Compere Show Creation

Actor

User Guide

7THSENSE

Actor : User Guide

This edition is for software version Actor 1.0-7
Document ref.: M702-2

E: info@7thsense.one
W: 7thsense.one

7thSense Design Ltd

2 The Courtyard, Shoreham Road
Upper Beeding
Steyning
West Sussex
BN44 3TN
UK

T: +44 (0) 1903 812299

7thSense Design LLC

4207 Vineland Rd
Suite M1
Orlando, FL 32811
USA

T: +1 407 505 5200

Introduction

In the 7thSense 'performer' range, Actor® is the media server, stage-managed by Compere® to play a scripted show of media sources and display outputs, on timelines.

Actor media servers can operate as single units, project grouped to increase the number of available GPU outputs, or scaled right up by feeding them into Juggler pixel processors. In all scenarios, the project group, all configuration, the timeline building and playback is handled by Compere. The Actor render engine runs on all clients and the full Compere UI runs on a control PC. Any other member of the Project Group can act as the group server.

The key elements to Actor are:

➢ asset management, ingest and media transformation

➢ timeline building and playback (render engine)

➢ input and output feed management.

Actor runs on each media server in a Compere Project Group, running timelines created through the Compere user interface on a control PC.

Related User Guides

➢ M760 Compere User Interface Guide

➢ M860 Managing Assets in Compere

➢ M750 Operating R-Series, P-Series Media Servers

➢ M757 Operating Juggler 2 Pixel Processor

➢ M611 Operating Juggler 1 Pixel Processor

➢ M710 Compere JSON External Control Protocol from our PDF Library

Terms and Definitions in Compere

We use a lot of terms that are specific to the Juggler-Compere world, so it's worth being familiar with them.

Tooltips are implemented throughout Compere, with longer descriptions for labels in panels and toolbars.

Term	Definition
Actor®	In the 7thSense 'performer' range, Actor is the media server for timeline and asset management, input/output configuration, and output rendering.
Asset	Any piece of file-backed creative material, or modifier of it, that can be used on a timeline. Assets can be copied and will have associated metadata. May be movie, image, audio, MPCDI, mesh object etc. Assets are ingested by Compere's Asset Logistics.
Asset Logistics	The underlying mechanism (app) that ingests assets into protected locations and manages the metadata. It also tracks and distributes assets around the project group.
Asset Management	The Compere component that interacts with the asset database to present metadata of all assets available on the network, and make them findable and accessible to use on timelines.
Bus	Juggler: The fibre-optic data bus connects Jugglers together to direct any input through any process to any other Juggler output in the system. The bus can carry individual media streams (input bus) or the whole system canvas (output canvas bus), and its overall bandwidth is dependent on the unit configuration.
Bypass	Juggler: A media stream input is directed in the same Juggler to a matched-type and resolution output, requiring no processing.
Canvas	Juggler: An array of pixels that is attributed to the combined resolution of number of physical outputs, for displaying media.
Canvas panel	Juggler: The assembly panel containing the total available video space for a Juggler system. This panel can contain multiple display canvases on which Canvas Outputs can be positioned.
Canvas Output	Juggler: A section of a composited canvas that is delivered to an output port via a Juggler.
Canvas Window	Juggler: A source of video that can be positioned on a Juggler Canvas across one or more Canvas Outputs.
Clone	xml descriptor for a project entity, e.g. canvas+outputs+windows; projectors; Juggler configuration; 3D model arrangements. Contains all properties and can be saved and reused by loading into in any project. Unlike presets, clones are saved without UUIDs.
Compere®	The project management software and UI that manages the other 'performers': Jugglers, Actors, Conjurers.
Conjurer®	In the 7thSense 'performer' range, Conjurer introduces generative media as a playback resource.
Connector	A physical signal connection on a device of any type (e.g. DisplayPort, HDMI, SDI, QSFP module or bus), input or output.
Database	Actor: All timeline resources (assets) are indexed in a distributed database, from which the Asset Manager derives all metadata. This allows for searching, filtering and locating assets for use on timelines.
Device	Any item of hardware that can run perform in a Project Group (Actor, Conjurer, Juggler).

Term	Definition
drop frame	In order to match video at 29.97 fps with real time clocks at 30 fps, (or 59.94 with 60 fps) this time code drops two frames every minute, on the minute, except every tenth minute. In Compere, drop frame timecode is written with semi-colons HH;MM;SS;FF or HH;MM;SS;ms. See https://en.wikipedia.org/wiki/SMPTE_timecode for a full explanation.
External Control	JSON SDK for command-style control over IP to address and message any element in a Project of networked devices.
Filepath	Refers to a specific file location rather than another item in a Project.
FPGA	Field Programmable Gate Array. The main component for video processing in Juggler.
Grid	A background scaling and positioning guide used in the assembly panels: e.g. Canvas, Nodes and Visualise.
Input Feeds panel	Actor: Select pixel areas from inputs (e.g. timelines) to display across the combined outputs of a media servers.
Ingest (assets)	Bring assets of any kind into a protected storage location and index it in the distributed database, incorporating editable metadata.
IntelligentSource™	7thSense automatic failover system.
Internal processor	Single board computers used in Juggler and R-Series servers managing internal communications and/or front panel touch-control displays.
Juggler®	A Juggler pixel processor unit of any configuration of inputs and outputs. Its external connections and internal processing are all managed by Compere to work with other 'performers'.
Media	Audio or visual creative content saved into a file format. Specific types of assets.
Mini Map	A small preview representing the current viewing position and enabling navigation, amongst all nodes available in the Nodes panel.
MinGUI	Compere running with minimal user interface where the overhead of the full GUI and panels is not needed, for example in client devices in a project group.
Network Client	Any network device running an instance of Compere that is not a Network Server.
Network Discovery panel	Manages all network connections between devices, allocates them to Project Groups and assigns group roles.
Network Server	Network device assigned as Compere 'project coordinator' across all devices. The server receives and distributes all changes to the project.
Node	Generic: UI object with pins that can be connected to other UI objects with pins to create flows and processes. Type: [device], device interface, source, process node, logic node etc.
Nodes panel	An assembly panel into which collections of nodes are introduced, and connections and processes built.
Output Canvas Bus	(OCB) An alternative bus mode. The canvas with its outputs and windows is carried around the bus, rather than being assembled from independent Juggler inputs that individually can be carried on the bus.
Output Feeds panel	Actor: Add, scale and position viewports across the combined outputs of a media server.
Panel	Any moveable section of a workspace, most of which can be docked with other panels.
Panel Settings	In Configuration> Settings: Properties that define how the contents of an assembly-type panel are seen. Settings are shared by all project users, unless 'use local settings' is set in Preferences.

Term	Definition
Path	In Compere, a path is the route to any Project component, allowing it to be addressed in order to obtain its value or to change it.
Pin	UI representation of a input or output connector, real or virtual.
Preset	Presets capture arrangements and settings for components in a Project. When recalled to the same Project, nothing is added to the Project, but dimensions and locations etc. of existing project components will be set again to those of the saved preset. *Example of use*: multiple arrangements of windows in a canvas or canvases.
Project	A single dataset of information for a system of networked devices, display configurations and show elements, shared and used by all Compere nodes. (Think stage, lighting and cast of performers with various roles and props.) The project dataset includes connections and configurations of all associated devices and assets. Every element in a Project has its own universally unique identifier (UUID). All project data can be stored and recalled, in a .prj file.
Project Group	A network Project Group comprises all devices on the same network assigned to work together in a specific way.
Project panel	Itemises every element of a Compere project: all devices, inputs, outputs and their connections, everything added to the project, from canvases to all assets in use on timelines.
Properties panel	Properties panels reveal all properties and settings, to read or edit, for selected items. A Properties panel can be locked to the selected item, allowing other properties panels to be opened to show other selections.
Resource	A replicable or reusable entity that can be used as a configurable copy in a project.
Rx / Tx	Rx (receive = an input), Tx (transmit = an output) typically used to identify connectors.
Task Tracker	Dynamic icon and panel displaying progress of internal project operations.
Timeline panel	Assembles assets and other resources, effects and and controls, on multiple layers for show creation and playback. Actor can have any number of timelines, viewed in separate timeline panels. Each timeline presents a feed which can be viewed in NDI.
Timeline Preview panel	Shows visual media from the combined viewports of a given timeline as arranged in the Output Feeds panel.
UUID	Every element in a Compere Project is assigned a Universally Unique IDentifier so that it can be addressed by any other part of the system, for example by external control commands.
Video Channel	Transport route through a Juggler. There are up to 4 video channels per Juggler 1 and up to 6 per Juggler 2.
Viewport	An area of a video input resolution selected in the Input Feeds panel and represented in the Output Feeds panel, to appear on a device output. A viewport has an input face and an output face and is assigned to a single video input.
Visualise panel	The assembly panel in which a 3D view of projectors and surfaces in an illuminated theatre space, can be created and manipulated.
Workspace	An arrangement of panels that can be saved.

Keyboard Shortcuts

Keyboard shortcuts are shown in menus and button dropdown lists, but some that you might use most often may be worth learning.

General

Mouse / key	Function
Left mouse + drag	Pan a whole grid and everything on it.
Left mouse + Shift + drag	Reposition and resize objects on a grid.
Right mouse click	Raise a context menu. There may be additional items relevant to the area or object clicked (shows a green border around the selected object).
Left mouse click	Select an item in a list (list panel type, menu, drop-down selector). In the **Canvas** panel, selects an object according to interaction mode.
Left mouse double-click	Select an object or part (shows an orange bounding box, populates the Properties panel).
Mouse wheel	Zoom in/out about the cursor point
=/− keys (main keyboard) +/− keys (num pad)	Zoom in/out
V	Bring all objects in an assembly panel into view.
Ctrl+s	Save the project
Ctrl+j	Select all Jugglers
Alt+F4	Quit Compere (standard Windows function)

Nodes panel

Key	Function
Shift+i	Import an MPCDI file
Ctrl+Alt+d	Clear temporary MPCDI data
Ctrl+j	Select all Jugglers
Ctrl+Shift+Alt+j	Calculate (red) bus links (same as toolbar button to show all bus links). Note that connections require a minimum zoom level to show, and must first be calculated.
h	Cycle display around revealed Juggler bus connections: All; Selected Jugglers only; None.
k	Cycle display around processing node links: All; Selected nodes only; None.
Shift+Alt+b	Reset the bus
Ctrl+x	Show / hide all text in Juggler nodes
Delete/Backspace	Remove link from selected pin

Canvas panel elements

Key	Function
m	Toggle interaction mode (None/Canvas, Outputs, Windows)
n	Toggle NDI in Windows
Alt+t	Toggle NDI transparent
Alt+m	Toggle the minimap
Shift+drag	**Outputs** and **Windows**: snap to edges
Shift+f	Toggle a Window to fill the parent Canvas
Ctrl+cursor left	Move selected Windows to align with left edge of Canvas
Ctrl+cursor right	Move selected Windows to align with right edge of Canvas
Ctrl+cursor up	Move selected Windows to align with top edge of Canvas
Ctrl+cursor down	Move selected Windows to align with bottom edge of Canvas
Shift+c	Centre a Window in the canvas
Cursor left	Move selected Window/Output/Canvas left one unit
Shift+cursor left	Move selected Window/Output/Canvas left 10 units
Ctrl+Shift+cursor left	Move selected Window/Output/Canvas left 100 units
Cursor right	Move selected Window/Output/Canvas right
Shift+cursor right	Move selected Window/Output/Canvas right 10
Ctrl+Shift+cursor right	Move selected Window/Output/Canvas right 100
Cursor up	Move selected Window/Output/Canvas up one unit
Shift+cursor up	Move selected Window/Output/Canvas up 10 units
Ctrl+Shift+cursor up	Move selected Window/Output/Canvas up 100 units
Cursor down	Move selected Window/Output/Canvas down one unit
Shift+cursor down	Move selected Window/Output/Canvas down 10 units
Ctrl+Shift+cursor down	Move selected Window/Output/Canvas down 100 units

Juggler admin

Key	Function
Shift+c	Show Juggler console window
Ctrl+Alt+c	Upgrade Compere version on a Juggler or Jugglers

Key	Function
Ctrl+Alt+e	Upload an EDID to a Juggler or Jugglers
Ctrl+Alt+f	Update firmware on a Juggler or Jugglers
Ctrl+Shift+e	Upload a script to a Juggler or Jugglers

Beam control

Key	Function		Key	Function
Individual	**Off**		**Individual**	**On**
Ctrl+r	Red beam off		Ctrl+Alt+r	Red beam on
Ctrl+g	Green beam off		Ctrl+Alt+g	Green beam on
Ctrl+b	Blue beam off		Ctrl+Alt+b	Blue beam on
Ctrl+w	RGB beams off		Ctrl+Alt+w	RGB beams on
All	**Off**		**All**	**On**
Ctrl+Shift+r	All Red beam off		Shift+r	All Red beams on
Ctrl+Shift+g	All Green beams off		Shift+g	All Green beams on
Ctrl+Shift+b	All Blue beams off		Shift+b	All Blue beams on
Ctrl+Shift+w	All RGB beams off		Shift+w	All RGB beams on

Actor / Timeline

Key	Function
f	Toggle Render window fullscreen
r	Rewind Timeline to start
spacebar	Stop/start toggle for playing a timeline
t	Create a new timeline
Ctrl+c	Copy a selected asset or assets
Ctrl+v	Place copied asset(s) to start at the current playhead position on a selected layer if available (empty and the same media type), or on a new layer if not
Ctrl+Shift+v	Paste copied asset(s) at a specified time on a selected layer if available (empty and the same media type), or at the specified time on a new layer, if not or if required
Ctrl+x	Remove selected asset(s) from the timeline; this does not delete the asset from the project and the asset can be pasted elsewhere
Ctrl+m	Add a timeline marker

Key	Function
Ctrl+Shift+m	Add a timeline marker at a position (raises dialog to specify)
Ctrl+g	Go to frame and stop (raises a dialog to specify)
= and - (or mouse wheel)	Zoom in and out of the timeline horizontally. Add shift for vertical layer zoom.
Ctrl+z	Zoom to fit all timeline assets into current panel view ('zoom extents')
Ctrl+ ◄ ►	Step playhead to next marker left/right on this timeline
Ctrl+Shift+ ◄ ►	Step playhead to previous / next asset start frame on this timeline
Cursor keys: ◄ ►	Nudge timeline asset one frame at a time

Configuration

Actor as a Compere Performer role, requires appropriate Codemeter licences on the Actor media servers. The Actor features in Compere for the media servers are the render engine itself, input and output feed management, asset management, and show timelines. Licence details can be seen in an Actor front panel display.

