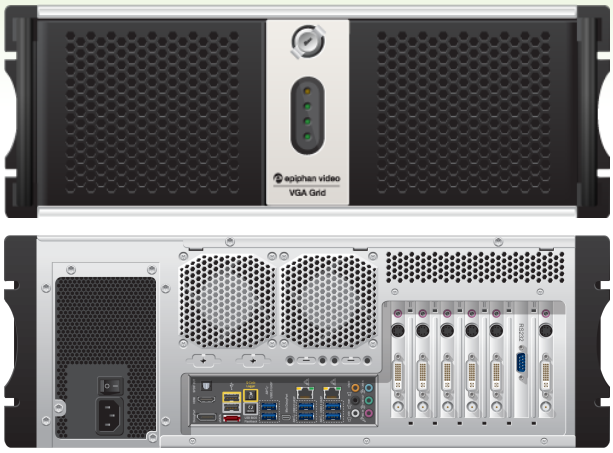
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User Guide

Standalone VGA Grid



Release 3.15.3
November 9, 2015

UG103-05

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- Emailing support@epiphan.com
- Live chat via the link on our support site http://www.epiphan.com/support/
- Phone toll free at 1-877-599-6581 or call +1-613-599-6581

Be sure to include as much information about your problem as possible. Including:

- Problem description
- Details of the video or audio source (type, connection, resolution, refresh rate, etc.)
- Product serial number
- Product firmware version (if applicable, from web admin interface)

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What's New in Release 3.15.3?

Firmware release 3.15.3 is a significant upgrade for Standalone VGA Grid that offers exciting new streaming/recording features while improving the functionality of existing ones.

Live video production

The features described below are applicable on all channels for Standalone VGA Grid, VGADVI Broadcaster Pro, and VGADVI Recorder Pro, but only on custom local channels for Networked VGA Grid (i.e. not HD Encoder channels).

New custom layout designer

The new custom layout designer helps you create unique personalized layouts using multiple video sources, pictures, logos, text overlays and backgrounds. Refine your sources and layout items to perfection with the layout editor's precision positioning, resizing, reordering and cropping tools before previewing the end result. Learn how to create custom layouts in Create a custom channel or layout.

Live switching

You can now switch video sources and custom layouts seamlessly while live streaming/recording. Change your streamed video content using the web interface (or HTTP and RS-232 APIs) to create dynamic and engaging live streams that will captivate your audience. Learn more about live switching in Live video mixing / switching.

Video source cropping

Selectively crop your video source content to remove unnecessary or redundant information, or crop multiple sources strategically to create perfect custom layouts.

Pictures as video sources

Upload a picture file to use as a video source and further your creative streaming possibilities. Use pictures as sources for custom pre-show announcement, a post-show display, or in conjunction with other images and video sources in custom layouts – the options are entirely up to you.

Transparent PNG images

Use PNG images with transparent backgrounds for improved customization in your layouts. Add corporate logos or other visual details to imbue a truly professional quality to your design.

Live streaming layout adjustments

Change video sources, swap visuals, adjust text overlays and modify backgrounds – all without disrupting the live stream. Adapt to any contingency for added flexibility and peace of mind while live streaming.

Configuration improvements

Custom "No Signal" images for sources

You can now create and upload customized “No Signal” images. These images are assigned to a specific source and display in any channel where the source is used but has no input detected. Ideal for enhancing professionalism in your next live event!

Important firmware 3.15.3 upgrade notice

Firmware release 3.15.3 introduces the new visual channel layout editor which adds the ability to have multiple layouts per channel and simplifies custom channel components like text overlays, images, and picture in picture layouts.

The firmware update process preserves your channel's existing encoding, streaming and recording settings and merges your previous visual channel setup in a new channel layout. We have tested this process carefully, but in some circumstances you may still need to do some small manual adjustments to get the best possible results.

Before you do a firmware update, take notes or a snapshot of your channel's layout. It is also a good idea to note your current release version make a configuration backup for the rare case you choose to return to your current release. **After the firmware update**, go to the sources page for your channel and review the created layout for your channel. If needed, make adjustments using the procedures described in Create a custom channel.

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Start here

Welcome, and thank you for buying Epiphan's Standalone VGA Grid™. This guide will help you configure your new system.

To get started, review the Overview and What's in the Box? sections. Next, a Quick Start guide walks you through the basic steps to get a single video (and optional audio) source configured as a streamable, recordable output from the Standalone VGA Grid.

Following the quick start section, a set of task-based procedures help you to tweak the system exactly how you want. These procedures are broken into five categories: Setup, Capture, Stream, Record and Maintenance.

About this Guide

Warnings are depicted as follows.



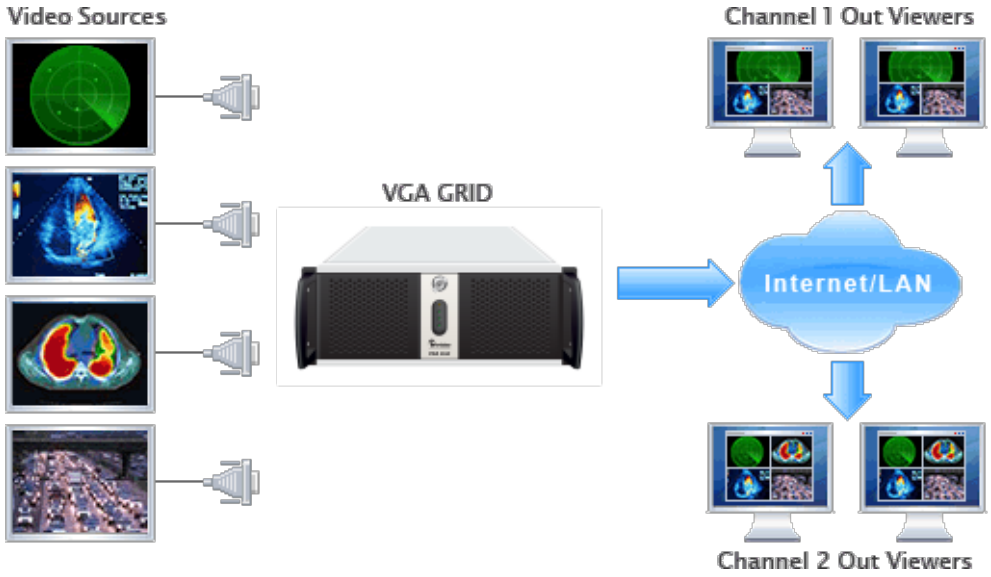
Tips and Notes are depicted as follows.



Throughout this guide there are situations where more than one solution will complete a task. In those cases the guide describes the simplest or most common variation first.

Standalone VGA Grid Overview

Epiphan's VGA Grid allows you to capture, stream, and record audio and video from a large number of VGA, DVI, HDMI, composite and component sources. It supports streaming to a large number of viewers using industry-standard codecs such as H.264 and MPEG-TS. Supporting resolutions between 640×480 and 2048×2048, the VGA Grid is suitable for a broad range of applications.



This versatile system has a variety of options enabling you to create and configure any number of streaming channels. You can choose to stream (or record) a single channel at once or a configuration of synchronized channels with picture-in-picture or picture-with-picture multiplexing selections.

The VGA Grid comes in two styles to meet your needs: Networked and Standalone. The **Standalone VGA Grid** captures video and audio through internal cards. Depending on the model, it has 4 or 6 DVI source ports, 4 or 6 SDI source ports and 4 or 6 S-Video source ports. The latest hardware models (with SDI capture) also support HDMI and SDI audio capture. Encoding and synchronization of the stream is done locally on the Standalone VGA Grid. The **Networked VGA Grid** has no internal capture cards, instead it uses VGA Grid HD Encoders to capture and encode sources, sending the already encoded stream to the VGA Grid. Using external encoders means the VGA Grid has less stress on its CPU so it can handle a greater number of inputs. HDMI audio capture and SDI video capture are not supported with Networked VGA Grid systems.

AV inputs

The latest hardware revision of Standalone VGA Grid supports the following AV inputs directly. Nearly every other AV input is supported provided you have the correct converter or adapter.

This document covers the **Standalone VGA Grid**.

Table 1 *Comparison for Networked VGA Grid and Standalone VGA Grid*

Model	DVI-I (single link)	DVI-I (dual link)	S-Video	SDI	Audio
Networked VGA Grid 	up to 64 encoders with up to 1920×1200	-	up to 64	-	up to 64
Standalone VGA Grid 	-	4 or 6 (model) local at up to 2048×2048	4 of 6 (model)	4 or 6 (model)	5 or 7 (model) + SDI and HDMI audio

What's in the box?

The Standalone VGA Grid is a 4U rackmount server with dimensions 522 mm (D) × 430 mm (W) × 176 mm (H) (20.5” × 16.9” × 6.9”).

Latest hardware revision:

Standalone VGA Grid can now capture more HD content than ever before. The newest Standalone VGA Grid comes with eight or twelve HD inputs (depending on the model). Half the inputs are for capturing from DVI/HDMI/VGA sources while the other half are for SDI sources. As before there are also 4 or 6 S-Video ports.

With this combination of available input ports and applicable DVI, SDI or S-Video adapters/converters you can bring in signals from nearly any source. This hardware upgrade also provides audio capture support for HDMI and SDI in addition to pre-existing support for 3.5 mm analog audio input ports.

Previous hardware revisions

Previous versions of Standalone VGA Grid came with four or six HD inputs (depending on the model). Many, although not all, previous hardware revisions can support the latest software release.Use the Firmware upgrade feature to see if your device is upgradeable. Note previous hardware revisions do not support HDMI audio capture.

Unpacking the box

The following list applies only to new devices with the latest hardware revision:

1. 4 or 6 (depending on model) VGA to DVI-I cables
2. 4 or 6 (depending on model) HDMI to DVI-I adapters
3. 4 or 6 (depending on model) DVI-I to DVI-I cables
4. 4 or 6 (depending on model) composite to S-Video cables
5. 4 or 6 (depending on model) SDI cables
6. One Ethernet cable
7. Power cable

Image	Name	Description
	VGA to DVI cable	Connects a VGA source to the system's DVI port(s).
	HDMI to DVI adapter	Connects an HDMI source to the system's DVI port(s).
	DVI-I Single Link cable	Connects a DVI source to the encoder's DVI port(s).
	Composite to S-Video cable	Connects a composite output from an analog sources to the system's S-Video port(s).
	SDI Cable	Connects an SDI source to the system via BNC connectors.
	RJ-45 Ethernet cable	Connects the system to your network.

Front and back panel view for the VGA Grid

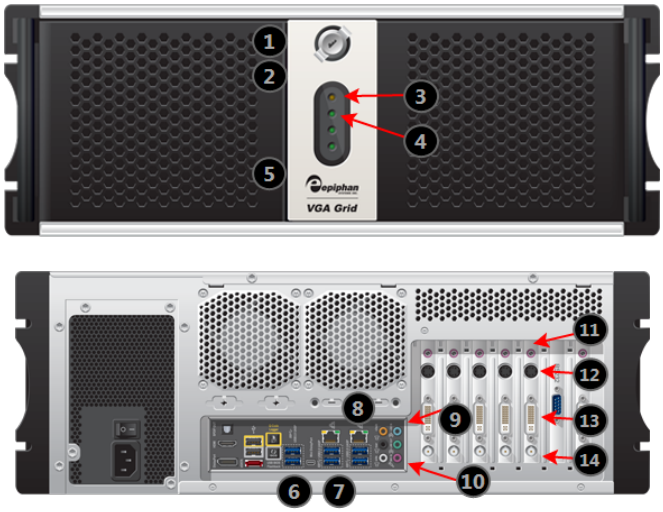


Table 2 *Rackmount Standalone VGA Grid Front and Back Panel Descriptions*

Label	Name	Description
1	Power Button (behind door)	Unlock the door to reveal the power button. Press to turn on; press and release to turn off the system. Press and hold for 4 seconds for a forced system shutdown.
2	Reset (behind door)	Unlock the door to reveal the reset button. Cycles the power off then on, like a computer reset button.
3	Power LED	Indicates the system is powered on.
4	Hard Drive LED	Blinks when the system is recording or accessing the hard drive.
5	USB Ports (behind door)	Unlock the door to reveal two USB ports. For connection of external hard drives, flash drives or control interfaces.
6	USB Ports	For connection of external hard drives, flash drives or control interfaces.
7	USB Ports	For connection of external hard drives, flash drives or control interfaces.
8	RJ-45 Ethernet	Auto-sensing gigabit Ethernet 10/100/1000 Base-T network port.

Label	Name	Description
9	Audio In (blue)	Connect amplified line in audio sources to the system.
10	Audio In (pink)	Connect unamplified microphone audio sources to the system.
11	Audio In (4 or 6)	Connect audio sources to the system.
12	S-Video ports (4 or 6)	Connect analog video sources (S-Video, composite etc) to the system.
13	DVI-I Dual Link (4 or 6)	Connect analog or HD video sources to the system.
14	SDI ports (4 or 6)	Connect digital SDI sources to the system.

Tech specs

This table outlines the technical specifications for the latest hardware revision of Standalone VGA Grid. Go to the Professional Recording and Streaming Systems page of the Epiphan website to get the most recent product specifications and additional information about Standalone VGA Grid.

Feature	Standalone	Networked
Style	4U Rackmount Server	
Dimensions	445 mm (D) × 430 mm (W) × 176 mm (H) (17.5” × 16.9” × 6.9”)	
Number of Encoders	-	up to 64
Maximum Resolution	2048×2048	1920×1200
VGA/DVI Screen Video Interfaces	4-6	up to 64 (via encoders)
S-Video/Composite Interfaces	4-6	up to 64 (via encoders)
SDI Interfaces	4-6	-
Audio Interfaces	5-7 plus audio support through SDI and HDMI	up to 64 (via encoders)
Video Codecs / Compression	H.264, MPEG-4, MJPEG	

Feature	Standalone		Networked	
Video Bitrate	10 Mb/s			
Audio Codecs	PCM, MP3, AAC			
Audio Sampling Rate	48000 Hz, 44100 Hz, 22050 Hz			
Audio Bitrate	64 - 160 kb/s			
Key Frames Intervals	programable			
Video Format Options	RGB plus HSync and VSync RGB plus CSync signal RGB with Sync-on-Green synchronization			
Update Rates	Resolution 640×480 1280×1024 1920×1200 2048×2048	fps 30-60 30-60 30-90 10-60	Resolution 640×480 1280×1024 1920×1200 2048×2048	fps 30 30 25 -

Quick Start

This section helps you get up and running quickly with your Standalone VGA Grid.

- Step 1: Physical set-up and power-on
- Step 2: Admin discovery and login
- Step 3: Set up the video source
- Step 4: Configure the channel
- Step 5: Testing the stream
- Step 6: Recording the stream

Before you get started, make sure you have:

- an HD source (i.e. a computer, a tablet, or a phone)
- the appropriate cables or adapters to convert the output to DVI or SDI (if needed)
- ideally, a network with Dynamic Host Configuration Protocol (DHCP)
- a computer with a web browser connected to the same network (this is referred to as the “admin” computer in the steps below)
- optionally, an audio source such as a microphone or the headphone jack from a laptop . Note that audio signals sent over HDMI and SDI are supported in the latest hardware revision(s). If you have SDI ports, your system supports HDMI and SDI audio.



These instructions include steps for setting up and configuring audio. Skip these optional steps if you do not want to configure an audio source at this time.

Step 1: Physical set-up and power-on

Complete the following steps to prepare and power on the system. Refer to the Front and Back Panel View section for your system to locate the appropriate input ports.

1. Turn on your HD source and connect the output cable to a DVI-I or SDI port on the back of the system.
2. (optional) Attach a 3.5 mm audio cable from your audio source to the system’s motherboard audio input port(blue port on the back of the system).
3. Connect the Ethernet cable to the Standalone VGA Grid.
4. Connect the Ethernet cable to your network.
5. Attach the power cable to the system and plug it into a power source.

6. Unlock the front panel and press the power button to turn on the system.
7. Wait for the Standalone VGA Grid to complete the power up sequence. The power LED illuminates and the hard drive LED flashes during start up.

Step 2: Admin discovery and login

The Standalone VGA Grid is managed from a web interface. This interface acts as a configuration utility and system monitor. The first time you access the web interface you will not know the IP address of the system.

The steps below use DNS-based service discovery (a type of zero-configuration networking) to access the system. Depending on the operating system on your admin computer you may need to install some software before you can used DNS-based discovery.



This quick start is meant for systems that support DHCP and DNS, however if your system does not support these mechanisms, refer to **Connect to the admin interface** and **Connect to the admin interface** for alternative discovery mechanisms. Return to step 3 below you have completed setting a static IP address for the Standalone VGA Grid.

Table 3 *Installing Bonjour Print Services*

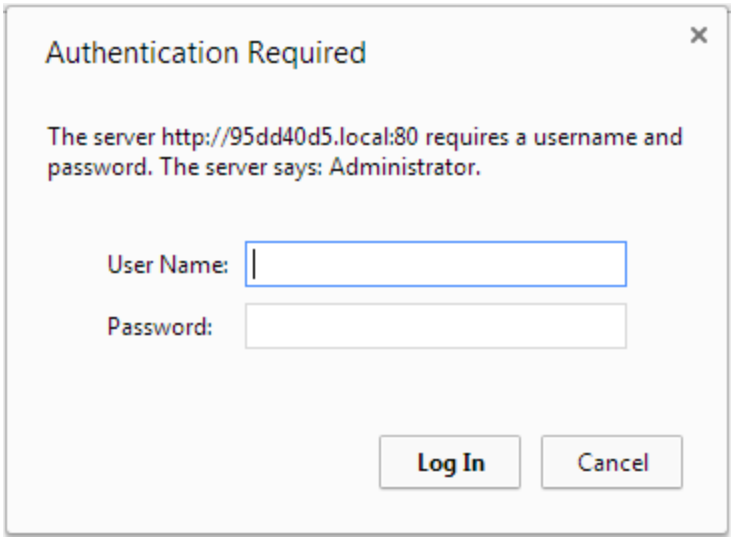
System	Action Needed
Microsoft Windows	You must install Bonjour Print Services: 1. Use the following URL - http://support.apple.com/kb/DL999 2. Click Download. 3. Follow the system prompts to download and install the application.
Mac OS X	The Bonjour software used for service discovery is built in to the Mac OS. No special actions are needed.
Linux	The Avahi implementation used for DNS-based discovery is shipped with most Linux distributions. If necessary, check with your administrator to ensure you have the Avahi package installed.

You are able to access the system web interface on the local network by specifying its serial number in a web browser on your admin computer.

1. Find the system's serial number. It is printed on a sticker on the back of the unit.
2. Type the following string into the address bar of your web browser on your admin computer (where <serial> is the serial number of your Standalone VGA Grid):

http://<serial>.local/admin
For example: http://95dd40d5.local/admin

3. Enter the user name and password then click **OK**. The administrative user is 'admin'. Initially no password is set. To set a password follow the procedure outlined in User administration.



4. Optionally, navigate to the **Network** link under the Configuration heading and note the **IP address** of the system.

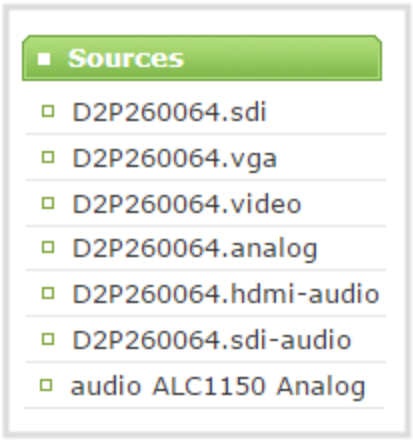
Step 3: Set up the video source

The web interface has a pre-configured list of the frame grabbers in the **Sources** section. Each video input card on the back of the system is a *frame grabber*. Each frame grabber has one DVI port, one SDI port, one S-Video port and one 3.5 mm audio port. The sources are listed by their frame grabber serial number.

DVI ports are listed with the suffix .vga, SDI ports are listed with the suffix .sdi, S-Video inputs listed with the suffix .video, and analog audio inputs are listed with the suffix _analog or, for the audio port on the motherboard: Analog. Digital audio inputs (for systems with SDI ports) are listed with the suffix .hdmi-audio or .sdi-audio, depending on their source.

The serial numbers for your system will not be the same as the examples shown below.

1. From the web interface, scroll to the **Sources** section. (You will see more sources than shown below.)



2. Find the DVI (or SDI) source that you have connected by selecting each DVI (or SDI) source (named .vga or .sdi as the suffix) and verifying if the preview on the right side of the screen reflects your source material.
3. Make note of the name of the source, or optionally, change the source name to reflect the data it is capturing.

   To rename the input source:

   a. Click on the source name at the top of the source configuration window. The name text becomes red.
   b. Edit the name. The following characters are supported: a-z; A-Z; 0-9; + (plus); - (hyphen); _ (underscore); , (comma), . (period); ~ (tilde); # (hash); [ ]; ( ). Although spaces are also supported, it is suggested you use underscores to separate words.
   c. Press Enter on the keyboard. The name is updated at the top of the screen and in the list of sources at the left side.
4. Optionally, configure the audio source (if connected):
   a. Scroll to the **Sources** section again and select the motherboard audio source. It is prefixed by the word audio and suffixed Analog (i.e. audio ALC892 Analog). The audio configuration page appears.
   b. From the **Input source** drop-down list, select **Line** for the blue port at the back of the system.
   c. Click **Apply**.

Source setup is complete. The system automatically detected and adjusted the image capture settings at start up and will continue to adjust every 60 seconds during operation (interval is configurable). The system's goal is to produce the best quality captured image given the source equipment used. Generally no further configuration tweaks are needed.

Step 4: Configure the channel

Now that you have confirmed the system sees your source it is time to add and configure a channel for output of your source. Channels expose your sources to your streaming users and prepare the sources for recording.

By default, when you add a channel, the system names it the same name as its source. If you changed the source name in previous steps, your new channel's name will reflect the new name.

To add a channel for your source:

1. In the web interface, click **Add channel** from the **Channels** section; a new channel is created and the channel configuration page opens.
2. From the **Use video source** drop-down list, select your source.
3. Click **Apply**.

To review and configure the channel:

1. From the web interface, scroll to the **Channels** section.
2. Click the link for your channel; the channel expands.
3. Click **Encoding** for your channel.
4. No need to change anything right now. Review some of the default settings. The four most useful settings to know about are codec, frame size, frame rate and bitrate.
    a. The codec is set to H.264 by default.
    b. The frame size should reflect the resolution provided by your source. You can set it to something different by typing in the fields or selecting an option from the different sizes shown. Scaling the image (making it larger, smaller, or different aspect ratio) takes some processing power, so it's always best to leave this at the value detected by the system unless you know it is wrong or know you need to scale the size.
    c. The frame rate limit is set to 30. This means the system won't spend extra computing time to attempt to receive more than 30 frames per second. For perspective, NTSC TV signals use 24 frames per second and most hand-drawn animations show only 12 unique frames per second.
    d. The bitrate is set to automatic, and the system will determine the best value.
5. Click **Status** for your channel.
6. Notice the **Stream Info** section has an item named Video that reflects the four settings reviewed in prior steps (the frame rate is specified as <resolution size>@30 for 30 (frames per second). It also provides an indication of the current actual frame rate.



You may now optionally add audio to your channel:

7. Click **Sources** for your channel; the media source page is displayed.
8. Select the audio source to which you connected your 3.5mm audio cable. If you connected to the blue line-in on the back of the system, the audio source is the audio source without a frame grabber serial number.
9. Click **Apply**.
10. Click **Encoding** for your channel; the Encoding page is displayed.
11. Scroll to the bottom of the Encoding and click the **Enable audio** checkbox.
12. Leave the default AAC format and audio bitrate.
13. Click **Apply**.

Step 5: Testing the stream

The Status page contains a link to the live broadcast stream for your channel.

To preview the channel in a browser:

1. From the web interface, scroll to the **Channels** section.
2. Click the link for your channel.
3. Click the **Status** link for your channel.
4. Right-click on the **Live broadcast** link for your channel and select **Open in a new tab** or **Open in a new window**.
5. The new tab or window opens with the stream displayed.
    a. If the signal is not detected, reset the DVI cable connections and try again.

Your stream setup is complete. Since most of the steps are pre-configured; you are up and running with a stream very quickly. You can share the live broadcast link with your users.

Step 6: Recording the stream

The stream is set up and broadcasting. This may be all you need, but if you like you can also record the stream.

To record the stream:

1. From the web interface, scroll to the **Channels** section.
2. Click **Recording** for your channel; the Recording page is displayed.
3. Click the red **Start** button; the text at the top of the screen changes to indicate the recording is starting, then indicates the length of time since the recording started.
4. Click the black **Stop** button; the recorder stops.
5. Refresh the page by clicking **Recording** again; the page reloads and a file list appears that shows your newly recorded stream snippet.
6. Click the file name to download and view your recording.

What's Next?

Now that you have a source set up and ready to stream, you can fine-tune the system to your exact requirements. You can look at topics such as:

- Add a video source (custom channel)
- Create a custom channel
- What is streaming?
- File and recording transfer
- User administration

When you have completed system tuning, make sure to back up the system configuration using the procedure described in:

- Save and restore device configuration

Refer to the table of contents for a complete list of the topics covered.

PART 1: Setup

If you followed through the quick start guide, you already have a basic configuration and possibly a recording of an input. Before you tweak the channel or configure more, this part of the manual helps you to get your Standalone VGA Grid properly configured for your network.

Topics covered:

- Connect to the admin interface
- User administration
- View system information
- Configure network settings
- Configure date and time
- Configuration presets
- Restrict viewers by IP address

The admin interface

Standalone VGA Grid is managed from a web interface. This means to perform administrative tasks with Standalone VGA Grid you use an internet browser on a PC (or laptop, or tablet) connected to the same local Ethernet network.

Connect to the admin interface

If you know the IP address of the system you may type it into the address bar of your web browser.

http://<IP Address of the Standalone VGA Grid>/admin

However if this is the first time you access your system, you likely don't know the IP address, so you can use one of the following connection methods:

For networks with DHCP use one of the following procedures:

- Connect via DNS-based service discovery
- Connect via the Epiphan discovery utility

For networks without DHCP, use the following procedure:

- Connect via persistent static IP address



You can also connect to a reduced Operator tablet interface. See **Connect to the tablet interface**.

Connect via DNS-based service discovery

The Standalone VGA Grid uses DNS-based messages to advertise details about itself, including its host name. With a compatible utility installed on your computer, you can access the system simply by typing its serial number and the suffix ".local" into the address bar of your browser.

To ensure you have compatible software, refer to the following table.

Table 4 *Installing Bonjour Print Services*

System	Action Needed
Microsoft Windows	You must install Bonjour Print Services: 1. Use the following URL - http://support.apple.com/kb/DL999

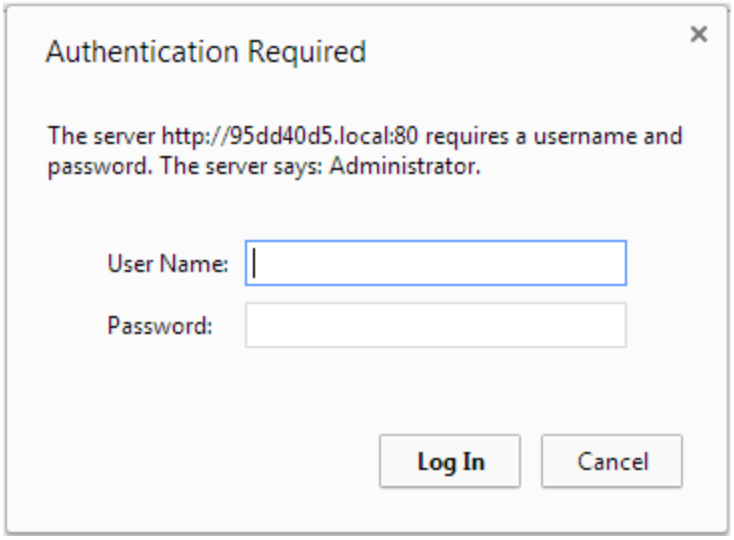
System	Action Needed
	2. Click Download. 3. Follow the system prompts to download and install the application.
Mac OS X	The Bonjour software used for service discovery is built into the Mac OS. No special actions are needed.
Linux	The Avahi implementation used for DNS-based discovery is shipped with most Linux distributions. If necessary, check with your administrator to ensure you have the Avahi package installed.

To access the Standalone VGA Grid's web interface via DNS service discovery:

1. Find the system's serial number. It is printed on a sticker on the back of the system.
2. Type the following string into the address bar of your web browser on your admin computer (where <serial> is the serial number of your Standalone VGA Grid):

http://<serial>.local/admin
For example: http://95dd40d5.local/admin

3. Enter the user name and password then click **OK**. The administrative user is 'admin'. Initially no password is set. To set a password follow the procedure outlined in User administration.



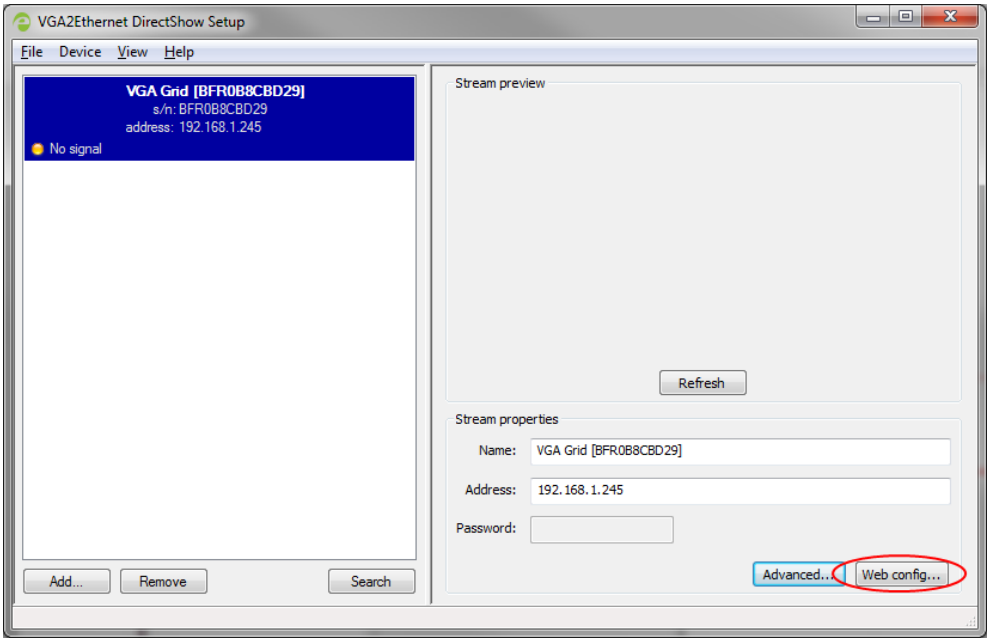
4. Optionally, navigate to the **Network** link under the Configuration heading and note the **IP address** of the system.

Connect via the Epiphan discovery utility

Epiphan provides a utility for discovering Epiphan systems on your network. The Epiphan network discovery utility is a 32-bit Windows executable that works on most 32-bit and 64-bit Windows operating systems. Download and install the utility via this link: http://www.epiphan.com/downloads/NetworkDiscovery.exe.

To access the Standalone VGA Grid's web interface via the Epiphan discovery utility:

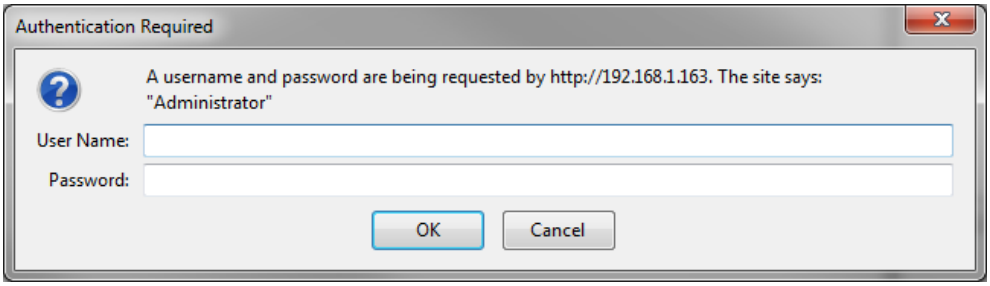
1. Launch the discovery utility.
2. Click **Search** to find all the Epiphan systems on the network; a list similar to the following appears.



3. If more than one system appears, select the one you wish to configure by matching the serial number listed with the serial number marked on the back of the system.
4. Optionally, note the **IP Address** shown in the stream properties. Use this for quicker access to the system on future configuration sessions.
5. Click the **Web config** button; your browser will open and point to the web interface page.

> http://<IP Address for Standalone VGA Grid>/admin

6. Enter the user name and password then click **OK**. The administrative user is 'admin'. Initially no password is set. To set a password follow the procedure outlined in User administration.



Connect via persistent static IP address

Your Standalone VGA Grid has a default persistent static IP address, also known as the **recovery IP address**. If ever you need to set it up on a network that does not support DHCP, or you need to recover from a previous static IP address setting, you can use this method to connect directly to the system for configuration.

To perform this procedure you will need a workstation computer for which you are able to modify network settings.

The Standalone VGA Grid is pre-configured with the following static address defaults:

- IP Address: 192.168.255.250
- Netmask: 255.255.255.252
- Username: admin
- Password: your admin password (by default set to no password)

To access the Standalone VGA Grid's web interface via the persistent static IP address:

1. Establish an Ethernet connection between the Standalone VGA Grid and the workstation by one of the following methods:
    a. Connect the system to a local Ethernet network shared with the workstation.
    b. Connect the system directly to the workstation's Ethernet port using either a regular or a crossover Ethernet cable.
2. Record the network settings of the workstation being used to connect to the Standalone VGA Grid so that they can be restored later.
3. Temporarily change the network configuration on the workstation to the following:
    a. Use Static IP assignment
    b. IP address: 192.168.255.249
    c. Subnet mask: 255.255.255.252

4. Start a web browser on the workstation and browse to: **http://192.168.255.250/admin/**
5. Log in as the administrator user with the user name admin and the admin password (by default there is no password); the web interface page opens.
6. Click the **Networking** link in the Configuration menu.
7. Select the radio button to **use a static address** and configure the system with a static IP address and network settings relevant to the network being used. For specific details about the settings presented, see Configure network settings.
8. Restore the previously saved network configurations on the workstation.

User administration

The Standalone VGA Grid has three configured users:

- admin
- operator
- viewer

By default, none of these users have passwords. For security purposes you should add passwords to the admin and operator accounts.

This section describes the following user administration topics:

- User types and privileges
- Set or change user passwords
- Remove user passwords
- Overcome lost passwords
- Configure LDAP
- Change the logged-in user
- Restrict viewers by IP address

User types and privileges

Standalone VGA Grid's three user accounts are admin, operator and viewer. The user account names cannot be changed and the accounts cannot be disabled. By default, none of the accounts have passwords.

Admin

The admin account is the main operator used for all system configuration. This user has access to all options in the web interface.

Operator

The operator account is a subclass of the admin account. The operator can log in and view all configuration items but may only make changes to a small number of options. This account is intended for an operator to start and stop recordings, download recordings, switch layouts while live streaming or perform network diagnostics.

Viewer

The viewer account is for all end-users who are permitted to view the streamed channels. By default, when there is no password, users are not prompted for a username and password when viewing a channel. The viewer username and password prompt appears only when there is a viewer password set.

In addition to the global viewer account, each channel can set a viewer password that overrides the global value. See Restrict access to streams for viewers.

Current user

When logged in to the web interface, the current username is displayed at the top right corner of the screen.



User privileges

The following table outlines the privileges for each user:

Table 5 *User privileges in the web interface*

Action or Menu Option	viewer	operator	admin
View Channel Output	✓	✓	✓
Channel Operations			
View Channel Configuration		✓	✓
Rename a Channel			✓
Configure Stream Channel			✓
Configure Stream Sources			✓
Publish a Stream			✓
Configure Branding for a Channel			✓

Action or Menu Option	viewer	operator	admin
Switch Layouts while Streaming/Recording		✓	✓
Start the Stream Recorder		✓	✓
Stop the Stream Recorder		✓	✓
View Recorded Files List		✓	✓
Download Recorded Files		✓	✓
Delete Recorded Files		✓	✓
Source Operations			
View Source Configuration		✓	✓
Rename Source			✓
Configure Source		✓	✓
View Source Snapshot		✓	✓
System Configuration Operations			
View System Configuration		✓	✓
Configure Automatic File Upload			✓
Select External USB Drive Behavior			✓
Configure FTP Server			✓
Configure UPnP Sharing			✓
Configure Network Address			✓
Configure USB Tethering			✓
Perform Network Diagnostics		✓	✓
Configure Date and Time preferences			✓
Set or Change User Passwords			✓
Configure the Touch Screen			✓
Configure Serial Port Flow Control			✓

Action or Menu Option	viewer	operator	admin
Upload Branding Images			✓
Upload Branding Templates			✓
Select Branding Template			✓
Enable Remote Support			✓
Backup Device Configuration			✓
Restore Device Configuration			✓
Restore Factory Configuration			✓
Reboot Device (via Web Interface)			✓
Shutdown Device (via Web Interface)			✓
Configure Time Until Next Disk Check			✓
Perform Disk Check			✓
View Disk Information		✓	✓
Rebuild/Clean Storage Disks			✓
Upgrade Firmware			✓
View System Information		✓	✓

Set or change user passwords

By default, admin, operator and viewer have no assigned passwords. Both the admin and the operator user have access to the web admin interface, so you should always set a password for both admin and operator accounts. Refer to your system administrator for your organization's specific password requirements.



If the admin password is defined and the operator password is undefined, then the operator uses the admin password by default.

In addition to setting global passwords for viewers, you can also set access passwords and IP restrictions on a per-channel basis from the channel's **Streaming** page. See Restrict viewers by IP address.

Passwords are case sensitive and can use all alpha-numeric keys in the ASCII range. Your password can be up to 255 characters long, but should not include any spaces.

Setting a user's password causes the user to be logged out. Be ready to log back in with the new admin password or have operators and viewers log in with the appropriate new password. Viewers may need to refresh their browser window or press play in their media player.

If you lose the admin password, refer to the section Overcome lost passwords.

Changing the admin password while live streaming disrupts the view of the stream for viewer-level users. Complete any admin password changes when there is no live stream in progress.

To set a user password:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Highlight and delete the **current password** for your selected user (the password is currently masked as dots).

   For security reasons, the current password appears as eight dots regardless of password length, and even if there is no password set.

5. Highlight and delete the **confirmation password** for the selected user.
6. Select the user's **password** field and type a new password for the user.

   The new password must have between 1-255 alpha-numeric characters or special characters with no spaces. Passwords are case sensitive.

7. Select the user's **password confirmation** field and confirm the new password.
8. Click **Apply**.
9. If you were logged in as the user whose password you just changed, you are logged out and must log back in with the new password. If you added or changed the viewer's password, all viewer's stream will pause until they log in with the new password.

If desired, you may specify multiple account passwords on the same page before clicking Apply.

Remove user passwords

If you want to remove passwords for one or more user accounts, you may do so via the web interface. If you don't remember the admin password, refer to the section Overcome lost passwords.

Note that viewer passwords can be set on a per-channel basis.



