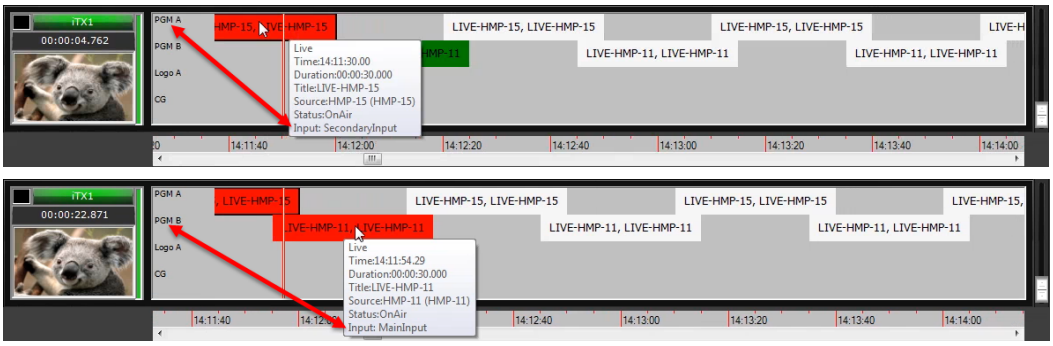
Note:
- Channel control and schedule changes cannot be performed on TXPlay channels.

Viewing Live Event Inputs on Channel Control Layouts

The input each live event is coming from can be viewed from the timeline in iTX Desktop.

To view the live event input:

- While a live event is on air, hover your mouse cursor over the event block on the timeline. The pop-up tooltip shows information about the event in focus, including its input (at the bottom).



C Maintaining an Output Server 2 System

This appendix contains information about how to maintain an Output Server 2 system. This includes the location of log files, the OS2 Engineering panel, changing Output Server 2 configuration and changing system configuration that is outside of Output Server 2, but which affects the way it operates.

Summary

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Activating or Deactivating Fill and Key using the Channel Controller 132
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Starting Output Server 2

As iTX services, Output Server 2, TXPlay 2, the I/O Device Controller and Media Cache 2 are controlled by the **Server Controller** application, which is installed with any iTX component. When the Server Controller is started, all of the services installed on the playout server are started, one after another. If a service is shut down, Server Controller can restart them automatically to protect system integrity.

Through Server Controller, Output Server 2 can be configured to control the way it starts, the channels it runs and the way those channels are setup.

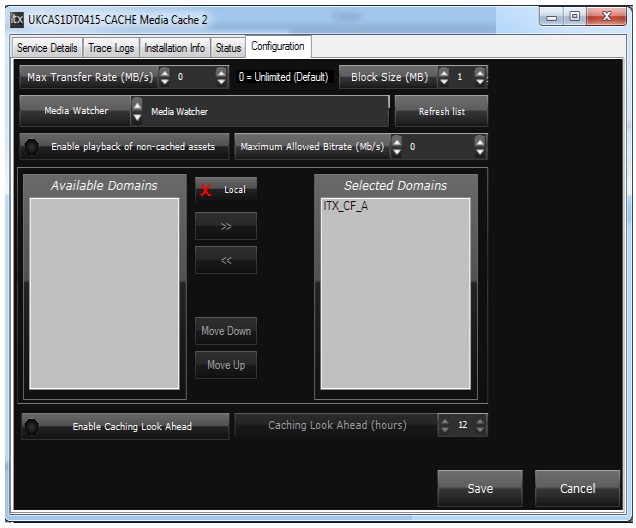
To start Server Controller:

- Go to **Start** > **All Programs** > **iTX 2.0** > **Server Controller**.

  The Server Controller appears and loads all of the installed services in their current configuration.

Configuring Media Cache 2

The Media Cache 2 service window includes a Configuration tab, for controlling caching thresholds, playback from the NAS and selecting which Media Watcher and domain to use.



Setting the Caching Thresholds

There are two fields for controlling the caching thresholds, one for the maximum transfer speed and one for the maximum block size.

The cache should be setup with a capacity large enough to meet the requirements of the most demanding schedule. However, if the schedule content cannot fit onto the cache, then set the **Enable Caching Look Ahead** and **Caching Look Ahead** fields. These options allow you to enable and configure a Look Ahead window where only items within the schedule that appear within the Look Ahead window are referenced by the Media Cache 2 service. Anything outside the window is a candidate for deletion.

