

# CALICO | PRO

VIDEO PROCESSOR



## C7-PRO-2200 CALICO PRO CALICO Studio

Firmware Version 1.0.0.19 or later  
CALICO Studio Version 1.0.3.5 or later

User Guide V1.1

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Welcome to tvONE Help, the place to get help with your:

CALICO™ PRO

CALICO™ Studio

\*Check that you have the latest revision of this document. Ensure that it matches your software version



Get more help. You can read more on-line

[Welcome to tvONE Help](#)

<https://www.tvone.com>

## Meet CALICO PRO

CALICO PRO connects to a wide range of sources and outputs and works with CALICO Studio software to allow you to build dynamic video installations with an easy-to-use visual interface.

### Features

- Share contents and output to displays, dvLED controllers, and projectors
- Our largest ever creative canvases at 64,000 x 64,000 pixels
- Consumes much less electricity than PC based systems
- Wide range of inputs, including HDMI, 12GSDI, HDBaseT, 4K playback, and streaming media
- Supports 4:4:4, 4:2:2, or 4:2:0 chroma subsampling on supported modules
- Supports up to HDCP 2.2 on-board and on supported modules
- Embedded audio support
- External S/PDIF and analog audio input and output via the optional audio module
- Front panel status screen
- Combination of different size and resolution of displays can be used
- Adjustable bezel compensation
- Edge blending of projectors
- Up-down-cross conversion
- Window luminance keying
- Control your video wall with CALICO Studio, secure IP
- HTTP and HTTPS connectivity, RESTful multi-user control, WebSocket event monitoring
- Crestron software module available
- Q-SYS plugin available
- CALICO PRO: 2RU frame size, 16 GIGAPIXEL, four separate design canvases



CALICO Studio is packed with features to help you create and manage your video walls.

- Simple, powerful, software interface
- Manage and control any CALICO PRO on your network
- Update your firmware
- Save window configurations as presets and transition between presets
- Rotate sources and outputs in 1° increments
- Choose sources for windows
- LED tools, markers, grid, and guidelines to help with building and organizing canvases.
- Manage streaming media
- Use custom resolutions, and manage EDID data
- See your changes instantly with live changes mode
- Undo and redo your work
- Control audio, configure labels, borders, and colors
- Position your outputs and windows with pixel-precision



# Get to know your products



Learn about the features and functions of your hardware.

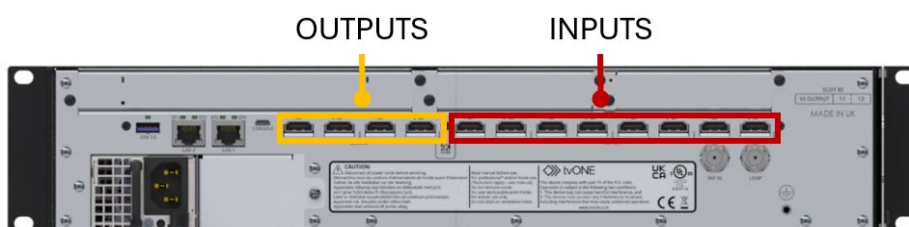
## About your CALICO PRO

CALICO PRO has pre-installed video inputs and outputs, so it can work right out of the box. There are three provided expansion slots, which can be field upgraded to allow more inputs and outputs as well as increased functionality.

CALICO PRO connects to a wide range of sources and display equipment and has been designed with features that make it easier to work with dvLED controllers by the addition of an output mapper.

CALICO Studio software is the configuration tool for CALICO PRO, and will allow you to build dynamic video installations with an easy-to-use visual interface

### Pre-Installed Inputs and Outputs

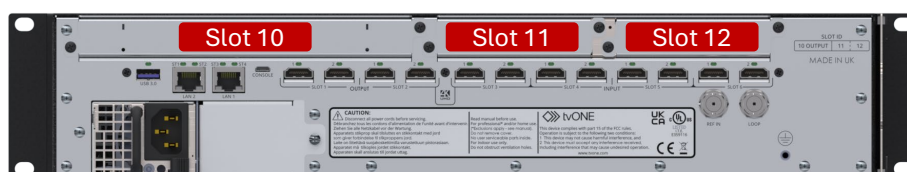


Your CALICO PRO comes with eight HDMI 2.0 inputs capable of accepting up to 4K60 (4096x2160) 8-bit video 4:4:4, or 4K60 (4096x2160) 10-bit video 4:2:2.

There are four pre-installed HDMI 2.0 outputs capable of up to 4K60 (3840x2160) 8-bit video 4:4:4, or 4K60 (3840x2160) 10-bit video 4:2:2.

All support up to HDCP 2.2

### Expansion slots



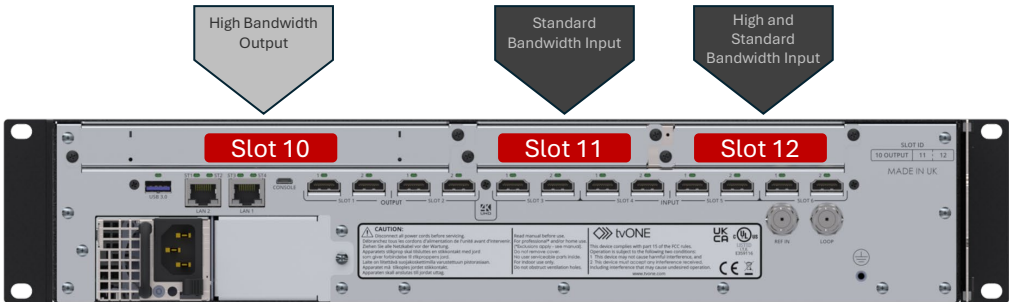
Your CALICO PRO has 3 slots available for option modules.

Slot 10 is for an output module, slots 11 and 12 are for input modules. You can have up to one output module and two input modules, in addition to the pre-installed inputs and outputs.

Rules for placing input and output modules



- High bandwidth output modules can only go into slot 10
- Standard bandwidth input modules can go into slots 11 and 12
- High bandwidth input modules can only go into slot 12
- You can install one high bandwidth input module, one standard bandwidth input module and one high bandwidth output module at the same time, but there are restrictions if two standard bandwidth input modules or the audio module are fitted.



Valid module combinations

Slot 10	Slot 11	Slot 12
ANY OR NONE	NO MODULE	NO MODULE
ANY OR NONE	NO MODULE	ANY SB/HB
ANY OR NONE	SB-ANY	NO MODULE
ANY OR NONE	AUDIO	ANY SB/HB
ANY OR NONE	SB-ANY	HB
ANY OR NONE	SB-DUAL	SB-DUAL
ANY OR NONE	SB-DUAL	SB-MEDIA
ANY OR NONE	SB-MEDIA	SB-DUAL
ANY OR NONE	SB-MEDIA	SB-MEDIA

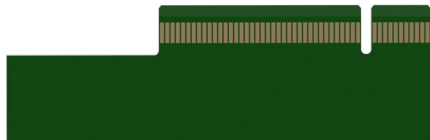
Key: SB = Standard Bandwidth | HB = High Bandwidth

- Pre-Installed inputs and outputs, so modules are all optional
- Any video module can be installed into slot 12
- Any standard bandwidth module can be installed into slot 11 if slot 12 is empty
- Audio module can be installed into slot 11 with any video module combination
- Any standard bandwidth module can be installed in slot 11 if slot 12 has a high bandwidth module installed
- There are four available standard bandwidth inputs shared between slots 11 and 12 so these combination are all possible

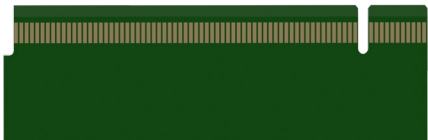
# Invalid module combinations



Slot 10	Slot 11	Slot 12	
ANY OR NONE	SB-ANY OR NONE	AUDIO	Audio module will not operate if installed into slot 12
ANY OR NONE	HB	ANY SB/HB	High bandwidth modules cannot be installed into slot 11
ANY OR NONE	ANY SB/HB	SB-QUAD	There are only four available standard bandwidth inputs shared between slots 11 and 12 so these combinations are not possible
ANY OR NONE	SB-QUAD	ANY SB	
Key: SB = Standard Bandwidth   HB = High Bandwidth			



Standard bandwidth module connector



High bandwidth module connector



Risk of damage - Do not insert high bandwidth input modules into slot 11. The device and module can be damaged. If you are unsure contact your supplier

## Fitting an optional input or output module



CALICO PRO C7-PRO-2200 has three slots available on the rear panel, for optional expansion modules to be installed. A range of modules is available that add functionality and additional input and output connectivity to your CALICO PRO. It also allows for future expansion as tvONE is constantly developing new options for these optional slots.

Two of the slots are for input modules. These are on the right side of the image shown and are colored dark grey. Slot 12 is a high bandwidth module slot.

The remaining double width slot on the left of the image shown is for a high bandwidth output module, that is colored light grey. These modules are field installable / swappable, so can be separately purchased and installed when required. CALICO PRO has pre fitted inputs and outputs, so can work without any option modules installed



- **Before** starting any disassembly or reassembly, suitable anti-static precautions **MUST** be taken to prevent any damage to CALICO PRO and its modules.
- CALICO PRO must be removed from the power by disconnecting **ALL** power cords from the rear of the unit. Optional modules are supplied in anti-static packages and must stay in them until the proper anti-static precautions have been set up.
- The modules themselves have exposed electronic components that can be physically damaged if mis-handled. Take precautions to make certain that the module is inserted into the unit correctly, using its guide rails. Do not force the module above or below the rails. If the module cannot be inserted smoothly, do not try to force it.
- Do not attempt to install a high bandwidth input module into slot 11 or slot 10, doing so will damage the module and CALICO PRO.
- If there are any doubts about installing expansion modules, please consult a qualified professional.
- Units that are damaged by static or physically damaged during the assembly or reassembly process are not covered by the manufacturers warranty.
- The lid of CALICO PRO does not need to be removed to fit any of the optional modules, power supplies or filters. If the lid is removed it will break the warranty seal, and in doing so void your manufacturers warranty.

### Remove, replace or add a new option module

Depending on the configuration of the CALICO PRO, the option module slot will have either a blanking panel or a module installed. Before you attempt to do anything, locate the module removal tools that came in the accessory pack along with your CALICO PRO. These are small silver plates that have a hook on one side for the module and a finger pull on the other side so that you can remove the module. You will need two of these to remove the output module and one of these to remove an input module (see the image shown).

Some modules are fitted with small thumbscrews that you can use to remove the module. The removal tool is not needed in that case, for example with the media module.

You will also need a suitable screwdriver to remove the fitting screws and anti-static precautions need to be applied before dismantling the unit and unpacking the modules.



1. First locate the two screws that hold the blanking plate or module in place. These are fitted one on each side of the plate or module faceplate.
2. Use a suitable screwdriver and unscrew the screws. Make sure that these washers are re-fitted correctly during reassembly. The screws have non-captive washers which can be dropped on the floor or inside the CALICO PRO..
3. Use the silver thumbscrews or module extraction tools to pull the plate or module backward, out of your CALICO PRO. The modules are fitted into an edge connector so there will be some resistance felt when trying to remove them. The blanking plate has no back part so should come free of the unit easily. Keep any blanking plates in a safe place as you will need them should you ever remove any module in the future. Pull the module towards you and out of the guide rails then remove it. Place any modules that have been removed back into their antistatic packaging.
4. To reinstall follow the reverse procedure.
5. Make certain that the module you are fitting is going into the correct slot
6. Offer the rear of the module up to CALICO PRO so that the main board slots into the guide rails in the unit at both sides. If the module is in the correct position, it will move easily.
7. Push the module into the unit until it connects to the edge connector (there will be some slight resistance), and the module should be fully in position.
8. Replace the two screws taking care with the washers.
9. Power up CALICO PRO. Any new modules should be automatically discovered then configured by the unit.
10. Make sure that a suitable configuration is now loaded as the inputs and outputs may differ from the previous set-up.

## CALICO PRO front panel



The front panel of your CALICO PRO includes a customizable status screen. The status screen can show the IP address of your CALICO PRO, its status, and the name of the device. You can also control the brightness of the status screen.

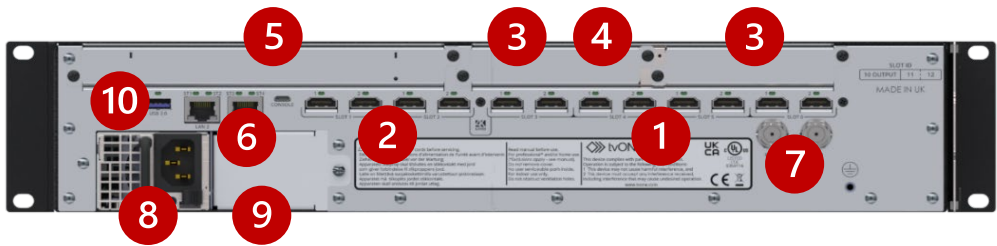
These settings are available in **Settings** in CALICO Studio when you are connected to the device.

You can choose which of these elements are displayed, for example you could choose not to display the IP address.

You can also decide if you want the blue illuminated chevrons to light up or not and control their brightness.

The front panel has two integrated carry handles that cannot be removed.

# CALICO PRO rear panel










1	Pre-installed inputs	HDMI 2.0 (eight inputs)
2	Pre-installed outputs	HDMI 2.0 (four outputs)
3	Optional input module (dark grey)	Connect to sources
4	Optional audio module (light blue)	Optional: connect to audio sources and/or playback devices
5	Optional output module (light grey)	Connect to displays, projectors and DVLED controllers
6	Ethernet connection	Connect to your network. Calico studio and other control systems.
7	Reference input and loop out	Genlock (BNC connections)
8	Hot swappable power supply (PSU)	Use supplied power cord and connect to suitable power outlet
9	Dual redundant hot swappable power supply (PSU2)	Optional: Use supplied power cord and connect to suitable power outlet
10	USB-3.0	Future use.

# About optional modules and accessories



CALICO PRO supports a range of options, including input and output modules and accessories, all with model numbers starting with C7-PRO-. Each option module supports specific connections.

## Input modules

Module	Product Number	Connections
Quad 12GSDI broadcast input module  (High bandwidth)	C7-PRO-12GSDI-4IN  	4x 12GSDI (Full size BNC) up to: 4096x2160p - 60Hz
Quad 3GSDI broadcast input module	C7-PRO-3GSDI-4IN  	4x 3GSDI up to: 1920x1080p - 60Hz
Quad HDMI input module HDCP 1.4	C7-PRO-HDMI-4IN  	4x HDMI up to: 1920x1080p - 60Hz
Dual HDMI input module HDCP 1.4	C7-PRO-HDMI-2IN  	2x HDMI up to: 4096x2160p Single input = 60Hz Dual input = 30Hz
Quad HDMI input module HDCP 2.2  (High bandwidth)	C7-PRO-HDMI-4K4IN  	4x HDMI up to: 4096x2160p - 60Hz
Dual 4K HDBaseT input module	C7-PRO-HDBT-2IN  	2x HDBaseT up to: 4096x2160p - 60Hz Single input = 60Hz Dual input = 30Hz 1x Ethernet
Media module IP decode Media storage and playback	C7-PRO-MEDIA  	1x USB-3.0 1x Ethernet 1x 128GB SSD  Two 4K30 playback channels, both playing a quad split of four 1080p 30 files ( <b>synchronized mode</b> ) 1x 4K30+1x 1080p (standard)



## Output modules



Module	Product Number	Connections
Quad 12GSDI broadcast output module  <i>(High bandwidth)</i>	C7-PRO-12GSDI-4OUT	4x 12GSDI (Full size BNC) up to: 3840x2160p - 60Hz
Quad HDMI output module HDCP 2.2  <i>(High bandwidth)</i>	C7-PRO-HDMI-4K4OUT	4x HDMI 2.0 up to: 3840x2160 - 60Hz 1920x1080p - 120Hz
Octad HDMI output module HDCP 1.4  <i>(High bandwidth)</i>	C7-PRO-HDMI-2K8OUT	8x HDMI 1.4 up to: 1920x1080p - 60Hz

## Audio module

Module	Product Number	Connections
S/PDIF and analog audio module  Audio embed/de-embed	C7-PRO-AUD-2IN-4OUT	Inputs: 1x analog, 1x S/PDIF  Outputs: 1x analog, 4x S/PDIF

## Accessories

Accessory	Product Number	Comments
Power supply Redundant PSU for 2RU series units (400W)  Hot Swappable	C7-PRO-4RPS	1 x IEC power cord
Air filter kit for dusty environments.	C7-PRO-2U-FILTER	Cleanable and re-usable stainless steel air filter for CALICO 2U models. Comes with installation kit.  Easy removal from the rear of the unit for cleaning.

## About your 4K media input module



The 4K media input module allows you to decode and play:

- Media and images from a USB drive
- Media and images from internal storage
- Video streams from IP sources.
- There is a supplemental guide available for more information about this module.

Sources include streaming server, and any device used with an IP encoder, for example, the Magenta Encoder-100.



### Features

- Two of these can be installed into a C7-PRO-2200 (slots 11 and 12)
- Play two simultaneous channels of media, including IP streams
- Play video clips from USB drive up to 4K30 3840x2160p - 30 Hz
- Play single IP streams up to 100 Mb/s
- Play dual IP streams up to 40 Mb/s
- Play still images up to 8K (stored), scaled to 4K into CALICO PRO.
- Play streams with low latency
- Play media from streaming server
- Create and save up to 20 playlists
- Primary channel supports up to 4K30 3840x2160p - 30 Hz
- Secondary channel supports HD 1920x1080p - 60 Hz
- IP streams up to 4K30 3840x2160p - 30 Hz
- Save up to 40 IP streams
- Full resolution and frame rate scaling
- Start playing media when your device starts
- Supports USB 3.0
- Synchronized mode - Two 4K30 playback channels, both playing a quad split of four 1080p 30 files
- FTP synchronization for media files
- Support AES CBC encrypted streams with 128- or 256-bit keys
- For CALICO PRO, C7-PRO-MEDIA comes with 128 GB internal storage



USB (LED) Indicates the status of the USB drive. **Green** means that the USB drive is working correctly. **Red** means that too much power is being draw through the connector

USB 3.0 Connect a USB drive to play media directly.

USB 2.0 For best results, we recommend using quality USB drives compatible with USB 3.0.

ST1 (LED) Indicates the status of the module. **Green** means that the module is working correctly. **Red** means that the module is starting, or that there is a problem.

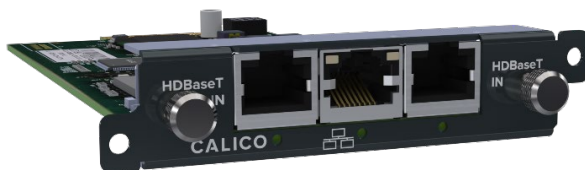
ST2 (LED) Indicates the status of the sub-module. **Green** means that the sub-module is working correctly. **Red** means that the sub-module is starting, or that there is a problem.

LAN Connect an Ethernet cable to play media over IP.

If any status indicator stays **Red**, restart your CALICO PRO. If that does not work, contact tvONE support. Contact details are at the back of this guide.

## About your HDBaseT input module


The 4K HDBaseT modules allows you to receive uncompressed, high-resolution 4K video and audio from stand-alone transmitters located up to 150m away. The input module also allows you to extend Ethernet from remote transmitters that support HDBaseT Class A and HDBaseT Class B.



Features



- Two of these can be fitted into a C7-PRO-2200 (slot 11 and 12)
- HDBaseT class A to 150m
- HDBaseT class B to 60m
- 1x channel 4K60 or 2x channels 4K30 or below
- Audio support

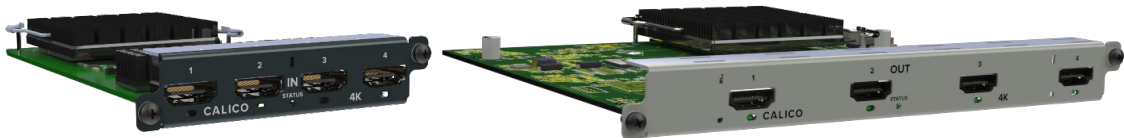
<div>Status indicator (LED)<div></div></div>	<div>Indicates the status of the module by the LED directly below the middle RJ45 connector.</div> <div><div>Green</div> means that the module is working correctly.</div> <div><div>Red</div> means that the module is starting, or that there is a problem.</div> <div><div>Off</div> means the module is powered down.</div>
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If any status indicator stays **Red**, restart your CALICO PRO. If that does not work, contact tvONE support. Contact details are at the back of this guide.

# About your HDMI input and output module



The High-Definition Multimedia Interface (HDMI) modules are an industry standard audio/video interface for transmitting uncompressed video data and uncompressed digital audio data from an HDMI-compliant source device.



Status indicator (LED)	Indicates the status of this module.  <b>Green</b> means that the module is working correctly.  <b>Red</b> means that the module is starting, or that there is a problem.  <b>Off</b> means the module is powered down.
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If any status indicator stays **Red**, restart your CALICO PRO. If that does not work, contact tvONE support. Contact details are at the back of this guide.

## What does the status LED under the HDMI connector mean?

HDMI (LED)	Indicates the status by the LED directly below the HDMI connectors on supported modules.	
	LED status patterns	
	Off	No signal
	Green	Valid signal with HDCP 2.2
	Green / short Off	Valid signal with HDCP 1.4
	Orange	Valid signal without HDCP
	Red	HDCP problem
	Red / Off	Fault or unrecognized image resolution

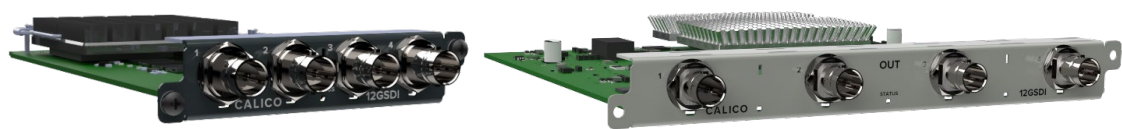
## About your 12GSDI input and output module



The Serial Digital Interface (SDI) modules are a professional standard video and audio interface for transmitting uncompressed/unencrypted video data and embedded audio data from an SDI-compliant device. SDI is commonly used in broadcast environments.

Status indicator (LED)	Indicates the status of this module. <b>Green</b> means that the module is working correctly. Blinking <b>Green / Off</b> or <b>Red</b> means that the module is starting, or that there is a problem. <b>Off</b> means the module is powered down.
------------------------	---

If any status indicator stays **Red** or blinking **Red / Off**, restart your CALICO PRO. If that does not work, contact tvONE support. Contact details are at the back of this guide.



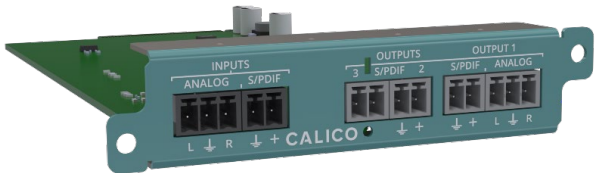
### What does the status LED under the SDI connector mean?

SDI (LED)	Indicates the status by the LED directly below the SDI connectors on supported modules.			
	LED status patterns	Stable	Unstable/Invalid	Resolution
	No signal	Off		
	12G	White	White / Off	2160p 50 – 60Hz
	6G	Blue	Blue / Off	2160p 23.98 – 30Hz
	3G-A	Green	Green / Off	1080p 50 – 60Hz
	3G-B	Cyan	Cyan / Off	1080p 50 – 60Hz
	HD	Yellow	Yellow / Off	720p / 1080i / 1080p 23.98 – 30Hz
	SD	Purple	Purple / Off	PAL / NTSC

# About your S/PDIF and analog audio module



You can use 3.5 mm terminal block connectors to connect to a range of audio inputs and outputs.



<b>INPUTS, ANALOG</b>	Connect an analog audio device.
<b>INPUTS, S/PDIF</b>	Connect a digital audio device.
<b>OUTPUT 1 S/PDIF ANALOG</b>	Connect an analog or digital device to play audio from the video installation on canvas 1.
<b>OUTPUT 2</b>	S/PDIF output. Connect a digital device to play audio from the video installation on canvas 2.
<b>OUTPUT 3</b>	S/PDIF output. Connect a digital device to play audio from the video installation on canvas 3.
<b>OUTPUT 4</b>	S/PDIF output. Connect a digital device to play audio from the video installation on canvas 4.
<b>STATUS (LED)</b>	Indicates the status of the module. Green means that the module is working correctly. Red means that there is a problem.

If any status indicator stays red, restart your CALICO PRO. If that does not work, contact tvONE support. Contact details are at the back of this guide.

## Supported formats

The S/PDIF and analog audio module supports all audio formats output as PCM with a frequency of 48 kHz.

## Audio Inputs

Your S/PDIF and analog audio module has two inputs, one analog and one digital input. You can use inputs from the S/PDIF and analog audio module as breakaway audio only.

## What's breakaway audio?

Breakaway audio is independent of the windows on your video wall. It does not change when the sources playing in your windows change. The audio is sent to all enabled outputs.

## Audio Outputs



Your S/PDIF and analog audio module has four outputs. Each output is locked to a canvas in the Editor. Output 1 is locked to canvas 1, output 2 is locked to canvas 2, and so on.

Output 1 has one analog and one S/PDIF digital port. Both connectors will transmit the same audio source.

To choose a canvas, select a canvas number from **Canvas**



Outputs 2-3 and 4 each have one digital S/PDIF output.