Clearing a user's password will cause that user to be logged out. Be ready to log back in with the new admin password. If viewers are watching the broadcast when the viewer password is cleared they will be logged out. Viewers may need to refresh their browser window or press play in their media player to trigger the login prompt.

To clear a user's password:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Highlight and delete the current password for your selected user (the password is currently masked as dots).



For security purposes, the current password appears as eight dots regardless of password length, and even if there is no password set.

5. Highlight and delete the **confirmation password** for the selected user.
6. Click **Apply**.
7. If you were logged in as the user whose password you just cleared, you are logged out and must log back in without a password. If you cleared the viewer's password, all viewer streams will pause until they log in without a password.

To clear a user's password on a specific channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. Click the **Streaming** link for the channel; the channel's Streaming configuration page opens.
4. From the Access control section do one of the two following things:
    a. clear the **viewer password** field; or
    b. select **Use global settings** from the access control drop down.
5. Click **Apply**.

Overcome lost passwords

If you have lost the password for the operator or viewer account, you can log in to the web interface as admin and reset the password using the procedure described in Set or change user passwords.

If you have lost the admin password and you have remote support enabled on the system, you can contact Epiphan support to request a remote password change. See Support. If remote support is disabled, you will need to return the system to Epiphan for password recovery. Contact Epiphan support to discuss this option.

Configure LDAP

You can use the Lightweight Directory Access Protocol (LDAP) for authentication into the system. Specify user roles by using group DNs for users who log in as the administrator, operator or as a viewer.



The system has only **one** admin user and **one** operator: LDAP users log in as either the admin or operator, they do not have their own private profiles.



When enabled, LDAP authentication is an **alternative** to the regular system usernames and passwords. You may still login as **admin**, **operator** or **viewer** using the passwords for those accounts. Furthermore, any LDAP users with the name admin, operator or viewer are ignored. The local accounts are used instead.

For security reasons, you should configure passwords for the local accounts. See **Configure LDAP**.

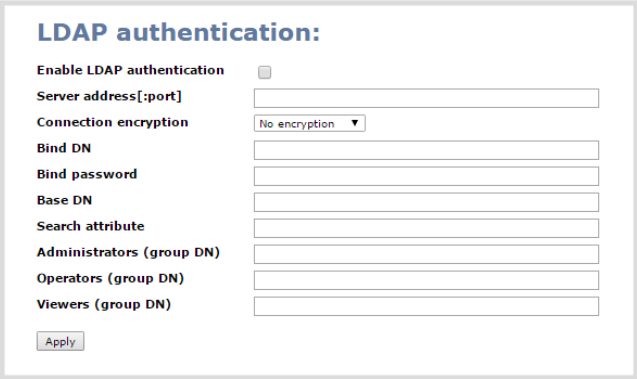
These instructions assume you have a pre-configured LDAP server. The server must support anonymous binding or have a special bind account with search access privileges. (Note that Active Directory does not support anonymous binding.)



LDAP referrals, restrictions and failovers are not supported.

To configure LDAP authentication for your Standalone VGA Grid:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Scroll to the **LDAP authentication** section.



5. Click the **Enable LDAP authentication** checkbox to enable LDAP authentication (or uncheck to disable).
6. Specify the server IP address and (optional) port for your LDAP server (i.e. 192.168.1.101:389) in the **Server address[:port]** field.
7. Use the **Connection encryption** drop-down to specify the type of encryption, if any used by your LDAP server.

Connection encryption	Description/Default port used
No Encryption	No encryption is used to connect to the LDAP server. The default port is 389.
SSL	SSL encryption is used to connect to the LDAP server. The default port is 636.
TLS/STARTTLS	The connection is initially unencrypted then upgraded to TLS encryption is used. The default port is 389.

8. Specify the fully qualified DN and password for LDAP bind in the **Bind DN** and **Bind password** fields. (The password masked as dots on the screen.) These fields are only needed if your LDAP server does not support anonymous binding.
9. In **Base DN**, specify the baseObject in which to search for entries. The system will search this object and the whole subtree starting at the base DN.

10. By default the search attribute is *uid*, which is suitable for a unix environment. Specify a different value in the **Search attribute** field, if needed. For Active Directory environments, specify *userPrincipalName*. The value of this attribute must be unique in the Base DN.
11. In the **Administrators (group DN)** field, specify the distinguished name of the group users must be part of to be logged in as the administrator. Users must have the *member* or *unqueMember* attribute for the specified group to be granted Administrator access.
    If left blank, LDAP is not supported for Administrators (but can still be used for Operators and Viewers).
12. In the **Operators (group DN)** field, specify the distinguished name of the group users must be part of to be logged in as the operator. Users must have the *member* or *unqueMember* attribute for the specified group to be granted Operator access.
    If left blank, LDAP is not supported for Operators (but can still be used for Administrators and Viewers).
13. In the **Viewers (group DN)** field, specify the distinguished name of the group users must be part of to be logged in as a viewer. Users must have the *member* or *unqueMember* attribute for the specified group to be granted Viewer access.
    If left blank, LDAP is not supported for Viewers (but can still be used for Administrators and Operators).
14. Click **Apply**.

When a user of the LDAP server next visits the admin or viewer page for the system, the system prompts for use the username and password. For ActiveDirectory servers, the user needs to enter his fully qualified username (i.e. username@domainname) in addition to his LDAP password.



Users are required to authenticate once to the system and one time per channel they view. Therefore users see a prompt to log in to the system (the system name is shown) and a second time to log in to the channel (the channel name is shown).



In one case, LDAP replaces the local **viewer** account instead of working side-by-side with it.

When LDAP is enabled and the viewer account has no password (either there is no global viewer password or the channel overrides the global password with a blank password), the viewer must authentication with LDAP, he may **not** alternatively use the **viewer** account with a blank password.

Change the logged-in user

When you log in to the web interface as admin or operator, your browser remembers this configuration and automatically logs you in as the same user when you go back to the site.

Sometimes you need to change from operator to admin, or vice versa.

To change the logged-in user:

1. Exit your browser completely, open an incognito/private window in your browser, or open a different browser (i.e. Internet Explorer, Chrome, and Safari are different browsers).
2. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
3. You are prompted for a username and password.

Restrict viewers by IP address

The Standalone VGA Grid permits you to restrict which computers can access broadcasts by building a list of allowed and/or denied IP addresses. You can do this at a global level for the system and can also override these settings on a per-channel basis. Both global and per-channel configuration procedures are described below.



IP address restriction is valid for the viewer only and does not affect the web admin interface or the mobile configuration interface.

If your viewer account has a password, your viewers must connect to the system from a computer (or gateway) with a permitted IP address and must also supply the username (viewer) and password before they can view the broadcast.

To restrict access by IP address you need to know the IP addresses, or range of addresses for your viewers. By default all IP addresses are allowed to connect to the broadcast.

If you're not familiar with creating allow/deny lists, refer to the examples below this procedure for assistance with crafting your lists.

To restrict viewers by IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Type allowed IP addresses or address ranges in the **Allow IP's** field. Separate addresses with a comma.
5. Type denied IP addresses or address ranges in the **Deny IP's** field. Separate addresses with a comma.
6. Click **Apply**.

To restrict viewers of a specific channel by IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.

2. Login as admin.
3. Select the **Streaming** link for the desired channel; the streaming configuration page opens.
4. From the **Access Control** drop-down, select **Use these Settings**; local password and Allow/Deny IP lists are enabled.
5. If desired, type a password for the viewer in the **Viewer Password** field.
6. Type allowed IP addresses or address ranges in the **Allow IP's** field. Separate addresses with a comma.
7. Type denied IP addresses or address ranges in the **Deny IP's** field. Separate addresses with a comma.
8. Click **Apply**.

If a user attempts to connect to the stream from a disallowed IP address, access is denied. If connecting by internet browser, the message "IP address rejected." is displayed.

The following table describes the applicable fields.

Table 6 *IP Based Restriction Fields*

Label	Description/Options
Allow IP's	Enter individual IP Addresses or IP Address ranges, separated by commas. To specify a range, use a hyphen (-). Optional spaces improve readability. Users connecting from addresses in this list are permitted to view broadcasts from the system, provided their IP address is not in the Deny IP's list. To allow all (except IP addresses in the deny list, if any), leave the field blank. You can use the Allow list by itself, or in conjunction with the Deny IP's list as an exception to a rule in the allow list.
Deny IP's	Enter individual IP Addresses or IP Address ranges, separated by commas. To specify a range, use a hyphen (-). Optional spaces improve readability. Users connecting from addresses in this list are not allowed to view broadcasts from the system, unless their IP address is in the Allow IP's list. If a specific IP address is in both lists, access to the stream is denied. You can use the Deny list by itself, or in conjunction with the Allow IP's list as an exception to a rule in the allow list.

IP restriction examples

Allow list with distinct IP addresses

The simplest allow/deny list is to use the list of known IP addresses to craft a list of allowed IP addresses. All other addresses are denied access to the broadcast.

For example if your system is accessible on your local area network (LAN) and you want to make sure only the CEO's specific desktop, laptop and tablet computers (with IP Addresses 192.168.1.50, 192.168.1.51, and 192.165.1.75, respectively) can connect to the broadcast, construct the following allow list:

```
Allow: 192.168.1.50, 192.168.1.51, 192.168.1.75
```

Allow list with a range of IP addresses

Sometimes you'll want a range of computer IP addresses to connect to your system. This may happen when you have one range of IP addresses assigned to desktop computers (i.e. in the range 192.168.1.1 to 192.168.1.100) and another range assigned to boardroom computers (i.e. the range 192.168.1.200 to 192.168.1.250). If you only want the boardroom computers to connect to broadcasts from the system you can specify the range of boardroom IP addresses rather than needing to type in each individual address. The allow list looks as follows:

```
Allow: 192.168.1.200-192.168.1.250
```

Note that we could have specified two of the IP addresses in the previous example as a range.

Allow list with a range of IP addresses and one or more specific IP addresses

Putting the first two examples together, we want to permit access to IP addresses in the range of boardroom computers (192.168.1.200-192.168.1.250) and also want to add the desktop, laptop and tablet computers of the CEO (IP addresses 192.168.1.50, 192.168.1.51, and 192.168.1.75, respectively). Note the first two IP addresses are consecutive, so they can be added as a second range. Add these IP addresses to the list as follows:

```
Allow: 192.168.1.200-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75
```

Your list can have multiple ranges and multiple distinct IP addresses, provided they are separated by commas.

Deny list with distinct IP addresses

Another simple allow/deny list is to use the list of known IP addresses to list specific denied IP addresses. All other addresses are allowed access to the broadcast.

For example imagine your system is accessible on your local area network (LAN) and you want to allow any computer on the LAN can access the stream except your publicly-accessible boardroom (with IP address 192.168.1.211). You can use the following deny list (leave the allow list empty) to permit all computers except the boardroom computer:

```
Deny: 192.168.1.211
```

As with allow lists, your deny list can specify a range of IP addresses, and can specify multiple ranges or distinct IP addresses in a comma-separated list.

Allow list with a range of IP addresses, distinct IP addresses and an exception

Building on the previous examples, consider the situation where you want the CEO's computers (192.168.1.50, 192.168.1.51, 192.168.75) and all boardroom computers (192.168.1.200-192.168.1.250) to access the broadcast, with the exception of the public boardroom computer (192.168.1.211). Use both allow and deny lists to create the rule as follows:

```
Allow: 192.168.1.200-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75

Deny: 192.168.1.211
```

Both lists can have multiple ranges and multiple distinct IP addresses, provided they are separated by commas.

Deny list with a range of IP addresses

Converse to the previous examples, consider the situation where you want every computer on the network to access the broadcast, with the exception of the CEO's desktop, laptop and tablet computers. Additionally, boardroom computers should not be permitted with the exception of the cafeteria computer (IP address 192.168.1.222).

The deny list is an "exception" list for the allow list. So to craft the rule described above we need to allow all the computers in the local subnet, then deny specific sub-ranges including two groups of boardroom computers ensuring the cafeteria computer's IP address is not in the deny list:

```
Allow: 192.168.1.1-192.168.1.250

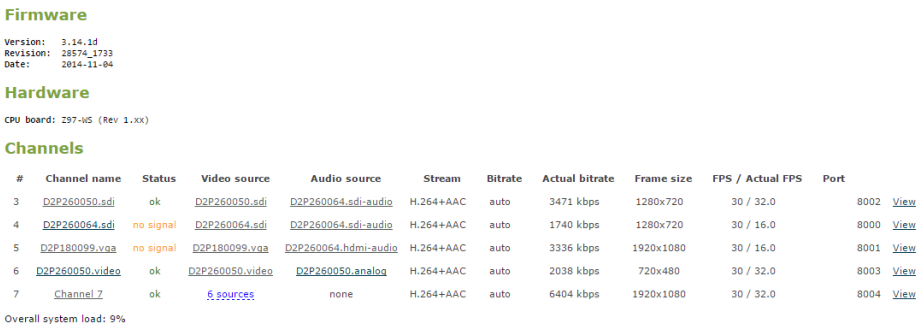
Deny: 192.168.1.200-192.168.1.221, 192.168.1.223-192.168.1.250, 192.168.1.50-192.168.1.51,
192.168.1.75
```

View system information

The system information page provides a great deal of useful information about your Standalone VGA Grid. Use the Info link from the Configuration menu to view your current firmware level, system hardware version (if available) and currently configured channels.

To view system information:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, scroll to the Configuration menu option.
4. Click **Info**; the system information page opens.



Firmware

Version: 3.14.1d
Revision: 28574_1733
Date: 2014-11-04

Hardware

CPU board: Z97-WS (Rev 1.xx)

Channels

#	Channel name	Status	Video source	Audio source	Stream	Bitrate	Actual bitrate	Frame size	FPS / Actual FPS	Port	
3	D2P260050.sdi	ok	D2P260050.sdi	D2P260064.sdi-audio	H.264+AAC	auto	3471 kbps	1280x720	30 / 32.0	8002	View
4	D2P260064.sdi	no signal	D2P260064.sdi	D2P260064.sdi-audio	H.264+AAC	auto	1740 kbps	1280x720	30 / 16.0	8000	View
5	D2P180099.vga	no signal	D2P180099.vga	D2P260064.hdmi-audio	H.264+AAC	auto	3336 kbps	1920x1080	30 / 16.0	8001	View
6	D2P260050.video	ok	D2P260050.video	D2P260050.analog	H.264+AAC	auto	2038 kbps	720x480	30 / 32.0	8003	View
7	Channel 7	ok	6 sources	none	H.264+AAC	auto	6404 kbps	1920x1080	30 / 32.0	8004	View

Overall system load: 9%

3. Use the information displayed to get an overview of your system, troubleshoot problems or view streams for configured channels.

Configure network settings

By default the Standalone VGA Grid uses DHCP to obtain an IP Address via an Ethernet-based network. If you want to change the network settings, or if you're having network-related issues, this section covers the network-related topics.

- Verify IP Address and MAC address
- Configure a static IP address
- Configure DHCP
- Tether to a mobile network
- Perform network diagnostics

Verify IP Address and MAC address

The web interface shows you the system's MAC address and current IP Address via the Network configuration page.

To view settings on network configuration page:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.
4. Note the **MAC address** and **Current IP address** listed at the top of the page.

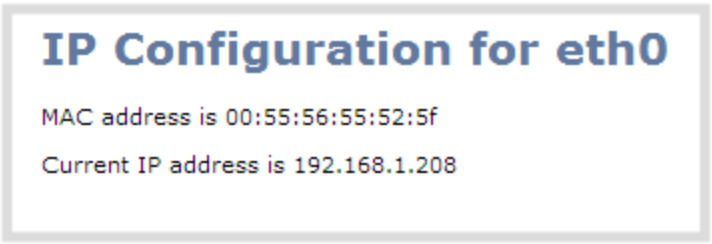


Table 7 *Network Information Fields*

Label	Description/Options
MAC Address	A media access control address (MAC address) is a unique identifier for the network interface. The value is read-only and cannot be changed. You may need to share this value with your system administrator.

Label	Description/Options
Current IP Address	Reflects the current internet protocol address (IP address) of the system. This value is either obtained from the DHCP server (if using DHCP) or is the configured static IP address. The Standalone VGA Grid supports IPv4 addresses. It does not support IPv6 addresses.

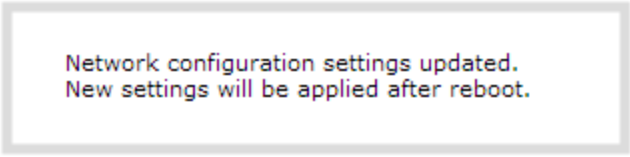
Configure DHCP

Occasionally, such as when moving your system to a new network, your Standalone VGA Grid must switch from static IP address allocation to dynamic allocation via DHCP. You can accomplish this in four ways:

- Restore factory settings, clearing all your custom settings. See Perform factory reset.
- Load a configuration file that uses DHCP networking. See Load a saved device configuration.
- Apply a configuration preset that uses DHCP networking. See Configuration presets.
- Change the network settings. See the procedure below.

To configure use of DHCP for networking:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.
4. Select the radio button **use DHCP**, if not already selected.
5. Change the **MTU Size** value only if needed. See the table below for information on maximum transmission unit (MTU) values.
6. Click **Apply** to save the changes; the changes are saved and a message appears asking you to reboot.



7. Select the **Maintenance** link under the Configuration menu; the maintenance page appears.
8. Click the **Reboot Now** button near the bottom of the page.
9. Wait for the system to reboot.
10. Connect to the admin interface using your preferred connection mechanism. SeeConnect to the admin

interface.

11. Log as admin and reload the Networking page to verify all changes were applied.

The following table describes the fields applicable when configuring DHCP on the Standalone VGA Grid.

Table 8 *DHCP Fields*

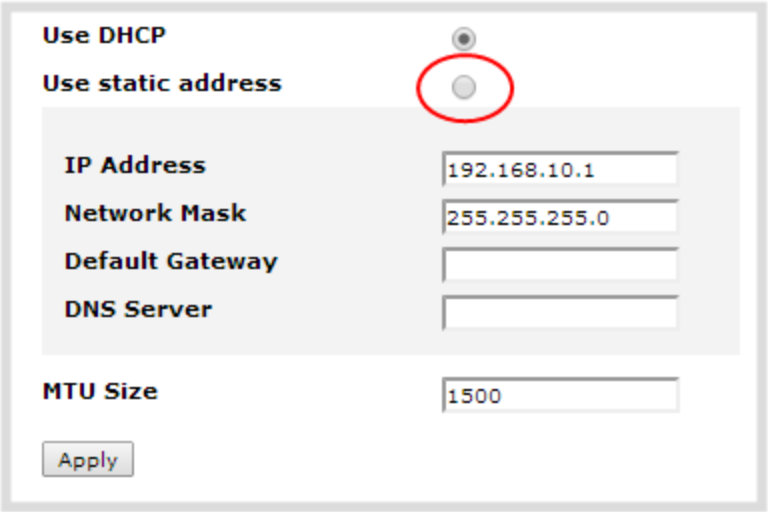
Label	Description/Options
Use DHCP	Select this radio button to dynamically obtain an IP address at boot up.
Use static address	Select this radio button to use the configured static IP address.
MTU Size	The maximum transmission unit (MTU) specifies the maximum packet size for transfer on the network. The default value is 1500, which is the largest value allowed by Ethernet at the network layer. It's best if all nodes in your network use the same value, so only change this value if you know other nodes use a different value.

Configure a static IP address

Your network administrator may require you to use a static IP address for your Standalone VGA Grid.

To configure a static IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.



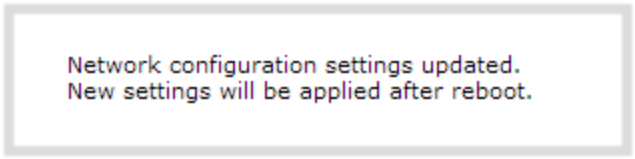
4. Select the radio button **use static address**, if not already selected.
5. Enter the desired **IP Address** and **Network Mask**.

Only IPv4 addresses are supported.

6. Enter the **Default Gateway** address. If you do not have a default gateway for your network, enter the same static IP address as in the previous step.

The default gateway cannot be left blank. If no default gateway is specified, unexpected behavior occurs.

7. Enter the **DNS Server** address. If you do not have a DNS server, enter the new static IP address of the system.
8. Change the **MTU Size** value only if needed. See the table below for information on maximum transmission unit (MTU) values.
9. Click **Apply** to save the changes; the changes are saved and a message appears asking you to reboot.



10. Select the **Maintenance** link under the Configuration menu; the maintenance page appears.
11. Click the **Reboot Now** button near the bottom of the page.
12. Wait for the system to reboot.
13. Open the Web interface using the new IP address.
14. Log as admin and reload the **Networking** page to verify all changes were applied.

The following table describes applicable fields when setting a static IP address.

Table 9 *Static IP Address Fields*

Label	Description/Options
Use DHCP	Select this radio button to dynamically obtain an IP address at boot up.
Use static address	Select this radio button to use the configured static IP address.
IP Address	The internet protocol address (IP Address) to assign. This value is may be obtained from your system administrator. The Standalone VGA Grid supports IPv4 addresses. It does not support IPv6 addresses.

Label	Description/Options
Network Mask	Also called the subnet mask, this value denotes a range of IP addresses. This value may be obtained from your system administrator, determined from another computer on the same subnet, or calculated using an online subnet calculator.
Default Gateway	The network node that serves as an access point to the rest of the network. This value cannot be blank unless you are using DCHP. Specify the system's IP address if you don't have a default gateway on your network.
DNS Server	The domain name system server (DNS server) translates human-readable hostnames into corresponding IP addresses. Specify the system's IP address if you don't have a DNS server on your network. This value cannot be blank unless you are using DHCP.
MTU Size	The maximum transmission unit (MTU) specifies the maximum packet size for transfer on the network. The default value is 1500, which is the largest value allowed by Ethernet at the network layer. It's best if all nodes in your network use the same value, so only change this value if you know other nodes use a different value.

Tether to a mobile network

The Standalone VGA Grid supports tethering to a mobile device via USB. Tethered networking can work side-by-side with Ethernet routing and either networking system can be a back-up for the other.



When the system falls over to the backup network type (i.e. from Ethernet to mobile, or vice versa) all streaming sessions with clients or servers directly connected to the system are closed and the clients will need to reconnect. You may need to provide a new stream URL (containing the new IP address) to your viewers. See the channel information page to get the new stream URL.

By contrast, actively published streams are closed and reconnected via the secondary network (mobile or Ethernet) automatically, permitted the required publishing server is accessible from the new network.

To configure tethering to a mobile network:

1. Configure the mobile device to allow tethering via USB.
2. Connect the mobile device to the Standalone VGA Grid with a USB cable.
3. Connect to the admin interface using your preferred connection mechanism. SeeConnect to the admin interface.
4. Login as admin.

5. Select the **Network** link in the Configuration menu; the network configuration page opens.
6. Click the drop-down box next to **Use phone/tablet connection** in the USB phone/tablet section; the following choices appear:

   Table 10 *Mobile Tethering Options*

Label	Description/Options
Disabled	Specifies that no USB tethering is permitted.
No tethering	Specifies that USB tethering is available for connecting a mobile device as a configuration utility (i.e. using the web browser), but no mobile data is used.
Prefer ethernet	When chosen, the system tries to use the Ethernet network first. It switches to use the mobile network (tethering) when the Ethernet network is no longer available. To prevent viewer interruptions, mobile data will continue to be used until the mobile network is down or publishing is restarted.
Prefer tethering	When chosen, the system tries to use the mobile network (tethering) first. It switches to use Ethernet (hard-wired) when the mobile network is no longer available. To prevent viewer interruptions, Ethernet data will continue to be used until the Ethernet network is down or publishing is restarted. Select this setting if you only have a mobile network.

7. Select your choice based on the table above.
8. Click **Apply**.

Perform network diagnostics

If your Standalone VGA Grid has network trouble, you can perform basic network troubleshooting tasks from the Network configuration page. In addition to providing the system's IP address and MAC address to your network administrator, you can also ping an IP address or use traceroute to determine the path taken to an address.



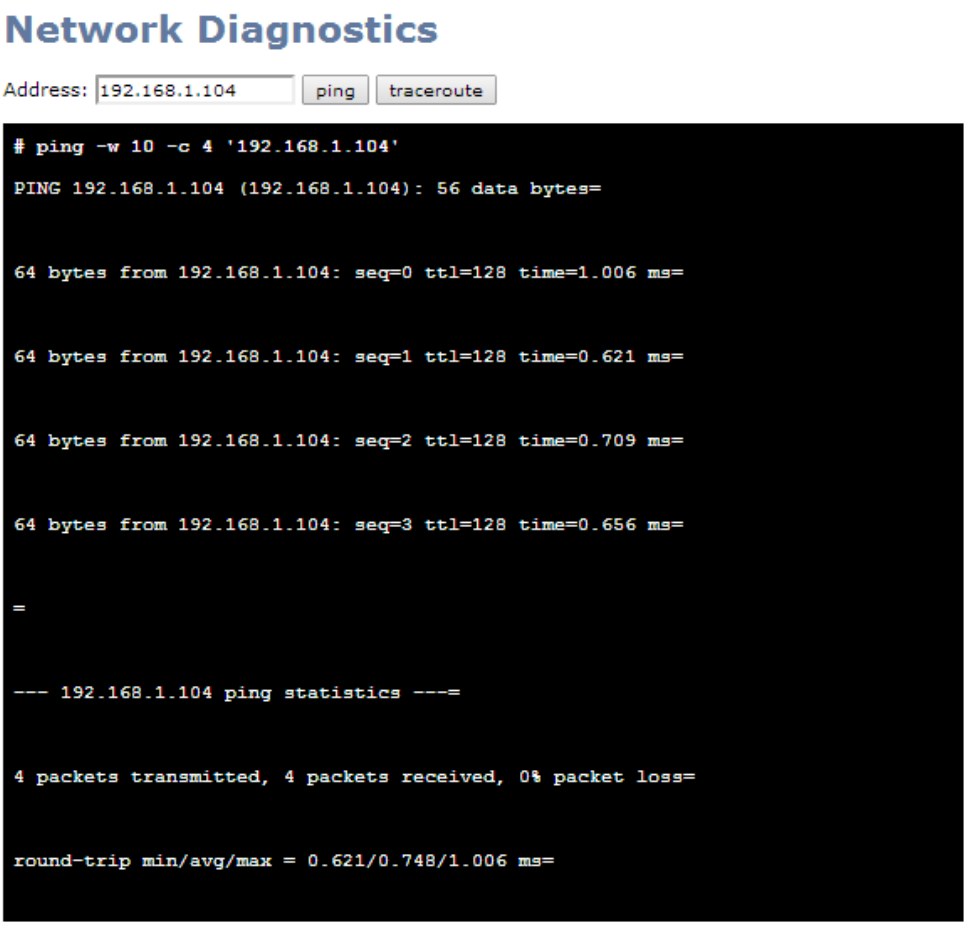
Not all networks support ping and traceroute.

To ping or traceroute an IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.



4. Click **ping** or **traceroute**; an animation appears to the left of the address to indicate processing is underway.
5. Upon completion of the command, read the results from the console-like display is shown below the Network Diagnostics setting.



Configuration presets

In situations where you have changing configuration requirements for your Standalone VGA Grid, you can use configuration presets to quickly and easily apply sets of pre-configured settings.

For an overview of configuration presets, see:

- Configuration presets overview

This section also covers the following related topics:

- Configuration groups
- Create a configuration preset
- Apply a configuration preset
- Apply the Factory default configuration preset
- Update a configuration preset
- Delete a configuration preset

There are also some very important configuration preset considerations to review:

- Configuration preset considerations

Configuration presets overview

Configuration presets make it easy to use your Standalone VGA Grid in a variety of situations without needing to reconfigure it. Configuration presets divide the system's settings into the following configuration groups. (For a complete list of what is included in each group see Configuration presets overview.)



System



Sources



Automatic file uploads



Network



Channels

Using the **Configuration presets** section of the **Maintenance** page, you can create configuration presets using any number and combination of the configuration groups. Mix and match the settings groups saved together to create sets of configuration settings needed for each situation. You also always have a special **Factory default** configuration preset (which cannot be erased) to help you return to factory configuration without destructively erasing files saved to the system hard drive (see Configuration presets overview

It's important to note that configuration presets are *applied over* existing settings. They affect only the settings groups included in the preset, all other settings are unaffected. Read the Configuration presets overview section carefully to understand caveats around using configuration presets.

Example of configuration presets in action

A recording and streaming company brings Standalone VGA Grid to a conference as part of a portable rack. Each conference session needs to be streamed and recorded with a picture in picture layout that includes identifying information about the presenter in the metadata and the background image for the stream. Automatic file upload is needed to make sure the files are uploaded right after each session is complete.

The company could bring Standalone VGA Grid in a factory configured state and get it ready between each session, but this requires a trained operator and doesn't allow much time to get multiple operations completed.

Instead, the company could connect the system to their own corporate network before the show, upload the required backgrounds, and create channel configuration presets for each conference track. They can also create network and automatic file upload (AFU) presets for each of the home and remote locations. Once at the conference, the only changes necessary are to apply the network and AFU preset upon arrival, and the channel configuration presets between sessions.

Channel configuration presets include links to background files used, but do not include the files themselves see **Branding content**. Be careful when deleting background images and logo files.

Internal network and AFU preset

The company uses this preset when configuring and testing from their corporate network. It uses a static IP address on their corporate network and AFU that uses ftp to upload to a local ftp server.



Conference network and AFU preset

The company applies this preset to the Standalone VGA Grid when they arrive at the conference. It changes only the network and AFU settings (using a conference-specific IP address and secure file transfer to an ftp server).

When applying this configuration preset, all other information including passwords, date/time, channels and source configurations, remains the same.



Conference session 1 preset

The company applies this preset from the corporate office when testing and at the conference prior to conference session 1 starting. All other preset groups remain unchanged, this preset only affects the channel (s) and their configuration. This preset includes a channel with a link to the correct background filename (the background file was uploaded during pre-show configuration at the corporate office) and has metadata specifying the speaker's name.



Conference session 2 preset

The company applies this preset from the corporate office when testing and at the conference prior to conference session 2 starting. After applying this preset the files recorded from session 1 remain present on the system and continue to upload via sftp (if not yet complete), but the channels reflect the session 2 background file name and presenter name.



Configuration presets are a versatile tool to help you use Standalone VGA Grid in a variety of changing conditions. Try it yourself and see!

Configuration groups

The following table describes what settings are saved with each configuration group.

Table 11 *Configuration group definitions*

Group Name	Symbol	Settings included in the configuration group
System		Date and time settings, serial port settings, remote support settings, custom disk check schedule, access passwords, deny/allow lists and LDAP configuration settings
Network		Network settings and tethering configuration.
Sources		All audio and video source configuration settings.
Channels		All channel configuration data and current recording state, all layouts, all recorder configuration data and current recording state, individual and global UPnP settings.
AFU		Automatic file upload type and parameters.

Note that **branding content**, **recorded files** and SFTP/SCP **private keys** are not included in any configuration preset.

Updloaded **EDID** configurations are applied immediately to the system and remain the norm for the source until a new EDID is uploaded. Configuration presets do not affect EDIDs.

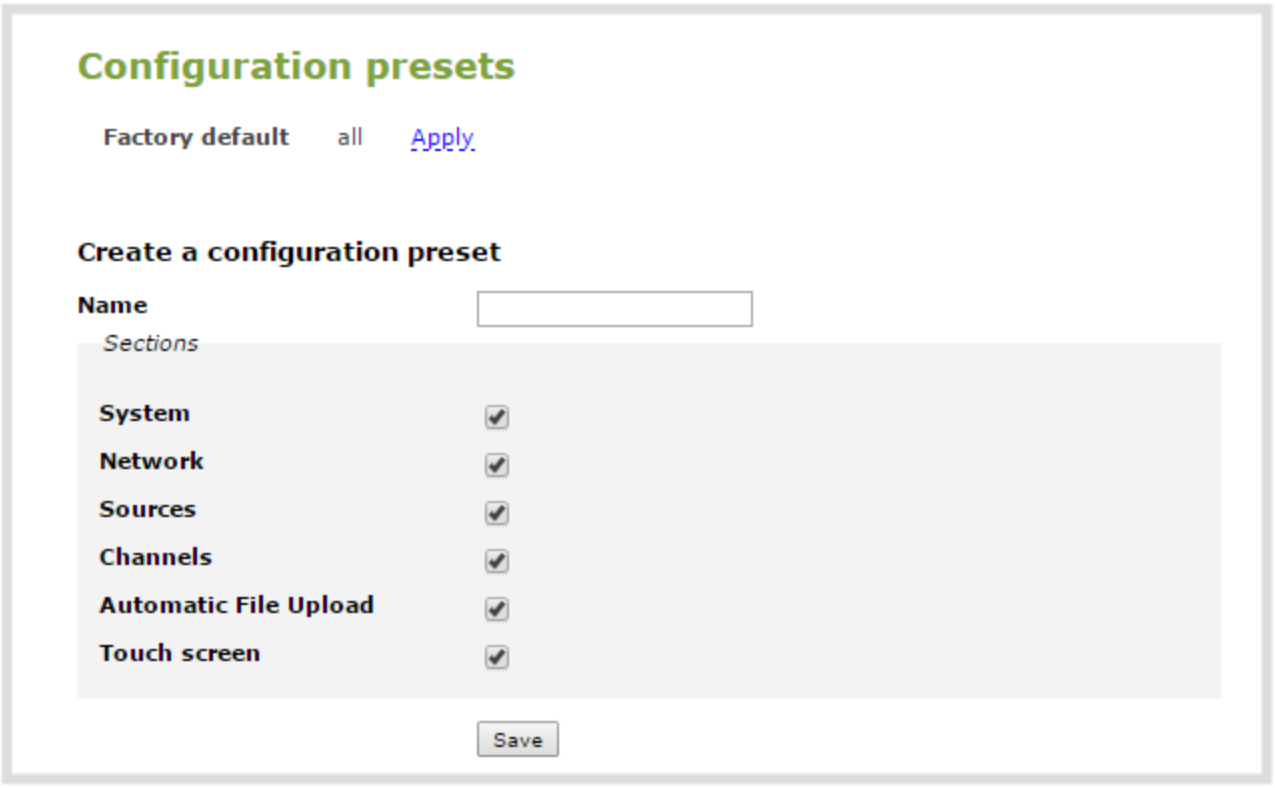
Create a configuration preset

You can create as many configuration presets as you need. The system keeps track of which configuration groups are part of the preset and you provide a name that lets you know the significance of the preset.

Note that configuration presets that include **network** or **system** settings require a system reboot when applied.

To create a configuration preset:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Scroll to the **Configuration presets** section.



5. Type a description for your preset in the **Name** field.
6. Ensure only the desired configuration groups are selected from the **Sections** group.
7. Click **Save**; your configuration preset appears in the list.

Apply a configuration preset

When you apply a configuration preset, the system settings for all included configuration groups are updated. Other settings on the system are not affected. For example if you apply a preset that includes the configuration groups **channnels** and **automatic file upload**, your network settings, passwords, time server, source configurations, etc are not modified. Similarly if you apply a configuration preset that has only **network** settings included, only the network settings change.

If you apply a preset that has the **network** or **system** configuration group, a reboot is required.

You can verify which configuration groups are included in a preset by looking at the list to the right of the configuration preset name. The term 'all' means all groups are included. Otherwise groups are listed individually.

You may apply multiple presets one after another. If you apply two (or more) configuration presets that include a particular configuration group, the settings (for that group) from the last applied preset are the active settings. In short, last in wins.

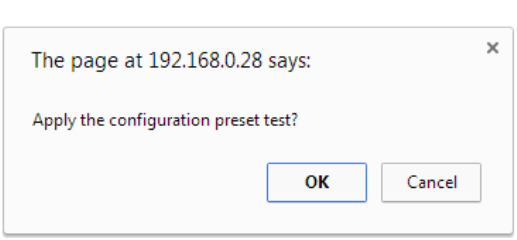
To apply a configuration preset:

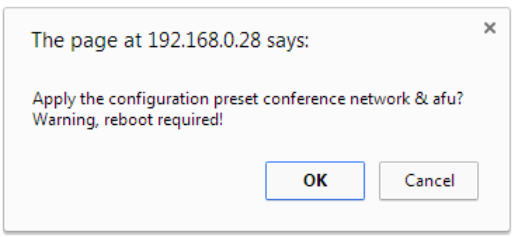
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Scroll to the **Configuration presets** section.
5. Click **Apply** next to the configuration preset you wish to apply.



6. The system asks for confirmation before proceeding.

If the configuration preset includes the **network** or **system** configuration groups, a reboot is necessary.





7. Click **OK** to apply the configuration preset; the configuration preset is applied.
8. The system reboots if needed.

Apply the **Factory default** configuration preset

Your Standalone VGA Grid comes with a special factory default configuation preset. This configuration preset cannot be erased and is always presented at the top of the configuration presets list. It contains all possible configuration settings groups.

Using the Factory default configuration setting is similar to using the Factory reset method (see Perform factory reset) with a few important differences.

In short, the **Factory default** configuration preset is less destructive than **Factory reset**. This table describes the exact differences.

Table 12 *Factory default configuration preset vs Factory reset*

	Factory default configuration preset	Factory reset function
Deletes all created channels	✓	✓
Deletes all recorded files in channels		✓
Deletes all created recorders	✓	✓
Deletes all recorded files in recorders		✓
Resets network configuration	✓	✓
Resets touch screen configuration	✓	✓
Resets user passwords	✓	✓
Deletes all created configuration presets		✓
Deletes all branding files		✓
Resets all Source settings	✓	✓
Deletes all Automatic file upload settings	✓	✓

To apply the factory default configuration preset, follow the instructions in Apply the Factory default configuration preset and select the **Factory default** preset. A reboot is required.

Update a configuration preset

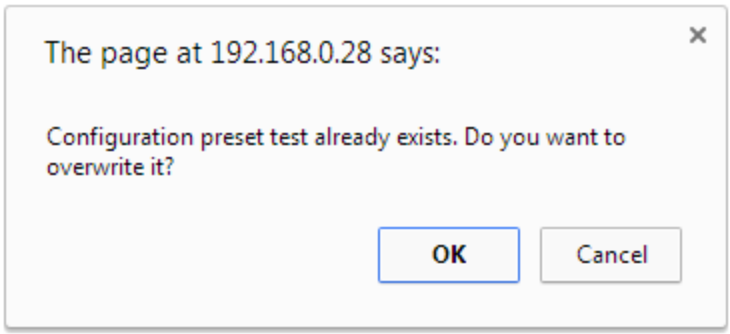
If you need to update a configuration preset to include different configuration groups, or simply new settings for the same groups, you can do so easily via the web interface.

