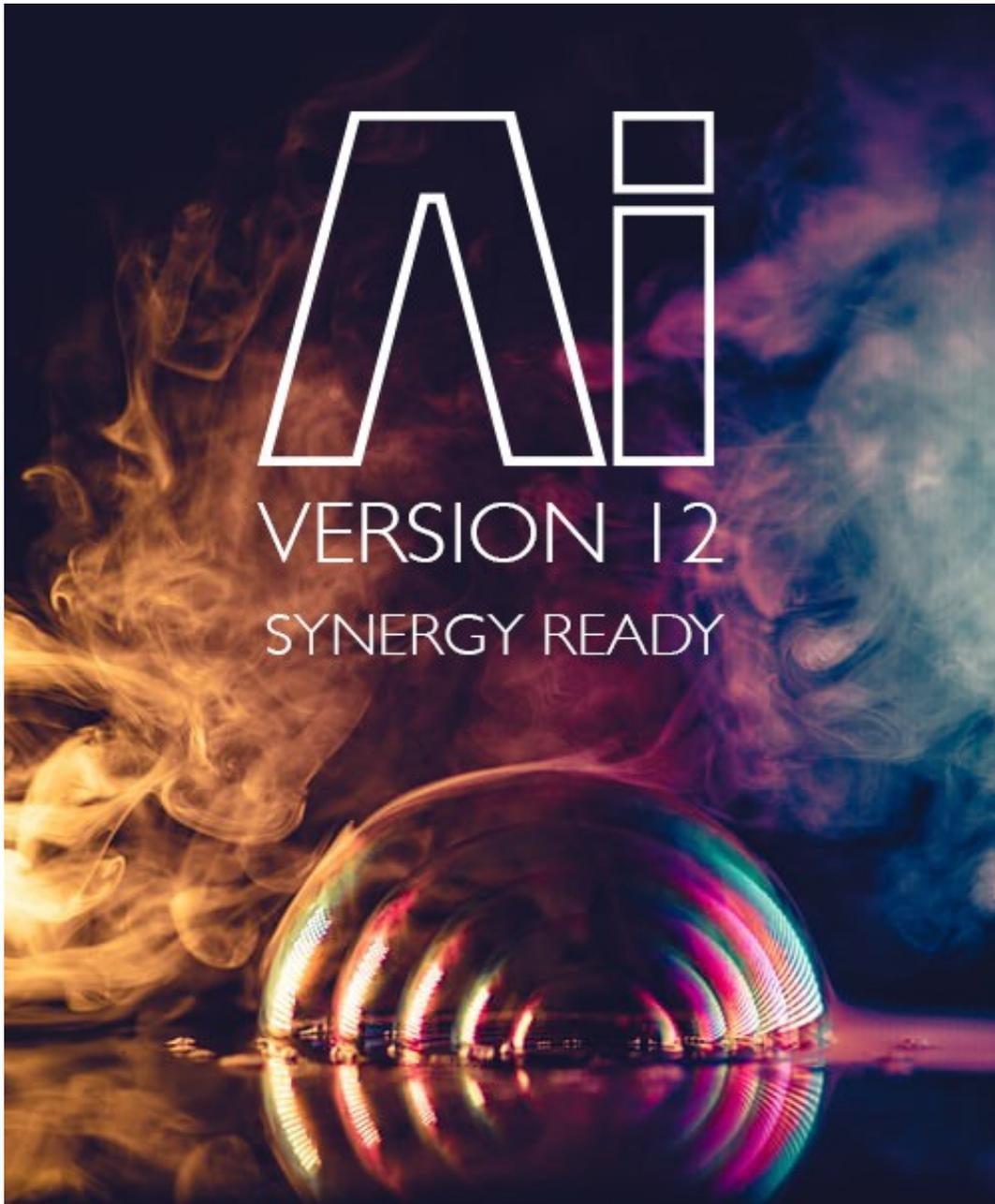




# Ai v12 User Manual





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# Whats New?

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Ai v12 introduces many new features and updates to the system

Alongside a large list of bug fixes and updates, the key additions to v12 include:

- Synergy ( Next-level Media server and lighting console integration )
- Mapping Matter Fixture ( Import projector fixtures based on mapping matter configuration )
- Updated Tap and Timecode Widgets ( improved and updated functionality )
- New Visual FX ( adding to the growing library of SVFX )
- Improved Watermarking ( Less obtrusive watermarking on Ai editor dongles )

For full details of all changes included within this build, please see the release notes.

Please note that in order to run a Synergy system, a computer or console running a licensed version of Titan v12 is required in addition to Ai software or hardware.

As always if any guidance is needed then we are here to help.

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Youtube Tutorials :

<https://www.youtube.com/user/avolitesvis>

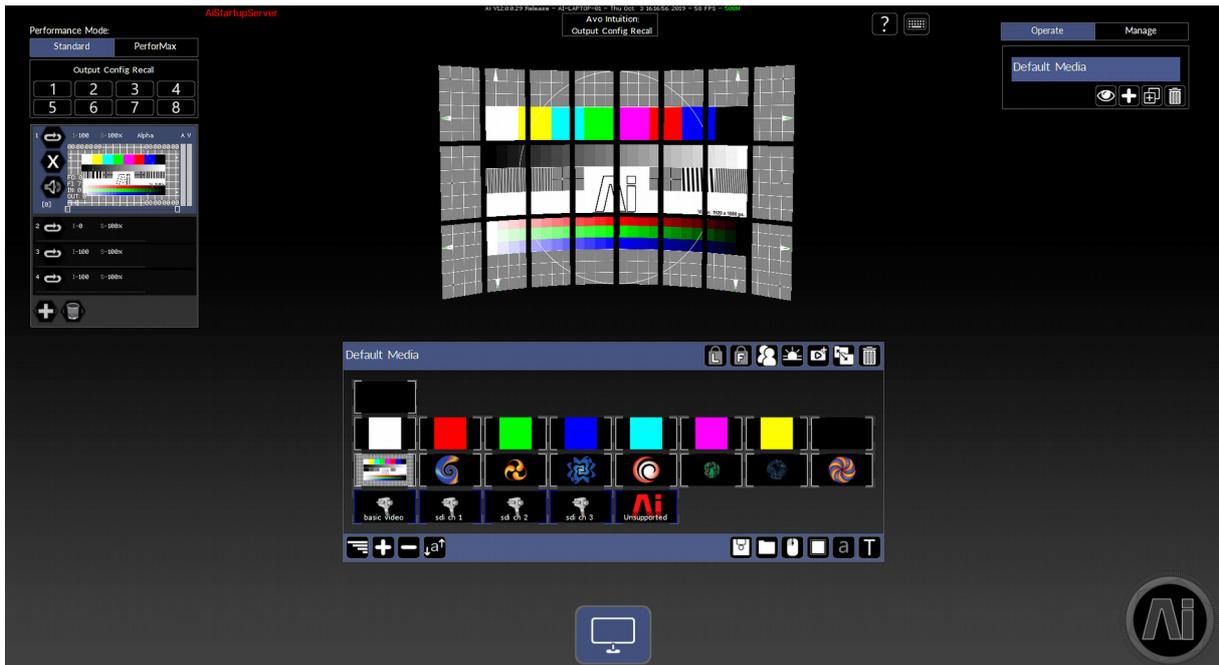
# What is Ai

## Overview

Ai is specialised software that has been focussed for media playback and designed for the live events, entertainment industry. Owned by Avolites, it has grown into a fully featured system, giving you creative visual control of your video system requirements.

Supporting both a 2D and 3D workflow, Ai provides a rich toolset that enable mapping, playback, manipulation and generation of live media.

The fully integrated 3D visualiser, supports importing of your stage set and content to allow you full pre-production. Ensuring that you have a confident system before you turn up on site.



# Fundamentals

## Interface

The Ai interface consists of several pages that are each designed to perform a certain task relating to the Ai workflow. These pages have been grouped together into categories and can be navigated using the Circular Ai page button in the bottom right-hand corner of the screen. This button will persist through all of the pages and is your way to navigate through the Ai software.

The four main categories are as follows, File - Perform - Stage - Output.

Whereas most of the GUI Elements (or widgets) are unique to individual pages, it is worth pointing out that the **fixture group** can be found on most pages. This is because the fixture group is a fundamental part of Ai. Depending on which fixture, or fixtures, are selected will determine some of the GUI Elements. For example, changing fixtures on the Output Page will change what tools are available to edit the outputs. It is also worth noting that some pages will not have functionality for certain fixture types and thus the fixture group will update to only allow the selection of valid types for that page.

Double clicking on the Ai Page Button will perform the Save task, giving you a quick way to save your show file!

## Fixtures



Fixtures in Ai are objects that control video in a certain way and will fundamentally output that data. There are three types of fixtures, each performing slightly different tasks.

The first is the **Screen Fixture**. This fixture can be thought of as a surface of video.



It can be a flat screen, or a 3D model that has information about what part of a flat video go to what areas. It has a layer stack that allows mixing of different video feeds and outputs it's data through a video signal. Typically DVI/VGA/Display Port.

The second fixture is the **Modular LED Fixture**. This fixture operates exactly the same as a screen fixture but differs on it's output abilities, where it outputs raw colour data over a network in the format of ArtNet, sACN or KiNet.

The Modular LED Fixture must have a canvas resolution on the X Set to a power of 2! [32, 64, 128, 256, 512, 1024...]

The third fixture is the **Projector Fixture**. This fixture is much more unique as it does not have a layer stack, nor does it directly render videos. However it can be thought of as a camera in the 3D Scene. The projector fixture will look at the scene and based on the geometry of available screen fixtures it will calculate the output mapping. This fixture outputs over video signals. Typically DVI/VGA/Display Port.

The projector fixtures need to come last in the list of the fixture groups!

The fourth and final fixture type is the **Mapping Matter Fixture** which is used to import precalculated projector positions from a Mapping Matter export file. These positions are then applied to all relevant projector fixtures within the current project.

## Canvas

A canvas can be thought of as the definition of a video surface in terms of pixels. This can be set on the Screen Fixture and Modular LED Fixture. The canvas will determine the processing of every layer on that fixture, including the mixing and blending together of those layers. So the higher the resolution of your canvas, the more processing Ai will have to do to process those layers.

Although not necessary, it is good practice to set your canvas resolution to the resolution of your playback media. If you set the resolution higher, than you are creating extra processing that is not needed. And if you set it lower then you will lose pixels, which translates to a loss in data.

Try to keep your canvases down to a power of 2. This is because Ai stores textures on the graphics card in powers of 2. So consider cutting down if possible. For



example an X resolution of 1100 is saved on the graphics card as 2048. Cutting it down to 1024 could save a lot of performance. Do you really need those extra 76 pixels!

## Layers

A layer can be thought of as an instance of media that is playing back inside of a fixture upon it's canvas. The layer will take a definition in pixels that is determined by the canvas and this will determine the amount of pixels that it processes at. The layer has a wealth of additional tasks that can be performed on it. From colour adjustments, spatial transformations, to visual effects. A layer can also be controlled remotely from a lighting desk where it will translate to a fixture, corresponding to a certain **Universe** and **Starting Channel**, assigning a given number of channels to different processing tasks that it can perform.

## Mix

A mix, or Final Mix, is the combination of all of the layers that have been declared for that fixture. The mix will blend these layers in a determined order to give a final desired texture. The blend will be determined by the blend mode selected and by the intensity of that layer.

By default Ai will mix the layers in the order from Top to Bottom. This means that Layer 1 (the layer on top) will behave as the last layer rendered and thus will show on top of the other layers. This mix order can be reversed in the System Settings if desired.

## Outputs

An output is a physical connection from your server that will send out some data.

There are two different kinds of outputs that Ai can treat for passing out video data.

The first is a video signal or **Display Output**. This is typically DVI/VGA/Display Port and will be set up to send large resolutions. Ai will automatically scan your Operating System for the configuration of your outputs and then use that to treat the signal that is sent out. Because of this it is important that you're outputs are setup correctly before starting Ai. EDID technology can help here, as if an output is lost during a



show, then the Operating System will reconfigure to accommodate for this change in setup.

Your Display Outputs will need to be arranged in the Operating System in numeric order. This means from left to right the numbers should incrementally increase. If the ordering is misplaced then the Output that Ai sends data to might be incorrect!

Your first Display Output should always be reserved for Ai's GUI. If you plan on using this to send data to a source then you will have no way of seeing what is going on!

The second output connection is a network connection, also known as Ethernet or RJ45. This will allow Ai to send out network packets that have video data encoded into them. The protocols currently supported are ArtNet, sACN and KiNet. The network adaptor inside of the server will need to be configured to a specific IP address and Subnet Mask before starting Ai. Similarly as with Display Outputs, if a network connection is lost whilst Ai is running, then the connections will be closed and you will need to restart Ai to enable them again.

## Media

Media is defined as something that will be played back on a layer, generating a texture. More commonly this is done by loading video files and then letting Ai play them back once triggered to a certain layer. However it can also be patches, which generate media, the most common being a live video feed. Or it could be using an external texture like Spout, Notch or NDI.

Media will have several definitions embedded into them, regardless of the medium. For example a video file will have encoding information and then will have a resolution in pixels, a frame rate and potentially audio information.

For clarity Ai has it's own specific video codec called AIM. Any video files played through Ai should be encoded with AIM, however Ai can handle a few other codecs. They must however be in a quicktime container (ending in .mov). It is worth noting though that full optimisations can only be achieved with AIM and thus this is the desired encoding method.

When loading video files it is important to note that this will impact the Hard Drive of



your system, as it is constantly being read from. A fast SSD will improve the performance of your system.

## Video

The primary format that should be used for playback in Ai is our own AiM codec. This provides benefits such as GPU accelerated playback allowing smooth playback of very large video files with high quality colour and pixel reproduction and reliable temporal reproduction.

AiM is the primary codec we use to test and is therefore the codec we use to create performance expectations and understand system performance. Whilst it is possible that non AiM encoded clips will playback in Ai, we cannot guarantee performance of the software or system when using other codecs.

The AiM codec supports playback of media formatted in RGB colourspace and can additionally accommodate an alpha channel as well as a stereo audio track.

## Still Image

Many formats of still image can be played back in Ai, including some which natively support alpha channels, however it is worth noting that image files do not receive GPU acceleration which can on occasion give unexpected results. The best way to ensure compatibility is to render the still images as very short AiM clips.

## Live Video Inputs

For best image quality and performance, we recommend the use of progressive format input signals. Interlaced format signals are supported but can result in visual artefacts or image degradation due to the nature of the legacy techniques used in this method of frame delivery.

When no other option is available, running an interlaced feed at a lower resolution can often result in less unexpected processing or temporal artefacts.



## Converting to AiM

Ai has a built in media transcoder, which allows you to convert media to the best format possible for playback in Ai – this is the easiest way to create AiM clips without a need to leave the Ai software. ( Please see page 64 for further details )

Another very popular option is to use the Adobe products to encode AiM clips. We have created a set of import and export plugins which allow the user to make use of Premiere, After Effects and Media encoder. These plugins can be downloaded for free from our website:

<https://www.avolites.com/software/ai-downloads>

AiM files can also be rendered from any Quicktime capable editor or convertor such as MPEGstreamclip or any of the other quicktime based renderers. The relevant AiM codec files can be also be found on our website:

<https://www.avolites.com/software/ai-downloads>

## 3D Visualisation

Ai operates inside of a fully functioning 3D environment, that is referred to as the visualiser. The 3D environment will display the models of Screen and Modular LED Fixtures, mapping their final mix to the models accordingly. The visualiser can give a very good interpretation on how the show will look, based on the information that has been imported and can be used as a pre-production tool for designers.

Because the visualiser operates in realtime, it can also be a good indication of the simulation of certain elements, including how media played back will look and how automation cues might change the stage set.

## Workflow

Typically inside of Ai a particular workflow is used to streamline the time and effort taken to get your show ready for production. This is broken down into two main categories, **Setup** and **Operation**.



The Setup phase can be thought of as everything that needs to be achieved to make the show file ready to use on your event. A breakdown of this is as follows:

- Define global system settings
- Define amount of Fixtures on Stage Construction Page
- Define output configuration on Output Page
- Define amount of Layers on Performance Page
- Define media on Performance Page or build a Timeline
- Address layers for external control (if necessary)
- Address media for external control (if necessary)

The Operation phase can be thought of as anything that you need to do during the show. This should be thought of in terms of recalling cues/presets or applying media to get a desired effect. Whereas some processes from the setup phase might be needed in the operation phase, most of the show file should not need to be edited.

# Synergy

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Version 12 of Ai and Titan sees the launch of a new type of media server and lighting console integration know as Synergy.

The Aim of Synergy is to remove the traditional hurdles encountered when integrating lighting and video into a single system, to improve the flexibility of the systems and to create an integration which truly feels like a single unified platform.

In developing Synergy, the use of proprietary code has allowed many of the more problematic sections of system integration to be bypassed to create a smoother, more fluid and easy to understand way to setup the show.

In addition to increased ease of use, many new features not previously possible have been added to the system. For example:

- Media files can be previewed in realtime on the lighting console.
- Media files can be uploaded from the console directly to the server and automatically transcoded into Ai's preferred format.
- Specific layers or mixes from Ai can be directly chosen as sources in Titan's Pixelmapper when creating an effect.
- Screen and Modled fixtures can be created and defined from the console.
- A much easier and more reliable process to patch media servers in Titan.

Many more features have been added into Titan which relate to improved ease of use and task specific streamlining tools when working with media servers. For a full breakdown of all new Synergy features in Titan, please refer to the Titan v12 manual which can be downloaded from our website or can also be found within the console running Titan v12 by going to Tools > Help > User Manual

Setting up a Synergy connection is done from the console and unlike C1TP or standard patching the media server does not need to be allocated specific channels or put into a ready mode – it just needs to be in an active network with the controlling console. The only Ai setting that is relevant is the NDI Preview button in Ai's system settings – when this is turned off, video streams are not passed to the console for previewing or pixel mapping.

# Getting Started

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## Avolites Hardware

Avolites manufacture a range of media servers that have been custom built with specific hardware in mind. The models in the range contain various specialised features such as on board EDID management, front panel system control, dedicated LTC ports, fast ethernet ports, SDI and DVI capture options and multiple show outputs. Using a dedicated Avolites media server ensures maximum compatibility and performance with Ai.

For up to date information about the latest products, please go to [www.Avolites.com](http://www.Avolites.com)

## Operating System Settings

The performance of Ai will only be as good as the Operating System will let it. A few key things to make sure are as follows:

- Operating System is running on High Performance Power Settings
- Firewall is disabled or configured to allow Ai to connect
- Antivirus and Malware tools are not obstructing resources
- Nothing is overusing the disks by constantly reading/writing

## Display Settings

The display settings are fundamental to Ai, as a lot of processing is executed on the graphics card. Ai will look at the order of the outputs in a linear fashion from left to right. It is important therefore that in Windows, the outputs have been configured consecutively and that they are placed on the same Y co-ordinate.



## Ai Installation Settings

Ai will install by default to this location:

`C:/Avolites/Ai/Distrib`

Ai can run from any directory, however it is always advised to keep the Distrib in this location and not rename it. It is also advised to store your project assets in the Distrib so they can easily be obtained for reference. The only example here is your media which is advised as being stored on a separate dedicated media drive.