This guide describes the features of Actor in Compere.

Actor media servers, typically 7thSense R-Series or P-Series range, are connected into a common network. They are added to a Project Group using the Compere Network Configuration panel (see M760 Compere UI User Guide). Each Actor will then be listed in the Compere Project, and is configurable there.

Actor Media Servers in a Project System

Actor media servers can be used alone or in small groups to deliver shows managed by Compere, out to HDMI or DisplayPort. They can also be used scaled up to very large venues, displays and resolutions when used to provide inputs to Juggler pixel processor systems. All performers in the range are ST 2110 capable, making them suitable for the very largest installations.

The workflow for building up Compere systems will therefore vary according to all the performers in the Project Group. All 7thSense devices in the project are listed in the Project panel under 'Devices', clustered by type. Each is a fully configurable node in the overall system (select and view the properties panel).

When Jugglers are involved, these become the processors for the entire canvas of pixels, with other performers as inputs, and the Jugglers provide the required outputs for display. (See Configure a Display with Juggler in the Compere user guide.)

Without Jugglers, Actors capture inputs and/or pre-rendered media and play timelines. In all cases, Actor outputs are configured to place pixels captured from their inputs on their GPU outputs. (See Video I/O Feed Management [22].)

Actor in the Project Panel

The Compere Project manages everything, so Actor also includes all its elements there too. Inputs, Outputs, Timelines, and all associated devices (hardware running Compere as a performer) and interfaces will be added as an Actor-based system is constructed.

Every device in the Project panel Devices tab can be regarded as a node that can be added to the Nodes panel for interconnections and processes, and can be addressed via external control. This makes media servers and connections configurable.

Project Devices

Project devices are the hardware elements (internal devices) available to join a Project Group to perform a role: Juggler, Actor, or Conjurer. All devices connected in the project network show here in the panel, and when selected, their connections are exposed: GPUs, ST 2110 inputs and outputs, audio, GPIOs, video channels and so on.

Video

GPUs are selectable under the project tree 'devices' tab under 'Outputs'.

Audio

Audio playback is configured by selecting the local audio device under the project tree 'devices' tab under 'Devices', and editing the properties. This includes enabling audio with that device.

➢ see <ins>Audio Playback</ins> [58]

Project Tree

As Projects and timelines are constructed, all the elements that comprise a show from inputs through to media on audio visual outputs is assembled as project contents. The structure is useful to understand, though mostly there are easier points of access to address the properties of particular contents.
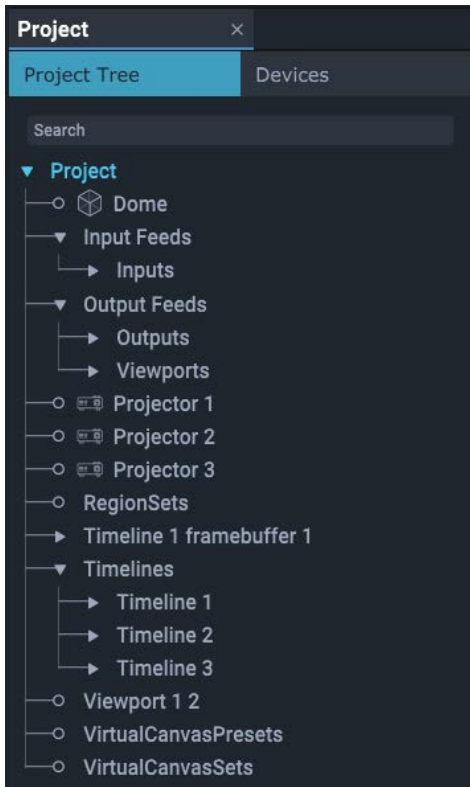
Video: Input Feeds section

All video inputs are listed together, whether external streams or in-project timelines. When a timeline or other input is brought from the Project Tree into the Input Feeds panel, it creates a video **framebuffer** listed under Inputs. These framebuffers have the pixel resolutions presented as a whole by each timeline. Inputs, including timeline framebuffers, can be renamed and are listed alphabetically.

Other direct inputs such as cameras, ST 2110 streams and NDI inputs will be listed in the project tree in their own right. Any input brought in as a Node becomes available to the Input Feeds panel.

Note that an NDI feed from a named source can be utilised solely as an internal live tracker within Compere UI, or as a timeline resource. In the former case, it is a direct internal feed, in the latter case, it is displayed as any other timeline resource but is also available to place for internal tracking. To display NDI feeds on a model in the Visualise panel, make sure the Actor output source of the feed (under 'Devices') has the property 'Add to Preview' enabled:
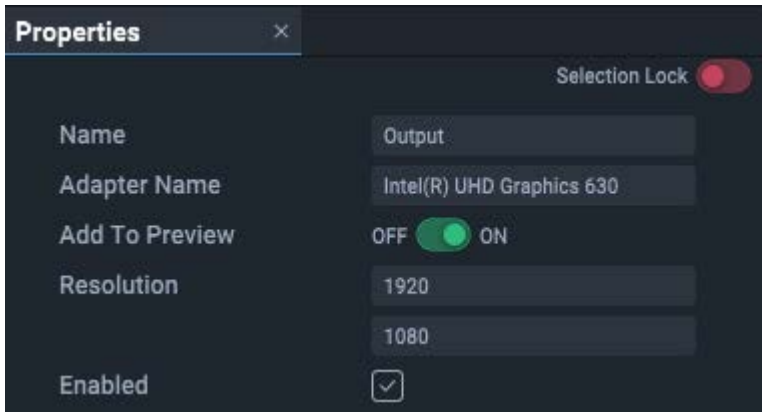
The role of viewports

Pixels from inputs are collected selectively for processing as streams by applying **viewports** over them. These are 'children' of input 'parents'. Viewport pixel areas can be bigger than an input, or cover only part. Several viewports can be applied to a single input, reducing the bandwidth of each stream, or a single viewport applied over the whole input to cover all or a selected area of outputs. Viewports belong to inputs as children.

➢ see [Input Feeds Panel](#) [35]

Video: Output Feeds section

When device outputs are introduced from the Project panel (under Devices) into the Output Feeds panel, to assemble an array of outputs, they are added here to the project as output areas. Dimensions are inherited from the EDIDs of the devices, and relative positions are set by the user. They can be renamed for easier identification, and arranged in whatever matrix arrangement is required.

Viewports, the video streams selected from the timeline input framebuffers, are replicated in the output feed manager, so initially appear sequentially as 'Viewport1, 2, 3' and so on in the same way as for the input feeds. Viewports can be renamed, can be resized or scaled, and the feed rotated in 90 degree increments within the viewport.

As in the Input Feeds panel, output viewports can be positioned anywhere over a display area of multiple outputs, so are at the same hierarchical level as outputs. The difference is that the viewports are not attached to any particular output area.

Other direct outputs such as ST 2110 outputs will be listed in the project tree in their own right. Any output brought in as a Node becomes available to the Output Feeds panel.

➢ see [Output Feeds Panel](#) [38]

Timelines section

Timelines are listed together in the order they are added. Each timeline has nested layers:

Timeline Layers are added when assets are placed on a timeline. A timeline layer can only contain assets of one type (audio, image, movie etc.).

Timeline Groups are added to a timeline when multiple assets on a timeline are made into a selection group (select assets on a timeline, right-click and 'Add selections to group'). Timeline Groups can be renamed.

Keyframe sets added to a layer, comprise a set of points along the timeline with associated properties of any entity, so that they are changed smoothly between the points. The entity is listed in the layer resource set of the same layer. Keyframes, for example may be used to change size, position, opacity of a viewport, a layer, a timeline, a window, or a movable object, lens characteristic etc.

Layer Resource Sets are all the assets that have been added into a layer.

Timeline Markers run through all layers are added at the playhead position but can be dragged or assigned to any position to trigger an action or control. They mark a position and can be used for stop and rewind.

➢ see [Timelines](#)

Non-timeline entities

Other entities in the project, such as cameras, NDI receivers, projectors or object models, and audio DSPs, are added to the project as root-level entries. Connections between devices and other content are made in panels such as Nodes or Visualise.

Resources

Resources are those generalised items brought into a project to be configured for a purpose, and they tend to be highly contextual. Essential resources for Actor include ST 2110 inputs and outputs, NDI feeds, Ethernet nodes, shared textures and viewports.

NDI feeds, for example, can be dragged onto a timeline as an asset, or directly onto the Input Feeds panel as a stream.

Managing and Organising Assets

Actor runs an integral database that is installed with Compere, to manage all timeline assets. This Apache CouchDB component is installed and runs as a service on each Actor server. The database runs on a peer-to-peer architecture, distributed to all devices running the **Asset Logistics** app, which manages the database and its contents.

This is a highly flexible and resilient-to-failure architecture.

Assets are introduced into Compere systems by **ingest** from named '**watched**' locations into secure, controlled locations '**vaults**' on devices. Locations and numbers of vaults is determined by the user for optimal performance and ease of use. For example, in a small system one vault on one server may be enough. However, where large media is divided into sections, local vaults per section server will be faster. For very large media, a networked storage solution might be an appropriate ingest point, distributing assets to multiple server vaults only as locally required for each section.

Assets placed in watched locations are detected by the Asset Logistics application. As they are being ingested, they are recorded in the database with the assets' implicit properties, plus additional (editable) metadata, and moved out of the watched location into selectable locations from where they can be accessed to deploy on timelines.

Watched locations are then left empty.

Any Actor device can be used to ingest assets. Distribution amongst servers is handled by an FTP server installed with Compere.

Assets include anything that might be required on a timeline, such as video, audio, shaders, maps, Notch blocks, mesh models and so on.

For a complete, and more technical explanation of the Asset Logistics application, and managing assets in Compere, see the separate user guide which describes the ingest process and using database tagging for sectioned media, destination locations and distribution. This guide describes the content and use of the Asset Management panel for populating timelines.

➢ M860 Managing Assets in Compere

Notch Blocks

Notch Blocks are separately-licensed special effect .dll files that mostly modify video assets and can be used in timelines. Each has a set of dynamic user-modifiable parameters. A Notch dongle is required to run these effects on a server.

Notch blocks are ingested via Asset Logistics and dragged onto layers over visual assets. Duration can be set alongside all the parameters of the particular block exposed in the properties.

Capture Sources

For capturing streams, other timeline resources are available. These are found in the Resources panel, and include NDI input and ST 2110 Input.

Drag a capture resource onto a timeline layer, and use the Path property to assign its source. Enter the name of the NDI feed, or the path of the SDP file for an ST 2110 source.

ST Maps

ST maps are used in warp mapping and are ingested via the asset logistics app see [M860-managing-assets-in-compere](#).

Video I/O Feed Management

Compere allows complete flexibility in directing input stream content onto display surfaces. Requirements are quite diverse, depending on the devices in the project group, what input streams are available, and what display surfaces are being used.

From video input feeds, whether live streaming or from timelines, Compere will paint across any available outputs from Actors in the Project Group. All inputs and outputs for each Actor device in the group will be found in the Project panel.

The resolution of any input is defined by either its native resolution (e.g. an HD camera) or the largest width and height dimensions of any media on a timeline. On a timeline, all media is based on a common origin of 0,0.

Pixels in are conveyed to pixels out via viewports.

A Generalised Workflow

1. Bring the required device video **outputs** into the Output Feeds panel and arrange them.

2. Bring the required **timelines** and/or direct **inputs** into the Input Feeds panel (note the separate listings).

3. Bring **viewports** onto each input to select the required pixels, bearing in mind the comparative resolutions of source and the outputs where they will be displayed. These viewports will now also be represented in the Output Feeds panel ready for positioning.

4. The viewport output 'faces' can be used to scale video pixel selections onto outputs.

5. Make sure that everything is named so that is is clearly identifiable to the users.

   - If multiple viewports are assigned to an input, they will be arranged relatively the same, over the outputs. Positional names can be useful (Top Left, Bottom Right, etc.)

   - If multiple inputs are assigned to display over a common arrangement of outputs, it is important to be able to identify the viewports by their input names.

If you have multiple timelines captured by a **common viewport arrangement** in the Input Feeds panel, these can simply be copied for subsequent timelines by right-clicking the new framebuffer in the panel, and clicking 'Copy viewports from'. Select the required timeline name and click 'Create'.