## Hardware recommendations

At tvONE, we design our products to the highest quality standards. To get the best results from our products, we recommend that you use the best quality connectors, cables, and adapters. Consider the points below when you choose accessories and position equipment.

- For best results at resolutions of 1080p – 60Hz or below with HDMI, use cables under 15m long, or shorter if you use connection adapters. If you need to place your products more than 15m apart, use active optical cables or a signal extender.
- For best results at resolutions above 1080p – 60Hz with HDMI, use cables under 2-3m, or shorter if you use connection adapters. If you need to place your products more than 3m apart, use active optical cables or a signal extender.
- For the best results with HDMI, use High Speed, Premium High Speed, or Ultra High-Speed HDMI cables.
- For the best results with DisplayPort, use certified cables under 2m long.





In industrial environments, use shielded Ethernet cables.

Shielded Ethernet cables are often marked F/UTP, FTP, or STP. Use shielded Cat 6 or above cables with HDBaseT input and output modules and Streaming media and 4K playback input modules.

Use good quality USB 3.0 drives.

For more hardware recommendations for your product, see the specification sheet.

Read more about HDMI at:

<https://www.hdmi.org>

Read more about DisplayPort at:

<https://www.displayport.org>

## Get help with your Magenta IP Encoder-100

The Magenta Encoder-100 works with your CALICO PRO

<https://www.tvone.com>

# Planning and configuring video installations



The first step towards creating a video installation with your CALICO PRO is planning and setting up your hardware.

## Planning a video installation

It's helpful to write a plan before you start installing. A plan saves you time and effort later, and helps you make sure you have all the equipment you need. Download the printable plan from:

<https://www.tvone.com>

If you can't print and fill out the plan, think about the following questions:

- **What do you want the final effect to be?** – This will drive the budget and what products will be required to deliver the project
- **What is the scope of the project?**
- **What will you need a video processor to do?**
- **What kinds of display technology will be used?**
- **How many outputs do you need?**
- **What sizes are the displays you will connect to the outputs?**
- **What are the bezel sizes of the displays?**
- **Are there any dvLED walls in the installation, and if so, think about how these will be mapped?**
- **What is the native resolution of each display?**
- **Do you need displays that support HDCP (High-bandwidth Digital Content Protection)?**
- **How many projectors do you need?**
- **Do you need to blend the edges of projectors and how much overlap do you need?**
- **What types of source do you need?**
- **What is the native resolution of each source?**
- **What is the frame rate of each source?**
- **Will the sources always be available when the video wall is operating?**
- **Is there any switching or processing before the source reaches your CALICO PRO?**
- **How many windows do you need to create the effect you want?**
- **Do you need labels?**
- **Will you need to monitor anything?** - Think about how you can use **Canvas watch**



Video tearing. Using a mixture of frame rates can cause video tearing. For best results, make sure all your displays use the same frame rate.



## What is a window?

A window is a container for a source input. You can have multiple windows playing the same source. You can resize, move, and rotate windows in the video wall editor.

## Presets

Do you want to use presets in your video wall?

What type of control system will you use to operate the video wall and change between presets?

## What is a preset?

A preset stores information about windows, including positions, transitions, and effects such as borders or rotation. You can save presets and recall them later from the dashboard.

# Installing your hardware

## Who can do this?

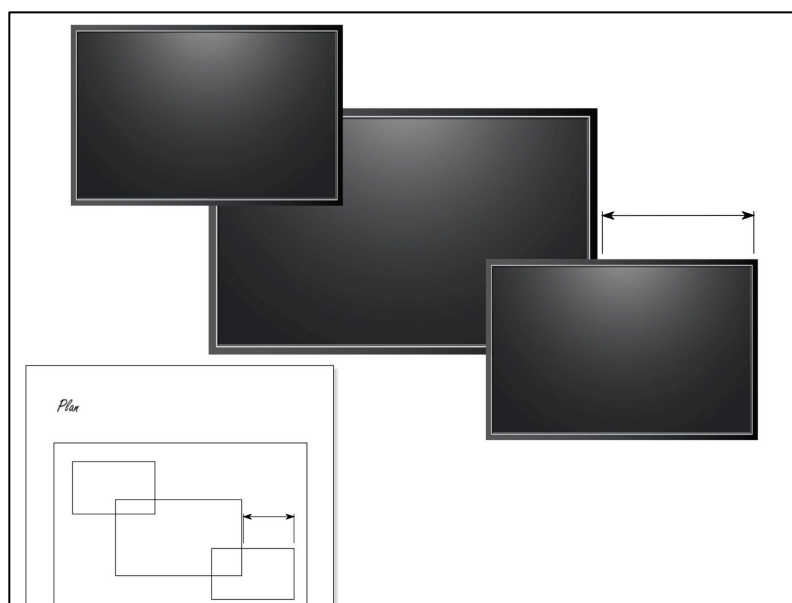
Anyone can do this task, but we recommend that you consult a qualified AV installer.

## Placing your CALICO PRO and display equipment

When you decide where to place your hardware, consider these points:

- Availability of electrical outlets
- Distance from CALICO PRO to sources and display equipment
- For best results at resolutions of 1080p60 or below with HDMI or DVI, use cables under 15m long, or shorter if you use connection adapters. If you need to place your products more than 15m apart, use active optical cables or a signal extender.
- For best results at resolutions above 1080p60 with HDMI, use cables under 2-3m, or shorter if you use connection adapters. If you need to place your products more than 3m apart, use active optical cables or a signal extender.
- Make sure your devices are within the operating specification.
- Installation environment
- In industrial environments, use shielded Ethernet cables.

## Position your display equipment and sources



1. Use your plan to help you position your displays, which can be dvLED walls, screens, projectors or a combination of all these.
2. Make sure you note all the measurements, so you can make an accurate video wall in CALICO Studio.
3. Position your sources.
4. Connect your dvLED controllers, displays and projectors to the outputs of your CALICO PRO.
5. Connect your sources to the inputs of your CALICO PRO.
6. Connect your CALICO PRO to your network.
7. Connect your CALICO PRO to an electrical outlet and power on. If you are using the optional redundant PSU, you must connect this to a separate electrical outlet
8. You can now connect to your CALICO PRO and create your video wall in CALICO Studio.



- It is recommended to use a cable mount to reduce the stress on the connector caused by heavy cables. See the installation instructions that came with your module or device.
- Keep a note of which source is connected to which port. You can use this information later when you name inputs and outputs in CALICO Studio.
- Keep a note of which display is connected to which port. You can use this information later when you name inputs and outputs in CALICO Studio. You can also label the inputs and outputs directly.








# CALICO Studio system requirements



- Works with PCs running Windows® 10 and 11
- Works with Microsoft Surface Pros and similar touch screen devices
- Does not work with touch-screen-only devices, including tablets or phones
- Full support for touch screen devices is under development
- Installs Windows .NET 8, if you don't have it
- Needs 600 MB of disk space during installation n Is approximately 150 MB in size once installed
- Minimum 8GB RAM, 16GB recommended.
- To use the preview feature, your PC must have Windows Media Player installed, and it must have been launched at least once. Preview performance depends on the specifications of your PC and number of windows in your installation. Discrete GPU is recommended.

## About CALICO Studio

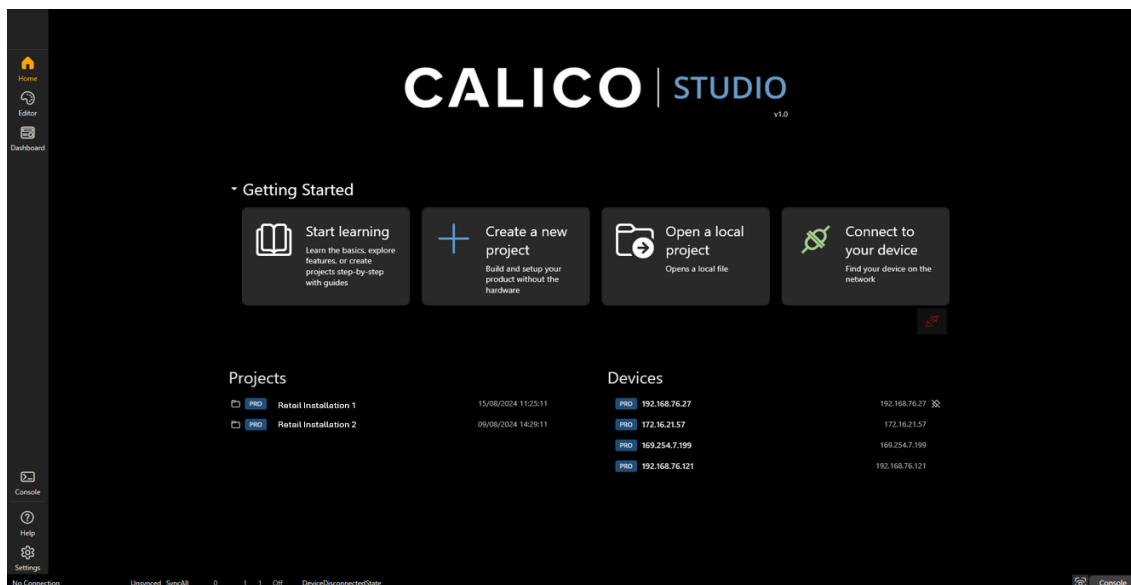
CALICO Studio is the software that configures and controls your CALICO PRO. You can create multiple video installations on any of the four available canvases. Each can have multiple outputs, video windows, crops and labels. Transitions and effects can be added for a state-of-the-art dynamic video installation.

 Home	 Home	<b>Home</b> is where you connect to a device, load a configuration from a file, or create an offline configuration.
	 Editor	<b>Editor</b> is where you create your installations on each canvas. If you have a C7-PRO model, you can create up to four canvases.
	 Dashboard	<b>Dashboard</b> is where you control the actions of your canvases.
	 Console	<b>Console</b> opens a window where you can see commands sent by CALICO Studio to CALICO PRO and vice versa. You can manually send commands using this interface and save the current activity to a file.
	 Help	<b>Help</b> takes you to the tvONE website and opens tvONE help for your product.
	 Settings	<b>Settings</b> is where you configure your system, network, modules, and more.

# Getting started with CALICO Studio



When you first open CALICO Studio, you see the Home page.



- If you have already set up your hardware, you can **Connect to your device** and get information about its configuration.
- If you have not set up your hardware yet, you can **Create a new project**. Or you can load a configuration from a **Project** file if you have one. You can save your configuration and send the configuration to your CALICO PRO later. You can also use saved configurations to configure other CALICO PRO units.

## Connect to your CALICO PRO and get its configuration

The easiest way to get started using CALICO Studio is to get the configuration of inputs and outputs directly from your CALICO PRO.

If you have recently connected to your device and want to re-connect, you can find your device from the **Devices** list on the home page. Just select your device to get to the login screen.



You can use the **Pin** next to items on the list. If you select this the item is pinned and will stay at the top. You can use this to pin devices that you always connect to. The last device you connected to usually appears at the top and the others are pushed down and eventually off the list. You can also remove devices from the list with the **X** button. This does not remove the device information; it simply removes it from this list.

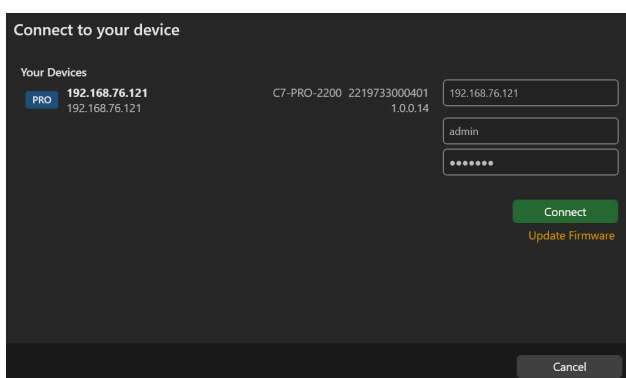
If this is the first time you are connecting to this device or it's been a while since you did, then you will need to discover the device on your network.



1. From **Home**, select **Connect to your device**, then find your CALICO PRO from the list of discovered Devices. If your CALICO PRO isn't in the list, try typing in its IP address.
2. If you were previously connected to the device but now the device is no longer powered on or is disconnected from the network, it may appear in the list of your devices, but it will have an **[offline]** message next to the IP address.
3. Enter your administrator login details.

When you first log in as an administrator, enter the username **admin** and password **adminpw**

**CALICO Studio always connects to your device securely. If you connect via RESTful API, you will need to set up a secure connection.**



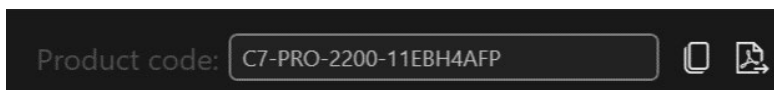
4. When you are logged in to your CALICO PRO, if prompted select **Read** to get its configuration.

## Create a configuration offline

You don't need to be connected to a CALICO PRO to create video installations, but you do need to recreate the configuration of your CALICO PRO so that you're using the correct inputs, outputs, and devices.

You can also create offline configurations to help you decide what hardware you need.

1. From **Home**, select **Create a new project**.
2. In **Configuration Editor**, choose a device, and give your configuration a name.
3. If you have a product code, enter it in **Product code** to automatically populate your modules.



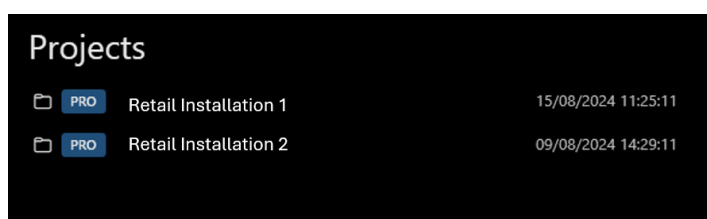
OR

4. If you do not have a product code, for each slot, choose a module from the list. Add accessories as required.

- The number of slots available depends on your device.
- You don't have to use any of the option slots unless extra inputs and outputs or different types of inputs and outputs are needed. CALICO PRO (C7-PRO-2200) ships with 8x 4K60 Inputs and 4x 4K60 outputs provided.
- If you are creating a configuration for an existing CALICO PRO, make sure its configuration matches the device you have.
- The configurator will guide you as to what modules can be fitted to the unit and in what positions. Invalid configurations will be flagged with a red warning message.
- **OPTIONAL:** You can copy the product code to the clipboard, so you can paste the product code into your email or document.
- **OPTIONAL:** You can export the product configuration summary to a PDF file to include in your documentation. If you intend to do this, you must create a pdf before clicking the **Create Configuration** button. You will be unable to create the summary .pdf after you have created the configuration.

## Send a configuration to your CALICO PRO

You can send a configuration to your CALICO PRO from the home screen. If the configuration was created with your version of CALICO Studio and saved as a file, it may appear on the Projects list on the home screen. If it does, select the file to load it





You can either load a saved configuration or create a new configuration offline and send it to your device.



1. Create or load a configuration.
2. In **Home**, select your device from the **Devices** list, or by selecting **Connect to your device** and then enter your administrator login details.
3. The default username is **admin**, and the default password is **adminpw**
4. Select **Send**.



For CALICO Studio the default admin username is **admin** the password is **adminpw**

## Naming input and output ports and channels

You can name the input and output ports and channels for each slot in CALICO Studio.

### Why should I name input and output ports and channels?

CALICO Studio uses aliases to give each input or output port or channel in each slot a unique name. CALICO uses slot aliases for its option module slots but also uses them for the pre-fitted inputs and outputs. This is done to simplify the set-up process.

For example, the first port in **slot 1** is named **s1o1** for **slot 1 output 1**. These unique identifiers tell you the position, but not what is connected to that input or output.

Name your ports and channels with something that indicates what is connected to the port or playing on the channel. Doing this can help you identify what devices are connected in your configuration and makes it easier for you to see quickly which source is playing in which window. For example, you might rename **s3i1** to **Camera 1**.


Naming the channels of a Streaming media and 4K playback input module

The media input module has two channels. Each channel refers to a play queue, not to a specific streaming source. If you intend to build play queues with multiple sources, for example, one or two streaming sources and media items from a USB drive, then consider unique names such as PlayQueue1 and PlayQueue2. If you intend to always have just one streaming source in a play queue, then you could use names like WOWZAstream, or LectureTheatreStream.

### Naming rules

Names must be unique and start with a letter. They can contain letters, numbers, and underscores, and can be up to 21 characters long.

### Naming input and output ports

1. In CALICO Studio, select  **Settings** then **Slot Status**.
2. For each port, enter a useful name.
3. To save your new names, select **Apply (inputs and outputs only)**
4. If you are creating an offline configuration, select **Editor** then **Save to file**

Input Slots	
Slot	Name
Slot3.In1	Camera_1
Slot3.In2	Camera_2
Slot4.In1	Camera_3
Slot4.In2	Camera_4
Slot5.In1	Camera_5
Slot5.In2	Camera_6
Slot6.In1	Camera_7
Slot6.In2	Camera_8
Output Slots	
Slot	Name
Slot1.Out1	Wall_1
Slot1.Out2	Display_1
Slot2.Out1	Display_2
Slot2.Out2	Display_3

What is HDCP?

High-bandwidth Digital Content Protection (HDCP) is a form of digital copy protection developed to prevent copying of digital audio and video content as it is sent between devices, for example protecting the content as it travels from a Blu-ray player to an amplifier to your TV.

What support does my CALICO PRO have for HDCP?

Your CALICO PRO can support video inputs and outputs with no HDCP or with HDCP versions 1.4, or 2.2 when using supported modules.

How does my CALICO PRO handle a mixing of HDCP versions?

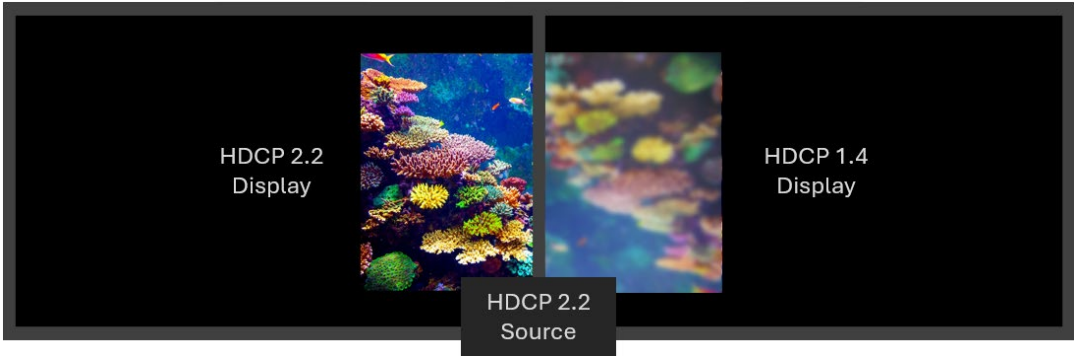
CALICO PRO will soften the image of a window visible on any outputs that are connected to display devices, including projectors and dvLED controllers that are using a lower HDCP encryption than required by the input sources. For example, a Blu-ray player with an HDCP encrypted movie as a source and playing out to a non-HDCP compliant PC monitor.

Use this table to identify HDCP compatibility between your sources and display devices:

Display Devices	HDCP Versions	None	1.4	2.2
Sources	None	✓	✓	✓
	1.4	Downscaled	✓	✓
	2.2	Downscaled	Downscaled	✓

Show me an example

The left display has HDCP encryption high enough for the input source, but the right display doesn't, so the part of the window shown in the right display is softened.




# How do I change the HDCP version of an input?

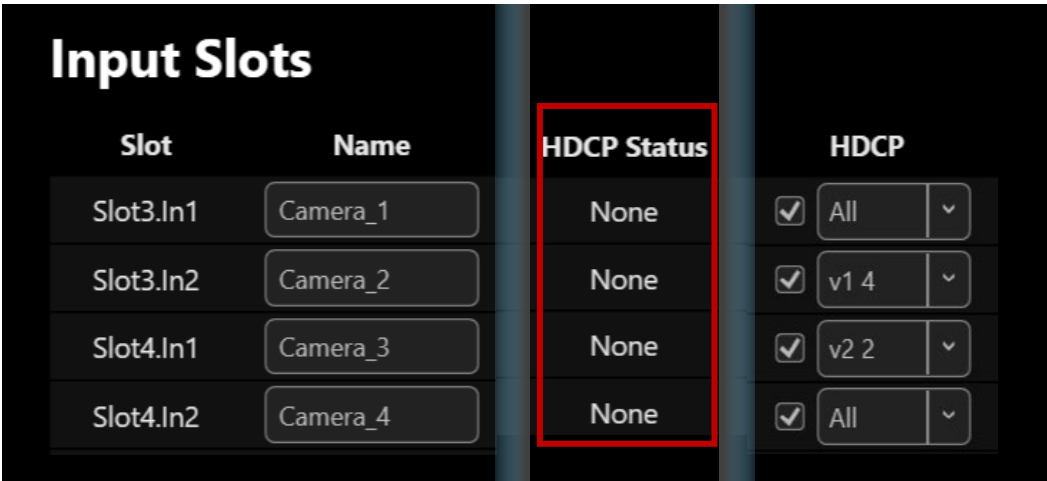


Your CALICO PRO's inputs negotiate with each connected source which version of HDCP to use, and the source will then make decisions on how to present the content, which may be no video.

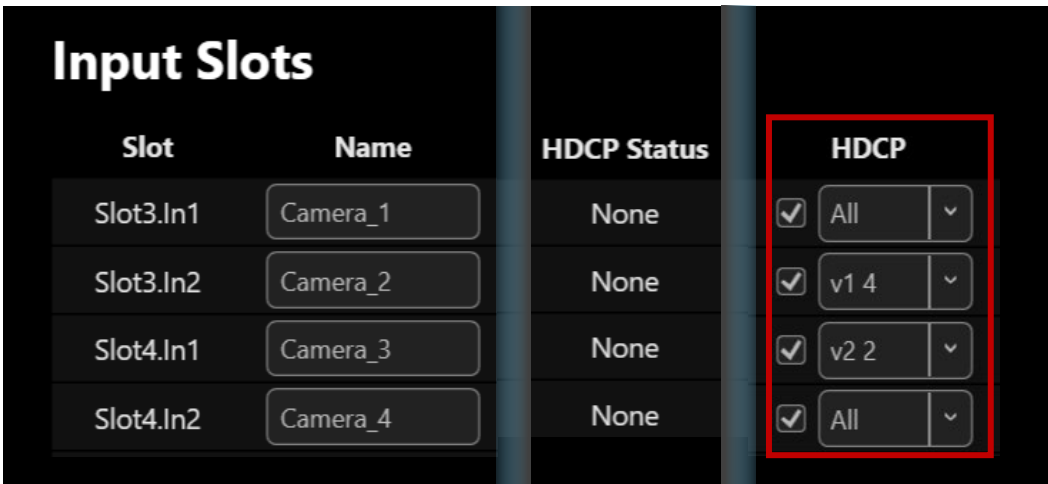
You can choose to disable HDCP support, and on supported modules which version the input will try to negotiate. This may help to force the source to send content in a particular version, for example you have HDCP 2.2 sources but only HDCP 1.4 displays.

## Bulk updating the input HDCP properties

1. In CALICO Studio, select **Settings**  then **Slot Status**
2. When connected to your device the HDCP Status will automatically update to show the version negotiated with the source.



3. For each port, select if HDCP is enabled and if available which HDCP version to negotiate with the source.





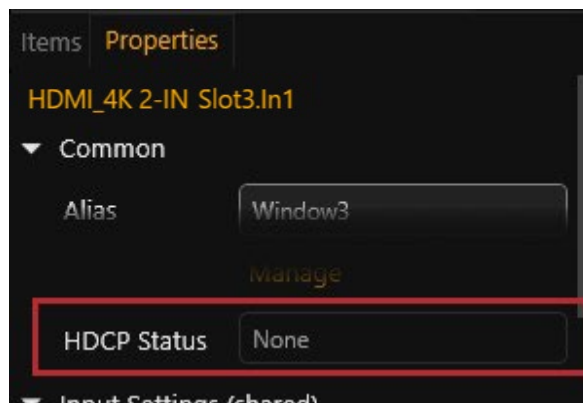
4. To save your changes select **Apply (inputs and outputs only)**

Apply (inputs and outputs only)

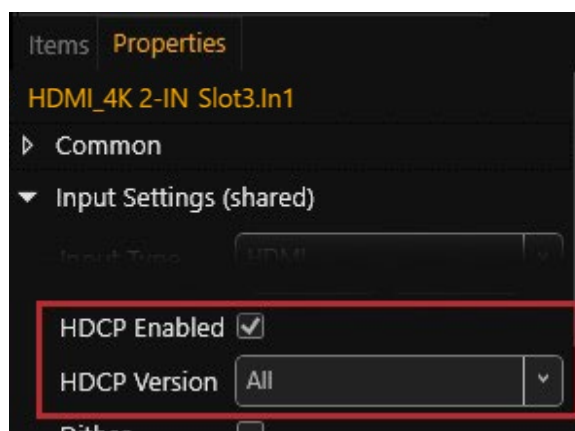
5. If you are creating an off-line configuration select **Editor**, then **Save to File**

### Individually from each window

1. In CALICO Studio, select **Editor**, double-click the window on the canvas that you want to set then go to the right-hand side and select the **Properties** panel.
2. When connected to your device the HDCP Status will automatically update to show the version negotiated with the source.



3. If there is no HDCP you can disable it by clearing the HDCP Enabled option, or if available, select the HDCP Version which will force the input to try to negotiate that version with the source.