To update a configuration preset:

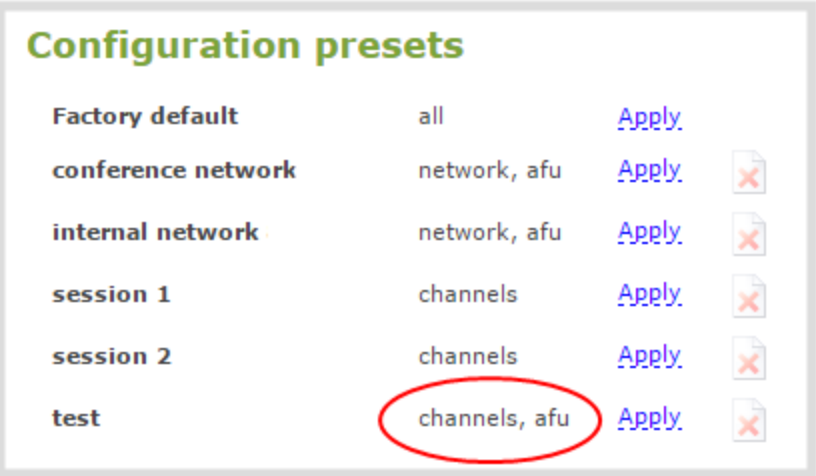
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Scroll to the **Configuration presets** section.



5. Find the preset you wish to change from the presets list.
6. Copy the name of the preset into the **Name** field.
7. Selected the desired configuration group(s) from the **Sections** group.
8. Click **Save**; a confirmation dialog asks you to confirm you want to overwrite the configuration preset.



9. Click OK; your configuration preset is updated in the list.



Delete a configuration preset

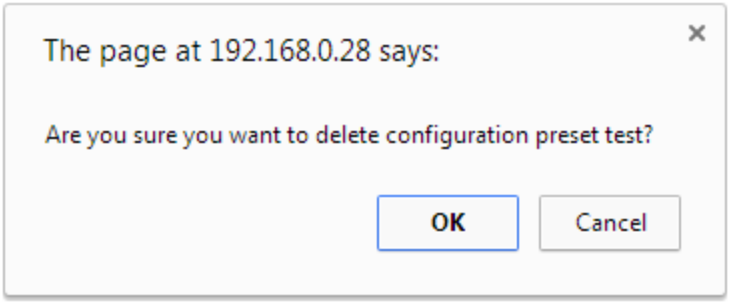
You may want to trim the list of configuration presets to only those that are needed for your ongoing needs. You can delete all configuration presets at once by doing a factory reset, or you can delete individual configuration presets from the **Maintenance** page.

To delete a configuration preset:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Scroll to the **Configuration presets** section.



5. Click delete (**x**) next to Apply for the configuration preset; a confirmation message appears.



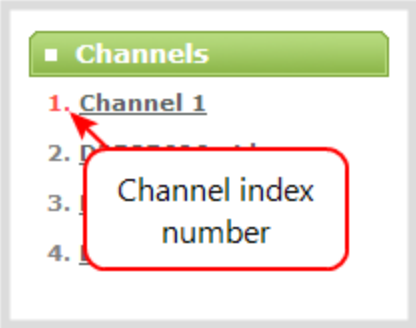
6. Click **OK** to confirm you want to delete the preset; the preset is deleted.

Configuration preset considerations

Configuration presets are groups of settings applied to the system, leaving other settings intact. The following considerations will help you get the most from your configuration presets.

Channel and recorder index number behavior

Each channel and recorder has an index number. The first channel created on a system is channel 1, subsequently channel 2, 3, 4, etc. Recorders are also created starting at index 1 with numbers incrementing as new recorders are created. The channel (or recorder) index number is found to the left of the channel or recorder name in the web interface:



Configuration presets that contain the **channels** configuration group specify the channels in the preset by their index number. This means if you have channels 1, 2, 3 and 4 when you save your preset, applying that preset will overwrite the configuration of your current channels with indexes 1, 2, 3 and 4. If prior to applying that preset you also had channels with indexes 5 and 6, the configuration settings for those two channels are when the preset is applied (because the preset only has 4 channels).

There are three areas where channel (and recorder) index numbers affect what happens when applying configuration presets. Read Recording stateRecorded files (in channels and recorders) and Deleting channels for more information.

Recording state

The Configuration groups section of this chapter shows that each channel and recorder's recording state is included in the **channels** configuration group. This means that if a channel (or recorder) is recording at the time you create a configuration preset, it will immediately start recording when you apply that preset. Similarly, if a configuration preset is saved when channels or recorders are not recording, those channels and recorders will not be recording when the preset is applied (this means a channel or recorder may stop recording as a result of applying the preset).

For example, when applying a preset with channel 3 set to record:

- If channel 3 exists prior to applying the preset and is already recording, the file will continue recording uninterrrupted unless the recording file type is different in the preset (in which case a new file is started).
- If channel 3 exists prior to applying the preset and is not already recording, it immediately begins recording.
- If no channel with index 3 exists prior to applying the preset, the channel is created and it immediately begins recording.

Recorded files (in channels and recorders)

Channels and recorders keep a list of files recorded in their **Recordings** section of the web interface. These files remain on the system even if the channel or recorder configuration is changed or removed as a result of applying a configuration preset.

For example, prior to applying your configuration preset, you have channels with indexes 1, 2 and 3; each of these has five recording files. When you apply a configuration preset that has channels with index 1 and 2 only, you'll notice those channels each still have the same 5 recording files. **Channel** with index 3 is no longer present, but the files are not lost!

Overwritten channel files are still available. To access and download/delete these recorded files, enter the following into the address bar: http://<deviceIP>/admin/channelN/archive or http://<deviceIP>/admin/recorderN/archive, where N is the index of the removed channel/recorder.

For example, if a **Channel** with index 3 is no longer present, its corresponding files can be accessed by entering the following into the address bar:

- http://192.168.0.183/admin/channel3/archive

If you now create a new channel with index 3 (or load a preset that contains a channel with index 3), you'll find it starts with five recorded files in the **Recordings** section. These are the same recorded files that existed at the start of this example.

Furthermore, if you delete any of the recordings, you are deleting the *only* instance of those files. Using our previous example, if you delete one of the five recordings from channel index 1, you'll find that even after applying different presets channel 1 will have only four recorded files.

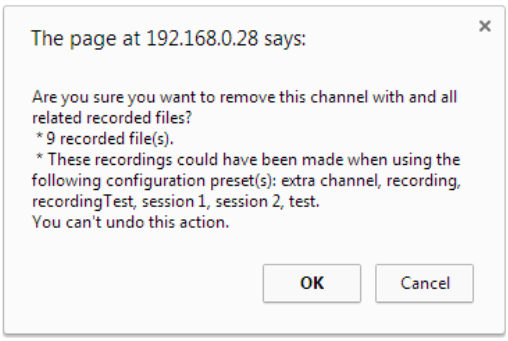
Deleting channels

Recorded files are stored on the system based on their channel or recorder number. All files saved for channel index 1 are in one folder, and all files for recorder index 2 are in another. When you **delete** a channel (or recorder), you permanently delete all recordings for that channel (or recorder) even if those recordings were made while a different preset is applied.



Applying a configuration preset with a different set of channels or recorders is **not** the same as deleting a channel.

When deleting a channel or recorder that has recorded files, the web interface warns you of other configuration presets that use the same channel or recorder index numbers. When you see this prompt, we recommend you take a moment to look through the **Recordings** list to make sure you're OK to proceed with permanently deleting all the recorded files.



Branding content

The **channels** configuration group includes the filenames for logos and backgrounds used in the currently configured channels. It does *not* include the image files. Therefore it is important to make sure that between uses of different channel-related configuration presets you do not delete or replace files listed in the **Branding Content** section of the web interface. There is currently no configuration group that includes the Branding Content files.

EDIDs

EDIDs are uploaded and immediately applied to a specific source. This change remains in place until the user uploads a new EDID or requests the factory EDID is applied by using the **Restore default EDID** button (see Force the capture card to use a specific EDID

If you apply a preset that needs a special EDID, be sure to remember to upload that EDID after applying the configuration preset.

Configuration presets are not user profiles

Configuration presets should not be confused with the concept of user profiles. Specifically, the following issues arise from trying to use configuration presets as user profiles:

- recorded files are not removed between application of configuration presets *(users could see each other's files)*
- configuration presets can be overwritten and deleted with no password *(users could affect each other's presets)*
- branding and recorded files can be deleted, affecting more than just the currently applied configuration presets *(users could erase branding or recordings belonging to other users)*
- applying a configuration presets does not clear the settings from groups not part of the preset *(user information is not private)*

Configure date and time

The Standalone VGA Grid uses the current date and time in naming recorded files and when synchronizing and timestamping inputs from multiple sources (i.e. when synchronizing an audio and a video source). The admin interface lets you specify date and time settings to ensure they are correctly configured for your time zone and your network.

This section covers the following date and time-related topics:

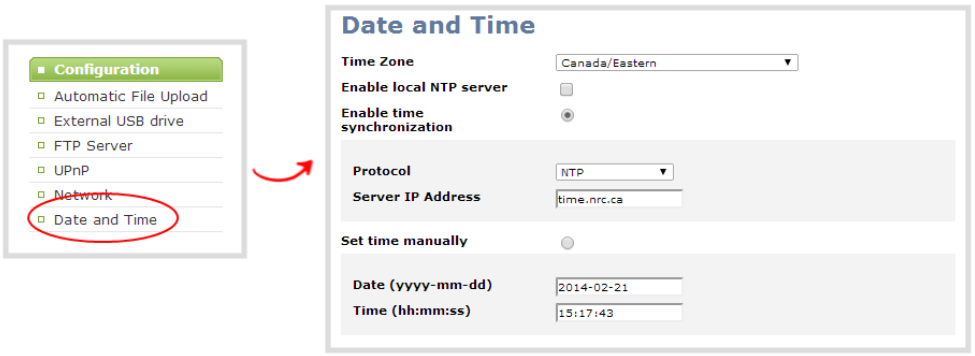
- Verify date and time settings
- Change the time zone
- Configure synchronized time (NTP, PTP v1 and RDATE)
- Configure a local NTP server
- Configure the date and time manually

Verify date and time settings

The current date, time, time zone, and synchronized time protocol settings are shown when the Date and Time configuration page is loaded in the Standalone VGA Grid web interface.

To view settings on the date and time configuration page:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens and the following information is displayed:



The date and time configuration page also indicates whether the system is currently using synchronized or manually set time, and whether or not a local network time protocol (ntp) server is running.

The following table describes the date and time configuration fields.

Table 13 *Date and Time Options*

Label	Description/Options
Time Zone	The currently selected time zone.
Enable time synchronization	Whether or not a time synchronization protocol is being used for setting time. (If not selected, time is set manually.)
Protocol	The time synchronization protocol.
Service IP Address	The time synchronization server address.
Set time manually	Whether or not time is set manually. (If time is not being set manually, a time synchronization protocol is used.)
Date	The current date. (This is the current date even if the radio button Set time manually is not selected.)
Time	The current time. (This is the current time even if the radio button Set time manually is not selected.)

Configure synchronized time (NTP, PTP v1 and RDATE)

By default the Standalone VGA Grid uses the network time protocol server (NTP server) protocol and a time server from National Research Council Canada. You can continue to use this time server or configure a new server that is more appropriate for your network and location. Your system administrator can provide the correct time synchronization server settings.

To set the time synchronization method:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Click the **Enable time synchronization** radio button if it is not already selected.
5. Choose one of the following choices from the **Protocols** drop down:

Table 14 Synchronized Time Options

Label	Description/Options
NTP	Network Time Protocol (NTP) is used for clock synchronization over the internet. There are many publicly available NTP servers you can use, or your company may have its own NTP server. For more information about NTP and to find NTP servers, refer to http://support.ntp.org/bin/view/Servers/WebHome.
RDATE	RDATE is a tool for querying the current time from the network. It is generally considered obsolete and has been replaced by NTP. It's offered here for backwards compatibility with older timekeeping systems.
PTP v1	The Precision Time Protocol (PTP) is used for clock synchronization over the internet. It has clock accuracy in the sub-microsecond range, making it more granular than NTP.

6. Tailor the synchronization protocol with the required parameters as described below.
7. If **NTP** is selected:
    a. Enter the IP address or server name for the NTP server in the **Server IP Address** field.



NTP uses UDP packets and port 123. If the system is behind a firewall and accessing an external NTP server, UDP packets must be permitted on port 123.

8. If **RDATE** is selected:
    a. Enter the IP address or server name for the RDATE server in the **Server IP Address** field.
    b. Select an update interval from the drop down box.
9. If **PTP v1** is selected:
    a. Select the multicast address of PTP v1 server from the **PTP domain** drop-down.

PTP Domain	Description
Default	PTP at multicast address 224.0.1.129
Alternative 1	PTP at multicast address 224.0.1.130
Alternative 2	PTP at multicast address 224.0.1.131
Alternative 3	PTP at multicast address 224.0.1.132

PTP uses UDP packets and ports 319 and 320 . If the system is behind a firewall and accessing an external PTP server, UDP packets must be permitted on ports 319 and 320.

10. Click **Apply**.

Configure the date and time manually

By default the Standalone VGA Grid uses NTP for time synchronization. If your system does not have access to a time synchronization server, or if you do not wish to use one, you can choose to manually set the date and time.

To manually set the date and time:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Type the desired date in the **Date** field. Use the format yyyy-mm-dd.
5. Type the desired time in the **Time** field. Use the format hh:mm:ss.
6. Click **Apply**.

Change the time zone

By default the system has the Canada/Eastern time zone set. Configuration of the time zone is necessary to ensure synchronized time servers provide the correct time to the system.

To select another time zone:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Select the new time zone from the **Time Zone** drop down box.
5. Click **Apply**.

Configure a local NTP server

The Standalone VGA Grid can run a local NTP server.

To configure a local NTP server:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Select the check box Enable local NTP server.

PART 2: Capture

Capturing is the process of taking the signals from your video and audio sources and encoding them in a format that is ready for streaming and recording.

If you followed the quick start guide, you're already capturing, streaming and possibly recording your sources. The section of the guide helps you fine tune and troubleshoot the capturing process.

When using Standalone VGA Grid, you can stick to all the default capture and encoding settings, or you tweak them to set the up exactly as you like.

You can capture a single source at once, capture multiple sources in a custom channel or even switch between sources or groups of sources (layouts) while streaming and recording.

Techniques for creating channels to capture, stream and record a single source; to create custom channels with multiple sources and multiple layouts; and how to switch layouts while capturing are all described in this section.

The chapters in this section include:

- Channels
- Live video mixing / switching
- Sources
- Troubleshooting

What is a channel?

Standalone VGA Grid uses **Channels** to organize and display content captured from DVI, VGA, HDMI, SDI, S-Video and audio.

Channels make your sources (DVI, VGA, HDMI, SDI, S-Video and audio) available for streaming and recording. You choose how you want to configure your sources (and extras like images and text overlays) into layouts within your channel.

DVI2PCIe cards do not support audio over HDMI. Standalone VGA Grid systems with DVI2PCIe cards will not be able to capture audio through HDMI sources.

Standalone VGA Grid gives you a lot of control over how your sources are streamed. You are not limited to creating a **Channel** list that is a one-to-one reflection of your **Sources** list. You can make channels from some or all of your sources and you can add the same source to multiple single-source or multi-source layout channels.

For example, you could use the same source in all three of these situations, concurrently:

- as the only source in Channel 1 at 1080p, 30fps, 10,000 kbps;

- as the only source in Channel 2 at 720p, 15 fps, 2,000 kbps;

- in Channel 3 as part of a multi-source layout with picture in picture.

All channels can be streamed and recorded simultaneously. Following the example above, you could record any combination of those three channels, and stream one, two or all three of them using any available streaming methods.

In addition to creating multi-source channels, you can customize your channels by adding a images, company information, corporate colors and time stamps. Standalone VGA Grid has a visual layout editor to help you create exactly the layout you want to stream.

For each channel you create, you can use the layout editor to create one or more channel layouts. Then, while recording and/or streaming, you can switch live between different layouts. To learn about creating layouts, read Create a custom channel and Custom channel layout editor. To learn how to do live video mixing / live video switching, see Live video mixing / switching.

You can now create and upload customized “No Signal” images for use in your channels. These images are assigned to a specific source and display in any channel where the source is used but has no input detected. For more information on how to create a "No Signal" image, see Add a No Signal image to a source

Through channel configuration and fine-tuning you can maximize your stream quality, minimize your processing requirements and bandwidth. You can also specify how the video is presented and streamed to sharing destinations and viewers. Topics in this section include:

- Create a simple channel
- Configure encoding
- Create a custom channel
    - Custom channel examples
    - Custom channel layout editor
    - Add a video source (custom channel)
    - Add an audio source (custom channel)
    - Add an image (custom channel)
    - Add a text overlay (custom channel)
- Live video mixing / switching
- Preview a channel
- Delete a channel
- Rename a channel



While configuring channels, consider opening a live preview of the channel in another tab or browser window so you can see the changes as they are applied, refer to Preview a channel.

Create a simple channel

Channels arrange the output from sources into a viewable and recordable stream. Although there are may ways you customize a channel, this procedure walks you through the most **basic channel setup with a single source**. For multiple-source channels and advanced layout editing see Add channel metadata. (You can always update this channel later to use multiple sources or multiple layouts.)

After creating this channel you'll be ready to stream it using the system default settings. Instructions to configure encoding, branding and CDN streaming are described in separate procedures.

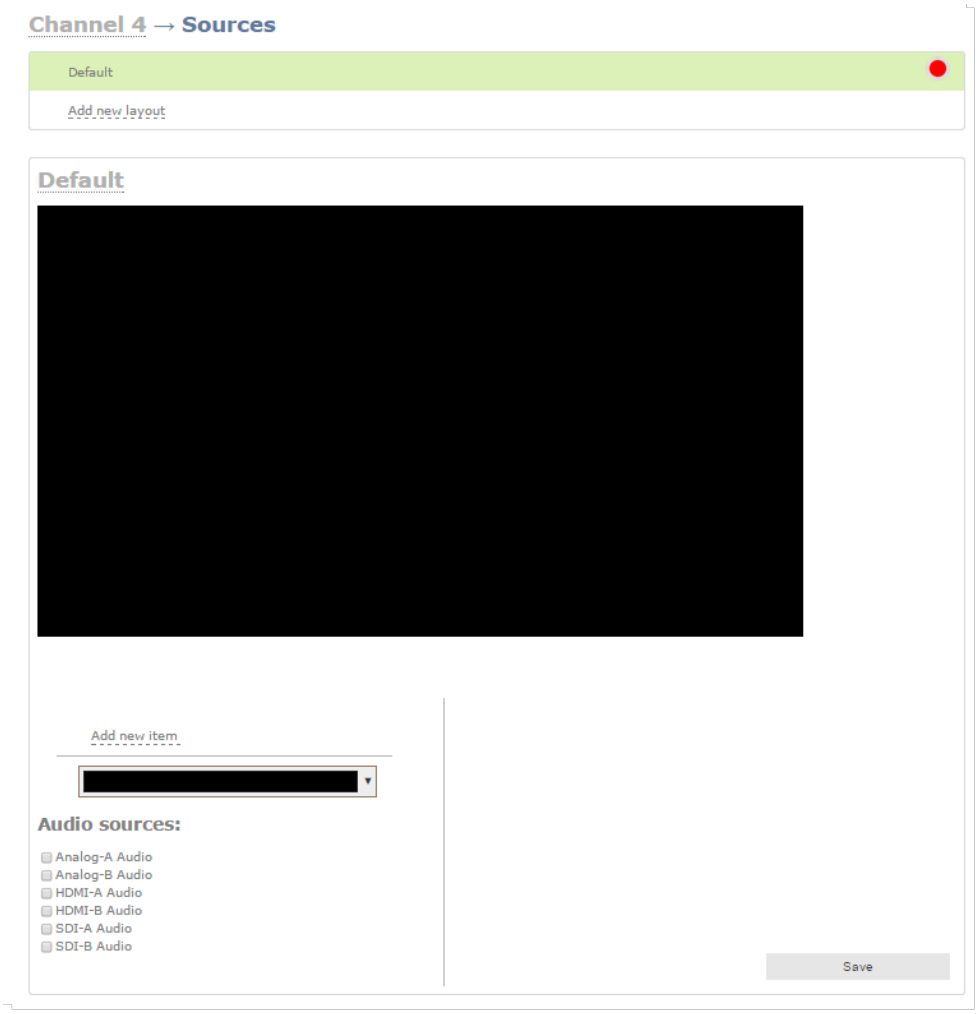
To create a simple channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

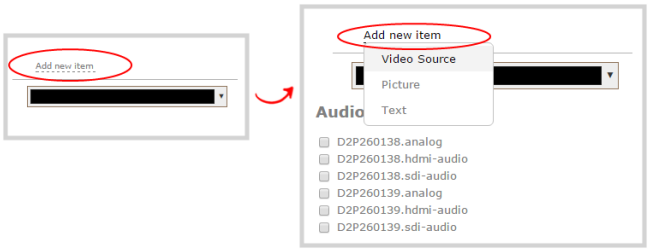
3. Ensure a DVI, HDMI, VGA or SDI input source is connected to the device and you know the name of the source it is connected to. If you're not sure, see What is a source?.
4. From the web interface, scroll to the **Channels** menu option. A list of existing channels, if any is displayed.
5. Click **Add channel** located at the bottom of the list; the Sources page opens.



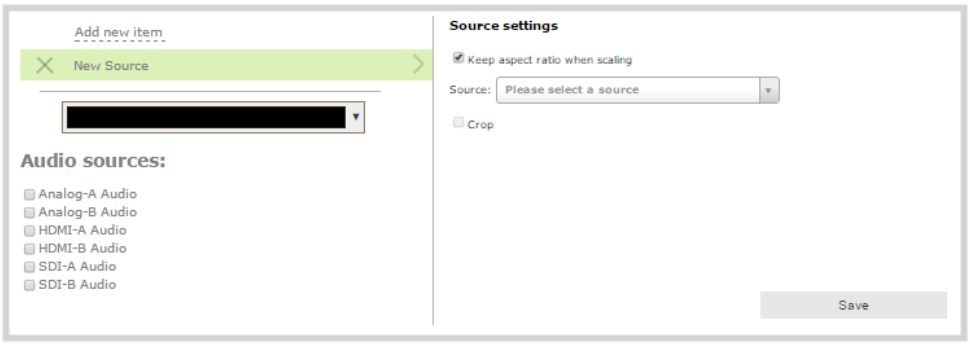
6. You're automatically editing the Default layout in the channel layout editor. (By default a 16:9 visual layout editor with a black background is shown.)



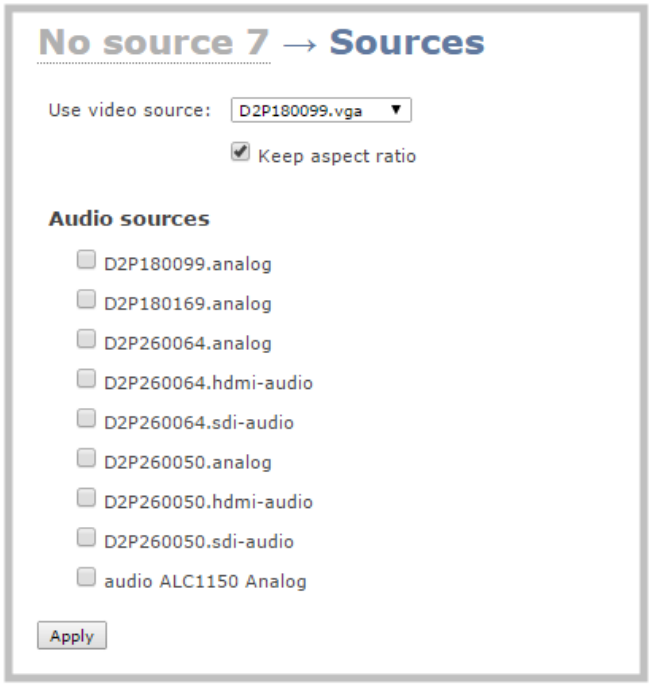
7. Click **Add new item**to add a layer to the layout; a drop down appears allowing you to choose the kind of item to add to your layout.



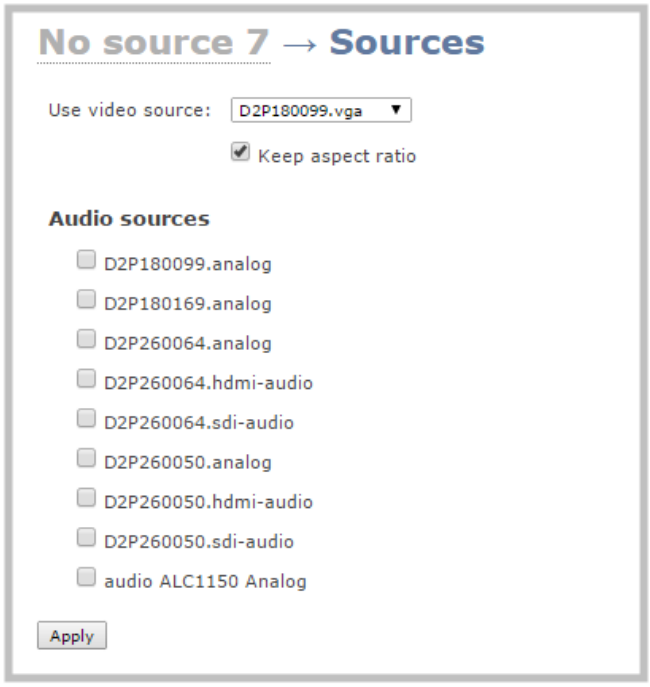
8. Select Video Source from the drop down; the new item is added to the layout and the **Source settings** box appears on the right side of the page.



9. Click the **Source** drop down and select your source; your source appears in the visual layout editor above.



10. For best results, keep the **Keep aspect ratio when scaling** checkbox checked in the **Source settings** box.
11. Use the red and white source handles in the visual editor to stretch your image to the full size of the layout.



12. If audio is desired, scroll down and choose an audio source from the displayed list.
13. Click **Save** at the lower right corner of the page; the layout changes are saved.

Because this is a single-source channel with only one layout, the channel's name is updated to display the source's name next time you view the channel. Click the channel name to refresh and view this, if desired. If you wish to change a channel's name directly, see **Rename a channel**.

Your channel is ready for basic streaming and recording.

By default (on a new channel), when the source doesn't have a 16:9 aspect ratio, the system automatically detects the correct aspect ratio and updates the layout after you leave and return to the layout editor screen. This happens because the encoding page has the **Use current signal resolution as frame size** setting selected by default. If you want to change the aspect ratio for your channel, see **Configure encoding** .

There are a lot of creative things you can do next with your channel, including creating more layouts and editing this layout to add images and more sources. See Create a custom channel

Create a custom channel

Standalone VGA Grid has two styles of channels.

1. Simple channels with a single source that fits the full screen, as discussed in Create a simple channel
2. Custom channels with one or more layouts, sources, background matte color and images.

Both types of channels are created using the same interface. In fact, custom channels are the same thing as simple channels, but they're called out separately in this manual because they are more complex. We call a channel a custom channel (or custom layout channel) when it has multiple sources, image elements, multiple layouts or any combination of those items.

So the only distinction between simple channels and custom channels is whether you choose to add any extra elements to the channel.

When making simple channels, your source takes up the whole screen, but with custom channels, you can organize sources, pictures and text overlays in different locations on your screen. We call these layouts, and each custom channel you create can have multiple layouts.

If you want to change the way things appear in your stream while streaming (aka video switching or video mixing), you'll need to create one layout for each of the views you want for your stream. Later, while you are streaming, you can switch live between the layouts using the web UI.



If you're planning to do live switching with your channel, we recommend you set the frame size to a fixed size instead of using the default automatic detection of source frame size. Setting the frame size to a fixed value ensures you don't experience any stream interruptions if the source frame size changes due to layouts that contain a single source that has a different frame size than those in other layouts.

As you saw when creating a simple channel, the first thing you need to do is create your (first) layout. Before getting started with custom channel layouts we recommend you review the Custom channel layout editor and get some inspiration from our Custom channel examples. Then use the remaining topics in this section to help you create and configure your perfect custom channel layout(s)!

- Create a custom channel or layout
- To upload an image
- Delete an uploaded image
- Add an image (custom channel)

- Add a video source (custom channel)
- Add an audio source (custom channel)
- Set the background color (custom channel)
- Add a text overlay (custom channel)
- Delete or move a layout (custom channel)
- Rename a layout (custom channel)

Once you have your layouts created, read about Live video mixing / switching to learn how to change between layouts while streaming and/or recording.



Each layout you add to your channel adds a bit of overhead on Standalone VGA Grid- and more complex layouts take more resources. So it's a good idea to make sure you delete any layouts you're not using.

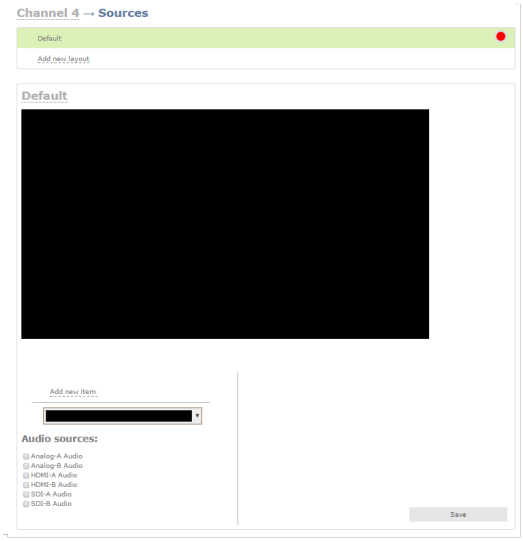
Custom channel layout editor

The visual channel layout editor gives you full control on size and position of the pictures, sources and text overlays you add to your channel.

You can edit existing channel layouts (even ones you initially created as simple channels) or you can create a new channel or a new layout within a channel to work with. To add a new layout, see Create a custom channel or layout.

To select a layout for editing:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select your channel from the channels menu and click **Sources** for the channel.
4. Select the layout you want to edit by clicking anywhere in the layout row; the layout editor shows the current state of the selected layout for your channel and the row for the layout you're editing is highlighted green.

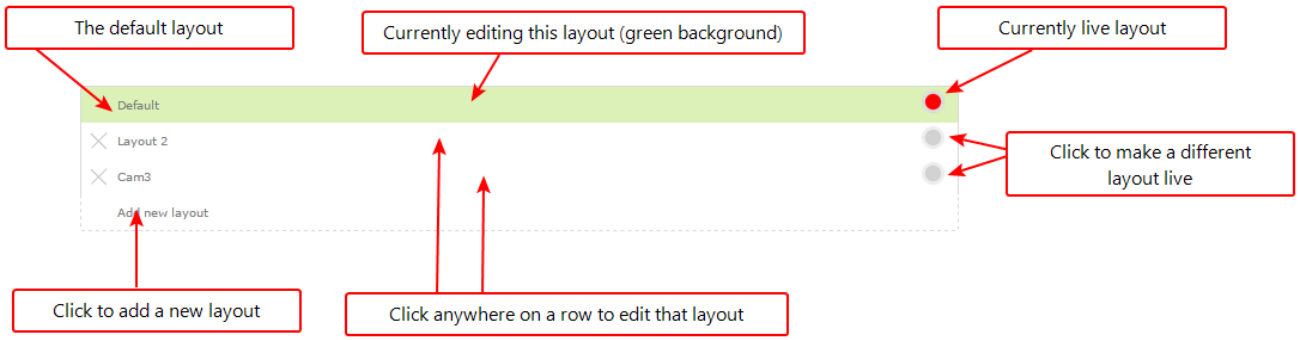


5. If this is a new layout, you are presented with an empty layout area and a black background matte.

The Sources page and channel layout editor is broken into a few pieces.

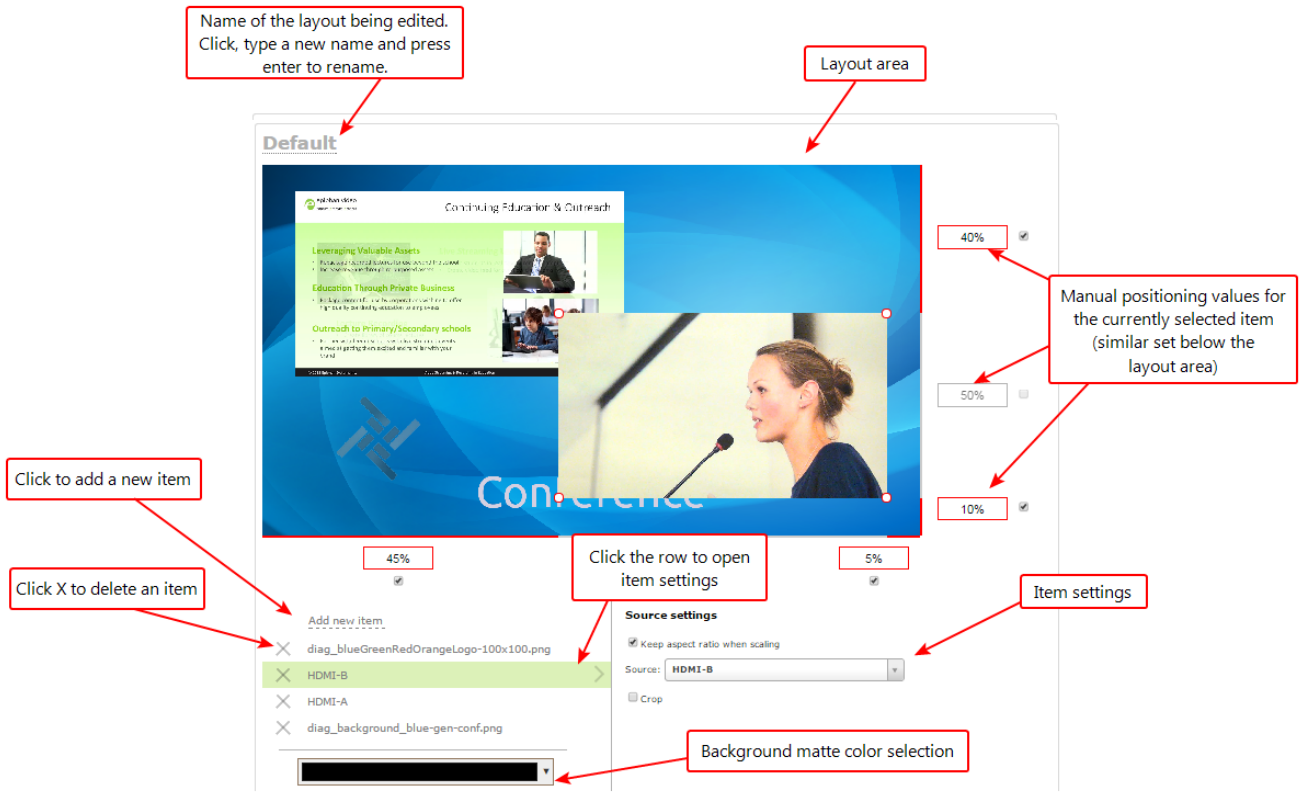
Layout selector

First there is the layout selector. From here you can pick which layout to preview/edit, create a new layout, delete a layout or select which layout is active.



Visual channel layout editor

Next is the channel layout editor where you can add pictures, sources and text overlays to your layout. You can also choose the background matte.



The heart of the channel layout editor is the layout area, which has the same frame size and aspect ratio as your stream. As you add items to the layout, they appear in the layout area. The currently selected item is presented in full colour while other items appear transparent.

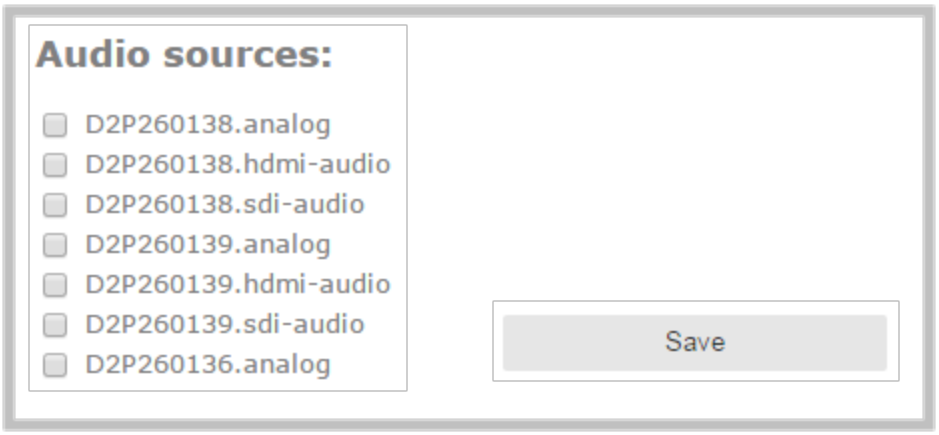
To **position** the items you can use the mouse to click and drag, or you can use the manual positioning values to set a location as a percent of the screen (by typing a value followed by the percent sign, e.g. 4%) or in pixels (by typing a value followed by px, e.g. 16px).

You can **resize** items by clicking and dragging the red and white circles at the corners of the items or by using the manual positioning values. For example entering 0% in all four of the outside boxes will stretch the item to the full size of the layout area.

You can modify the settings for each item by clicking the row. The item's settings box appears. See Add an image (custom channel), Add a video source (custom channel) and Add a text overlay (custom channel) for more details on item settings.

Audio source selector and save button

The last section of the Sources page is the audio selector and the (very important) **Save** button.

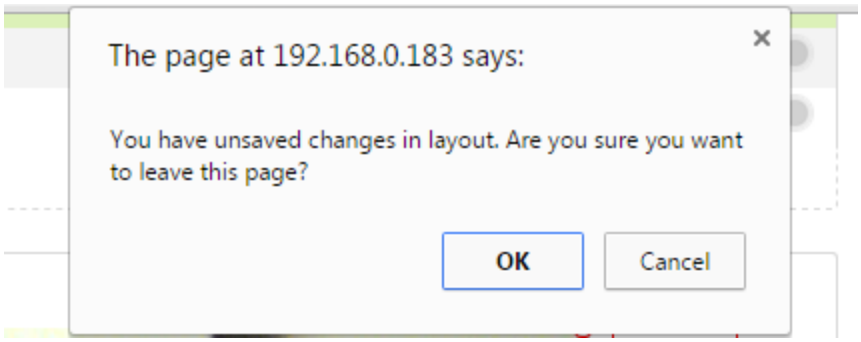


Select the audio source(s) you want to add to your channel.

Sources are mixed at equal levels. If you have one source it's added at 100% it's volume. With two audio sources, each is added at 50%, and so on.

When you're done all your changes, use the Save button to save the changes to your layout.

If you accidentally try to leave the layout without saving, Standalone VGA Grid reminds you to save before leaving.

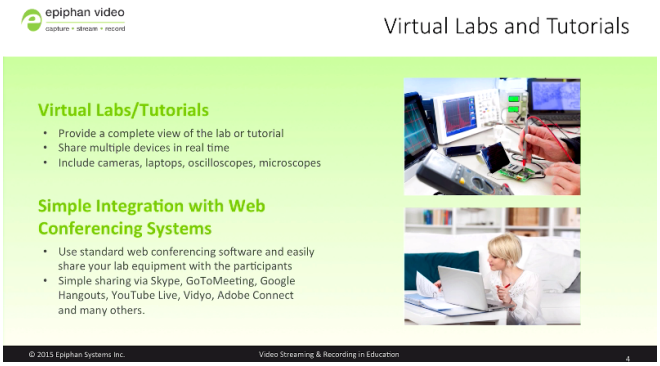


Ready to make some layouts of your own? Try these topics:

- Create a custom channel or layout
- Add a video source (custom channel)
- Add an audio source (custom channel)
- Add an image (custom channel)
- Add a text overlay (custom channel)
- Delete or move a layout (custom channel)
- Set the background color (custom channel)
- Rename a layout (custom channel)

Custom channel examples

Here are a few examples of what you can do with just two sources and two picture files. Use your imagination to create the layouts you want!