How Actor Inputs Relate to Outputs

The required arrangement is set up initially in a pair of panels that work together: the Input Feeds panel and Output Feeds panel. These can be resized and docked, perhaps arranged into a workspace you want to retain for setting up or adjustment.

The Input Feeds panel is where you place inputs and decide the content to take through to device outputs (including only selected areas from timeline framebuffers or streaming sources):
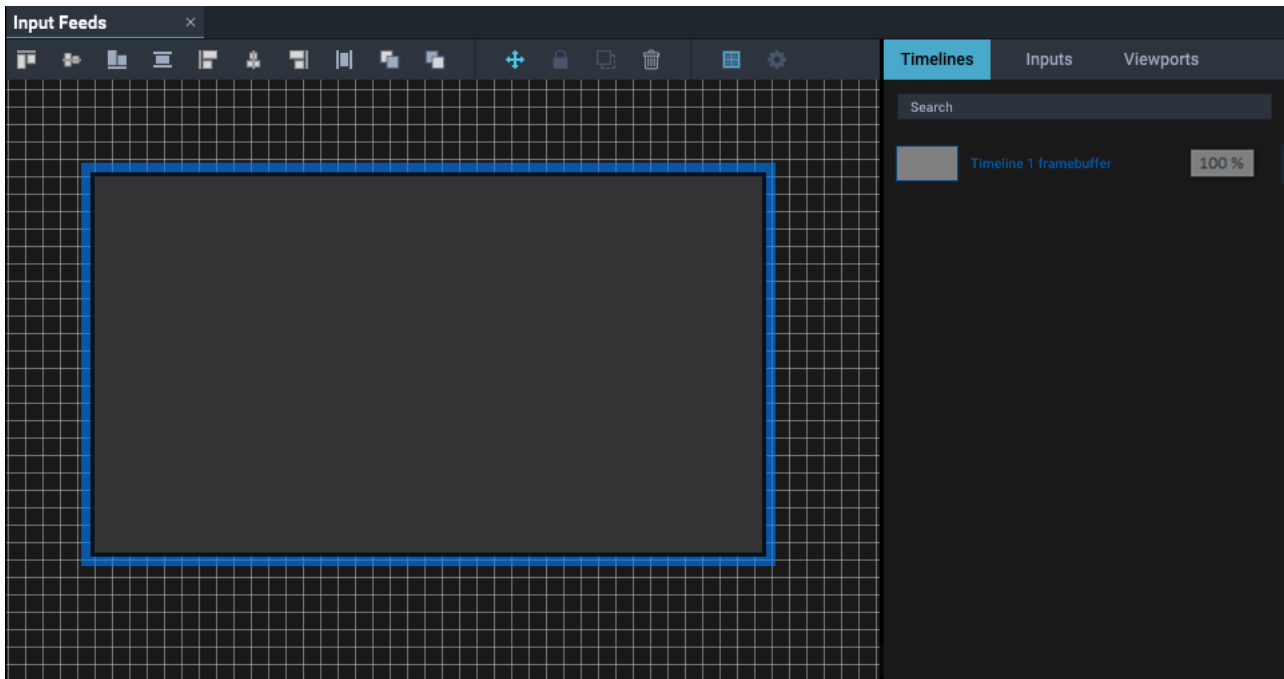

The rectangle here represents the resolution of an input that has been applied. The right-hand panel lists inputs (timelines, cameras, etc.) with their opacity value, and viewports (selections of input resolutions to use, not yet applied here). Multiple inputs can be added here, each with viewports to take to outputs.

- An input will display the source NDI feed.

- A thumbnail for each input added will show under the 'Inputs' tab on the right.

The Output Feeds panel is where Actor outputs are assembled into a one or more display areas.

All available outputs (e.g. GPU or ST 2110) from all Actors in a Project Group, are listed in the Devices tab of the Project panel, under each named device. Each output can be dragged into the Output Feeds panel and arranged as in a GPU group or mosaic.
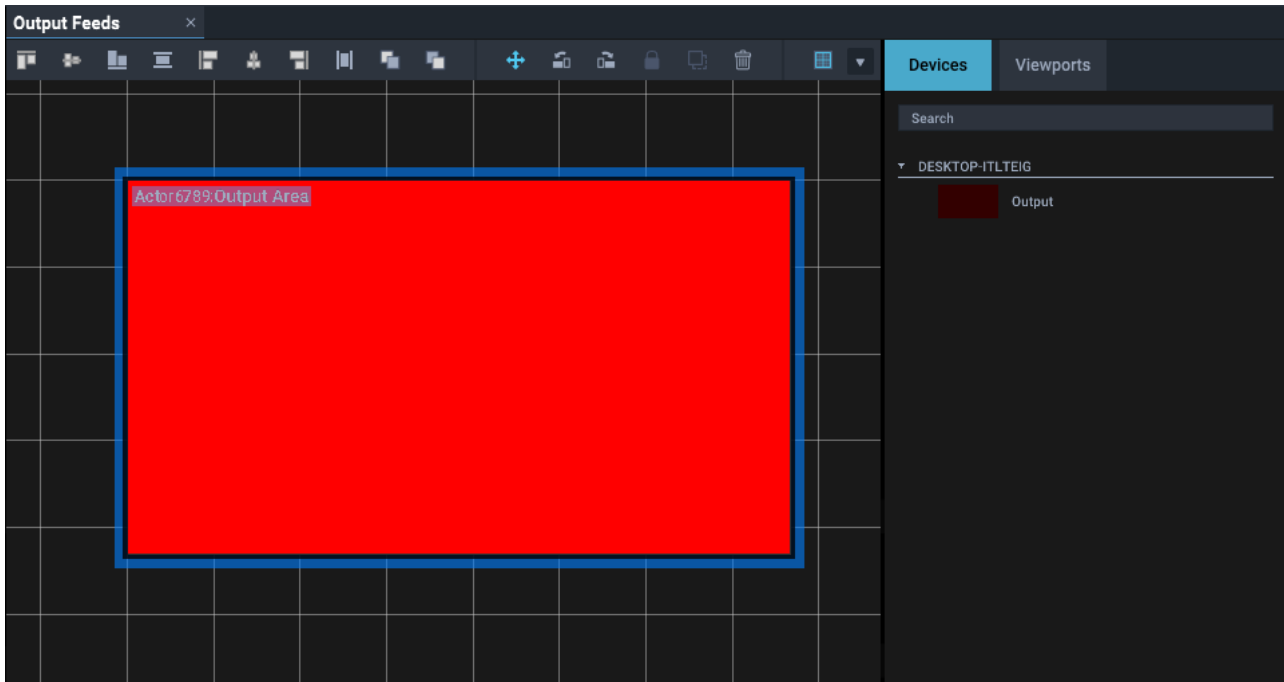
In this illustration, a single output has been added from an Actor and represents initially the native resolution of that output.

Viewports: getting inputs to outputs

Viewports are pixel streams with an input face and an output face. They are created by placing the input face on a single video input, and so can only be added and deleted from the Input (not the output). The output face then appears in the Output Feeds panel. Placed over one or many outputs, they represent the areas on the combined outputs where visual media will be displayed.

A **viewport input** face selects pixels, a **viewport output** face scales and displays them. Both faces are represented in NDI in the input and output panels, and available viewports are listed and can be selected to the right of these panels.

Various possibilities of application are shown in <u>I/O Layouts and Layering</u> [26] .

Both of these panels have optional positioning grids, a side panel listing the objects in the main panel, and a toolbar. The toolbars have intuitive alignment layering tools, and a 'move' toggle that locks the contents to the grid once everything is positioned. The toolbar is the same for both panels apart from the icons to rotate a viewport on the output side.
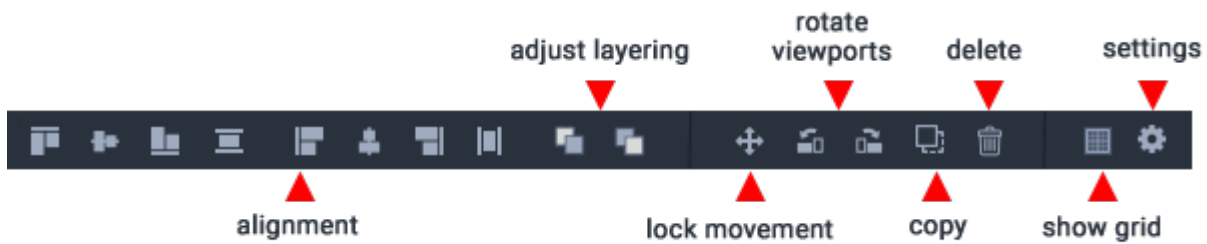
When the toolbar is shortened, a drop-down list of the hidden icons is added at the end.

Use the mouse wheel to zoom in and out. The grids can be mouse-dragged (panned) with everything on them, and timelines, outputs and viewports can be dragged over the grids. Toggle the 'move' icon to prevent accidental further movement with the mouse. Alternatively, precise positioning of all contents can be given using the properties panel.

Identifying Elements in the Project Panel

The **Project panel** is divided into two branching lists, Project Tree and Devices.

The **Devices tab** lists the hardware on the network with in and out connectors, and from this, selected outputs are brought in to create combined output area.

The **Project Tree** contains branches for the Input Feeds and Output Feeds panels, listing a frame buffer for each input, and its corresponding viewports.

A **viewport input** has size and position in relation to the input to which it belongs, since it is just a selection area.

An **viewport output** has its own position and size, so it is scalable, and can be rotated in 90 degree intervals. The output position can be linked to its input position to move together, if required.

Selecting Elements in the I/O Feed Panels

When multiple viewports are placed on inputs or outputs in the feed panels, it can be difficult to grab something that has been overlaid, using a mouse. Anything in either feed panel can be brought forward or sent back to facilitate this, by right-clicking on it in the Project Tree to change its order. Multiple viewports on an input will retain their order relative to the input when its order is changed, for example.

I/O Layouts and Layering

Viewport Layer Order

Right click a viewport to change its render order. On viewports, right click to 'Change Order': Bring to Front / Step Forward / Step Back / Send to Back. Used on the output feeds, this has the obvious effect of changing which visual asset is opaque to others.

Separate Inputs to Separate Outputs

Two input streams are being displayed on different outputs of an Actor.
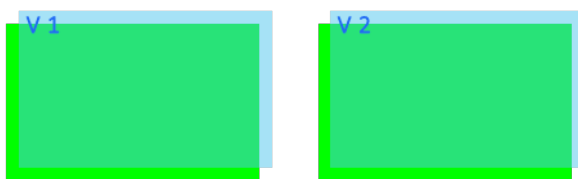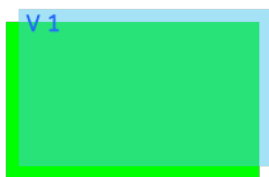

2 inputs, each with 1 viewport,
each captures the whole input
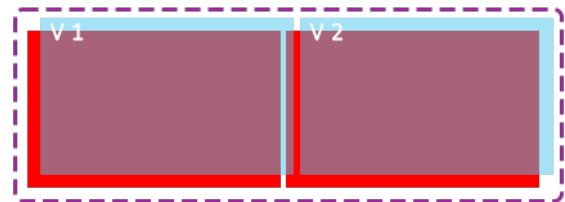
1 Actor with 2 outputs, each with 1 viewport

Viewports are associated with the one input they are positioned over. They can only be dragged onto and belong to one input. However, they can be positioned and scaled over any outputs from any available Actors.

One Input to Combined Outputs

All, or part, of any input can be positioned anywhere over an arrangement of outputs from several Actors.

1 input with 1 viewport
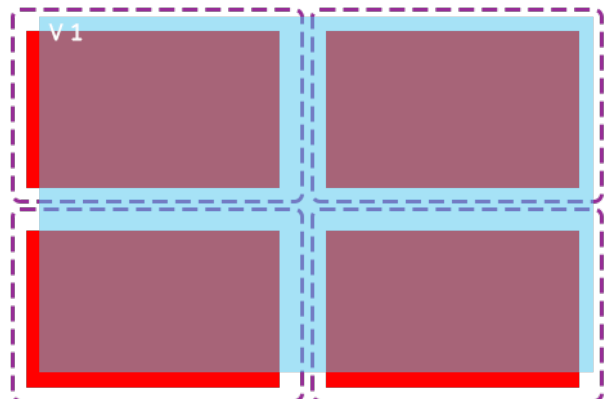
4 Actors each with 1 output, 1 viewport over all

One Input Replicated on Many Outputs

A single stream is directed to multiple outputs (for example displays in different spaces).