4. When you are happy, select **Take** and then **Set Device Startup** to save the take on your CALICO PRO. Your changes will then be restored on start-up.
5. If you are creating an offline configuration, select **Save to File**

# How do I change the HDCP support of an output?




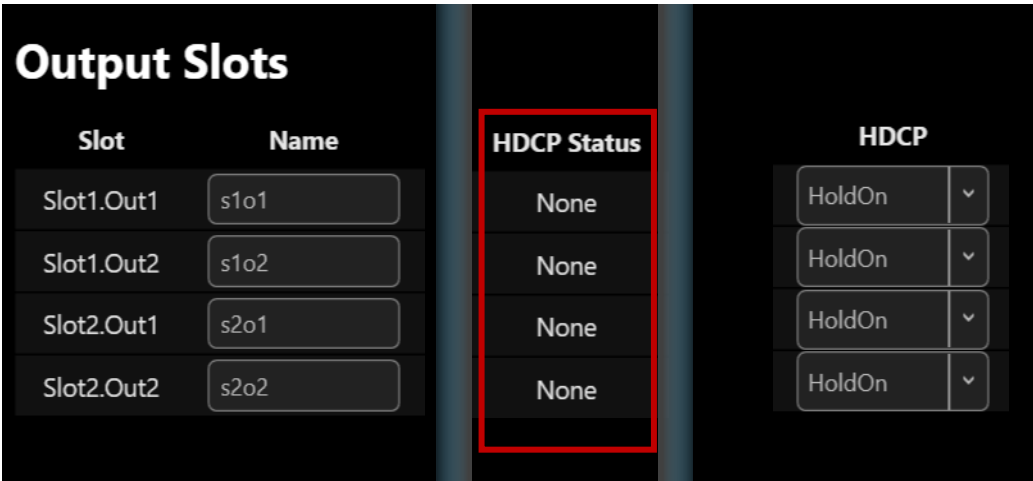
Your CALICO PRO's outputs negotiate with each connected display which version of HDCP to use.



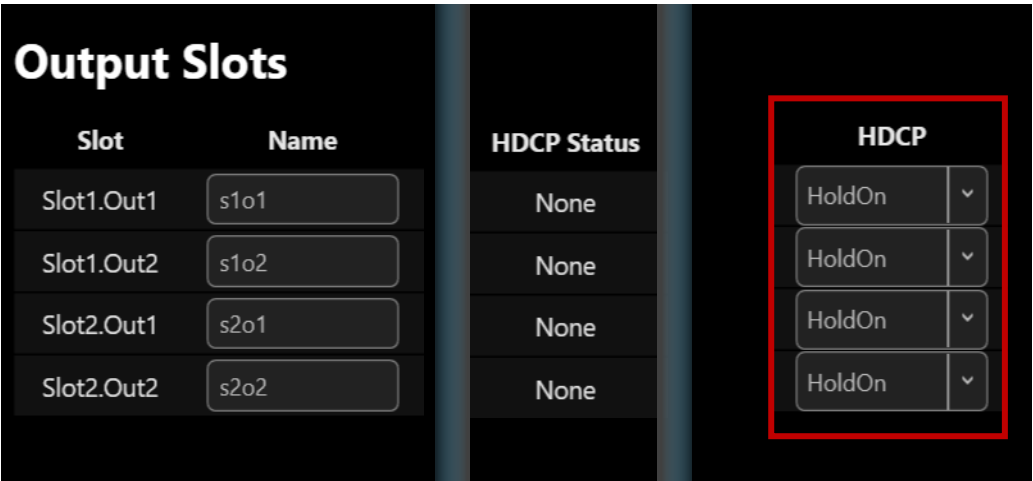
You are not allowed to output HDCP encrypted content on unencrypted or lower HDCP version displays

## Bulk updating the output HDCP properties

1. In CALICO Studio, select **Settings**  then **Slot Status**
2. When connected to your device HDCP status will automatically update to show if HDCP is active.



3. For each port, select the HDCP mode to tell the output how to handle the display



- **HoldOn:** Keeps HDCP active
- **KeepOff :** Turns off HDCP

4. To save your changes select **Apply (inputs and outputs only)**

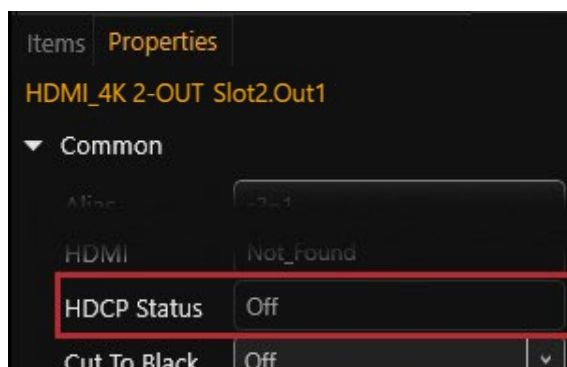
Apply (inputs and outputs only)



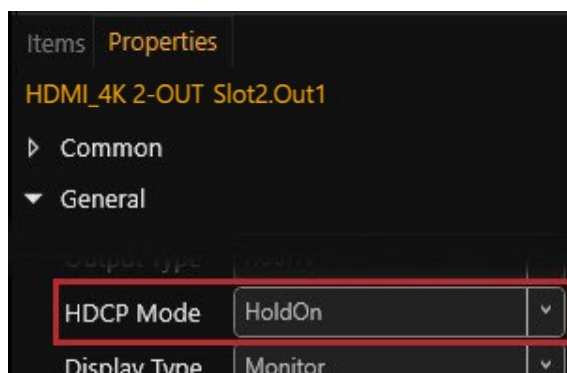
If you are creating an offline configuration, select **Editor** then **Save to file**.

#### Individually from each output

1. In CALICO Studio, select **Editor**, double-click the output on the canvas that you want to set then go to the right-hand side and select the **Properties** panel.
2. When connected to your device the HDCP Status will automatically update to show if HDCP is active.



3. Select the HDCP mode to tell the output how to handle the connected display.



4. When you are happy, select **Take** and then **Set Device Startup** to save the take on your CALICO PRO. Your changes will then be restored on start-up.
5. If you are creating an offline configuration, select **Save to File**

# Keying windows on your CALICO PRO




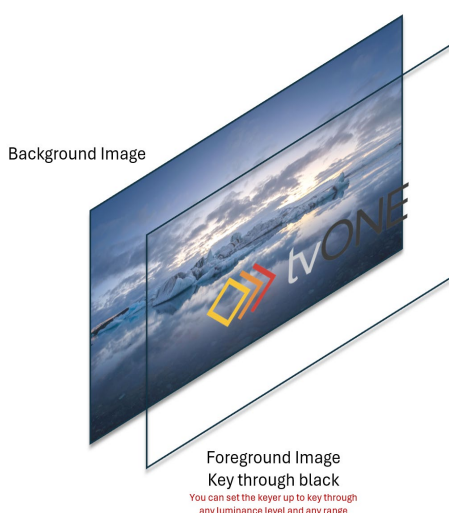
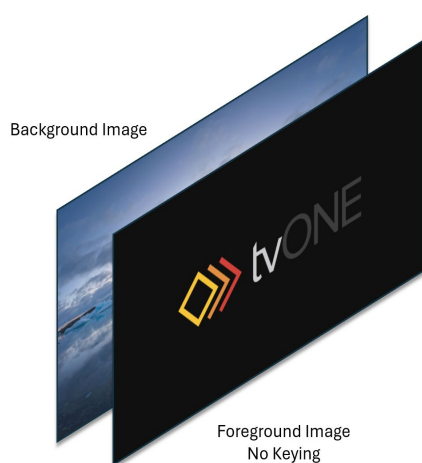
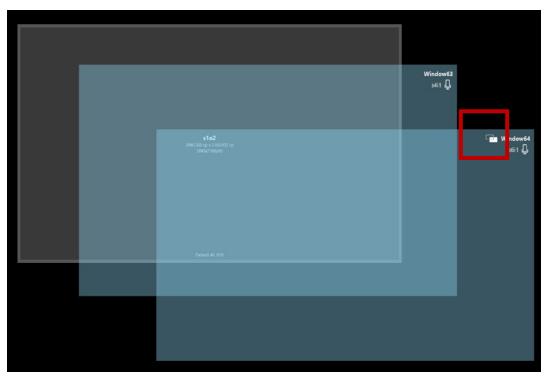
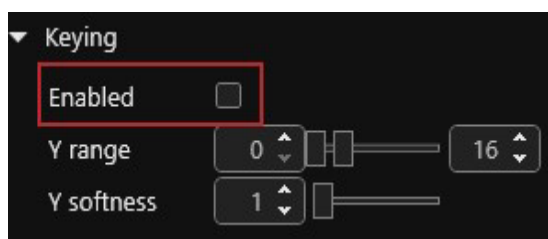
Your device supports luminance keying on all outputs. Keying makes parts of a window or label become transparent in real time.

## What is Luminance keying?

Luminance keying determines background objects from foreground objects by the difference in the luminance (brightness) levels.

## How to enable keying on a window?

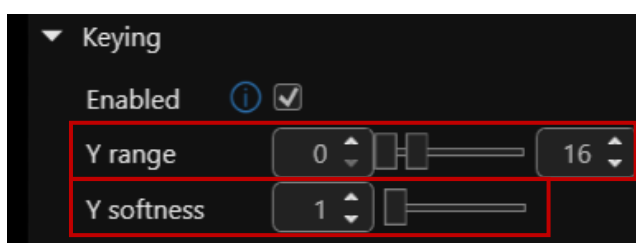
1. From **Editor**, double click the window you want to enable keying on
2. From the window **Properties** panel, open Keying then check the **Enable** box
3. The symbol  will be shown in the top right corner of a window that has keying enabled.



- Keyed windows may use more bandwidth than windows that are not keyed
- Sources that have very thin lines may show scaling artifacts at certain window sizes. Try adjusting the window size a little
- Window borders will work on keyed windows, but will not be keyed



4. Set the luminance **Y range** that you want to key out.
  - In the case of key through black set up the lower slider to zero and increase the upper one until the black area in your content is keyed out. If you are unsure, then set to 16
  - In the case of key through white set up the upper slider to 255 and increase the lower one until the white area in your content is keyed out. If you are unsure, then set to 240
  - Set the slider range to key out other ranges for different effects
5. If you get aliasing around the edges of the key use the luminance **Y softness** control to blur the edges and improve. The higher the number, the stronger the blur.

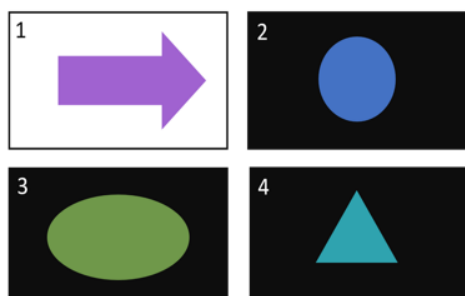


### Why are my overlapping windows and labels not keying how I expected?

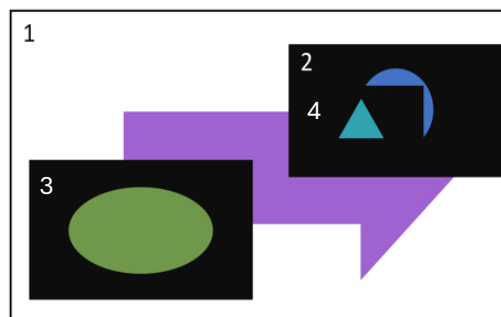
Window keying is only between two layers, which may include windows, labels or the black background of the canvas. If your keyed windows overlap, then you may get undesirable results.

Here is an example of what you might see. **Window 1** is the background, **Window 2 and 3** are overlapping keyed windows, and **Window 4** does not overlap other keyed windows.

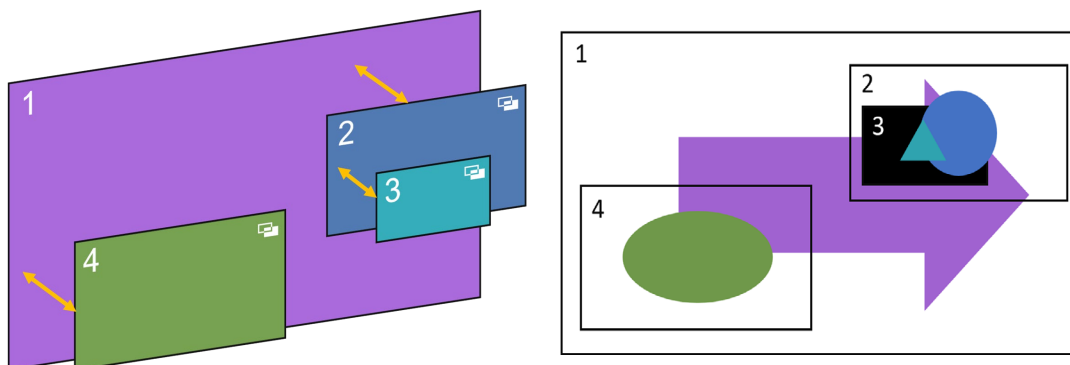
Sources of the windows



Output with all window keying turned off



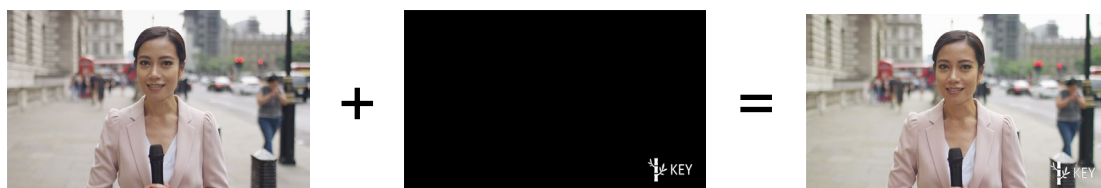




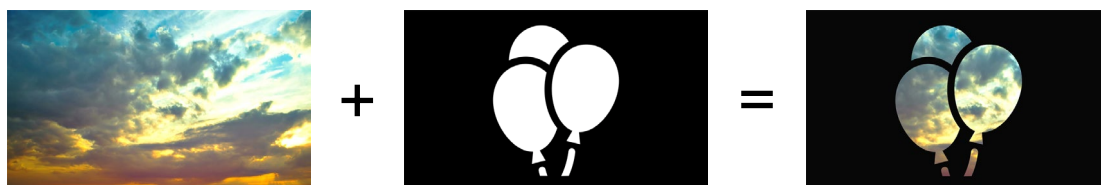
- In this example, **Window 2** and **Window 4** key through black to show **Window 1**
- Overlapped keyed **Windows 2 and 3** show black areas of **Window 2** instead of showing **Window 1**

## Show me some examples of keying

### White logo keyed using black to remove the background



### Cut out keyed through white



Various tools are available to help you create and organize your canvas.

Hundreds of different elements can be present on a canvas. Outputs, windows and labels are some of these and will need to be properly aligned with each other.

## Markers

Markers are used to help organize your canvas into groups, position items, indicate where an obstruction is located, mark areas of a display that are not in use.

### Add a marker

1. From **Editor** select **Markers** from the top menu ribbon, then select the markers you want to add to the canvas.
2. Position and size the markers to the required locations.
3. Double click on the marker to show the **Properties** panel on the right-hand side.
4. Adjust the settings to your requirements, for example show a border, or enter custom text.
5. Clear the Fill Color check box to allow you to select items under the marker, for example when using the marker border as a zone around windows and displays.
6. Hide the alias text if you want to just have a marker with no text.
7. Lock the markers in place from the **Items** list on the right-hand side, then select the padlock symbol next to the item. Toggle to lock and unlock

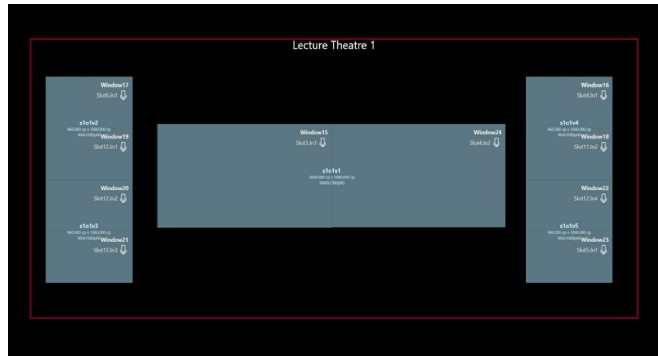


- Other items can be snapped to markers, for example windows and outputs.
- Markers are like windows and outputs within the editor, but they are only visible in CALICO Studio and not on the output.
- Clear the fill color check box to allow you to select items under the marker. For example, when using the marker border as a zone around windows and outputs.
- Hide the alias text if you want to just have a marker with no text.
- Lock the markers in place from **Items** then select the **padlock** next to the item.

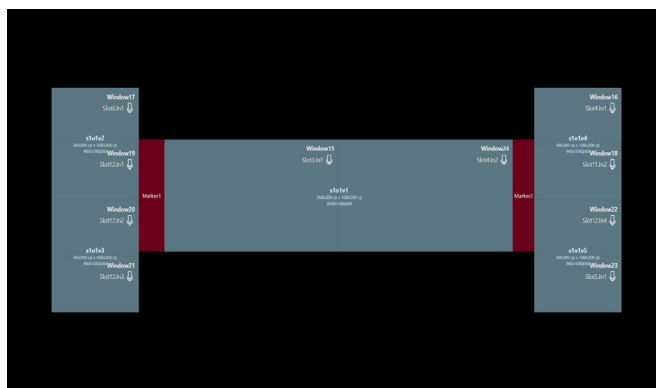
## Show me examples



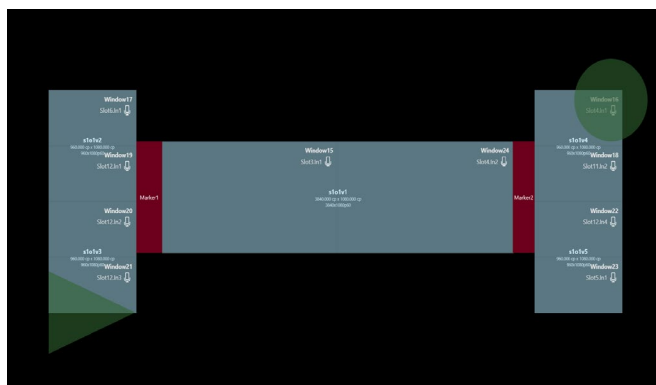
Each marker can be used to define a zone that exists in a different physical space on a canvas with their own sources and presets controlling them. The example here is a dvLED wall installed in **Lecture Theatre 1**



Markers are being used here as positioning guides that set the physical gap between wall sections.



Here the green markers are being used as a guide for areas that are obscured from the viewer due to an obstruction. The guides can help you to place relevant contents on the wall.



Markers are not visible on any outputs. They are only guides visible on the canvas editor in CALICO Studio.

# Guidelines



Guidelines help to align items on your canvas, they are purple lines that can be added and stretch from the top to bottom or left to right of your canvas.



## Add a guideline

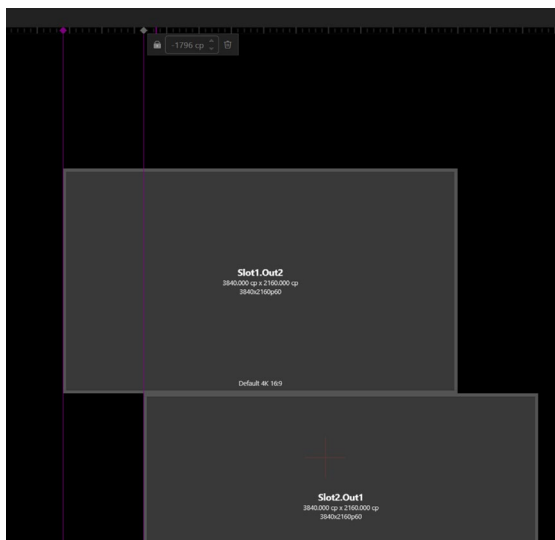
1. From **Editor**, place the mouse pointer over the top or left edge of the canvas.
2. Click on the location where you want to add a guideline.
3. Click and drag the guideline diamond to move the guideline's location.

## Edit, lock, or remove a guideline

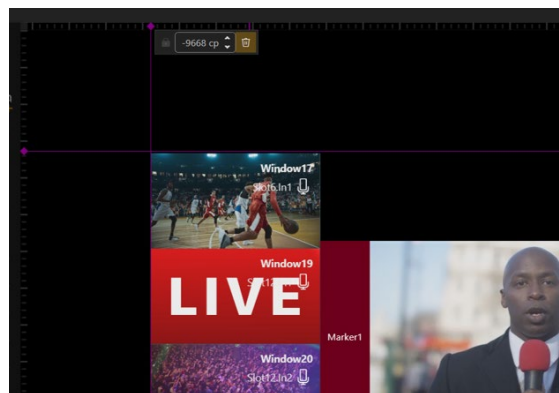
1. From **Editor**, right click on the guideline diamond to show their properties.
2. You can enter the exact value to position the guideline on the canvas. or
3. Lock the guideline to stop it from being accidentally moved by selecting the **padlock**. or
4. Remove the guideline from the canvas by selecting the **bin**.

## Show me examples

### Using guidelines to space the outputs correctly

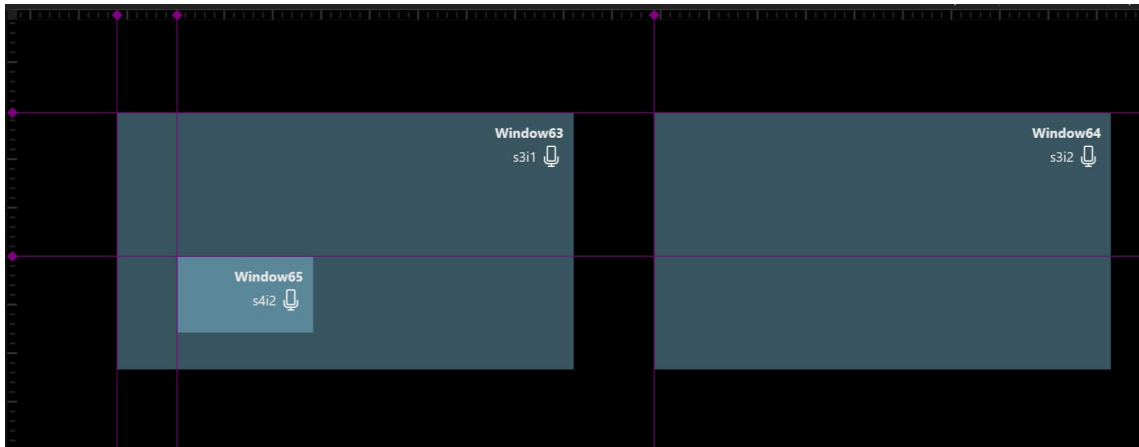


### Using guidelines to space the windows correctly



Guidelines are not part of the undo history

Turn off snapping to displays and windows and use guidelines to arrange your windows in specific locations.



## Canvas grid

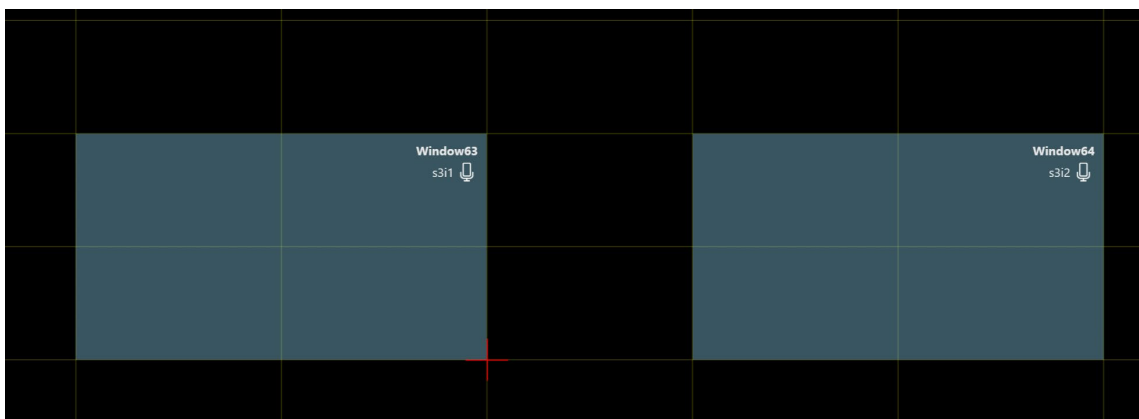
You can show a customizable canvas grid to help arrange items

### Show the canvas grid

1. From **Editor** select **Canvas options** from the top menu ribbon.
2. Select **Grid** then check the **Show grid lines** box.
3. Change the Width and Height values to your requirements.
4. If you want editor items to snap to the grid, select **Snap** then **Snap to Grid**.

### Show me an example

Grid is spaced out in 1920x1080



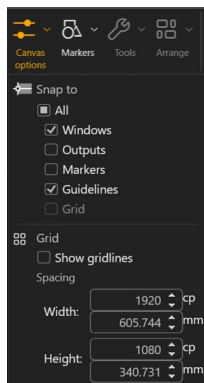
## Snapping options



You can control what items will snap to, making it easier to set up and manage complex canvases with many items.