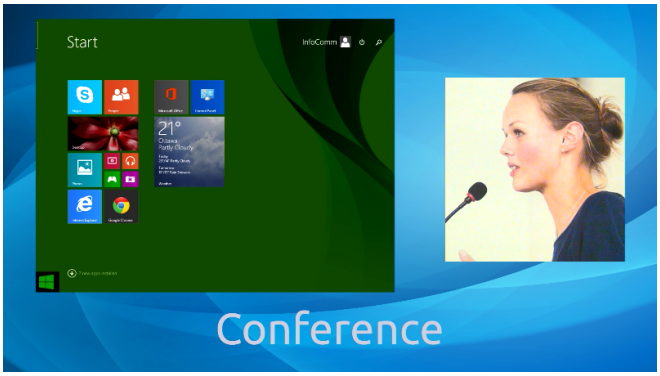
Layout example	Description
	One source, at the full size of the channel. (Simple channel) **To get this look:** Add one source to the layout, select keep aspect ratio and stretch to fit the full layout size.
	One source, with a green background matte. **To get this look**: Select a background color. Add a source to the layout and size appropriately, leaving the background matte visible.
	One source with a logo (.png with transparency) in the bottom left corner. **To get this look:** Upload an image with transparency through the Branding Content page. Follow the steps from the first example to add the source, then add a picture item and place it where desired.

Layout example	Description
	One source with a text overlay in the bottom right corner. **To get this look:** Follow the steps from the first example to add the source, then add a text overlay item to the layout. Enter your text in the settings box and place it where desired.
	One source with a background image. **To get this look:** Upload your backround image (must have the right aspect ratio) through the Branding Content page. When creating the layout, first add the picture and stretch it to the full screen. Next, follow the steps from the first example to add the source.
	Two sources with a background image. **To get this look:** Follow the steps for the example above, then add and position a second source.

Layout example	Description
	Two sources (one cropped to a new aspect ratio), a background image and a logo. **To get this look:** Upload your background and logo images through the Branding Content page. When creating the layout, first pick the background, then the sources, and lastly the logo. Size and position each. For the second source, click "cropping" in the source settings and select the desired crop.

A few more examples, this time including a 4x3 source.

Layout example	Description
	One source, at the full size of the channel. (Simple channel) **To get this look:** Add one source to the layout, select keep aspect ratio and stretch to fit the full layout size. (Note the channel broadcasts in 4x3 if you have **Use current signal resolution as frame size** selected on the encoding page.)
	One 4x3 source in a 16x9 frame, with a green background matte. **To get this look**: Make sure your encoding page has a 16x9 frame size. From the sources page, select a background color. Add a source to the layout and stretch to the full height of the screen, leaving the background matte visible.

Layout example	Description
	A 4x3 source and a cropped 16x9 source together with a background image. **To get this look:** Upload an image with transparency through the Branding Content page. Follow the steps from the first example to add the sources and use the crop utility to crop the second source to a square aspect ratio.

Time to get started on your own layouts! See:

- Create a custom channel or layout
- Custom channel layout editor

Create a custom channel or layout

We call a channel a custom channel (or custom layout channel) when is has multiple sources, image elements, multiple layouts, or any combination of those items. Custom layouts give you full control on size and position of the pictures, sources and text overlays you add to your channel.

Custom local channels use HD Encoders that have been added as sources (see Add an HD Encoder as a source (custom channel)). Each HD Encoder used adds overhead to the VGA Grid Concentrator. Ensure you monitor CPU usage when using multiple HD Encoders.

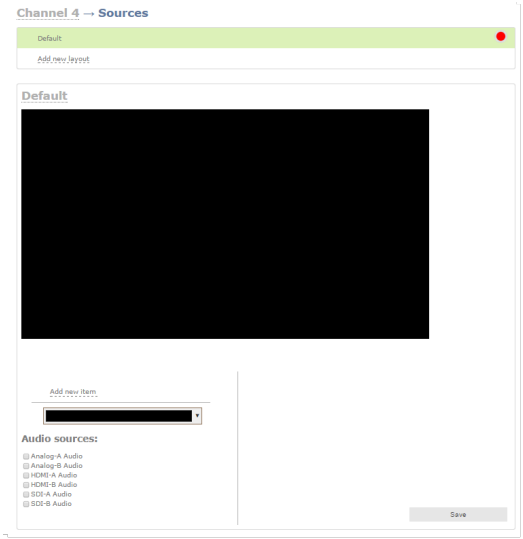
Use this procedure to help you create a new channel or layout, then use the related procedures to add elements to your layout.

If you're planning to use live switching, we strongly recommend you rename the channel rather than using the default channel name (**Rename a channel**). See the note at the bottom of this topic to avoid streaming and recording issues resulting from adding or deleting layouts when live switching.

To create a new custom channel (with default layout) or add a layout to an existing channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. Do one of the following to make the Sources page appear:
    a. select your channel from the channels menu and click **Sources** for the channel; or
    b. select the **Add channel** link to create a new channel.
4. Next, pick one of the following actions to create or select a layout to edit:
    a. select the layout you want to edit by clicking anywhere in the layout row; or
    b. click **Add Layout** to create a new layout.
5. The layout editor shows the current state of the selected layout for your channel and the row for the layout you're editing is highlighted green.



6. If this is a new channel or layout, you are presented with an empty layout area with a black background matte.

Now that you've created your layout, you can start adding items to it. See these topics:

- Add a video source (custom channel)
- Add an audio source (custom channel)
- Add an image (custom channel)
- Add a text overlay (custom channel)
- Delete or move a layout (custom channel)
- Set the background color (custom channel)
- Rename a layout (custom channel)

Important note for channels with multiple layouts

By default (and historically), Standalone VGA Grid's channels are named automatically based on the content in the channel.

When a channel has only one layout, and that layout has only one source (regardless of whether or not there are pictures or overlays in the layout), the channel name is the same as the source name

> **For example:** By default, a channel with one layout that has HDMI-A in it will be named HDMI-A.

When you add a second layout to a channel, the channel name changes to a generic name **Channel X** (where X is the channel index number). Normally this wouldn't pose any problem, but the changing name does have some side effects: the stream is stopped and restarted, and the channel's recorder (if recording) is stopped and a new file is started.

Furthermore, when you delete layouts in a channel until there is only one layout (with one source) left, the channel name reverts to the source name.

To avoid any issue with changing channel names on channels where you'll have more than one layout, we strongly recommend you rename the channel to a custom name (**Rename a channel**. This will ensure no automatic channel name changes.

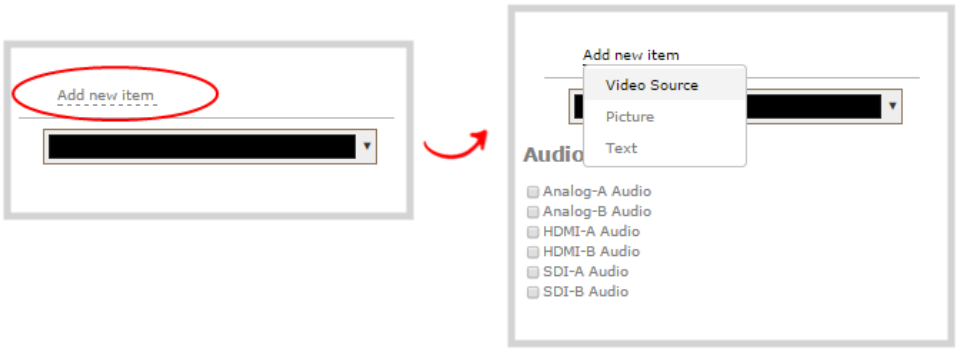
Add a video source (custom channel)

To stream a source you need to add it to a channel. In the case of custom channels with layouts, you can add one or more sources to the layout area.

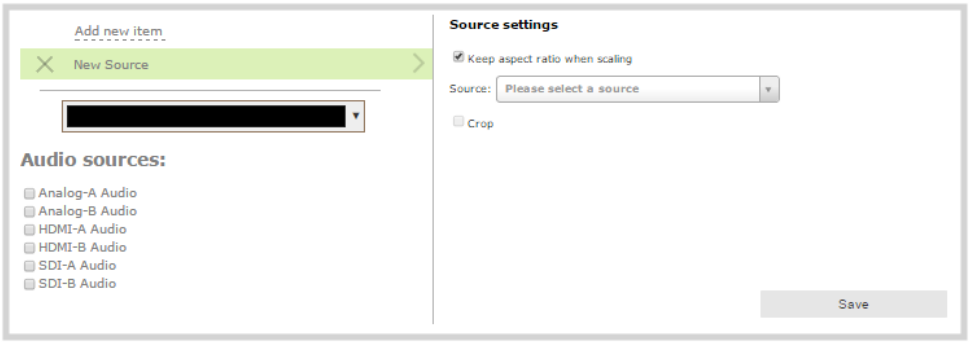
You can add a source to a layout on an existing channel or you can create a new channel. If you're not sure how to create a channel or a layout, start by reviewing the first few steps in the topic Custom channel layout editor or start with Create a simple channel.

To add a source to your layout:

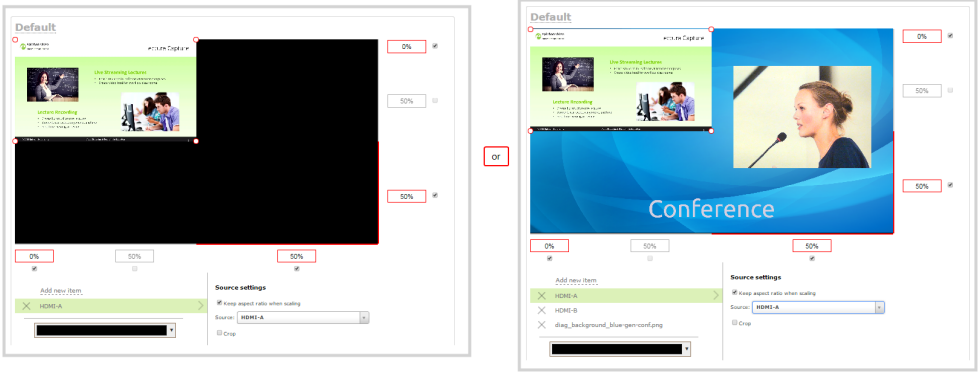
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.
4. From the channel layout editor, click **Add item**; a drop down box appears. (If you have any other items already in your layout, the new item appears at the top of the list.)



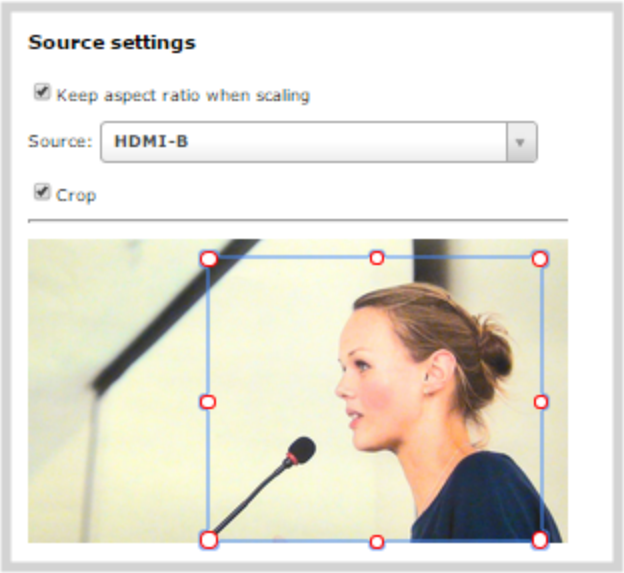
5. Select Video Source from the drop down; the new item is added to the layout and the **Source settings** box appears on the right side of the page.



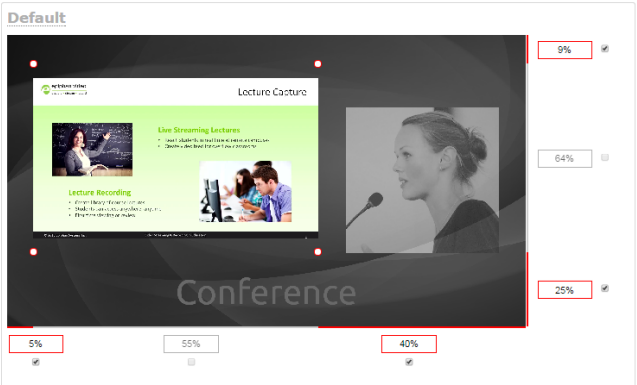
6. Click the **Source** drop down and select your source; your source appears in the visual layout editor above.



7. For best results, select the **Keep aspect ratio when scaling** checkbox from the **Source settings** box.
8. If desired, select **Crop** from the **Source settings** box and use the red and white handles to draw a box around the section of the source you'd like to have in the layout; your cropped selection changes in the layout area.



9. Moving back to the layout area, use the mouse, the keyboard or the manual position value fields to position and resize your source. You can click and drag, stretch using the handles in the layout area, or type values into the fields. See the note below for more information.



10. If needed, re-order the items in your layout by clicking and dragging items in the item list (under the **Add new item** link).

> For example, if you added your video source over a text overlay, the video source could conceal the overlay. To fix it, drag the video source item below the text item in the list, or vice-versa.

11. When your layout is complete, scroll to the bottom of the page and click **Save** to save your work.

Other things you may want to add to your layout:

- Add an audio source (custom channel)
- Add an image (custom channel)

- Add a text overlay (custom channel)
- Delete or move a layout (custom channel)
- Set the background color (custom channel)
- Rename a layout (custom channel)

A note about item positioning and sizing

There are four ways to position and size items in the layout area

1. using the mouse
2. using the keyboard
3. using the manual positioning values with percents
4. using the manual positioning values with pixels

To use the mouse:

Click and drag to move the item. Click and drag the red and white circles to resize the item as you wish. Using this method you can make quick changes that are in increments of approximately 5% of the width or height of your layout area. For more refined movements, hold the down the Ctrl key on your keyboard while dragging the item with the mouse.

To use the keyboard:

Use the arrow keys on the keyboard to move the item up, down, left or right in the layout. Changes are in increments of approximately 5% of the height or width of the layout area. Make more refined movements by holding down the Ctrl key on your keyboard while pressing the up, down, left or right keys. You can also hold the Shift key while using the arrow keys to control the size of the item on the layout. Hold both Ctrl and Shift for fine-grained size control.

Using percents:

Specify a whole number, followed by a percent sign (e.g. 4%) in any of the manual positioning fields. The image will move and resize to honor the space you specified. For example to move the item in 12% from the left side of the layout area, enter 12% in the bottom left positioning value square. The image will resize to accomodate your change. If you further enter 15% in the bottom right positioning value square, the image will be centered and take up 76% of the width of the layout area.

Using pixels:

If you need to specify an exact amount in pixels (rather than percent) you can type a pixel value in any of the positioning value squares followed by the characters px (e.g. 56px). You can mix and match

pixels and percents changing only the boxes you want to use pixel values. At any time you can switch back to percents by typing a percent.

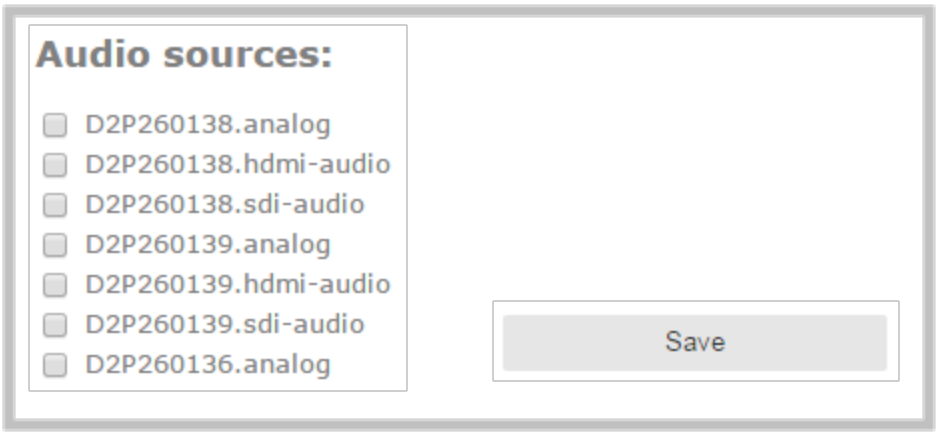
Add an audio source (custom channel)

To stream the audio for a source you need to add it to a channel and make sure audio is enabled in the channel's encoding page. (Audio is enabled in the encoding page by default.)

Audio must be added to each layout for your channel. You can use the same audio for each layout, or if you desire, you can have different layouts use different audio. If you're not sure how to create a channel or a layout, start by reviewing the first few steps in the topic Custom channel layout editor or start with Create a simple channel.

To add an audio source to your layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.
4. Select the audio source(s) you want to add to your channel. Sources are mixed at equal levels. If you have one source it's added at 100% its volume. With two audio sources, each is added at 50%, and so on.



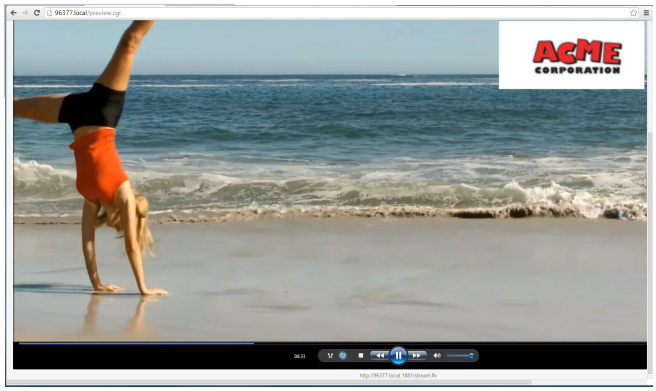
5. When your layout changes are complete, scroll to the bottom of the page and click **Save** to save your work.
6. Follow the steps in Configure audio codec to ensure audio is enabled for your channel and to select your audio settings.

Other things you may want to add to your layout:

- Add a video source (custom channel)
- Add an image (custom channel)
- Add a text overlay (custom channel)
- Delete or move a layout (custom channel)
- Set the background color (custom channel)
- Rename a layout (custom channel)

To upload an image

You can customize your channels by adding pictures as backgrounds, overlays or information. Collectively the images you upload to the system are known as branding images.

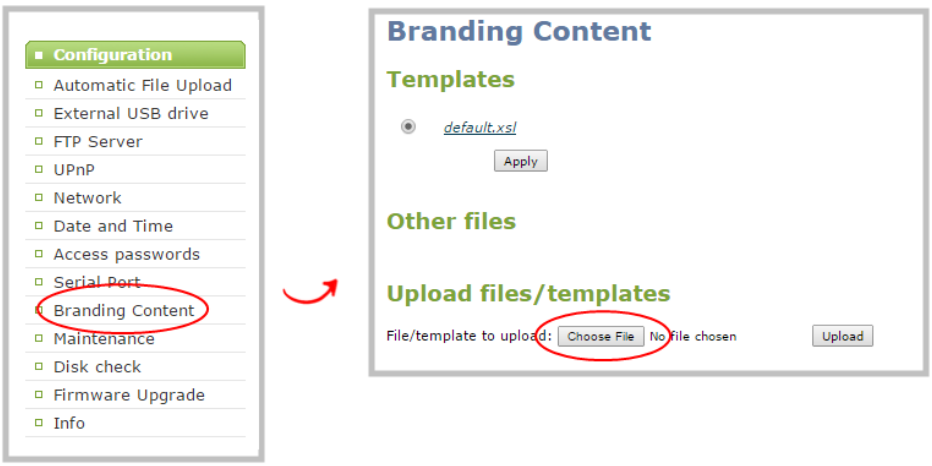


For best results always upload images that are already the correct size needed in your layout. Background images should match the frame size of your channel (frame size is set in the **Encoding** configuration page).

There are two ways to upload branding images. You can upload images to the branding page, as described in this procedure, or you can drag and drop images using the procedure described in Add an image (custom channel). Note that using the procedure below is the only way to see whether or not you'll be overwriting an existing image.

To upload a branding image to the branding page:

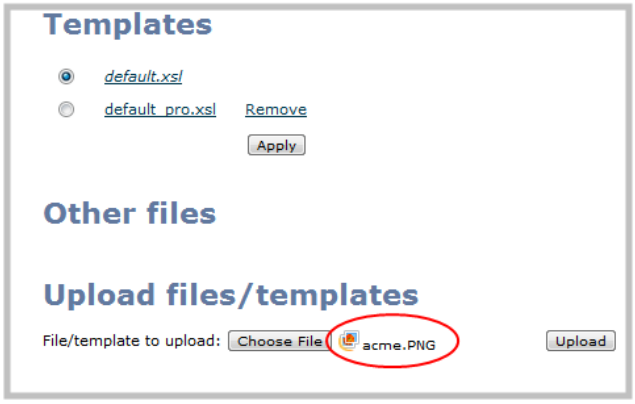
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click **Branding Content** under the Configuration menu; the configuration page opens.



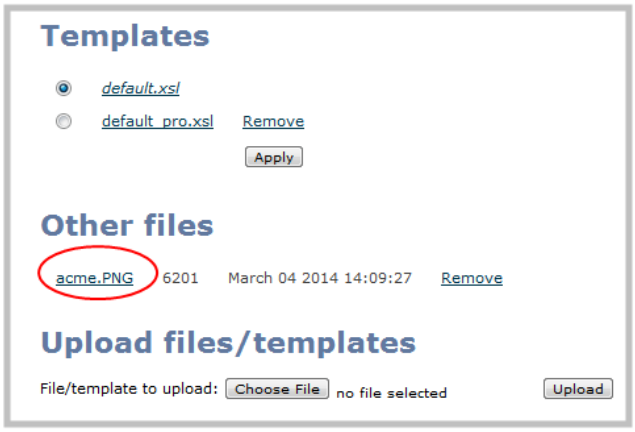
4. Click **Choose File**; a browser page opens.
5. Navigate to the folder on your admin computer that contains the logo.
6. Select the file, the following file formats are supported: PNG and JPEG.

> The maximum supported file size is 3840×2160. No warning or error message is displayed if your image is too large. Files that exceed the maximum size do not appear in the drop-down list when selecting an image.

7. Click **Open**; the file is added to the File/template to upload field.



8. Click **Upload**; the file is uploaded and displayed in the Other files section.



See the following topics to learn how to apply the logo, background, overlay text or other images to a channel:

- Add an image (custom channel)
- Add a text overlay (custom channel)

Add an image (custom channel)

You can use images in your custom channel layouts to create a background for your source, to add your corporate logo, or to add relevant information about the event you're streaming.

Standalone VGA Grid supports png (PNG) and .jpg (JPEG) images. You can upload any image from 16×16 pixels to a maximum size of 3840×2160, however it's strongly recommended that you upload exactly the size you need to avoid having your image scaled.

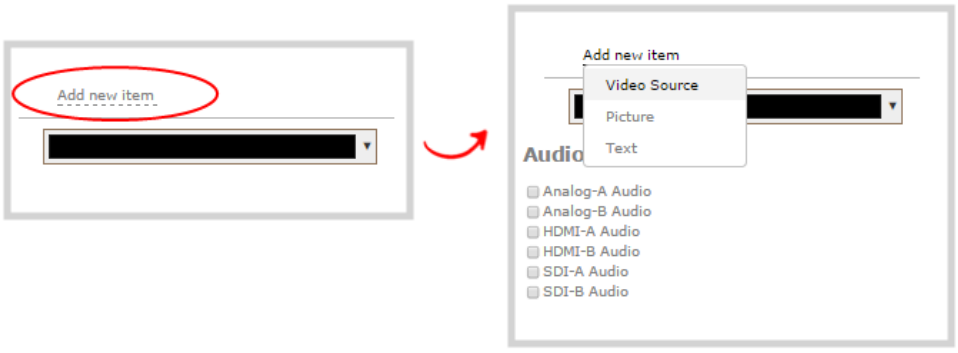
In earlier releases, there were separate procedures for adding backgrounds and logos to a channel. These actions are now both considered adding an image to a custom channel layout and can be accomplished with the steps below.

You can add a picture to a layout on an existing channel or you can create a new channel. If you're not sure how to create a channel or a layout, start by reviewing the first few steps in the topic Custom channel layout editor or start with Create a simple channel.

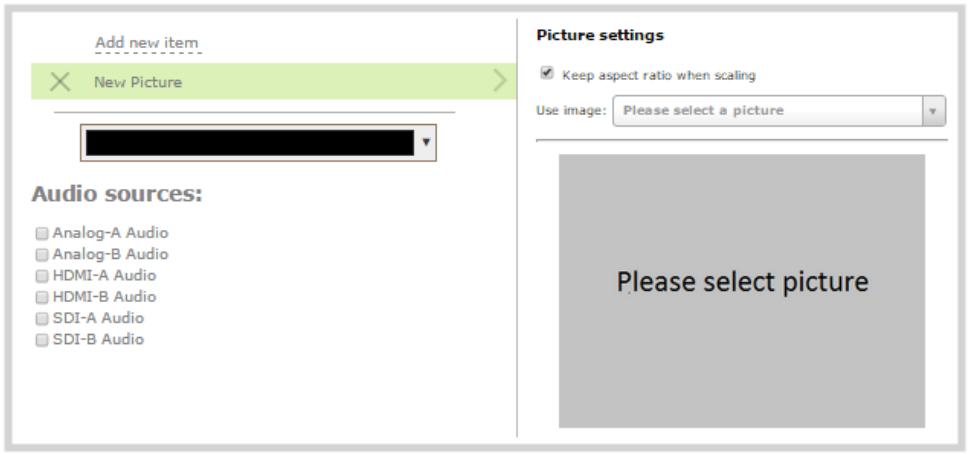
To add a picture to your layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in To upload an image or Create a custom channel or layout to upload your image, if not already uploaded. If you like, you can also use the drag and drop technique described below.
4. Follow the steps in Custom channel layout editor to get to the channel layout editor.

5. From the channel layout editor, click **Add item**; a drop down box appears. (If you have any other items already in your layout, the new item appears at the top of the list.)

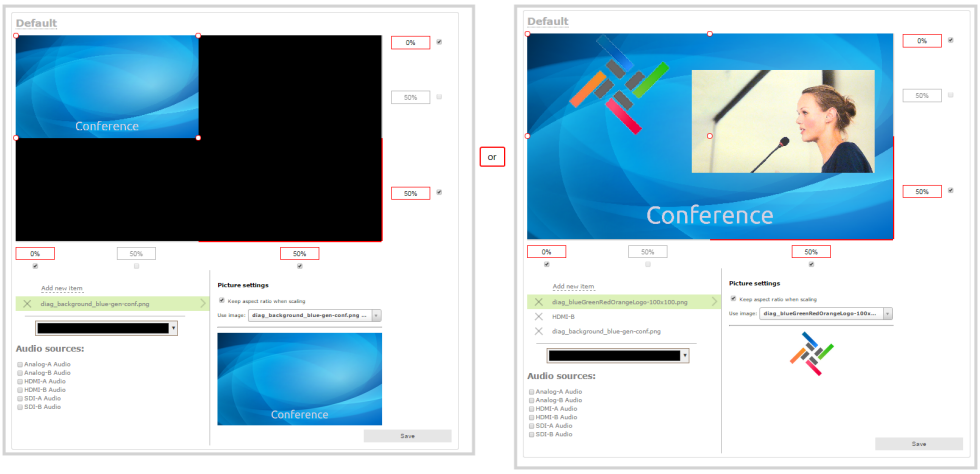


6. Select **Picture**; the **Picture Settings** section appears on the right side of the page.

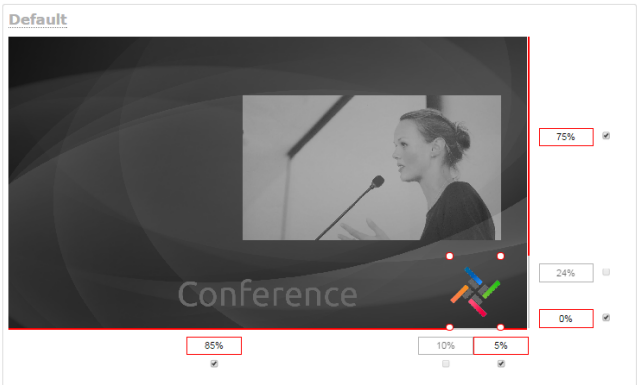


7. If you haven't already uploaded your image, you can drag and drop it from your desktop to the gray **Please select picture** box. (Note: no warning is displayed if the image is too large or will replace another file).
8. If you have already uploaded the image, click the **Use image** drop down to select an image you have uploaded to the system;
9. Your picture appears in the **Picture settings** preview and is added to the layout area. It is selected for sizing and positioning.

If your uploaded image does not appear in the list, ensure it doesn't exceed the maximum file size of 3840×2160.



10. For best results, keep the **Keep aspect ratio when scaling** checkbox selected in the **Picture settings** box. (This is selected by default.)
11. In the layout area, use the mouse, the keyboard or the manual position value fields to position and resize your image. For background images, click and drag to fill the full layout area. See the note below for more information on positioning techniques.



12. If needed, re-order the items in your layout by clicking and dragging items in the item list (under the **Add new item** link).

> For example, if you added your background image after adding a video source, the background image conceals the video source. To fix it, drag the video source item above the background image item in the list, or vice-versa.

13. When your layout is complete, scroll to the bottom of the page and click **Save** to save your work.

Other things you may want to add to your layout:

- Add a video source (custom channel)
- Add an audio source (custom channel)
- Add a text overlay (custom channel)
- Delete or move a layout (custom channel)
- Set the background color (custom channel)
- Rename a layout (custom channel)

A note about item positioning and sizing

There are four ways to position and size items in the layout area

1. using the mouse
2. using the keyboard
3. using the manual positioning values with percents
4. using the manual positioning values with pixels

To use the mouse:

Click and drag to move the item. Click and drag the red and white circles to resize the item as you wish. Using this method you can make quick changes that are in increments of approximately 5% of the width or height of your layout area. For more refined movements, hold the down the Ctrl key on your keyboard while dragging the item with the mouse.

To use the keyboard:

Use the arrow keys on the keyboard to move the item up, down, left or right in the layout. Changes are in increments of approximately 5% of the height or width of the layout area. Make more refined movements by holding down the Ctrl key on your keyboard while pressing the up, down, left or right keys. You can also hold the Shift key while using the arrow keys to control the size of the item on the layout. Hold both Ctrl and Shift for fine-grained size control.

Using percents:

Specify a whole number, followed by a percent sign (e.g. 4%) in any of the manual positioning fields. The image will move and resize to honor the space you specified. For example to move the item in 12% from the left side of the layout area, enter 12% in the bottom left positioning value square. The image will resize to accomodate your change. If you further enter 15% in the bottom right positioning value square, the image will be centered and take up 76% of the width of the layout area.

Using pixels:

If you need to specify an exact amount in pixels (rather than percent) you can type a pixel value in any of the positioning value squares followed by the characters px (e.g. 56px). You can mix and match pixels and percents changing only the boxes you want to use pixel values. At any time you can switch back to percents by typing a percent.

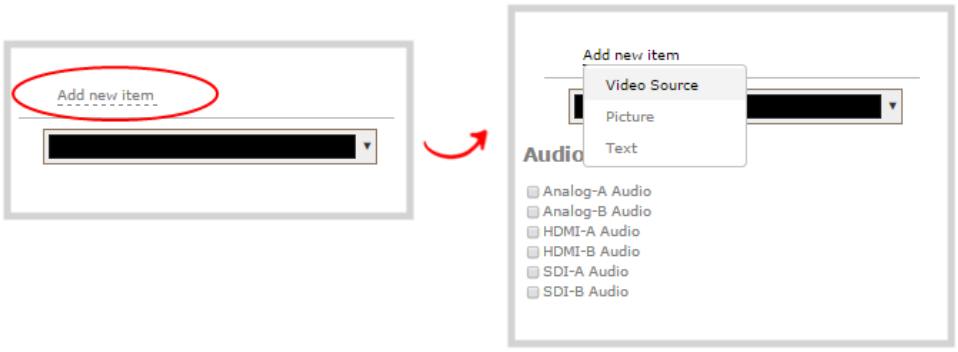
Add a text overlay (custom channel)

Adding the date and time, channel name or other custom text as an overlay on your video is an easy way to customize your stream.

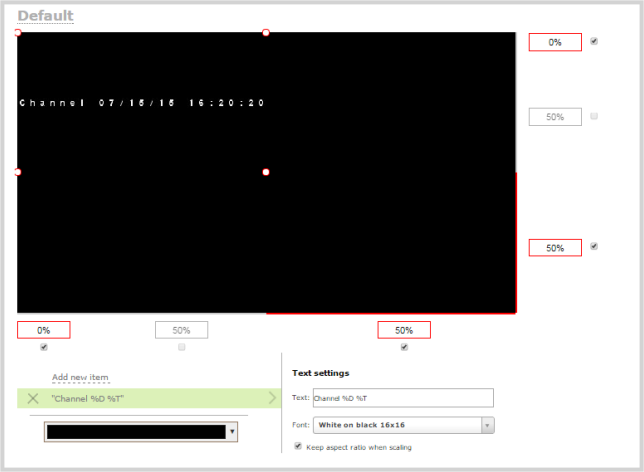
You can add an overlay to a layout on an existing channel or you can create a new channel. If you're not sure how to create a channel or a layout, start by reviewing the first few steps in the topic Custom channel layout editor or start with Create a simple channel.

To add a picture to your layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.
4. From the channel layout editor, click **Add item**; a drop down box appears. (If you have any other items already in your layout, the new item appears at the top of the list.)



5. Use the item type drop down box to select **Text**; the Text settings box appears and the layout area is updated with the text overlay.



6. In the **Text** field, specify the overlay text you want to add to the layout. Use your own text and any combination of the shortcut codes listed at the end of this procedure.

> **For example**: Use this string:
>
> `%A %B %d, %G. Live streaming channel Auto A.`
>
> to obtain these results (**Thursday February 26, 2015. Live streaming channel Auto A.**):
>
> Thursday February 26, 2015. Live streaming channel Auto A.

7. Use the font drop down to select the size of your text.
8. For best results, select the **Keep aspect ratio when scaling** checkbox from the **Text settings** box. (This is selected by default.)
9. In the layout area, use the mouse or the manual position value fields to position and resize your text overlay. (You may first need to change the height of the text box handles before you can proceed with resizing or positoning.) See the note below for more information on positioning techniques.
10. If needed, re-order the items in your layout by clicking and dragging items in the item list (under the **Add new item** link).

> For example, if you added your overlay text before adding a video source, the video source conceals the overlay text. To fix it, drag the overlay text item above the video source item in the list, or vice-versa.

11. When your layout is complete, scroll to the bottom of the page and click **Save** to save your work.

Table 15 *Time Format options*

Field	Value	Example
date	%F	2012-01-26
year	%G	2012
month (01)	%m	01
month (Jan)	%b	Jan
month (January)	%B	January
day of the month	%d	26
weekday (Thu)	%a	Thu
weekday (Thursday)	%A	Thursday
time	%T	08:40:45
hour	%k	08
minute	%M	40
second	%S	45
millisecond	%#m	378
channel name	%c	Camera Feed 1

Other things you may want to add to your layout:

- Add a video source (custom channel)
- Add an audio source (custom channel)
- Add an image (custom channel)
- Delete or move a layout (custom channel)
- Set the background color (custom channel)
- Rename a layout (custom channel)

A note about item positioning and sizing

There are four ways to position and size items in the layout area

1. using the mouse
2. using the keyboard
3. using the manual positioning values with percents
4. using the manual positioning values with pixels

To use the mouse:

Click and drag to move the item. Click and drag the red and white circles to resize the item as you wish. Using this method you can make quick changes that are in increments of approximately 5% of the width or height of your layout area. For more refined movements, hold the down the Ctrl key on your keyboard while dragging the item with the mouse.

To use the keyboard:

Use the arrow keys on the keyboard to move the item up, down, left or right in the layout. Changes are in increments of approximately 5% of the height or width of the layout area. Make more refined movements by holding down the Ctrl key on your keyboard while pressing the up, down, left or right keys. You can also hold the Shift key while using the arrow keys to control the size of the item on the layout. Hold both Ctrl and Shift for fine-grained size control.

Using percents:

Specify a whole number, followed by a percent sign (e.g. 4%) in any of the manual positioning fields. The image will move and resize to honor the space you specified. For example to move the item in 12% from the left side of the layout area, enter 12% in the bottom left positioning value square. The image will resize to accomodate your change. If you further enter 15% in the bottom right positioning value square, the image will be centered and take up 76% of the width of the layout area.

Using pixels:

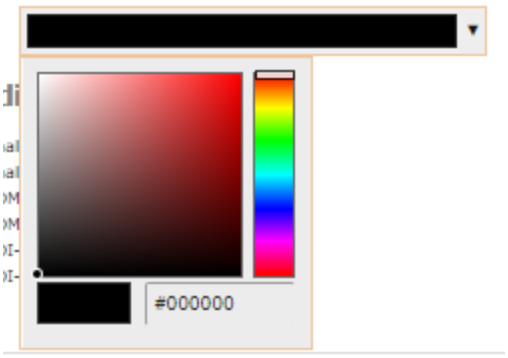
If you need to specify an exact amount in pixels (rather than percent) you can type a pixel value in any of the positioning value squares followed by the characters px (e.g. 56px). You can mix and match pixels and percents changing only the boxes you want to use pixel values. At any time you can switch back to percents by typing a percent.

Set the background color (custom channel)

When you create a custom channel layout, you can select the background color to fill any unused space. For example you can add a color from your corporate color scheme.

To add a picture to your layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.
4. From the channel layout editor, click the drop down arrow next to the existing (by default black) background color; the color picker opens.



5. Pick a new color or type in an RGB value in the field; the color is updated in the layout area.
6. Click anywhere off the color picker to close the picker.
7. When your layout is complete, scroll to the bottom of the page and click **Save** to save your work.

Rename a layout (custom channel)

Layouts you create are automatically given a default name (the first one is Default!). You can keep these names, or you can edit them to something more descriptive.

You can rename any layout, even the currently active layout.

To rename a layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.
4. From the layout picker, click on the row of the desired layout; the layout appears in the editor below.



5. From the editor, click the name of the layout; it turns red.



6. Type in your new layout name and press **Enter** to save the new name. (Note if you click somewhere else without pressing Enter, your changes are discarded.)

Delete or move a layout (custom channel)

Your custom channel can have multiple layouts. It's simple to re-order layouts or erase layouts you're not using any more.

Reorder layouts

To move a layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.
4. Using the rows in the layout selector, click and drag to rearrange the order of your layouts.



Delete layouts

You can delete any layout except the currently active layout.



If you're planning to use live switching, we strongly recommend you rename the channel rather than using the default channel name (**Rename a channel**). See the note at the bottom of this topic to avoid streaming and recording issues resulting from adding or deleting layouts when live switching.

To delete a layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor to get to the channel layout editor.
4. Click the **X** at the left side of the row for the layout you wish to delete; the system prompts you to make sure you want to delete the layout.



5. Click **OK** to proceed; the layout is deleted.

Important note for channels with multiple layouts

By default (and historically), Standalone VGA Grid's channels are named automatically based on the content in the channel.