1 input with 1 viewport
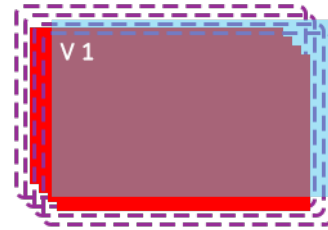
4 Actors each with 1 output layered exactly,
1 viewport over a single output area

Inputs Inserted as Picture in Picture

A camera or broadcast stream appears as an insert in a larger display. Viewport 2 is layered over viewport 1. The output viewport can be moved independently relative to the Actor's outputs.
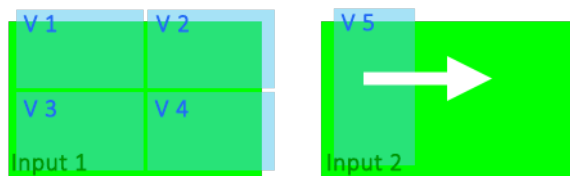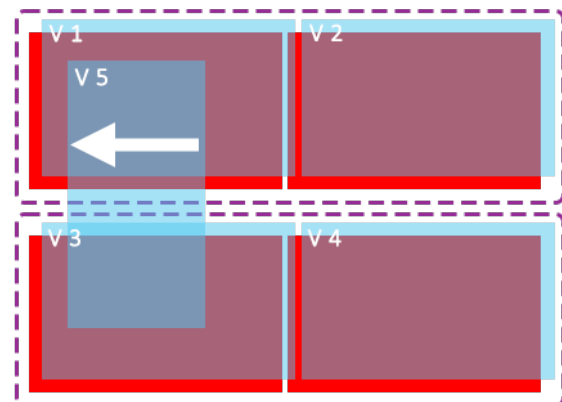

2 inputs, each with 1 viewport
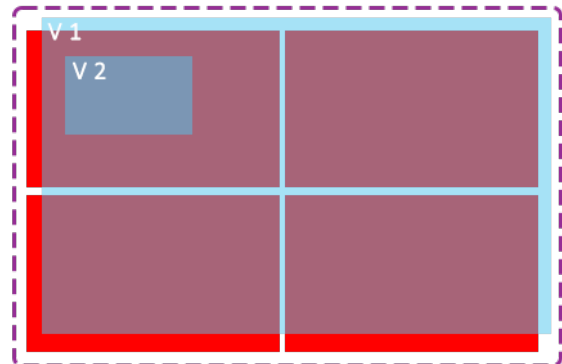
1 Actor with 4 outputs.
Input 1 fills all outputs, Input 2 picture in picture

Selective Input Viewports

One area of an input stream is extracted for display.

2 inputs; 1 input captured by 4 viewports.
1 input selectively captured by 1 (smaller) viewport:
this can be moved to capture different areas of input 2

2 Actors each with 2 outputs, 1 viewport per output.
Viewport 5 selects from input, as picture in picture;
content changes when viewport moved on input,
position changes when moved on output.
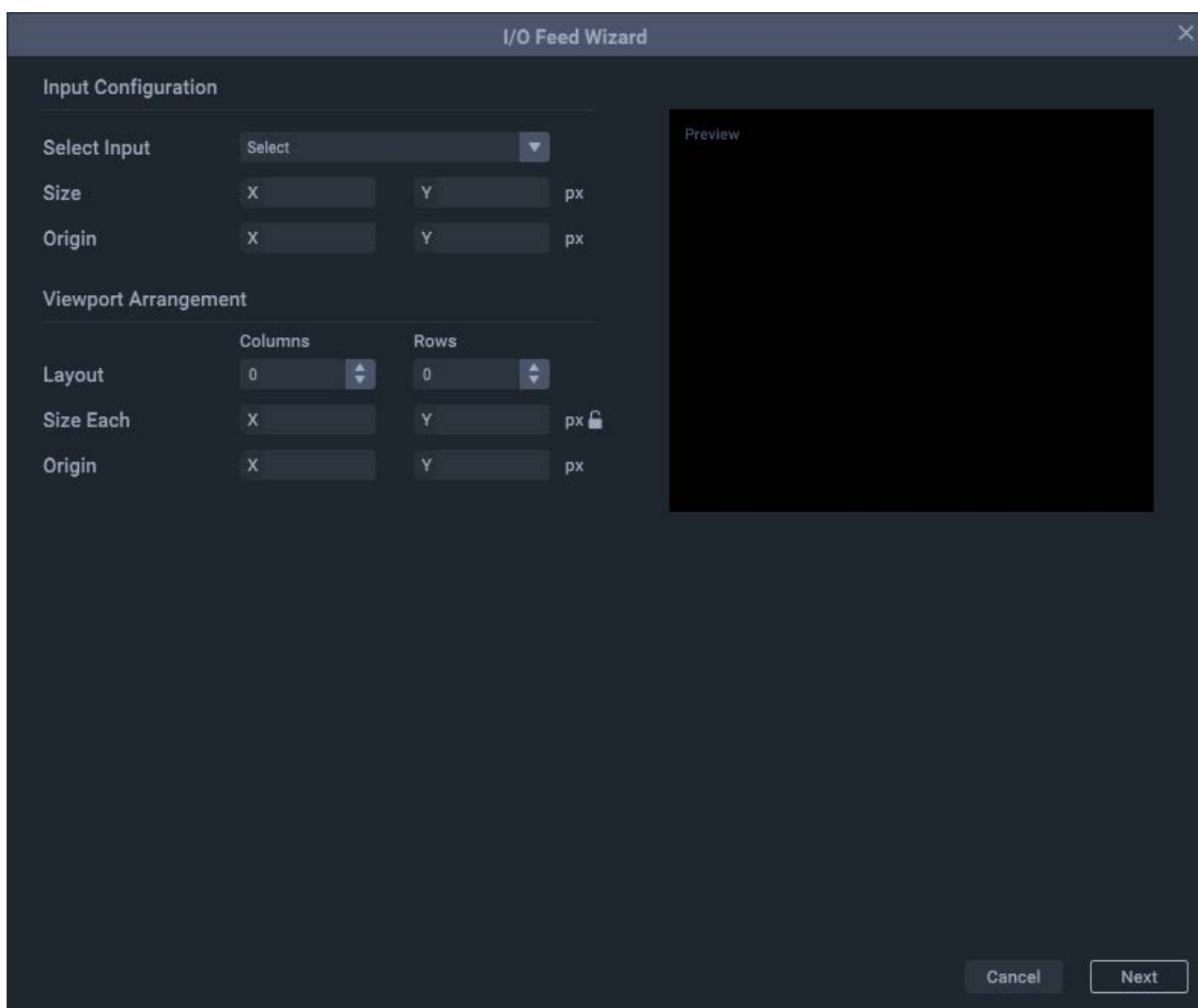
Example: Since Viewports can be dynamically moved, the area of interest in a fixed camera can be tracked.

Actor Video Walls

For regular flat rectangular displays, the I/O Feed Wizard (top menu > Wizards) will very quickly arrange rows and columns of viewports over rows and columns of Actor device outputs. This saves calculating the distribution and setting sizes individually, and taking account of bezel compensation or projector overlap.

Input Configuration

This page will establish a single viewport or an array of contiguous viewports to select pixels from an input.

Select Input

All inputs in the Project are available; select the one for which you want to apply viewport(s).

Size

This will normally be the resolution of the selected input.

Origin

An input origin represents where in the Input Feeds panel it will be placed. The first would normally be at 0,0. Inputs can be moved by measure or by dragging if required, once the wizard has been completed, and will take their viewports with them.

Viewport Arrangement

This will create an array of viewports, from 1 to the number required, laid out and numbered in rows and columns.

Layout

Select the number of rows and columns.

Size Each

Click the padlock icon to auto-size all viewports to fit and fill the input resolution. Alternatively, enter the default size to apply to all viewports.

Origin

The origin of the array is relative to the position of the input. Unless you want the array of viewports not to us the same origin as the input, leave this at 0,0.

The wizard will now show a preview of the input arrangement:
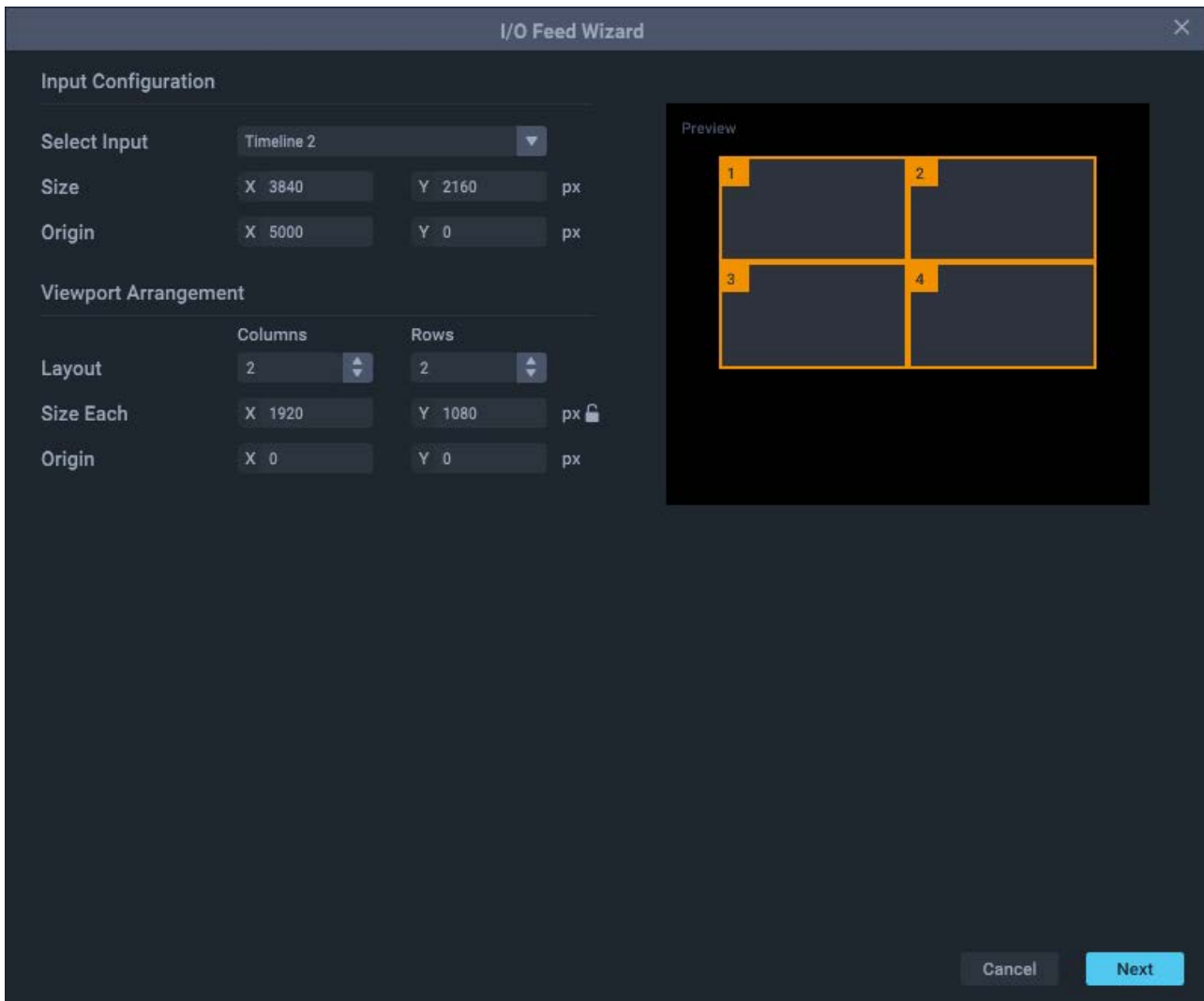
The 'Next' button will turn blue; press to continue to output configuration.

Output Configuration

This page will gather the required device outputs to assemble them in rows and columns and then distribute the viewport outputs over them. The wizard assumes that all devices have 1, or the same number of, outputs (GPUs).

Arrangement
>   Select the number of rows and columns into which the servers (Actor, Conjuror, Delta) will be arranged.

Select Servers
>   From the list of all servers detected in the Project, select those with the required GPU outputs.

Outputs per server
>   Enter the number of GPUs in each server (usually 1 but this must be the same for all).

Type of Output
>   Select the graphics output format. If ST 2110, then select the applicable SDP file below

Resolution
>   Select the common resolution for all outputs.

Output Arrangement
>   Select the rows and columns to arrange the output positions per server.