Multiple instances of Ai can be installed at a time, all that is required is that the existing Distrib is renamed to something else.

Before installing a new version of Ai it is advisable to rename or delete any existing Distrib folder before proceeding. Older files left over from a previous install can produce undesired effects when overwritten with a new install. Renaming the folder is the safest option as nothing is destroyed and can also allow you to have multiple versions of Ai installed.

# Using Ai

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## Project Management

The project browser page gives you a quick overview of what current projects are available to you. The page consists of three different rows of projects that can each be navigated through either swiping or by clicking on the arrow buttons.

The top row provides a list of template projects that will allow you to create a new show file based on the information on that project.

The middle row is a comprehensive list of all the projects that are found in the **Distrib/Projects** folder, excluding the template projects.

The bottom row is a list of the last loaded ten projects. This is saved in a text file called **recent** in the Distrib/Projects folder. It is worth noting that depending on your setup, some of the projects that have previously been loaded might not exist any more, this is meant to be an indication of your last work.

Project or Show Files are saved as .scb files. Whenever you save a show in Ai it will automatically create a backup of the show, with the extension .bak. If you need to load the backup file, you will need to manually change the extension to .scb for it to become valid.

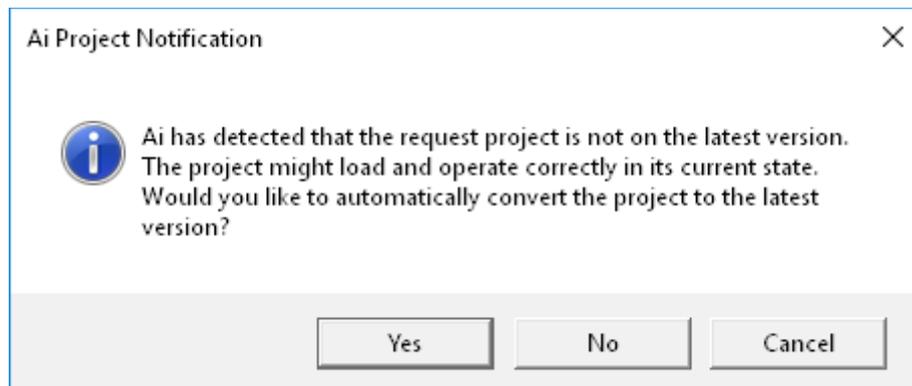
## Loading a Show

When you start Ai, it will attempt to load the last project that was saved or loaded in your last session. This information is obtained by reading the name of the show file in the **recent** text file that can be found in Distrib/Projects. If for any reason your show file has become corrupted, then it will be beneficial to change the name of the project in this text file to allow for Ai to load correctly.

To load a show file through Ai, once on the project browser page, a single click on the desired project from either the Projects Row or the Recent Projects row will close your current show file and load the desired project.

You can also load a show file from Salvation. This is achieved by clicking on the Salvation bar at the top of the screen and going to File -> Load. This will not close the currently loaded project, so it is worth closing your current show file before attempting this.

Showfiles made on older versions of Ai can now be imported and updated to the latest version with Ai's built in project importer. When opening an older project via the project browser or through Salvation, the following pop-up will appear:



It should be remembered that once a project file has been updated to the latest version, it will no longer be possible to run it in the version of AI it originated from.

## Creating a Show from a Template

To create a new show, once on the project browser page, you can create a new show from a template by clicking on the desired template. Ai will prompt you to enter a name for the desired show file and will close your current project whilst it opens the new project.

If you find yourself using the same setup for most of your shows then you can create your own custom templates. To do this, just put your show file in the Distrib/Projects/Templates folder, and next time you start Ai, that project will be available as a template.

## Saving a Show

The save button under the project tree of the Ai button will automatically save your project file. It will overwrite the current show file with the changes that you have made.



## Saving Duplicates of a Show

The Save As button under the project tree of the Ai button will save a new show file to the Distrib/Projects folder. You will be prompted to enter a name of the desired show file and pressing enter will execute the save command.

## System Settings

The system settings window in Ai allows you access to many of the underlying settings which don't need to be controlled during a live show but may need to be setup differently for each project.

When we open the system settings window, we can see that its split up into different sections.

### ArtNet / CITP

The first set of options relate to ArtNet control and allow us to set an ArtNet and CIP protocol adaptor separately, specify the ArtNet control type ( the v6 profiles are for backwards compatibility, all modern projects will use v7 control ), choose whether the current machine runs as master or slave and then set the universe and channel to transmit and receive master / slave control data. The initialise button is used at the appropriate time when first connecting your Ai server system to a lighting console allowing for the requisite data to be shared via the CIP protocol. The triggering method determines whether media is selected and triggered from the Ai interface or via the file and folder system used on many lighting consoles. The three personality options are set as a system wide option depending on the level of control you require for your layers and show. When using the file and folder triggering method it is possible to specify an alternative folder instead of the media folder by locating your chosen destination using the set global mixer path button.

### Midi

The second section of options relates to MIDI and MIDI time code. The drop down



menu allows you to select your master midi device for midi control input or MIDI time code input. Then we have several buttons which appertain to MIDI time code specifically – the first button reveals the time code widget in the main interface. This widget has numerical values below it to show the current frame and any offset that has been applied to the timing. Inside the widget there are a series of 4 bands - each of which relate to frames, seconds, minutes and hours – which fill up as time progresses. Next we have the Time code Active button which activates the widget ( red is inactive, blue is active ). An alternative way to activate the widget is to click on the widget itself once it is exposed within the main interface. If your machine has an LTC port ( as found on the Infinity 8 and EX models ) then pressing the Use LTC timecode button makes your system listen to that port regardless of the one specified in the drop down.

Enabling or disabling Freewheel changes the behaviour that happens if the timecode signal stops for any reason. If this is disabled, the clip will sync frame to frame to timecode, pausing it will also pause the playback. If this is enabled then the video file will carry on running in the even that timecode is paused, using an internal clock generated inside of Ai.

The option to use the system clock as the time code generator can be very useful in a situation where you wish to have timed events, but a time code generator is not available or appropriate to run a show. For instance in a bar you might always know that at 8pm you want to advertise drinks offers and can therefore just use the system clock regardless of the time it is started instead of making sure your time code generator starts at the same time each day. The time code base rate needs to be set at the same value as that which is being received in the time code – a mismatch can result in missed triggers and unexpected behaviour.

Finally in 10.2 there is a new option to decode an LTC signal via a line in port. You can select the device and then either enable/disable this to sync to the desired TC.

## General

The general section is focussed more on how the system works. The default cross fade period is the value used by all clips when fading on the layer unless an alternative value has been set for that clip in the right click properties and the Stage Page Grid brightness allows you to adjust the visibility of the background grid in the stage construction page.



Layer Render Order lets you choose whether the top layer in your stack is shown above or below the following layers – this is to make the working order more familiar to people used to working from the bottom up instead of from the top down. The Use Gl Finish option will alter the way Open GL is rendered, and in some situations can give a noticeable performance improvement when selected. Optimal 1.0 speed playback changes the way video playback clocks are calculated to trust output monitor refresh rate when clip speed equals 1.0, or to use the system clock as the trusted clock source. Last frame behaviour has two options, black and hold last frame, which allow you to choose how the last frame is held when using a relevant playback mode.

TGA Sequence Memory Path is a useful option when using TGA image sequences – it determines whether Ai uses a section of GPU memory to store the sequence, which can improve efficiency when using a compatible AMD card. The next two options relate to using TGA image sequences in Ai – TGA Sequence Memory Path..... and TGA

Sequence Frame rate allows you to specify how many of these frames are played back per second.

Sync offset and continuous sync are two options for files which contain audio as well as video. When enabled, continuous sync allows the system to adjust the video forwards or backwards to maintain synchronisation with the clock in the embedded audio stream. Sync Offset sets an offset between the Audio playback and the video playback to allow for any delay between audio playback and video playback. The Show Mouse On option allows the user to select which screens the mouse should be shown on. And finally the User Interface GPU Mode allows you to block textures which are currently being sent to the 2nd GPU from being shown in the main UI window. This can offer significant performance improvements, in projects where large textures are being sent to outputs 4-8 (on the 2nd GPU), with the compromise of having the UI window not show the textures routed to the 2nd GPU. This option basically reduces the amount of data being transferred around the PCIe bus to the minimum required to service the systems outputs appropriately.

The Layer Render Options button allows you to configure the way the layers are rendered you can choose to omit parts of the render processing. This can offer



significant performance improvements if there are areas of the render processing that you do not require in your project. Auto Output Assignment allows you to toggle whether the system should automatically attempt to assign the video outputs or not. The default is 'Auto Assign'. If you select 'Manual Setup' then this can be adjusted manually within the Output configuration page accessible through the Patching Page via the Ai Outputs 'Configure' button. The Sync Group Ethernet allows you to open a page which shows the Ethernet modules used within the Sync Group Processing.

## Sync Groups

The sync groups allow you to share the current playhead position of a video across your network, frame syncing the playback. This is automatically managed for you via a UDP broadcast protocol. The synchronisation occurs by setting a flag on the layer, however the IP for the transmission is defined here.

## BPM

The BPM Sync is an option that will affect the playback of the media to a given BPM. For more information on how this is done see the Performance Page Section. The first option here allows you to override the set BPM value on a layer with the information tapped into the Beat Widget. The second option gives you a button to tap the BPM and can be mapped to Midi or DMX to tap via an external controller. lastly the final button toggles whether the BPM Widget is visible or not.

## Remote Folder Synchronisation

The remote folder synchronisation section is to allocate and setup up to sixteen source and destination folders and when activated can look for media which is either present or missing from these folders and distribute the content accordingly.

## Input Module Paths

The input Module Paths allows for you to define where in the project file a dedicated external texture is located. This is Useful if you want to customise adding in generated content.

## NDI

NDI is a protocol developed by NewTek that allows for streaming video over ethernet. Ai supports 8 NDI streams by default and will automatically build a list of the streams that it finds on the network. This can be viewed in the sources drop down box. If there are incorrect streams in the list, using the **Rebuild List** button will clear this list and add any streams that are showing themselves.

By default on the layer when referencing the NDI streams, the stream that is referenced will correspond to the index in the list. I.e NDI Source 1 will be the first source in the list. If you require an absolute stream that you know the source of, you can enter it's name into the **Manual Input** text box and enable it with the button to the side of it. This will ensure that the NDI stream will always look for that stream, rather than the ordering of the list.

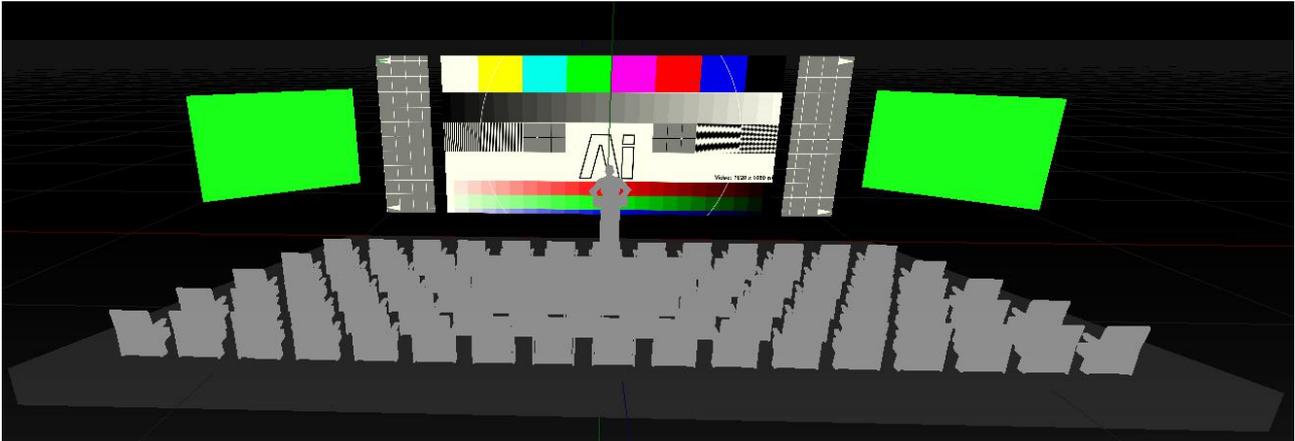
## Canvas Editor

The two options for the canvas editor allow you to define the colour that is used for the Vertices and the Edges. This is useful if your content map is using a similar colour and so the Vertices and Edges are hard to see.

## Machine Name

The machine name option will add some text in the upper right hand corner of the performance page. This is useful if you have several servers on a show and want to quickly see what the server is by an identifier. You can change the colour and size of the text with the next two options.

## Stage Construction



The stage construction page is used for the configuration and setup of your show in terms of what fixtures will be used, and their placement in the virtual 3D environment. This allows for you to build a virtual representation of your physical show. This will be useful for creating the mapping of the objects on your stage, but will also be a useful visualisation tool - creating a graphical interpretation of how content will look for your show.

## Using the Visualiser

The main bulk of the stage construction page consists of the virtual scene. The virtual scene is defined as a perspective projection area that takes the geometry of the fixtures and then passes them to a virtual camera, giving you the visualisation that you see.

The scene is defined using 3 axis (X, Y, Z) in that particular order. This can be described as X representing Width, Y representing Height and Z representing Depth. A grid can be seen that depicts each of these axis, where the red line refers to the X axis, the green line refers to the Y axis and the blue line the Z axis.

It is possible to navigate through this scene be either holding 'shift' and clicking/dragging the mouse to pivot or rotate. Or by holding 'Alt' and clicking/dragging the mouse to pan around. The mouse wheel will allow you to zoom in/out. Once you have navigated to a point of interest, it is possible to save

this as a preset by pressing shift and either 'f7', 'f8' or 'f9'. Pressing the function keys without shift will recall that position.

## Fixture Group



The fixture group is a list of all of the fixtures that have been added to the current show. On the Stage Construction page it will display all fixtures in the system.

The selected fixture or fixtures will be highlighted by having a blue background. If no fixtures are selected then the functionality of that page will be limited until something is selected. A single mouse click will select the appropriate fixture and deselect the other fixtures. To select multiple fixtures, simply hold down the mouse and draw over the fixtures you desire to select. It is worth mentioning that some functionality will be limited to single fixtures. In this case, the first selected fixture will be affected.

On the stage construction page you can affect physical properties of the selected fixture by use of the properties box on the right hand side. The properties box will update depending on what type of fixture is selected.

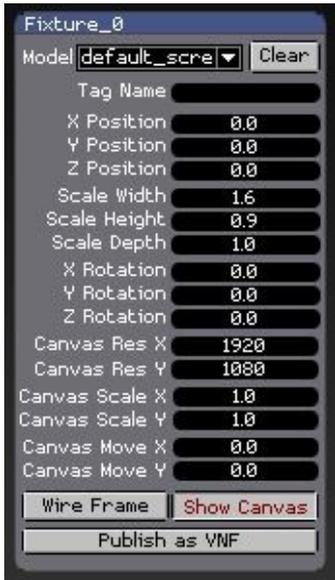
It might take a little time to create a fixture so please be patient. When adding a Screen or Modular LED fixture it is important to notice that it will be inserted before any projector fixture. This is useful to know as Ai is reliant on the ordering of some fixture types. Projectors should always come last in the list on the fixture group. This should be expected throughout the system.

## Adding Fixtures



To add a fixture, you simply need to click on the top left menu which has a button for each of the fixture types along with a plus icon.

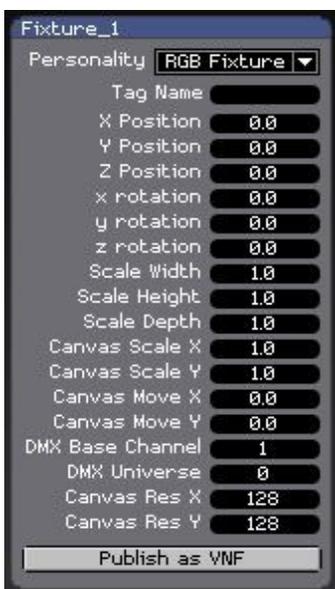
## Screen Fixture



This is the most commonly used fixture type and is used as the starting point for projection mapping, LED screens and more traditional video output. You can either use the default screen model and deform it as needed, which for most jobs is fine, or you can import a 3D Model by dragging it from Windows onto the desired fixture in the fixture group. This allows for you to work with highly complex projection targets, such as cars, buildings and very organic curved surfaces. Which would otherwise be very difficult to work with using traditional methods. The benefits of this approach are many fold, but primarily the use of 3D models allows for very flexible and editable screen designs and the use of UV mapping ensures reliability in terms of accurate reproduction of video content onto stage technology.

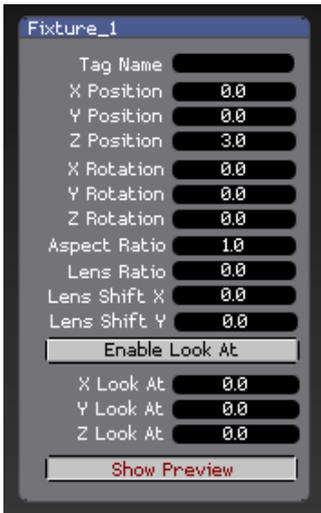
Currently Ai supports the use of several 3D model formats: 3DS, OBJ, BLEND, LWO, LWS, LXO. Of these, 3DS and OBJ are the most regularly used as they supported by the majority of 3D software, regardless of the platform in use.

## Modular LED Fixture



The modular LED fixture operates almost identically to the Screen Fixture. Where it differs though is in it's capacity to output it's information over a network protocol (ArtNet / KiNet).

## Projector Fixture



The projector fixture should be used when you intend to do video mapping or vertex editing using a 3D model. It works in conjunction with the Screen Fixture models, by capturing their geometry and then applying adjustments on those based on it's positioning in the Virtual Scene.

In order for Ai to produce something that is as close to the real world as possible, it is very important to enter the real world projector values as accurately as possible. Such values as the aspect ratio and the lens ratio will change how Ai applies distortion to create an Image that will be sent to the output. When your real world and virtual settings match up, then everything will fall into place very easily for you.

## Mapping Matter Fixture



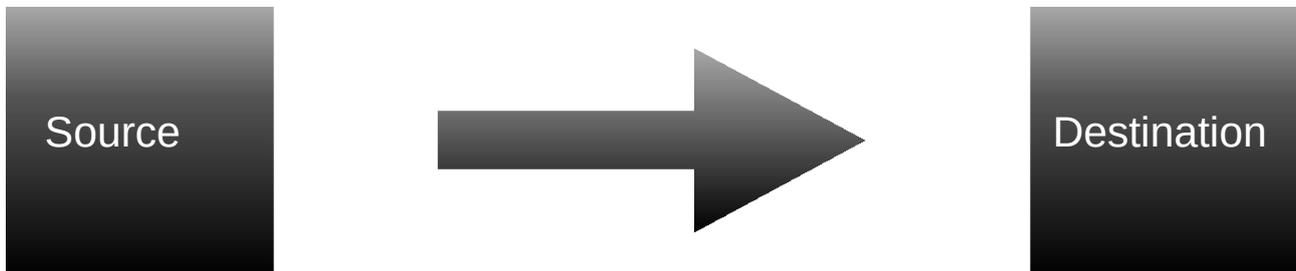
Mapping Matter is a 3<sup>rd</sup> party software which is used to accurately plot projector positions, ensure good coverage and illumination of the target surface based on an extensive inbuilt library of projector and lense information.