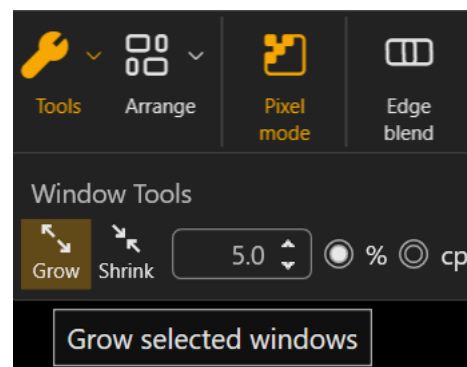
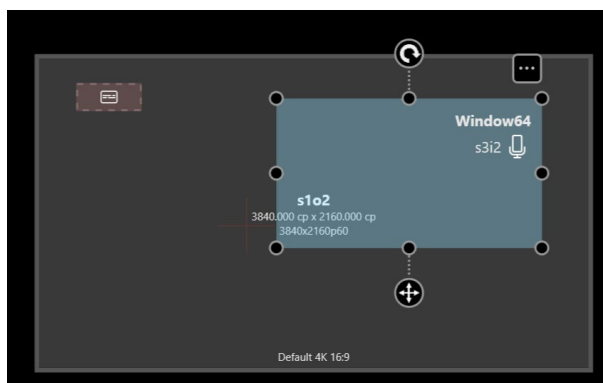
### Customize the canvas snapping

1. From **Editor** select **Canvas options** from the top menu ribbon.
2. Select or clear which options to change the snapping behavior.



## Shrink or grow a window or label

1. From **Editor** select a window or a label you want to grow or shrink.
2. You can select to shrink or grow a window as a percentage of the current size, or the canvas units.
3. From **Tools** select **Grow** or **Shrink**.



To select a label, you must be in the Label editor

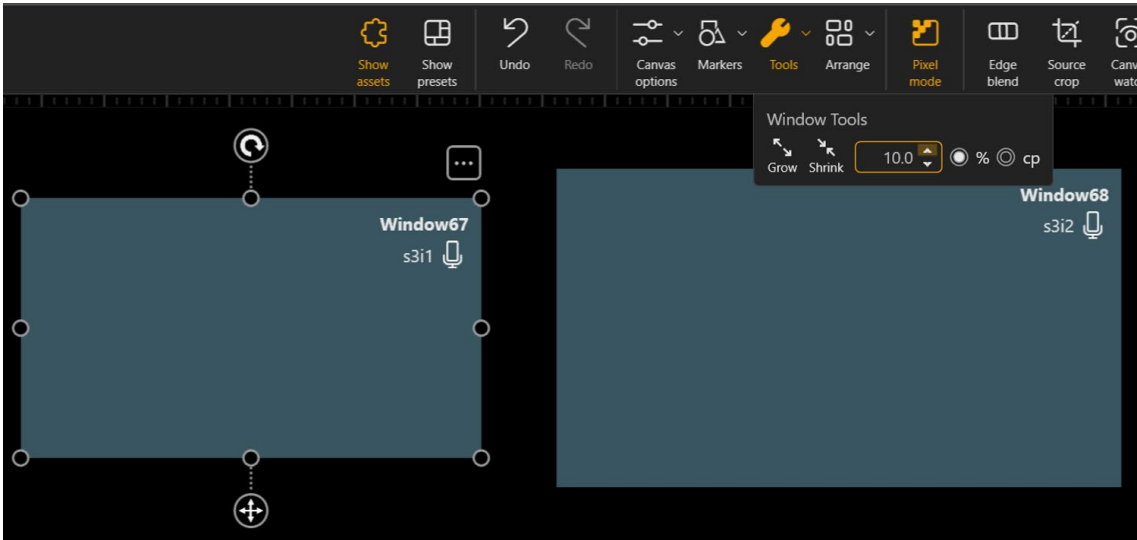


Turn Pixel mode ON to adjust in pixels

Show me an example



In this example window 67 has been shrunk by 10%.



# Creating a video installation



To create a video installation in CALICO Studio, you need sources and displays to connect to your inputs and outputs. Make sure you've either loaded your configuration from your CALICO PRO or created an offline configuration.


## Create a video installation on a canvas

When connecting to a new CALICO PRO or one that has been factory reset, CALICO Studio will present the screen shown and ask you to set up at least one canvas refresh rate. Each canvas can only be set to one refresh rate, but you can set each canvas up with a different one if required. All outputs added to a canvas must then be set to the canvas refresh rate.

The canvases can also be locked (frame locked) together by using the Canvas Link settings.

There are three methods that can be used to synchronize your canvases

1. **Synclock** – Canvases are frame locked to an internal system clock. This is the default mode.
2. **Framelock** – Any video source can be chosen as a frame reference
3. **Reference lock** – (genlock). Uses the external BNC input as a reference

The settings can be changed later by going to **Editor** then go to Canvas and click on canvas settings 

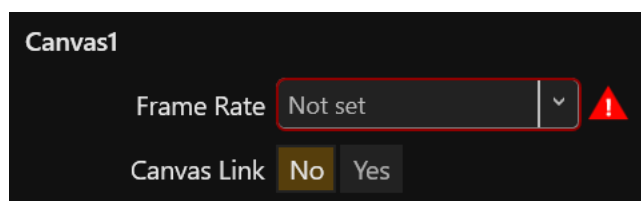




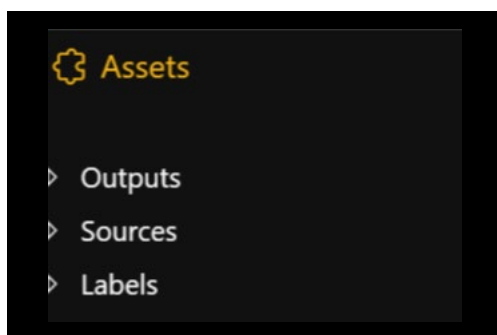
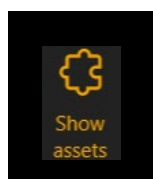
1. Go to **Editor** then choose a **Canvas**



2. If you have not set the framerate for the chosen canvas, the device and settings menu will appear and warn you a frame rate is not set. Set one and apply it to return to the canvas editor



3. Next select **Show Assets** from the top menu ribbon. The **Assets** panel will open on the left side, and you will see what assets are available for you to use in your CALICO. The assets include any available outputs, including mapped outputs, available sources and any labels stored in the on-board storage area.



4. An optional, but recommended step for your outputs is to assign equipment to an output by selecting the **pencil** icon. In the equipment editor select or create the equipment then assign it to the chosen output. This step will involve you knowing the specifications of your equipment and will include physical sizes, as well as resolutions. In the case of displays there is also settings for each bezel size. CALICO PRO needs this information if you plan to mix display types or indeed match the physical world where the displays will be installed.

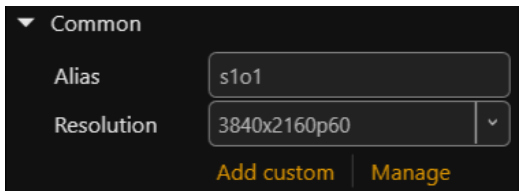


You can change or assign equipment later by selecting the output on the canvas, then from the **Properties** panel on the right-hand side, open **Equipment**, select **Assign**.

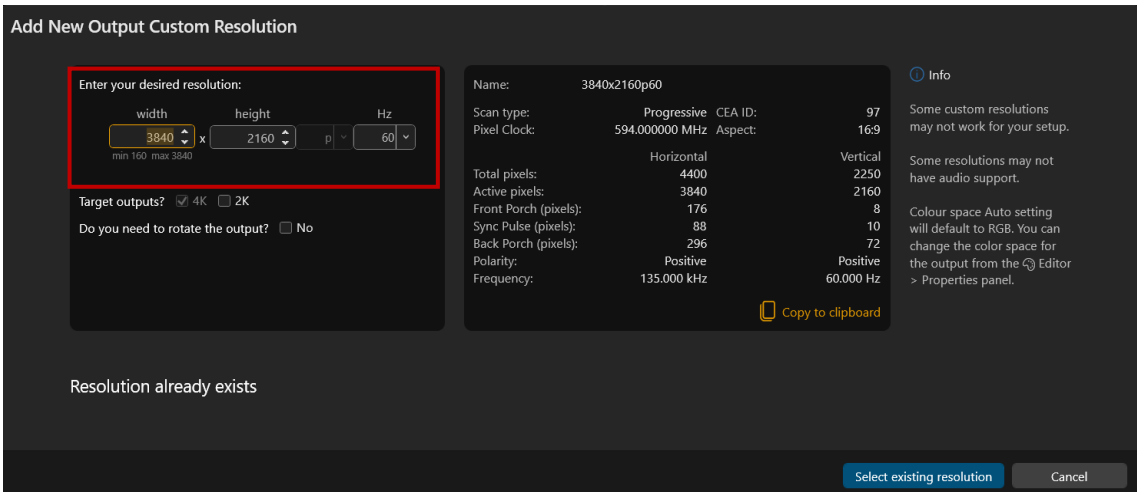
If the display resolution is not listed there are two possibilities:



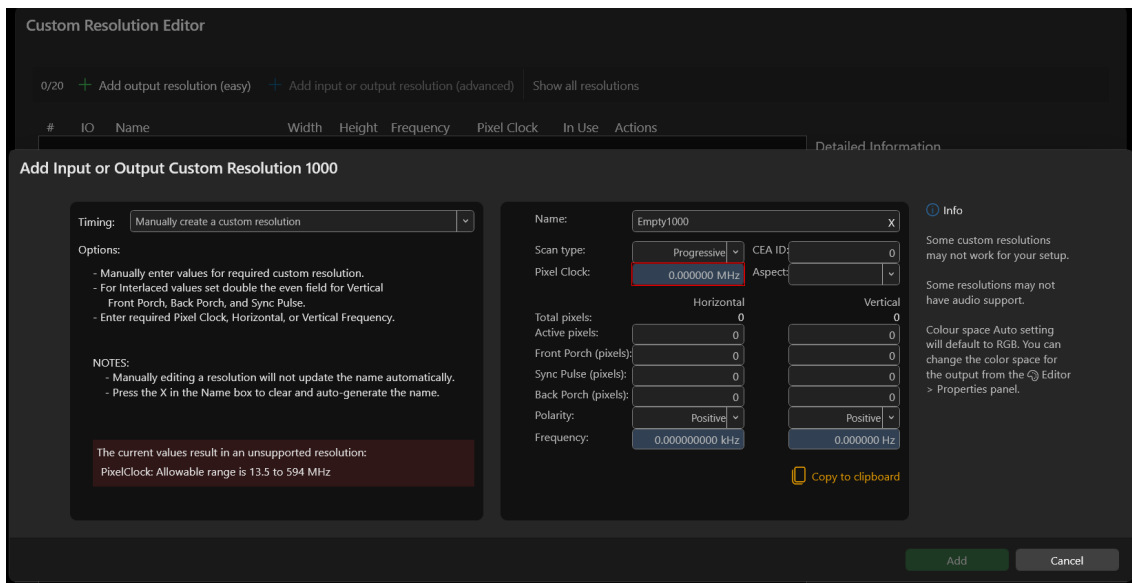
- 1. The output you have chosen does not support the resolution you require, for example you want a 4K resolution on a 2K output. You will need to use a different output that supports your required resolution.
- 2. The resolution is not in the built-in list. If supported by the output, you can add a custom resolution by selecting **Add custom** or **Manage**.



- 3. **Add Custom** opens a dialogue that guides you to set a custom resolution. The tool uses a special algorithm to assess if the desired resolution is possible with that output. The algorithm maximizes the likelihood that the resolution will work in your setup.





- 4. **Manage** opens the advanced dialog where you can manually enter timing values or use one of the timing providers.



- Custom resolutions may not always work with your display equipment.
- If your output is connected to a dvLED controller, it is better to keep a standard resolution and use **Output Mapper**
- Ensure that the refresh rate for the custom resolution matches the canvas refresh rate, otherwise you will get a warning message (display turns red) when you try to add it to the canvas.

## Add outputs to a canvas

Every output from CALICO PRO can be used to connect to any kind of display device that has a suitable video connector. This includes displays and monitors, projectors and dvLED controllers.

1. There are two ways to add outputs to your canvases.
2. Add a single output, using the  button next to an available display in the assets list, or by simply dragging and dropping an output to a canvas. You can drop it anywhere and scale and position it later.
3. Map the display using **Output mapper**  and create a series of virtual outputs that can be used as mapped areas for an dvLED setup or as separate pieces of a single output to a monitor set to be a canvas watcher.



# Output Mapper




When the output goes to a display monitor or Projector, the aspect ratio of the output is known and one output drives one display. When connected to a dvLED (direct view LED) controller however, the display is built using cabinets or tiles of a size and resolution decided by the LED manufacturer. It is rare that these are used with conventional aspect ratios, resolutions and standard layouts. dvLED controllers are designed to manage this arrangement by using mapping techniques, but still expect a standard resolution as a single input from a source in most cases.

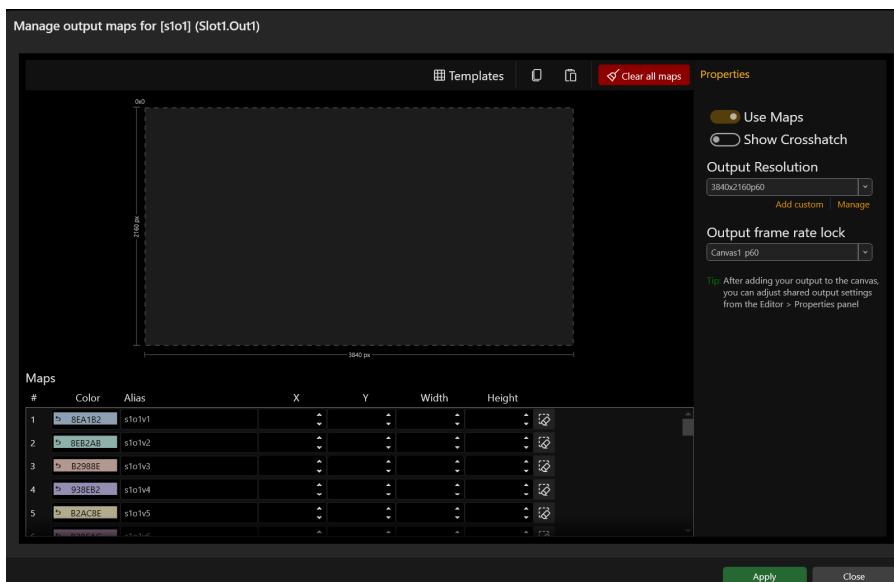
CALICO PRO can “**map**” it’s outputs to match the mapping used by the controller that drives the dvLED wall, which may have been installed with multiple pieces and patterns.

The **output mapper** can be used to create virtual outputs that can then be positioned correctly on a CALICO canvas to mimic a real-world installation, ensuring that content placed on the wall is displayed correctly and is easy to manage with CALICO Studio’s UI. Using CALICO PRO to map the output and manage the content, makes the job of setting up the dvLED controller much simpler.

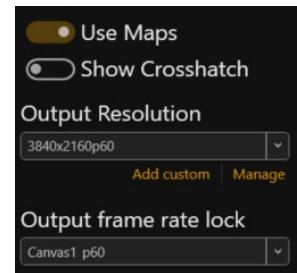
Using CALICO PRO’s output mapper also maximises the use of every available pixel, potentially cutting down the number of dvLED controllers that would be needed for a large installation.

## Mapping an output

1. Select an available output from the **Assets** list then **Outputs**.
2. Click the output mapper button  for the output to access the mapping tool.



1. To activate the map for the chosen output, select **Use Maps**
2. You can decide if any unmapped areas of an output will show as black or show as a **Crosshatch** pattern. The setting shown in this example would output black.
3. Check that the **Output Resolution** is set correctly. If it is not, then select a new one from the drop-down list or create a custom resolution by selecting **Add custom**.
4. Using the **Output frame rate lock drop-down**, check that the mapped output will be added to the chosen canvas and that the canvas refresh rate is set as you expect.



There are several ways to create output maps in this tool. You can directly enter the mapping information for each mapped area by entering the values **(X, Y, Width and Height)** into the table at the bottom labelled **Maps**

#	Color	Alias	X	Y	Width	Height
1	8EA1B2	s1o1v1				
2	8EB2AB	s1o1v2				
3	B2988E	s1o1v3				

You can add up to 32 mapped areas per single output from CALICO PRO, and each map is represented by a different colour in the mapping tool.

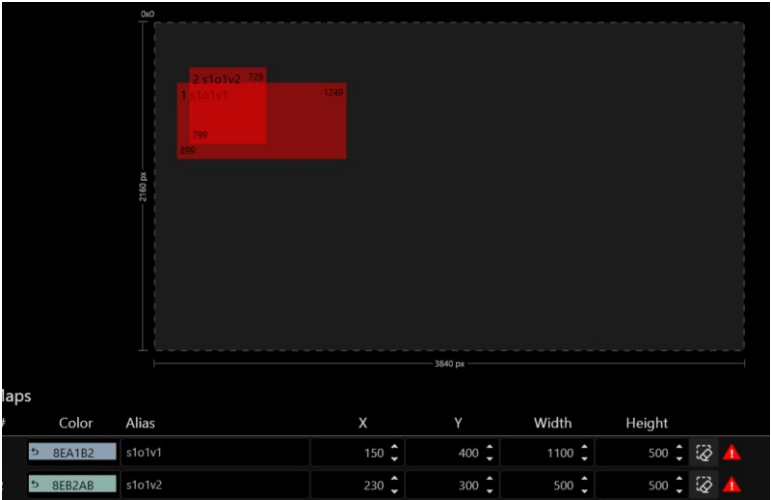
In this example, a single map has been created from s1o1. The map starts at 150 pixels in **(x)** and 400 pixels down from the top left **(y)** and is 1100 pixels wide and 500 pixels high. The map has been given a virtual output name of **s1o1v1**



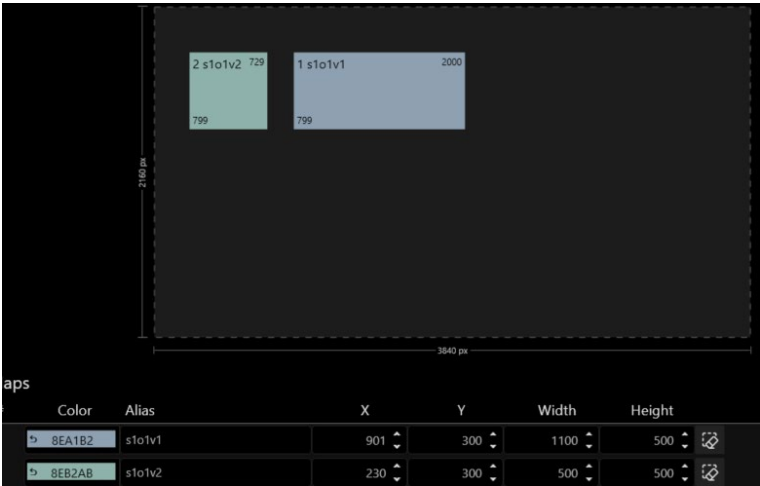
Mapped areas can be moved to another position within the output by clicking on them and dragging them to a new position or by adding new information into the table.



In the example below, a second mapped area has been created that is overlapping the first area. This setting is not possible with an output, as the pixels cannot be used more than once. The output mapper shows this as an error (outputs are now red and warnings have appeared in the mapping table).



Correct the problem by moving the maps into the correct positions



The maps here MUST match the mapping in the dvLED controller.



Each map can be a maximum of 3840 pixels wide, 2160 pixels high and not smaller than 16 x 16 pixels in size.

Once created, the maps become virtual outputs and can be used anywhere on any of the four available canvases. The virtual outputs can also be rotated (360° in 1 ° increments) and re-sized to match the physical dimensions of the real-world displays, ensuring that content will always look correct.

## Show me an example



The lecture theatre shown in this example has three dvLED walls. The centre wall is a 4K wide by 1K high wall and the side walls are approximately 1k wide by 2K high

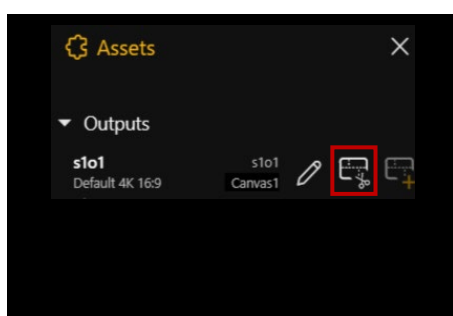


This wall is almost 6K wide plus 2K high and it is very difficult to map this using a standard 4K dvLED controller. Two controllers or even three controllers might be required. Content would also be tricky and could not easily be shared across all three walls.

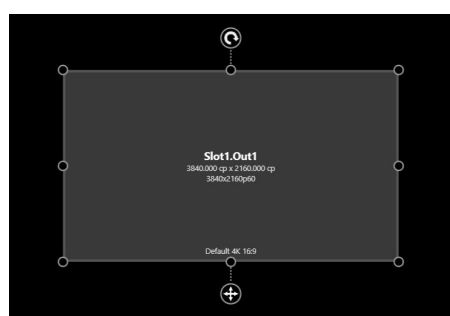
CALICO PRO can solve all these problems and deliver all three walls using a single 4K60 output to only one standard 4K controller. The output mapper can efficiently pack all these areas together so that the minimum number of pixels in the controller are wasted if any.

In the **Assets** panel in CALICO Studio, choose an output that you will map. This can be an output already added to a canvas or an available output from the list.

Select the Output Mapper icon next to the output in the list



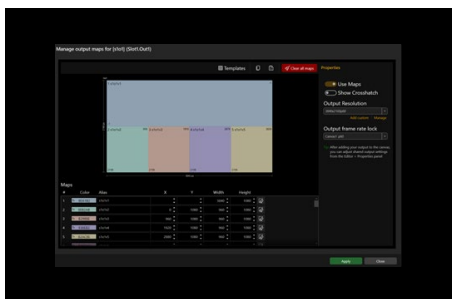
The chosen output as a single 4K



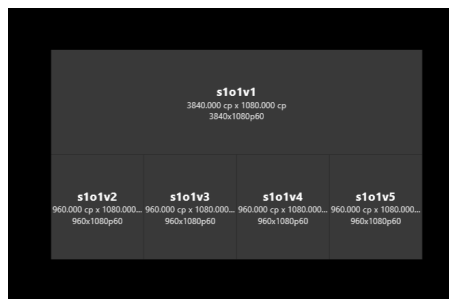
Using the output mapper, enter the mapping information to match the resolution and shape of the dvLED set-up. Here, the centre part of the wall is 3840 pixels wide x 1080 pixels high, and each side screen is 960 pixels wide x 1080 pixels high. In this example, the side screens have been mapped as two separate sections which will be stacked when added to the canvas.



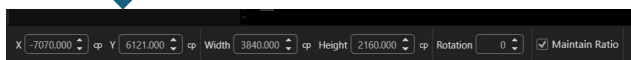
### Output mapper (5x mapped areas)



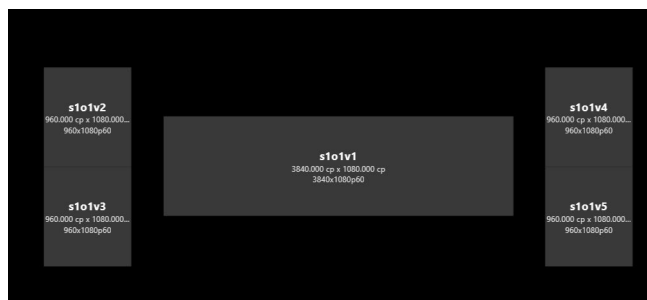
### Apply and add the virtual outputs to the canvas



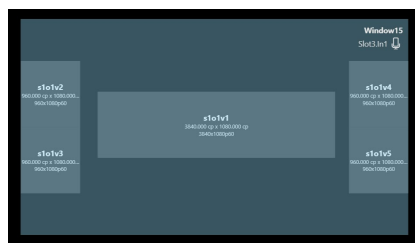
Drag and drop or enter the exact position of each output on the canvas. The position of any canvas item is shown, and can be adjusted when you set it in the bottom left side of the editor



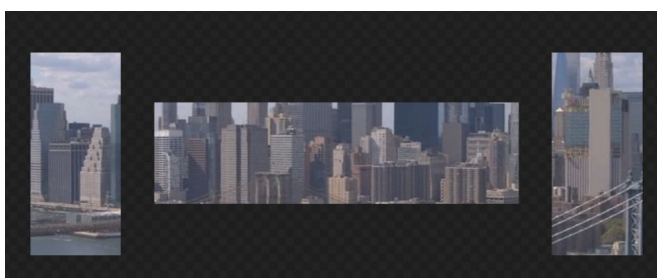
### The virtual outputs are rearranged on the canvas to match real world



### Add a source window and position it to cover the whole wall

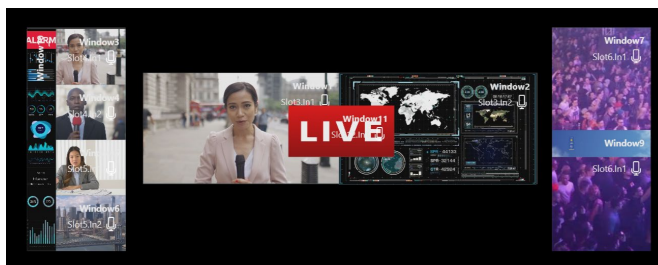


### Real world dvLED walls with single content across all outputs



A more complicated set up with windows displaying different live sources

### Canvas view





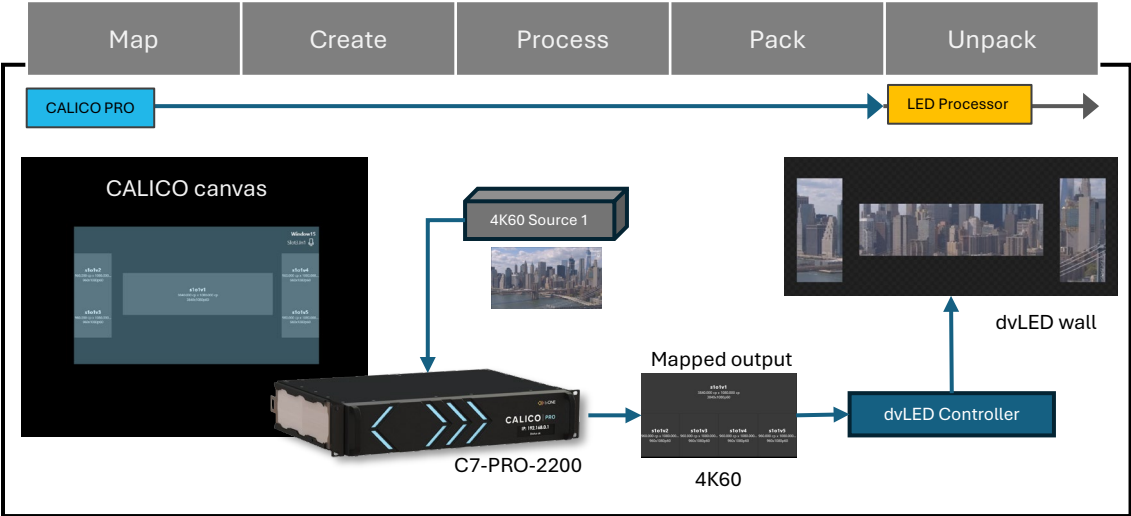
Output mapper re-packages the output and sends to the dvLED controller. The LED controller unpacks the maps again and sends each pixel to the correct place on the walls.