To change the caching thresholds:

1. On the playout server running the Output Server 2 system, expand the **Media Cache 2** service window.
2. Click the **Configuration** tab.
3. Enter a value in the **Max Transfer Rate (MB/s)** field to select the maximum caching speed, up to 1024 MB/s (or 8.192 Gbit/sec).

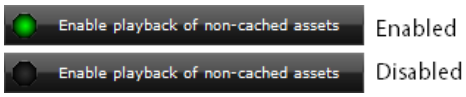
   This option defaults to 0 MB/s, which means the speed is uncapped.
4. Enter a value in the **Block Size (MB)** field to control the size of the data blocks that are written to disk. The default is 8 MB. Increasing this value can reduce the amount of throttling that is required during caching and improve the overall performance.
5. (optional) If the schedule content cannot fit onto the cache, then set the **Enable Caching Look Ahead** and **Caching Look Ahead** fields.
6. Click **Save**.

Controlling Playback from Network Attached Storage (NAS)

When media cannot be cached in time for playout, iTX can resort to playing it from the NAS. The success of playing from a NAS depends on several facts, including the speed of your network and the bitrate of the media being played. As such, the Media Cache service allows you to control playback from the NAS and the maximum media bitrate it will attempt to play. This can be useful when you have higher bitrate media, such as DNxHD encoded MXF files, which might struggle to play from a NAS.

To control the playback from a NAS:

1. On the playout server running the Output Server 2 system, expand the **Media Cache 2** service window.
2. Click the **Configuration** tab.
3. Click **Enable Playback From NAS** to enable or disable playback from NAS.



4. Enter a value in the **Maximum Allowed Bitrate (Mb/s)** field to limit NAS playback to media that is below the specified value.

   The default value is 99999Mb/s.

5. Click **Save**.

Selecting the Media Watcher

The Media Cache 2 service allows you to select which Media Watcher you want to copy files from external search folders when they are required for playout. Depending on the search folder configuration, the copy destination may be either the Output Server cache or a Media Store managed by the Media Watcher.

To select a Media Watcher:

1. On the playout server running the Output Server 2 system, expand the **Media Cache 2** service window.
2. Click the **Configuration** tab.
3. From the **Media Watcher** box, select the Media Watcher you want to use to copy files from external search folders when they are required for playout.
4. Click **Save**.

Selecting Search Domains

Through the search domains panel, you can tell a Media Cache 2 service to use a user specified search domains list, instead of the central list that you configure in the Media Watcher.

> Note: If you set up the Media Cache 2 Service to use a local domain search list, you must set up TX Play on the same machine to use an identical list.

To select search domains:

1. On the playout server running the Output Server 2 system, expand the **Media Cache 2** service window.
2. Click the **Configuration** tab.

   The **Configuration** panel appears.
3. Click **Local** to switch the service between using the local configuration and the central one.
4. In the **Available Domains** list, select the domains you want to use, then click >> to add them to the **Selected Domains** list.
5. Click **Save**.

Managing Audio Registration, Output and Mapping

In addition to the initial configuration of audio programs and output groups, you may want to change how your audio is registered, output and substituted. Some of this configuration is performed outside of Output Server 2 and the iTX Desktop. This section describes how to perform these tasks.

Separating Mono Tracks on Import

By default, Delivery Manager combines mono tracks to create stereo programs on import. This option can be enabled or disabled within the Delivery Manager endpoint configuration, Once changed, this configuration will only affect newly imported media.

To separate mono tracks in Delivery Manager:

1. From Windows, click **START** > **All Programs** > **iTX 2.0** > **Delivery Manager Config**.

   The **Select Configuration** dialog is displayed.
2. Select a configuration profile and click **OK**.

   The **Delivery Manager Configuration** dialog appears,
3. On the **Delivery Manager Configuration** dialog, select the tab for the endpoint you want to configure.
4. In the **Audio Options** section, uncheck **Group Mono Tracks**.

   Note that the **Group Mono Tracks** checkbox is only displayed if the **Use Audio Import Rules** checkbox is unchecked.
5. Click **Save**, then **Close**.
6. Restart the Delivery Manager service.

Including Language Metadata on Import

By default, Delivery Manager ignores any language audio program labels contained within the metadata of video and voice over media. This option can be enabled or disabled within the Delivery Manager endpoint configuration, Once changed, this configuration will only affect newly imported media.