Once calibrated in Mapping Matter , the fixture allows users to import this data directly into Ai and integrate the plotted positions and lense settings directly into the projector fixtures. This fixture type does not create its own unique fixture but instead creates as many projector fixtures as dictated by the plotting.

## Output

The output page is used to configure the signal that will be sent out of the server via the various attached devices. Depending on the fixture that is selected, the page will update its tools and controls to give a different workflow in accordance with what is necessary. However the main principle of the output page remains the same, giving a uniform interface that should be translated across all three workflows.

On the left hand side is the source. This can be thought of as the input from the fixture. This will be either the model data that a projector can see or a final mix of a screen or modular led fixture. On the right hand side is the destination. This can be thought of as the output, the information that will be sent out of the server through a physical connection.



In between the source and destination windows there is a vertical bar that defines the difference between the two. By clicking and dragging this bar, it will allow you to resize the source and destination windows. Allowing for you to focus on one specific area at a time. A right click on the bar will reset it back to the middle.

## Physical Outputs

At the top right of the output page are a definition of the physical outputs assignable on the machine. If a projector or screen fixture is selected, then this will show 8 buttons with a number in each button. These numbers correspond to the physical video outputs connected to the server. With the ordering of the outputs aligned to how your

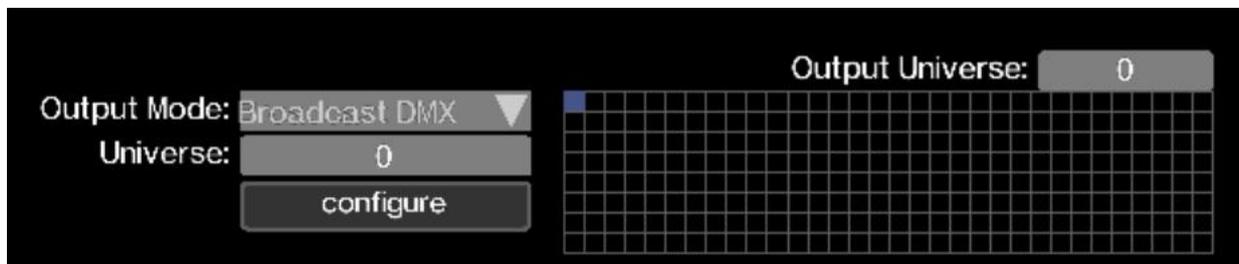


operating system has arranged them. It is important to note in Ai the main interface screen is seen as output 1, so most of your work will start from output 2. The selected output will be obvious with a blue highlight over it. You may notice however that some of the outputs have a dot in the top right hand corner of them. This is to indicate that there is data mapped to that output.



When using a modular LED fixture, the output graphic is different as there are no video outputs to send data to. Instead a widget that allows you to select the current universe replaces it. Where boxes indicate what universe is selected. You can either click on a box to select that universe, or type it in the appropriate box above. If data has been mapped to a universe then the box will pulse, whereas a solid box indicates that you are working with that current universe.

On the left hand side there is an output mode box. This allows you to configure the universe and choose how it is output. The options are 'Broadcast DMX', 'UnicastDMX', 'Streaming ACN' and 'KiNet'. If you choose Unicast DMX then an address box allows you to type the destination to send to. Choosing Streaming ACN will provide a priority box that you can set. There is a configure button that allows you to quickly configure lots of universes defined in the CSV file.

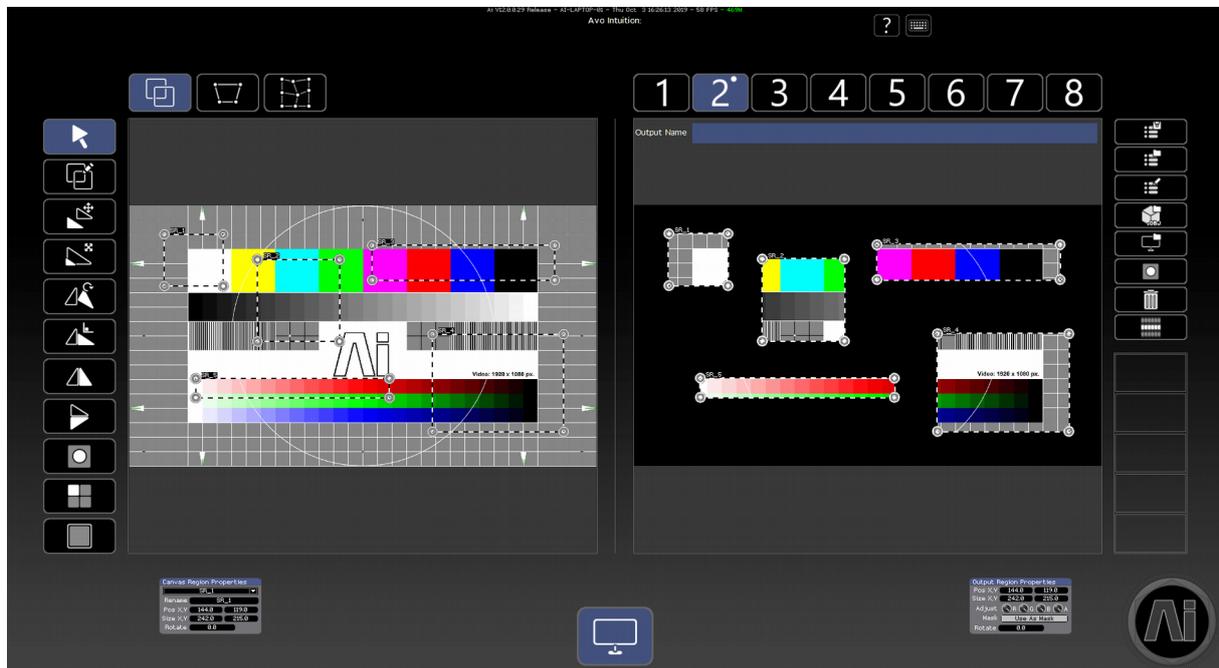


The CSV file would be defined as following:

Universe Number	Type	Unicast address
1	broadcast	
2	unicast	2.0.0.1
3	sACN	

If unicast is selected, a combination of up to 5 unicast addresses can be entered using a comma as a separator. An example of this would be: **2.0.0.1:2.0.0.2:2.0.0.3.**

## Screen Fixture



The screen fixture provides an underlying toolset to allow you to create regions, specifying an area on the output to draw to, and what part of the texture to extract from. Where the main unit of control here will be pixels. If a region has inequality between the sizes of the source and destination, then Ai will perform bi-linear interpolation for the scaling. Scaling linearly in both the width and height.

Working with the regions mapper can be thought of as more traditional video mapping. Where instead of working with the geometry of the 3D model and scene, you are working directly with the 2D texture.

By default the region mapper allows for you to create rectangular sections from within anywhere of your source (texture) and place them directly on your outputs. These regions can be drawn using the Region Draw Tool and they can be fine adjusted with numerical controls if needed. Where the defined operation is to draw a region on your source, and then draw a second region on your output. Double clicking on a region will full screen it on either the source or the output, depending on the chosen region that was clicked. If desired a multi-point region can be created

by right clicking on the Region Draw Tool. This will update the icon and you will be able to create a region of multiple points, by clicking to add a point. A double click will complete the shape.

On the left side of the screen is the tools menu. This is the main set of functionality that you will be using when mapping out your regions and layout for your outputs.



**Region Select Tool.** This will allow you to select regions by clicking on them. Multiple regions can be selected by moving the mouse when the left button is down to create a selection window.

**Region Draw Tool.** Draw new regions with the tool. Click and drag the mouse to create a shape when in Rectangle Region mode. If in multi-point mode then click to add a point to the shape.

**Translate.** move selected regions.

**Scale.** Click and drag to scale selected regions.

**Free Rotate.** Click and drag to rotate selected regions.

**Rotate 90.** Click to rotate selected regions on output by 90 degrees.

**Mirror X.** Flip selected regions on the x plane.

**Mirror Y.** Flip selected regions on the y plane.

**Mask.** Cycle through a set of pre-calculated masks for individual regions.

**Highlight.** Make selected regions pulse on the output. Shift click to stop all regions from highlighting.

**Border.** Display a 3 pixel border on selected regions on the output. Shift Click to clear all borders.

Once regions have been created, they can either be manipulated with the toolset above, or they can be edited with the numeric boxes available for either the source or the destination. Using the keyboard you can translate the regions on the output by a single pixels with the arrow keys, or pressing shift will affect the translation by 10 pixels.

Pressing control whilst using the arrow keys will translate the source of the

region, rather than the destination.

On the right hand side is the operations menu. This menu gives you options for affecting the entire mapping configuration. It is worth noting that some actions like the save and load affect the entire mapping of your show across all fixtures!



**Save Output Configuration.** Saving an output configuration will pop up an external dialogue and allow you to save an .Air file. This file will contain the entire mapping data for all of your fixtures.

**Load Output Configuration.** This will allow you to load an .Air file. Loading a configuration will overwrite your current mapping for all fixtures.

**Adjust Output Configuration Presets.** This will pop up a preset box that will allow you to choose the location of 8 output configurations. These configurations can be used to quickly change the output mapping live during the show. Pressing the button will close the preset box.

**Load Regions from External Model.** This will load region data from a 3D model. Where the geometrical co-ordinates will relate to the output and the UV co-ordinates the source.

**Load Regions from Screen Fixture Model.** This is similar to loading from an external model, however will use the model for the Screen Fixture.

**Load a template for Output.** This will allow you to put an image as the background for the output. This is useful if you need to align the outputs to a template.

**Remove template for Output.** This will remove the loaded template.

**Load Regions From XML.** This allows you to load regions from an existing configuration in XML format.

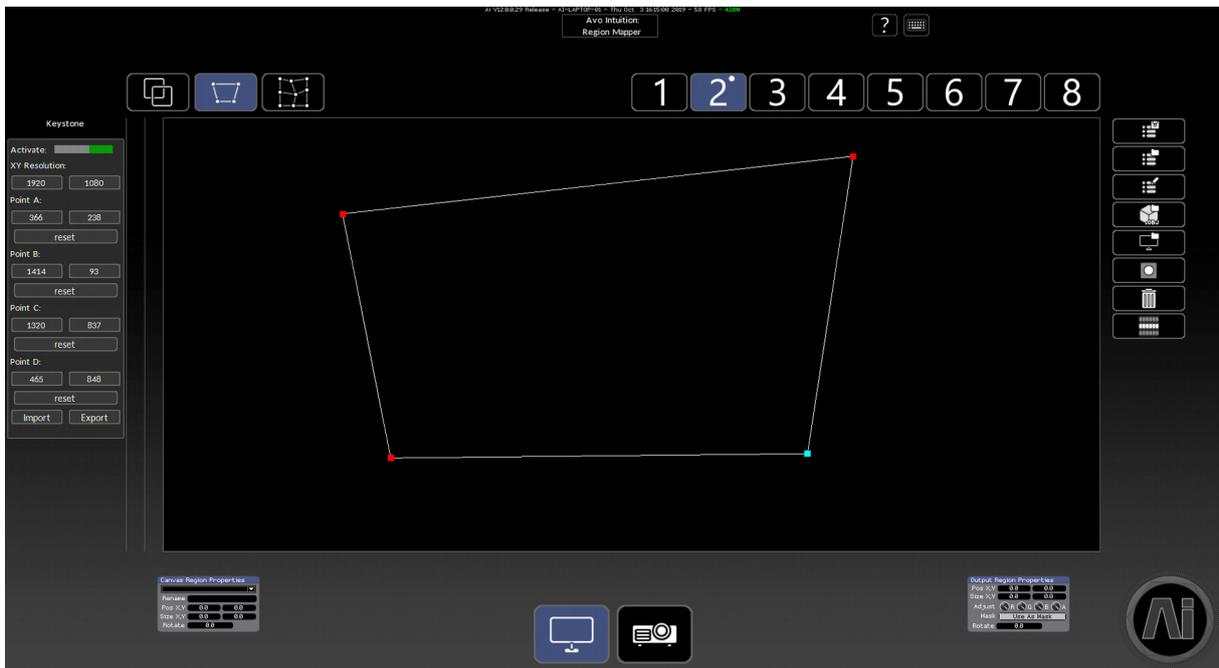
# Meshwarp



Meshwarp is the name that defines both the keystone and the grid-warp engine. This is because they both work together in parallel. Where the grid-warp is applied through the keystone. The meshwarp engine works by affecting the output at a last pass. This means that any information that has been mapped to that output, will have the distortion applied to it. However in order to see something on your output you will need to draw a region on that output before activating the meshwarp.

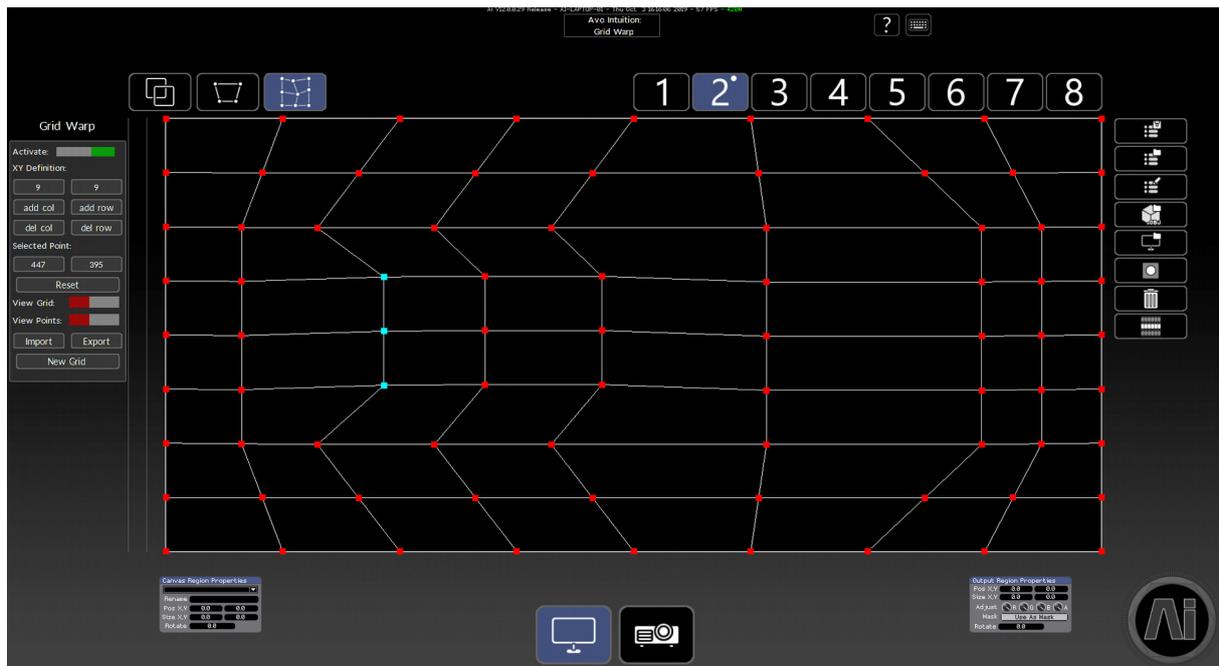
By default the meshwarp engine is disabled per output. On both the keystone and grid-warp pages, an 'Activate' toggle will allow you to enable/disable the engine on that particular output.

# Keystone



The keystone page has 4 points that can be adjusted. The can be clicked on individually, or a box can be dragged to create a selection of points to affect. Affecting the points will automatically update the GUI and the output, allowing for you to see the distortion as you work. For fine adjustments you can use the arrow keys to adjust the points by a single pixel. Or you can enter a numeric value for the points in the controls on the side. The points are arranged from top left in a clockwise spiral - starting with Point A.

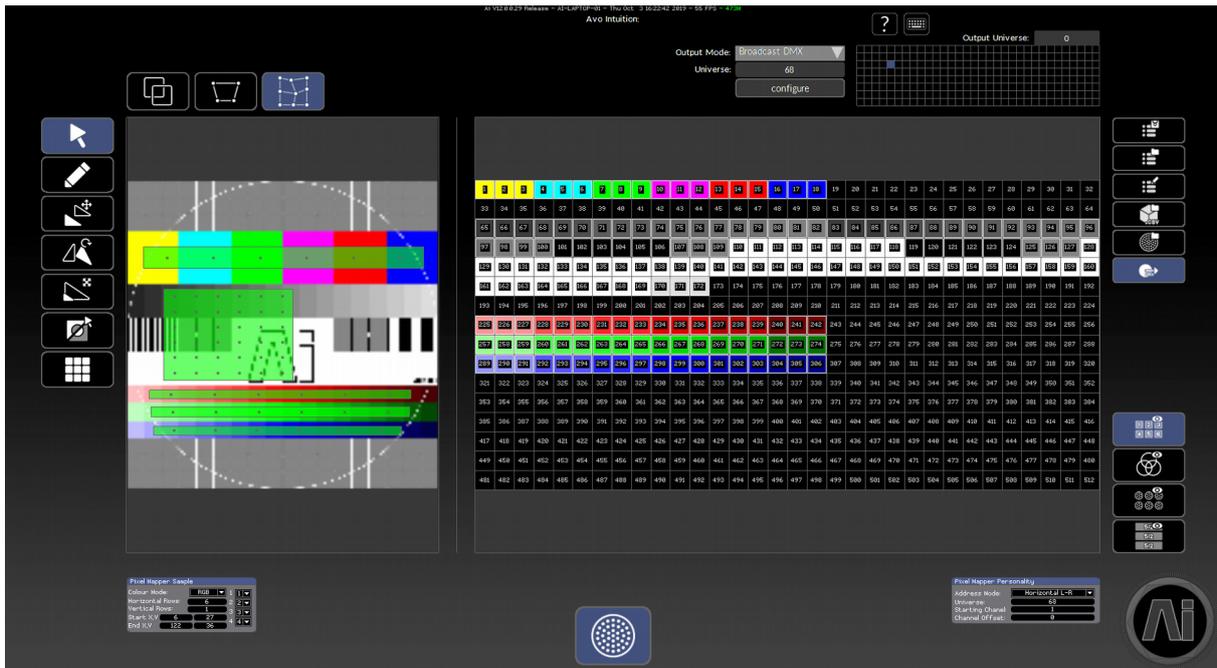
# Gridwarp



Grid-Warp is a little more complex than the keystone engine, but is operated in a similar way. The default is a 3x3 grid of points that can be moved around to create linear distortion on the output. The grid can be affected by adding more rows or columns. This is shown in the definition boxes (note they can't be manually edited). If you choose to add a row or column after editing the grid, then it will automatically work out the interpolation needed to put that point in the current location. Other controls include text boxes to manually position a selected point, a toggle to turn the lines on/off on the output and a toggle to turn the points on/off on the output. The new grid option will delete all the current mapping and allow for you to start again.

Both the keystone and the grid-warp have import/export options. That will allow you to save the mapping for that particular option and load it back in to overwrite the current mapping for that one particular output.

# Modular LED Fixture



The modular LED fixture takes a similar approach to the Screen fixture for mapping information to an output using regions. However instead of a source and destination, there is only a source to be drawn. Where the destination is defined using a channel grid for the ArtNet data. You can define the current universe that the region is on, with the starting channel. Depending on the definition of the region the output page will calculate the pixel information to be sent over DMX.