When a channel has only one layout, and that layout has only one source (regardless of whether or not there are pictures or overlays in the layout), the channel name is the same as the source name

For example: By default, a channel with one layout that has HDMI-A in it will be named HDMI-A.

When you add a second layout to a channel, the channel name changes to a generic name **Channel X** (where X is the channel index number). Normally this wouldn't pose any problem, but the changing name does have some side effects: the stream is stopped and restarted, and the channel's recorder (if recording) is stopped and a new file is started.

Furthermore, when you delete layouts in a channel until there is only one layout (with one source) left, the channel name reverts to the source name.

To avoid any issue with changing channel names on channels where you'll have more than one layout, we strongly recommend you rename the channel to a custom name (**Rename a channel**. This will ensure no automatic channel name changes.

Delete an uploaded image

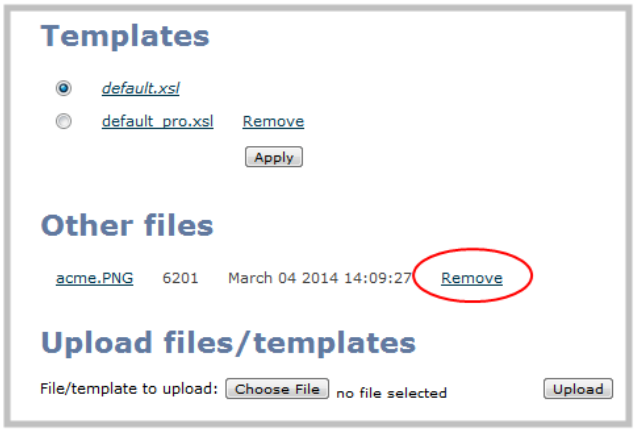
Images used in custom channel layouts are stored on the system hard drive. You can delete an image after you are done using it, or to when performing general housekeeping duties on the system.

To delete an uploaded image:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

> If the image is used as part of the layout for any channel, select a different image or no image by using the drop-down list in the **Picture settings** box within that channel's layout before deleting the file using the steps below.

3. Click **Branding Content** under the Configuration menu; the configuration page opens.



4. Click **Remove**; a confirmation dialog box opens.
5. Click **OK**; the dialog box closes and the image file is removed from the configuration page.

Configure encoding

You can modify the encoding settings for each channel you create. These settings let you perfect your stream by selecting the right frame size, bit rate, audio/video codecs and more.

This section covers the following encoding topics:

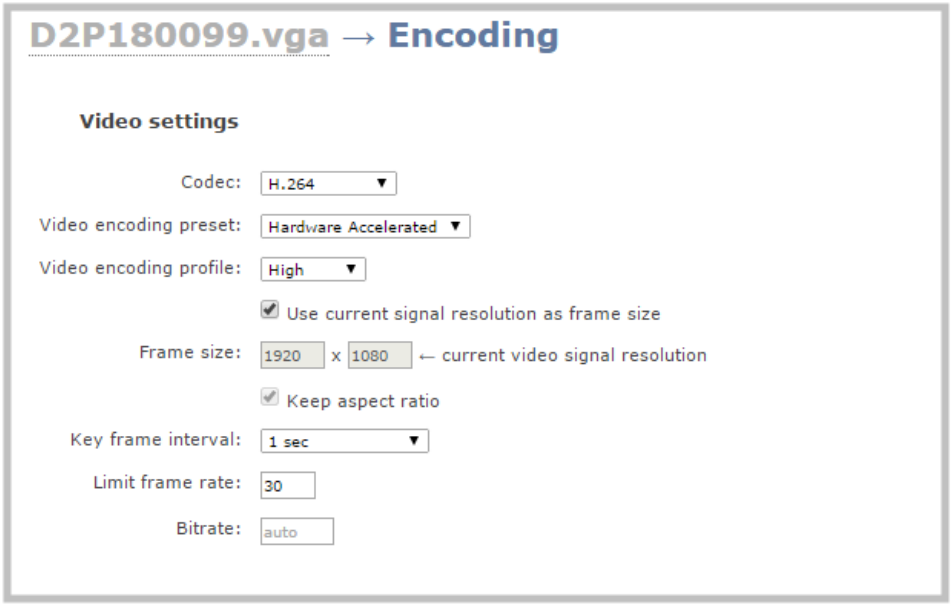
- Configure video codec
- Configure frame size
- Fine tune stream settings

- Configure audio codec
- Codec and file format compatibility

Configure video codec

To configure encoding:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click the **Encoding** link for your channel; the encoding configuration page opens.



4. Click the **Codec** drop-down menu to change the size and speed of the compression and decompression and the quality of the image. Choose one of the following options from the **Codec** drop-down menu.

Value	Description
H.264	H.264 is the default value and provides high quality video while using low bandwidth. This is the preferred codec for the system.
Motion JPEG	This is suitable for live streaming and video, however may have low quality images while using high bandwidth. Motion JPEG does not support audio.
MPEG-4	This may be suitable for presentations. Provides good image quality, while using moderate bandwidth.

5. If the selected codec is Motion JPEG, you can configure the **Page refresh time**. Specify a time in a seconds.
6. If the selected codec is H.264 (default), click **Video encoding preset** to define how the video stream is encoded. Choose one of the following:

Value	Description
Hardware Accelerated	This is the default H.264 encoding preset. Choose this setting for best performance.
Software	This matches the default from previous generations of Epiphan products. Choose this **only** if you need software encoding or X.264 encoding to match results created with previous generations of Epiphan products or firmware.

7. If the selected codec is H.264 (default), click **Video encoding profile** to limit or include video formats that are supported. Choose one of the following:

Value	Description
Baseline	Choose this option when streaming to an application that requires robustness and cannot tolerate data loss, for example video-conferencing.
Main	Choose this option for standard-definition broadcasts. This is the default.
High	Choose this option when video is viewed for broadcast and disk storage applications, particularly for high definition television application such as Blu-ray disk storage format and HDTV broadcast service.



Video encoding profile and preset can be set only when the H.264 codec is selected.

8. If all your changes are complete, scroll to the bottom of the page and click **Apply**.

Configure frame size

By default, for channels with only one layout and when that layout has only one video source, your Standalone VGA Grid automatically uses the incoming source frame size as the stream frame size. Frame size greatly affects the amount of bandwidth needed to transmit your stream. The larger the frame size, the more bandwidth you need to stream it. So you may want to keep the frame size the same as your source, or you may want to apply upscaling, downscaling, stretching, or black bar framing, depending on your needs.

For example:

- if the input signal resolution is 1920×1080 (a 16:9 aspect ratio)
- and stream frame size is set to another 16:9 frame size such as 1280×720,

the smaller stream frame size causes the system to downscale the image and use less bandwidth to transmit.

Or if you have a widescreen/HD format source but need a 4:3 output frame size, you can add black bars to the top and bottom of the frame.

The system is designed to provide scaling, however for the best overall system performance (particualrly when reaching maximum system capacity), configure your source to provide the correct frame size and avoid scaling.

To configure your stream's frame size:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click **Encoding** for the your channel; the encoding configuration page opens.
4. Scroll to the **Frame size** section.
5. Perform one of the following steps:

   Using current signal resolution as the frame size only works for channel layouts with a single source. If you're using multiple sources, follow the steps below to set your frame size.

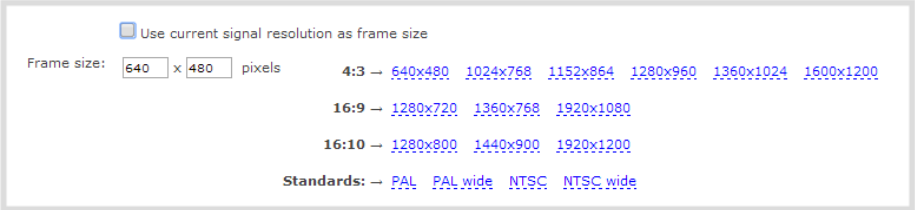
   a. Check the **Use current signal resolution as the frame size** check box. Enabling this feature greys out the other frame-size configuration fields. The system automatically streams at the frame size of the input signal.



If you change the frame size (resolution) of the input signal after streaming (or recording) begins your may see interrupted streaming and recording. Enabling this feature is not recommended for systems where input resolution is changed frequently.

b. Change the frame size, follow the steps below.

6. Set the **Frame size** values to reflect the dimensions required for your stream. Some suggested values cover popular resolutions of cameras and display devices such as monitors, but you may also specify something custom:



a. Uncheck **Use current signal resolution as frame size**.

b. Type a frame size in the field; or

c. Select an option from the sizes shown, the dimensions will appear in the frame size field.

Scaling occurs automatically (no extra configuration needed) when you make the dimensions larger, smaller, or a different aspect ratio than the source.

If your channel has a layout with only one source and your source and stream aspect ratios differ, when viewing that layout, your source is centered in the frame and matte bars are added to the top and bottom or left and right sides to make up the difference. See **Remove black bars (matte) from the video**.

7. If all your changes are complete, scroll to the bottom of the page and click **Apply**.

If you plan to use layout switching during a live stream, it's best to choose a fixed layout size. This avoids causing the stream restart due to frame size change when you switch between single-source layouts that use frame sizes.

Fine tune stream settings

Along with video/audio codecs and frame size, there are other configurable stream settings that affect quality and bandwidth. Like with frame size selection, values for these settings can be a tradeoff between bandwidth available and quality for stream viewers.

A table at the end of this section provides additional guidance for the settings

To fine tune your stream's settings :

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click **Encoding** for your channel; the encoding configuration page opens.
4. Scroll to the **Key frame interval** setting.
5. Click the **Key frame interval** drop-down box to choose how often a key frame (a frame that contains all the pixels) is sent when streaming the video. The longer the key frame interval the smaller the video file size, and vice versa.
6. If desired, change the **Limit frame rate**. The default should be adequate in most applications. While decreasing the limit may improve system performance, you may need to test different values to balance video smoothness and processing power.
7. If using H.264 of MPEG4 video codecs, you can increase or decrease image quality by increasing or decreasing the target **Bitrate** value. Video with a high level of motion and high resolution, such as a sporting event, requires a high bitrate.
8. If all your changes are complete, scroll to the bottom of the page and click **Apply**.

Table 16 *Stream settings guidance*

Key frame interval	The key frame interval feature specifies how often a key frame (a frame that contains all the pixels) is sent when streaming the video. This setting also impacts how quickly a video moves through the frames when a viewer uses the search function of their media player. Increasing the number of seconds between key frames can significantly reduce your bandwidth and system resource usage with minor impact to your video quality. A good rule of thumb is to keep the interval between 2 to 3 seconds and decrease the key frame interval as the motion increases. Try different settings and note changes in the video quality. If your video quality is poor and jittery you may need to decrease the interval between key frames. If you have unlimited bandwidth and system resources you

	can choose an option to stream key frames only.
Frame rate	Frame rate reflects the number of images captured by the device per second. Reducing the frame rate reduces bandwidth usage, and vice versa. The system's ability to maintain a set frame rate is based on several factors, for example: • overall system load affects the ability for the device to process pixels; • available network bandwidth; • the source and stream frame size (resolution); • the type of motion that is captured; and • number of users accessing the stream. When adjusting the frame rate, you may need to try different values to achieve the best outcome.
Bitrate	In general, higher bitrate mean higher image quality in the stream, at the cost of higher bandwidth needed to transmit it. For comparison against something you are likely familiar with, an HD Blu-ray video is typically in the range of 20 mbps, standard-definition DVD is usually 6 mbps. If you don't know what value to use, a good place to start is 5000 kbps (slightly less than a typical DVD). Test to see how this works for your viewers and adjust.

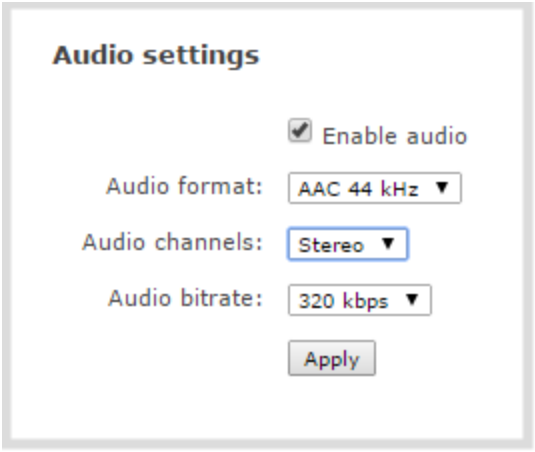
Configure audio codec

If your channel sources included audio (see Create a simple channel or Create a custom channel), your stream will by default use the AAC audio codec at 48 kHz. You can modify this setting to best match your streaming or post-processing needs.

To configure your stream's audio codec :

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. Click **Encoding** for the your channel; the encoding configuration page opens.
4. Scroll to the **Audio settings** section.



5. Ensure the **Enable audio** checkbox is checked.
6. If the default audio format AAC 44KHz, stereo, 320 Kbps is not desired, click the **Audio format** drop-down menu to select an audio codec. A table at the end of this procedure gives details about each option.
7. Click the **Audio channels** drop-down menu to choose mono (1 channel) or stereo (2 channels).

If desired, you can choose **Mono** to have left and right stereo channels combined and streamed together (i.e. when listening to the streamed audio, the same blended sound will come through both the left and right channels).

8. Select an **Audio bitrate** from the drop-down menu. The table at the end of this procedure gives some guidance on audio bitrates.

For **stereo** audio, we recommend 256 kbps or 320 kbps.

9. If all your changes are complete, scroll to the bottom of the page and click **Apply**.

Table 17 *Audio codecs and bitrate guidance*

Value	Description
AAC	AAC is the default audio codec. This codec is comparable to MP3, and may have better sound quality with a similar bit rate. Supported values are 16, 22, 44 and 48K kHz. Most digital signals (HDMI

Value	Description
	or SDI sources) use 48 kHz audio. Matching the encoded level with the source level provides the best sound quality by avoiding audio resampling. For analog signals, 44 kHz provides higher sampling. The maximum bitrate for mono encoding of a 44 kHz signal is 264 kbps. For stereo, 320 kbps is supported.
MP3	MP3 provides a common audio format for audio storage. Supported values are 22 kHz, 44 kHz and 48 kHz. Most digital signals (HDMI or SDI sources) use 48 kHz audio. Matching the encoded level with the source level provides the best sound quality by avoiding audio resampling. For analog signals, 44 kHz provides higher sampling. Flash (FLV) doesn't support 48 kHz MP3 audio. When selecting this value you'll need to use a media player (or install ASF browser plugins) to preview your channel.
PCM	Pulse Code Modulation (PCM) is a standard for digital audio in computer and other devices such as, digital telephone systems. Most digital signals (HDMI or SDI sources) use 48 kHz audio. Matching the encoded level with the source level provides the best sound quality by avoiding audio resampling. For analog signals, 44 kHz provides higher sampling. Flash (FLV) doesn't support 48 kHz PCM audio. When selecting this value you'll need to use a media player (or install ASF browser plugins) to preview your channel.

Codec and file format compatibility

Not all streaming and recording protocols support all combinations of video and audio codecs. Use the tables below to determine what settings work for your streaming and recording needs.

The following table displays the compatibility between the video/audio codecs and formats supported for streaming.

Video Codec selected	Audio Codec selected	RTSP	FLV	ASF	MPEG-TS	MJPEG
H.264	No audio codec	✓	✓	✓	✓	
H.264	PCM	✓	✓	✓		
H.264	MP3	✓	✓	✓	✓	
H.264	AAC	✓	✓	✓	✓	
MPEG-4	No audio codec			✓		
MPEG-4	PCM			✓		
MPEG-4	MP3			✓		
MPEG-4	AAC			✓		
MJPEG	No audio codec					✓

The following table displays the compatibility between the video/audio codecs and formats supported for recording.

Video Codec selected	Audio Codec selected	MP4	AVI	MOV	MPEG-TS
H.264	No audio codec	✓	✓	✓	✓
H.264	PCM	✓	✓	✓	
H.264	MP3	✓	✓	✓	✓
H.264	AAC	✓	✓	✓	✓
MPEG-4	No audio codec	✓	✓	✓	
MPEG-4	LPCM	✓	✓	✓	
MPEG-4	MP3	✓	✓	✓	
MPEG-4	AAC	✓	✓	✓	
MJPEG	No audio codec	✓	✓	✓	✓

Add channel metadata

Adding company information to metadata is an easy way to identify and copy protect your broadcast or recording.

This section describes the following topics for customizing your channel:

- Add channel metadata
- Remove metadata from a channel

Previous firmware versions gave the ability to configure "No Signal" images per channel. "No Signal" images are now done on a per-source basis instead . See Add a No Signal image to a source .

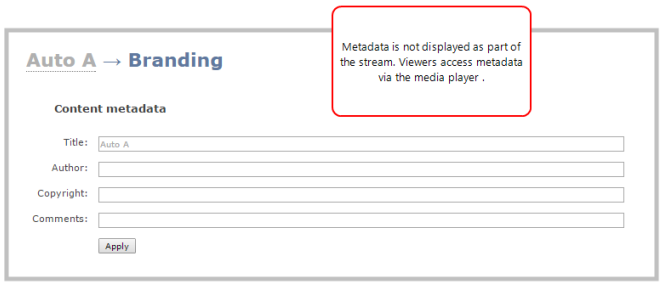
Add channel metadata

Using the Branding feature, you can apply a logo to your channel and specify the following meta data that the media player displays for your viewers:

- title of the presentation;
- company website;
- presenter's name;
- copyright date or other labels such as proprietary information, preliminary etc; and
- additional information about the broadcast, such as time of the broadcast, or change to the schedule.

To apply channel metadata:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, select a channel; the menu expands.
4. Click the **Branding** link for your channel; the Branding configuration page opens.



5. Enter metadata such as: presentation title, presenter name(s), any copyright dates and additional information about the broadcast that you want the viewer to know.



How metadata is displayed depends on the media player. For example VLC stores the metadata in a media information file, while other media players scroll the text horizontally from right to left along the bottom of the media player window, similar to a ticker message bar.

6. Click **Apply**.

Remove metadata from a channel

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, select a channel; the menu expands.
4. Click the **Branding** menu option; the Branding configuration page opens.
5. Scroll to the **Content metadata** section.
6. Click the Author, Copyright or Comments field.
7. Highlight the text and press delete on the keyboard. The field is empty.
8. Click **Apply**.

Preview a channel

While configuring a channel, you may want to open a live preview of the channel in another tab or browser window so you can see the changes as they are applied. Choose one of the following options to preview your channel:

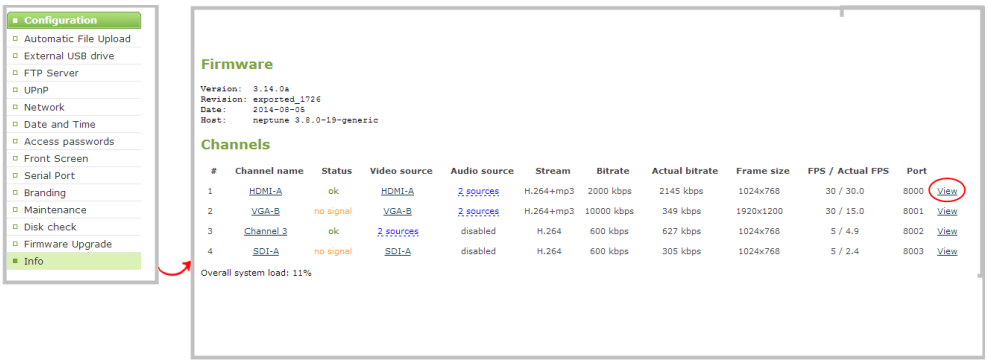
- Preview a channel from the Info page
- Preview a channel from the Status page
- Preview all channels at once

Preview a channel from the Info page

The system's Info page displays links for previewing your channel(s). This fast and simple method allows you to see link for all the streams in a single location.

To preview a channel from the **Info** page:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Info** from the Configuration menu option; the system information window opens .



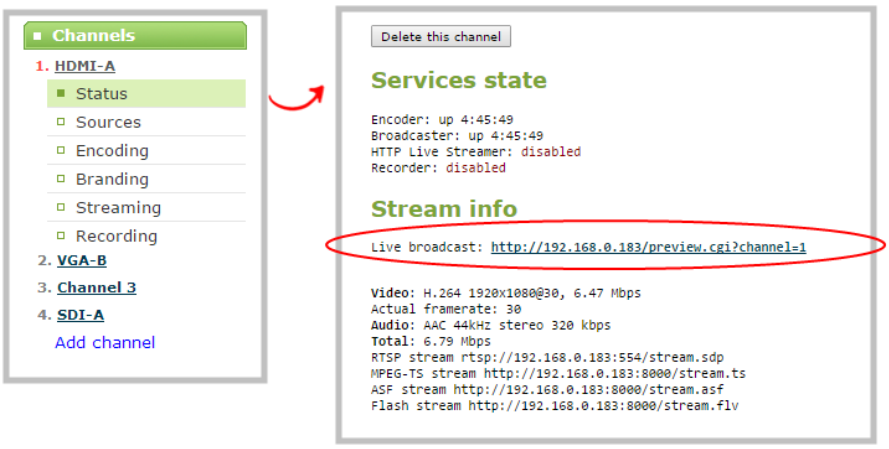
4. Scroll to the channel you want to preview.
5. Click **View**; the corresponding channel is displayed in the window.

Preview a channel from the Status page

The channel's status page gives a wealth of information about the channel, including bit rate, frame size, a snapshot of the channel and links to preview the channel.

To preview a channel from the Status page:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click the link for Channel you want to preview, the menu expands.
4. Click **Status**; the channel's Status page opens.



5. Scroll down to see the snapshot.
6. Right-click the **Live Broadcast** link and select **Open in a new Tab** or **Open in a new Window**; a tab or window opens displaying a preview of the channel.

Preview all channels at once

Standalone VGA Grid has a special preview mode that lets you see all configured channels at once.

The resulting web page can be very large. You may wish to be aware of your web browser's zoom hot keys. Many browsers will zoom out with Ctrl-- (control minus) and zoom in with Ctrl-= (control equals).

To preview all channels at the same time:

1. Open a new browser window.
2. Type the following string into the address bar of your web browser on your admin computer (ipaddress is the IP address of your Standalone VGA Grid).

   http://<ip address of Standalone VGA Grid>/preview.cgi
   For example: http://172.20.1.33/preview.cgi

3. Press **Enter**, the preview web page appears displaying the content of all active channels.

Rename a channel

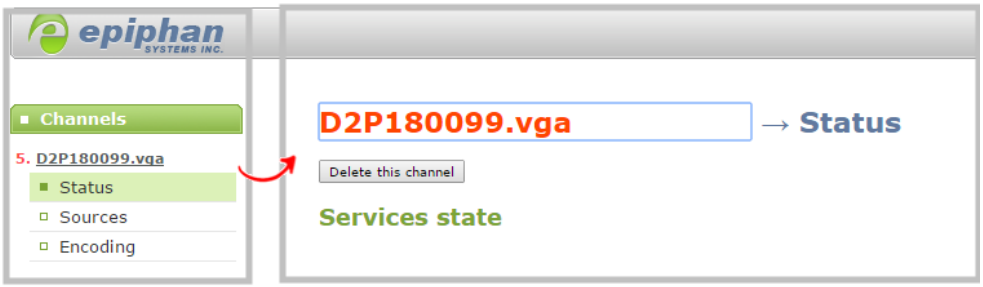
By default, channels are created with the same name as their source - until a second layout or a second source is added to the channel, at which time the channel is renamed Channel X where X is the index of the channel. However there may be circumstances when you want to create a distinct name for the channel to reflect the source(s) it contains.

To rename a channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, scroll to the Channels menu option.
4. Click on the channel you want to rename; the menu expands.
5. Click any link for the channel; the corresponding channel status or configuration page opens.

You can change a channel's name from any of it's configuration pages.

3. Click the channel name at the top of the channel configuration page; the name text becomes red to indicate that it is editable.



4. Highlight the old name and press backspace or delete on the keyboard.
5. Type the new name, using alphanumeric characters. It's recommended (but not mandatory) that you use underscores to separate words, if needed.
6. Press Enter on the keyboard. The name is updated at the top of the screen and in the list of Channels in the navigation menu.

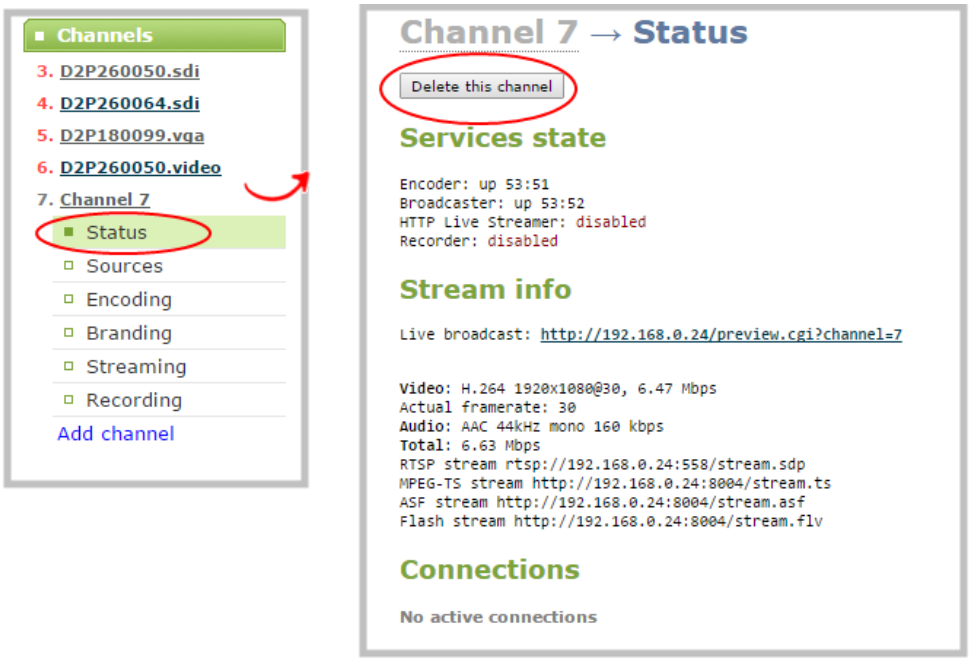
You must press the Enter key on the keyboard for the change to take effect.

Delete a channel

From time to time you may want to clean up the list of channels, and remove channels that are no longer used. The following steps describe how to delete a channel. Deleting a channel does not delete the input source configuration, however it deletes any recorded files for the channel.

To delete a channel, follow the steps below.

1. From the web interface, scroll to the Channels menu option.
2. Click the channel you want to delete; the menu expands.
3. Click **Status**; the Status page opens displaying the service state and stream info for the channel.



4. Click **Delete this channel**; a confirmation dialog box appears to remind you that all recorded files for this channel will be removed.



You cannot undo this command.

5. Click **OK** to continue or **Cancel** to stop. If you proceed, a message indicating that the channel was successfully deleted appears at the top of the page.

Live video mixing / switching

Standalone VGA Grid supports live video mixing (also known as live video switching) while you are capturing, streaming and recording. Video mixing is a great way to create dynamic content for your viewers and recordings. With Standalone VGA Grid, switching happens in less than half a second (< 500 ms)!

This means you can start your stream with a video source showing a countdown, move to a single-camera view, then switch between multiple cameras or multiple layouts with more than one source, and end again with a thank you message for attendees. (Layout switches made in your channel are reflected in both the live stream and recording.)

For example, your stream could look like this:



Before you can switch between layouts, make sure you have your custom channel with layouts created. See Create a custom channel or layout.

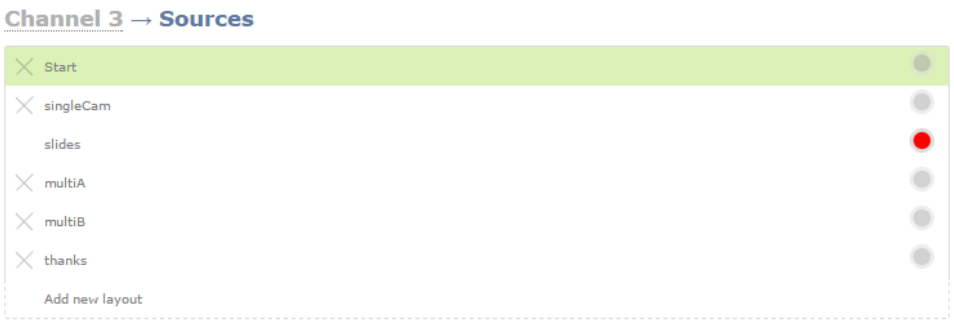
Now on to the fun part!

Switching / mixing using the web UI

Switching live video inputs, or video mixing, is fast and easy using the web UI. For best results, you may wish to be in a location where you can see the live action, and have a solid understanding idea of what is in each of your layouts. Good layout names can help with this. See Rename a layout (custom channel).

To do live video mixing:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the steps in Custom channel layout editor or Create a custom channel or layout to get to the channel layout editor.



4. The currently active layout has a red button in the rightmost column.
5. Touch the empty circle for another layout to make it the active layout; the layout changes in the live stream (and recording), and the new row gets the red button.



6. Continue to switch layouts as needed for the duration of your event or recording.

What is a source?

A source can be an image, video, or audio from a camera, a computer screen or any device that provides a VGA, S-Video, SDI, DVI or HDMI video signal and audio signal output.

Video sources

The web interface automatically discovers all video source ports and displays them in the **Sources** section of the web admin interface.

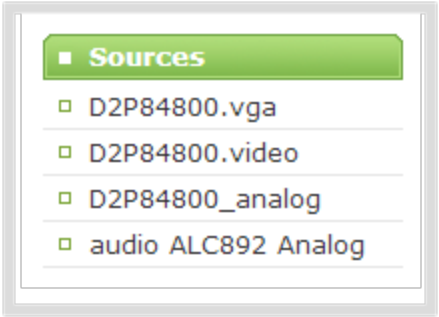
Each video input on the back of the system is a frame grabber. Input sources are identified by their frame grabber serial number. Each frame grabber has one DVI port, one SDI port, one S-Video port, and one audio port. DVI ports are listed with the suffix .vga, SDI ports with the suffix .sdi, S-Video inputs are listed with the suffix .video, and audio inputs are identified by the word audio. Video sources include a preview of the images they are capturing. It is a good practice to view the images from each source to confirm what is captured. See below.

When a source is connected, the system automatically detects and adjusts the image capture settings at start up and continues to adjust every 60 seconds during operation (interval is configurable). The system's goal is to produce the best quality captured image given the source equipment used. Generally no further configuration is needed.



VGA Grid HD Encoders can also be used as sources for your Networked VGA Grid Concentrator. To accomplish this, you must first add your HD Encoder(s) to a channel and then add the channel as a source. See Add an HD Encoder as a source (custom channel) for more information.

If there is no source connected to a specific port , then the default "No Signal" image will display in any channel where the source is used. You can use Standalone VGA Grid.'s default "No Signal" image for your sources, or you can create your own custom "No Signal" image for your channels to enhance branding and add professionalism to your display. See Add a No Signal image to a source



Audio sources

Standalone VGA Grid's web interface also automatically discovers all audio sources displays them in the same section. Audio sources are identified by the word audio in the source name. Audio input devices such as a microphone and portable music players can send audio signals to the Standalone VGA Grid using the audio input ports at the back of the system. Audio is also supported via HDMI and SDI.

DVI2PCIe cards do not support audio over HDMI. Standalone VGA Grid systems with DVI2PCIe cards will not be able to capture audio through HDMI sources.

This chapter covers the following sections:

- Connect a source
- Preview a source
- Rename a source
- Control audio volume
- Confirm audio levels
- Add a No Signal image to a source

Connect a source

You can connect sources to the Standalone VGA Grid at any time, either before or after the system is powered on. Similarly you can disconnect a source from a port and even connect a different source at any time.

Changing the source connected to a port that is being streamed or recorded can result in the recording stopping or the stream frame size changing depending on how your channel is configured.

If the frame size changes, viewers may be disconnected and need to re-connect to the stream.

Connect the input sources to the following input ports on the system:

Table 18 *Cable and port connections*

Cable	Input Port
VGA, HDMI* or DVI	DVI port
SDI	SDI port

Cable	Input Port
composite or S-video source	S-Video port
audio	Audio Input port

* Standalone VGA Grid only supports video and audio capture from HDMI content that is not HDCP-protected.

Preview a source

You can preview the images captured from your sources in the web admin interface. No extra configuration is needed.

To preview the captured stream/images:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Ensure a source is connected to the input port, see Connect a source.
4. Scroll to the bottom of the source configuration page to see the **preview**.

Configure a source

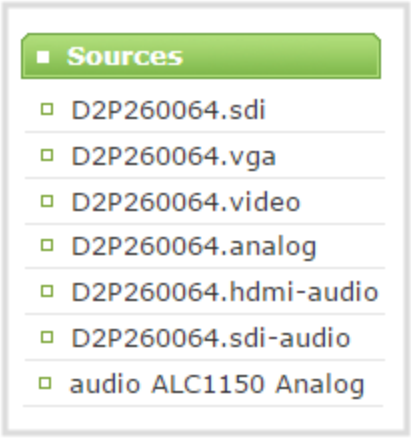
Generally the captured stream doesn't require any additional configuration, but if needed, you can log into the web interface to make configuration changes.

To configure a source:



The following adjustments cannot be made for S-Video sources.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Ensure a source is connected to the input port, see Connect a source.
4. From the web interface, scroll to the Sources menu option.



5. Click the .vga, .sdi or ,video source link; the source configuration page opens.
6. If desired, scroll to the bottom of the source configuration page to see the video **Snapshot**.
7. Make note of the name of the source, or optionally, change the source name to reflect the data it is capturing. You'll need to know this name to add the source to a channel. See Create a simple channel.
8. In most cases the video is ready to add to a channel and broadcast. If fine adjustments are required, refer to the table below to make minor configuration changes.

DVI and HDMI signals

Although many options can be listed on the .vga (DVI) source configuration page, only certain ones are applicable to DVI or HDMI signals. When you have a digital source connected, the page indicates that most changes are not configurable.



The following values are configurable for digital sources connected to the DVI port:

Value	Description
Autoadjustments interval (sec)	When a source is setup, the system automatically detects and adjusts the image capture settings at start up and continues to adjust every 60 seconds during operation. To change the number of seconds between update, enter a value, or 0 to disable the feature, otherwise the default of 60 seconds is set.
Rotate	This feature is useful when a source captures video that is rotated 90º or is displayed upside down. Choose one of the following values to change the video orientation while streaming: • No rotation • 90º clockwise • 90º counter clockwise • 180º
Enable deinterlacing	Enable this feature to convert an interlaced source signal to a non-interlaced signal.

VGA signals (coming in via DVI port)

The following values are configurable for VGA signals coming in via a DVI port.

Value	Description
Use signal from	Specify the native color space of the signal source, either RGB or YUV. The following values are available: • VGA/DVI signal (RGB) (this is the default setting) • Component signal (YCrCb) Configurable for VGA sources only.
Autoadjustments interval (sec)	When a source is setup, the system automatically detects and adjusts the image capture settings at start up and continues to adjust every 60 seconds during operation. To change the number of seconds between update, enter a value, or 0 to disable the feature, otherwise the default of 60 seconds is set.
Vertical shift	When an image is not aligned in the window, use this feature to move an image up or down on the screen. The values range from 20 (moves the image up) to –20 (moves the image down).
Horizontal shift	When an image is not aligned in the window, use this feature to move an image left or right on the screen. The values range from -999 (moves the image to the left) to 999 (moves the image to the right).
Phase	Specifies phase adjustments for VGA signals. Generally not used unless value is provided by Epiphan support. Configurable for VGA sources only.
PLL adjustment	Changing the value adjusts the horizontal resolution of the image. Adjust the value using small increments until the image is sharper. The value ranges from 0-999 to 999. Configurable for VGA sources only.
Offset	The Offset and Gain parameters function as contrast control for an image. The Offset controls the darker parts of the image and the gain controls the bright parts of the image. Adjust both values to optimize image quality. Adjust the values using small increments until the image is sharper. If you set Offset to a high value, set a high value for the gain to balance the two. Configurable for VGA sources only.
Gain	The Gain and Offset parameters function as contrast control for an image. The Gain controls the bright parts of the image and Offset controls the darker parts of the image. Adjust both values to optimize image quality. Adjust the values using small increments until the image is sharper. If you set Offset to a high

Value	Description
	value, set a high value for the Gain to balance the two. Configurable for VGA sources only.
Aspect Ratio	Sets the aspect ratio of the captured image. The default is 4:3. Set the value to Wide mode when capturing images that have a wide aspect ratio. Using the incorrect setting causes the image to be distorted or stretched. Configurable for VGA sources only.
HSync threshold	Adjust horizontal sync detection. Configurable for VGA sources only.
VSync threshold	Adjust vertical sync detection. Configurable for VGA sources only.
Rotate	This feature is useful when a source captures video that is rotated 90º or is displayed upside down. Choose one of the following values to change the video orientation while streaming: • No rotation • 90º clockwise • 90º counter clockwise • 180º
Enable deinterlacing	Enable this feature to convert an interlaced source signal to a non-interlaced signal.

S-Video signals

The following options are available for S-Video signals via S-Video ports.

Signal type	Specify the video source connected to the S-Video input source. The options are Default, Composite, S-Video.

SDI signals

The following options are available for signals via the SDI port.

Value	Description
Rotate	This feature is useful when a source captures video that is rotated 90º or is displayed upside down. Choose one of the following values to change the video orientation while streaming: • No rotation • 90º clockwise • 90º counter clockwise • 180º
Enable deinterlacing	Enable this feature to convert an interlaced source signal to a non-interlaced signal.

Add a No Signal image to a source

By default the system displays a gray background with the text No Signal when there is no video signal coming in to a source. You can customize this image to display a different message to your viewers. For example if a viewer logs in early, or if you are experiencing delays you could indicate the start time (or expected resolution time) using the no signal image.

Before you can specify a custom no signal image for a source, you must upload it following the procedure **To upload an image**.



Transparent PNGs are not a supported file type for "No Signal" images.

To set the no signal image for a source:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Follow the instructions above (To upload a logo to a channel) to upload an image via the **Branding Content** page.
4. From the web interface, select your desired source under the **Source** header; the source configuration page opens.
5. Select a “No signal” image. This image displays in the channel when the source's signal is not detected. (If your uploaded image does not appear in the list, ensure it doesn't exceed the maximum file size of 3840×2160.)

Alternatively, to select an image you can simply drag and drop your chosen picture file to the blank space below the Image field.



6. In the Timeout field, enter the number of seconds before the "No signal" image is displayed. If no manual value is entered, the default time to display is 5 seconds.
7. Click **Apply**.
8. Test that the No Signal image is correctly applied by disconnecting your source and previewing the channel(s) containing said source. See Preview a channel for more information.

Rename a source

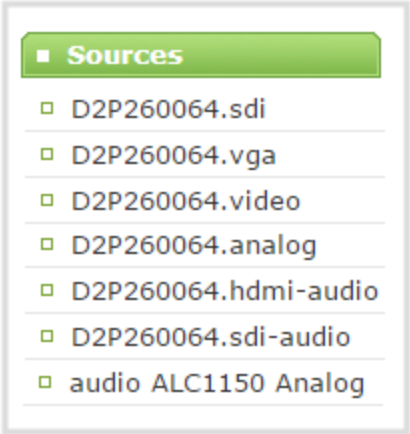
Source names are used when adding sources to channels, therefore it is important that you know the name of the source you wish to use. If a channel has only one source, the channel name will by default be the same as its source name and will update automatically when the source name changes.