To include language metadata in Delivery Manager:

1. From Windows, click **START** > **All Programs** > **iTX 2.0** > **Delivery Manager Config**.

The **Select Configuration** dialog is displayed.

2 Select a configuration profile and click **OK**.

The **Delivery Manager Configuration** dialog appears.

3 On the **Delivery Manager Configuration** dialog, select the tab for the endpoint you want to configure.

4 In the **Audio Options** section, uncheck **Ignore Language Metadata**.

Note that the **Ignore Language Metadata** checkbox is only displayed if the **Use Audio Import Rules** checkbox is unchecked.

5 Click **Save**, then **Close**.

6 Restart the Delivery Manager service.

Editing Audio Program Labels

The audio program labels that are currently stored in the iTX Opus database can be viewed, selected and edited from the iTX Desktop's Configuration layout (see page 20) or the Audio tab of the Output Server 2 Configuration user interface.

If the labels are not in use, they can also be edited and deleted. The labels are stored centrally and therefore changes you make on one playout channel are available on all of the other playout channels in the same iTX domain.

Labels that are currently in use cannot be edited. This is indicated by a closed padlock icon on the Audio tab of the Output Server 2 Configuration user interface.

To edit the list of audio program labels

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

2 Select the **Configuration** > **Audio** tab.

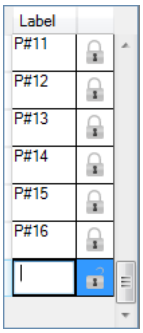
The **Audio Programs** and **Audio Output Program Groups** panels appear.

3 In the **Audio Programs** section, click **Available Labels**.

A list of all of the available labels appears. This includes those created when media was registered (e.g. `P#1`, `P#2`, `P#2`, etc) and user created labels. If languages were defined in an Asset's metadata, they are also displayed, for example `ENG#1`, `ENG#2`, `FRA#1`, etc.

4 You can edit the list of audio program labels in the following ways:

- To edit a label (that is not in use), double-click on its entry in the list and type the required amendment.
- To add a label, click in the blank box at the bottom of the list, type in a name, then press the Enter key.



- To delete an existing entry (that is not in use), select it and press the Delete key.

5 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Editing Audio Programs and Mapping Rules

All of the configuration for existing audio programs can be altered, including the mapping rules, or they can be deleted altogether.

To edit an audio program:

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

2 Select the **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

3 In the **Audio Programs** section, an existing Audio Program mapping rule can be edited in the following ways:

a To rename a rule, double-click on its **Name** cell and type the new name.

b To delete a label from the rules, select the label in the **Preferred Rule** cell or the **Alternative Rule** cell and press the Delete key.

c To change whether the scheduled voice over is applied to the audio program, check or uncheck **Apply VO?**. See Configuring Voice Overs Playback on page 84.

d To change the Dolby metadata configuration, click **Edit** in the **Dolby** column.

The popup Dolby dialog appears. See Configuring Dolby Metadata on page 78.

e To change the upmixing profile for audio programs requiring conversion to Dolby 5.1 or Dolby 7.1, click **Edit** in the **Upmix** column.

The Upmixing Configuration pop-up dialog appears for the selected audio program. See Configuring Audio Upmixing on page 79.

f To change the audio watermarking type and/or settings, click **Add** in the **Watermarking** column.

The Watermark pop-up dialog appears for the selected audio program. See Configuring Audio Watermarking on page 81.

g To change the Automatic Loudness Control settings, click **Add** in the **ALC** column.

The ALC Profile pop-up dialog appears for the selected audio program. See Configuring Automatic Loudness Control (ALC) on page 83.

h To change the output channel, select an alternative from the **Output Channels** drop-down list.

When you select a different output channel type, a pop-up message appears asking if you would like to change the Dolby configuration to defaults that are appropriate for the output type.

Click **Yes** to change your Dolby configuration to sensible defaults or **No** to leave the Dolby configuration as is.

i To delete an audio program, click X at the end of the row.

4 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Editing Audio Output Program Groups

An audio output program group can be edited by changing its audio type, changing the rules assigned to it or by deleting it altogether.

To edit an audio output program group:

1 On the playout server, expand the instance of **Output Server 2** for the channel to be configured (e.g. `ITX1 Output Server 2`).

The Output Server 2 user interface appears.

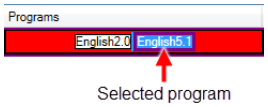
2 Select the **Configuration** > **Audio** tab.