Edge Adjustment

Adjustment Type
> Select edge-butted (LED tiles), underlap (bezel compensation) or overlap (for projector blending).
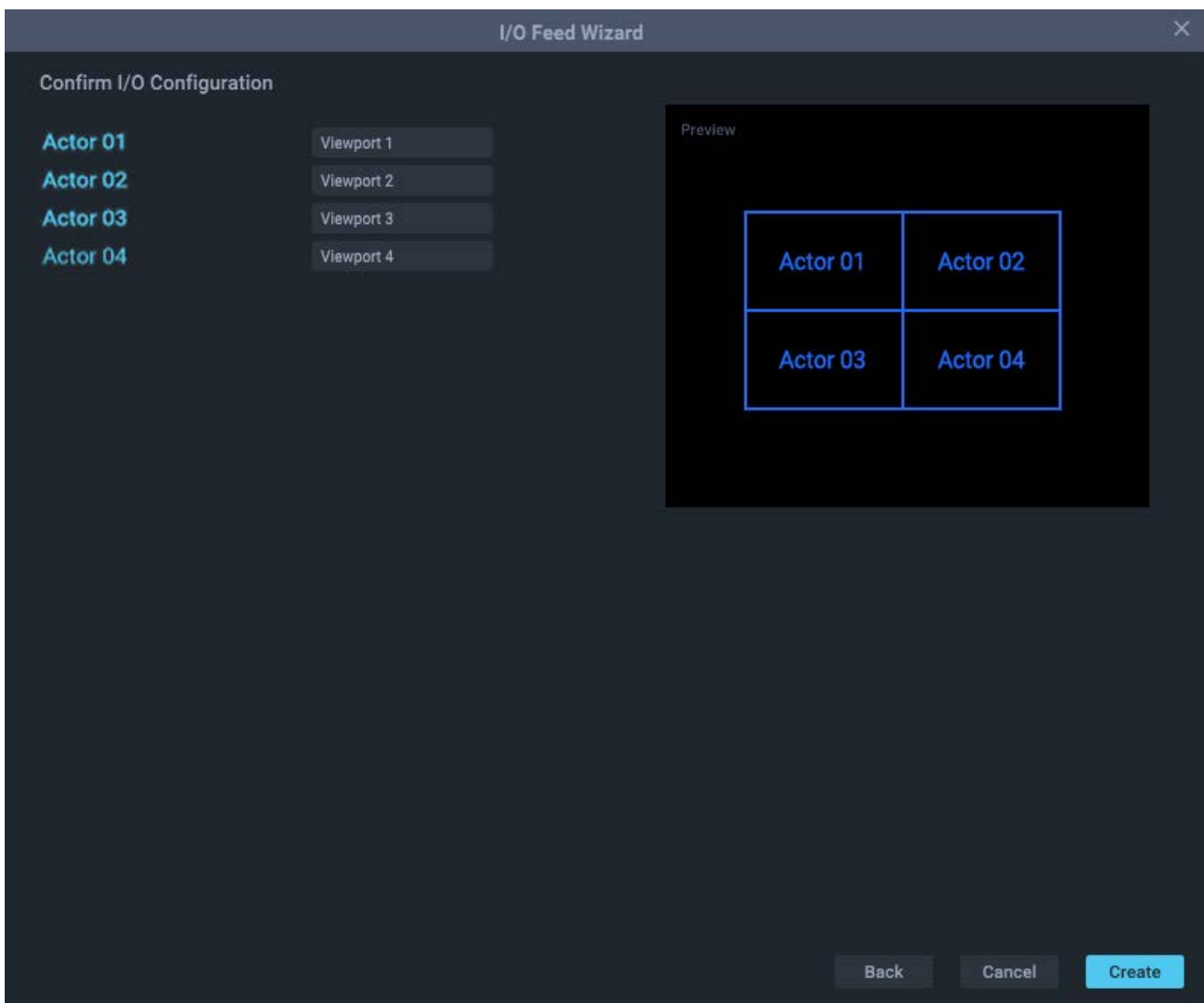
Unit
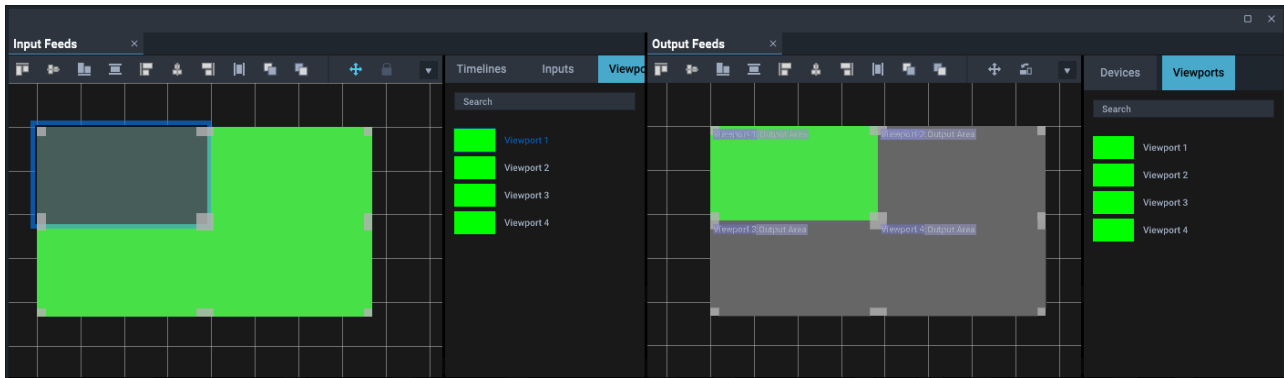> Select percent or pixels.

Value
> Add the percent or pixels required .

The wizard will now show a preview of the output arrangement.

Press 'Next' to preview the list of servers and assigned viewports layout before pressing 'Create' to finish.

The input, viewports and output arrangements are now complete:

Adjustments

Once a matrix array of inputs, viewports and outputs, has been constructed, every element in it can be manipulated in exactly the same way as described for manual configuration in the Input Feeds panel and the Output Feeds panel. This includes the addition of other input sources and other device outputs.

There is no 'restore' function, but Compere can save your arrangements as Presets or Clones (see the Compere UI User Guide). Clearly this wizard is more useful for larger arrays and setting up, as in this example of an ST 2110 15-panel display:

IO Feed Wizard ✕

Output Server Layout

	Column	Row
Layout	3	5

Select servers

Search

- ☑ Select All (15)
- ☑ Actor 4846
- ☑ Actor 4857
- ☑ Actor 4889
- ☑ Actor 4814
- ☑ Actor 4866

Preview

Actor 4846	Actor 4857	Actor 4889
Actor 4866	Actor 8746	Actor 1464
Actor 9746	Actor 6517	Actor 9865
Actor 4814	Actor 5416	Actor 4934
Actor 6484	Actor 6517	Actor 9155

Output Layout

Output per Server   1

Type of Outputs   ST 2110

SDP 1

Resolution   3840   2160   px

	Column	Row
Layout	1	1

Output Overlap

Choose Overlap   Select

Unit   ⦿ Percent   ◯ Pixels

Value   0   0

Cancel   Back   Next

Input Feeds Panel

The input Feeds panel brings input streams and/or timeline framebuffers into play. From these we can be selective as to which pixels will get passed to outputs. The Input Feeds panel is used to gather all types of inputs, and once arranged the panel can be closed and recalled as required.

Populate the Input Feeds Panel

Drag any input stream or timeline framebuffer from the Project tab of the Project Panel into the Input Feeds panel. This represents the maximum resolution to be rendered from the input and adds the input into the Project tree. In the case of a timeline input, this creates an 'Input > Timeline Framebuffer'. This input is the rectangle you see in the Input Feeds panel: it is all the pixels coming in from the chosen feed.

Inputs can be left-mouse dragged to reposition them in the panel, or the whole panel grid panned in the same way. The mouse wheel will zoom the whole panel in and out.

Inputs can be resized to a relative resolution using the size properties.

Timeline feed properties

Name
　　Name each input for easy identification, especially if also renaming your timelines, so they correspond. Make sure you can easily relate your timeline input names to your framebuffer names. Note that timelines are listed in order of addition, not alphabetically.

Position
　　X,Y origin (top-left corner position) of this frame buffer in the panel. An origin of 0,0 is best practice for the first. Input viewports are positioned relative to input positions.

Render Order
　　As required, enter the z-order of multiple timeline framebuffers.

Size
　　Pixel width and height of the input.

Input feed properties

Name
　　Name each input for easy identification, especially if also renaming your timelines, so they correspond. Make sure you can easily relate your timeline input names to your framebuffer names. Note that timelines are listed in order of addition, not alphabetically.

NDI Source Name
　　Enter the name of the NDI stream.

Persistent

Check this to keep the source in cache, uncheck to save memory use.

Position

X,Y origin (top-left corner position) of this frame buffer in the panel. An origin of 0,0 is best practice for the first. Input viewports are positioned relative to input positions.

Render Mode

Select from GUI, Server or both, as the whether this feed will be rendered in the user interface as an independent feed, or (where a timeline asset) in the actual server output to display.
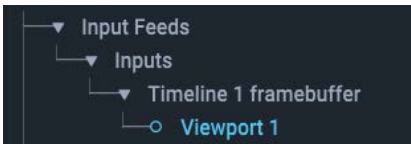
Size

Pixel width and height of the input.

Viewports in Input Feeds

Viewports select those pixel areas of an input (e.g. a timeline frame buffer, camera feed, NDI stream) that you want to bring onto your outputs.

Drag a viewport from the Resources panel onto the input in the Input Feeds panel. The first viewport will snap to the origin of the input it is dropped over, and fill it. It will show in the Project panel under Input Feeds as a child of its input:

Move and resize it as required, either by dragging or by precisely entering position and dimensions in its properties. This will display any current input that lies within the bounds of the viewport. This viewport belongs to this input, and cannot be dragged onto a different input. Viewports may overlap, but can only be 'attached' to an input when introduced into uncovered space on that input.

Once created, viewports are added as thumbnails to the input and output feeds panels under 'Viewports', from where they can also be selected and dragged.
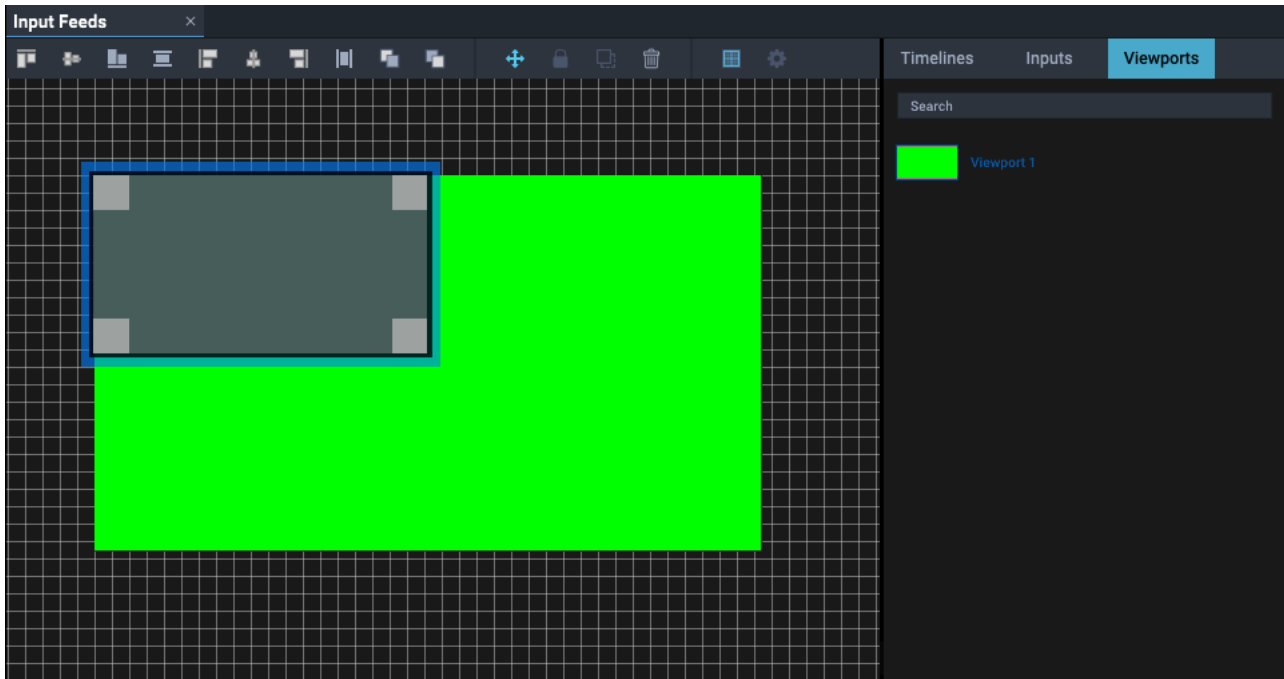
This is the point at which you can return to the Output Feeds panel to position and scale the captured pixel area on the canvas.

Viewport properties

Name

Name each viewport for easy identification. This might be an individual stream name, or a position reference.

Position (input)

X,Y origin (top-left corner position) of this viewport relative to the input feed it is laid over.

Size (input)

Pixel width and height of the viewport input area.
Note: viewports are added by default at the resolution and position of the input to which they are applied.
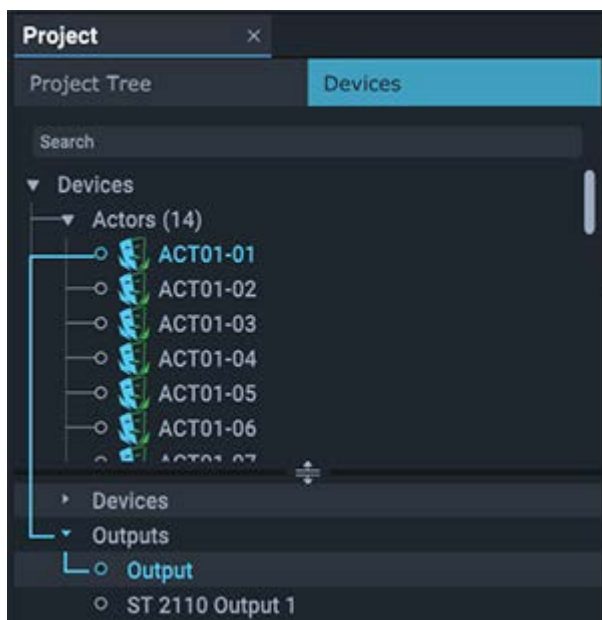
Output Feeds Panel

Device outputs

Here is where your required device outputs are arranged into a canvas (or canvases).

All networked 7thSense devices (Actor, Conjuror, Juggler) will have their outputs – mosaiced (if NVIDIA GPUs in a server) or individual – listed in the Project Panel > Devices tab.

> **ST 2110** : first add an **ST 2110 Output** to each output in the Output Feeds panel by right clicking it in the side panel under Devices, and selecting 'Add ST 2110 Output'.
>
> Now in the properties for each ST 2110 output, add the SDP file to be used.

These outputs are dragged from the device in the project into the Output Feeds panel where they appear as red rectangles. The resolution will match the single output, or Windows arrangement of multiple outputs, or NVIDIA Mosaic of outputs.