Sometimes it's helpful to configure the source name to match the data it's capturing so it's clear what the channel is capturing too. Alternately you can change the channel's name. See Rename a channel.

To change a source name:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. From the web interface, scroll to the Sources menu option.



4. Click the .vga or ,video source link; the source configuration page opens.
5. Click the **source name** at the top of the page; the name turns red.
6. Highlight and delete the existing **source name**.
7. Type a new source name.
8. Press **Enter** (on your keyboard) to save the new name.

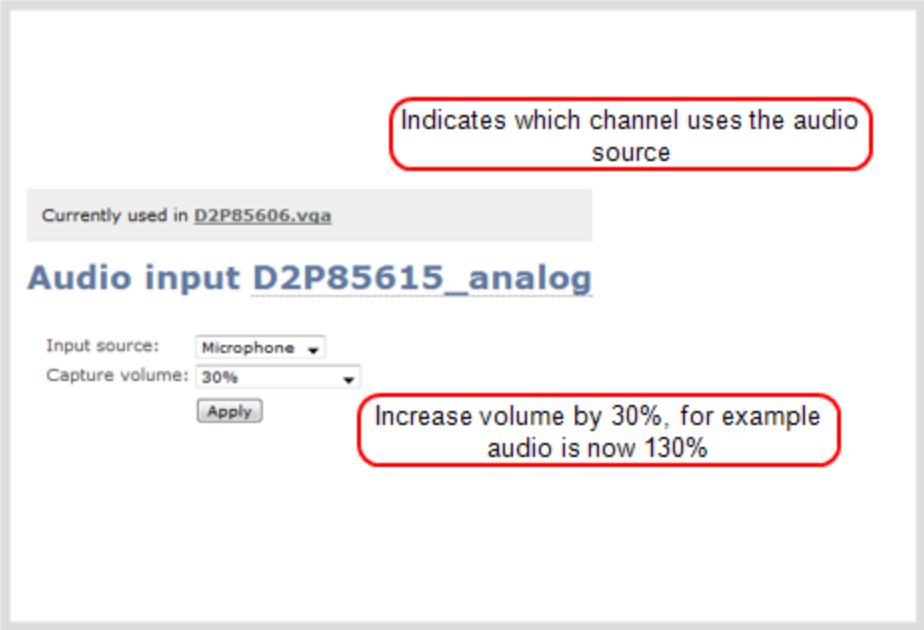
You must press Enter to save the new name. The **Apply** button will not save the source name change.

Control audio volume

Do you find the volume is too high or too low for some of your audio sources? You can control the volume level for audio inputs via the web admin interface.

To set audio volume:

1. Ensure an audio input source is connected to an audio input port.
2. Connect to the admin interface using your preferred connection method. See Connect to the admin interface.
3. Login as admin.
4. From the web interface, scroll the **Sources** section.
5. Select an audio source; the audio configuration page opens.



6. For Analog audio sources (TRS), select an Input source from the drop-down menu.
7. Choose **Line** to capture high-powered audio signals from self-powered equipment, such as a CD player, synth or amp, or select **Front Mic** or **Rear Mic** to capture audio from a microphone connected to the audio input port.

> "Passive" microphones requiring phantom power are not supported. Supported microphones require their own external power source, such as a battery.

9. Click the **Capture volume** drop-down menu. A list of percentages is displayed. Choose to amplify the volume by a percentage of the original volume. The default setting is 30%. Decrease the percentage if the output volume is too loud. Increase the percentage if the output volume is not loud enough.

> Adjusting the **Capture volume** adjusts the recorded and streamed output audio.

10. Click **Apply**.

Troubleshoot capture

In addition to fine tuning channel settings such as frame rate, resolution and bit rate to ensure optimal use of resources while streaming a quality video, there may be circumstance when you must fine tune the video input source.

Changing how source images are displayed may cause undesired results, for example experimenting with the PLL setting may result in the image not being displayed properly. It is a good practice to backup your configuration settings so that you can revert back to a good configuration if the changes that you made are not desirable. See Save and restore device configuration.

The following topics are covered in this section:

- Remove black bars (matte) from the video
- Force the capture card to use a specific EDID
- Unstretch the output video
- Video not centered (VGA sources only)
- Remove the combing effect on images
- Video looks squished (VGA sources only)
- Video too bright, too dark or washed out (VGA sources only)

Remove black bars (matte) from the video

By default, for channels with only one layout and only one source, the Standalone VGA Grid makes sure that the aspect ratio of input signals is preserved when the output is streamed. If an input video signal doesn't match the encoded frame aspect ratio, bars are added to the sides or top and bottom of the encoded stream when the output is streamed and recorded. The color of the bars (matte) is defined by the Background color selected on the **Channel sources** page. See Create a custom channel.

For example:

- Input signal resolution is 720×480 (a 3:2 aspect ratio)
- encoded resolution is 640×480 (a 4:3 aspect ratio that is narrower than the input resolution)

Borders are added to the top and bottom of the image to preserve the wider ratio of the input.



For example:

- Input signal resolution is 720×480 (a 3:2 aspect ratio)
- encoded resolution is 1280×800 (a 16:10 aspect ratio that is wider than the input resolution)

Borders are added to the left and right of the image to preserve the narrower ratio of the input.



If you are seeing bars on your image but would rather have the image fill the whole screen you have to options:

1. Change the output frame size to match the aspect ratio of the input.
2. Stretch the image to fit the output frame size aspect ratio.

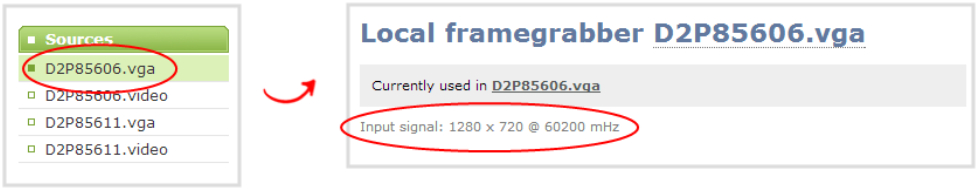
These two options are described below.

Match the output frame size to the aspect ratio of the source signal

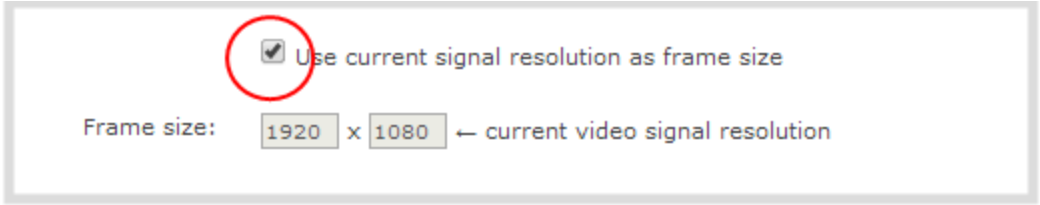
The frame size is matched only for layouts that have only one source. Note that if you have layouts with different frame sizes, switching them while live streaming will cause an interruption and restart of the stream. The same thing happens if you change the resolution of your source while streaming.

To change the output frame size on channels to match the aspect ratio of the source:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select a channel; the menu expands.
4. Click **Sources**; the Sources page opens.
5. Find the name of the media source used for the channel.
6. Click this source under the **Sources** menu.



7. Make note of the input signal resolution.
8. Click the channel's **Encoding**; the Encoding page opens.
9. Scroll to the frame size parameter.
10. The simplest option is to select **Use current signal resolution** as frame size and click **Apply**. You can alternatively select it briefly to note the current video signal resolution, then deselect it and follow the steps below.



11. Look for the source aspect ratio in the list of aspect ratios provided.



    a. If the source resolution is on the list, choose another resolution on the same line (i.e. with the same aspect ratio).

    b. If the source resolution is not on the list, use a calculator to get a factor of the source resolution and enter it in the **Frame size** fields.

12. Click **Apply**.

Stretch the image

To remove the matte (black bars) by stretching the image to fit your output frame size:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select a channel; the channel menu expands.
4. Click **Sources**; the Sources page opens.
5. Click the row for your layout; the layout appears in the layout editor.
6. Select the **gear** for your Item with your video source; the Source Settings box appears.
7. Deselect **Keep aspect ratio when scaling** in the Source Settings box.
8. Click and drag the source in the layout editor to stretch as desired to fill the frame.
9. Click **Save**.

Force the capture card to use a specific EDID

Extended display identification data (EDID) is data provided by a video display device (usually a monitor) to describe its capabilities to a video source (usually a graphics or video output card in a PC or another device). The video source uses the EDID to determine the capabilities of the monitor to determine the resolution, color depth and other settings that the monitor can support.

EDID is crucial for DVI sources but mostly ignored by VGA sources.

Like monitors, each video capture card in theStandalone VGA Grid contains an EDID. When you connect a VGA or DVI video source (such as a laptop or video camera), this source sees the Standalone VGA Grid's HD Encoder's capture card as a monitor and uses its EDID to negotiate which video signal to send.

Generally the capture card's DVI input correctly emulates a monitor that supports your video source. However sometimes, particularly if your source uses a custom set of display properties, you need to help Standalone VGA GridHD Encoder by uploading a custom EDID to force the capture card to report that it emulates a resolution, color depth, etc needed by your laptop, camera or other video source.

Upload a new EDID

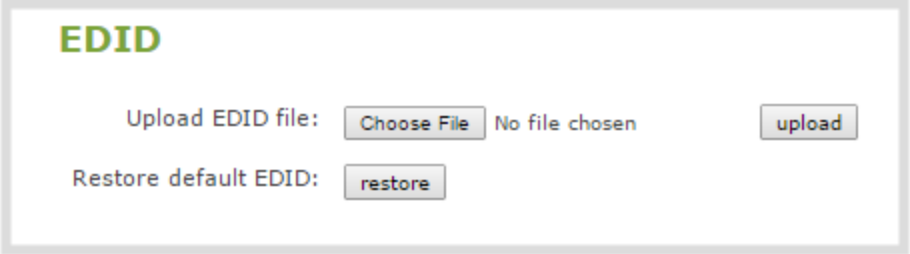
In most circumstances the factory installed default EDID, is sufficient. However, there may be some cases where a video source uses resolutions that you do not want to use. In that case you can choose an EDID that forces the Standalone VGA Grid's capture card to use a specific set of attributes.

The uploaded EDID is permanently installed on your system and this capture card (a "Source" in the web interface) will always share the uploaded EDID with the connected video input source.

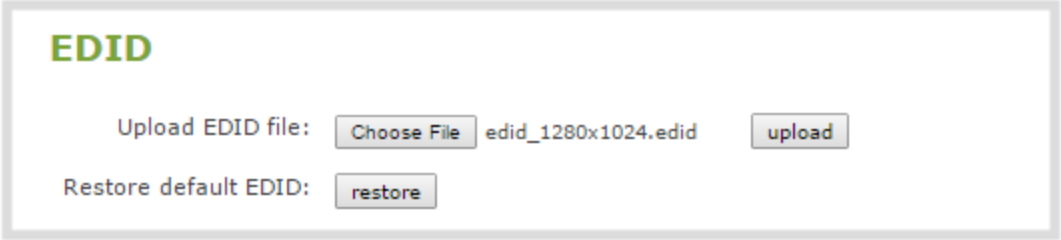


EDID changes are permanent until you replace them with another EDID or specifically choose to restore the facotry EDID for a given source. Not even a system-level factory reset removes the configured EDIDs.

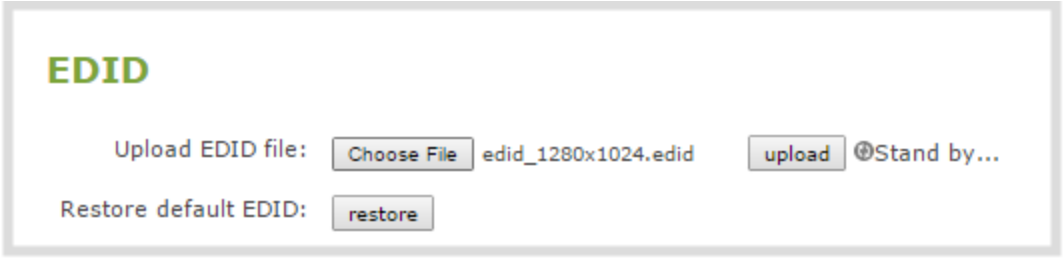
1. To download a new EDID file, go to the Epiphan support web page. The support page opens.
2. Select the support page for Standalone VGA Grid.
3. Scroll to the **EDID** section.
4. Click on an EDID from the list. The file is saved to your downloads folder on your hard drive.
5. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
6. Login as admin.
7. From the web interface, Scroll to the **Sources** section.
8. Click the name of the DVI capture card (source) for which you want to upload an EDID; the Source Configuration page opens.
9. Scroll to the **EDID upload** section.



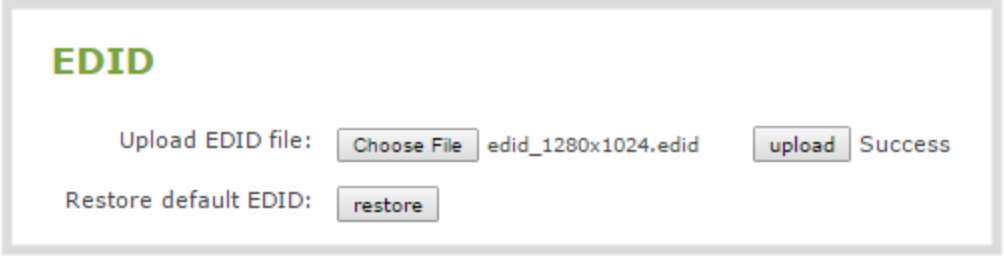
10. Click **Choose File**; a file browser opens.
11. Browse to the location where the custom EDID file was saved and select the file.
12. Click **open**; the EDID filename is displayed on the screen.



13. Click **upload**, the EDID upload begins; the screen shows a progress inidicator.



14. When the upload is complete the page changes to reflect success or failure.

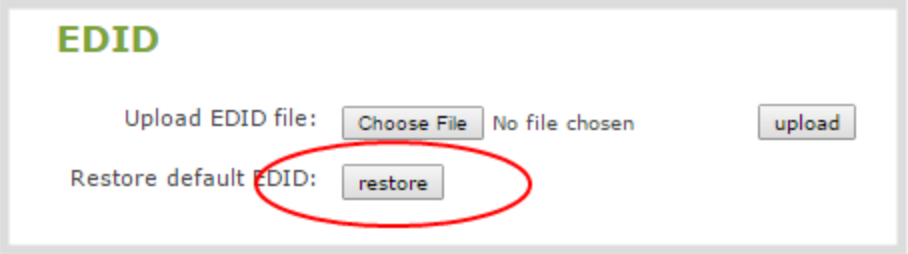


Restore factory default EDID

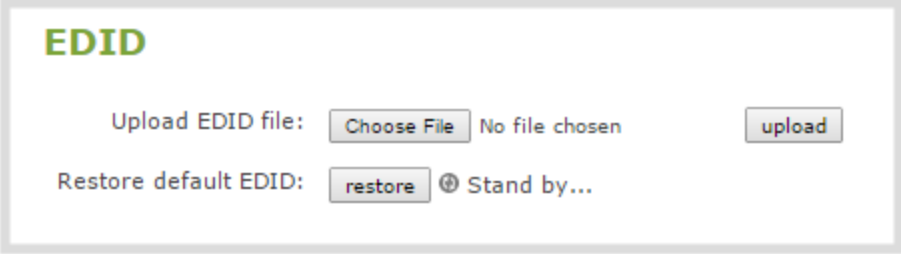
When you have finished with a custom EDID, you can restore the capture card (in the Sources list) to the default EDID. Currently there is no way to tell if your capture card is using a custom EDID. If you are unsure, restoring to factory default is the best approach.

To restore the default EDID:.

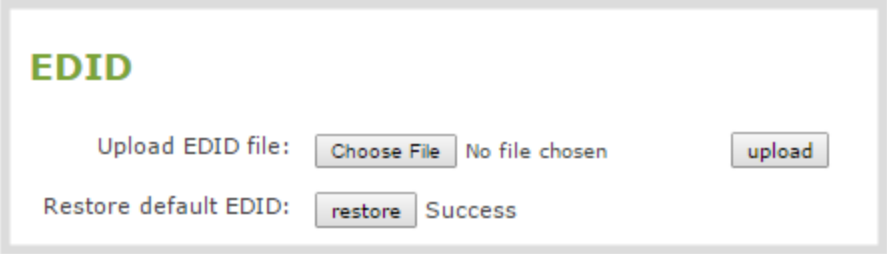
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, scroll to the **Sources** section.
4. Click the capture card (source) for which you wish to restore the EDID; the source configuration page opens.
5. Scroll to the **EDID** section.
6. Click the restore button.



7. The screen updates with a status indicator.



8. When the EDID restoration is complete, the page updates to reflect the action is completed.

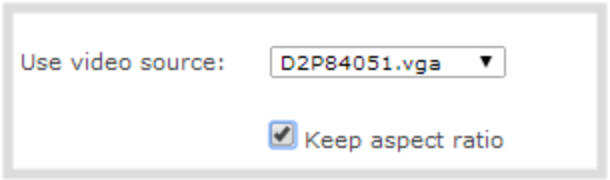


Unstretch the output video

By default, the Standalone VGA Grid makes sure that the aspect ratio of input signals is preserved when the output is streamed. If this default was overridden or if the channel was created in a version of the software earlier than 3.11.0, the image is stretched to match the output frame size. The effect may be subtle and may not be problematic for you, but if you want to resolve this it is very simple to do.

To preserve the source aspect ratio:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Encoding**; the encoding page opens.
4. Click **Sources**; the Sources page opens.
5. Click the row for the layout you want to edit; the layout editor opens.
6. Select the gear icon for your source from the list of layout items; the **Source settings** box appears.
7. From the **Source settings** box, make sure **Keep aspect ratio when scaling** is selected.



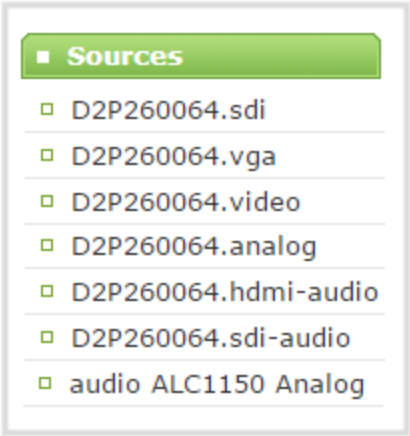
8. Scroll to the bottom of the page and click **Save**.

Unstretching the image causes a matte (black bars) to appear on the sides or top and bottom of the output. To remove these see **Remove black bars (matte) from the video**.

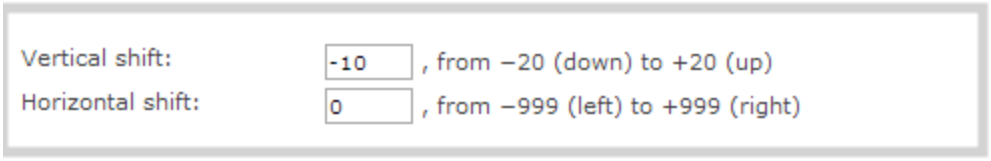
Video not centered (VGA sources only)

The image from the source is displayed too high or low, or too far to the left or right.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, scroll to the Sources menu option.



4. Click the desired video source ; the source configuration page opens.
5. To move the video horizontally to the left or right, scroll to **Horizontal shift** .
6. Enter incremental values to shift the video image to the left (use a negative value) or right (use a positive value).



7. Click **Apply**. View the output in the Snapshot preview below . You may need to make further adjustments to move the video left or right.
8. Make further adjustments and click **Apply** after each change to confirm the results.
9. To move the video up or down, scroll to **Vertical shift** .
10. Enter incremental values to shift the video image down (use a negative value) or up (use a positive value).

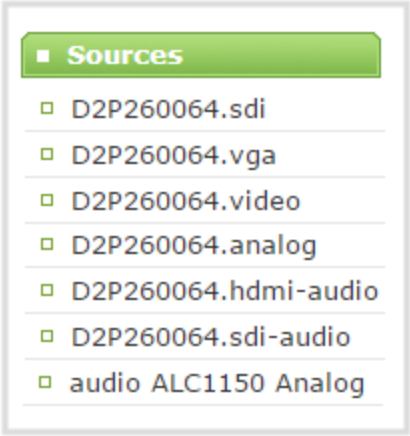
11. Click **Apply**. View the output in the Snapshot preview below. You may need to make further adjustments to move the video up or down.

Remove the combing effect on images

When frames are interlaced, artifacts from one frame may appear on the next frame. This occurs when a fast motion video is interlaced. Since each frame is captured from a different point in time, the action captured in one frame is carried over to the next frame. The result is a blurred image and horizontal lines running across the video.

To convert an interlaced source signal to a non-interlaced signal.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, scroll to the Sources menu option.

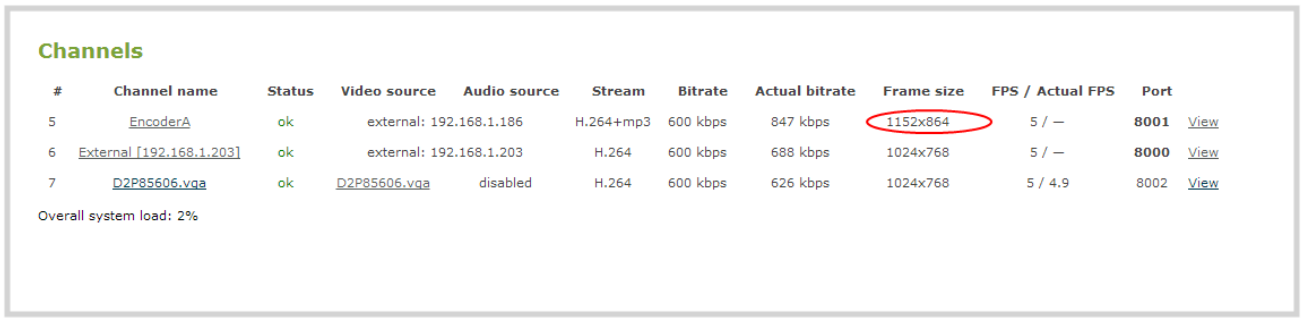


4. Click on the desired video source ; the source configuration page opens.
5. Enable the **Enable deinterlace** setting.
6. Click **Apply**. View the output in the Snapshot preview below.

Video looks squished (VGA sources only)

The image is squeezed horizontally on the screen. This distortion occurs when there's a mismatch between the aspect ratio the Standalone VGA Grid detects and the aspect ratio that is sent from the source signal. To compare the two signal values, you must know the aspect ratio that the source is sending.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Info**; the info window opens with a list of all configured channels.

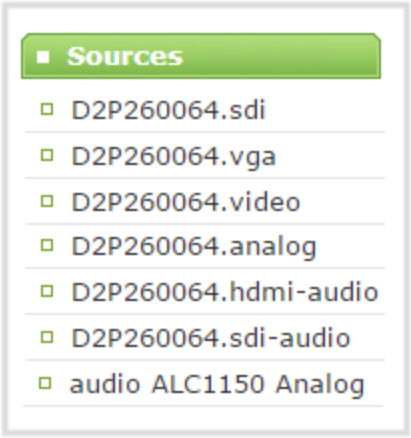


Channels

#	Channel name	Status	Video source	Audio source	Stream	Bitrate	Actual bitrate	Frame size	FPS / Actual FPS	Port	
5	EncoderA	ok	external: 192.168.1.186		H.264+mp3	600 kbps	847 kbps	1152x864	5 / —	**8001**	View
6	External [192.168.1.203]	ok	external: 192.168.1.203		H.264	600 kbps	688 kbps	1024x768	5 / —	**8000**	View
7	D2P85606.vga	ok	D2P85606.vga	disabled	H.264	600 kbps	626 kbps	1024x768	5 / 4.9	8002	View

Overall system load: 2%

4. Compare the aspect ratio from the source with the aspect ratio from the Standalone VGA Grid info window. Confirm if there is a mismatch.
5. If there is a mismatch, go to the Encoding page for the channel and change the frame size to match the frame size that is sent from the source. See Configure encoding .
6. If the video is still squeezed horizontally on the screen, follow the steps below.
7. From the web interface, scroll to the Sources menu option.



8. Click on the source for which you want to change the aspect ratio; the source configuration page opens.
9. Scroll to the Aspect ratio setting.
10. Select **Wide mode** from the drop-down menu, when the source is wider than what is being displayed in

the preview or Live View.

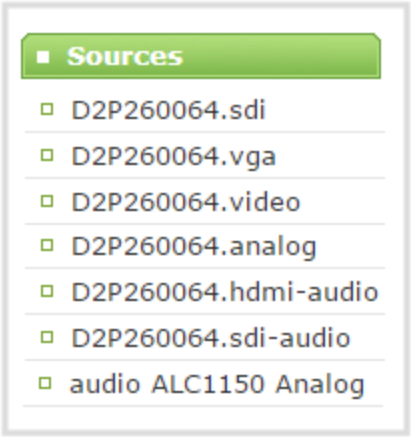
11. Click **Apply**. View the output in the Snapshot preview below.

Video too bright, too dark or washed out (VGA sources only)

If the video from the source is too light, too dark or washed out, use the offset and gain controls together to optimize image quality. Increasing the gain amplifies weak signals but also increases noise, you must balance offset and gain values to achieve the best quality image.

Adjust these settings by the smallest values possible; compensate for a large change to one by making a large change to the other. Setting both offset and gain to high values can result in poor video quality.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, scroll to the Sources menu option.



4. Click the desired video source; the source configuration page opens.
5. Scroll to **Gain**.
6. Enter a small value, for example 1 to 25 in the field to brighten the image.
7. Scroll to **Offset**.
8. Enter a small value, for example 1 to 15, to balance the gain setting . The Offset value behaves as a contrast to the Gain value.
9. Click **Apply**. View the output in the Snapshot preview below. You may need to make further adjustments to fine tune the brightness and contrast.

PART 3: Stream

Streaming provides powerful and flexible approaches to delivering to your users. Offering an easy to use interface, users can stream video using multiple formats to multiple users and devices such as web browsers, media players, set-top-boxes, Smart TVs and Content Distribution Networks. The tool's flexibility is further enhanced by its ability to support standard codecs used by most sharing destinations and media players.

This section discusses the following topics related to publishing your content:

- What is streaming?
- Stream to viewers
- Stream to a server
- Stream to a media player
- Samples of stream settings

What is streaming?

After you have configured your media and channels, decided on the content and layout of your broadcast, it's time to share your stream.

Standalone VGA Grid provides a number of options for streaming. Choose from methods for unicast, multicast, CDN, SAP, UPnP and more.

The following sections provide a description of the available streaming options, insight into why you would choose each option, and procedures to stream your content using each option.

- Choose a streaming option
- Supported streaming formats

Streams for viewers:

- Stream to viewers
- Disable (and enable) streams for viewers
- Restrict access to streams for viewers
- Stream content using HTTP or RTSP
- Configure HTTP and RTSP streaming ports
- Stream content using HLS (HTTP Live Streaming)
- Stream content using UPnP

Stream to a server:

- Stream to a server
- Stream to a CDN
- Stream content using multicast

Stream to a media player:

- Stream to a media player

Choose a streaming option

Each method of streaming media has strengths and weaknesses depending on your audience location, hardware resources and bandwidth. To help you decide how to publish your content, you must first identify the number of viewers and how viewers will access your content. Are you streaming live video, or recorded video. Do you need to stream the content to one client (peer-to-peer), deliver a single stream to multiple

clients (multicast), or provide web-based streaming where multiple clients can access the broadcast (Content Distribution Network).

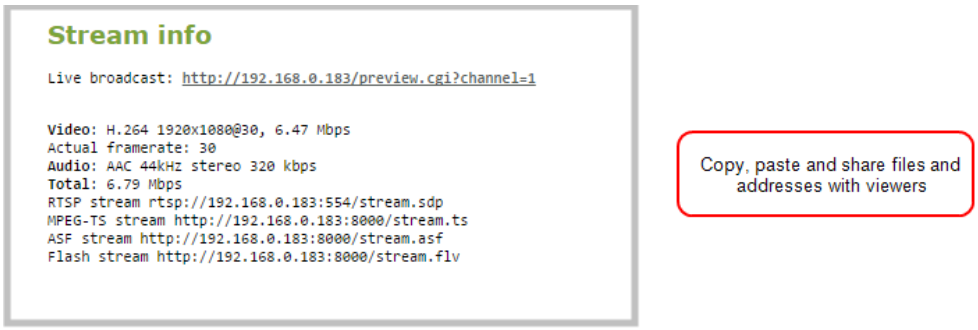
Your Standalone VGA Grid can stream to individual viewers through HTTP, HTTP Live Streaming, UPnP and RTSP and can also simultaneously stream to a server such as a multicast server or CDN.

Supported streaming formats

When you set up your channel the system generates and displays a list of available video formats and standards specific to the selected audio and video codecs used by your channel.

To view the video formats and standards specific to your selected codec:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Status**; the following page opens displaying the stream protocol that is supported based on the selected codecs.



Stream to viewers

Streaming to viewers allows people to connect directly to your Standalone VGA Grid via their web browser or media player to view the live stream.

You can configure whether or not streaming is enabled for viewers. See Disable (and enable) streams for viewers.

Publishing Options	Use this option to...
HTTP	Quickly stream content to viewers simultaneously. No set up is required. The Standalone VGA Grid is ready to stream content as soon as it is has power and a configured channel. No other settings are required. Your audience need only access the URL of the broadcast and they are instantly connected. This viewing method is ideal for a small number of viewers. For each viewer, you are using the full stream bandwidth and a small amount of system overhead on the Standalone VGA Grid. For more information about using a HTTP streaming, refer to Stream content using HTTP or RTSP.
RTSP	Quickly stream content to viewers. No set up is required. The Standalone VGA Grid is ready to stream content as soon as it has power and a configured channel. No other settings are required. Your audience need only copy and paste the URL of the stream into a media player. For more information about using a RTSP and HTTP streaming, refer to Stream content using HTTP or RTSP.
HTTP Live Streaming (HLS)	Stream live over the standard HTTP port 80, making it possible to cross firewalls and proxies that are normally accessible to other HTTP traffic and facilitates content delivery to CDNs. See Stream content using HLS (HTTP Live Streaming). There is approximately a 30 second delay when streaming using HLS.



To stream video outside of your LAN, configure port forwarding on your router. Work with your Network Administrator on this task. Network configuration is beyond the scope of this guide.

Stream content using HTTP or RTSP

The quickest and simplest way to deliver your content is to send the broadcast's URL to your viewers. You can provide separate URLs for each channel being streamed.

The format of the URL provided to you by the admin interface depends on the method you used to access the system, either through network discovery using the serial number or IP address.

The system must be accessible on the viewer's LAN for the viewer to use access by serial discovery.

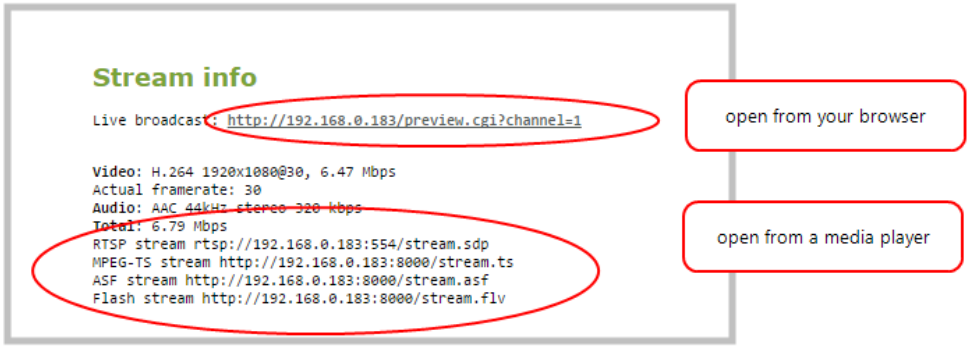
If your system is behind a firewall and you wish to share with remote viewers, you will need to set up port forwarding on your network. See your IT administrator.

Table 19 *URL options*

Access Method	URL Format
serial discovery	http://<serial>.local/preview.cgi?channel=<channel number> rtsp://<serial>.local:<port>/stream.sdp Where serial is the serial number of the system and channel number is the provided from the GUI (see below).
IP address	http://<IP Address of Standalone VGA Grid>/preview.cgi?channel=2 rtsp://<IP Address of Standalone VGA Grid>:<port>/stream.sdp Where the IP address is the IP address of the system and the port and channel number informationis provided on the channel's status page.

To retrieve the stream URL for your viewers:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Status**; the following page opens displaying the stream protocol that is supported based on the selected codecs.



5. Jot down the either the **Live Broadcast** , **RTSP stream** or other web streaming address. This is the address you can send to viewers or to create a link to your broadcast.

Users must install Bonjour Print Services on their Windows or Mac computer to access the live Preview using the serial number.

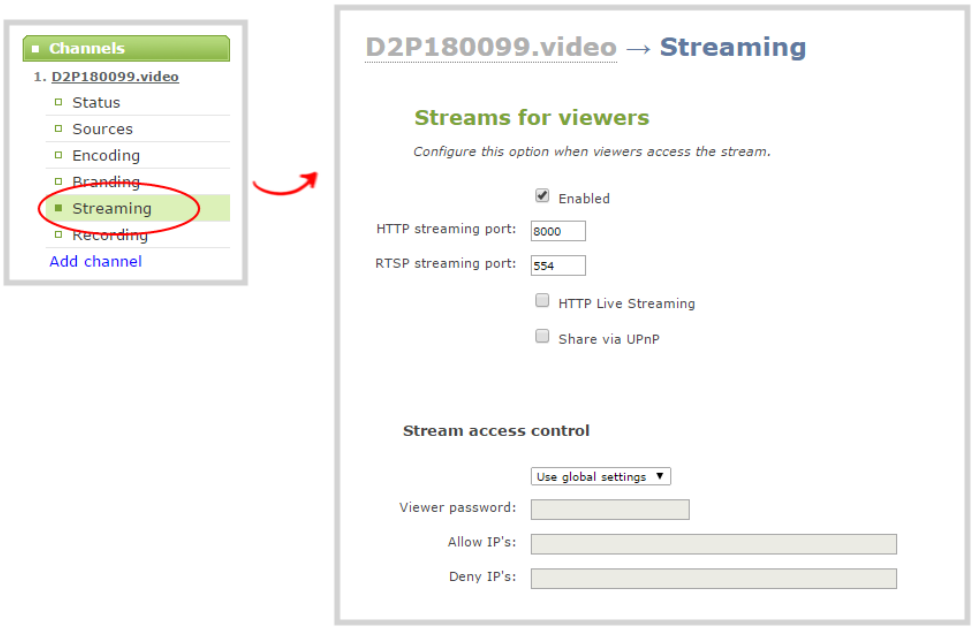
If you're seeing URLs with serial numbers instead of IP addresses and want to change this, log into the admin interface by IP address (instead of by Serial number/Bonjour Print Services) to see URLs with the IP address. Connect to the admin interface.

Configure HTTP and RTSP streaming ports

For RTSP streaming the only information required to view the broadcast is the URL and the port number used to stream the broadcast. Port numbers are also used for HTTP streaming methods such as FLV, ASF and MPEG-TS. By default, each channel has a unique HTTP and RTSP port number. If needed, you can modify these port numbers. Be sure to always use unique numbers for each channel.

To set the HTTP and RTSP streaming ports, follow the steps below.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.



5. Set the **HTTP Streaming port** to specify the port used to stream the HTTP broadcast. This value along with the URL is used by viewers to access the FLV, ASF and MPEG-TS streams.

> The port number must be higher than 500 for HTTP. In the case of RTSP streaming this value is ignored.

6. Set the **RTSP Streaming port** to specify which port to use when you are streaming live video via RTSP. This value along with the URL is used by viewers to access the broadcast. The default for channel one is 554.
7. Click **Apply**.

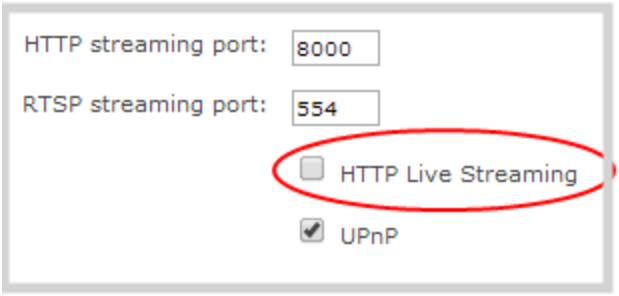
Stream content using HLS (HTTP Live Streaming)

Stream live over the standard HTTP port 80, making it possible to cross firewalls and proxies that are normally accessible to other HTTP traffic .

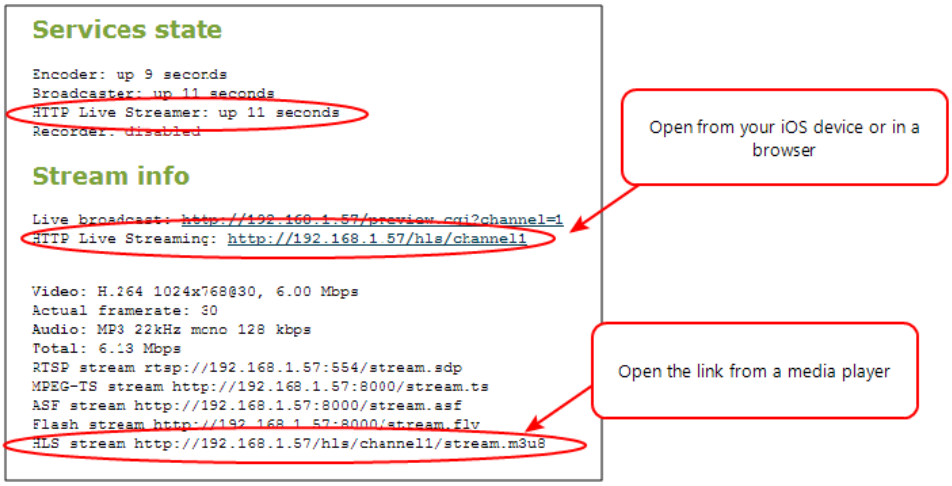
> HLS is supported with the H.264 codec and MP3 or AAC audio encoding. When streaming using HLS there is approximately a 30 second delay.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. From the web interface, select the channel containing video you want to stream; the menu expands.
4. Click **Streaming**; the channel's Streaming configuration page opens.
5. Enable HTTP Live Streaming by selecting the **HTTP Live Streaming** checkbox.