The pixel mapper sample box gives you the ability to define the colour mode of the pixels (Mono, RGB, RGBA, CMY, RGBW, Mono 16bit), the amount of pixels horizontally and vertically, the start and end positions and the colour routing. The colour routing are the numbers on the right hand side and refer to the colour mode. But it allows you to change RGB to BGR by choosing the first channel and relating it to a different pixel. This works for all colour modes, for example you could define BGRA instead of RGBA.

The pixel mapper personality box allows you to choose the address mode (the wiring of the physical pixels), the starting universe and channel and a channel offset if needed.

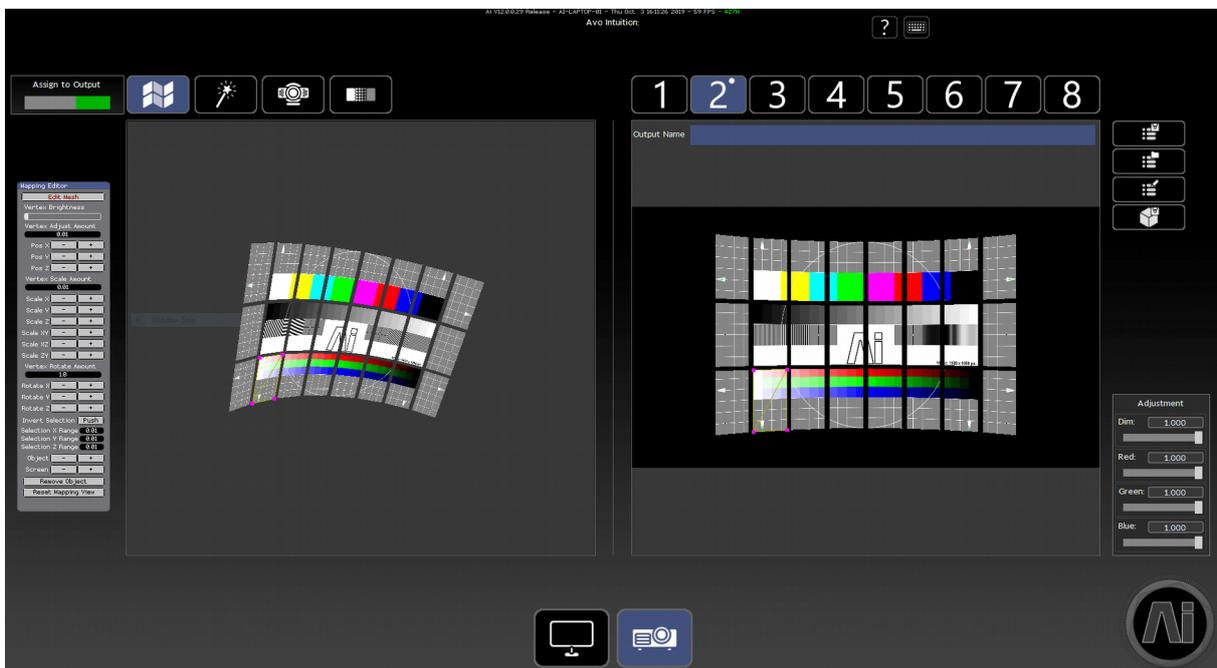
It is important to note that Ai does not support wrapping of universes. So if a region would span multiple universes, then it is important to break that down to

smaller regions. Then map them accordingly.

On the right hand side there are some tools that share the same as the screen fixture, including saving/loading and configuring output presets. The further tools include loading mapping data from a CSV file, loading mapping data from a fixture file and disabling/ enabling DMX on the entire Ai show file.

Underneath this menu is another menu that has 4 buttons. These buttons allow you to visualise the data in different ways. The first disables/enables the channel numbers. The second changes the visualisation of the channel data. The third enables viewing regions on multiple fixtures and the last enables viewing regions on multiple universes.

## Projector Fixture



The projector fixture operates differently to the other two fixtures, where there is no region data used for the mapping. However it still follows the source and destination principles. Instead of using regions, it will use the 3D geometry data of the models loaded onto the various screen fixtures that it can see. You will then see a preview of the output, which is a snapshot of what the projector can see from the virtual scene.

To assign a projector to an output, you simply need to select the output and then click



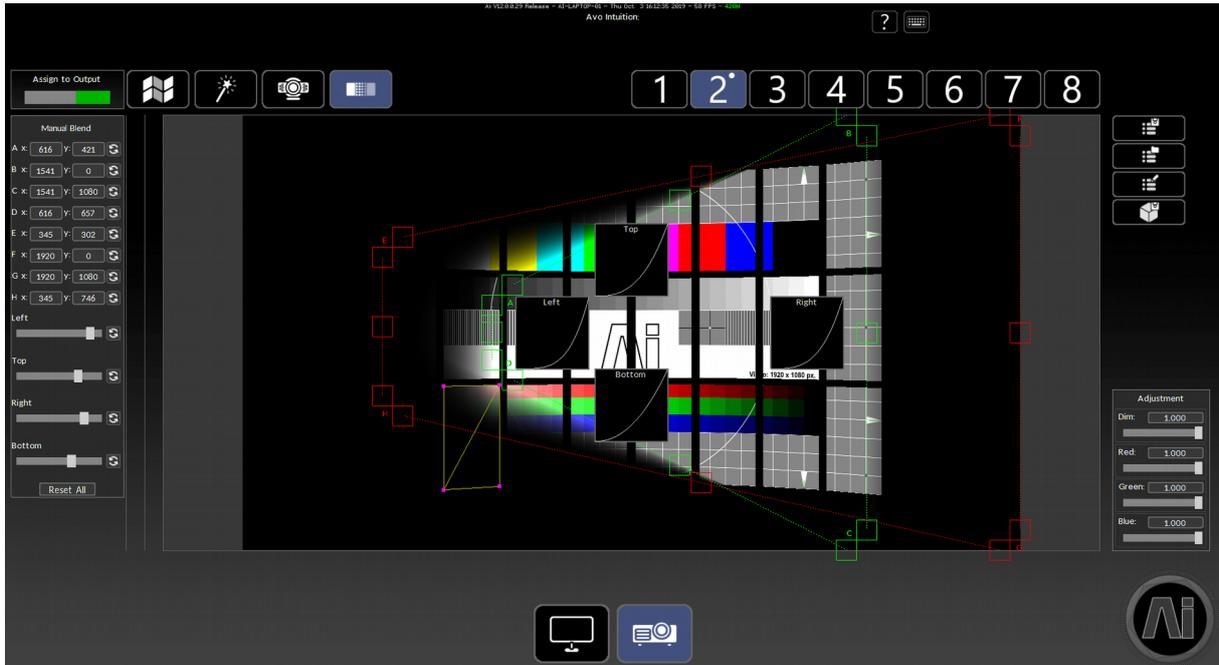
on the background. Clicking again will disable the projector from the current output. The main method of mapping here would be the Mapping Editor. The mapping editor allows for us to change the geometry of the models that the projector can see by editing the vertex positions in 3D Space. The projector will store a copy of the model data, so it will only be affected for that one projector and you should notice that the visualisation in the virtual scene does not update. To access the mapping editor you need to press the 'Edit Mesh' button. This will allow you to draw a selection box around vertices in the left hand window. You can add vertices to the selection by holding 'Shift' whilst creating a selection. Or remove vertices by holding 'Alt'. If this is not selected then you can rotate around the viewport using shift and the mouse, or pan using alt and the mouse. Once you have selected vertices you can adjust their position, scale or rotation with the various controls. There is also an amount, which changes how much you edit the vertices by.

You can work with multiple screens and multiple meshes inside of the mapping editor. To access different screens, you can use the '-' or '+' buttons next to the screen tag. Similarly you can access next or previous objects with the same controls under the object tag. Whilst an object is selected it can be removed with the remove object button. If you would like to recover the object then it is necessary to remove all objects and the next press will load the objects again.

On the right hand side there are some tools that share the same as the screen and modular led fixture, including saving/loading and configuring output presets. The further tools include saving the mapping data as a new model. Or loading a model into this projector to use as mapping data.

It is possible to subdivide the entire model by pressing the 's' key. This will give more vertices and more precision. However it is worth noting that this will add extra processing to the projector and should be used sparingly.

# Soft Edge Blending



In previous versions of Ai, softedge blending was accessed via the Projector Output Page. Version 11 introduces a separate page for controlling blending which can be accessed from the new icon at the top of the Projector Output Page alongside the icons for Autoblend and Automap.

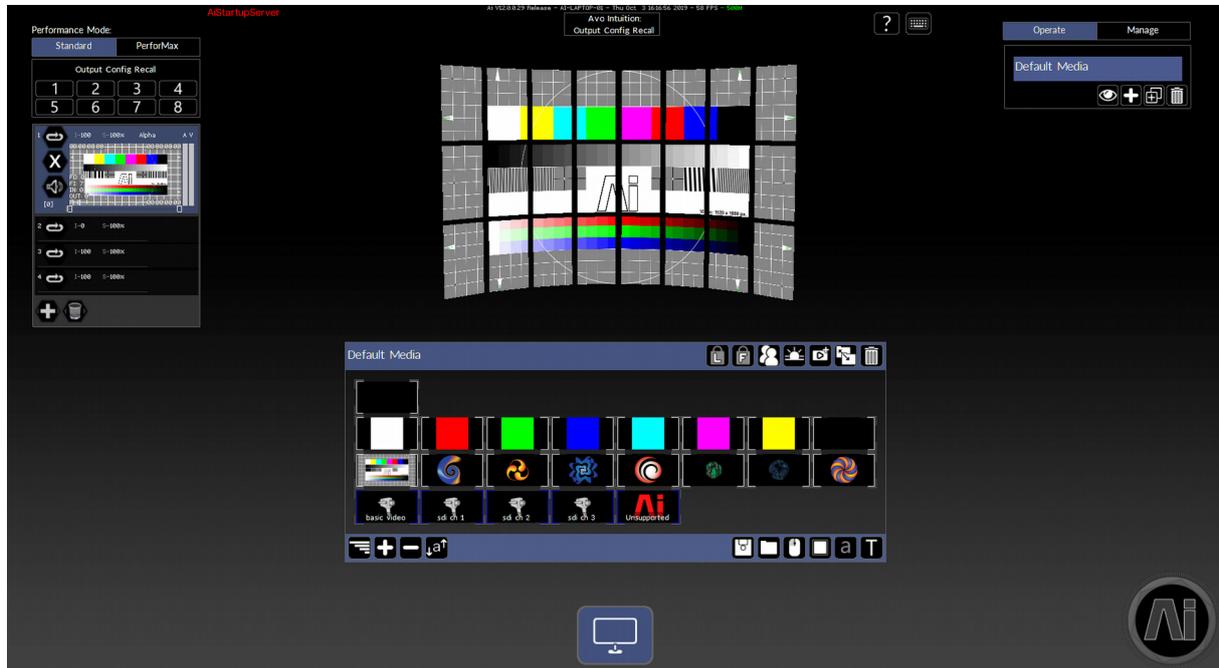
It is possible to add projection blends to this output by moving your mouse to the edge of the viewport. When your mouse hovers near the edge, the soft edge options will flash up and you will be able to add the blend to this output. There are 2 boxes that can be clicked on and moved to initiate the blend. the green box indicates the end position of the blend and the red box indicate the start position or fall off. A further box has a curve description that allows for you to edit the gamma curve, describing the falloff of the blend. It is possible to affect this by clicking and dragging in that box.

The arrow keys can also be used to adjust the blend position. When holding shift and then left clicking on the blend to adjust, the handle becomes highlighted in white, now the arrow keys will adjust the position until you next click off of the handle.

Alongside the existing interface controls to adjust the position and size of the blends, extended controls for softedge blending can now be found on the left side

of the projector output page. In addition to the control bars and curves already on offer, the new set of controls allow for numerical control and input for each of the associated values such as position, size and falloff allowing for even greater levels of accuracy and precision.

## Performance Page



The performance page allows you to setup and trigger your media to the desired fixture and layer. The media can then be blended together in a stack to create a final mix, which is shown in the visualiser as a preview of how the content might look on the output. The only fixtures that you can control on this page are the Screen Fixture and Modular LED Fixture.

To trigger media you need to make sure that the correct fixture and layer are selected, then clicking on the desired media tile will trigger that piece of media to that location. Ai will automatically crossfade the media based on the settings that have been entered.

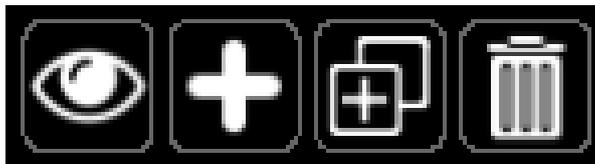
## Media Banks

On the right hand side is the media bank browser. A media bank holds a collection of media tiles and can be thought of as a folder of files. You can rename the banks by double clicking on the name, or add a new one with the plus button at the bottom. There is also a trash can that will delete the currently selected bank.

A bank is stored in the Distrib under the 'Banks' folder as a.aib file. These can easily be imported into shows by dragging them onto the performance page. It is worth noting that this will overwrite the current bank loaded. Furthermore when changing banks, Ai will automatically save the current bank to the Distrib, so that all of your edits persist.

If you wish to rearrange the order in which the banks are displayed in the list, select the bank you wish to move by left clicking on it and then whilst holding the shift key use the up and down arrows to change its position.

A selection of tools are available at the bottom of the media bank list.



From left to right the functions of these buttons are: Hide / Show media banks, Add new media bank, Duplicate media bank, Delete media bank

## Media Tiles

The media tiles are the primary way to add and store media within the Performance page. Each individual piece of media can be seen as a tile in a grid system that can be configured and arranged.

To add media, you can drag and drop from Windows explorer into an empty space. This can include Folders in which the sub-folders will be scanned and Ai will work out the correct media to add.

Once media tiles have been added, they can be re-arrange by either dragging a box around them or shift + clicking to make a selection without triggering that particular tile. They can then be dragged to a new location by holding alt with the mouse click. Or if ctrl + c is pressed, then a copy of the selection will appear at the mouse position. Ready to be moved to the desired place.

## Scene Triggers

A powerful feature within the performance page are Scene Triggers. These allow you to create a recording of the current state and then store it as a trigger. By default a Scene Trigger will record everything, including all Fixtures and Layers, and then give you the ability to turn certain things on or off.

To create a scene trigger, the button with a sun above the tiles will create a new trigger in the next available tile slot. Once you right click on the scene trigger, you will get a pop out of all the values recorded. Clicking on a different fixture or layer will show the information stored in those as well. Allowing for you to enable/disable certain parameters, or to edit the values of some of the states that you have defined.

## Layer Widget

On the left hand side is the Layer Widget. This allows you to preview what is going on in the layer stack for the selected fixture or fixtures. It also allows for some editable controls, such as the intensity or blend mode for that layer.

A layer can be collapsed or expanded by right clicking on it. If more or less layers are needed then the plus button or delete button can be used to add or remove layers. This is only possible when a single fixture is selected. By default the layer rendering stack is top to bottom. This means that the first layer is always shown above everything else. This can be reversed in the System Settings as an option.

To configure the properties of a layer, double click on the preview of the layer in the Layer Widget. This will pop open a configuration for a lot of the layer settings.

## Output Preset Widget

Just above the Layer Widget is the Output Preset Widget. This tool allows for you to reload different output configurations that have been saved on the output page. Clicking one of the buttons corresponds directly to the .air file that has been chosen for that configuration and the loading of it will happen instantly with a snap.

## Tap Tempo Widget



The Tap Tempo widget can be exposed by pressing F4 on the Performance Page. Enabling it then allows media playback speed to be controlled either by manually taping a tempo or by entering a value into the text field.

## Clip Properties

The clip properties page allow you to configure unique display, playback and control properties for a specific piece of media instead of using the overall layer or system settings. For example you may have one single clip in your whole show which needs to be panned and scaled in a different way to all other clips being used. To open the clip properties window, right click on the specific piece of media on the performance page that you wish to adjust.

Once opened the clip properties will present different options, giving information about your media and ways to configure it. In the centre is a preview of the media. This will only work on video or image files (Patches or audio files will not have an adjustable preview) allowing you to see what your changes will look like on a flat canvas. Note that all changes made to the clip properties are considered to be in blind mode (i.e. they will not be seen until that media has been re-triggered).

On the left hand side is the Cell Properties. These are settings that allow you to control more generic properties of the media as well as some playback options.



## Filename

## File Location

**Open Folder Button** – Opens the file in Windows Explorer

**Open Externally Button** – Opens the file with QuickTime

**Edit As Patch Button** – Opens the file inside of Ai as a stand-alone patch that you can edit.

**Label** – Text shown on this cell in the Performance Page

**ArtNet ID** – Trigger number for the file channel from ArtNet

**Media Speed** – Speed of media playback

**Thumb Frame** – Thumbnail to use in the Performance Page

**Play Mode** (see below for list of playmodes)

**Buddy Group** – ID of buddy group. A

buddy will trigger other media once it has been triggered.

**Midi Trigger Note**

**Time Code Trigger**

**In Frame**

**Out Frame**

**Transition Period** – Crossfade time in seconds. -1 is to

use the global settings

**Transition Mode** – Crossfade blendmode -1 is to use the global settings

**Fixture Lock[s]** – Lock the trigger to a dedicated fixture

**Follow On Action** – Once media has finished execute a specific command

**Playing On Layers** – Currently Playing on what layers

**Trigger On Layer** – Lock the trigger to a dedicated layer

**Sync Offset Frame** – Offset of the sync clock in frames

**Synchronisation Group [Listening]** – Choose which sync group to listen to

**Synchronisation Group [Source]** – Select this as the sync source to listen to.

## Follow On Actions

The follow on actions allow for you to program what will happen after the media has finished playing. There are a set of predetermined commands that will allow a sequence to be created. The following commands exist:



- **first** – trigger the first media in the bank
- **last** – trigger the last media in the bank
- **up** – trigger the media directly above the current media
- **down** – trigger the media directly below the current media
- **left** – trigger the media directly to the left of the current media
- **right** – trigger the media directly to the right of the current media
- **random** – trigger a random piece of media
- **goto\_XXX** – trigger media with based on a specific Artnet ID
- **InFade\_X** – fade the media in over the specified time in seconds
- **OutFade\_X** – fade the media out over the specified time in seconds
- **InOutFade\_X\_Y** – fade the media in and out over the specified times in seconds
- **HoldX** – hold the media for the specified time in seconds

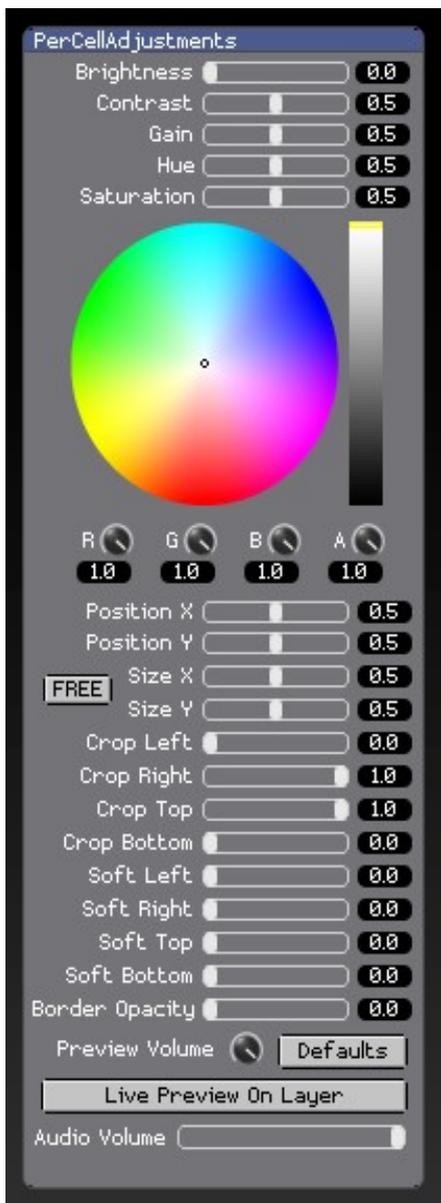
## PlayModes

The playmodes affect how the media is played back and there are several different varieties. The first number in the list below refers to the ArtNet ID of the playmode. You may notice that there are repeats of the same playmode with an exception after it. The two exceptions are 'pause on zero intensity' which will hold the current frame once the clip has no intensity and resumes it's playback from there once it gains intensity. The second exception is 're-trigger on intensity' which will start the media again if the intensity has reached 0 and has then been given a positive value.