The Audio Programs and Audio Output Program Groups panels appear.

3 In the **Audio Output Program Groups** section, select an output target tab, either **SDI** or **IP**.

4 An existing output group can be edited in the following ways:

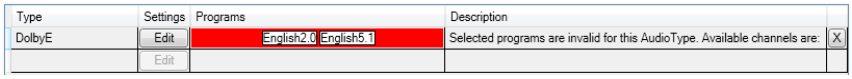
- To change the audio type, select an alternative from the **Type** drop-down list.
- To delete a audio program from the output group, select the program in the **Programs** cell:



Press the Delete key.

- To delete an output group, click X at the end of the row.

Note: If the combination of the selected audio program's output channel and the output group's audio type are incompatible, the **Program** cell turns red and the **Description** cell displays an error, explaining why the selected combination cannot be used together.



To correct this error, change either the output group's audio type or the selected audio programs.

---

5 Click **Save** to store your changes and automatically reboot the Output Server 2 service.

Alternatively, wait until you have finished making changes in other areas of the Configuration panel, then click **Save**.

Overriding the Default ALC Processing State using the Channel Controller

The Channel Controller service's **Engineering** tab features an **ALC** button that allows system administrators to override the initial ALC state (activated or deactivated) for the TXPlay2 channels controlled by the Network channel. This ensures that the initial ALC Processing state is uniformly applied to the channels upon their first start-up.

You can easily identify the channel's current ALC processing state by the color of the ALC button:

- When the ALC button is green, it means that ALC is active on all audio programs in the channel Network whose ALC Profile is enabled.
- When the ALC button is grey, it means that ALC is inactive across all audio programs in the channel Network.

When a schedule is being played out on the Network channel and the ALC button is clicked, an **Activate ALC Profile** or **Deactivate ALC Profile** is added as a secondary event to the on-air primary event in the Schedule Grid and the ALC profile is either immediately activated or deactivated. If no event is currently on-air, the ALC setting will be applied but no secondary event will be added to the Schedule Grid. The ALC event's Item Title in the Schedule Grid acknowledges that the event was added as an "Engineering Override" and the event is also added to the Trigger track in the iTX Desktop's Timeline.

Activating or Deactivating Fill and Key using the Channel Controller

The Channel Controller service's **Engineering** tab features two **Fill and Key** buttons that allows system administrators to override the current Fill and Key states (activated or deactivated) for the TXPlay2 channels controlled by the Network channel.

You can easily identify the channel's current Fill and Key processing state by the color of the Fill and Key button:

- When the Fill and Key button is green, it means that Fill and Key is active on all the channels controlled Network channel.
- When the Fill and Key button is grey, it means that Fill and Key is inactive across all the channels controlled Network channel.

When a schedule is being played out on the Network channel and the Fill and Key button is clicked, a **Fill and Key Manual On** or **Fill and Key Manual Off** is added as a secondary event to the on-air primary event in the Schedule Grid and the event is also added to the Fill & Key track in the iTX Desktop's Timeline. If no event is currently on-air, the Fill & Key setting will be applied but no secondary event will be added to the Schedule Grid.

Honoring NTSC SD Field Orders

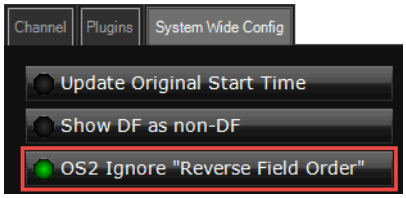
In an Output Server 1 system, the field order for NTSC SD assets often had to be reversed on a per-asset basis for video to playout as expected. This was done by checking the **Reverse Field Order** check box on the **Asset** tab of the **Asset** layout in **iTX Desktop.** Output Server 2 is able to interpret the field order from the media itself. As such, Output Server 2 defaults to ignoring the Reverse Field Order checkbox and plays out the asset as the media dictates.

If you are operating a mixed Output Server system, you may not want Output Server 2 playout servers to ignore assets with reversed field orders. This can be controlled using a global configuration called **OS2 Ignore "Reverse Field Order"**. If this option is set incorrectly for you system, your NTSC SD assets it may play out incorrectly (juddering or shaking).

To configure OS2 to honor Reverse Field Order:

1. On a playout server that is running Output Server 2, start the **iTX Desktop** client.
2. Log in with a system administrator profile.
3. Open the **Engineering** layout.
4. Click **Channel Config**.