Each output has position (top left corner origin) and dimensions, so many outputs can be arranged into a canvas as required. Outputs can be clicked and dragged to reposition them in the panel, or the panel grid panned. The mouse wheel will zoom the whole panel in and out.
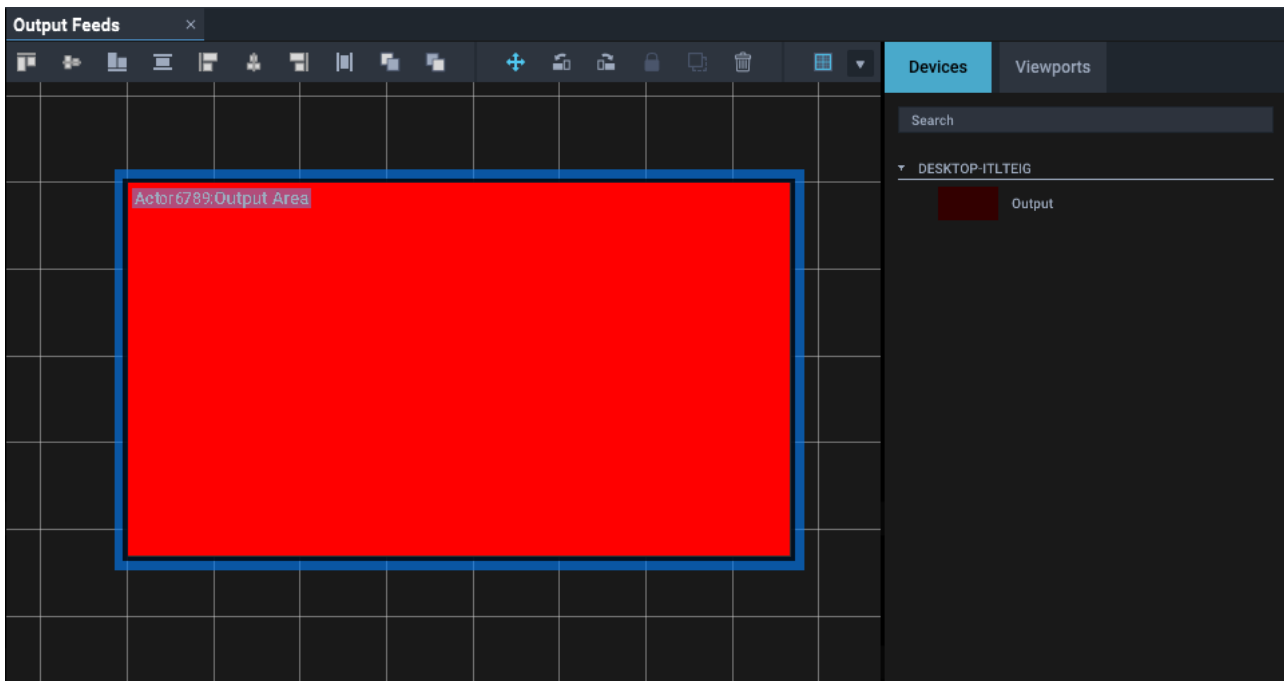
Output Area properties

Name

Rename outputs to provide easy functional identification.

Position

X,Y origin (top-left corner position) of this output in the panel. Set your first output to an origin 0,0 to establish an origin for the Output Feeds panel grid, since all outputs and viewports work to this common origin.

Size

Pixel width and height of the output.

Viewports in Output Feeds

A viewport is an area of an input resolution selected in the input configuration panel and represented in the output configuration panel, to go onto device outputs. When Viewports are added to inputs (next step), they are presented to the Output Feeds panel, where they can be arranged over the output(s) to paint the canvas.

When introduced onto inputs, viewports in both input and output feeds will follow the resolution and origin of the input side. By default the two are linked (in the output viewport properties) to move together, but can be unlinked to be positioned independently.
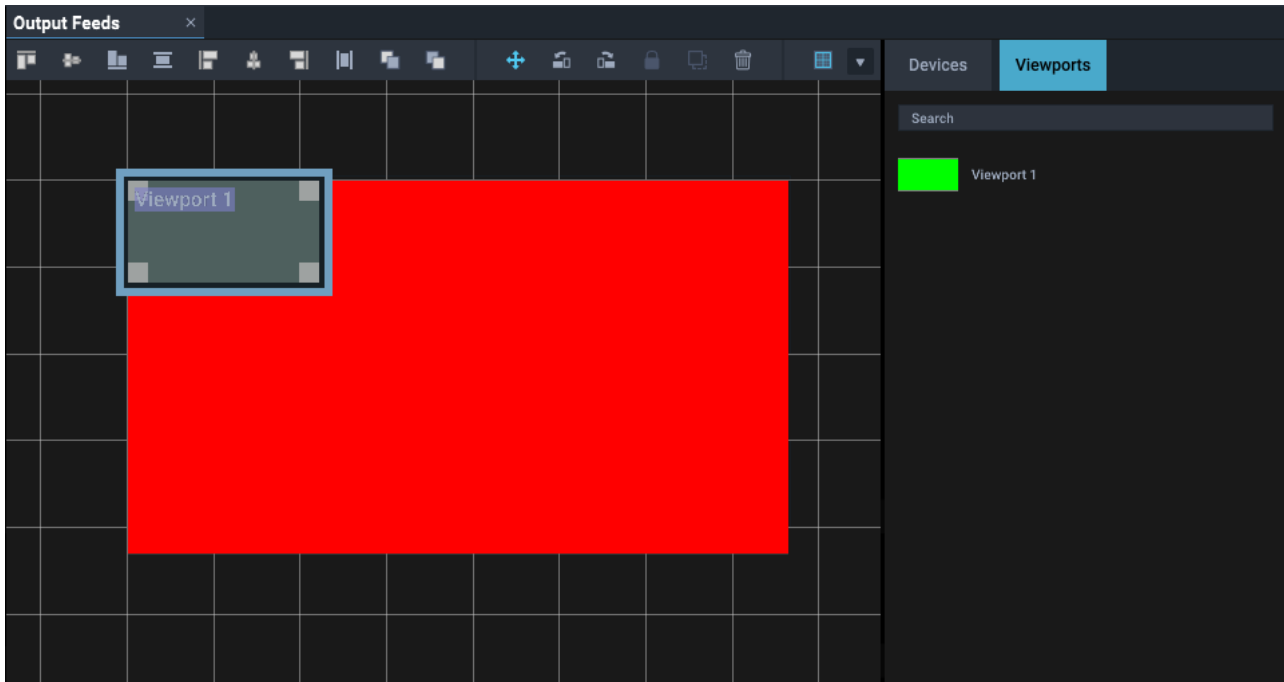
A simple arrangement may involve a single viewport (e.g. 8K) to cover an array of outputs (e.g. 4 × 4K), up to the most complex requirements of distributed outputs, picture-in-picture elements and so on.

Viewport properties

Name

Names are editable on the viewport input side.

Linked

Uncheck this if you do not want viewport input and output to share the same size and position properties.

Position (output)

X,Y origin (top-left corner position) of this viewport in the panel. Viewports work to a common origin with outputs.

Size (output)

Pixel width and height of the viewport.

Feed Rotation

Viewport outputs can be rotated relative to their inputs. Select the orientation in 90 degree increments.

Virtual Canvas

A virtual canvas defines an area overlaying part or all of a contiguous display surface that can be used to create picture-in-picture (PiP) regions for IMAG captures.

Within this virtual canvas, regions can be defined and saved as presets to be applied to the canvas. Into these, assets can be mapped as feeds. All the components of a virtual canvas are listed in the Warp Mapping panel.

➢ See M863 Warp Mapping and IMAG with Actor

Timelines

The Timeline panel

The top of a timeline panel has **playback controls**: rewind to start, frame nudge forward and back, play, pause, and stop. Pause will hold the frame/asset cache, whereas stop will blank all assets.

From the dropdown selector on the right we can see this is Timeline 1 (a user-editable name). Using the + button, timelines are added to the Project. They can then be populated with media assets, markers, keyframes, play controls, shaders – along with all it takes to make a show. Timelines can be controlled dynamically, saved, edited and reloaded.
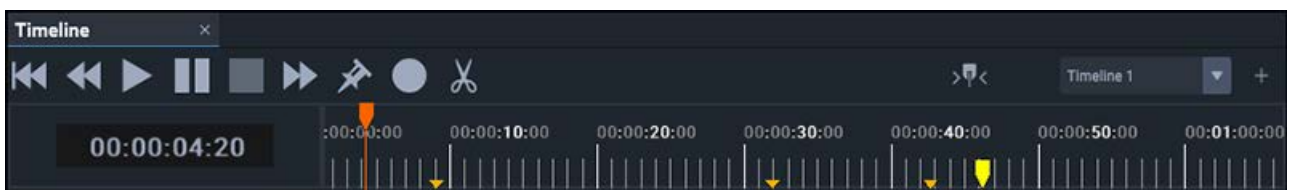

Note the orange **playhead** and its time position shown here in HH:MM:SS:Frames. Time format is set in Configuration > Settings > Preferences [Timecode Format]. The playhead can be dragged, and will jump to a time position clicked on the time graticule (ruler).

The orange arrows show that there are keyframes [53] present on this timeline, and the yellow pointer is a marker [52] pinned to the timeline. Jump between markers quickly with Ctrl+arrow keys.

Hold: The icon next to the Timeline selector on the right allows the playhead to run only to a central position and then hold, when the timeline will instead flow behind a static playhead. When not toggled on, the playhead will continue running off to the right and the timeline will remain fixed.

Zoom the timeline in and out with the mouse wheel, or zoom to the left or right of the playhead position, using the round blue timeline scrollbar handles:
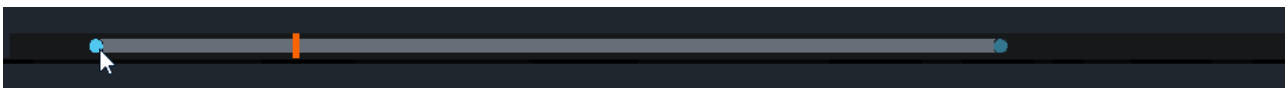
- The scrollbar represents the visible portion of the timeline, its length is relative to the whole.

- The orange marker is the relative position of the playback head, which may be dragged in the visible portion or beyond it, within the total timeline duration.

- With the playhead in 'hold' state, dragging the marker will drag the scrollbar with it. Dragging the scrollbar alone will disengage the 'hold' state.

> To keep your timeline view and controls more manageable, adjust the duration to your actual show. The default is 24 hours, whereas your show may be only 2 hours.

- Timelines are added into the Timeline panel by typing 'T' or clicking the + icon on the right side toolbar.

- Timelines can be renamed and are listed and selected from the toolbar dropdown in the panel. It may be useful to open multiple Timeline panels, selecting a different timeline in each.

- The contents of the Timeline panel can be zoomed horizontally with the mouse wheel, or using the top row - and = keys.

- Use the horizontal and vertical scroll bars to navigate length and layers.
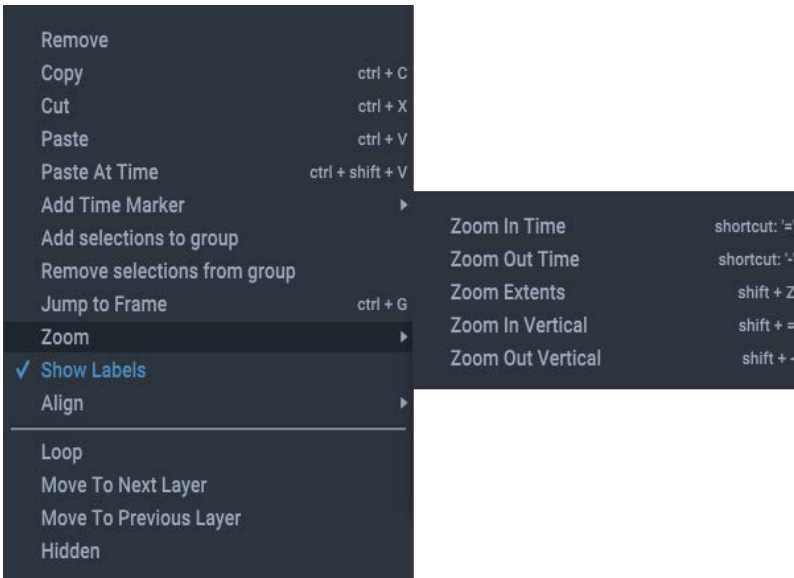
Playhead

- The playhead will track across during play and can be dragged to a position. Dragging to a position during play will place the timeline in pause state.

- Click on the timing graticule to bring the playhead to that point

Quick keys

- Start and stop play with the spacebar.

- Click on the timeline time ruler at the required time to position the playhead there.

- Ctrl+G will go to the specified time position (timecode format as set in Preferences)

- Ctrl+G+Return (=00:00:00:00) will return the view and the playhead to the timeline start.

- Ctrl+ arrow keys will jump the playhead forward and back between markers.

- Ctrl+Shift+arrow keys will jump the playhead between the start frames of assets in any layer on the timeline.

- Click the 'Hold Playhead' icon to run the playhead to centre and resume playing assets past the playhead instead.

- Use the mouse wheel to zoom the length of the timeline.
  (Alternative: use the + and – keys to 'zoom in/out time'.)

- Shift+z will fit all timeline assets into the current timeline view ('zoom extents')

- Use Shift+zoom (mouse wheel) to expand the height of layers for readability of the thumbnails next to the names. (Alternative: Shift plus the + and – keys to 'zoom in/out vertical'.)