- **0 – In Frame**
- **1 – Out Frame**
- **2 – Loop Forward**
- **3 – Loop Reverse**
- **4 – Play Once Forward**
- **5 – Play Once Reverse**
- **6 – Stop**
- **7 – Pause**
- **8 – Bounce (Ping-Pong)**
- **9 – Take Over Frame**
- **10 – Loop Forward with pause on zero intensity**
- **11 – Loop Reverse with pause on zero intensity**
- **12 – Play Once Forward with pause on zero intensity**

- 13 – Play Once Reverse with pause on zero intensity
- 15 – Bounce (Ping-Pong) with pause on zero intensity
- 20 – Sync frames to Time code
- 21 – Random Frame
- 40 – Loop Forward with re-trigger on intensity
- 41 – Loop Reverse with re-trigger on intensity
- 42 – Play Once Forward with re-trigger on intensity
- 43 – Play Once Reverse with re-trigger on intensity
- 45 – Bounce (Ping-Pong) with re-trigger on intensity

On the Right hand side is the Per-Cell Adjustments. These are settings that will affect the texture directly, allowing you to manipulate what your media looks like.



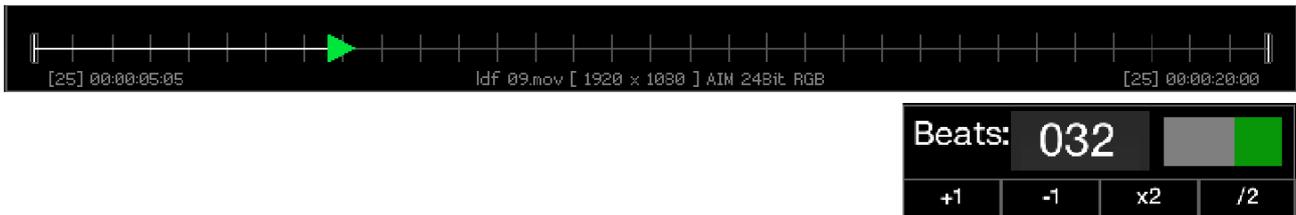
- Brightness
- Contrast
- Gain
- Hue
- Saturation
- Colour
- Position X
- Position Y
- Free / Locked
- Size X
- Size Y
- Crop Left
- Crop Right
- Crop Top
- Crop Bottom
- Soft Left
- Soft Right
- Soft Top
- Soft Bottom
- Border Opacity
- Preview Volume
- Process Adjustments
- Defaults
- Live Preview On Layer
- Audio Volume

## Audio Preview

The audio preview will show up when a MOV file has audio embedded in the file. There is no interaction available here, it is just a generation of the audio wave. The wave has three colours, white (part of the audio that has past) – green (current part of the audio) and grey (part of the audio that has yet to happen).



## Playback and Video Beats



The playback bar allows for you to affect the in/out points of the media as well as allowing you to scrub the current playhead to a given point in time for the media selected. To change the in/out points you simply click on the first or last bar and drag it to the desired location. Clicking anywhere in between and dragging will scrub the playhead position of the media to that point in time.

Video Beats is a feature that allows you to synchronise the playback speed of media to a defined BPM. The BPM can either be extracted from an external source like a CDJ, tapped in via the Tap Tempo Widget on the performance page, or set on the layer via channels 93/94 as a 16 bit number.

The Video Beats defines a set amount of beats for the duration of the video. This is automatically calculated when you import media into a tile, however it can be customised. To do this you can either type in a number in the beats box, or press one of the buttons below to either add or subtract a beat, or to multiple or divide the beats by 2. The toggle will turn on/off the beat sync, which should be immediately obvious by looking at the divisions in the playback bar.



At the bottom of the playback bar you should notice a little bit of information that can be used as indicators for the current piece of media:

On the left you have the frame rate and the current playhead position  
in the middle you have the filename, the resolution and the codec + audio if applicable

when the clip is in the AiM codec the information tells you which version of Aim is used, whether it has an alpha channel and if it contains audio:

AiM Superstream 24bit RGB	= Superstream
AiM 24bit RGB	= Quality
AiM RGB	= Performance

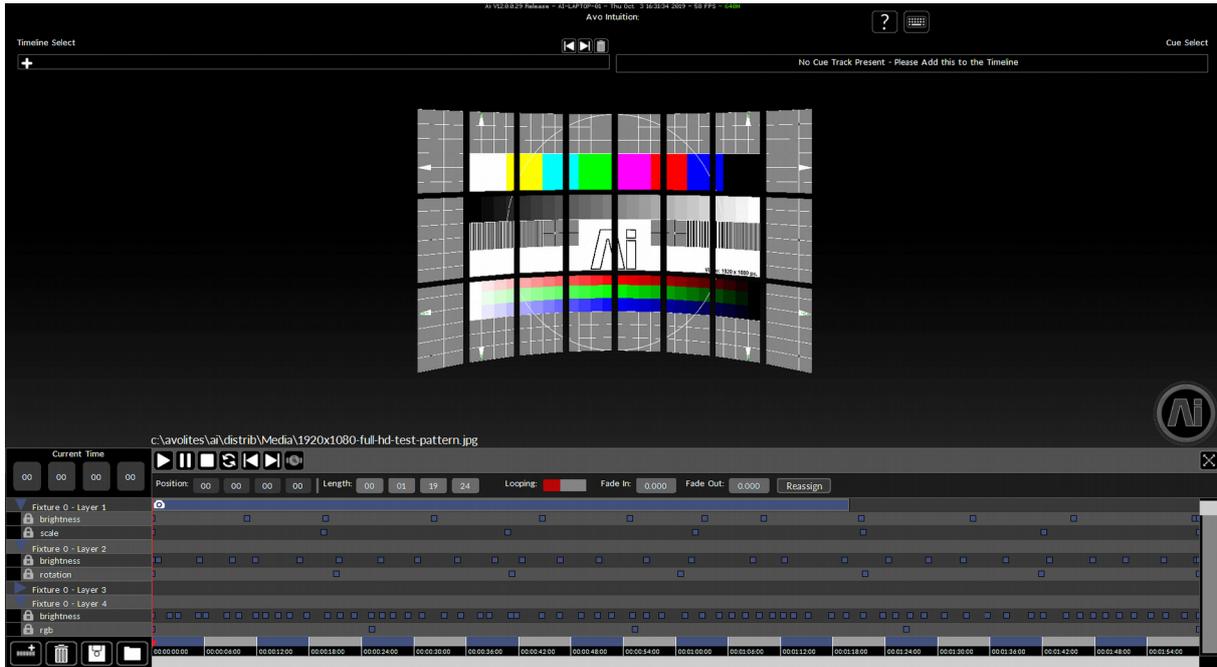
If the clip contains an alpha channel it will show as:

AiM Superstream 24bit RGBA	= Superstream with Alpha
AiM 24bit RGBA	= Quality with Alpha
AiM RGBA	= Performance with Alpha

if the clip contains alpha and audio it will show as :

AiM Superstream 24bit RGB + Audio	= Superstream with Alpha
AiM 24bit RGB + Audio	= Quality with Alpha
AiM RGBA + Audio	= Performance with Alpha

# Timeline



The Timeline Page in Ai allows you to program and sequence a show, or parts of a show, linearly using a standard timeline interface. When entering the timeline page, it will first appear blank. This is because you have to determine what it is that you want to add to the timeline. These are called tracks.

## Adding Tracks

To add a track to the timeline, click on the add track button in the bottom left. This will pop up a box with all the available tracks to add. The pop up box can be scrolled with the mouse wheel to reveal all tracks available. Currently there are 4 different types of tracks you can add to the timeline:

- **Video Track.** Essentially a layer on one of your fixtures. Ai will calculate the layers active and show you what layers you can add to the timeline. So it is important that you set your fixtures and layers up before programming the timeline.



- **Audio Track.** A container that allows you to add audio files to the timeline. Currently there is a maximum of 8 audio tracks per timeline.
- **Control Track.** A container that allows you to add points of control on the timeline. These points of control affect the behaviour of the timeline playback. Currently only 1 control track can be added per timeline.
- **Cue Track.** A Container that allows you to add points of reference in the timeline at a given point in time. You can then use these references as quick jump to points. Currently only 1 cue track can be added per timeline.

## Programming Tracks

Once you have added a track you can start the programming of your show. If it is a video or audio track you can add media into it by dragging and dropping from windows explorer (in a similar way to the performance page). Ai will calculate the length of the piece of media and display this as a box. The box will highlight red if where you hover is in an incorrect part of the timeline to place the media and grey if it is acceptable. As well as video clips, you can drag images or patch files onto a video track, by default the timeline will set these to be 2 seconds long. Currently there is no support for dragging multiple files at once onto the timeline!

If it is an attribute, control or cue track you can add keyframes to the timeline by right-clicking on the track at the designated point in time. This will add a marker point at that time.

To edit the properties of a keyframe you need to select it by either left clicking or dragging around the one to adjust. Once selected, the relevant properties for that parameter type will show in the bar above the main timeline area.

## Adding Attributes

The video and audio tracks both support the editing of attributes. Attributes are elements of the video or audio that can be manipulated. To add an attribute you need to select the designated track, you should see the add track button changing it's icon.



The pop-up window will then display all the attributes that you can add to that track. By default the video track will have 'Brightness' added and the audio track will have 'Master' (volume) added. The audio track does not have any more attributes, however it is useful to be able to re-add the master in case it got deleted before. It is also worth noting that there can not be duplicates of an attribute for a track. I.e only one brightness per video track.

The following attributes are as follows:

**Video:**

1. Brightness
2. Red Green Blue
3. HSC
4. Position
5. Rotation
6. Scale
7. Strobe
8. Aspect Mode
9. Volume

**Audio:**

1. Master

## Programming Attributes

By default each attribute added to a track comes in locked (this means that you cannot edit it). You should see a little lock on the left hand side next to the attribute. Clicking on the lock will unlock it and make it editable. Adding attribute markers is the same as adding a keyframe for a control or cue track. Right-clicking at the designated time on the track will add a marker. You can then select the marker to show its properties in the box above the main timeline workspace.



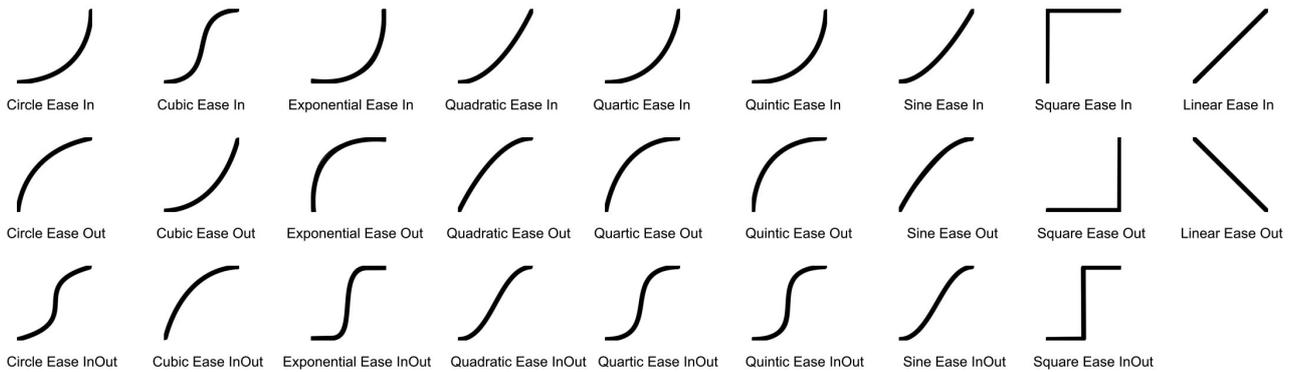
Above we can see which parameters are available for each video attribute type when selecting the relevant keyframe on the timeline. Starting at the top and working down we have Brightness, RGB, HSC, Position, Rotation, Scale, Strobe, Aspect Mode and Master Volume. Each marker type has it's own unique set of parameters, however all of them start with the time in H:M:S:F. at which the keyframe occurs and all of them end with easing curve options.

## Keyframe Easing

Interpolation – sometimes referred to as Easing – is the process of moving from one set of values to another, such as when used on position to create a pan or scale to create a zoom.

Previously in Ai's timeline, any interpolation between keyframe values was performed on a linear basis. That is to say that any movement or parameter adjustment was performed in a constant linear manner. In the real world, very few things move in a linear fashion – too much of this on a timeline can lead to the automation and animation feeling unnatural and over programmed.

For this reason, we have now introduced the following different types of interpolation for use on the timeline, which allow your actions to have a more natural and organic feel:



Ease In based easing curves will start slowly and gradually increase in motion, Ease Out will get slower towards the end of its progression and Ease InOut speeds up as it gets towards its mid position and slows down again as it reaches its destination. How quickly the easing occurs is determined by the type of curve itself, an visual indication of which is given by the thumbnail displayed when an easing type is selected

Easing can be applied to any keyframe on the timeline by selecting the marker and choosing the easing type from the bar above the timeline. You are not restricted to one type of easing per track, you can use different methods for each keyframe in the animation.

## Advanced Programming

On the left hand side you have the tracks and attribute window. This holds all your tracks and their associated attributes. A track can collapse its attributes by clicking on the triangle to the side of it. You can also select and multi-select attributes by clicking on them for different reasons. Beneath them are 4 buttons that allow you to add tracks/ attributes. Delete tracks/attributes. Save the timeline or load a timeline. If loading a timeline it will overwrite anything in the current timeline. So make sure you save your current work beforehand. At the very top on the left hand side is the current playhead position on the timeline in H:M:S:F. When the timeline is not playing, you can manually enter a time in and jump directly to that position.

When editing media or markers, you can click to select one. It will then highlight to show the selection, or you can click and drag to multi-select. Clicking on a selected item and dragging the mouse will move the selection along the timeline in time. If you

hold shift during this moment it will change the length of media, or adjust the markers over a spread.

Clicking on the timeline background, whilst the timeline is not playing, will move the playhead position to that point in time and will update the output based on your programming.

## Live Programming Update

Editing the timeline will cause the output to update based on the current position of the playhead. This is useful so that you can see your edits and how they effect different times in the timeline.

## Playback Buttons

There are 7 basic control buttons located at the top of the timeline. These buttons allow you to affect playback of the timeline. The buttons are as follows:

- 1) Play
- 2) Pause
- 3) Stop
- 4) Restart
- 5) Jump to Previous Cue
- 6) Jump to Next Cue
- 7) Toggle Timecode sync on/off (in the picture it is off)



## Global Window



The global window is hidden by default. To access this you need to click on the expand button in the top right of the timeline. This button will then change to a collapse button, allowing you to hide the global window. The purpose of the global window is to apply some global properties to the timeline. These properties include the length of the timeline in H:M:S:F. The base frame rate of the timeline. And the Timecode Sync offset in H:M:S:F.





If you have programmed some parts of the timeline and change the length or framerate. It will update your programming automatically so that it is in the current time position that you had before the changes.

It is recommend to set up the timeline to run at the frame rate of your media. This allows for easier programming when trying to place things into the correct H:M:S:F bracket. The playback of the timeline clock converts this into milliseconds using a high-frequency clock. So there is no playback benefit of 50fps over 25fps.

Synchronising playback to timecode will have the affect of moving the playhead based on the H:M:S:F received by the timecode signal. If you receive a timecode signal of 25fps and you have set your timeline up to be 50fps. Then each timecode frame will count as 2 frames on the timeline, and the playback will miss a frame each iteration. So it is important to match the frame rate up with timecode when using this option.

External control over the timeline is now possible via Salvation. The module Timeline External Control allows the same functionality as controlling the playback of timelines from the interface but from the console or sequencer of your choice without the need for a timecode signal.

## Zooming and Panning

There are two sliders that allow you to control the main window of the timeline. On the right hand side you have the zoom slider. This will zoom into the timeline. This is done by changing the timing frames that are visible. The slider on on the bottom will then allow you to pan around. If the timeline is active and playing. It will automatically lock the pan window and move it accordingly based on the current position in time for the playhead.

You can also zoom the timeline by holding SHIFT and using the mousewheel or using the '+' / '-' keyboard keys

You can also pan the timeline by holding ALT and using the mousewheel or using the 'LEFT' / 'RIGHT' arrow keyboard keys.

## Timeline Select

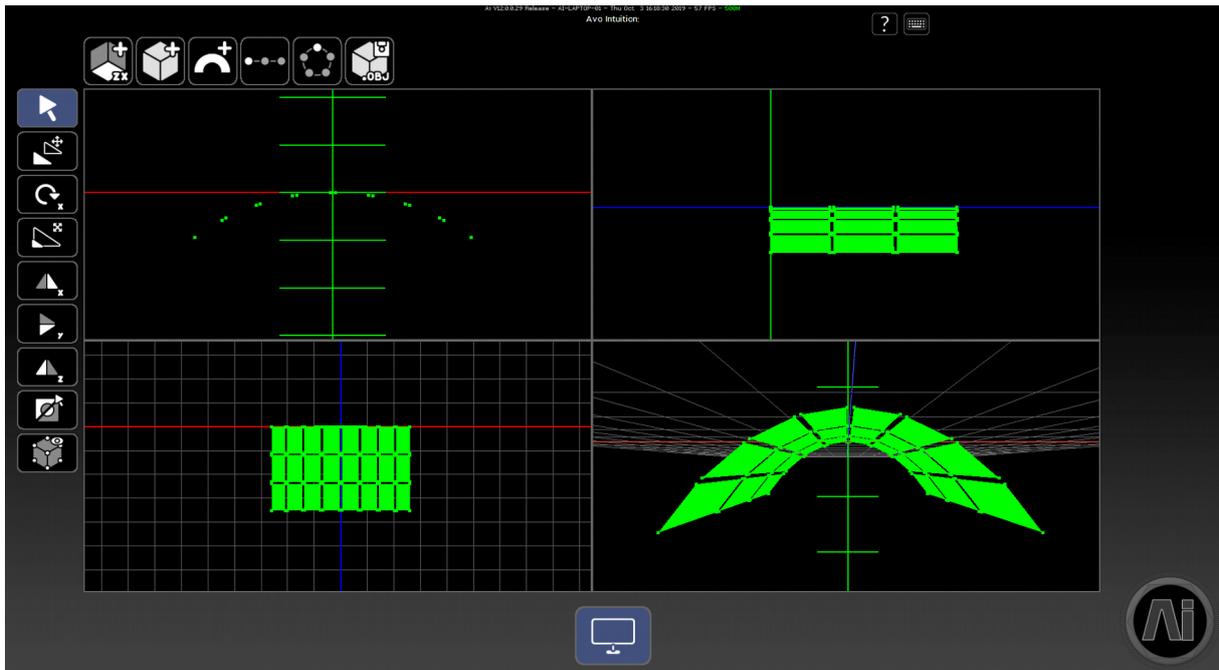
The timeline select widget allows you to quickly load multiple timelines during a show. Clicking on the little plus button will open up a window where you can navigate to a saved timeline file. Once selected this will pop a button into the widget where if you press it, it will load the timeline show and then automatically play it from the beginning of the timeline. Please note any changes you have made to the current timeline will be lost.