   The **Channel Config** pop-up layout appears.
5. Click the **System Wide Config** tab.
6. The **OS2 Ignore "Reverse Field Order"** field is enabled (lit green) by default.



   Click **OS2 Ignore "Reverse Field Order"** to disable it.
7. Click **Close**.
8. The Channel Config pop-up layout closes.

> Note: For Output Server 2, a video asset's detected field order can be seen in the **Field Order** field on the **Locations** tab in the **Asset** layout of **iTX Desktop**.

Maintaining Custom Aspect Ratio Control (ARC) Modes

Custom ARC modes are stored in the iTX database, so when one is created it is available to all channels within the same iTX domain. As such, editing or deleting a custom ARC mode affects all of the channels using it.

Editing a custom ARC mode

> Note: Custom ARC modes can be edited at any time and the very next scheduled item to be played out with matching field values will have its ARC operation and AFD code changed accordingly. This includes those in schedules on other channels that use the same custom ARC mode.

To edit a custom Aspect Ratio Control mode:

1. Open the iTX Desktop and click the **Engineering** layout.
2. Click **Channel Config**.

   The **Channel Config** pop-up layout appears.
3. From the **View** list, select the view containing the channels to be configured. The channels associated with that view appear.
4. Click the name of the channel to be configured.
5. Click the **Channel Config 4** tab.
6. In the **Advanced Aspect Ratio Control** panel, click **Configure Mapping...**

   The **Advanced Aspect Ratio Control - Mapping Configuration** dialog appears.
7. In the **Advanced Aspect Ratio Control - Mapping Configuration** dialog, click **Select...**.

   The **Select Item** dialog appears.
8. Select the ARC mode to be edited then click **OK**.

   The select custom ARC mode and its settings appears.
9. Modify the Input and Output Aspect Ratio, size and position as required. For more information see To remove the previous baseline subtitle configuration for legacy subtitles:, on page 97.
10. When you have finished making changes, click **Save**.
11. Click **Close**.

    You are returned to the **Advanced Aspect Ratio Control - Mapping Configuration** dialog.

Deleting a custom ARC mode

It is possible to delete a custom ARC mode from any iTX channel. If the deleted custom ARC is still in use (either on the selected channel or any other channel), iTX will automatically restore it.

To delete a custom Aspect Ratio Control mode:

1. Open the iTX Desktop and click the **Engineering** layout.
2. Click **Channel Config**.

   The **Channel Config** pop-up layout appears.
3. From the **View** list, select the view containing the channels to be configured. The channels associated with that view appear.
4. Click the name of the channel to be configured.
5. Click the **Channel Config 4** tab.
6. In the **Advanced Aspect Ratio Control** panel, click **Configure Mapping...**

The **Advanced Aspect Ratio Control - Mapping Configuration** dialog appears.

7 In the **Advanced Aspect Ratio Control - Mapping Configuration** dialog, click **Select...**.

The **Select Item** dialog appears.

8 Select the ARC mode to be deleted then click **OK**.

The select custom ARC mode and its settings appears.

9 Click **Delete**.

The item is deleted with no further confirmation or prompts and the first custom ARC in the select list is displayed.

10 Click **Close.**

You are returned to the **Advanced Aspect Ratio Control - Mapping Configuration** dialog.

11 Click **OK** to close the **Advanced Aspect Ratio Control - Mapping Configuration** dialog.

About Restored Custom ARC Modes

If the custom ARC mode was assigned to a channel, it is not removed from the iTX database.

When the Advanced Aspect Ratio Control - Mapping Configuration dialog is next accessed from a channel using a deleted custom ARC, a warning will appear to say the deleted custom ARC mode has been restored.

If a new custom ARC is created with the same name as a deleted custom ARC, when the deleted one is restored, its name is appended with a dash then a number. e.g. a custom ARC mode called `example_custom_arc` would be restored as `example_custom_arc-1`.

To permanently delete a custom ARC mode, it must be unassigned on every channel that is using it before being deleted.

Deleting a Channel

Channels can be deleted from the ITX Channel Config dialog of TXPlay 2 Config.

IMPORTANT

- You must make sure you stop the instances of TXPlay 2 and Output Server 2 associated with the channel to be deleted before you begin.
- Deleting a channel from an playout server does not remove it from any views in iTX Desktop.