Mapped output

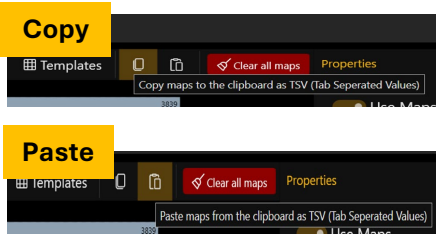


Workflow



Importing and exporting maps

Maps created with output mapper can be exported to a TSV (Tab-separated values) file. This can be used by the installer to map the dvLED controller correctly, or you can use the maps in CALICO PRO to copy mapping co-ordinates from one out to another. You can load a TSV file to configure the output mapper by copying the table from excel, You can paste this to create the maps by using the paste button in the output mapper. This is very useful if you are building an LED perimeter ribbon for example.

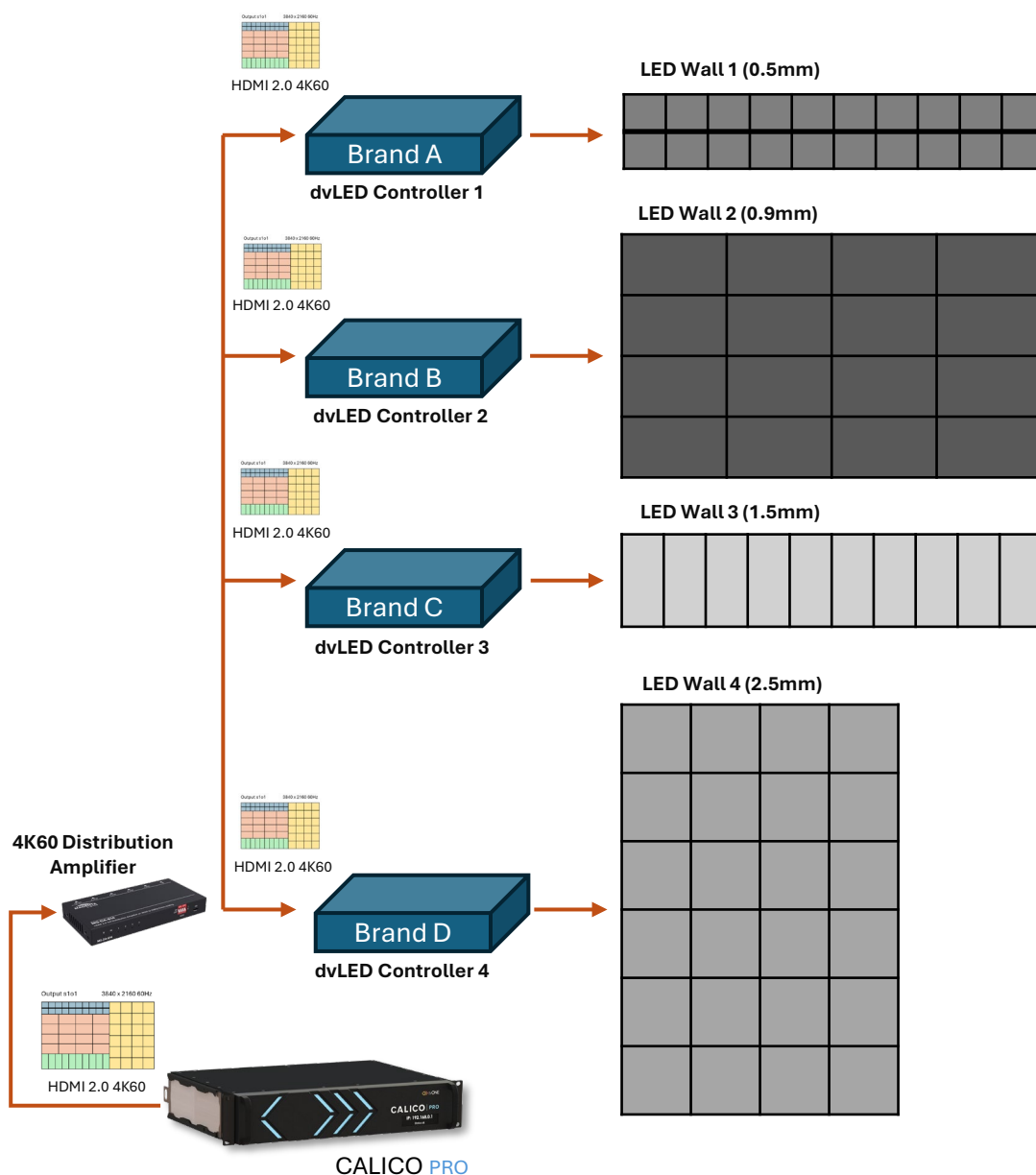


#	Color	Alias	X	Y	Width	Height
1	0x8EA1B2	s1o1v1	0	0	3840	1080
2	0x8EB2AB	s1o1v2	0	1080	960	1080
3	0xB2988E	s1o1v3	960	1080	960	1080
4	0x938EB2	s1o1v4	1920	1080	960	1080
5	0xB2AC8E	s1o1v5	2880	1080	960	1080

## Connecting multiple dvLED controllers



A single mapped output can also be used by several dvLED controllers, even if they are assorted brands and connected to different pixel pitches of dvLED. In this case a single 4K60 output map from CALICO PRO can be copied multiple times by using a suitable distribution amplifier (DA), and then connected to each dvLED controller. If the controllers are mapped correctly, they will only use the part of a map that is relevant to them. CALICO PRO, by using its real-world canvases can deliver content across this whole environment, ignoring the fact that these controllers and walls are all different. CALICO PRO can control every pixel in an installation, regardless of how many types of displays, Projectors or dvLED controllers are used.



## Canvas Watch



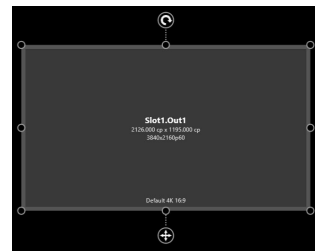
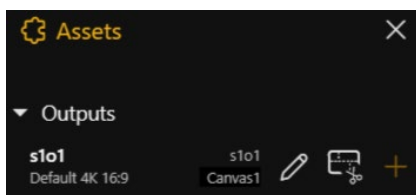
Canvas watch is a feature that allows a special type of output that “watches” and area of a canvas that you have chosen.

- This could be an entire video wall set up or even the whole canvas if needed.
- Any available output including mapped outputs can be used as canvas watchers.
- Canvas watch can be used for monitoring purposes, as a multiviewer or for program and preview use.

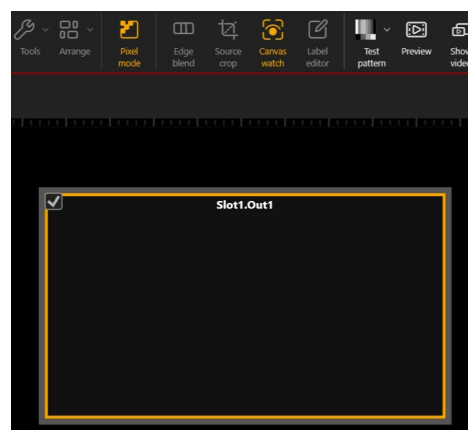
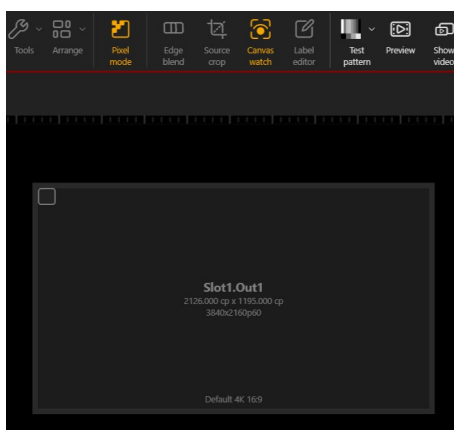
ANY and/or ALL available outputs, including mapped outputs can be used as canvas watchers.

### Set up an output to use as a canvas watcher

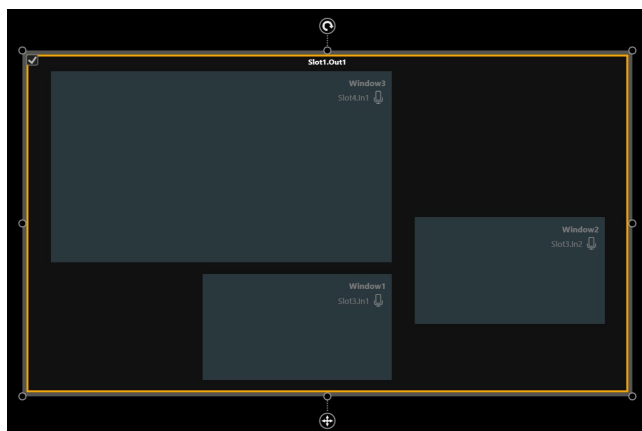
1. Open the Assets panel and choose an available output. **(You can configure it by assigning equipment to match the display you are using for monitoring).**
2. Add the output to your canvas
3. Select the display on the canvas by left clicking it



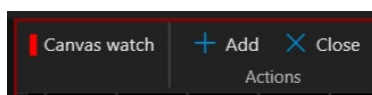
4. Select Canvas watch from the top menu ribbon
5. This will open the canvas watch editor.
6. The output will grey out and a check box will appear in the top left-hand corner **(this will happen with every output and virtual output on the canvas. You can select one or multiple outputs to be canvas watchers)**



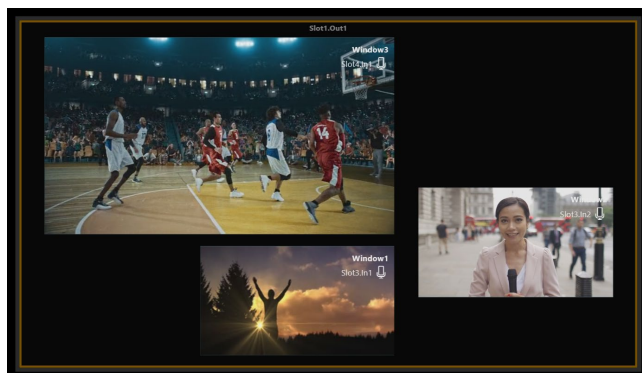
7. Tick the check box. The display will vanish, and, in its place, you will see a yellow bordered box
8. Select the box and position, scale and rotate to a canvas area that you wish to watch.



9. Select Close from the menu in the canvas watch editor when you have placed your canvas watchers in the correct positions.



10. This will exit the editor and lock the canvas watchers on the canvas to prevent accidental selection and movement.



11. You can edit the watchers by accessing the Canvas watch editor, then select the watcher you want to edit.

In off-line mode, you can preview the canvas watch by selecting the Show video button from the top menu ribbon. Pre canned video clips will then play in the windows that are visible in the canvas watch box. Each source can have its own video as shown in the example.

This view is exactly what your canvas watch display will see when the installation is all running. You can set up as many canvas watchers as you wish and have available outputs for.

## Set up an output to use as a canvas watcher for multiple areas



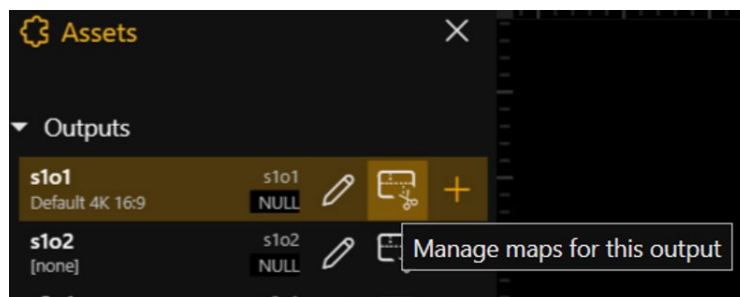
The previous example showed how a canvas watcher can be set up to watch an area of the canvas, but what if you want to monitor several areas across the same, or even all 4 canvases?

Combining **Canvas watch** with **Output mapper**, can solve this dilemma

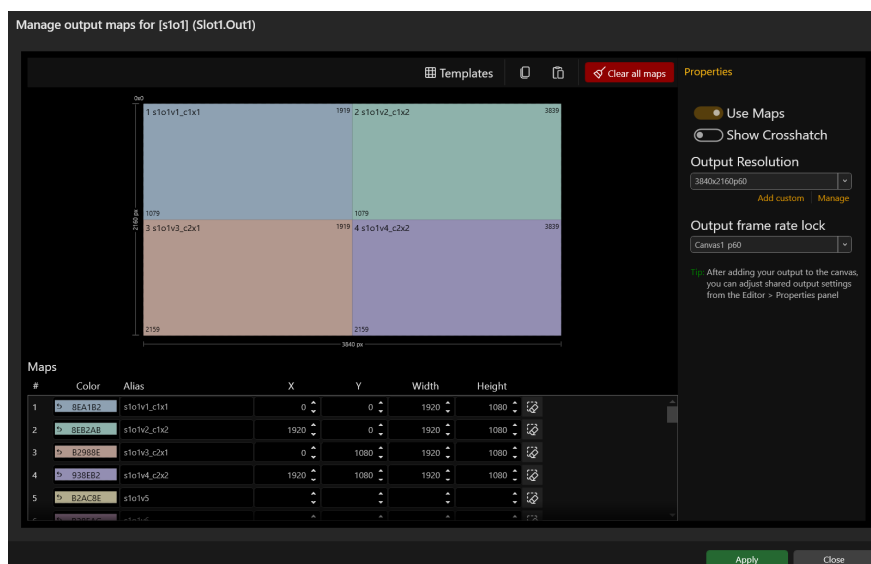
For example, using the output mapping feature, map a 4K output into four 1080p quads. This will give you four separate canvas watch virtual outputs (1920 x 1080), that can be used on any canvas and at any scale or position. These virtual outputs are then re-packaged and delivered to a connected display at a supported resolution.

One 4K display could then be used to monitor or watch four different areas of your set up in a quad split screen all in 1080p. Monitor 4 different scenarios, even split between all four different canvases. Up to 32 mapped sections can be used for a single output.

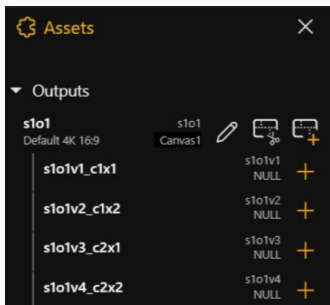
1. Follow the steps to add a canvas watcher as in the previous example, but instead of adding a whole output to the canvas, first access its output mapper.



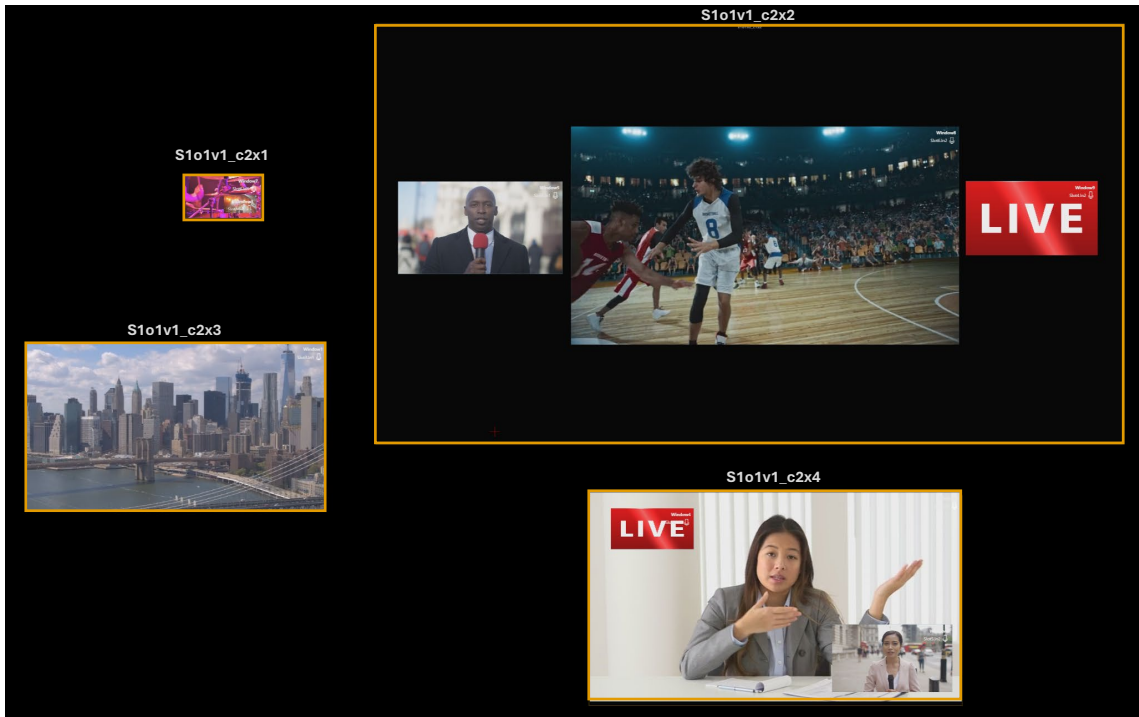
2. The 4K output is mapped into four 1080p virtual outputs



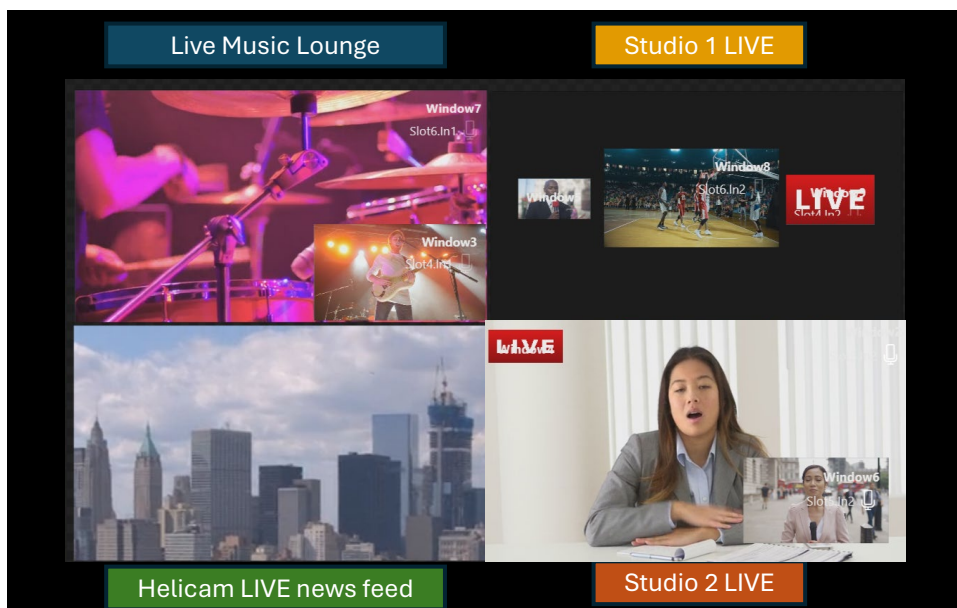
3. There are now four virtual displays that can be used as canvas watchers. You can map up to 32 times for a single output



3. All 4 canvas watchers looking at different views in a broadcast Studio



4. Canvas watch monitor




## Source crop



Any source connected to CALICO PRO can be cropped to Provide a live source for a video window. This is useful when you need to display only a section of a live input, for example the news feed of your live web page, or a ticker. Multiple crops can be taken from the same source (up to 256), which can then be used as you wish on any canvas. Crops can also be “nested”, overlap each other. Once a crop is used as a source for a video window, it can be scaled and rotated as desired and used in transitions during presets.

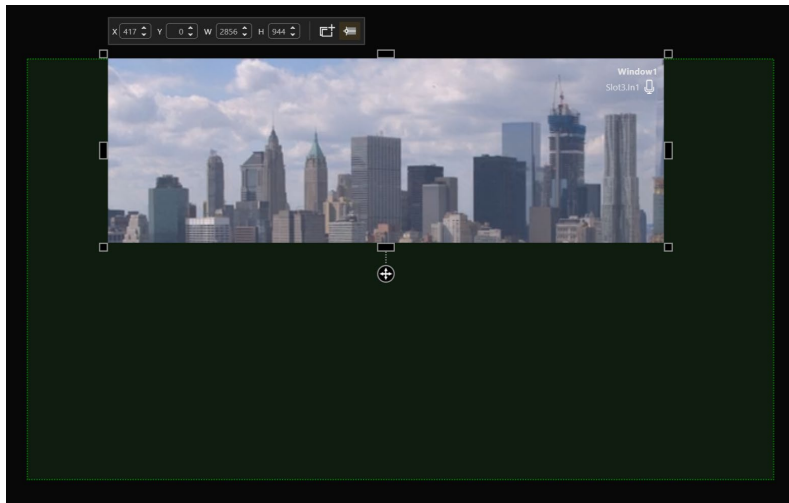
### How to use the source crop feature

1. Go to the **Assets** panel and scroll down to **Sources**.
2. Select the source to be cropped by adding a video window using the  button
3. Click on the window on the canvas to highlight it, then go to the top menu ribbon and select the **Source crop** feature
4. The window will now have grab handles at each corner and in the middle of each side. There is also a manual input for x and y coordinates and resolution of the crop.

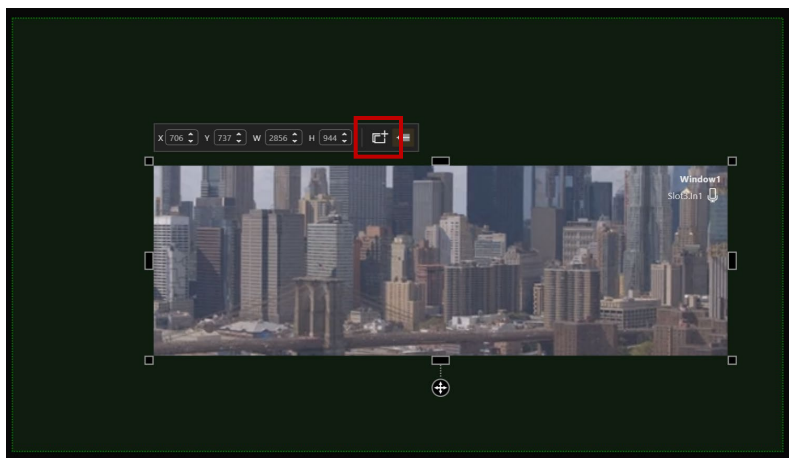


The view shown here is offline using the Show video feature to play the video image in the window. If you are connected to a CALICO PRO, you will not see this view. In that case you will just see a blue window for the crop and the same green shaded window for the source. To see a real image when connected to a system, you need to use an output connected to a display. You can then view the crop live.

5. Use either the grab handles, to quickly crop a section or input the crop values directly for more accuracy. The original source will appear as a green box and the area that will be cropped out will be highlighted.



6. Once the size of the crop is selected, it can be moved around by dragging and dropping to find the correct position. Use the mouse or keyboard arrows for finer positioning or enter the correct numbers for x and y.



7. If only a single crop is needed at this point, close the Input crop tool and the window will be cropped and can now be used as you wish. A cropped copy has been created leaving the original source intact.
8. With multiple crops from the same source, instead of using the close button, use the add window button to copy the crop to another window then move, resize that window to make a new crop. Repeat this as often as needed up to the maximum of 256 (depending on available resources)





10. Crops can be separately named and labelled (except source labels), but as multiple crops could be from the same source they do not have individual source Id's and therefore cannot be switched to another source or other crop.
11. You can easily edit a crop by selecting it on the canvas, then clicking on the **Source crop** button in the menu ribbon. This will take you back to the original source window (green box) and you can freely edit the crop as needed. Select close to apply the new crop values. This will only affect the crop you selected and not any others that might be from the same source.
12. Cropping a source is also useful to crop mosaic content to use it separately in an installation. This is useful if you have many smaller resolutions or odd resolution content. To save on inputs and playback devices, the contents can be packed in to a single HD or 4K input. CALICO PRO can then crop each piece of the content as a separate video window, which can then be used wherever it is needed.