On the right side of the timeline select widget, there are two arrows pointing left and right. When a timeline is selected within this widget, using these arrow buttons will allow you to change the order of the timelines within the widget. The trashcan icon will delete the selected timeline from the widget.

## Cue Select

The cue select widget allows you to quickly jump to positions in the timeline based on the cue track that you have created. It will automatically show the cues as a little box and depending on the position of the timeline, the colours of the boxes will change. Where Grey means the cue has past, green means it has yet to come and red means it is currently active. Hovering your mouse over the cue will give the same description that has been programmed and clicking will jump the playhead of the timeline to that position.

## Surface Modeller



The surface modelling page offers a simple set of tools that allows you to add or edit the geometry of your 3D virtual models for Screen Fixtures. It provides a common set of modelling functions that could be found inside a 3D package, however they have been watered down to cater for simple to use functions. A perfect example of how the surface modelling page excels is when a small item has been added to the stage that needs to be mapped in coherence with the existing geometry.

By default the surface Modelling page is set up in a four way split view with default camera positions already located for each view. These are set up with 3 orthographic viewpoints viewing the front, side and top respectively. Add in one perspective view and that gives us our four windows. The views are treated in the same way that the stage construction page is. Where shift + click/dragging will rotate your view and alt + click/ dragging will pan it. Defaulted viewpoints have been integrated into the surface modelling page and by pressing the number keys, 1 through to 6 will automatically interpolate the camera to the desired position. The positions are as follows:

1 = Front, 2 = Back, 3 = Left, 4 = Right, 5 = Top, 6 = Bottom. In order to change between orthographic and perspective the number 0 key will toggle between the different projection views.

Using the mouse to click and drag will create a selection rectangle that will allow you to select vertices. Whilst selecting vertices 'A' will append to the current selection. Whilst 'C'

will remove/clear from the current selection.

When in the quad view setup depending on what quadrant your mouse is will execute different keyboard/mouse operations. It is possible to swap between a single quadrant and the 4 quad split by pressing the 'F' key. The quadrant that will get 'full screened' is the one that your mouse is currently hovering over. Pressing 'F' again will toggle back to the quadrant view.

Additionally the interface of a selected view can be locked by pressing the L button. This will disable panning / rotating but will still allow the selection of vertices and the manipulation of geometry. This is a useful feature if you navigate to a useful viewpoint and don't want to accidentally change that. The view that is locked is dependent on where the mouse is in the same regards as full screening views.

The surface modelling page will show you the geometry of the current fixture selected and supports multiple fixtures. If multiple fixtures are selected then you will



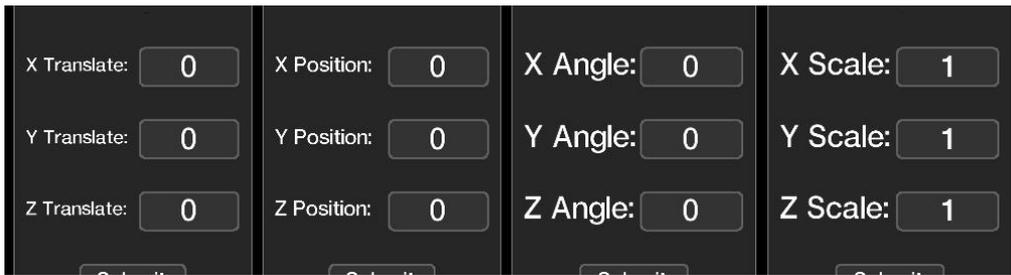
be able to edit the models accordingly and it will allow you to save the multiple models into one. The surface modelling page does not update on the outputs live nor does it retain information about models. Changing between fixtures in the surface modelling page will re-load the geometry and therefore any changes that you have made and not saved will

be lost. You can not work independently on multiples of fixtures.

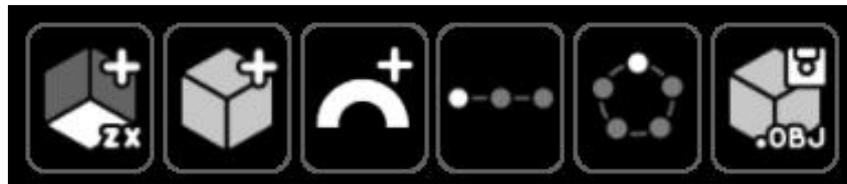
The left hand column of icons gives us tools to manipulate our selection. The first icon, that looks like a mouse pointer, is our selection tool. This will allow us to select / deselect vertices within the 3D model. Below this is the translate tool. This will translate based on where you first click the mouse and where you release your click. Next is the rotate tool (right-clicking this icon changes the axis of rotation). Furthermore: scale, mirror on x axis, mirror on y axis, mirror on z axis, invert selection and draw method. The draw method changes the way that the objects are displayed (vertex points, solids, wireframe, bounding boxes or textured objects).

For numerical entries you can shift-click on the translate, rotate, scale icons to

produce a pop up box that you can enter manual information in.

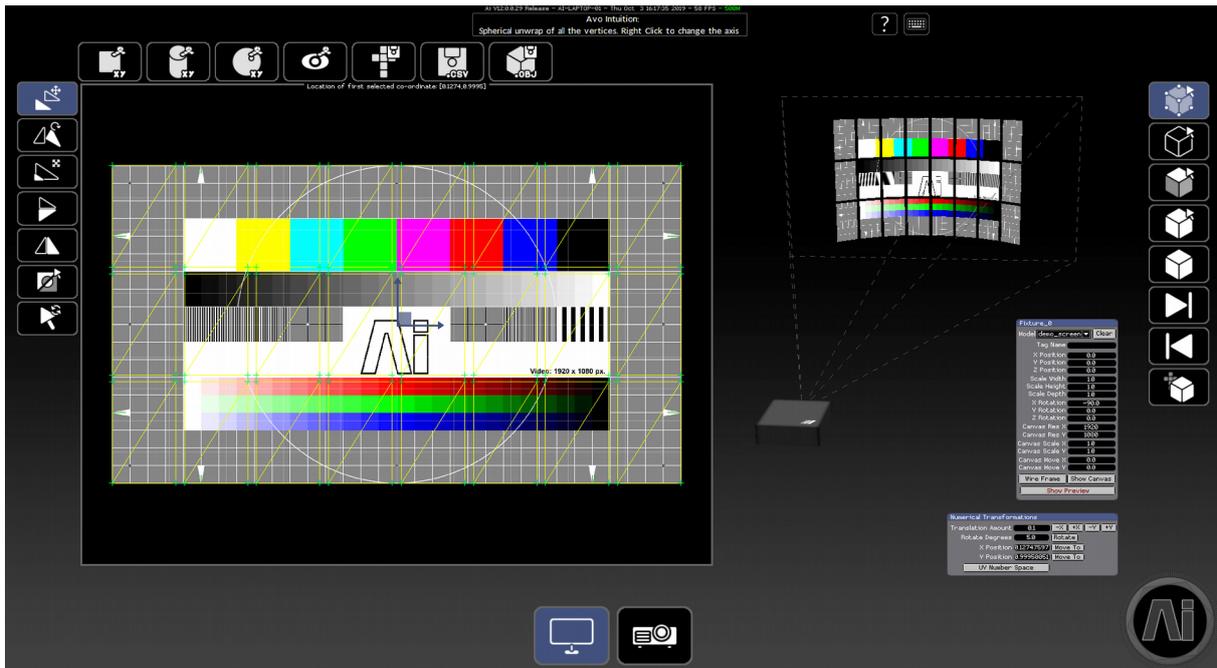


Along the top of the screen we have several more icons which allow us to generate a plane, generate a cube, generate a curved surface, create duplicates along a straight line, create duplicates along a curve and finally a button to save the newly edited model as an .obj file – any updates to your screen model are only applied once it has been saved.



If multiple fixtures are selected when modelling, the saved model will have all the geometry from the selected fixtures and will load the newly saved model into the first selected fixture. You will have to delete the according fixtures on the stage construction page.

# Canvas Editor



When making use of a 3D model for a screen, there are two important parts to the process – the 3D geometry of the model itself and also how your image is applied to this geometry, also known as the UV Map. UV mapping is a term used to describe the process of placing your screen shape within a defined texture area and generating coordinates for it based on this information. The U and V are used to mean horizontal and vertical as X and Y are already used for referring to position.

The main uses for the Canvas Editor will usually be in a situation where you are working on site and an update needs to be made to your mapping due to either a change in plan or a new update from your team, but it is also commonly used when generating a new screen model from the Surface Modelling page as any newly generated screen will most likely not have the appropriate UV map layout for your requirements.

To use the canvas editor you can select points by either clicking and dragging a selection box around the desired points. Or by clicking in an area. This is defined by the appropriate selection methods. Once you have a selection you can use the tools available to manipulate the points (UV coordinates) to create your own map.

Updates to the canvas will show up on the 3D model in the visualiser as a preview. This will also occur on the output if you're using a projector and have not done any complex mapping (subdividing or importing mapping into the projector). It is important that you save the model after you are happy with your layout. If you do not save then when you restart Ai the changes will be lost.



On the left side of the screens is the Tools menu displaying the tools for modifying the coordinates.

**Translate** (move selected points). Click and drag the square to translate on the XY, or alternatively you can translate on just X or Y by clicking the bars with arrows.

**Rotate**. You can change the centre point of the rotation by moving the diamond. You can also rotate in 15 degree increments by holding shift whilst rotating.

**Scale**. You can change the centre point by moving the diamond. Clicking in the faded triangle will scale on XY relative to mouse movements. If you hold shift whilst doing this then it will do a uniform scale. Alternatively you can scale on just X or Y by clicking on the bars.

**Mirror X** (flip the points vertically)

**Mirror Y** (flip the points horizontally)

**Invert Selection**

**Reset Selection**. Reloads the position of the points from the saved model.

On the right side of the screen is the Modes menu displaying the different options for selecting parts of the UV map.



**Vertex Selection**. (Select the UV points).

**Edge Selection**. (Select an edge comprising of two UV points).

**Face Selection**. (Select a triangle face comprising of three UV points).

**Solid Selection**. (Select a collection of faces that share cohesive UV points).

**Object Mode**. Toggles between showing all of the model or individual objects/meshes.

**Next Object**. In object mode this will toggle to the next object.

**Previous Object**. In object mode this will toggle to the previous object.

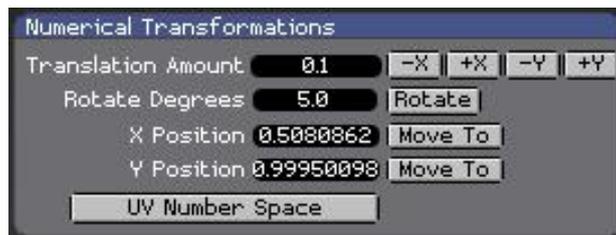
**Stage Mode**. Toggles between a larger stage view (3D Preview) with a smaller work area or a smaller stage with a larger work area.

On the top of the screen is the Unwrapping menu displaying different options for procedurally generating a UV map or exporting the data.



- Planar Unwrap. This will generate a UV map based on a flat plane. Right-clicking on the button will change the 2 axes that can be seen on the lower right corner.
- Cylindrical Unwrap. This will generate a UV map based on a cylinder. Right-clicking on the button will change the 2 axes that can be seen on the lower right corner.
- Spherical Unwrap. This will generate a UV map based on a sphere. Right-clicking on the button will change the 2 axes that can be seen on the lower right corner.
- Perspective Unwrap. This will generate a UV map based on a Point of View (POV) of a projector fixture. In order for this to work you need to have a screen and projector selected.
- Export Layout. This will export a TGA image file of the outlines of your UV map.
- Export CSV. This will export a CSV file containing the UV data that can then be used to generate pixel mapping from a spreadsheet.
- Export OBJ. This will export the edited model as an OBJ. It will automatically reload the model back into the selected screen fixture.

On the bottom right of the screen is the numerical transformations box. This will allow you to fine tune either the position of points or the transformation of points.

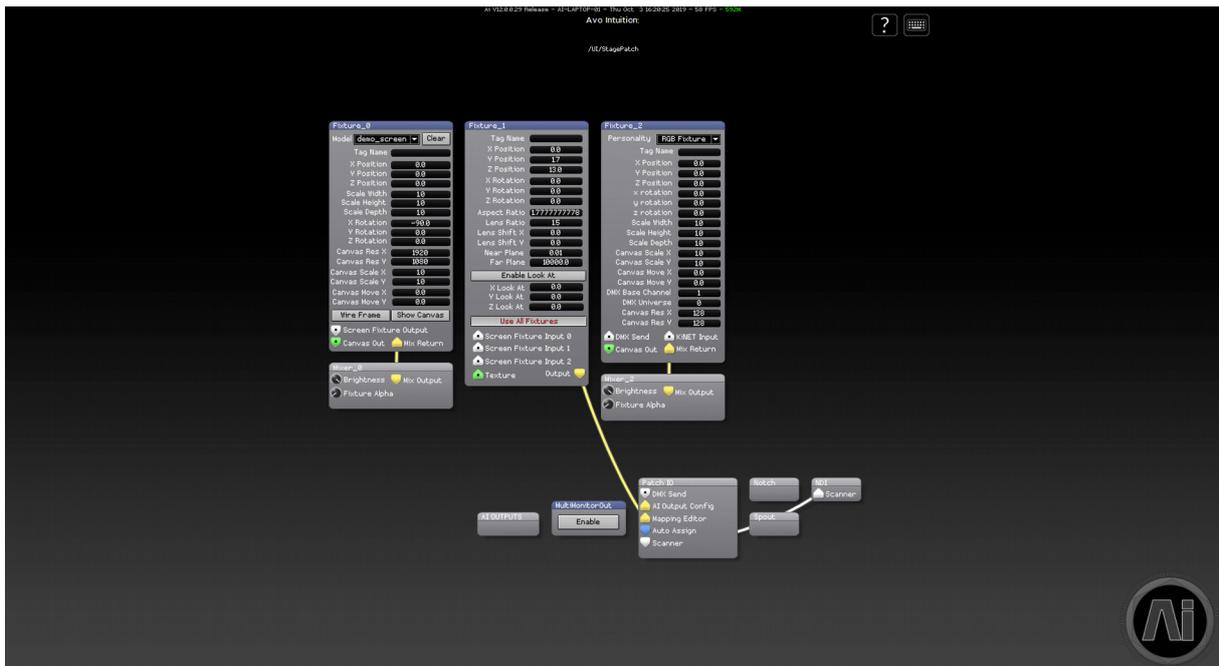


- Translation Amount. This will move the selected points the entered amount on either positive/negative X or positive/negative Y by pressing the appropriate buttons.
- Rotate Degrees. This will rotate the selected points by the entered amount. The

rotation is in degrees.

- X Position. This will move the selected points to the selected X position.
- Y Position. This will move the selected points to the selected Y position.
- UV Number Space / Pixel Number Space. This toggles between using the UV number space (normalised, between 0 – 1). Or by using pixel space (between 0 – canvas resolution).

## Patch Page



Under the hood of the main Ai interface, is the node based programming system known as Salvation. This gives you access to a wide range of inter connectible modules, each of which represent a different function or feature. You have the opportunity to create precisely the result you want – whether that’s a generative content patch, a new set of layer functions or an output system that’s just too complex for the output page.

The Patch Configuration Page gives you a way to access the inner workings of the Salvation engine without needing to leave the Ai interface. To navigate around the patches use the arrow keys, zoom in and out using ctrl + and ctrl – and open up a module by double left clicking on it. If at any time you want to return back to the fixtures, just press the page button in the corner.

In Salvation, we talk about modules and patches – a module is a single grey box



used for a specific command and a patch is a group of these to collectively create a new function or perform a task - A module will have a blue header bar and a patch will have a grey header bar. On the modules and patches there are coloured ports with cables connecting some of them together.

**Green is GL Texture** – Shares image data stored as OpenGL textures between modules. Typically this is seen by the user as a 2 dimensional image file ( .jpg, .tga, .png, etc ) or a video file ( .mov ) The Fixture Output node of a module contains geometry (mapping) information in addition to the media. The Canvas Output just contains the raw media as an open GL texture. This can be used when the media itself needs to be modified, for example in a soft edge effect where two projectors overlap.

**Yellow is GL Render** – Routes rendering streams from one module to another. The drawing commands represented by a graphics stream are not executed unless the stream is connected to an on-screen window.

**Blue is Control Value / Vector** – Routes control data between modules using 64-bit floating point values. A control value port is commonly used to route a single numerical value from one module to another (such as rotation angles, brightness and contrast)Vectors can also be passed through the control value port. A vector is a group of control values stored as an ordered list of numerical values which can be sent from one module to another (such as XYZW location in space, or RGBA colour information).

The ports themselves are shaped like triangles which either point up (an input) or down (an output). To connect two ports, left click and drag from one port and drop the cable into a second port. Just before you drop it in, your pointer will change into an arrow – good connection – or show a no entry sign – invalid connection. You can also see what is being passed through a specific connector by holding the mouse over it to see a moving preview of the video or data in real-time, which can be very useful for troubleshooting or chasing your signal through the system.