➢ For other shortcut keys, see Keyboard Shortcut (Actor) [10]

Context menu (right-click)

The right-click timeline context menu also lists the shortcut keys:

Below the line selections apply to the selected asset, and show when one is selected. Align allows accurate placement to other assets, markers, or the playhead.

'Mute' shows for audio assets, others show 'Hidden'. Mute and Hidden are also in the respective asset's property panel.

Selected assets can also be moved up and down between layers providing this is is legitimate move (i.e. the layer and occupancy at this time is available).

Layers

Layers on the timeline are created when assets or resources are introduced.

On the left of the timeline, layers are listed. Each layer can contain only media of the same type (video, audio, image, input capture, generative media etc.). The layer colour and icon indicate the media type they contain. The exception to this is effects and shaders that can be 'attached' to other assets in the same layer, shown underneath the asset.
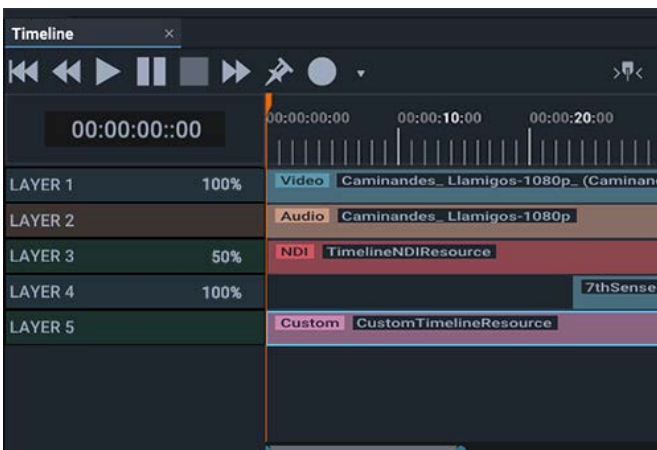
- Layers can be reordered by dragging their labels on the left, but retain sequential numbering in the labels area.

  Note that timeline 'Layer 1' (property = Layer number 0) when given the order property of number 3, will become 'Layer 4' on the timeline.

- They can be given a user name in properties, but this is not displayed.

- Visual Layers can be given opacity values (displayed in the layer label), and

- can be enabled or disabled (i.e. all assets hidden or muted).

The opacity value display is optional, toggled on/off under *Settings > Preferences*.

Multiple timelines

Multiple timelines can be played and edited simultaneously, each with its viewport directed to required outputs. Open new Timeline panels and select the timeline to run, build or edit in each. You could, for example, tab the timelines instances together in one panel.

Timeline properties

These properties apply to the timeline, not individual assets.

Audio DSP Connection
Enable or disable DSP connections (see [Audio Playback](#) ⁵⁸).

Timeline Duration
The default duration is 24 hours.

Frame Rate Fraction
Enter the non-drop frame rate per second (e.g. 60 in the first field and 1 in the second), or for drop-frame timing, use the second field as a fraction (e.g. 60000 over 1001 for 59.94 fps).

Opacity
Sets the opacity of the entire timeline. Opacity can be dynamically changed using external controls and by using keyframes.

Volume
Audio level, all layers.

Pitch
Change the pitch of all audio on the timeline.

Contrast Overall
Applies to all video assets on the timeline. This and individual colours are around a normal value of 100, minimum 0.

Red

Applies to all video assets on the timeline.

Green

Applies to all video assets on the timeline.

Blue

Applies to all video assets on the timeline.

Brightness Overall

Applies to all video assets on the timeline. This and individual colours are around a normal value of 0, ±100.

Red

Applies to all video assets on the timeline.

Green

Applies to all video assets on the timeline.

Blue

Applies to all video assets on the timeline.

Gamma

Applies to all video assets on the timeline. Values 1 (min) and 8 (max).

Enable Preview

This works in conjunction with the Actor property 'Enable Preview' which configures a broadcast stream from each device. (Project Tree > Devices > [Actor/Conjurer]).

First 'Enable Preview' in the device properties to add the device output(s) to the broadcast stream (preview mode = NDI), and set the required resolution of the broadcast stream. This will broadcast all output viewports from this device that have also been 'Preview Enabled' here via the Timeline property.

Disabling a timeline preview with this switch will simply stop broadcasting from its respective viewports.

Timeline Assets

Adding

Ingested assets can be dragged straight out of the Asset Management panel onto the central area to create new layers or populate existing layers.

Assets that are inherent **resources**, such as NDI, ST 2100 and other captures, or Text overlays, may be pulled from the Project panel, or the timeline toolbar.

Assets on layers are selectable (Ctrl+left mouse to multi-select) and offer a right-click context menu:

Copy (Ctrl+C): copy a selected asset or assets. Select multiple assets by dragging a marquee over them or by Ctrl+select.

Paste (Ctrl+V): place copied asset(s) to start at the current playhead position on a selected layer if available (empty and the same media type), or on a new layer if not.

Paste at Time (Ctrl+Shift+V): paste copied asset(s) at a specified time on a selected layer if available (empty and the same media type), or at the specified time on a new layer, if not or if required:
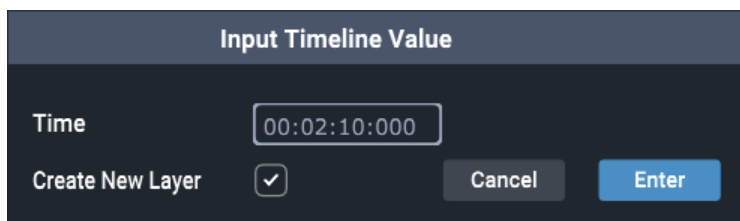

Add Selection to Group / Remove Selections from Group: actions applied to one selected asset in a group will be applied to all.

Manipulating Assets

Assets can be dragged within the timeline, along and between layers of the same media type. They will snap to each other, and for each the properties can be edited in the Properties panel. Here, property terms are shown in **blue**.

Cut: Select the asset(s). Position the playhead where you want to cut, and click the scissors icon. A cut section is actually a trimmed instance of the same asset in the same layer. Cut sections can be moved away, dragged to another layer, or removed.
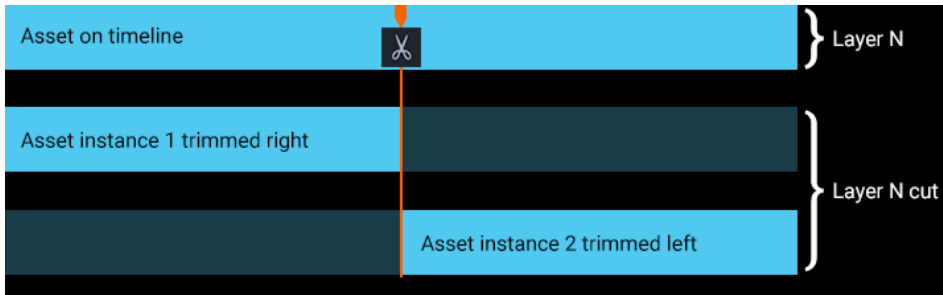
The position of an asset on the timeline is determined by its **start time**. If the start time is not the very beginning of the asset, then the asset has a **start time offset** achieved by trimming the leading edge.

Trim: The start or end point within an asset's **duration** can be adjusted by trimming (cropping). When the mouse moves towards either end of an asset, a bright green marker is shown that can be grabbed and moved in, so that the asset does not play from the beginning, or stops before the end. Dragging the ends out again will restore up to the **original duration**. This works the same for any cut asset part. Trimming can also be done by entering the required Start Time Offset property value for the asset, or by JSON external control.

Changing the value of the **duration** property for an asset is equivalent to trimming from the end.

Relative alignment: right click an asset or assets to **align** to the playhead, markers or first/last assets.

Loop (Repeat)

To extend beyond the duration of an audio/video asset, it can be looped to start playing again on repeat along the timeline. This is a property toggle, also available in the right-click context menu.

Note that editing the duration or offset of the looped segment will make the same change for every repeat of it.

Asset Properties

Asset properties will vary by type of asset.

Properties in common include:

Path (Source)
> For captures, e.g. NDI name, ST 2110 path.

Start Time
> Start position of an asset on a timeline.

Original Duration
> Duration of the ingested untrimmed asset.

Duration

> Duration of play after accounting for forward and backward trimming and looping.
> When entered for an unlooped asset, this will trim from the end. When entered for a trimmed and looped asset, it will repeat the trimmed duration to this value.

In Point

> For a forwards-trimmed asset, the trimmed start frame/time of the asset.

Loop

> Enables the asset to be repeated by extending it along the timeline.

Hidden / Mute

> Disables/enables the asset.

Video Assets:

Position, X, Y, Z

> Relative position for the asset within the timeline input resolution of the timeline, from 0 (origin) to 1.
> Example: X = 0.5 will place the left edge of a visual asset halfway across the input.
> Note that this means positions outside the bounds of the input are allowed.

Size, X, Y

> Relative size for the asset within the timeline input resolution.
> Example: values of 0 will fit the timeline resolution, 0.5 scales to 50%.
> Note that scaling to greater than the input size will crop the asset.

Frame Rate Fraction

> Enter the framerate per second (e.g. 60 in the first field and 1 in the second), or using the second field, as a fraction (e.g. 60000 and 1001 for 59.94 fps)

Opacity

> Sets the opacity of the entire timeline. Note that opacity can be dynamically changed using [Keyframes](53) or external controls.

Packed

> Check this, if the media frames are UV packed.

Enable Chroma Keying

> Chroma keying separates foreground objects from a keyed screen background (typically green). For most opaque objects this is determined by which side of a threshold value their colour sits on – if more green than the threshold, then they're considered background, else foreground.

Toggles on/off to set a threshold colour, defined in the RGB **values** properties (below), and within a defined tolerance (per the individual **R**, **G**, **B ratios**, below), to be transparent to layers below.

Enable Luma Keying

Toggle on/off. Chroma and Luma are not normally used together. Sets which monochrome Luma (luminance) value will become transparent to layers below. It is most usable on greyscale images. Tolerance is around the monochrome value.
(If used on a colour image, RGB image values are in fact converted to YCbCr and so the Y value becomes the key.)

Red /Green / Blue Value

Each is a 12-bit expression. Range 0-4096.

Red /Green / Blue Ratio

Fine saturation (colour to white) adjustment, to improve precise keying. Suggested starting values are 0.15, with further adjustment from there.

Luma Value

12-bit expression. Range 0-4096.

Despill Value

Specific to green screen, addresses foreground translucence and reflection when chroma keying a background out, by remixing the R and B channels.
0 = no despill, 1 = full despill.

Despill Luma Add

Despill can darken other colours, so luma can be boosted to compensate.
0 = no effect, 1 = fully brighten affected pixels.

Audio Assets:

➢ See also Audio Playback ⁵⁸.

Audio DSP Connection

Identifies any digital signal processor being used.

Channel Offset

Offset this track in time

Map Mono to All

Send a mono audio track to all audio channels.

Mute

Mute this audio asset.

Pitch

Change the pitch of all audio on the timeline.

Volume

Audio level for this audio asset. Note that volume can be dynamically changed using [Keyframes](#) ⁵³ or external controls.
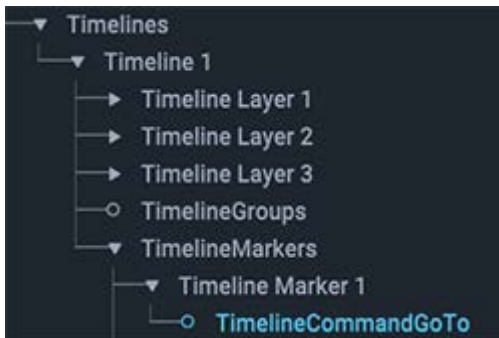
Markers

Position the cursor where you want a marker and click this icon to add it across all layers. Alternatively, right-click on the required timeline position and select 'Add Time Marker'. Markers are named, can be dragged on the timeline, positioned via their time property, removed, and deleted. A marker can be given an active property of **Go To** (send the playhead to a time position) or just to **stop** the playhead. If it has type 'none', it can be used as a named position on the timeline for other purposes.

Edit the type by selecting the marker in the project panel:

Shortcut keys

Ctrl+M to add a marker at the playhead position. If the playhead is moving, the marker will be dropped in position and play continues.

Ctrl+Shift+M to add a marker via a dialog for a specified time position. If the playhead is moving, it will stop, allowing the marker time to be entered. Play is not automatically resumed.

Ctrl+arrow keys to step quickly between markers.

Keyframes

Keyframes are groups of markers referring to an object or asset, with selected initial property values and subsequent property values, such that these values increment smoothly from one to the other during play. For example, a projector or model might be rotated between two points, or sequentially between several points, or an asset might be brought from full transparency to zero.

1. Position the playhead for the initial state time.

2. Click the keyframe record icon.

3. Select the object or asset and set the initial values for the required properties. Note that to detect these initial requirements, the required property values must be changed. (So if the initial value is required, change it and then back again.)

4. Move the playhead to the time for the end of the transition.

5. Reselect the same object and set its new values for the same properties.

6. Either repeat for continued transition to further property values, or click the keyframe record icon to stop recording.

This will have created a new layer, which you can rename for its function, containing a yellow diamond showing that it is a keyframe layer. Click this diamond to expand all properties affected with their values at the playhead position:

For incremental value changes, the keyframe bar will be graduated, for step changes (0 /1, on/off) it will be solid colour. When a keyframe set is disabled, it will show as red.