To delete a channel:

1 On the Windows desktop of the playout server, double-click on the **TXPlay 2 Config** icon. The **ITX Channel Config** dialog appears.

2 If there is more than one channel configured on the playout server, select the channel to be deleted from the **Channel Name** drop-down list.

3 Click **Delete Channel**.

The channel disappears from TXPlay 2 Config.

4 Click **Save** to confirm the deletion.

Configuring Server Controller for Output Server 2 Components

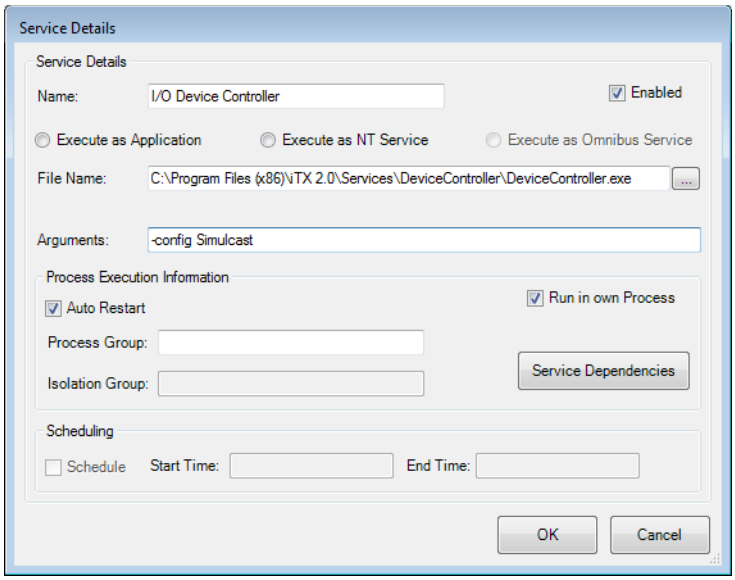
Under normal operating conditions, the Service Controller configuration for each iTX service is updated and maintained by modifying their respective configuration utility. For example, the running the TXPlay2 Config utility defines the Server Controller arguments for Output Server and I/O Device Controller. However, sometimes it is necessary to make changes to the way a service runs by changing the Server Controller configuration directly.

Server Controller Configuration for the I/O Device Controller

To edit the Server Controller configuration for I/O Device Controller:

1. From Windows, click **Start** > **All Programs** > **iTX2.0** > **Server Controller Config**. The Server Controller Configuration dialog appears.
2. Go to the **Services** tab.
3. Select the **Device Controller** service then click **Edit**.

   The **Service Details** dialog appears.



4. Make sure **Enabled** is checked. This will run the instance of the service when Server Controller is started.
5. In the **Arguments** field, the following arguments are available:

Argument	Description
`-config SingleChannel`	Single input, single output channel.
`-config SingleChannel4K`	Four inputs, four outputs for a single channel.
`-config DualChannel`	Two independent channels, each with a single input
`-config DualLive`	Single channel with two inputs
`-config DualFK -device Corvid88`	Single channel with two inputs and two pairs of Fill & Key inputs
`-config Simulcast`	Two channels sharing two inputs

6 Make sure **Auto Restart** is checked. This ensure Server Controller automatically restarts the I/O Device Controller service in the event of a failure.

Server Controller Configuration for Output Server 2

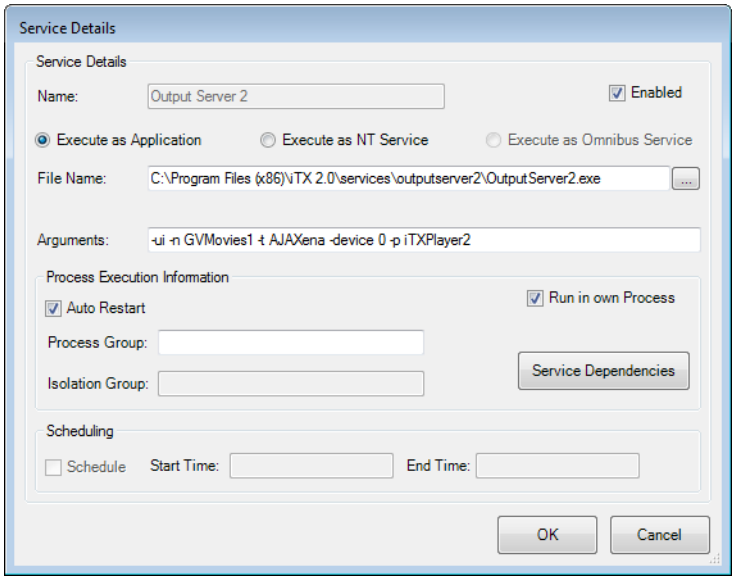
To edit the Server Controller configuration for an Output Server 2 channel:

1 From Windows, click **Start** > **All Programs** > **iTX2.0** > **Server Controller Config**. The Server Controller Configuration dialog appears.