- Arrow keys move window contents
- Ctrl + / - zoom in / out
- Ctrl G group modules into sub patch

## Generative Elements

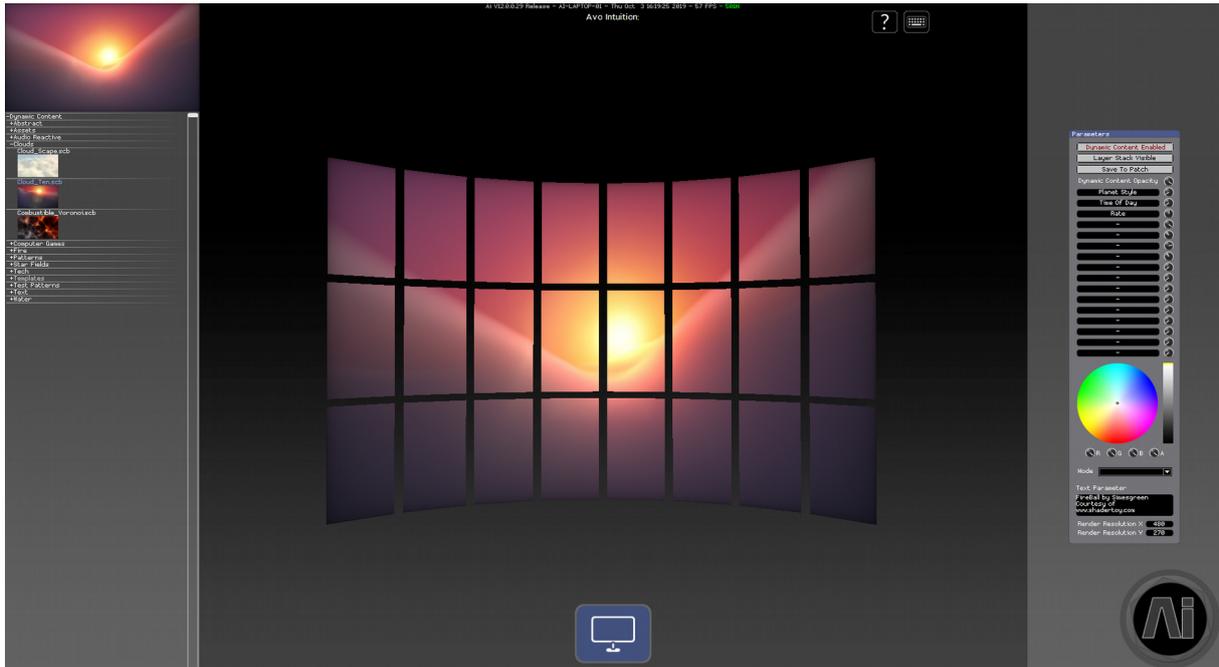
The Dynamic Content Page gives you easy, real time control of generative content patches. Examples of this could be Audio reactive, user designed shader code and real time text effects to name a few.

The concept behind the Dynamic Content Page is that it uses a standardised approach to patch creation and when loaded, the patch is displayed within a “wrapper” which has preallocated controls and interface elements that can be used for manipulation and control of the patch. This removes the need for any complicated preassigning of controls when creating the patches as long as you stay within the framework for construction. This also allows you to use a single uniform set of controls for adjustment of these patches instead of needing a unique set of assignments per patch.

To use the Dynamic Content , once the page is opened, on the left there is a file browser which points towards Distrib/Patches/Dynamic Content – this will allow you to browse existing patches on your system. Then select one or more fixture icons as the destination for the dynamic content and then toggle the button labelled “ Dynamic Content Disabled “ so that it now reads “ Dynamic Content Enabled “. you should now be able to select different content from the browser and control the output using the Dynamic Content Controllers on the right side of the screen.

Once you are happy with your edits, you can save the content out as a patch. This can be directly loaded back into Ai on the performance page and triggered as a standard piece of media.

# Dynamic Content Page Templates



We have supplied many different examples with Ai as well as three different templates to help you get started on creating your own dynamic content. You can find these in Distrib/Patches/Dynamic Content/Templates.

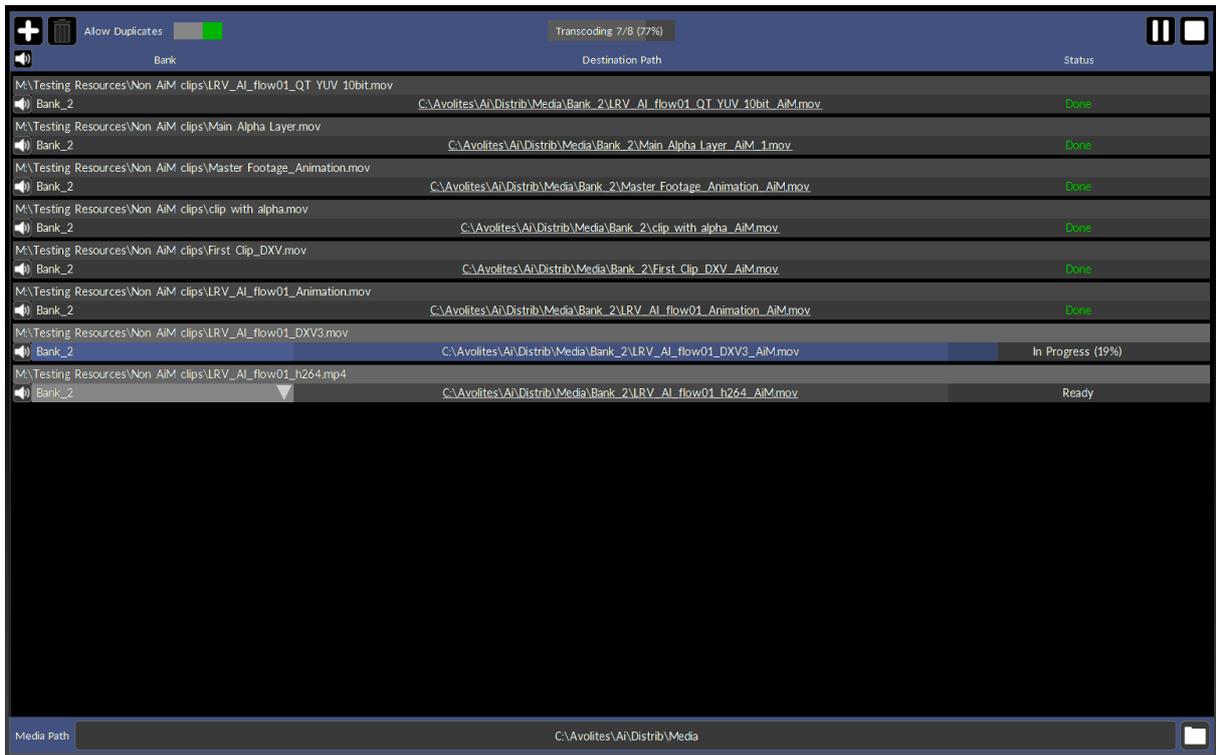
Template is a simple framework to help you create your own patches which will work within the Dynamic Content Page. You can make use of any valid form of Salvation patching whether it be modular or code based.

ShaderToy\_Template is setup so that you can easily copy and paste shader code from the popular website [www.Shadertoy.com](http://www.Shadertoy.com) which is a repository for GLSL code based effects and realtime content, all of which is provided for free to the community by its users.

ShaderToy\_Template\_Audio\_Reactive takes this one step further and has a pre made architecture which supports audio input within ShaderToy based patches.

When using the ShaderToy templates, there will be one or two text fields that need to be copied into the patch – we have labelled the text input areas accordingly within the patch to correspond with Shadertoy, so that it should be easy to understand where each field needs to be placed.

# Media Transcoder



## Using The Transcoder

In the ideal world, your media will always be provided to you in the correct format, but in the real world you are often faced with files of varying format and specification delivered at the last minute. To counter this common problem, Ai has its own built in media transcoder.

Ai's transcoder can be accessed within Ai from the Performance page, just at the top right above the banks list are two buttons – Operate and Manage. The Operate button provides the familiar Performance page with the media visible in the middle whereas the Operate button brings up a new window which covers the banks area.

When the working area is open, the files to be transcoded can be added to the job list - there are several ways this can be done:

- Pressing the + button at the top of the transcoder opens up a file dialog which allows you to select one or more files to be transcoded. Once the files have



been located and selected, press the Open button and they will be added to the job list.

- Dragging one or more files from your file browser into the transcoding list.
- When a non AiM clip is added to a media bank in Ai, it will automatically be appended to the transcoding job list

Now that the files have been added to the job list, we are presented with some information for each file. At the top of each entry we can see the current location of the file to be transcoded. Then on the next row, we can see a drop down menu which allows the choice of which media bank to place the transcoded file once it has completed. Next to that we can see the destination for the new file along with the name it will use and finally there is a report box which confirms the current status of the transcoding for that file.

The destination bank for the transcoded media will default to the currently selected bank unless the user chooses otherwise. The dropdown menu will show all of the banks available in the current project and allow the user to override this default destination.

Any new files created by the transcoder will by default be placed inside of a folder named after the destination bank which in turn will be placed inside of the system media folder. To change the location of the media folder click within the **Media Path** box at the bottom of the transcoder and navigate to the desired location.

The Status bar provides information about the selected media transcode either with text or a progress bar depending on the current operation:

- **SourcelsAiM** – if the file is already in AiM format, no transcoding will occur.
- **Ready** – this file is ready and awaiting transcoding
- **in Progress** – the file is currently being converted
- **Paused** – transcoding of the current item has been temporarily paused.
- **Stopped** – the user has stopped the transcoding operation.
- **Failed** – an error has prevented the media from being transcoded
- **Bank Error** – cannot find the bank to send the transcoded file to
- **Done** – the transcode for the file has been completed successfully

Once all of the desired settings and destinations have been specified, the transcoder can be started by pressing the **Go** button at the top. When processing, this button then becomes Pause and next to it is a stop button to stop the queue from being transcoded

## Removing jobs

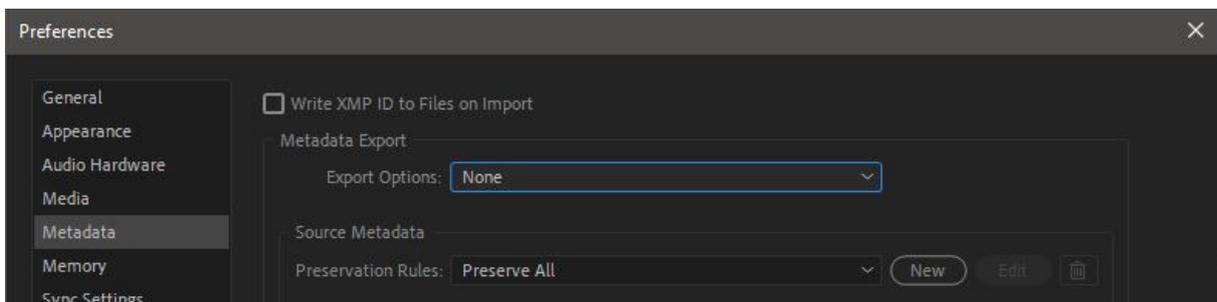
Specific jobs can be removed from the transcoder list by selecting or multiselecting the entry from the list and pressing the **Trashcan** icon in the interface or the **Delete** button on the keyboard. An item which is mid transcode or which has been paused cannot be deleted from the list, otherwise an item can be deleted at any time.

## Job Prioritisation

With a collection of standard files on your media server to be transcoded, the jobs will be executed when the user presses the go button, starting with the top entry in the list and working down to the bottom entry. On some occasions you may want to push a clip further up the list to ensure it gets converted sooner – this can easily be done by right clicking with the mouse on the file in the list and dragging it to its new position. It is worth noting that this can be done whilst the transcoder is working through the job list – you do not need to stop the process in order to rearrange the list.

## Media Encoder Settings

To avoid Media Encoder creating duplicate files during encoding, the Metadata export options need to be set to None. This option can be found in Media Encoder > Edit > Preferences > Metadata.



# External Control

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## Lighting Console Control

The interface to your Lighting Console is configured through the System Settings.

ArtNet Adaptor – select which physical network adaptors we are using for the ArtNet inputs and outputs. The system IP address in windows needs to be set to a valid ArtNet range, usually 2.0.0.x where x is a unique number for each system in the network.

CITP Adaptor – select which physical network adaptors we are using to send commands to and from a CITP compatible lighting console to Ai. CITP is used to pass media thumbnail images back to the lighting console.

ArtNet control type – Lighting desk – use a standard desk / AI remote (now called V7 UI Control) select when using multiple servers in a master slave configuration. Master or Slave mode – Master mode allows you to control multiple servers together from this server – one server will control all of the others. Slave mode is used when this server is to be controlled by another server (the Master).

## ArtNet/DMX control

Setting up a lighting console to control Ai

The console will need a personality for the Ai server – you can patch as an active fixture (uses CITP to retrieve thumbnails of the media clips) or a normal fixture (no thumbnails).

If using Active Fixture, on the Ai System Settings menu click CITP initialise (wait), the Ai server should then be visible on the lighting console as an active fixture.(if not you may need to restart the Ai software or the lighting desk, for further assistance please contact Avolites Media support team)

## ArtNet parameters

For a complete list of ArtNet Channel definitions please see DMX Fixture In summary the parameters are:

1	Library Folder	0 - 255	0	Selects Media Sub Folder	Fixture Texture Reference - Folder 240,241,242....
2	Library File	0 - 255	7	Selects Media File	Folder 0, File 0 will clear all content on layers
3	Coarse In Point	0 - 255	0	In point of Media in Frames	In point Frame Number
4	Fine In Point	0 - 255	0		
5	Coarse Out Point	0 - 255	255	Out Point of Media in Frames	Out point Frame Number
6	Fine Out Point	0 - 255	255		
7	Play Mode	0 - 255	2	Play Mode	See List of playmodes
8	Play Speed	0 - 255	127	Play Speed	0 = 100% optimal speed 1 - 127 = 1% - 100% 128 - 255 = 100% - 1000%
9	Coarse X Rotation	0 - 255	128	X Axis Rotation	16 bit number. 0 - 16383 = auto rotate ACW (0 fast : 16383 stop) 16384 - 32767 = manual rotate ACW 32768 - 49150 = manual rotate CW 49151 - 65535 = auto rotate CW (49151 stop : 65535 fast)
10	Fine X Rotation	0 - 255	0	Y Axis Rotation	16 bit number. 0 - 16383 = auto rotate ACW (0 fast : 16383 stop) 16384 - 32767 = manual rotate ACW 32768 - 49150 = manual rotate CW 49151 - 65535 = auto rotate CW (49151 stop : 65535 fast)
11	Coarse Y Rotation	0 - 255	128		
12	Fine Y Rotation	0 - 255	0	Z Axis Rotation	16 bit number. 0 - 16383 = auto rotate ACW (0 fast : 16383 stop) 16384 - 32767 = manual rotate ACW 32768 - 49150 = manual rotate CW 49151 - 65535 = auto rotate CW (49151 stop : 65535 fast)
13	Coarse Z Rotation	0 - 255	128		
14	Fine Z Rotation	0 - 255	0	Image Size	16 bit number. 0 = very small 32767 = normal size 65535 = very big
15	Coarse Image Size	0 - 255	128		
16	Fine Image Size	0 - 255	0	X Position	16 bit number. 0 = far left 32767 = centre 65535 = far right
17	Coarse X Position	0 - 255	128		
18	Fine X Position	0 - 255	0		

19	Coarse Y Position	0 - 255	128	Y Position	16 bit number. 0 = far bottom 32767 = centre 65535 = far top
20	Fine Y Position	0 - 255	0		
21	Aspect Ratio	0 - 255	0	Aspect Ratio	0 - 127 = normal to squash vertical 128 - 255 = squash horizontal to normal
22	Movement Speed	0 - 255	0	Interpolation Speed of Positions	1/10th of a second for smoothing of movement parameters: position, size & aspect ratio
23	Intensity	0 - 255	255	Brightness	Layer Brightness/Intensity/Dimmer
24	Red Value	0 - 255	255	Red Pixel Value	Multiple Red Channel 0 - 100%
25	Green Value	0 - 255	255	Green Pixel Value	Multiple Green Channel 0 - 100%
26	Blue Value	0 - 255	255	Blue Pixel Value	Multiple Blue Channel 0 - 100%
27	Strobe	0 - 255	0	Strobe	0 - 63 = Square wave adjustable period 64 - 127 = Single Frame adjustable period 128 - 191 = Random adjustable period 192 - 255 = Random adjustable sustain
28	Undefined				
29	Colour FX	0 - 255	2	Blend Mode	See List of Colour FX
30	Visual FX1 Selection	0 - 255	0	Visual Effect	See List of Visual FX
31	Visual FX1 Param1	0 - 255	Relative		
32	Visual FX1 Param2	0 - 255	Relative		
33	Undefined				
34	Undefined				
35	Undefined				
36	Undefined				
37	Undefined				
38	Undefined				
39	Undefined				
40	Undefined				
41	Visual FX1 Opacity	0 - 255	0	Visual effect Crossfade Value	0% - 100%
42	Visual FX1 Param3	0 - 255	Relative		
43	Visual FX1 Param4	0 - 255	Relative		
44	Visual FX1 Param5	0 - 255	Relative		
45	Visual FX1 Param6	0 - 255	Relative		
46	Visual FX1 Param7	0 - 255	Relative		
47	Visual FX1 Param8	0 - 255	Relative		
48	Visual FX1 Param9	0 - 255	Relative		

49	Visual FX1 Param10	0 - 255	Relative		
50	Visual FX1 Param11	0 - 255	Relative		
51	Visual FX1 Param12	0 - 255	Relative		
52	Visual FX1 Param13	0 - 255	Relative		
53	Visual FX1 Param14	0 - 255	Relative		
54	Visual FX1 Param15	0 - 255	Relative		
55	Visual FX1 Param16	0 - 255	Relative		
56	Visual FX2 Selection	0 - 255	0	Visual Effect 2	See List of Visual FX
57	Visual FX2 Opacity	0 - 255	0	Visual Effect 2 Crossfade Value	0% - 100%
58	Visual FX2 Param1	0 - 255	Relative		
59	Visual FX2 Param2	0 - 255	Relative		
60	Visual FX2 Param3	0 - 255	Relative		
61	Visual FX2 Param4	0 - 255	Relative		
62	Visual FX2 Param5	0 - 255	Relative		
63	Visual FX2 Param6	0 - 255	Relative		
64	Visual FX2 Param7	0 - 255	Relative		
65	Visual FX2 Param8	0 - 255	Relative		
66	Visual FX2 Param9	0 - 255	Relative		
67	Visual FX2 Param10	0 - 255	Relative		
68	Visual FX2 Param11	0 - 255	Relative		
69	Visual FX2 Param12	0 - 255	Relative		
70	Visual FX2 Param13	0 - 255	Relative		
71	Visual FX2 Param14	0 - 255	Relative		
72	Visual FX2 Param15	0 - 255	Relative		
73	Visual FX2 Param16	0 - 255	Relative		
74	MTC Hour	0 - 255	0	MTC Hour Offset	
75	MTC Minute	0 - 255	0	MTC Minute Offset	
76	MTC Second	0 - 255	0	MTC Second Offset	
77	MTC Frame	0 - 255	0	MTC Frame Offset	
78	Cross Fade Period	0 - 255	0	Single Layer Crossfade. Period is 10th of a second	
79	Cross Fade Mode	0 - 255	0	Blending Mode of Single Layer Crossfade	See List of Colour FX
80	Aspect Mode	0 - 255	1		0 = Letterbox 1 = Crop 2 = Stretch
81	Hue Adjust	0 - 255	0	Adjust Media in HSC Colour Space	Hue Angle Adjust 0 - 360 degrees
82	Saturation Adjust	0 - 255	127	Adjust Media in HSC Colour Space	0 - 127 = Greyscale through full colour 128 - 255 = full colour through heavy saturation
83	Contrast Adjust	0 - 255	127	Adjust Media in HSC Colour Space	0 - 127 = no contrast through normal contrast 128 - 255 = normal contrast through heavy contrast