The below shows an example of “mosaic” content. This single 4K video is eight different pieces of content that have been stitched together. CALICO PRO can unstitch it using its cropping tool. The result will be eight different windows that can be used how you like.



## Using the source crop feature off-line



It is possible to use the crop tool to crop pre-loaded content stored within CALICO Studio.

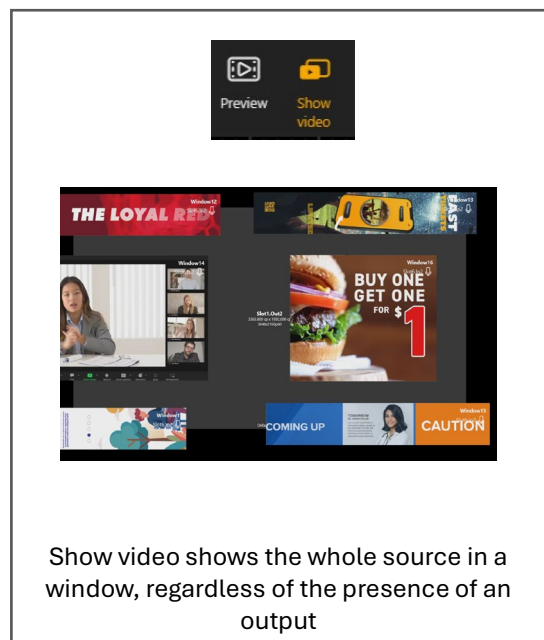
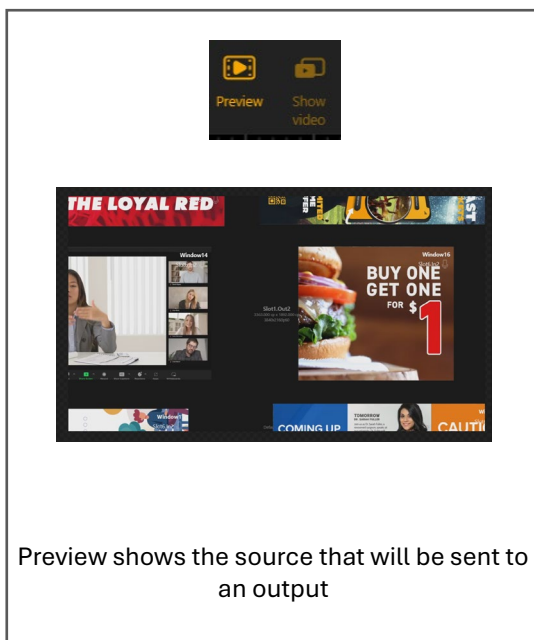
In the off-line mode, windows are automatically given a dummy source (looped video) so that previews can be viewed. This can be changed to a different video to provide a contrast between different sources.

The video can be changed by selecting the window you want to change, then go to the **Properties** for that window, found on the right-hand side panel. Scroll down to **Input settings (shared)**, then find **Preview video**. You can then select a suitable video from the list. Any window added from the same source will now have the same preview video.

In **Preview** mode though only windows that are over an output on the canvas would be displayed. When cropping, it is essential to be able to see the whole of the video in the window, so that it can be cropped. A feature has been added to help with this called **Show video**. This feature can be found next to the Preview button on the top menu ribbon.

Once this feature is activated you will see the pre-loaded video content playing in all the windows visible on the canvas.

Select a window that you want to source crop, then select **Source crop** from the top menu ribbon. The steps to crop the source content are now the same as if the source was a live one.



## Labelling



CALICO PRO can create four distinct types of labels, which can be used for many applications. Any window, display or layout can have multiple labels **Parented** to it.

- **Text labels** – create a text label and change its font, font Color and background Color, as well as being able to add a border
- **Source labels** – apply a text label that changes to reflect the selected source
- **Image labels** – use an image from the on-board image store and apply as a label. This could also be a background for a video window (up to 4096 x 2160 resolution)
- **Live sources as labels** – this is usually a crop of a source and is applied as a label to fix its position, move and scale it with an item its parented to.
- Labels can be rotated, scaled and parented to any other canvas item such as a video window, window crop, outputs, including mapped outputs and canvas layouts.

Multiple text, image and live source labels can be used together, but only one source label can be used for each source.

Labels can be keyed by using the luminance keying feature.

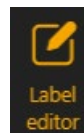
Labels can also fade to black or have transparency applied, in the same way as video windows.

Labels can be created and saved to the image store to be used later or can be created and used at once.

## Label editor

The label editor is used to apply, create and add labels. Labels can only be added to the canvas when you are in the label editor.

In the canvas **Editor** go to the top menu bar and click **Label editor**.



Any labels created here will be added to the internal storage and will appear on the assets list.

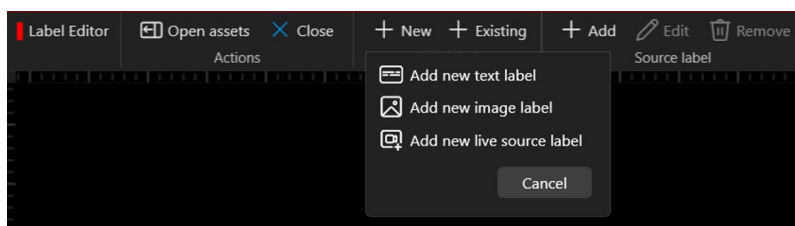


CALICO PRO has an internal storage area which is 3GB (three giga-bytes) in size. This is where any labels, background images etc. are stored. When you first configure a system, this store will likely be empty.

When you create any labels, they appear in this store and can be accessed and applied to a configuration.

Images uploaded to the store will not appear in the labels list unless you have used them to create a label

In the label editor, the following menu is displayed



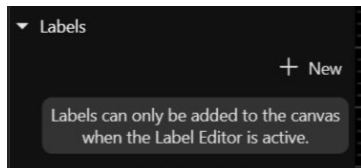
Click on the **+ New button** to create a label. If a source label is required, click on the **+ Add** button in the source label section of the menu. Only one source label can be added per source, but multiple text, image and live source labels can be added together.

Image labels can be added from here, as long as:

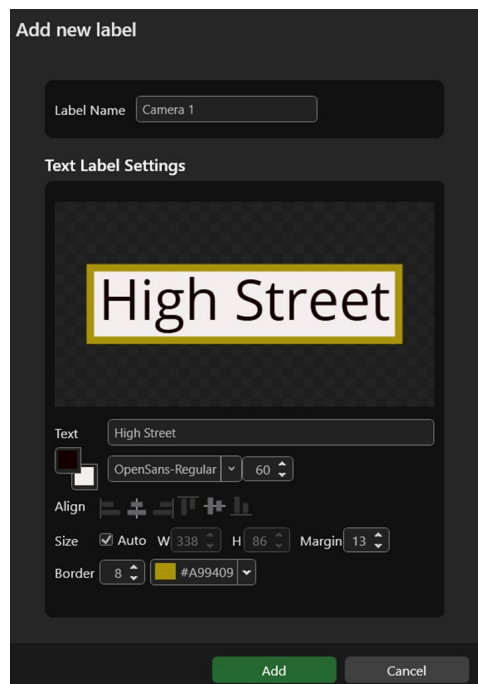
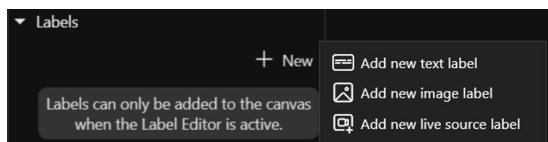
- Suitable images have been uploaded to use as labels
- You upload a suitable image when prompted during the label creation process

## Use the assets panel and create a label

Labels created here will be saved to CALICO PRO and can then be applied and used when needed



Click on the **+ New** button to create and add a new label.



## Creating text labels



These are fixed text labels and can be used as on-screen visual elements, or as off-screen elements to be used in canvas watch.

When creating a text label, the following settings can be used:

**Label name** – How the label appears in the storage area list

**Label text** – what the label will say

**Text and background colour** – Change the colour of the label text and its background

**Font** – Apply a stored font to the label

**Size** – Font size of the text

**Alignment** – positioning of the text within its box

**Auto** – This auto sizes the text box to fit the text typed in. Uncheck this to fix the text box to a specific size

**Size** – Physical dimensions of the text box. Only available if auto is unchecked

**Margin** – Padding area between the text and the inside of the text box

**Border** – Will the text box have a border, how much weight does it have and what colour will it be



After creating the label click **Add** to apply it to the canvas and add it to the internal storage.

## Label properties

Clicking on any label on the canvas will access its **Properties**. This will open on the right-hand side of the editor. You can also double click on the label in the **Items** list.

There are several additional label settings that can be changed as label properties.

The settings that can be changed here are:

**Parent** – Set a parent element for the label or change its current parent.

**Edit Label** – Returns to the label editor for this label.

**Reset label size** – Returns the label to the size it was when it was created.

**Appearance Fade** – Set the brightness of the label or make it transparent if the keyer is active

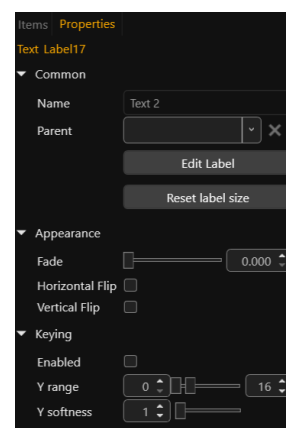
**Horizontal flip** – Flip the label horizontally 180 degrees.

**Vertical flip** – Flip the label vertically 180 degrees

**Keying enabled** – switch the keyer on or off for this label

**Y range** – Sets the luminance range that will be keyed out.

**Y softness** – Anti-aliasing



## Creating image labels



These are fixed image labels and can be used as on-screen visual elements such as background images and keys, or as off-screen elements to be used in canvas watch, for example warning symbols.

When creating an image label, the following settings can be used:

**Label name** – Name used to identify a label in the assets list.

**Image** – Dropdown to access images stored on the device or upload new images

**Border** – Does the image have a border and if so, what is its weight and color.

## Creating live source labels

These are source windows that are parented to another source window. The benefit of them being created as a label is that they can move, scale, transition with their parent window. This feature is especially good for tickers and live crops from sources such as a PC showing a company website for example. Maybe a scrolling product or news feed from a website. Maybe an on-screen scoreboard or news feed.

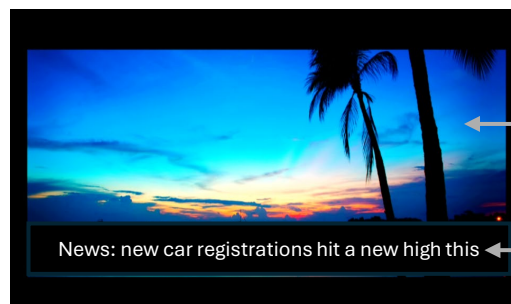
When creating a live source label, the following settings can be used:

**Label name** – Name used to identify a label in the assets list.

**Source** – Which source will be used for the label

**Crop** – Crop out a section of a live source to use as a label

**Border** - Does the live source have a border and if so, what is its weight and color.



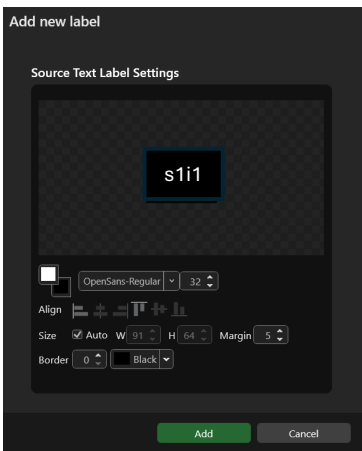
Main content

live source label

## Creating source text labels



These are text labels that will change to show a source alias name when source of a window is changed. The default is the input slot number, but this can be changed to a more practical name by clicking on **Settings** then **Slot status**.

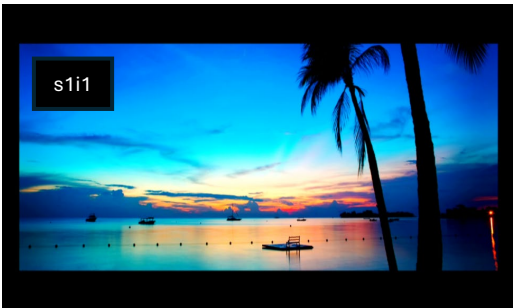


Input Slots	
Slot	Name
Slot3.In1	s3i1
Slot3.In2	s3i2
Slot4.In1	s4i1
Slot4.In2	s4i2
Slot5.In1	s5i1
Slot5.In2	s5i2
Slot6.In1	s6i1
Slot6.In2	s6i2

Output Slots	
Slot	Name
Slot1.Out1	s1o1
Slot1.Out2	s1o2
Slot2.Out1	s2o1
Slot2.Out2	s2o2

The source text label is like a regular text label in the way it is set up. The difference being that this label is dynamic.



If the label editor is used to edit an already used label CALICO Studio will show a warning message. If the label has already been used, then all copies of that label will also be changed.

## Internal Image and label Store

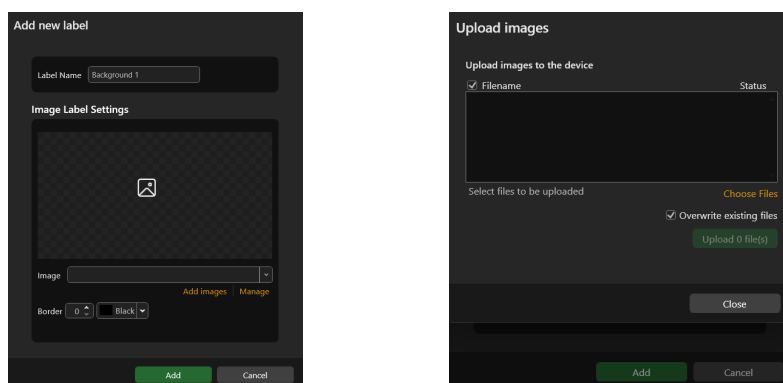


CALICO PRO has 3GB of memory available to store images, backgrounds and labels. Images can be uploaded to CALICO PRO remotely using CALICO Studio, using the labelling feature. Created text labels are also stored here.

Access to the images and labels stored here is via the assets panel or the label editor. When uploading files to CALICO PRO, CALICO Studio sets up a secure FTP connection.

### How do you upload images into CALICO?

Access the label editor or assets panel and add a new image label. Under the **Image** dropdown field locate the two links **Add images** and **Manage**



**Manage** is used to access the on-board storage file browser and delete any images that are no longer used and take up space on the drive.

1. To add images to the internal storage drive, click on **Add images**
2. In the **Upload** images window, click **Choose files**. This will take you the file explorer of your PC.
3. Search for the files you want to upload. The selected files will appear in the list of images.
4. Choose the files to upload from the list by clicking on the file's checkbox
5. Choose to tick check box if you want to automatically **Overwrite existing files** with the same filename
6. After selecting all the files to upload, press the Upload files (green) button. The files will now be transferred to CALICO PRO.
7. The admin password will need to be typed in again before the files can be uploaded.



# Settings



You can manage device settings, network settings, and user settings. You can also get information about your CALICO PRO and name your modules.

## Device settings

Administrators can configure settings for your CALICO PRO, including creating and changing its name, changing the measurement units you use to create video walls, backing up and restoring your configuration, and resetting the CALICO PRO to its factory default settings.

## Naming your CALICO PRO

You can give your CALICO PRO a unique name.

## Why should I name my CALICO PRO?

If you have more than one CALICO PRO unit on your network, giving each unit a unique name can make it easier to find and log in to that unit quickly.

## To name your CALICO PRO

1. Select **Settings** then **General**
2. Enter a name for your CALICO PRO in the **Device name** box.
3. Select **Save**

The screenshot shows a dark-themed interface. At the top, the word "General" is displayed in a large, bold, white font. Below this, there is a section labeled "Device Name" in a smaller white font. To the right of the label is a light gray rectangular input box containing the text "MyCALICO" in a dark gray font.

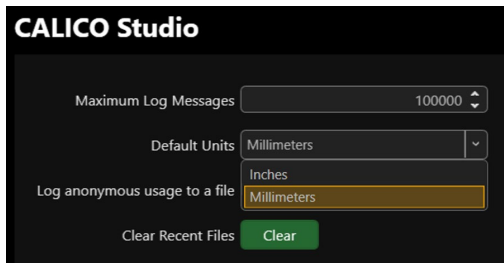


## Choosing your working units

You can choose to work in inches or millimeters when you build video installations in CALICO Studio

### To choose a unit

1. Select **Settings** then **CALICO Studio**.
2. From **Default units**, choose your preferred units



## Customizing the front panel of your CALICO PRO

You can choose what information appears on the screen on the front panel of your CALICO PRO.

1. Select **Settings** then **Front panel** then **Settings**
2. Select save to rescue the options you want to customize the front panel and display.
3. Select **Save front panel settings**

## Backing up and restoring your settings

You can save your settings to a file on your CALICO PRO, or to a file on your computer. You can restore your settings from either file. You can share a file saved on a computer between several CALICO PRO units that have the same configuration of modules.

### Backing up your settings and what is saved on your CALICO PRO

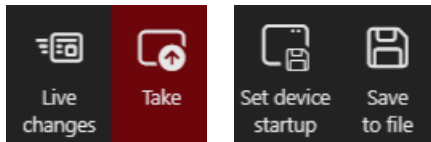
All settings are saved to a backup file on your CALICO PRO, including:

- Presets
- Configuration, including custom names
- Canvases
- The play queue of a media module
- Network settings
- Manually added streams

## What is not saved on your CALICO PRO



Any work that you have not saved to the device, with **Take** and **Set device startup**, will not be saved to the CALICO PRO backup file.



It is recommended you save your configuration to a file to keep a backup on your computer.

## To back up your settings on your CALICO PRO

1. Check that you have saved all your work.
2. Select **Settings** then **Backup and Restore** then **Backup to SD Card**

**Note:** The SD Card is inside CALICO PRO and is not removable or accessible.

## Restoring your settings from your CALICO PRO

1. Select **Settings** then **Backup and Restore**
2. Select **Restore to SD Card**

## Backing up your settings to a file on your computer Settings that are saved on your computer

Most settings are saved to a backup file on your computer, including:

- Presets
- Configuration, including custom names
- Canvases n Network settings
- Manually added streams
- Custom resolutions

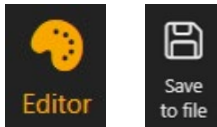
## What is not saved to your computer

The play queue and playlists of any fitted media modules are not saved to your computer.

## To back up your settings to a file on your computer

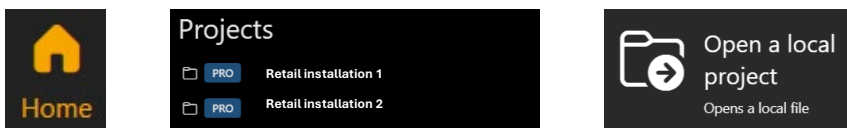


1. Select **Editor** then **Save to file**
2. Choose a location for the file and then save to your computer.



## Restoring or copying settings from a file on your computer

1. Connect to the CALICO PRO that you want to update with saved settings
2. Select **Home**
3. If the saved file appears in the **Projects** list, it can be loaded from there. If it is not, then select **Open a local project** to locate the file
4. Load the configuration file into CALICO Studio



## Problems sharing settings between CALICO PRO units

You can't share saved settings between devices with different configurations of modules.

You might not be able to copy settings from one CALICO PRO to another if they have very different firmware versions, or you might lose some data in the process.

## Resetting your CALICO PRO to factory default settings

### Why restore factory default settings?

If your CALICO PRO has become unstable, you have repeated errors that you cannot fix, or you need to remove all settings and presets, you can reset your CALICO PRO to its factory default settings.



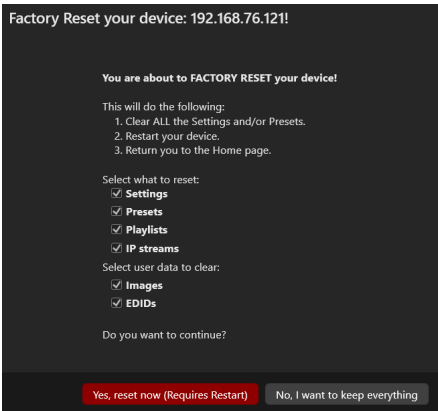
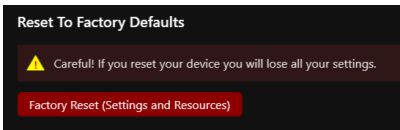
When you reset your CALICO PRO to factory default settings, all your settings and configurations are deleted.

Before you reset your CALICO PRO, you might want to back up your configuration. When you set up your CALICO PRO, you can restore your configuration.

To reset your CALICO PRO to factory default settings



- 1. Select **Settings** then **General**
- 2. Under **Reset to factory defaults** select **Factory reset (Settings and Resources)**
- 3. You can choose what is reset and what will be kept.



User settings

Administrators can create and edit users, change user roles, and enable specific timeout times. Users and power users can change their own passwords.

Creating and editing users

You can create and edit users, change user roles, and enable specific timeout times. You can have up to four additional users.

Who can do this?

Administrators can do this

User roles

CALICO Studio has three types of user. These are **Administrator**, **Power user** and **User**.

Permissions	Users	Power Users	Administrators
Use the dashboard inc. loading presets and using audio controls	✓	✓	✓
Send configurations to CALICO PRO		✓	✓
Create offline configurations		✓	✓
Save and load configurations		✓	✓
Set window and output properties including disabling audio		✓	✓
Create and edit video installations		✓	✓
Create and edit presets		✓	✓
Use the console			✓
Change settings, including creating and editing other users			✓
Set up a new CALICO PRO			✓

## To create a new user, or edit an existing user



1. Select **Settings** then **Users**
2. Choose an empty user slot **User 1 - 4**
3. Create a **username**, **password**, **user role** and decide if the auto logout (**timeout**) is enabled and what the time will be.
4. Select **Save** to create the new user or **Cancel** to exit without saving.

User 1

Username: user1

User Role: PowerUser

New Password:

Confirm Password:

☒ Enable timeout

5 minutes

Save Cancel

### Note:

**Usernames** must start with a letter, and can contain only letters, numbers and underscores

**Passwords** must be between 5 and 32 characters. They can contain any number of alphanumeric characters and symbols but cannot contain spaces.

Auto logout (**timeout**) can be set from 1 to 546 minutes



tvONE recommends a timeout of between 1 and 5 minutes

## Changing other user's passwords

### Who can do this?

Only **administrators** can make changes to other user's passwords.

1. Select **Settings** then **Users**
2. Find the user whose password you wish to change and enter and confirm the new password
3. Refer to Passwords shown in the **Note** above explaining the password creation rules.

## Changing your own password

### Who can do this?

**Administrators, Power users and users** can make changes to their own password.

1. Select **Settings** then **Users**
2. Find your user detail and enter and confirm the new password
3. Refer to Passwords shown in the **Note** above explaining the password creation rules.



By default, a connection to CALICO PRO must stay active, or it is disconnected after 5 minutes. You can change this by setting a longer timeout for a user or disabling timeout for that user. CALICO Studio will only allow one connection to CALICO PRO at a time, so a user with a long or no timeout setting could block other users from connecting at all. To fix this, use the REST API with WebSocket events to allow other control systems to connect in parallel. The API is available from <https://api.tvone.com/>

## Network settings



Administrators can configure network settings for CALICO PRO units and any installed media modules.

## Configuring network settings for your CALICO PRO

You can choose a DHCP or static IP address and configure your static IP settings

### Before you start

If you want to use a static IP address, you need some information about the range of available IP addresses on your network. Your network administrator should be able to help you.



If a static IP address is used, it must be set to unique value on your network. Using the same IP address on more than one device will cause network issues such as disconnections.

### To configure network settings for your CALICO PRO

1. In CALICO Studio, select **Settings** then **Networking**
2. Choose an IP **Configuration**
3. If you choose **DHCP** a dynamic IP address is assigned to you by the network router. If you choose **Static** the IP address will need to be manually configured

The screenshot shows the 'Networking' settings window. At the top, 'Secure connection' is unchecked. The 'Configuration' dropdown menu is set to 'DHCP'. Below this, the 'IP Address' field shows '192.168.1.1', 'Subnet Mask' shows '255.255.255.0', 'Default Gateway' shows '192.168.1.1', and 'MAC Address' shows '00:16:9e:00:00:00'.

The screenshot shows the 'Networking' settings window. At the top, 'Secure connection' is unchecked. The 'Configuration' dropdown menu is set to 'Static'. Below this, the 'IP Address' field shows '192.168.1.1', 'Subnet Mask' shows '255.255.255.0', 'Default Gateway' shows '192.168.1.1', and 'MAC Address' shows '00:16:9e:00:00:00'.

### To configure a Static IP

1. In CALICO Studio, select **Settings** then **Networking**
2. Choose IP **Configuration** and set to **Static**
3. Enter the **IP address** and **Subnet mask**
4. If your PC and CALICO PRO are on a different network, enter a value for your **Gateway**
5. Contact your network administrator for help with these values if you need assistance


# Enabling secure mode



You can use secure mode to encrypt information you send and receive from your CALICO PRO

## About secure mode

Secure mode uses HTTPS to encrypt all communication between CALICO Studio, or another secure controller, and your CALICO PRO. HTTPS encryption uses TCP port 443.