2 Go to the **Services** tab.

3 Select the **Output Server 2** service then click **Edit**.

The **Service Details** dialog appears.



4 Make sure **Enabled** is checked. This will run the instance of the service when Server Controller is started.

5 In the **Arguments** field, the following arguments are available:

Argument	Description	Inclusion
`-ui`	Enables the user interface, which is required to access Output Server 2's Configuration and Engineering panels.	Required
`-n <Name>`	Specifies the name of the service. For example, for a channel called "GV Movies 1" you might enter: `-n GVMovies1` (no spaces) A user friendly alias for channel names can be created in iTX Desktop.	Required
`-backup`	Used to indicate an instance is a backup service.	Optional

Argument	Description	Inclusion
`-t <Card type>`	Describes the type of video or audio card fitted in the host machine. In most cases this will say: `-t AJAXena`.	Required
`-id <Letter>`	Used to identify the inputs/outputs on the video/audio I/O card being used for the channel. For example: `-id A` or `-id B`.	Required for: • Corvid 44 • Corvid 88 • Dual Corvid LPs
`-p <plugin name>`	Identifies the media application framework plugin to be used with Output Server 2. Valid values include: • `-p iTXPlayer2` (default value) • `-p Simulator` (use for testing only)	Default
`-ratefamily <framerate>`	Specifies the frame rate to use for the channel, overriding the valid specified in I/O Device Controller's configuration. Valid values include: • `-ratefamily 50` • `-ratefamily 59.94` • `-ratefamily 24` • `-ratefamily 23.98` Note: • If you add or change this argument you will need to reselect the Resolution from the Output Server 2 user interface.See Selecting the Channel Resolution and Frame Rate on page 64. • If the frame rate family specified in Output Server 2 does not match that of the I/O Device Controller, Output Server 2 will start up in an error state.	Optional

6 Make sure **Auto Restart** is checked. This ensure Server Controller automatically restarts the Output Server 2 service in the event of a failure.

Viewing the Output Server 2 Engineering Panel

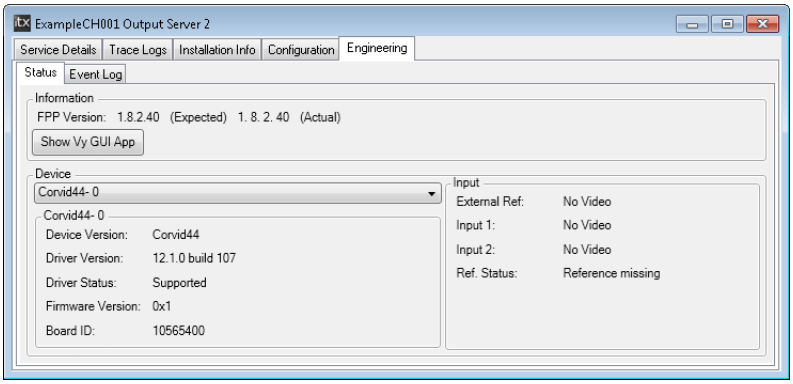
Along with the Configuration panel, Output Server 2's user interface includes an Engineering panel, which contains the following tabs:

- **Status**
- **Event Log**

For information on accessing the user interface, see Selecting the Channel Resolution and Frame Rate, on page 64.