84	Colour Adjust Mode	0 - 255	0	Different Modes for Colour Adjustments	0 = RGB Multiply before layer transforms 1 = RGB Add colour 2 = RGB Multiply after layer transforms 3 = HSC - Hue Clamp to single Hue Value
85	Random Period	0 - 255	0	Random Playback of Media	Time between random frame jumps
86	Sync Group Listen	0 - 255	0	Set this to listen to a designated sync group source	ID of source to listen to
87	Sync Group Source	0 - 255	0	Set this to declare this layer a sync group source so others can listen to it	ID of source for others to listen to
88	Sync Group Offset In Frames	0 - 255	0		Offset in frames the sync clock
89	Audio Volume	0 - 255	0	Volume of Embedded Audio in Media	Volume Dimmer - 0 = no sound, 255 = full sound
90	External Texture Input	0 - 255	0		0 = Ai Layer 1 = Spout Input 2 - 9 = NDI Inputs (1 - 8)
91	BPM Sync On/Off	0 - 255	0		Turn on Syncing to a BPM master (boolean value on/off)
92	BPM Value	0 - 255	0		Enter the current BPM value
93	Beats Per Video Coarse	0 - 255	0		16 bit number. Describes how many beats are in a given video file. Setting this to 0 will force Ai to calculate this value.
94	Beats Per Video Fine	0 - 255	0		
95	Frame Blend Threshold	0 - 255	0	Set the amount of frames to blend for video playback, up to 1 second.	Percentage in which Ai will start frame blending based on speed of video file. 0 = default (80%). 255 = Always on. 1 - 254 = 0 - 100%
96	Undefined				
97	Undefined				
98	Undefined				
99	Undefined				
100	Undefined				

List Of Play Modes
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ArtNet ID	Play Mode
-----------	-----------

0	In Frame
1	Out Frame
2	Loop Forward
3	Loop Reverse
4	Once Forward
5	Once Reverse
6	Stop
7	Pause
8	Bounce
9	Takeover Frame
10	Loop Forward, Pause on 0 Intensity
11	Loop Reverse, Pause on 0 Intensity
12	Once Forward, Pause on 0 Intensity
13	Once Reverse, Pause on 0 Intensity
15	Bounce, Pause on 0 Intensity
20	Sync to MTC
21	Random
40	Loop Forward, Retrigger on Intensity
41	Loop Reverse, Retrigger on Intensity
42	Once Forward, Retrigger on Intensity
43	Once Reverse, Retrigger on Intensity
45	Bounce, Retrigger on 0 Intensity

## List of Colour Effects / Blend Modes

ArtNet ID	Blend Mode
-----------	------------

0	Alpha Standard
1	Intensity Mix
2	Alpha Standard
3	Alpha Shader
4	Non Additive Mix
5	Luma
6	Lighten
7	Additive
8	Difference
9	Wipe Transition
10	Multiply
11	Darken
12	Screen
13	Subtract
14	Inverse Luma
15	Scale Transition
16	Scale Rotate Transition
17	Video Mask
18	Video Mask Inv
19	Cube
20	Linear Burn
21	Blur
22	Transparent Black
23	Transparent White
24	FFT Bass
25	FFT Mid
26	FFT Treble
27	FFT Adjustable
28-61	Transitions



The 40 channel mode contains the following controls:

- Folder/file selections (may be numeric, alphanumeric or ID numbers)
- In/out points
- Play mode/speed
- Rotation xyz
- Image size/position/aspect
- Movement speed (smoothing)
- Intensity
- RGB (multiply values, e.g. 0 remove all red 255=full red)
- Strobe
- Colour fx – sets blend mode

The 80 channel mode adds the following controls:

- Additional 14 params for fx1
- Fx2 effect and 16 params
- MTC- set timecode offset for trigger
- Xfade period/mode sets xfade for layer
- Aspect mode – old aspect mode from v5 software.

100 channel mode adds the following:

- Hue, saturation, contrast
- Colour adjust – sets how RGB works – if 0, works as above. If 1, multiplies up to 50% then adds colour in above that ie 0=no red 50%=100% red in media 100%=add red
- Random period
- Sync Group listen / source
- Audio volume
- BPM Sync on / off / value
- Frame Blending Threshold

By expanding the ArtNet window to the right, you can link ArtNet channels to other Ai parameters using the blue nodes to enable further controls.

You can also insert a module into the Node Based windows such as Network/ArtNet Input Small which will allow you to route custom parameters from your lighting console to any control parameter of Ai.



# List of Visual Effects

ArtNet ID	Visual Effect
-----------	---------------

0	None
1	Infinite Black Border
2	Edge Shutters
3	Blur
4	4 Point Warp
5	Box Blur
6	Crop
7	Edge Detection
8	Hue Rotate
9	Invert
10	Levels
11	Luma Key
12	Mirror Adjust
13	Pixelate
14	Pixel Grid
15	Posterize
16	RGB Multiply
17	Ripple
18	Sepia
19	Shift RGB
20	Stretch
21	Threshold
22	Vignette
23	Chroma Key
24	Channel Blur
25	Tile
26	Colour Blend
27	Colourise
28	Bloom
29	Desaturate
30	Exposure
31	Psychedelic Paint
32	Infra-Vision
33	Infinity Zoom

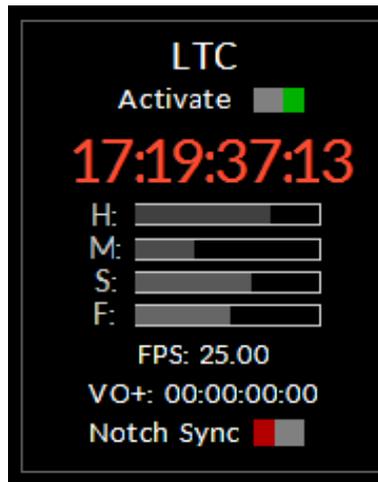
ArtNet ID	Visual Effect
-----------	---------------

34	Dot Grid
35	Kaleidoscope
36	Mask
37	Radial Blur
38	Tunnel
39	Feedback
40	Border RGB
41	2 Times
42	3 Times
43	RGB Glitch
44	Scroll
45	Alpha Mask
46	Audio EQ
47	Waveform Custom
48	Timecode Readout
49	Test Patterns
50	RGB Delayed
	Feedback
51	Rainbow Delayed
	Feedback
52	Flower of Life
53	SpiraScope
54	Edge Highlight
55	Edge Lowlight
56	Edge Glow
57	Spout Input
58	Alpha Luma Layer
	Combine
59	Alpha Luma Layer
	Lines
60	Prism Kaleidoscope
61	Fossilized Edges
62	Spiral Instancer
63	Colour
	Segmentation
64	Alpha Cut Out
65	InstaEffect
66	Shatter
67	Sin Displacement

ArtNet ID	Visual Effect
-----------	---------------

68	Highlight Glow
69	Ripple Space
70	Edge Pulse
71	XY Light
72	Feather Chroma
73	Filter Jam
74	Alpha to RGB
75	Rainbow Filter
76	Greyscale
77	Emboss
78	Fish Eye
79	Lens Flare
80	Sharpen
81	Retro TV
82	Lunar Reflection
83	Halftone
84	Beach View
85	Mirror Crop
86	Notch
87	Image Mosaic
88	Tim Mix
89	Chromatic
	Abberation
90	Toon Shading
91	Sobel
92	Raindrops
93	AiBarrelDistortion
94	AiNightVision
95	AiBokeh
96	AiProjectiveBlur
97	AiGammaCorrection
98	AiDither
99	AiScanLines
100	AiSepiaFilmGrain
101	AiBubbleNoise

## SMPTE Timecode



Timecode triggering and playback within Ai allows you to have frame accurate playback of the video elements of your show to ensure show critical playback occurs at just the right time, giving a tighter, more dynamic feel as well as a show that can be reproduced perfectly every time.

When using Timecode in Ai, it can either be run fully locked to the master timecode signal, in which case if the clock signal is interrupted or stopped, then the playback of the video will stop. Alternatively, it can be run in freewheel mode which means that the master clock controls the playback of the media, but if it is interrupted or stops, then the clip will switch to the internal clock and keep playing until it then receives the master signal again.

Timecode itself is represented by a series of numbers, for instance: 02:34:17:03 which when read from left to right reads as 2 hours, 34 minutes, 17 seconds and 3 frames. To assign a timecode trigger to a specific clip, you can either enter the value directly in the performance page or from within the right click properties of a specific media in your media banks.

When on the performance page, pressing the Home key will show each media tiles assigned timecode trigger. An individual tiles timecode value can easily be adjusted by using the following keyboard shortcuts:

- page up / down adjusts frames
- shift + page up / down adjusts seconds
- Alt + up / down adjusts minutes
- shift + Alt + page up / down adjusts hours.



Alternatively, if you'd rather enter your chosen timecode value with a keyboard, right click a specific tile and halfway down the Cell Properties panel on the left, there is a value box that you can use either the mouse or the keyboard to adjust.

Once timecode triggers have been assigned to media, it is necessary to then make a few decisions as to how your timecode will be operating within Ai. Open up the System Settings window, the second section is devoted to Midi and is where we can make any system changes related to midi timecode such as the method , source and running mode. here we can see the different options given by the buttons both unchecked and checked:

- **Master Device** : select the master midi device for timecode.
- **Show Time Code Widget** : hides or displays the timecode widget within the Ai interface.
- **Time Code Active** : allows timecode to function within Ai.
- **Use LTC Timecode** : disabled – MTC is clock source, active - LTC port is clock source.
- **Free Wheel Time Code** : disabled – exclusively use master clock for playback, active – switch to internal clock when master clock is interrupted.
- **Use System Clock As Tc** : uses the onboard system clock as the timecode master.
- **Time Code Base Rate** : Set the base rate at which your timecode system is running.

The timecode widget can be activated either by selecting the option from within the system settings window or by using the mouse to click on the widget itself in the main Ai interface. The widget will have a red border when inactive and a blue border when active.

Timecode can also be selected as a playmode for layers – allowing you to playback any media without needing a predetermined trigger, but still receive the benefit of being frame locked for playback. To set this for a layers playback mode choose MTC from the playback modes list.

Within the layer personality it is also possible to find some ArtNet controls related to timecode. When using Ai in file and folder mode clip playing mode, channel 73



adjusts the offset in hours, 74 adjusts minutes ,75 adjusts seconds and 76 and adjusts frames. Ai needs to be set in 80 or 100 channel mode for this to function. Now that we have had a look at all of the related features, lets have a look over what is involved in making use of timecode triggering within Ai. Whether you want to trigger a single piece of media to one screen or several pieces at the same time to multiple fixtures, the process is fairly simple:

### **Procedure for triggering clips with timecode:**

1. Layer lock each clip in the clip properties ( right click media tile ) if you wish to Timecode trigger to a certain layer.
2. Set each clip to MTC play mode if you wish to lock the clip to the MTC clock in the clip properties. ( right click media tile )
3. Set your Timecode Trigger times in the clip properties. ( right click media tile )
4. Make sure your System Settings/Midi timecode options are set appropriately.

### **Procedure for triggering to multiple fixtures simultaneously with timecode:**

1. Fixture lock each clip you wish to trigger with timecode to the relevant fixture (select fixture, select clip, then Ctrl click clip).
2. Layer lock each clip in the clip properties if you wish to TC trigger to a certain layer.
3. Set each clip to MTC play mode if you wish to lock the clip to the MTC clock in the clip properties.
4. Set your Timecode Trigger times in the clip properties.
5. Buddy all of your clips which you wish to trigger simultaneously together (shift click to multi select and then Ctrl B, or enter manually in clip properties)
6. Make sure your System Settings/Midi timecode options are set appropriately.

Once you have gone through the relevant process, you can then show the timecode widget, activate it and then once timecode is sent to your machine, your clips will playback at the appropriate times.

## **MIDI Devices**

Any of the parameters or controls found within the Salvation patching engine can be mapped to midi, but often the most commonly used place is the ArtNet layer



window. Within the window, alongside each of the layer parameters is an on screen controller, right clicking on one and choosing Edit MidiMap opens a window where you can select a midi device and channel, use midi learn to assign channels or key ranges and an output range option should you ever need to work with custom ranges.

Another option for MIDI control is to use the modules found in the MIDI section and patch them directly in to ports in Salvation - there are modules for keys and cc's for both inputs and outputs allowing you to create complex MIDI patches and operations.

## **Controlling by MIDI**

You can use MIDI input to control almost any parameter of Ai. The simplest control is to use MIDI notes and controllers to trigger buttons and faders, but using the stage patch window even numerical fields can be controlled.

Example : Controlling a layer intensity by MIDI

Open the Mixer\_0 window (double click) from the stage patch  
Right click the I parameter of Layer 1 (you can right click on most objects to MIDI control them)  
On the context menu click Edit Midi Map  
Choose MIDI device to be used, and the MIDI channel to listen on

Select Learn CC#, then operate a controller on the midi device to link the fader to the controller.

Example: trigger a clip from a midi note

(first select your Master MIDI device in the System settings)  
In Performance page, select clip to be controlled  
Press Ctrl-M  
The clip turns pink  
Send the desired MIDI note  
The clip turns green

You can also place a MIDI module on the Stage Patch screen to enable different control functions.



## Notch

You can load Notch blocks directly into Ai and play them back on a layer, parsing the media from the layer into Notch and then getting the exposed results. To do this you need to start with loading a Notch block from the stage patch. In there, a subpatch exists that has 8 containers where you can load an individual Notch Block. It is important that you load the desired Notch Blocks into one of these containers before proceeding to import the block onto the layer.

Once you have loaded the Notch block into the desired container, you can then reference the Block by choosing your layer and then choosing effect number 86. This will load an effect that puts Notch directly in the layer chain and gives you control of some of the parameters for that Block.

By default the effect is setup to reference the Notch Blocks in the Stage Patch via the Notch Module. Therefore the first parameter on the Notch Effect allows you to index into those individual containers, selecting different blocks. The second parameter is setup to allow you to index into the different layers within that Notch Block. The last 14 parameters are reserved for exposed controls that have been declared within that Notch Block.

By loading this effect, it quickly sets up a Notch environment where you can change through Blocks and gain control of the parameters, feeding in whatever you want, content, live video etc.



# Keyboard Shortcuts

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## Global + Visualiser

F1	Open Manual to Current Page
Mouse Wheel	Zoom In / Out
Shift + Click and Drag	Rotate Scene
Alt + Click and Drag	Pan Scene
Shift + F7 / F8 / F9	Store Current Viewport
F7 / F8 / F9	Jump to Stored Viewport
F11	Interpolate Around Stored Viewports

## Performance Page

Tab	Create New Scene Trigger
Ctrl + Del	Delete Selected Tiles
F4	Open Tap Widget
Ctrl + A	Select All Tiles
Ctrl + B	Buddy Selected Tiles
Ctrl + M	MIDI Learn Selected Tile
Ctrl + I	Toggle Tile Information
Ctrl + F	Toggle Tile Filename
Ctrl + R	Relocate File
Ctrl + Mouse Click	Fixture Lock Selected Tiles
Ctrl + U	Clear Buddy Fixture Lock and Layer Lock on
Enter	Toggle Pause / Play all Media
Left / Right / Up / Down Arrows	Trigger Media Based On Spatial Position
Space	Trigger Next Media, Will Wrap if last Media is Active
Shift Space	Trigger Previous Media, Will Wrap If first Media is Active
F6	Centre Media Tiles
Ctrl + C	Copy Selected Tiles
Ctrl + X	Cut Selected Tiles
Home	Display Timecode Trigger
Page Up	Move 1 Frame Forward
Shift + Page Up	Move 1 Second Forward
Ctrl + Page Up	Move 1 Minute Forward
Ctrl + Shift + Page Up	Move 1 Hour Forward
Page Down	Move 1 Frame Backward
Shift + Page Down	Move 1 Second Backward
Ctrl + Page Down	Move 1 Minute Backward
Ctrl + Shift + Page Down	Move 1 Hour Backward
Ctrl + End	Reset Tiles Timecode Trigger
, or <	Speed - 0.005
. or >	Speed + 0.005
:	Hide / Show Media Tiles
#	Hide / Show Layer Widget and Media Banks

# Timeline Page

Left / Right Arrow	Pan Timeline
+ / -	Zoom In / Out of Timeline
Up / Down Arrow	Scroll Tracks Up / Down
Enter	Play / Pause Timeline
Backspace / Delete	Delete Selected Marker or Track
G	Toggle Globals Menu
M	Add Keyframe at Position on Selected Track
O	Scrub Timeline -1 Frame
Shift + O	Scrub Timeline -10 Frames
Ctrl + O	Scrub Timeline -1 second
P	Scrub Timeline +1 Frame
Shift + P	Scrub Timeline +10 Frames
Ctrl + P	Scrub Timeline +1 second
A	Move Media -1 Frame
Shift + A	Shorten Media -1 Frame
D	Move Media +1 Frame
Shift + D	Extend Media +1 Frame
Shift + Mouse Drag	Shorten / Extend Selected Media
Shift + Mouse Drag	Spread Selected Keyframes
T	Toggle Time Stretch or Loop Mode on Selected Media

# Surface Modeller

F	Toggle Selected Quadrant to Fullscreen Mode
L	Lock / Unlock Current Window
1 - 6	Default Camera Positions
O	Toggle Between Orthographic and Perspective
T	Translate
R	Rotate
S	Scale
Escape	Stop Current Transform
Delete / Backspace	Delete Current Object
Up / Down Arrow	Translate Selected Vertices 0.1 Units in Y
Left / Right Arrow	Translate Selected Vertices 0.1 Units in X
Ctrl + Up / Down Arrow	Translate Selected Vertices 0.1 Units in Z
Shift + Up / Down Arrow	Translate Selected Vertices 1 Units in Y
Shift + Left / Right Arrow	Translate Selected Vertices 1 Units in X
Shift + Ctrl + Up / Down Arrow	Translate Selected Vertices 1 Units in Z
X / Y / Z	Lock transformation to Axis
O / P	Cycle Through Draw Modes
A + Mouse Selection	Append Vertices to Selection
C + Mouse Selection	Clear / Remove Vertices from Selection



## Canvas Editor

Shift + Mouse Selection	Add Coordinates to Selection
Alt + Mouse Selection	Remove Coordinates from Selection
T	Translate
R	Rotate
S	Scale
I	Invert Selection
Shift + X	Select Coordinates on Same X Plane
Shift + Y	Select Coordinates on Same Y Plane
Ctrl + X	Align Selected Coordinates to Same X Plane
Ctrl + Y	Align Selected Coordinates to Same Y Plane



## Output Page

Arrow Keys	Move Selected Output Region
Ctrl + Arrow Keys	Move Selected Canvas Region
Ctrl + C	Copy Selected Regions
Ctrl + V	Paste Selected Regions Horizontally
Ctrl + Shift + V	Paste Selected Regions Vertically
Tab	Next Region
Shift + Tab	Previous Region
Arrow Keys on Projection	Move Vertices
S On Projection	Subdivide Geometry



# Salvation

Space + Click and Drag	Move all Modules
Ctrl + Q	Quit
Ctrl + W	Close Patch
Ctrl + O	Open Patch
Ctrl + Tab	Switch Between Open Patches
Ctrl + Z	Undo
Ctrl + Shift + Z	Redo
Ctrl + C	Copy
Ctrl + X	Cut
Ctrl + V	Paste
Ctrl + A	Select All
Ctrl + D	Deselect All
Ctrl + / -	Zoom In / Out
Ctrl + G	Group Modules into Subpatch
Ctrl + Click	Select Components