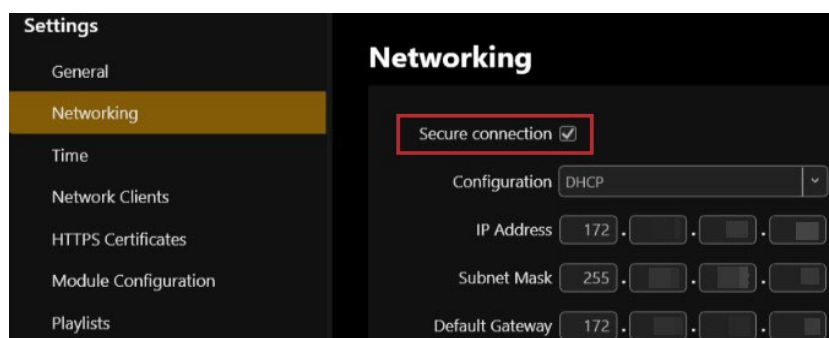
When secure mode is active, in **Home** you can see the padlock  next to the name of the CALICO PRO.



Secure mode disables unsecured connections over Ethernet. Unencrypted third-party controllers do not work over Ethernet when you use secure mode.

## Enabling secure mode

1. Select **Settings** then **Networking**
2. Select **Secure connection**
3. Select **Save** and **Yes**. CALICO PRO will restart
4. When CALICO PRO restarts, **login**





## Configuring network settings for media modules



1. If you want to stream media over your network, or from the internet, configure the network settings for your media module.
2. If you only want to use your media module to play media from a USB drive, you don't need to configure network settings.

### About static IP addresses

If you want to use a static IP address, you need some information about the range of available IP addresses on your network. Your network administrator should be able to help you.



If a static IP address is used, it must be set to unique value on your network. Using the same IP address on more than one device will cause network issues such as disconnections.

### To configure network settings for media modules

1. In CALICO Studio select **Settings** then **Module configuration**
2. Locate the media module that you want to set up (**slots 11 and/or 12**)
3. Select the three dots in the top right of the module ● ● ●
4. From the dropdown list, select **Configure**
5. Follow the same process as for the main unit to configure the modules network properties.



- If you want to decode IP streams from an internet server, you must set a value for your gateway.
- If you want to refer to a source by name you must set a value for DNS

## Playlist settings

If you have a media module installed, you can view the status of your playlists, delete all playlists or individual playlists, move playlists between modules, and rename playlists.

### Renaming playlists and moving playlists between modules

1. Go to **Settings** then **Playlists**



The media module has two operating modes, each with separate playlists. These playlists are not compatible with each other and won't be visible when set into the other mode.

## Renaming playlists



1. In CALICO Studio select **Settings** then **Playlists**
2. Locate the playlist you want to rename and enter a new **Name**

Number	Name	Module	Resolution	
1	<input type="text" value="Playlist1"/>	Slot 11 ▾	1920x1080p60	<button>Remove</button>
2	<input type="text" value="Playlist2"/>	Slot 12 ▾	1920x1080p60	<button>Remove</button>
3	<input type="text" value="Playlist3"/>	Slot1 ▾	1920x1080p60	<button>Remove</button>

## Moving playlists

1. In CALICO Studio select **Settings** then **Playlists**
2. Locate the playlist you want to move and select a new module from the dropdown list

Number	Name	Module	Resolution	
1	<input type="text" value="Playlist1"/>	Slot 11 ▾	1920x1080p60	<button>Remove</button>
2	<input type="text" value="Playlist2"/>	<input type="text" value="Slot 12"/> ▾	1920x1080p60	<button>Remove</button>
3	<input type="text" value="Playlist3"/>	Slot1 ▾	1920x1080p60	<button>Remove</button>

## Deleting individual playlists

1. In CALICO Studio select **Settings** then **Playlists**
2. Locate the playlist you want to delete and select **Remove**

Number	Name	Module	Resolution	
1	<input type="text" value="Playlist1"/>	Slot 11 ▾	1920x1080p60	<button>Remove</button>
2	<input type="text" value="Playlist2"/>	Slot 12 ▾	1920x1080p60	<button>Remove</button>
3	<input type="text" value="Playlist3"/>	Slot1 ▾	1920x1080p60	<button>Remove</button>

## Deleting all playlists

1. In CALICO Studio select **Settings** then **Playlists**
2. Select **Remove all saved playlists**

### Playlists

Total

Used

Available

Remove all saved playlists

## Managing encoders and streams

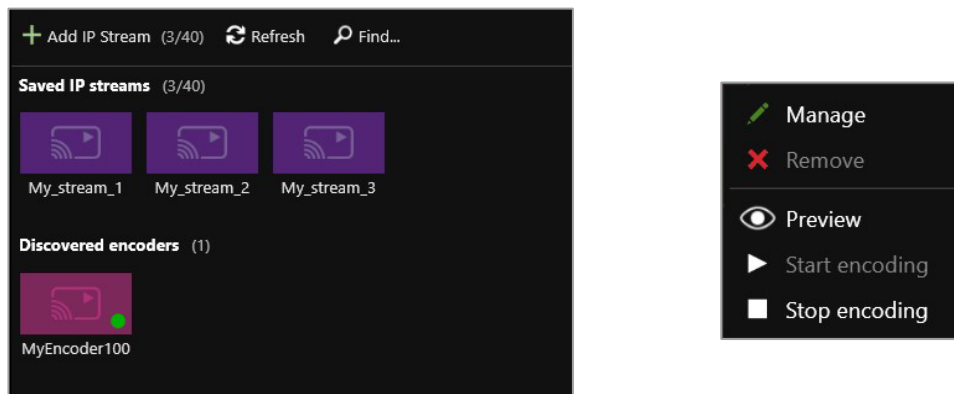


You can view and manage all your encoders and saved streams.

Select **Settings** then **IP Streams**

### Managing your encoders

Encoders that CALICO Studio detects appear under Discovered encoders



You can:

- Refresh the list of encoders
- Search for an encoder that does not appear automatically
- Select an encoder to see details about it

Select more ● ● ● to:

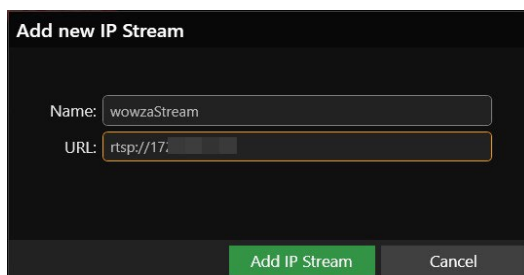
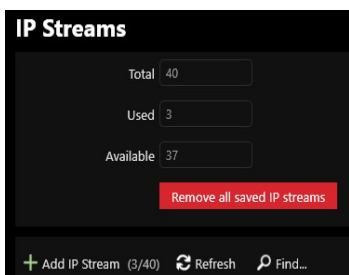
- Manage the encoder or change your configuration
- Remove an inactive encoder
- Preview the stream from an encoder
- Start or stop encoding

### Managing your saved streams

Streams that you add and save manually appear under Saved IP streams.

You can:

- See how many streams you have
- How many slots you have left
- Add new streams
- Remove all saved streams



You can edit the name and URL of saved streams

1. Select the stream then select more ● ● ● then **Edit**
2. Edit the name and URL of the media stream

## Resolution Editor

Administrators can add and remove custom resolutions in this feature for both inputs and outputs of CALICO PRO.

### What are custom resolutions

CALICO PRO has several commonly used resolutions that you can choose from for your outputs or detected from a source connected to an input.

Custom resolutions are resolutions that you can define yourself to get extra support that is not built-in to CALICO PRO already.



It's important to understand that not all custom resolutions will work with your setup because there are many factors that can influence if a resolution is usable, for example the hardware used in sources and outputs, the cables used and their length, or the requirements of the device.

### When to use custom resolutions

Create a custom resolution when:

- **Output mapper** and **Source crop** have been considered and cannot solve the problem.
- The resolution your source or display requires is not one of the built-in resolutions.



tvONE recommends that custom resolutions are only used as a last resort, as they can be unstable, even if they worked when you set it up. Use the mapping tools in CALICO PRO where possible.

# Creating and editing custom resolutions

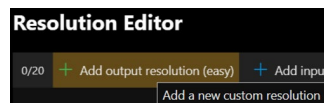


## Add a custom resolution to use with outputs

To keep video synchronized in CALICO PRO, all outputs on the same canvas must have the same frame rate, for example all displays are showing video at 60 Hz.

We've created a custom resolution algorithm that maximizes the likelihood that the resolution will work in your setup.

1. In CALICO Studio select **Settings** then **Resolution editor**
2. Select **+ Add output resolution (easy)** to show the dialog
3. Enter the resolution you need and the frame rate
4. Click **Add new resolution** to save it in CALICO PRO



Entering a resolution that is not supported will show an error

Entering a resolution that the algorithm is happy with (remember that it's not guaranteed to work with your setup).



We will search the CEA-861-F (Consumer Electronics Association) resolution list for matches and if found you can add this instead of creating a new custom resolution

## Add a custom resolution with the advanced options



Sometimes you might already know the resolution timing values from the manual or specification sheets of the connected devices. These could be specific to the device, or from an existing standard.



If you are creating a custom resolution for an output, use the **+ Add output resolution (easy)** dialog

1. In CALICO Studio select **Settings** then **Resolution editor**
2. Select **+ Add output resolution (advanced)** to show the dialog
3. Enter the timing method you want to use to add this resolution
4. Enter the required values
5. Click **Add new resolution** to save it in CALICO PRO



Resolutions and timings outside of the allowable range for the hardware will result in warning messages and the resolution will not be created

- **Manual** - Allows you enter the values directly. The blue boxes are linked depending on the total values, so changing one will update the other two.
- **CALICO PRO output resolution generator (tvONE)** - Enter the values to create a custom resolution for your outputs that is compatible with the requirements of the system outputs.
- **CVT v1.2 Standard (VESA Coordinated Video Timing)** - This method uses the CVT formula to create a resolution which are best for analog devices.
- **CVT v1.2 Reduced Blanking (VESA Coordinated Video Timing)** - This method uses the CVT Reduced Blanking formula to create a resolution which are best for analog devices.
- **DMT 1.0r11 (VESA Display Monitor Timing)** - Select from the list of DMT resolutions which are best for analog devices.
- **CEA-861-F (Consumer Electronics Association)** - Select from the list of CEA resolutions which are best for digital devices.










For interlaced resolutions the vertical sync pulse, and front and back porches must be twice the even field. CALICO PRO output resolution generator (tvONE) uses the same method as + **Add output resolution (easy)**, but will not search the existing resolutions, or the CEA list for matching resolutions. Resolutions that are in use and then deleted will be set back to their assigned equipment's default resolution. You may have to adjust them manually from the Editor.




## Edit a custom resolution for outputs







You might just want to make a tweak to resolution instead of deleting and create it again

1. In CALICO Studio select **Settings** then **Resolution editor**
2. Find the resolution you want to edit then select the (green)  dialog
3. Make the edits in the resolution editor then select **Update resolution**


Resolution Editor							
2/20		+ Add output resolution (easy)		+ Add input or output resolution (advanced)		Show all resolutions	
#	IO	Name	Width	Height	Frequency	Pixel Clock	In Use Actions
1000	IO	160x32p60hwb	160	32	60.000	148.500	  
1001	IO	1250x1300p60hwb	1250	1300	60.000	148.500	  







## Edit a custom resolution with the advanced options

1. In CALICO Studio select **Settings** then **Resolution editor**
2. Find the resolution you want to edit then select the (blue)  dialog
3. Make the edits in the resolution editor then select **Update resolution**

Resolution Editor							
2/20		+ Add output resolution (easy)		+ Add input or output resolution (advanced)		Show all resolutions	
#	IO	Name	Width	Height	Frequency	Pixel Clock	In Use Actions
1000	IO	160x32p60hwb	160	32	60.000	148.500	  
1001	IO	1250x1300p60hwb	1250	1300	60.000	148.500	  

## Delete a custom resolution

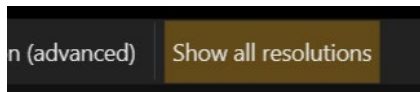
1. In CALICO Studio select **Settings** then **Resolution editor**
2. Find the resolution you want to delete then select the (bin)  dialog


Resolution Editor							
2/20		+ Add output resolution (easy)		+ Add input or output resolution (advanced)		Show all resolutions	
#	IO	Name	Width	Height	Frequency	Pixel Clock	In Use Actions
1000	IO	160x32p60hwb	160	32	60.000	148.500	  
1001	IO	1250x1300p60hwb	1250	1300	60.000	148.500	  

## Show all loaded resolutions



1. In CALICO Studio select **Settings** then **Resolution editor**
2. Select **Show all resolutions**
3. All pre-installed and added resolutions will now be shown in a list
4. You can select any resolution from the list and copy its parameters as **Detailed information**



Detailed Information		
Name:	1920x1440p60hwb	
Scan type:	Progressive	CEA ID:0
Pixel Clock:	297.000 MHz	Aspect:4:3
	Horizontal	Vertical
Total pixels:	3300	1500
Active pixels:	1920	1440
Front Porch (pixels):	1316	52
Sync Pulse (pixels):	32	4
Back Porch (pixels):	32	4
Polarity:	Positive	Positive
Frequency:	90.000 kHz	60.000 Hz
 Copy to clipboard		

## Using your CALICO PRO

### Presets

You can create and save up to 500 presets in CALICO Studio

#### What is a preset?

A preset stores information about windows and labels, including positions, transitions, and effects such as borders or rotation. You can save presets and recall them later from the dashboard.

#### What is included in a preset?

Presets store information about windows, including:

- Source playing in the window
- Position
- Z-order / stacking order
- Size
- Rotation
- Border
- Flip
- Source change transitions
- Fade





## What is not included in a preset?

- System settings
- Outputs
- Canvases other than the one you are working on

## For best results

To prevent your presets behaving unexpectedly, follow the advice below.

## Build your busiest preset first

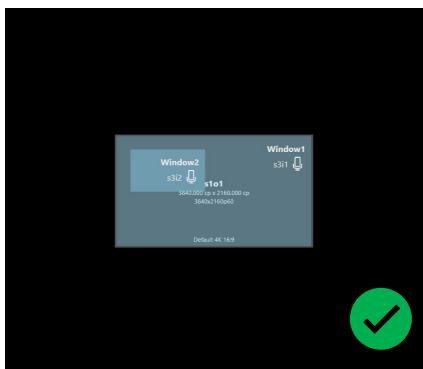
Build the preset with the highest number of windows / labels first. Include all the windows and labels you want to use in all your presets for the canvas you're working on

## Don't use presets to add and remove windows or labels

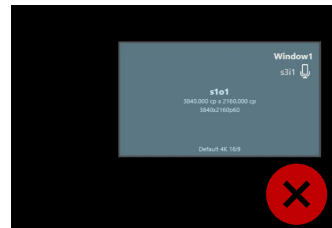
If you want to remove a window from your outputs with a preset, don't delete the window;

- Move the window away from the outputs
- Reduce the physical size of the window to minimize its footprint on the canvas
- If you do delete a window from a canvas, that window is also deleted from any presets for that canvas

Preset 1 – There are two windows



Preset 2 – window 2 was removed



Preset 2 – window 2 has been moved



## Creating a new preset with all windows on a canvas

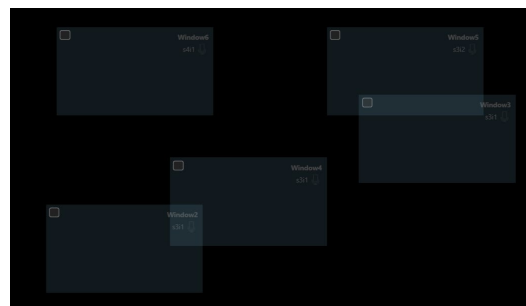
1. In **Editor**, create an installation on one canvas and then select **Show Presets** from the top menu ribbon
2. Select the preset **number** or leave this and it will automatically select the lowest available one



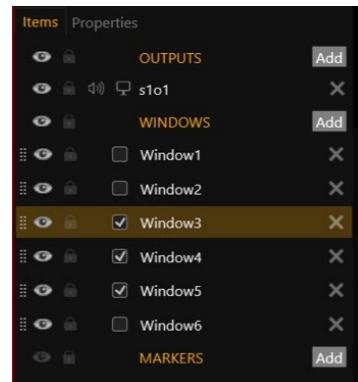
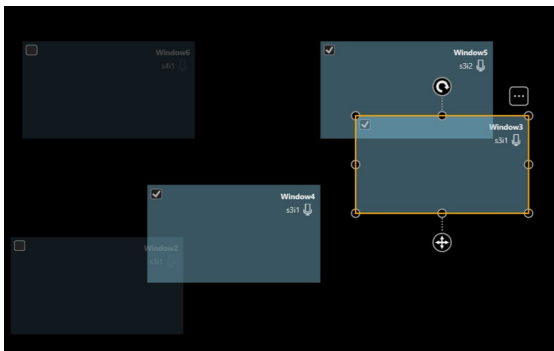
3. Enter a **Name** for your preset – names can be up to 19 characters long
4. Enter a **Duration** for your preset (maximum time is 60 seconds) – The duration is the time taken to transition the preset.
5. Select **Layout only** to create a preset that will not change any selected window sources but can move and scale the windows around – If this is unchecked then the preset will switch the window sources to the source it was set to when it was created. Leave it unchecked if you want to create a preset with a known fixed condition, for example, reset everything to a standard state before the day starts.
6. Select **Add with all windows**

## Creating a new preset and choosing which windows to include

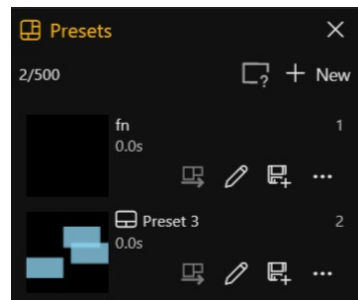
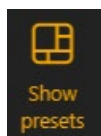
1. In **Editor**, create an installation on one canvas and then select **Show Presets** from the top menu ribbon
2. Select the preset **number** or leave this and it will automatically select the lowest available one
3. Enter a **Name** for your preset – names can be up to 19 characters long
4. Enter a **Duration** for your preset (maximum time is 60 seconds) – The duration is the time taken to transition the preset.
5. Select **Layout only** to create a preset that will not change any selected window sources but can move and scale the windows around – If this is unchecked then the preset will switch the window sources to the source it was set to when it was created. Leave it unchecked if you want to create a preset with a known fixed condition, for example, reset everything to a standard state before the day starts.
6. Select **Choose windows**



7. Check the tick box in the upper left corner of the windows that you want to include in this preset. Leave unchecked those that you do not want to be affected by this preset.
8. You can check the windows directly on the canvas or from the Items list on the right-hand side. This is the easier method as it will be difficult to select the correct windows if there are lots on the canvas, especially if they overlap.
9. Hovering over the items list will also highlight the window on the canvas.
10. When you have finished selecting the windows select **Save** to save and close the editor

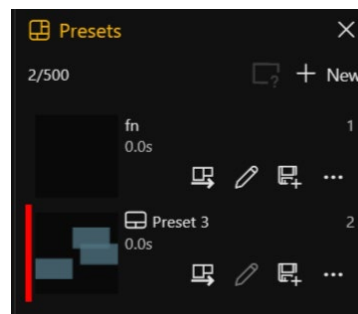


Presets that have been saved appear in the presets panel on the left side when you select **Show presets** from the top menu ribbon.



## Edit a saved preset using the preset editor

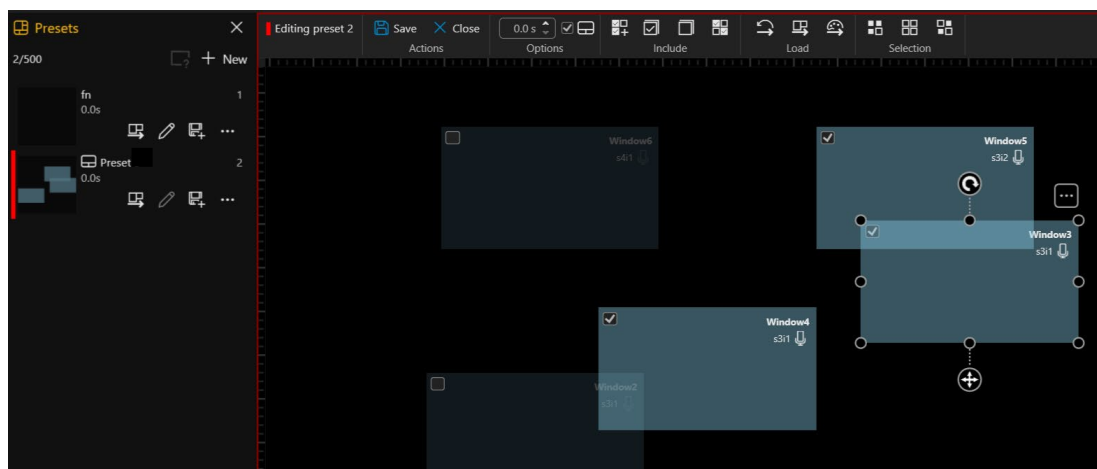
1. In **Editor**, select **Show Presets** from the top menu ribbon
2. From the **Presets** panel, find the preset that you want to edit and select the
3. A red bar indicates the preset that is being edited



4. **Preset 2** can now be edited – use the preset toolbar to help you.

- Select or clear windows that you want to be included
- Change window positions, sources, rotation

5. When you have finished editing, select **Save** to save and close the editor

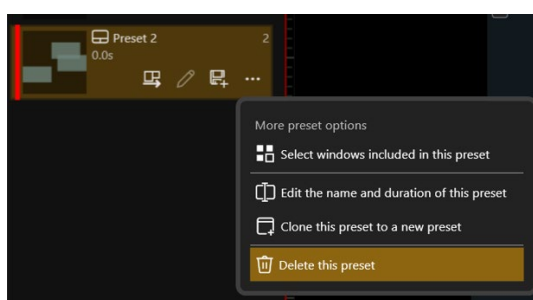


## Quick edit, overwrite, cloning, and deleting presets

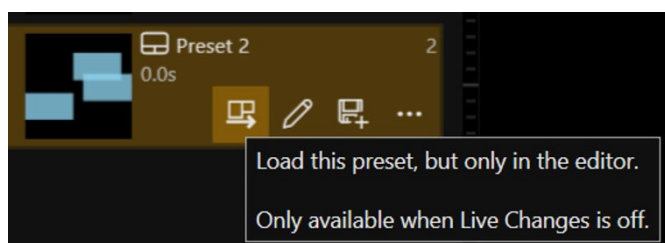
You can change the name and duration of a preset, or overwrite a preset with a new configuration

### To quickly change a preset

1. Select **Show presets**
2. In **Presets** find the preset you want to edit, then select **more options** ● ● ●
3. You can quickly edit:
  - What windows are selected
  - The preset name and duration
  - You can clone the preset
  - You can delete the preset



### To quickly load a preset into the editor only



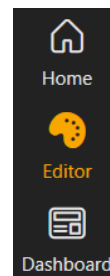
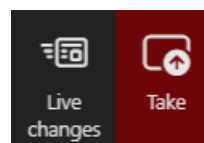
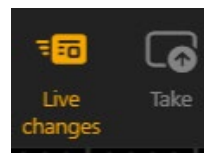
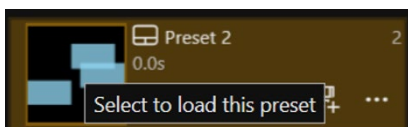
## Loading a preset



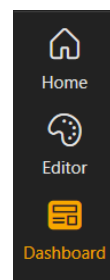
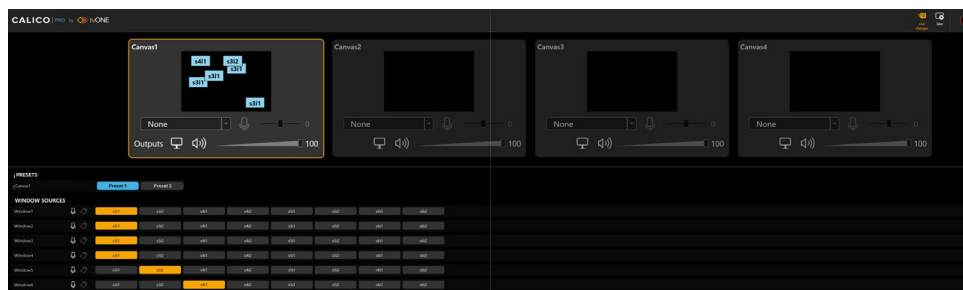
If you have saved one or more presets in CALICO Studio, you can choose a preset to load.