6. Click **Apply**.
7. Click **Status** for the channel. The status page opens.



8. Provide the HLS stream link to your viewers.

Send stream URLs to viewers

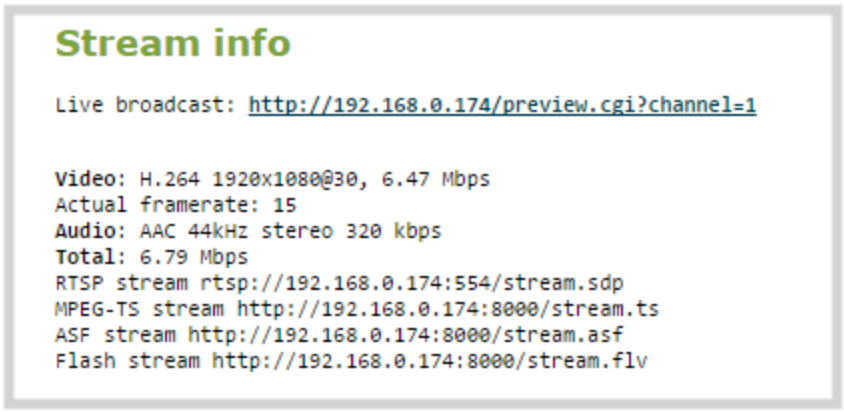
For participants to log in and view a stream, you must provide a stream URL. The URL that you send depends on the device the participant uses to view the stream. You can provide separate URLs for the stream coming from each channel, or one URL that includes all the streams for the channel.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. From the web interface, click the channel that you want to view; the menu expands.
4. Click **Status**; the Status page opens displaying the stream protocols supported based on the selected codecs. For more information on compatibility between codec and file formats, see Supported streaming formats.

MPEG-TS: Used in broadcast systems sych as DVB, ATSC and IPTV. It is supported by media players such as MPlayer, VLC and KMPlayer.

RTSP: Supported by most media players including QuickTime, MPlayer and VLC. Supports H.264 and MPEG4 standards and analog audio from an external source.



ASF: Supported on Windows Media Player. Additional codecs may be needed to view ASF streams. Supports H.264 and MPEG4 standards. Supports analog audio from an external source.

FLV: Supported on most web browsers and media players. Supports the H.264 standard and analog audio from an external source.

5. Copy the URL and provide to viewers.

Viewers may now view the stream using a digital media player or browser. See Viewing with a web browser and Viewing with a media player (RTSP).

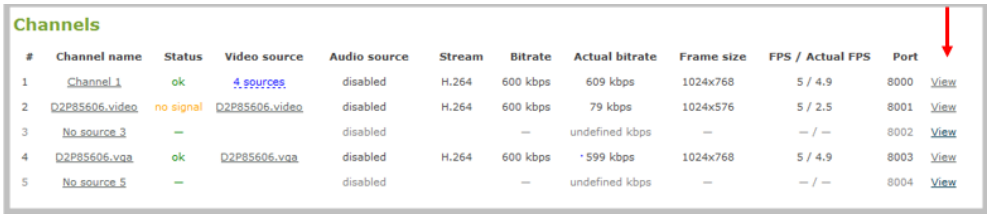
View the Flash stream

There are two methods to view the retrieve the flash stream URL:

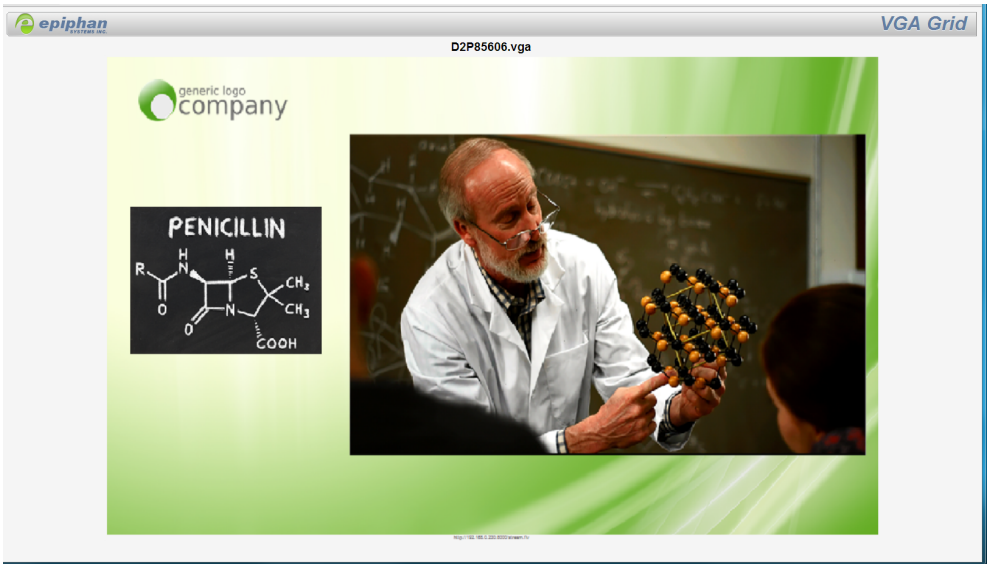
- Live broadcast link on the channel's status page.
- Info page from the configuration menu

View your broadcast using the View link on the Info menu

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. From the web interface, click **Info** menu option; the info window opens with a list of all configured channels.



4. Click on the channel you want to preview. A page opens displaying the live broadcast and broadcast URL.



5. Copy the URL and provide to viewers.

View your broadcast using the Live broadcast link on the Status page

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.

3. From the web interface, click the channel that you want to view; the menu expands.
4. Click **Status**; the status page opens displaying the live broadcast and stream URL.



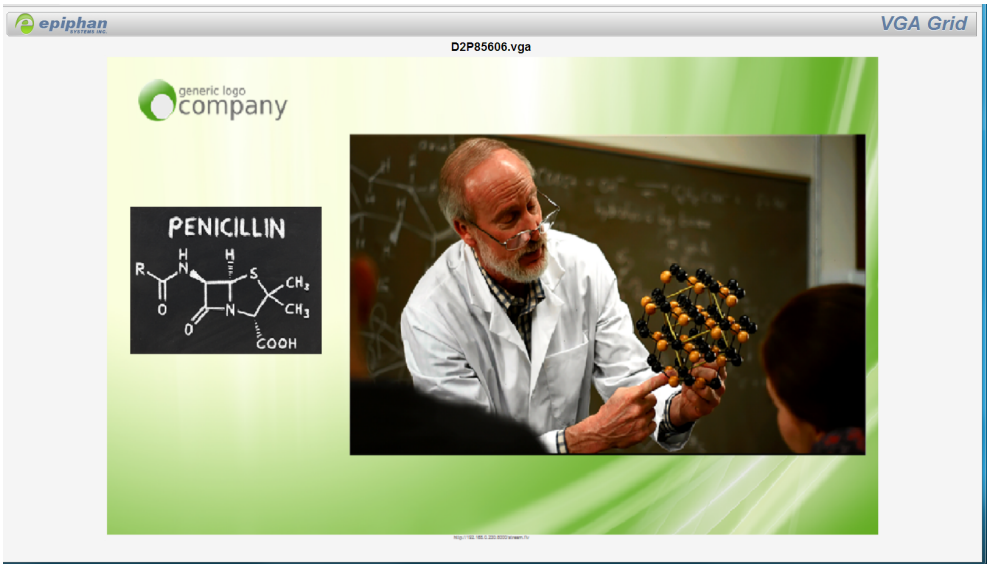
5. When HTTP live streaming for the channel is enabled the status page also shows the **HTTP Live Streaming** link. See, Stream content using HLS (HTTP Live Streaming).

When HLS is enabled and with no viewer password set, viewers can access the stream using a tablet or smart phone device. If the viewer passwords is set, HLS connections are not possible.



6. Click on the Live broadcast or HTTP Live Stream link, if it configured. The window opens displaying the live broadcast and broadcast URL.

Previewing the broadcast with FLV player results in moderate buffering delay (15-30 seconds).



7. Copy the URL and provide to viewers.

Viewing with a web browser

If a viewer password is configured, provide participants with the password to log in, along with the IP address or the URL to be used by the participant's browser.

STOP If your channel is configured with 48 kHz audio, flash streaming (which is used for browser viewing) may not work. In this case, we recommend you view the channel with a media player instead. (See below.)

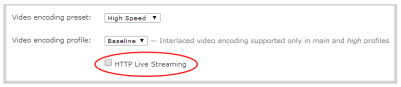
1. Open a web browser.
2. Enter the IP address of the broadcast stream, refer to the example below. To locate the IP address for the broadcast, refer to Send stream URLs to viewers.

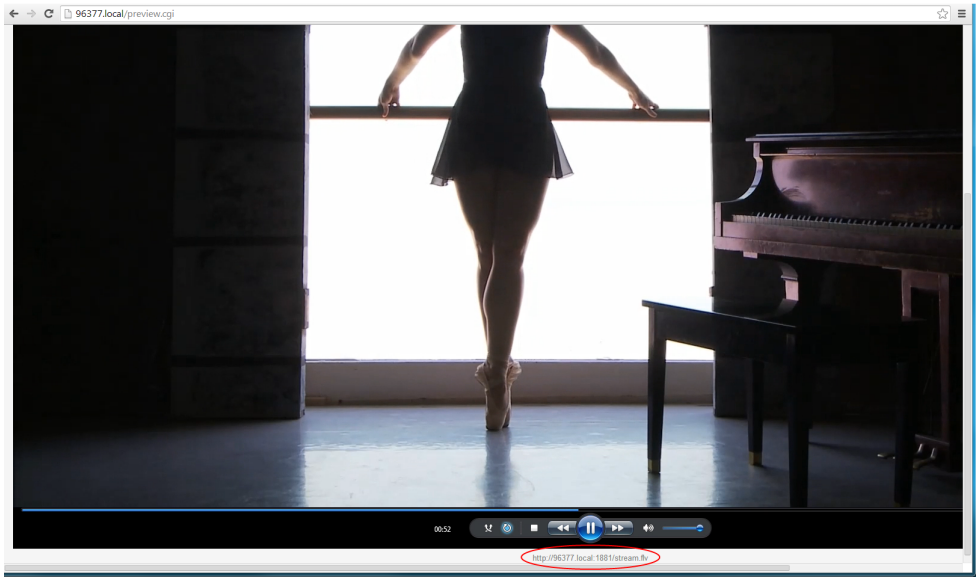
   If the IP address of the broadcast is 172.20.1.33, then browse to:
   http:// 172.20.1.33/preview.cgi?channel=<channel number>

3. Enter the user name and password at the prompt:

   User Name: viewer
   Password: (enter the viewer password)

4. Press Enter. The stream is played in the browser window.



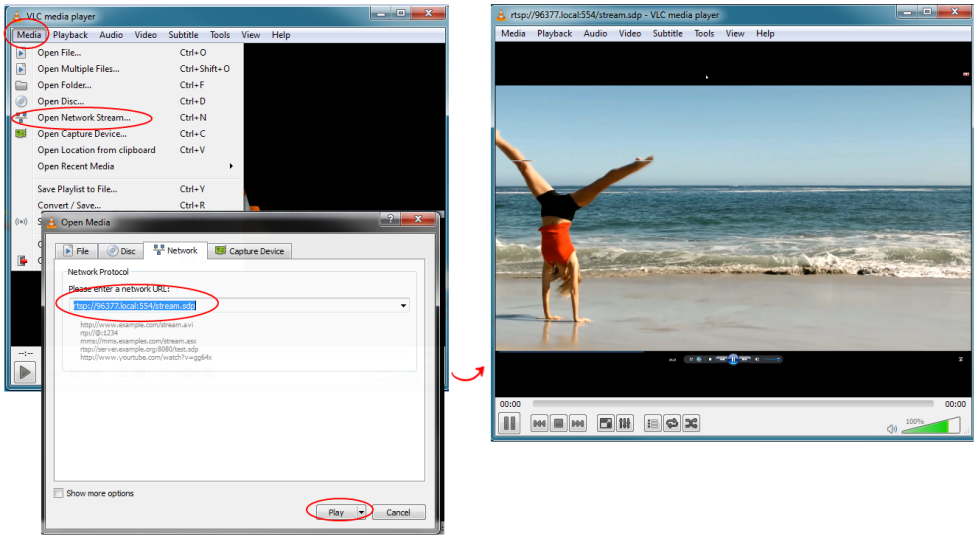


Viewing with a media player (RTSP)

If a viewer password is configured, provide participants with the password to log in, along with the IP address or the URL to be copied to the media player. For example purposes the following procedure describes the steps using a VLC media player.

1. Launch a media player.
2. Click the **Media** tab, a drop-down menu opens.
3. Choose Open Network Stream; a dialog box opens.
4. Enter the stream URL (using either the IP address or the network discovery serial number method).

rtsp://49E7B8E4.local:554/stream.sdp



5. Press Play; the stream is played in the media player window.

Disable (and enable) streams for viewers

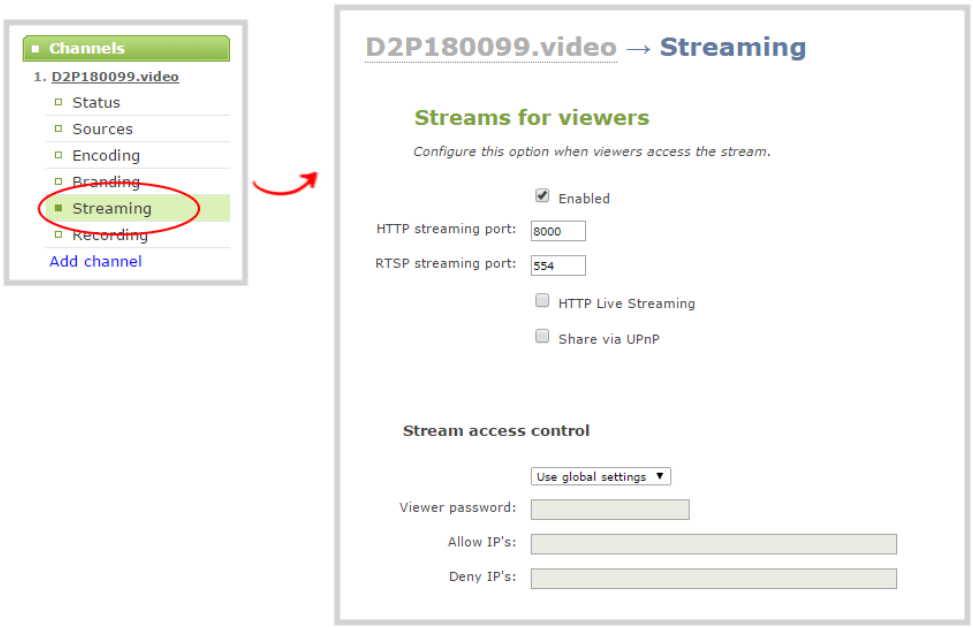
When you create a channel it's available by default for viewing by stream viewers who have the stream URL. You can choose to disable streaming to viewers through the channel's streaming configuration.



Disabling streams for viewers disables all viewer formats including HTTP, RTSP, HLS and UPnP.

To disable (or enable) streams for viewers:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Streaming** for the desired channel; the streaming page opens.



3. Uncheck **Enabled** to disable streaming to viewers (or check to enable).
4. Click **Apply** at the bottom of the page.

Restrict access to streams for viewers

Standalone VGA Grid can restrict access to all viewer streams using global viewer passwords and IP allow/deny lists. See Set or change user passwords and Restrict viewers by IP address



If LDAP is configured for viewer authentication, the viewer must pass global autentication using LADAP credentials (or the viewer global password, if there is one) and must meet the local channel settings (come from an allowed IP address). See **Configure LDAP** for more information on LDAP configuration.

To restrict viewers for a channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Streaming** for the desired channel; the streaming page opens.
4. Scroll to the **Stream access control** section of the page.



5. Select **Use these settings** from the drop down list; the configuration fields are enabled.

Global LDAP settings are always enforced. Any local settings are in addition to LDAP sign on.

6. If desired, specify a password for viewers of this channel; the password appears masked as you type it.

If you have global allow/deny lists or a global user password, you can override the global settings and remove all access control for a channel by selecting **Use these settings** and leaving all the fields blank.

7. If desired, specify allow and deny IPs for viewers of this channel. See Restrict viewers by IP address for more information about allow and deny lists.
8. Click **Apply** at the bottom of the page.

To return a channel to the default (global) access control settings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Streaming** for the desired channel; the streaming page opens.
4. Scroll to the **Stream access control** section of the page.
5. Select **Use global settings** from the drop down list; the configuration fields are disabled (any changes to the configuration fields are not saved).
6. Click **Apply** at the bottom of the page.

Restrict viewers by IP address

The Standalone VGA Grid permits you to restrict which computers can access broadcasts by building a list of allowed and/or denied IP addresses. You can do this at a global level for the system and can also override these settings on a per-channel basis. Both global and per-channel configuration procedures are described below.



IP address restriction is valid for the viewer only and does not affect the web admin interface or the mobile configuration interface.

If your viewer account has a password, your viewers must connect to the system from a computer (or gateway) with a permitted IP address and must also supply the username (viewer) and password before they can view the broadcast.

To restrict access by IP address you need to know the IP addresses, or range of addresses for your viewers. By default all IP addresses are allowed to connect to the broadcast.

If you're not familiar with creating allow/deny lists, refer to the examples below this procedure for assistance with crafting your lists.

To restrict viewers by IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Type allowed IP addresses or address ranges in the **Allow IP's** field. Separate addresses with a comma.
5. Type denied IP addresses or address ranges in the **Deny IP's** field. Separate addresses with a comma.
6. Click **Apply**.

To restrict viewers of a specific channel by IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Streaming** link for the desired channel; the streaming configuration page opens.
4. From the **Access Control** drop-down, select **Use these Settings**; local password and Allow/Deny IP lists are enabled.
5. If desired, type a password for the viewer in the **Viewer Password** field.
6. Type allowed IP addresses or address ranges in the **Allow IP's** field. Separate addresses with a comma.

7. Type denied IP addresses or address ranges in the **Deny IP's** field. Separate addresses with a comma.
8. Click **Apply**.

If a user attempts to connect to the stream from a disallowed IP address, access is denied. If connecting by internet browser, the message "IP address rejected." is displayed.

The following table describes the applicable fields.

Table 20 *IP Based Restriction Fields*

Label	Description/Options
Allow IP's	Enter individual IP Addresses or IP Address ranges, separated by commas. To specify a range, use a hyphen (-). Optional spaces improve readability. Users connecting from addresses in this list are permitted to view broadcasts from the system, provided their IP address is not in the Deny IP's list. To allow all (except IP addresses in the deny list, if any), leave the field blank. You can use the Allow list by itself, or in conjunction with the Deny IP's list as an exception to a rule in the allow list.
Deny IP's	Enter individual IP Addresses or IP Address ranges, separated by commas. To specify a range, use a hyphen (-). Optional spaces improve readability. Users connecting from addresses in this list are not allowed to view broadcasts from the system, unless their IP address is in the Allow IP's list. If a specific IP address is in both lists, access to the stream is denied. You can use the Deny list by itself, or in conjunction with the Allow IP's list as an exception to a rule in the allow list.

IP restriction examples

Allow list with distinct IP addresses

The simplest allow/deny list is to use the list of known IP addresses to craft a list of allowed IP addresses. All other addresses are denied access to the broadcast.

For example if your system is accessible on your local area network (LAN) and you want to make sure only the CEO's specific desktop, laptop and tablet computers (with IP Addresses 192.168.1.50, 192.168.1.51, and 192.165.1.75, respectively) can connect to the broadcast, construct the following allow list:

Allow: 192.168.1.50, 192.168.1.51, 192.168.1.75

Allow list with a range of IP addresses

Sometimes you'll want a range of computer IP addresses to connect to your system. This may happen when you have one range of IP addresses assigned to desktop computers (i.e. in the range 192.168.1.1 to 192.168.1.100) and another range assigned to boardroom computers (i.e. the range 192.168.1.200 to 192.168.1.250). If you only want the boardroom computers to connect to broadcasts from the system you can specify the range of boardroom IP addresses rather than needing to type in each individual address. The allow list looks as follows:

```
Allow: 192.168.1.200-192.168.1.250
```

Note that we could have specified two of the IP addresses in the previous example as a range.

Allow list with a range of IP addresses and one or more specific IP addresses

Putting the first two examples together, we want to permit access to IP addresses in the range of boardroom computers (192.168.1.200-192.168.1.250) and also want to add the desktop, laptop and tablet computers of the CEO (IP addresses 192.168.1.50, 192.168.1.51, and 192.168.1.75, respectively). Note the first two IP addresses are consecutive, so they can be added as a second range. Add these IP addresses to the list as follows:

```
Allow: 192.168.1.200-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75
```

Your list can have multiple ranges and multiple distinct IP addresses, provided they are separated by commas.

Deny list with distinct IP addresses

Another simple allow/deny list is to use the list of known IP addresses to list specific denied IP addresses. All other addresses are allowed access to the broadcast.

For example imagine your system is accessible on your local area network (LAN) and you want to allow any computer on the LAN can access the stream except your publicly-accessible boardroom (with IP address 192.168.1.211). You can use the following deny list (leave the allow list empty) to permit all computers except the boardroom computer:

```
Deny: 192.168.1.211
```

As with allow lists, your deny list can specify a range of IP addresses, and can specify multiple ranges or distinct IP addresses in a comma-separated list.

Allow list with a range of IP addresses, distinct IP addresses and an exception

Building on the previous examples, consider the situation where you want the CEO's computers (192.168.1.50, 192.168.1.51, 192.168.75) and all boardroom computers (192.168.1.200-192.168.1.250) to access the broadcast, with the exception of the public boardroom computer (192.168.1.211). Use both allow and deny lists to create the rule as follows:

Allow: 192.168.1.200-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75

Deny: 192.168.1.211

Both lists can have multiple ranges and multiple distinct IP addresses, provided they are separated by commas.

Deny list with a range of IP addresses

Converse to the previous examples, consider the situation where you want every computer on the network to access the broadcast, with the exception of the CEO's desktop, laptop and tablet computers. Additionally, boardroom computers should not be permitted with the exception of the cafeteria computer (IP address 192.168.1.222).

The deny list is an "exception" list for the allow list. So to craft the rule described above we need to allow all the computers in the local subnet, then deny specific sub-ranges including two groups of boardroom computers ensuring the cafeteria computer's IP address is not in the deny list:

Allow: 192.168.1.1-192.168.1.250

Deny: 192.168.1.200-192.168.1.221, 192.168.1.223-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75

Stream to a server

Your Standalone VGA Grid streams to a server when you want to use a CDN or Multicast.

By default, no server streaming is configured. See Stream to a CDN and Stream content using multicast for details on configuring one of these two options.

Publishing Options	Use this option to...
Content Distribution Network	Stream web content to many viewers simultaneously to any geographical location. A viewer accesses the broadcast from a website using a user name and password, if required. Using a CDN to host your broadcast is highly scalable and makes financial sense to website owners since you do not pay for additional server hardware or routing should your network traffic increase or decrease. Using a CDN to stream live content allows you to reach a large geographically diverse audience and because CDNs perform format conversion, the stream is platform independent. For more information about streaming to a CDN, see Stream to a CDN.
Multicast Streaming	Stream content to a multicast IP address where it can be shared with multiple viewers within the same LAN. All viewers receive the same stream at the same time. Similar to turning on a radio station where all listeners hear the same music at the same time. This delivery method relies on network equipment that supports multicasting and is usually used in high bandwidth corporate LANs and not on Internet-based architectures. This delivery method is useful for training sessions, when there is a specific timeframe when the audience will view the content. For more information about using multicasting for streaming your content, see: Stream content using multicast This option can be used to stream video and audio to an IP TV or set top box playlist.

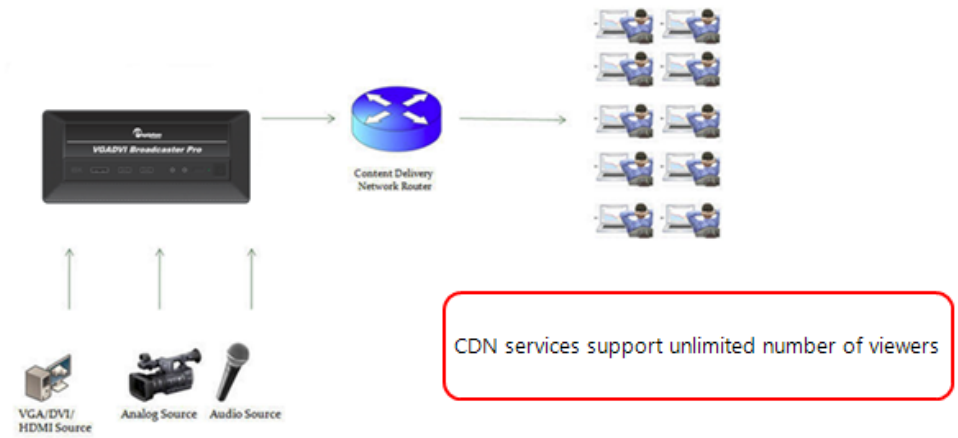


To stream video outside of your LAN, use a CDN or configure port forwarding on your router. Refer to your Network Administrator; network configuration is beyond the scope of this guide.

Streaming to CDNs and multicast streaming is available only when the H.264 codec is selected.

Stream to a CDN

A Content Delivery Network (CDN) relies on geo-diverse CDN servers to receive and disperse web content to the CDN server closest to the user. The closer the server is to the user the faster the content is delivered. Streaming your content through a CDN allows you to stream any time, anywhere, regardless of the viewing device.



You can publish to any CDN provider that supports incoming streams sent via RTSP announce or RTMP push. Both RTSP and RTMP can be used for live streaming, however not all CDNs or media servers support both formats. Choose the streaming format that your CDN or media server supports. Epiphan has tested with the CDN providers listed here: http://epiphan.tv/cdn-partners.php. Contact your CDN for a list of supported audio codecs and ensure your configuration uses one of the supported codecs.

To publish content to a CDN provider ensure you have:

- a path to the mount point or an XML configuration file (provided by the CDN provider);
- verify which transport protocols your CDN supports:
- a current flash player; and
- select the H.264 codec from the channel's Encoding page.

You can also test how your content is streamed by sending your content to Epiphan's CDN. For a list of Epiphan's preferred CDN providers, see: http://epiphan.tv/cdn-partners.php.

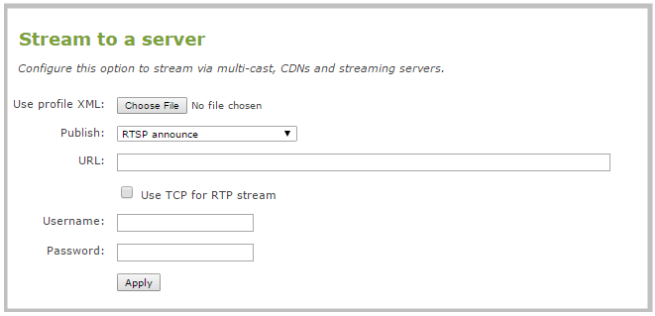
Use one of the following links to configure your Standalone VGA Grid for publishing to a CDN:

- To stream content to a CDN using RTSP announce
- To stream content to a CDN using RTMP push

- Stream to a CDN using an XML profile
- Stream to Wowza Streaming Cloud
- Test using Epiphan TV CDN

To stream content to a CDN using RTSP announce

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
5. Scroll to the **Stream to a server** section of the page.
6. Click the **Publish** drop-down menu.
7. Choose **using RTSP announce** from the drop-down menu.



8. Enter the ingestion point url provided by the CDN or media server.
9. Check the **Use TCP for RTP stream** checkbox. Verify which transport protocols your CDN provider supports.
10. Enter a user name and password.

> The CDN provider assigns a user name and password to authenticate the publisher. Contact the CDN provider for your log in credentials.

12. Click **Apply**.

To stream content to a CDN using RTMP push

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.

2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
3. Click the **Publish** drop-down menu.
4. Choose **using RTMP push** from the drop-down menu.



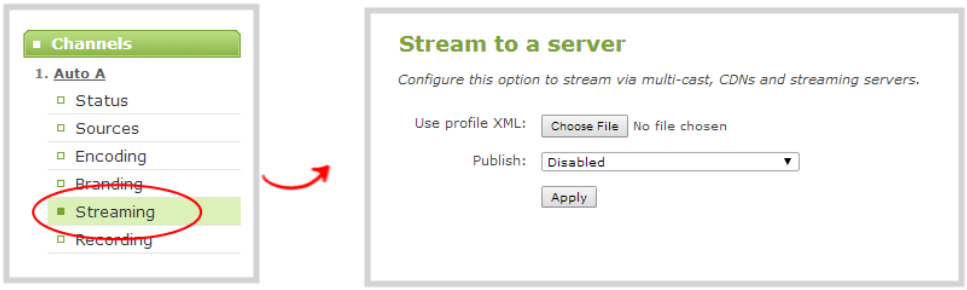
3. Enter the ingest point **URL** provided by the media server or CDN.
4. In the **Stream name** field, enter the stream name you configured with the CDN..
5. Enter the CDN user name and password.

The CDN provider assigns a user name and password to authenticate the publisher. Contact the CDN provider for your log in credentials.

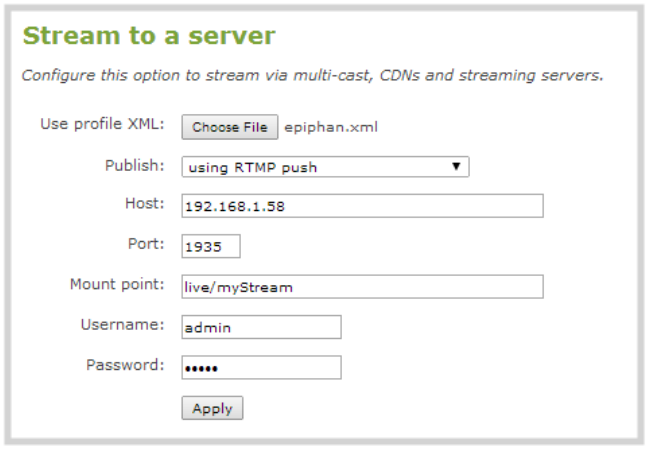
6. Click **Apply**.

Stream to a CDN using an XML profile

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.



3. Click the **Choose File** button next to **use profile XML**; a file browser window opens.
4. Select the XML profile supplied by your CDN and click **OK**; the configuration is read from the XML file and applied.

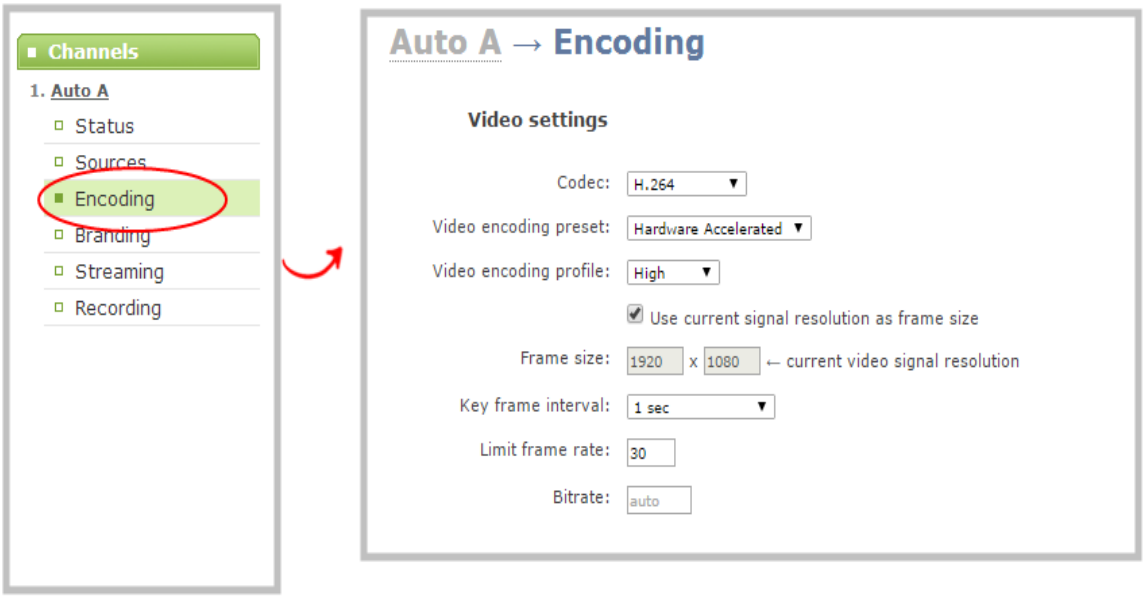


3. Click **Apply**.

Stream to Wowza Streaming Cloud

To set up streaming via Wowza Cloud, you first need to sign in to the Wowza Streaming Cloud web site and create a new Live Stream. Retain the connection code that is provided upon applying the configuration settings; this code is required to complete the streaming set-up process.

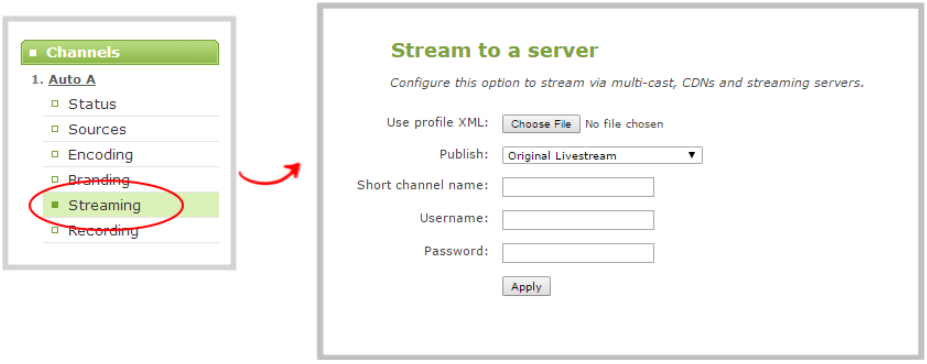
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Encoding**; the channel's Encoding page opens.



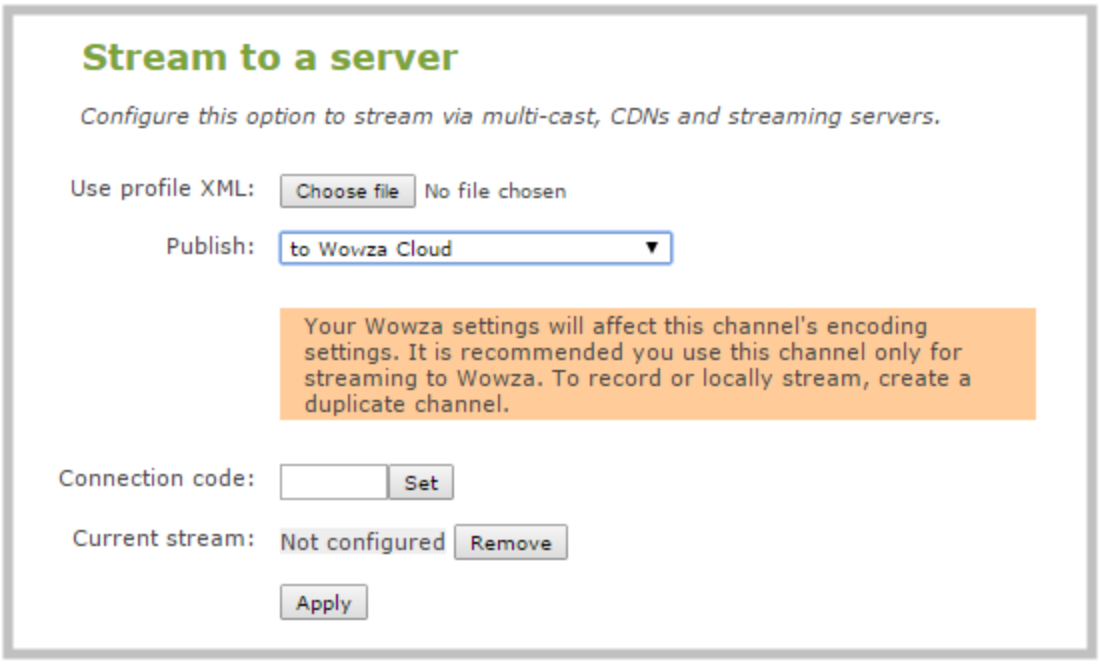
5. Configure Encoding settings accordingly, ensuring the **Codec** selected is H.264.

Configuring audio is optional. Supported formats are limited to MP3 and AAC. Due to RTMP restrictions, MP3 48 kHz is not supported.

6. Click **Apply**.
7. Under the selected channel, click **Streaming**; the channel's Streaming page opens.



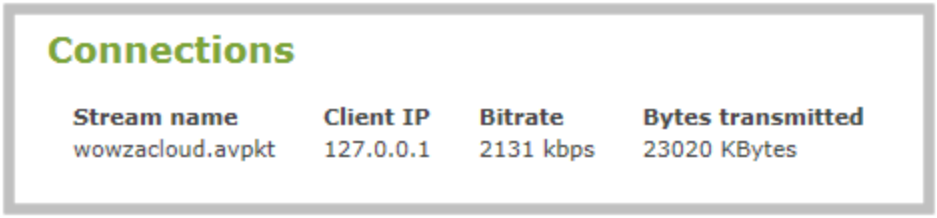
8. Click the **Publish** drop-down menu.
9. Select **to Wowza Cloud** from the drop-down list.



10. Enter the connection code obtained from the Wowza Streaming Cloud set-up into the **Connection code** field.



11. Click **Set** to pair the channel on Epiphan's encoder with the live stream on Wowza Cloud
12. Click **Apply**. When the connection to Wowza Cloud has been established, the stream name appears on the channel's **Status** page.



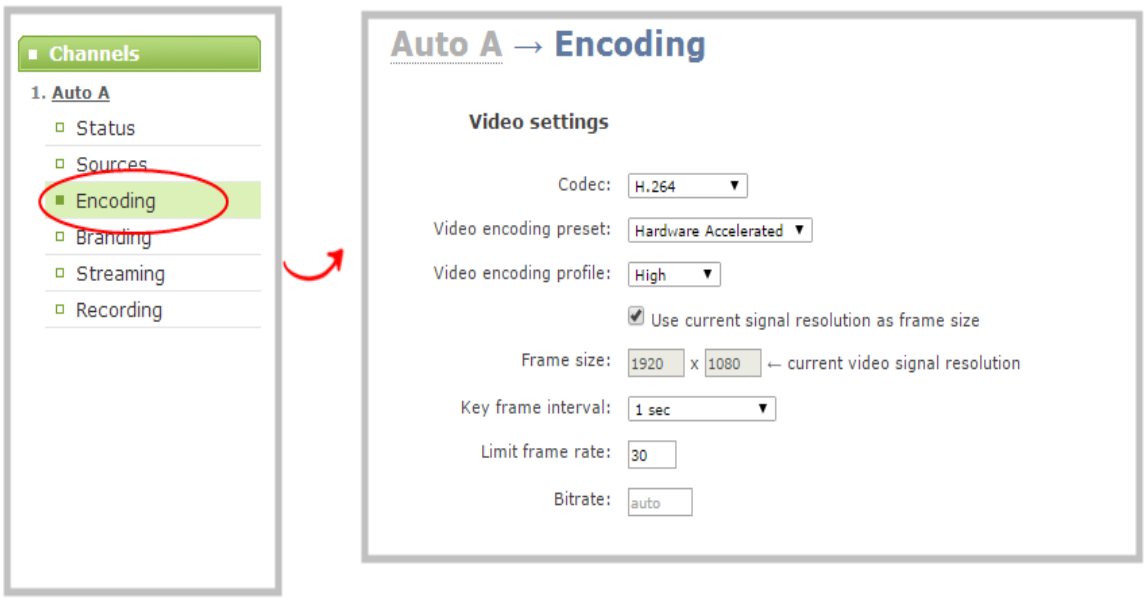
After clicking **Apply**, there may be a short 2-3 minute delay before the live stream is displayed.