The object will retain the final keyframe values after playing.

Keyframe Properties

Name

> Name keyframes by function for ease of recognition.

Interpolation

Choose the interpolation method. Keyframes can be step changes from one state to another (e.g. on, off). Linear interpolations show as graduated colour, step changes as solid.

Time

The time point of the marker on the timeline.

Timepoint Value(s)

A position may have 3 components, X, Y and Z, even though you want to only change one.

Enabled

Keyframe markers can be disabled (first, middle, last or all). Disabled keyframes show red.

Rendering Statistics and Timing

Statistics and timing information can be superimposed on screen per viewport by switching Display Actor Rendering Stats to On in *Configuration > Settings > Preferences*.

When displayed on screen, moving crosshairs will reveal timing differences between display devices. Top right, a square alternates red and cyan so should appear steady grey. The black square bottom right flashes white every 10 frames: all displays should be in sync.

The central graph shows a yellow line for frame time, and the red below are each frame's render time up from 0 at the bottom axis to the yellow line being 1 frame.

Statistics can give an idea of how frames are being handled per server.

Framebuffer format
    As Settings > Preferences

Frame counter
    A running count of frames played and the frame rate

Local
    Frames counted on the local device

Late frames
    Late frames tracks both dropped graphics and dropped media frames.

When an image has been requested to load from disk but the frame index was behind, the frame has been discarded and not requested to be uploaded to the GPU in the upload thread.

or:

When an image has been loaded from disk to RAM and uploaded to GPU memory, but was received by the render thread too late.

Dropped graphics frames

We didn't actually manage to render an image this frame (typically because the renderer is still busy rendering the last frame, and missed the deadline for presenting it).

When an image is loaded from disk to RAM and uploaded to GPU memory but was received by the render thread too late.

Dropped media frames

We didn't manage to load the image off disk into GPU memory in time for rendering.

A count of images that are missing when rendering occurs. In theory, every late frame results in a dropped media frame.

Repeats

The local frame count hasn't incremented since we last ran the renderer. Typically caused by bad SyncData being received from the server (eg: if the server is running in desktop mode, but isn't genlocked).

The remaining stats are primarily for sync and timing technical diagnosis.

Sync Data

Used to synchronize all client machines to the server, sync data is sent periodically to regulate the internal clocks of client servers. Frame and Time are both sent from the server and Rx represents when it was sent.

'Frames since Rx' is the only local client-based figure. It is the number of frames since the last time a sync pulse was received.

The last line of sync data indicates the mode of sync timing, for example, PTP, employed by the whole Compere/Actor system. Timing mode is set in the preferences. Another option for sync is using the GPU clock.

Time Data

Used to make ensure all clocks are in sync. Similar to sync, it is sent from the server, but is restricted to time-only data.

'Update' is the last update time of the sync data.

'Offset' is last calculated clock offset between the server time and this clients time. e.g. server might be at 1000 client at 998. so offset this time is 2. but the calculation prior could be 3.

'Smthd' is the clock offset smoothed so that it doesn't jump around based on newly calculated offsets, for example after a spike in time difference.

'Now (raw)' is the raw local time of the device.

'Corrected' is the raw time + the calculated smoothed offset. So the time synchronized to the server.

'At sync' is the time the sync was received and 'Since sync' is the time since then.

Audio Interfaces

Select the required audio device in the project tree > *Devices* > 'Devices', check 'Enabled' and adjust the audio device properties as appropriate.
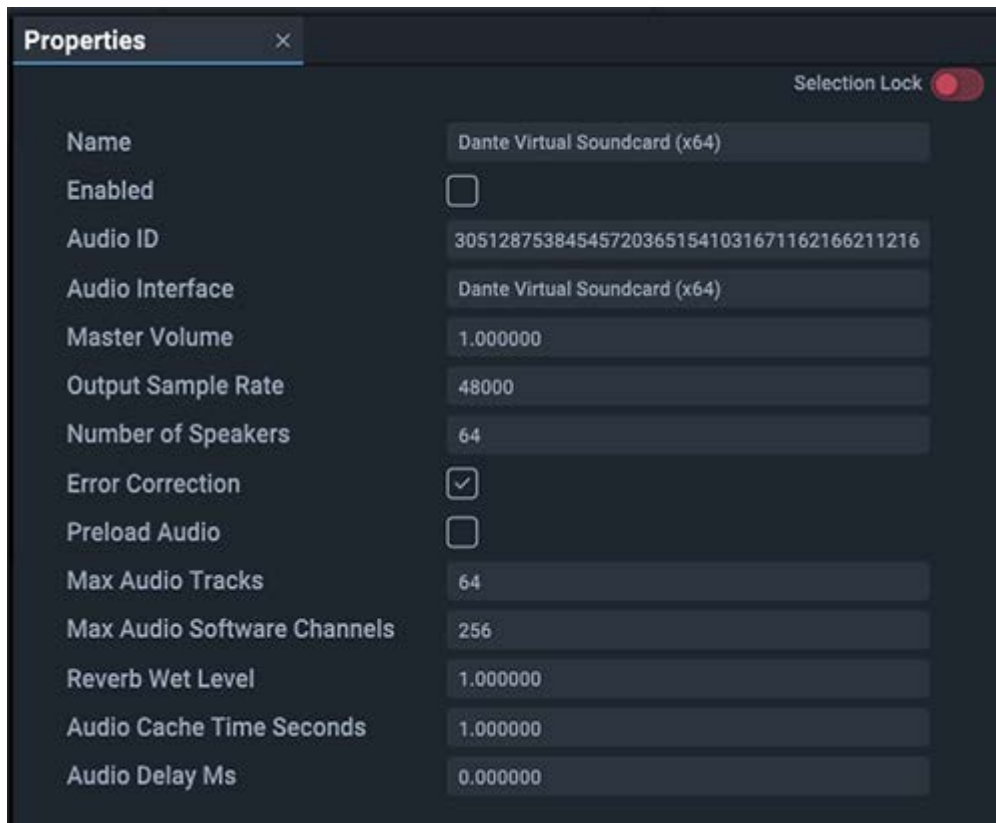
Master Volume

  Range 0-1, min to max. Apply to relative volume for all tracks; each audio track layer on a timeline has its own volume control.

Output Sample Rate

  For information only. Typically 48 kHz

Number of Speakers

  Speakers available to this audio interface; can be overridden to select the number of output speakers to enable on the interface.

Error Correction

  Enable error correction. This will actively correct audio timing to keep it in sync with Actor frame pulses.

Preload Audio

  Switch in audio caching, all audio on this Interface will be loaded into RAM for the duration of the project.

Max Audio Tracks

Maximum number of tracks that can be played simultaneously.

Max Audio Software Channels

The maximum number of software channels in parallel, to process at once. (How many separate track sounds you will be able to hear playing simultaneously.)

Audio Cache Time Seconds

Caching audio tracks prior to play, cuts the potential for delay in retrieval. The default is 1s, meaning that audio will begin to be heard 1 second after a play command. For systems using many Audio tracks, a longer cache time may be required.

Audio Delay ms

Adds a delay in milliseconds to the track when its played. A timeline offset.

Audio Tracks

Audio Formats

Supported audio formats include WAV, OGG, MP3 (mono), multi-channel playback up to 64 channels ASIO, and Windows audio. Channel mapping operates on the basis of file naming. Audio assets on a timeline can be directed to specific channels and devices.

Audio assets are placed on timeline layers in the same way as visual media. As with video, audio assets can be looped: right-click the asset and select 'Loop'

Channel mapping

Channels are by default mapped by name, either: _L, _C, _R, _BL, _BR, _FR, _FL, or _1, _2, _3 etc.

Alternatively, use the channel offset property.

Audio asset properties
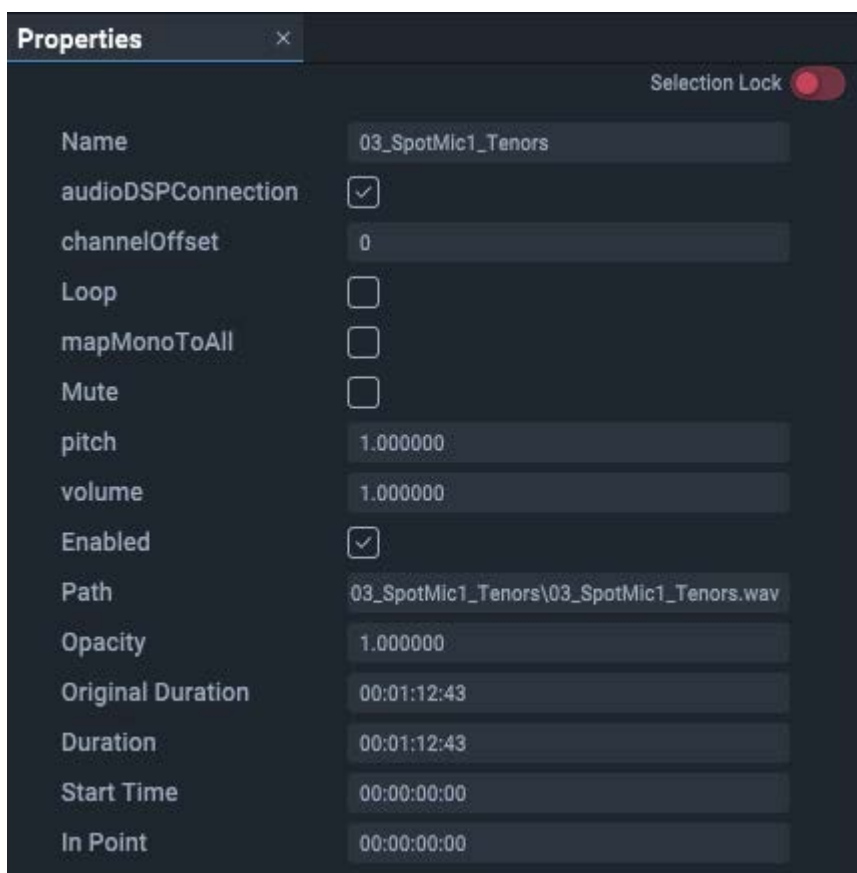
Name

The audio asset (track) name.

Audio DSP Connection

Check as required to add.

Channel Offset

Offset this track in time.

Loop

Check to loop selected tracks (as in all assets) by extending out.

Map Mono to All

Check to feed single track to all channels.

Mute

Check to mute selected tracks.

Pitch

Adjust pitch of selected tracks.

Volume

Relative volume of this track.

Start Time

Start position of the track on a timeline.

Original Duration

Duration of the ingested untrimmed track.

Duration

Duration of play after accounting for forward and backward trimming and looping.
When entered for an unlooped track, this will trim from the end. When entered for a trimmed and looped track, it will repeat the trimmed duration to this value.

In Point

For a forwards-trimmed track, the trimmed start time of the track.

Digital Signal Processors (Audio DSP)

DSP files can be added into C:\Users\[user]\AppData\Local\Compere\Resources.

- Drag the DSP into Nodes panel, this will not show, but it adds the DSP into the project panel. Drag it from Project into Nodes.

- Drag the Timeline / Layer / Asset from Project into Nodes and Shift+R-click to add a DSP connector.

- In Nodes Ctrl+drag to link from Timeline/Layer/Asset to DSP.

- Address properties of the DSP.

Properties of each DSP type will be specific to the type. Each can be enabled or disabled as required, for example by external control commands.

Build a Multiple Timeline Show

Generalised Workflow

- Add a timeline and name it by function (content may be ambiguous and changing)

- Add asset(s) so that it is distinctive and visible while you build the timeline structure.

- Add the timeline to the Input Feeds panel. The timeline frame buffer this creates will adopt the timeline name. If you rename a timeline, rename the frame buffer.

- Drag and arrange the named available device outputs into the Output Feeds panel.

Video is placed on the available outputs using viewports. These select pixel areas from the input which can be positioned, scaled and layered on the outputs.

- Add viewport(s) to select timeline frame buffer pixel area(s). These will be added to the Output Feeds. Decide if in and out positions and dimensions are linked or independent.

- Name viewports uniquely, again for their source and function. **All of this naming will make external control addressing robust.**

Repeat for multiple timelines. Clear, functional and unique names for timelines and frame buffers are very important.

Opacity

These elements have the **opacity** property, enabling fading and transitions:

Assets – feed pixels to a layer

Layers – feed pixels to a timeline

Timelines – feed pixels to a frame buffer

An empty section of a timeline that is opaque is transparent.

Since all viewports for a particular input (such as a timeline frame buffer) belong with that feed, they will share the opacity of the source timeline. This is a good reason to keep a timeline reference in the viewport name.

Layering

Assets belong to layers and cannot themselves be layered

Layers are stacked within a timeline, and can be re-ordered, with Layer 1 being above Layer 2 and so on, whatever the name they have been tagged with.

Timelines and frame buffers are not layered, but are independent entities. Therefore whichever source – timeline frame buffer or other input – owns the highest-order viewport with opacity, will have priority.

Order

Viewports represent the opacity of their timelines and can be ordered, so when a viewport is brought 'in front' or 'to front', any other viewports from the same input will share the same order.

Tracking

Actor supports PosiStageNet 2.0.3 and NatNet APIs via its own internal interface.

Document Information

Date	Document edition	Software version	Revision Details	Author/Editor
December 2023	1	1.0-7	New release	Andie Davidson
June 2024	2	1.0-7	Refinements and adjustments	Andie Davidson