You can load presets in the **Editor** or from the **Dashboard**

1. In **Editor** Select **Show presets**
2. In **Presets** find the preset you want to load
3. Click on the preset thumbnail to load it
4. In Live changes, the preset will load immediately
5. If Live changes is not active select Take to load





1. Select **Dashboard**
2. Select a **Preset**



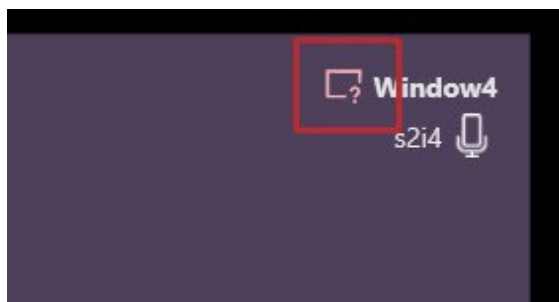
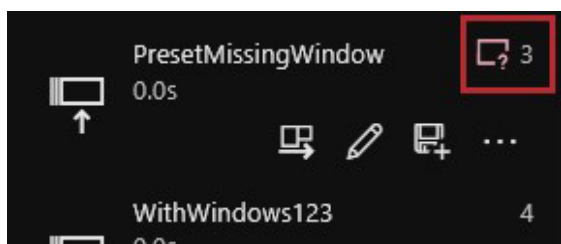
## Adding new windows to a canvas with existing presets

If you are adding new windows after you have created presets, then existing presets will not know about the new windows. When you load a preset these windows will not update, if this is undesirable behavior you can include them in your presets.

You can use the preset window analyzer to help identify presets and windows that need your attention.




1. In **Editor** Select **Show presets**
2. In **Presets** Select  to enable or disable the analyzer
3. Enable it
4. Check each canvas for 
5. If you have windows missing from presets, then a dialog will give you instructions on what you can do to identify presets and windows to indicate what needs your attention.







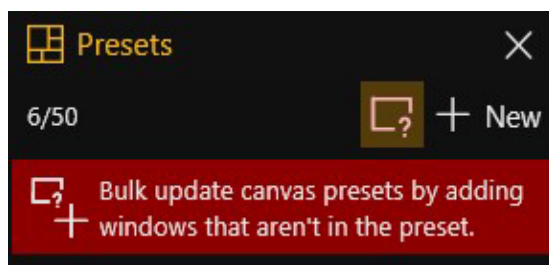
You can disable the preset window analyzer when you have finished  
The analyzer is disabled every time you load or read a device config.

## Manually updating presets with the new windows

1. In **Editor** Select **Show presets**
2. In **Presets** Select  to enable the analyzer
3. In **Presets** choose a preset to update by looking for 
4. Select  to edit the preset. This will load the preset into the preset editor without changing the currently loaded preset on your device.
5. Include and reposition your windows if required
6. Select **Save** from the preset editor toolbar

## Bulk updating presets

1. In Editor Select Show presets
2. In Presets Select  to enable the analyzer
3. Select  to bulk update all missing windows,



Do not bulk update presets if you are deliberately using selected windows in your presets.

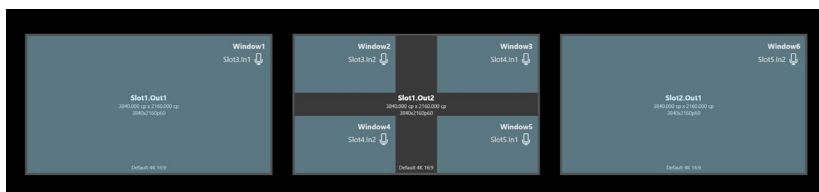
## Show me some preset scenarios



You can use presets to create installations for various scenarios, from simple to sophisticated. Using the presets correctly can dramatically reduce the number you will need to achieve your desired results.

### All the windows presets

All the windows presets are great for resetting the canvas to a known state, for example at the start of the day, event, or meeting. You can put all the windows and source selections back to something you know is good to use



### Layout only presets

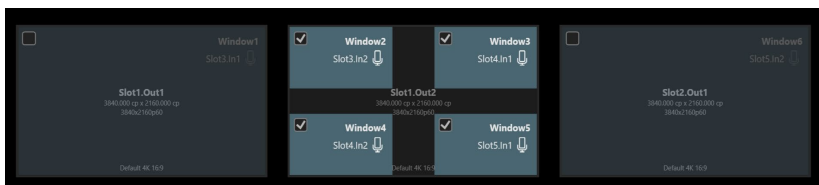
Presets can be created that do not change the source selection of windows. This can be used when you want to change the layout of the windows but keep your window sources as you have set them.



You can change the window source for specific windows from CALICO studio or with a third-party controller using the API

### Control different aspects of the same area on the canvas

You can control different groups of windows in your installation on the same canvas, for example you have a main presenter display and 2 side displays, you can create presets that only change the windows you want.



## Zone your canvas



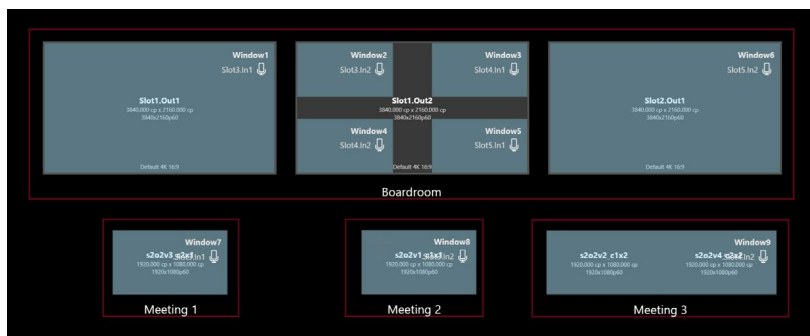
If using different canvases is not possible then you can extend the concept of controlling different areas to zoning your canvas.

### Recommendations when naming presets:

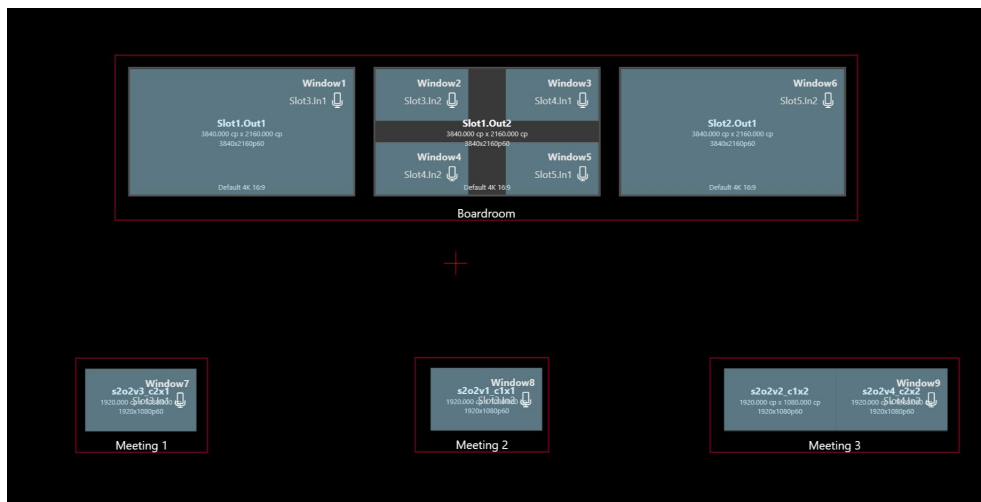
- Create prefixes for the different zones, for example Room\_1\_ and Room\_2\_.
- Prefix your displays with the same zone as your presets to help organize the canvas, for example Room\_1\_LED\_1.
- Have a 'reset all' preset that puts the whole canvas back to a known good state, for example 'Default Start Up'.
- Have a 'reset zone' preset for example Room\_1\_Reset or Room\_1\_Default.
- Leave enough space between the zones for window transitions on and off the displays.
- Third-party controllers can use the prefix to filter by zone, so you only see the presets you are interested in.

### Space is important

A bad example of canvas zoning. Areas are too close leaving little room to move windows during any preset transitions. This layout though may be valid in a canvas watch set-up



A better layout for presets as there is more room between areas





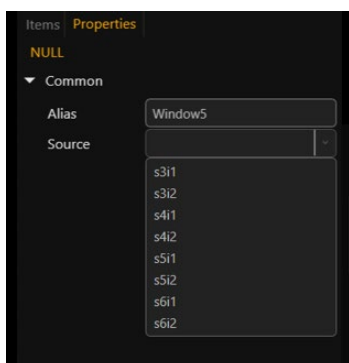
## Changing the source playing in a window



You can choose which source plays in any window in CALICO studio.

### Changing the source in CALICO studio from the Properties panel

1. From **Editor** double click any window whose source you want to change
2. Choose a new source from the dropdown list.



### Changing the source in CALICO studio from the window

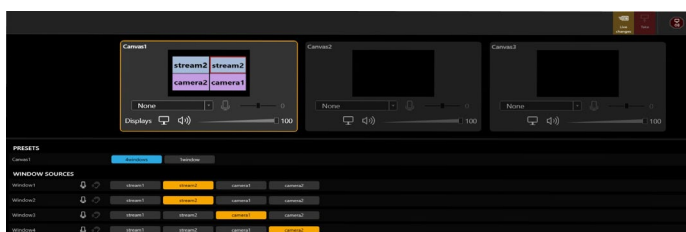
1. From **Editor** select any window whose source you want to change
2. Select ● ● ● then select a new source from the dropdown list



### Changing the source using the dashboard

You can change the source playing in any free window from the dashboard in CALICO Studio

From Dashboard find a free window that you want t change, and select a source.



## Adding and managing custom EDID files



You can upload an EDID file saved to your PC to your CALICO PRO. You can manage the EDID files saved to your CALICO PRO in CALICO Studio

You might want to upload a saved EDID file if a source, for example, a PC, is using the preferred resolution from your CALICO PRO rather than the resolution you wanted for the source device. This can cause unexpected effects. You can create an EDID file for the resolution you selected for the source device and upload it to your CALICO PRO.

EDID files must:

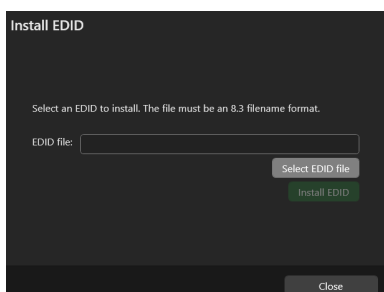
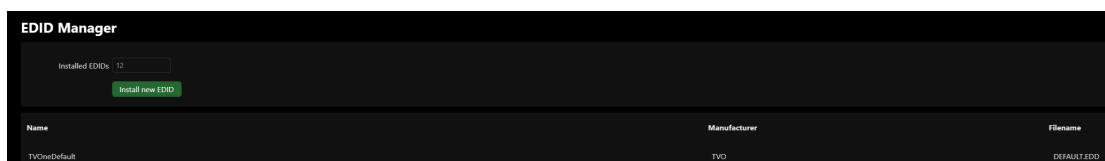
- Be a binary EDID file
- Have a filename in 8.3 format
- Have a .edd extension, or a .bin (as this can just be renamed to a .edd file)
- Have a filename no longer than 8 ASCII characters

### Before you start

Before you add custom EDID files or remove saved EDID files, we recommend that you make a backup copy of your configuration

### Adding a saved EDID file

1. In CALICO Studio select **Settings** then **EDID manager**
2. Select **Install new EDID**
3. Select, **Select EDID file** and browse to a saved EDID file stored on your PC
4. Select **Start install**



## Removing EDID files



1. In CALICO Studio select **Settings** then **EDID manager**
2. Find the **EDID** you want to delete
3. Select, **Remove**



### **Risk of unexpected effects**

- If you delete an EDID file that is in use and then reboot your CALICO PRO, it reports that it is using the deleted EDID file but is really using the default EDID file
- Your uploaded EDID files can only be used with sources
- CALICO Studio does not check that a custom EDID file is valid or supported. Uploading an invalid or unsupported EDID file can cause source loss and unexpected results. Creating custom EDID files is an advanced task. If in doubt, contact a qualified AV professional.

## Firmware Update



CALICO PRO's firmware can easily be updated in the field using CALICO Studio.

Firmware updates may be necessary to allow added features or options to be used, or for the purpose of fixing a reported bug.

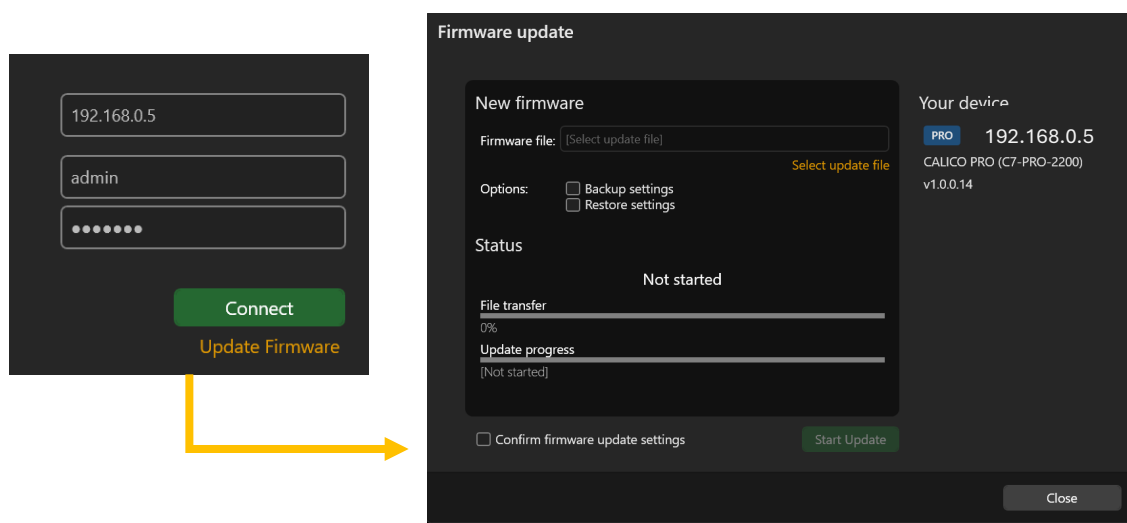
New firmware for your CALICO PRO can be downloaded from the tvONE website, <https://tvone.com/>.

Select your specific model carefully so that the correct firmware can be downloaded. The download will be in the form of a .zip file.

To install the new firmware:

1. Open CALICO Studio and select connect to your device.
2. Locate your device on the network using its name and/or IP address. Verify at this stage that the already installed firmware is not the same one as you are trying to upload.
3. Once the correct CALICO PRO is found and you have decided that a firmware update is needed, enter the administrator username and password.
4. Normally you would click the green “connect” button at this stage to connect to your device but instead choose the link below this button that says “update firmware”
5. Follow the prompts to find the new firmware .zip file (you now have some backup and restore options). If all is set correctly check Confirm settings box, the then Start update
6. The update should not take more than a few minutes.

**Note:** Ideally, this should be done when the system is not being used as the unit will re-boot after the update to complete it.



## Returning a product for repair



You can request to return your product to tvONE for repair. When you contact tvONE support, have the following information ready

- Product type
- Serial number of the faulty unit (this is on the underside or sides of the unit)
- Full details of the issue
- Invoice number (if available)

### Contact tvONE support for your area.

Customers in North, Central, and South America (NCSA), email

[tech.usa@tvone.com](mailto:tech.usa@tvone.com)

Customers in Europe, the Middle East, and Africa (EMEA), email

[tech.europe@tvone.com](mailto:tech.europe@tvone.com)

Customers in Asia, email [tech.asia@tvone.com](mailto:tech.asia@tvone.com)

Customers in EMEA and Asia receive an RMA Request form from tvONE support. Complete the form and return it to tvONE support for your area.

### All customers

tvONE support decides if your product needs to return for repair, and, if needed, provide a return authorization number.

Send your product to tvONE by insured carrier or registered mail. Write your return authorization number on the outside of the packaging, and on any documents that you send with your product.

You must arrange and pay for shipping and insurance. Products in transit are your responsibility. tvONE does not accept responsibility for products lost in transit.



Do not return a product for warranty repair without a return authorization number. tvONE will not repair your product

[tvONE.com](http://tvONE.com)

[info@tvone.com](mailto:info@tvone.com)

### tvONE NCSA

North, Central and South America



621 Wilmer Avenue, Cincinnati, Ohio 45226 USA



Tel +1 513-666-4210



**Sales:** [sales@tvone.com](mailto:sales@tvone.com)

**Support:** [tech.usa@tvone.com](mailto:tech.usa@tvone.com)

### tvONE EMEA

Europe, Middle East, Africa and Asia Pacific



Unit V Continental Approach, Westwood Industrial Estate, Margate, Kent, CT9 4JG, UK



Tel +44-1843-873311



**Sales:** [sales.europe@tvone.com](mailto:sales.europe@tvone.com)

**Support:** [tech.europe@tvone.com](mailto:tech.europe@tvone.com)

### tvONE Asia

Asia



**Sales:** [sales.asia@tvone.com](mailto:sales.asia@tvone.com)

**Support:** [tech.asia@tvone.com](mailto:tech.asia@tvone.com)

## Regulatory compliance for CALICO PRO and all modules

This product has been tested for compliance with appropriate FCC and CE rules and regulations. The power adapter or supply has been tested for compliance with appropriate UL, CUL, CE, PSE, GS, rules, regulations and/or guidelines. This product and its power adapter or supply is RoHS compliant.

### WEEE directive



The wheeled bin symbol on this product or its packaging indicates that this product shall not be treated as household waste. In line with EU Directive 2012/19/EU for waste electrical and electronic equipment (WEEE), this electrical product must not be disposed of as unsorted municipal waste. Dispose of this product by returning it to the point of sale, or to your local municipal collection point for recycling. Doing this helps conserve our environment

# Specifications C7-PRO-2200



Video Processing	
CALICO video processing	CALICO FPGA core (10-bit 4:4:4)
Parallel processing architecture	Yes
Video / graphics layers	256 (max including video windows, keys, graphics, labels, background images)
Video latency (input to output)	Min 1 frame, max 2 frames regardless of I/O
Up/down/cross conversion	Yes (all inputs and outputs)
Number of canvases	4
Canvas size	(64,000 x 64,000) pixels per canvas
Keying	Luminance Keying (any layer to layer below / keys cannot be overlapped). Adjustable key-range and focus adjustment.
Fading	Fade to black / fade to transparent / crossfade
Display size compensation	Yes, different physical sizes in video walls (Physical Mode).
Output rotation	Yes for any outputs, windows and labels (360° rotation 1° increments).
Output mapper	Yes (All outputs)
Projector edge blending	Yes (all outputs)
HDCP key handling	HDCP 2.2 (Expansion modules may have different specifications depending on connectivity)
Video Inputs	
HDMI 2.0	8x 2160p (4096x2160) 60Hz
HDCP	2.2 / 1.4
Chroma sub-sampling (10-bit)	4:2:2
Chroma sub-sampling (8-bit)	4:4:4
Color space	YCbCr BT.601, YCbCr BT.709, RGB, RGB limited range and auto detect
Supported Input Resolutions (for standard unit 8x HDMI 2.0 IN)	
720p (1280x720)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
1080i (1920x1080)	50, 59.94, 60Hz
1080p (1920x1080)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60, 100, 119.88, 120Hz
2160p (3840x2160)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
2160p (4096x2160)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
Video Outputs	
HDMI 2.0	4x 2160p (3840x2160) 60Hz
HDCP	2.2 / 1.4
Chroma sub-sampling (10-bit)	4:2:2
Chroma sub-sampling (8-bit)	4:4:4
Color space	YCbCr BT.601, YCbCr BT.709, RGB, RGB limited range and auto detect

Supported Output Resolutions (for standard unit 4x HDMI 2.0 out)	
720p (1280x720)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
1080i (1920x1080)	50, 59.94, 60Hz
1080p (1920x1080)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60, 100, 119.88, 120Hz
2160p (3840x2160)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
Images (Backgrounds / Labels)	
Still Image formats supported (internal image store)	BMP, PNG, JPG, JPEG, TIF, TIFF, PPM, PGM, PBM, HDR
Interfaces	CALICO studio, File transfer supported (FTP). USB-3 on rear of unit
Control Methods	
Network interface	RJ45 - Gigabit Ethernet
Network standard	IPv4
API protocols	REST using HTTP or HTTPS, CLI using TCP/IP
API specification	Available from <a href="https://api.tvone.com/">https://api.tvone.com/</a>
Warranty	
Limited warranty	5 years parts and labor
Regulatory Compliance	
System / modules	FCC, CE, RoHS, UL, UKCA
Mechanical	
Height	88mm (3.46")
Width	435mm (17.13") / including rack ears 482mm (19")
Depth	341mm (13.43") / including PSU Handle 364mm (14.33")
Weight	10kg (22 lbs.)
Environmental	
Operating temperature	32° to 104°F (0° to +40°C)
Operating humidity	10% to 85%, Non-condensing
Storage temperature	14° to +158°F (-10° to +70°C)
Storage humidity	10% to 85%, Non-condensing
BTU	1365 BTU (400W)
Fan noise	Nominal 45dB(A) - max 57dB(A) (@1m)
Power	
Dual-redundant hot-swappable PSU	400W load balancing (One supplied - additional PSU optional)
Power consumption	250W
Input voltage	100 to 240V (+/- 10%) AC (50/60Hz), 6-3A auto switching
Output voltage	12V dc

## Available Accessories (Field Upgradable / Replaceable)

C7-PRO-HDMI-4K4IN	Quad 4K60 HDMI input module 2160p (4096x2160) 60Hz 4:4:4
C7-PRO-HDMI-4K2IN	Dual 4K30 HDMI input module 2160p (4096x2160) 30Hz dual, or single 60Hz 4:2:0
C7-PRO-HDMI-2K4IN	Quad 2K60 HDMI input module 1080p (1920x1080) 60Hz 4:4:4
C7-PRO-12GSDI-4IN	Quad 12GSDI input module 2160p (4096x2160) 60Hz 4:2:2
C7-PRO-3GSDI-4IN	Quad 3GSDI input module 1080p (1920x1080) 60Hz 4:2:2
C7-PRO-HDBT-4K2IN	Dual 4K30 HDBT input module 2160p (4096x2160) 30Hz dual, or single 60Hz 4:2:0
C7-PRO-MEDIA	Dual 4K30 + 1080p/60Hz streaming input and media playback module
C7-PRO-AUD-2IN-4OUT	Audio external input and output module
C7-PRO-HDMI-4K4OUT	Quad 4K60 HDMI output module 2160p (3840x2160) 60Hz 4:4:4
C7-PRO-HDMI-2K8OUT	Eight 2K60 HDMI output module 1080p (1920x1080) 60Hz 4:4:4 and 4:2:2 10-bit
C7-PRO-12GSDI-4OUT	Quad 12GSDI output module 2160p (3840x2160) 60Hz 4:2:2
C7-PRO-2U-FILTER	Optional fan filter kit
C7-PRO-400RPS	Hot swappable, dual-redundant power supply
Optional fan filter kit	C7-PRO-2U-FILTER
Hot swappable, dual-redundant power supply	C7-PRO-400RPS

Main Features	
FPGA video processing	CALICO core (patented video processing).
Set up and control Software	CALICO studio (free download and free to use. From <a href="https://tvone.com">https://tvone.com</a> ).
Included inputs and outputs	8x Inputs, 4x outputs (4K60 HDMI 2.0, HDCP 2.2).
Video windows	Up to 256 per system (no canvas restrictions).
Four design canvases (over 16 Gigapixels of design space)	4.1 Gigapixels per canvas. Canvases are massive real world design spaces. Place displays and contents freely and accurately.
Field upgradable	Firmware updates using CALICO studio.
Output mapper	32 maps per output (used for DVLED mapping and for monitoring to create virtual outputs).
Input mapper *	32 maps per input (create virtual / cropped sources from a single input).
HDR (High Dynamic Range) *	HDR10 and HLG (Hybrid Log Gamma) - convert any input to any output.
Custom resolution engine *	Available for inputs and outputs (with restrictions).
Window source cropping	Any input, max 256 crops / dependent on system bandwidth (live crops from any input source).
Canvas watch	Used for monitoring, multiviewing. Any output including mapped outputs. Any and/or all available outputs can be set to canvas watchers.
Labelling	Complete labelling engine include: Source, Text and Images (upload images via CALICO studio for backgrounds, keys, graphics and labels). Labels can be linked to video windows, crops, displays and outputs.
Presets	Up to 500 with effects and transitions.
Any output any canvas	Any output including mapped outputs on any canvas in any position and orientation.
Optional expansion modules (Increase the number and/or type of I/O connections, and add new features and functionality)	3x slots (1x high bandwidth input, 1 standard input, 1x high bandwidth output). Can be fitted as a future upgrade. Installable from the rear of the unit.
Internal storage	3GB (images, EDID's, fonts and labels).
Reference lock (Genlock)	BNC ref input and loop.
Audio	One stereo pair per canvas. Expansion module available for analog and digital audio ingest and break-out (supported on HDMI and SDI).
Display agnostic	Designed for DVLED controllers / displays / projectors.
2U compact size	Rack mount or desktop (removable rack ears and feet included).
EDID manager	Up to 20 custom EDID's can be uploaded and applied to inputs in addition to the provided system EDID's.
Secure access	User login with 3 levels of access available (Admin / Power-user / User).
Secure connection	HTTPS with AES 128bit encryption (TLS 1.2 , HTTP 1.1, TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256).
Low power consumption	250W including optional modules.
OLED display	IP address, device name and status messages (customizable using CALICO studio, content, brightness and ON/OFF).
Integrated carry handles	Easy rack installation and transport.
Rugged all metal cabinet and chassis	Solid aluminum front panel and powder coated steel cabinet.
Front panel illumination	Fully controllable via CALICO studio (brightness level and ON/OFF).
Designed for continuous use	24/7, 365 days a year operation, with 5-year limited warranty. Perfect for mission critical applications.
Smart cooling system	Automatic temperature controlled fans with option to fix a fan profile if required. 3x 80mm fans fitted.
Optional stainless steel fan filter kit available	For dusty operating environments. Only requires cleaning periodically, no need to replace, removable from the rear without de-installation.

\* Coming soon