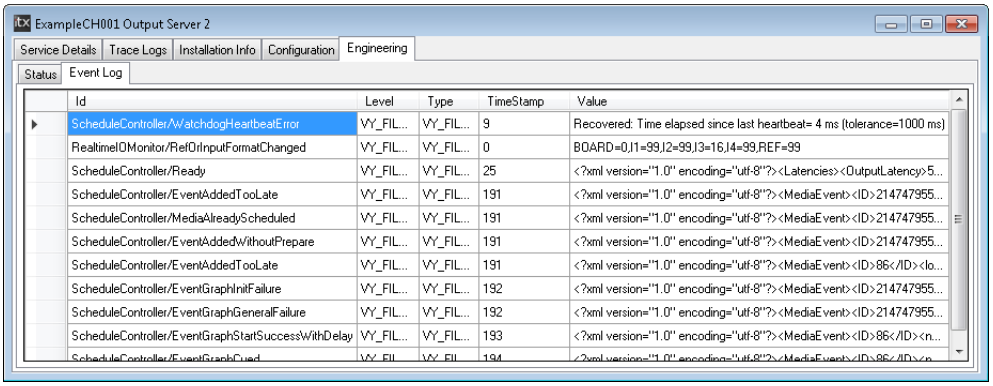
About the Status tab

The Status tab shows the input status of the video/audio I/O card and information about the GV Engine. It also allows you to select the I/O Device and also adjust the audio synchronization for the current clip.



About the Event Log

The Event Log displays events sent from GV Engine to Output Server 2. This information can be used by GV Care to diagnose potential issues with either FPP or Output Server 2.



About Logging for Output Server 2

Log File Locations

The log files for an Output Server 2 channel and its related components can be found in the following locations:

Component	Logs
Output Server 2 service	Each messages sent from TXPlay 2 to OutputServer2 is logged as an individual XML file in the following location: **C:\ITXLogs\OutputServer\YYYY-MM-DD*.xml**
VyConsoleApp for FPP	Each pooled VyConsoleApp process creates its own log file in the following location: `%APPDATA%\Miranda\VyConsoleApp_CHANNELNAME_SC_COM_POOLID.log.*`
VyCOMScheduler for FPP - Engineering logs	The engineering logs are written to the following location: `%APPDATA%\Miranda\VyCOMScheduler\VyCOMScheduler_CHANNELNAME.log` This file will roll over when it reaches about 10 MiB and up to 5 rolled over files are kept.
VyCOMScheduler for FPP - Command logs	All commands that VyCOMScheduler receives are logged as executable powershell scripts. `%APPDATA%\Miranda\VyCOMScheduler\SchedulerCommandLog.ps1.*` This file will roll over when it reaches about 10 MiB and up to 5 rolled over files are kept. **Note:** These scripts must be provided when reporting an issue since it tells Grass Valley Support exactly what Output Server 2 received and when, and allows Grass Valley Support to replay the commands.

Custom logging profiles from iTX v2.8 onwards

For each iTX service there is a corresponding logging profile file. These are XML files that provide the service with parameters for how to collect and output logs. Although these logging profile files are distributed with default parameters, you can edit them to create custom logging profiles.

Each logging profile file has the same filename as the service it is for, followed by `.logging`. For example, `OutputServer2.exe` has a logging profile file called `OutputServer2.exe.logging`.

iTX v2.8 introduced 64-bit versions of Output Server 2 and I/O Device Controller, with executable filenames that end `_x64.exe`. If you have any existing custom logging profiles for either Output Server 2 or I/O Device Controller they will no longer work, as the 32-bit executables to which they refer are no longer active.

To continue using your custom logging profiles for Output Server 2 or I/O Device Controller, you will need to copy their configuration from the old file to the 64-bit version.

To copy a custom logging profile to the 64-bit version:

1. On the Appliance Server running Output Server 2, open Windows Explorer.
2. Navigate to the `Services` folder for the iTX installation, e.g. `C:\Program Files (x86)\Services`.
3. To update the logging profile for the 64-bit Output Server 2:
   a. Open the folder `OutputServer2`.
   b. Open `OutputServer2.exe.logging` in a text editor, then copy and paste its contents into `OutputServer2_x64.exe.logging`.
   c. Save `OutputServer2_x64.exe.logging` and close the text editor.
4. To update the logging profiles for the 64-bit I/O Device Controller:
   a. Open the folder `DeviceController`.
   b. Open `DeviceController.exe.logging` in a text editor, then copy and paste its contents into`DeviceController_x64.exe.logging`.
   c. Save `DeviceController_x64.exe.logging` and close the text editor.
5. Using Server Controller, restart the Output Server 2 and/or I/O Device Controller service(s) to pick up the changes to the logging configuration.

Grass Valley Technical Support

For technical assistance, contact our international support center, at 1-800-547-8949 (US and Canada) or +1 530 478 4148.

To obtain a local phone number for the support center nearest you, please consult the Contact Us section of Grass Valley's web site (www.grassvalley.com).

An online form for e-mail contact is also available from the web site.

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