Stream to Original Livestream

To set up streaming via the Original Livestream service, you first need to sign in to your Original Livestream account and create a new stream.

To configure streaming on your Standalone VGA Grid:

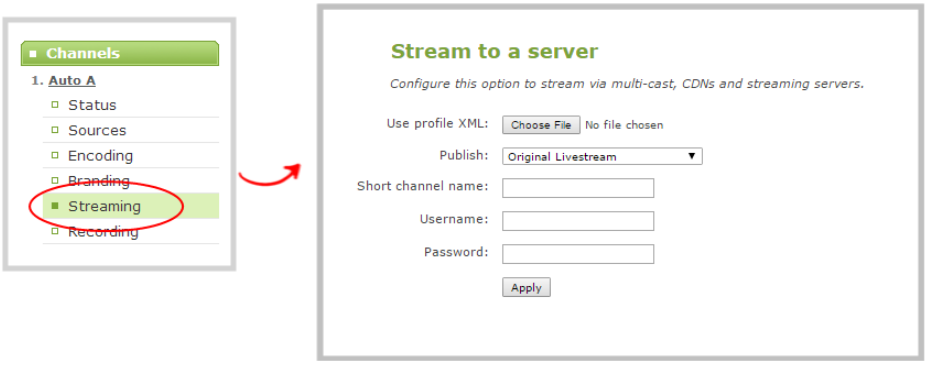
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Encoding**; the channel's Encoding page opens.



5. Configure Encoding settings accordingly, ensuring the **Codec** selected is H.264.

Configuring audio is optional. Supported formats are limited to MP3 and AAC. Due to RTMP restrictions, MP3 48 kHz is not supported.

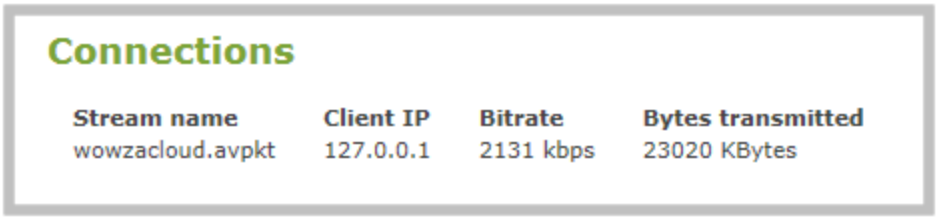
6. Click **Apply**.
7. Under the selected channel, click **Streaming**; the channel's Streaming page opens.



8. Click the **Publish** drop-down menu.
9. Select **Original Livestream** from the drop-down list.



10. Enter the channel name in the **Short channel name** field.
11. Enter your Original Livestream **Username** and **Password** in the next two fields.
12. Click **Apply**. When the connection to Original Livestream has been established, the stream name appears on the channel's **Status** page, similar to this example from Wowza Streaming Cloud.



After clicking **Apply**, there may be a short 2-3 minute delay before the live stream is displayed.

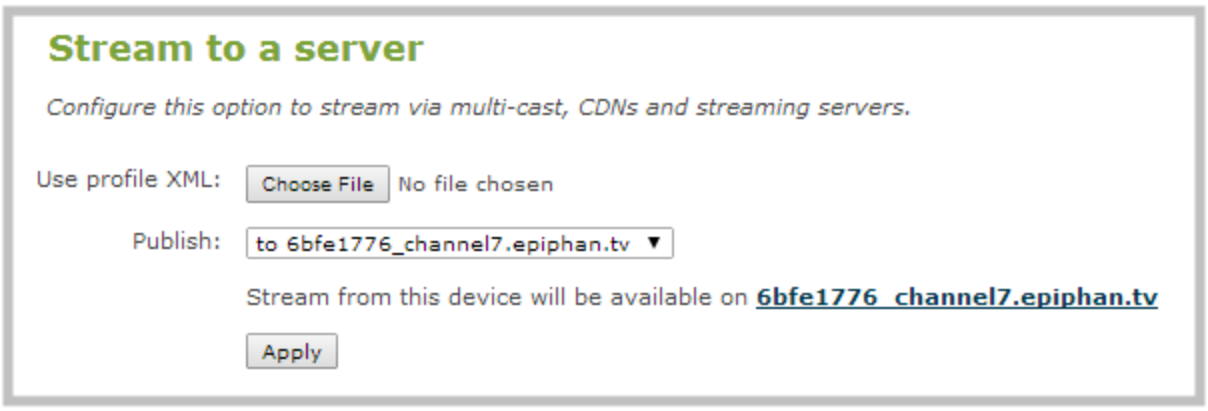
Test using Epiphan TV CDN

Epiphan.tv is a service provided by Epiphan to help our customers to experiment with content distribution networks, bandwidth, performance limits and viewer limits are applied. To upgrade to a full service, select one of Epiphan's preferred CDN providers at http://epiphan.tv/cdn-partners.php.

Stream to Epiphan TV

To hear audio content from Epiphan TV ensure audio is set to MP3 in Encoding configuration.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
5. Scroll to the **Stream to a server** section of the page.
6. Click the **Publish** drop-down menu.
7. Choose **to <serial>. Epiphan.tv**. Where <serial> is the serial number of the system.



8. Click **Apply**; a connection through the media tunnel is established. The system streams to Epiphan's portal – epiphan.net.

You must set audio format to MP3 when streaming through epiphan.net, see **Configure encoding** .

View content from Epiphan TV

Before viewing content from Epiphan TV ensure you have:

- a current browser;
- a current flash player;

- select the H.264 codec from the channel's Encoding page; and
- set the stream bitrate lower than 500 kbits/s in the channel's Encoding setup.

To view content:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
3. Click the link to view the broadcast.



4. A web page opens displaying the broadcast.



Specify a multimedia player to view your Epiphan TV broadcast

1. From the Epiphan TV portal, click **Switch To** on the bottom of the screen; the following options appear.

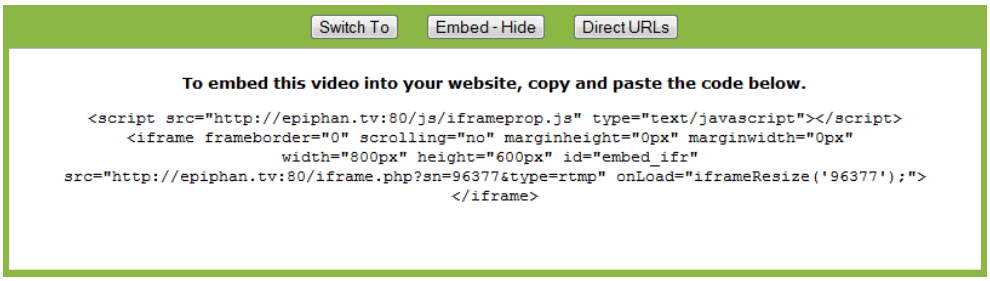


2. Choose a plug-in from the list, the stream is displayed using the selected multimedia player.

Add a link to your website to stream your Epiphan TV broadcast

Follow the steps below to embed code for the broadcast in a web page.

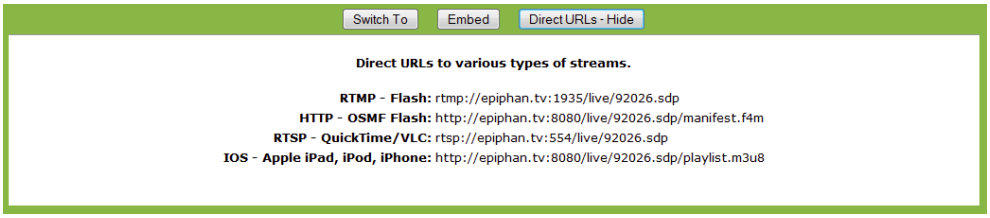
1. Go to the Epiphan TV portal.
2. Click **Embed** on the bottom of the screen; a dialog box opens displaying the code.



3. Highlight and right-click on the code in the dialog box. A drop-down menu appears.
4. Choose **Copy**.
5. Paste the content into the HTML code for your website. A link to your broadcast on Epiphan TV is added to your web page.

Retrieve a list of addresses based on video stream encapsulation

1. Go to the Epiphan TV portal.
2. Click **Direct URLs** on the bottom of the screen; a dialog box opens displaying a list of URLs for different types of streams.



3. Use the copy and paste function to provide viewers with the URL to view the stream.

Stream content using multicast

A multicast stream consists of one stream distributed to many viewers via a multicast-capable network.

Standalone VGA Grid supports multicast streaming content to an IP TV or a set-top box playlist when the stream format is MPEG-TS.

The following procedures outline the steps to distribute your content using multicast streaming:

- MPEG-TS streams using RTP/UDP push
- MPEG-TS streams using UDP push
- Multicast streaming using RTP/UDP

MPEG-TS streams using RTP/UDP push

Before configuring your channel for MPEG-TS streaming, ensure the following codecs are configured:

- Video – H.264
- Audio – MP3 or AAC, if audio is configured.

To configure your channel for MPEG-TS using RTP/UDP push:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
5. Click the **Publish** drop-down menu.
6. Choose **using MPEG-TS RTP/UDP push**.
7. Enter the destination multicast IP address where the broadcast can be viewed.



A IPv4 multicast address range is an address between 224.0.0.0 to 239.255.255.255. Contact your System Administrator for the specific address to use.

8. Enter the destination port number through which the media will stream.
9. Perform one of the following:
    a. If you do not want to advertise your stream to a media player over a local network, go to the last step of this procedure; or
    b. To advertise your stream to a media player over a local network, follow the steps below.
10. Enable the **SAP announcement** checkbox to advertise your stream over a local network. When the checkbox is enabled and a multicast IP address is configured, your stream is displayed in the playlist of local media player.

11. Enter a multicast IP address in the **SAP announcement IP** field. If your media player is configured to receive multicast streams from an IP address that is different from the default address 224.2.127.254, you may need to contact your system administrator for a specific multicast IP address.
12. Enter a channel number in the **Channel number** field to identify your stream in the media player. By default the Channel number is the channel identifier.



When a channel number value is not specified, viewers cannot select a channel from the set-top box or Smart TV .

13. Enter a name for a group of streams in the text box next to **Group name**. Since media players simply present a list of available streams, you can organize your streams into multiple folders or in cases where folders are not displayed, use dot separator hierarchy to help your viewers filter out unwanted streams by category.
14. Click **Apply**.
15. Click the **Info** menu option of the web interface. An Info page opens displaying stream information.

    To view the stream from a media player, open the URL in a media player, for example:

rtp://@ip:port or in the case of the sample configuration in the figure shown above:

rtp://@226.10.24.32:7000

To view the stream when SAP announce has been set and the stream is advertised on a media player, set-top-box or Smart TV, refer to Viewing with Session Announcement Protocol (SAP).

MPEG-TS streams using UDP push

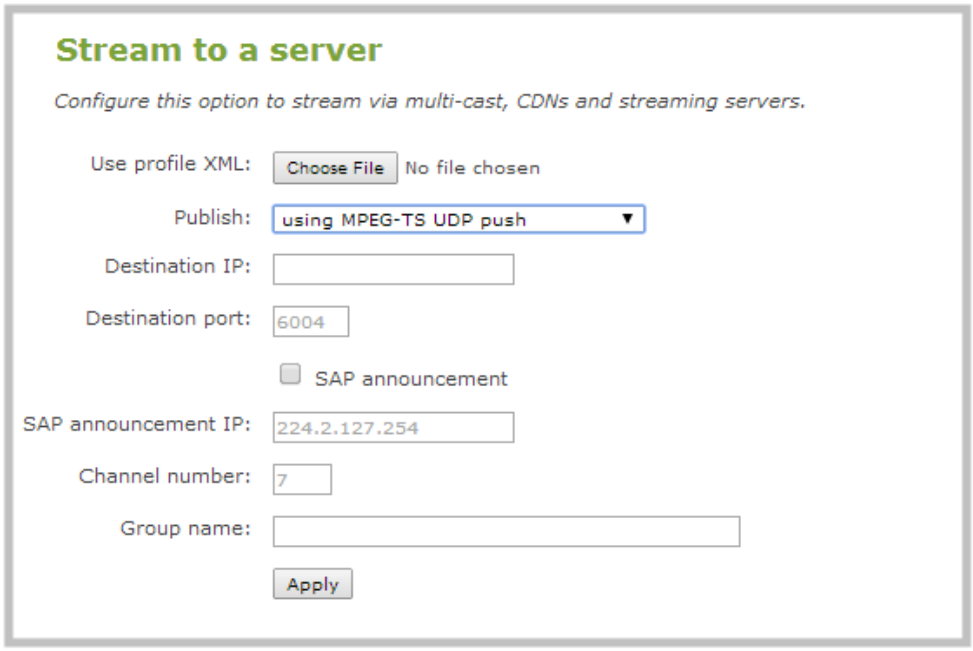
Before configuring your channel for the MPEG-TS streaming, ensure the following codecs are configured:

- Video – H.264
- Audio – MP3 or AAC, if audio is configured.

To configure MPEG-TS with UDP push:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.

5. Click the **Publish** drop-down menu.
6. Choose **using MPEG-TS UDP push**.



7. Enter the destination multicast IP address where the broadcast can be viewed.

> A IPv4 multicast address range is an address between 224.0.0.0 to 239.255.255.255. Contact your System Administrator for the specific address to use.

8. Enter the destination port number through which the media will stream.
9. Perform one of the following:
    a. If you do not want to advertise your stream to a media player over a local network, go to the last step of this procedure; or
    b. To advertise your stream to a media player over a local network, follow the steps below.
10. Enable the **SAP announcement** checkbox to advertise your stream over a local network. When the checkbox is enabled and a multicast IP address is configured, your stream is displayed in the playlist of local media players.
11. Enter a multicast IP address in the **SAP announcement IP** field. If your media player is configured to receive multicast streams from an IP address that is different from the default address 224.2.127.254, you may need to contact your system administrator for a specific multicast IP address.

12. Enter a channel number in the **Channel number** field to identify your stream in the media player. By default the Channel number is the channel identifier.

> When a channel number value is not specified, viewers cannot select a channel from the set-top box or Smart TV .

13. Enter a name for a group of streams in the text box next to **Group name**. Since media players simply present a list of available streams, you can organize your streams into multiple folders or in cases where folders are not displayed, use dot separator hierarchy to help your viewers filter out unwanted streams by category.
14. Click **Apply**. To view the stream, open the URL in a media player, for example:

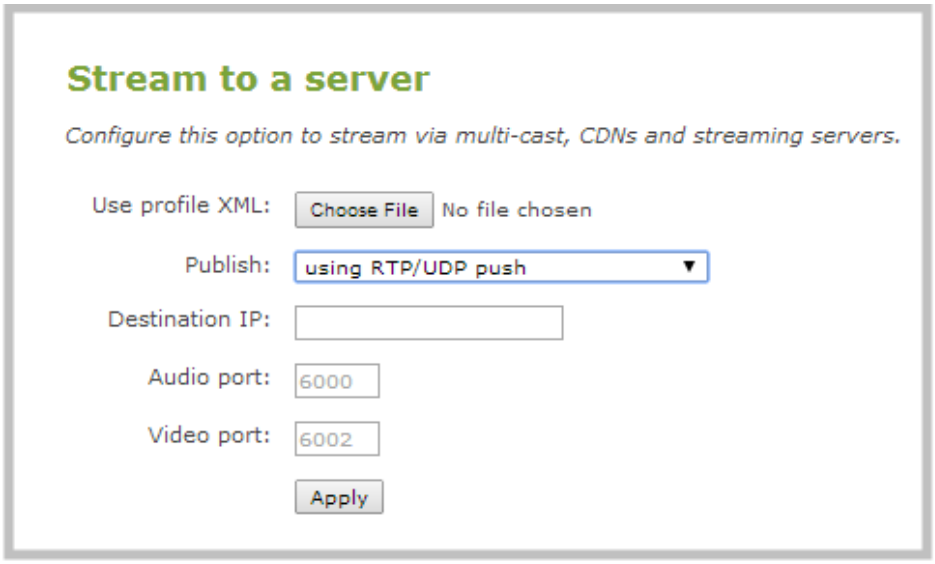
    udp://@ip:port

    For example: udp://@226.10.24.32:7000

    To view the stream when SAP announce has been set and the stream is advertised from a media player, set-top-box or Smart TV, refer to Viewing with Session Announcement Protocol (SAP)

Multicast streaming using RTP/UDP

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
3. Click the **Publish** drop-down menu.
4. Choose **using RTP/UDP push**.



5. Enter the destination multicast IP address.
6. Enter the port number through which the audio will stream.
7. Enter the port number through which the video will stream.

Audio and video use nearby port numbers (<port number>and <port number+2>). The minimum distance between audio and video ports must be 2.

8. Click **Apply**; an SDP file is generated and available from the channel's status **Status** page.
9. Click the SDP file to download it. If asked, specify a name and location for the SDP file.
10. Share the file with viewers.

Stream to a media player

Your Standalone VGA Grid can use UPnP and SAP to stream to set top boxes, digital signs, smart TVs and other digital media players.

The following table gives an overview of each option.

Publishing Options	Use this option to...
UPnP	Using the Universal Plug and Play (UPnP) networking protocol, your Standalone VGA Grid can be discovered and can stream to software and hardware media players, set-top-boxes and Smart TVs with ease.
SAP	SAP (session announcement protocol) is a protocol for broadcasting multicast session information. Media players can see the announcement or can use the multicast SDP file (session description file) directly.



To stream video outside of your LAN, use a CDN or configure port forwarding on your router. Refer to your Network Administrator; network configuration is beyond the scope of this guide.

Stream content using multicast

A multicast stream consists of one stream distributed to many viewers via a multicast-capable network.

Standalone VGA Grid supports multicast streaming content to an IP TV or a set-top box playlist when the stream format is MPEG-TS.

The following procedures outline the steps to distribute your content using multicast streaming:

- MPEG-TS streams using RTP/UDP push
- MPEG-TS streams using UDP push
- Multicast streaming using RTP/UDP

MPEG-TS streams using RTP/UDP push

Before configuring your channel for MPEG-TS streaming, ensure the following codecs are configured:

- Video – H.264
- Audio – MP3 or AAC, if audio is configured.

To configure your channel for MPEG-TS using RTP/UDP push:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
5. Click the **Publish** drop-down menu.
6. Choose **using MPEG-TS RTP/UDP push**.
7. Enter the destination multicast IP address where the broadcast can be viewed.

> A IPv4 multicast address range is an address between 224.0.0.0 to 239.255.255.255. Contact your System Administrator for the specific address to use.

8. Enter the destination port number through which the media will stream.
9. Perform one of the following:
    a. If you do not want to advertise your stream to a media player over a local network, go to the last step of this procedure; or
    b. To advertise your stream to a media player over a local network, follow the steps below.
10. Enable the **SAP announcement** checkbox to advertise your stream over a local network. When the checkbox is enabled and a multicast IP address is configured, your stream is displayed in the playlist of local media player.
11. Enter a multicast IP address in the **SAP announcement IP** field. If your media player is configured to receive multicast streams from an IP address that is different from the default address 224.2.127.254, you may need to contact your system administrator for a specific multicast IP address.
12. Enter a channel number in the **Channel number** field to identify your stream in the media player. By default the Channel number is the channel identifier.

> When a channel number value is not specified, viewers cannot select a channel from the set-top box or Smart TV .

13. Enter a name for a group of streams in the text box next to **Group name**. Since media players simply present a list of available streams, you can organize your streams into multiple folders or in cases where folders are not displayed, use dot separator hierarchy to help your viewers filter out unwanted streams by category.
14. Click **Apply**.

15. Click the **Info** menu option of the web interface. An Info page opens displaying stream information.

    To view the stream from a media player, open the URL in a media player, for example:

rtp://@ip:port or in the case of the sample configuration in the figure shown above:

rtp://@226.10.24.32:7000

To view the stream when SAP announce has been set and the stream is advertised on a media player, set-top-box or Smart TV, refer to Viewing with Session Announcement Protocol (SAP).

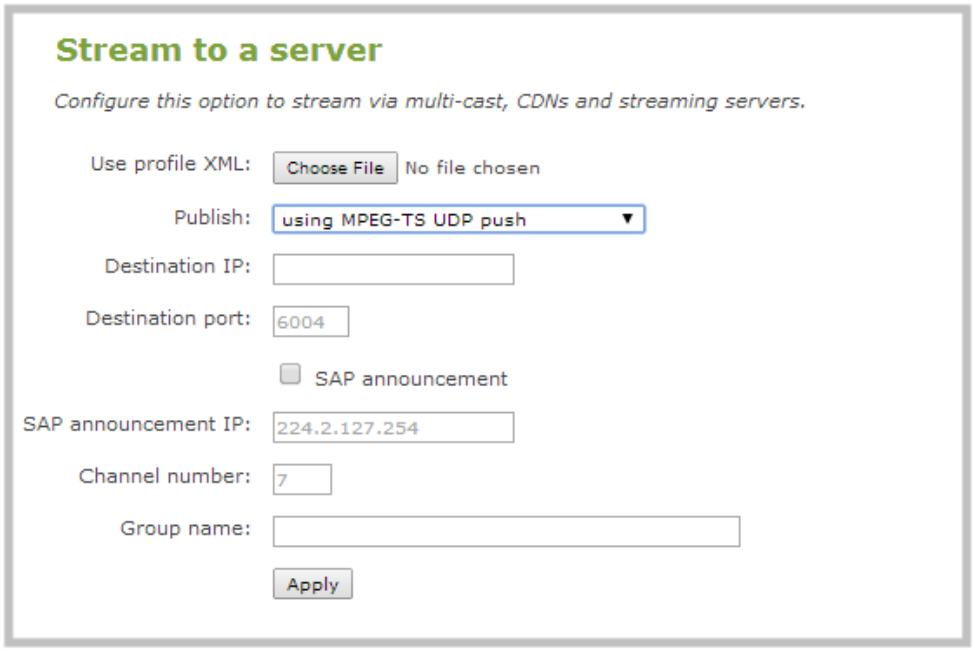
MPEG-TS streams using UDP push

Before configuring your channel for the MPEG-TS streaming, ensure the following codecs are configured:

- Video – H.264
- Audio – MP3 or AAC, if audio is configured.

To configure MPEG-TS with UDP push:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
5. Click the **Publish** drop-down menu.
6. Choose **using MPEG-TS UDP push**.



7. Enter the destination multicast IP address where the broadcast can be viewed.

> A IPv4 multicast address range is an address between 224.0.0.0 to 239.255.255.255. Contact your System Administrator for the specific address to use.

8. Enter the destination port number through which the media will stream.
9. Perform one of the following:
    a. If you do not want to advertise your stream to a media player over a local network, go to the last step of this procedure; or
    b. To advertise your stream to a media player over a local network, follow the steps below.
10. Enable the **SAP announcement** checkbox to advertise your stream over a local network. When the checkbox is enabled and a multicast IP address is configured, your stream is displayed in the playlist of local media players.
11. Enter a multicast IP address in the **SAP announcement IP** field. If your media player is configured to receive multicast streams from an IP address that is different from the default address 224.2.127.254, you may need to contact your system administrator for a specific multicast IP address.
12. Enter a channel number in the **Channel number** field to identify your stream in the media player. By default the Channel number is the channel identifier.

When a channel number value is not specified, viewers cannot select a channel from the set-top box or Smart TV .

13. Enter a name for a group of streams in the text box next to **Group name**. Since media players simply present a list of available streams, you can organize your streams into multiple folders or in cases where folders are not displayed, use dot separator hierarchy to help your viewers filter out unwanted streams by category.
14. Click **Apply**. To view the stream, open the URL in a media player, for example:

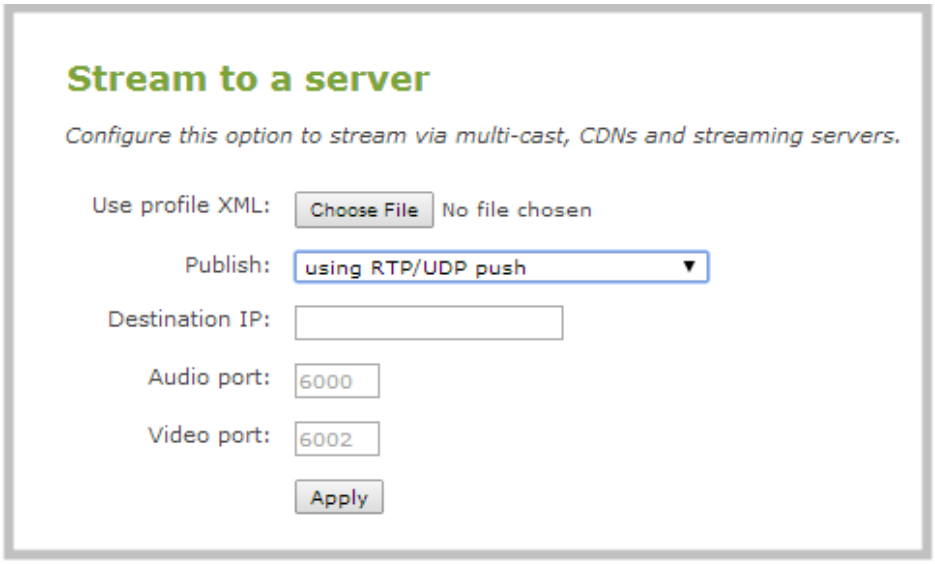
    udp://@ip:port

    For example: udp://@226.10.24.32:7000

    To view the stream when SAP announce has been set and the stream is advertised from a media player, set-top-box or Smart TV, refer to Viewing with Session Announcement Protocol (SAP)

Multicast streaming using RTP/UDP

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click a **Channel**; the menu expands.
4. Click **Streaming**; the channel's Streaming page opens.
3. Click the **Publish** drop-down menu.
4. Choose **using RTP/UDP push**.



5. Enter the destination multicast IP address.
6. Enter the port number through which the audio will stream.
7. Enter the port number through which the video will stream.

Audio and video use nearby port numbers (<port number>and <port number+2>). The minimum distance between audio and video ports must be 2.

8. Click **Apply**; an SDP file is generated and available from the channel's status **Status** page.
9. Click the SDP file to download it. If asked, specify a name and location for the SDP file.
10. Share the file with viewers.

Viewing with Session Announcement Protocol (SAP)

When SAP Announce is configured for a stream that uses UDP streaming, the stream is advertised over the local network. Local viewers can view the stream using a software or hardware media player. Viewers are presented with a list of available channels, similar to a television menu. Viewers need only click on a stream and the video is streamed to their desktop, mobile or tablet. To configure SAP announce, go to Stream content using multicast.

Your stream is advertised by the metadata title, if one was configured under Branding, otherwise it is identified by it's channel identifier. For a description of how to set the metadata, refer to Add channel metadata.

When browsing from a VLC media player, streams are advertised by their channel identifier and are organized by the group name. When browsing from an XBMC media player, streams are advertised by the stream's metadata title, if configured, otherwise streams are advertised by their channel identifier.

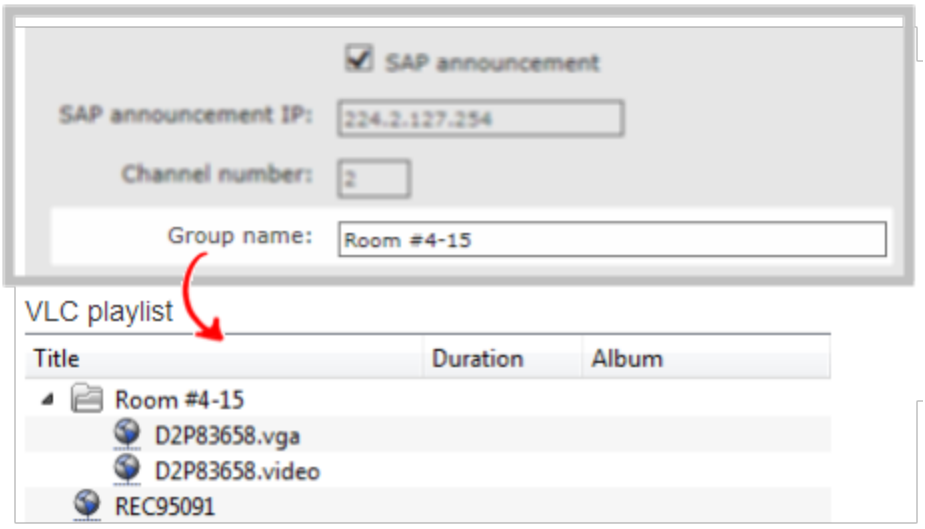
1. Ensure the stream has SAP announcement enabled, otherwise it is not advertised in the media player's playlist.
2. Ensure the SAP announcement IP is a multicast IP address.



Some media players, for example Exterity receivers, listen for SAP announcements on a specific multicast address 239.255.255.255. If your audience is using Exterity to view your stream, you must change the SAP announcement IP address to 239.255.255.255.

4. Launch a media player. The following steps are based on a VLC media player and may be different for other media players.
5. Click **View** from the menu; a drop-down menu opens.
6. Select **Playlist**. A Playlist window opens. The right-hand panel indicates the playlist is empty.
7. From the side menu, click **Network streams (SAP)**. The playlist is populated with all streams in your network that are SAP announcement enabled. If you specified a Group Name when you configured the publish stream the stream will be listed in folder identified by the group name.

In the example below, two streams D2P83658.vga and D2P83658.video are organized in a folder by their group name.



8. Click on a live stream; the stream plays in the media player window.

Stream content using UPnP

Using the Universal Plug and Play (UPnP) networking protocol, your Standalone VGA Grid can be discovered and can stream to software and hardware media players, set-top-boxes and Smart TVs with ease. If UPnP is enabled, the system automatically establishes communication with media players on the network.

UPnP uses MPEG-TS over HTTP with the H.264 codec and MP3 or AAC audio encoding (or no audio). You can only access live streams or recordings that meet these requirements.

For security reasons the default behavior prevents UPnP access to live streams and recorded files.

This section covers the following topics:

- Enable UPnP
- Disable UPnP
- Viewing with UPnP
- Play directly to a media player
- Auto-restart playback to a UPnP device
- Change UPnP device name

Some players will not be able to access the stream or saved recordings if a viewer password is set. If needed, see **User administration** to clear the viewer password.

The topics in this chapter include how to enable and disable UPnP and how to control media players from the Standalone VGA Grid. To choose recordings or live streams from your media player, see Play directly to a media player.

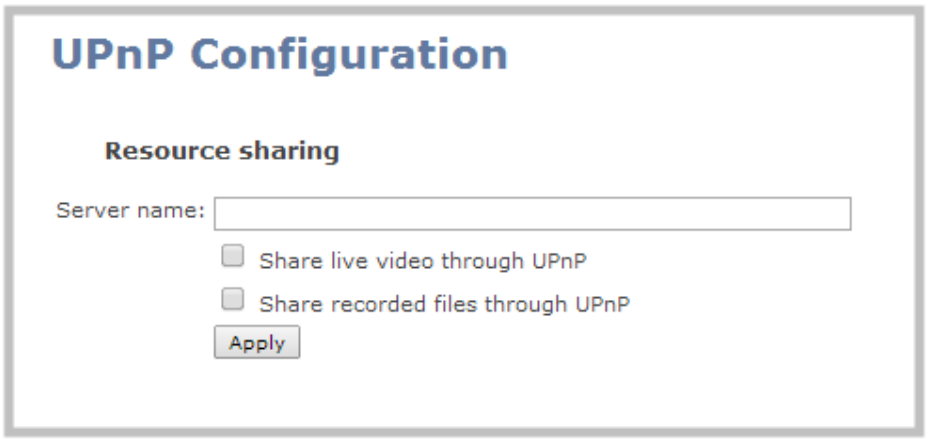
Enable UPnP

Enable UPnP to allow digital media players on the network to browse for media or live streams from your system. There are two steps required to enabled UPnP, enabling UPnP for the system (including setting a share name) and enabling UPnP per channel or recorder. By default, UPnP is disabled at the system level and for each channel.

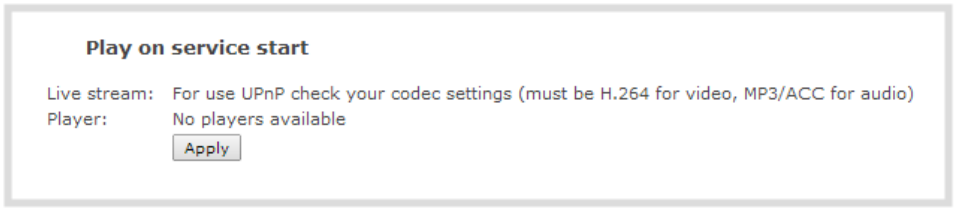
Streams and MPEG-TS recorded files must use the supported codecs: H.264 with MP3 or AAC audio. Having a viewer password could prevent the ability to use UPnP.

To enable UPnP:

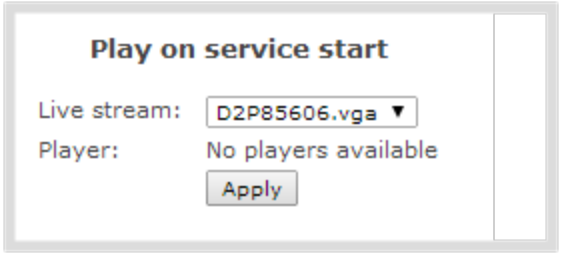
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.



4. Enter a name in the **Server name** field. If no name is provided the server name will be the system's serial number.
5. Select whether you want to share live video and recorded files.
6. Click **Apply**.
7. If no live stream is available that meets the criteria for UPnP, a message is displayed in the **Play on service start** section of the page.

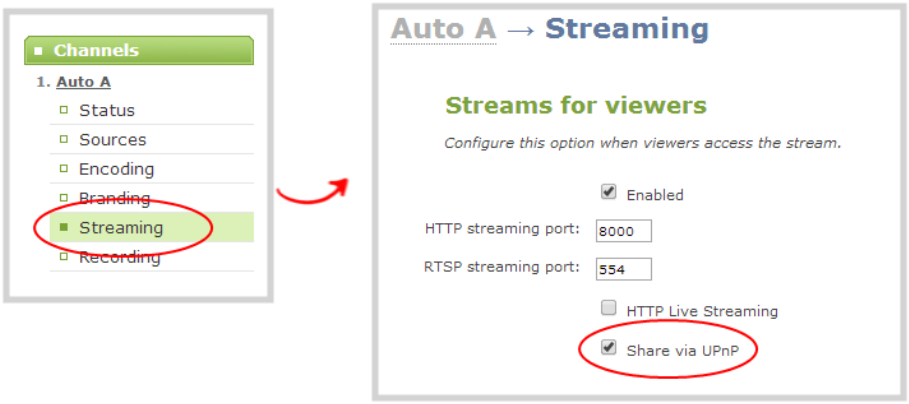


8. Otherwise, the Play on service start section shows a drop-down list of what can be streamed.

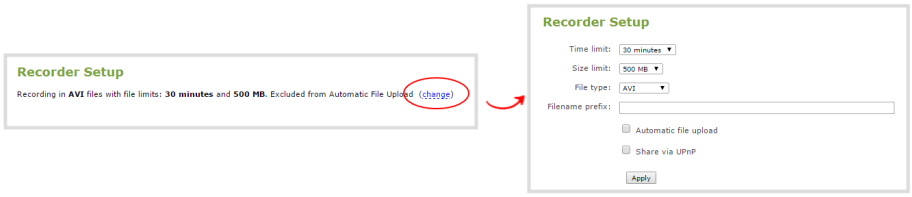


Enable UPnP sharing for the channels or recorders you want to share:

1. For channels (live streaming):
    a. Click the **Streaming** link for the desired channel; the Streaming page opens.



    a. Click the **Share via UPnP** check box (if not checked).
    b. Click **Apply**
2. For channels (recorded files):
    a. Click **Recording** for the desired channel; the channel's recording page opens.
    b. Click the word **change** next to the list of what is being recorded; the recording options expand.



    c. Click the **Share via UPnP** check box (if not checked).
    d. Click **Apply**.
3. For recorders:
    a. Click the link for the recorder from the Recorders menu; the recorder's configuration page opens.
    b. Click the word **change** next to the list of what is being recorded; the recording options expand.



c. Click the **Share via UPnP** check box (if not checked).

d. Click **Apply**.

You can now browse for your server from your digital media player.

Disable UPnP

By default, UPnP sharing is disable for the device, and for each channels and recorder. If you enabled UPnP sharing it for a particular broadcast, you may want to disable UPnP sharing after the broadcast is complete. You can choose to disable access to live streams, recorded files, or to the whole system.

To disable UPnP for a channel or recorder:

1. For channels:
    a. Click the **Streaming** link for the desired channel; the Streaming page opens.
    b. Deselect the **Share via UPnP** check box (if checked).
    c. Click **Apply**
2. For recorders:
    a. Click the link for the recorder from the Recorders menu.
    b. Click the word **change** next to the list of what is being recorded; the recording options expand.



    a. Deselect the **Share via UPnP** check box (if not checked).
    b. Click **Apply**.

To disable UPnP globally (for the whole system):

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.
4. Deselect **Share live video through UPnP** to stop sharing live video.
5. Deselect **Share recorded files through UPnP** to stop sharing recorded files.
6. Click **Apply**; UPnP sharing is disabled.

Viewing with UPnP

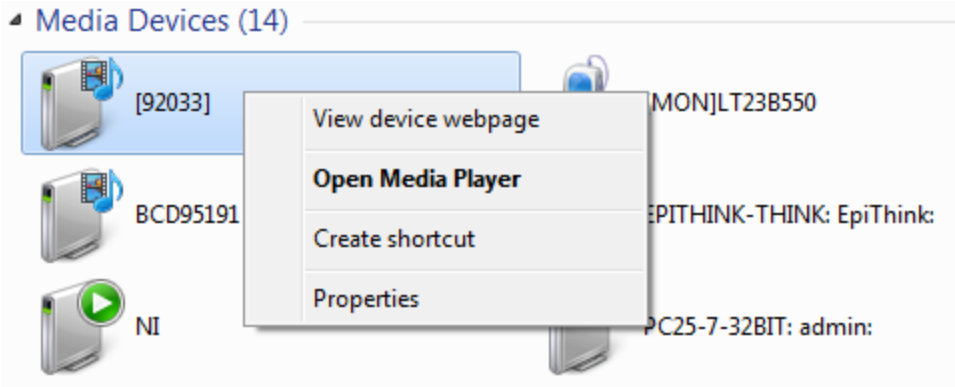
Using a software or hardware media player, you can browse for files or streams with Universal Plug and Play (UPnP). UPnP uses MPEG-TS over HTTP with the H.264 codec and MP3 or AAC audio encoding (or no audio). You can only access live streams or recordings that meet these requirements.

For security reasons the default behavior prevents UPnP access to live streams and recorded files. To enable UPnP, see **Enable UPnP**

Some players cannot access the stream or saved recordings if a viewer password is set. If needed, see **Remove user passwords** to clear the viewer password.

When browsing via UPnP your Standalone VGA Grid is displayed by the server name you set, or it's product serial number.

For example, when browsing from a Windows computer, you will see a list of media devices that includes the Standalone VGA Grid:



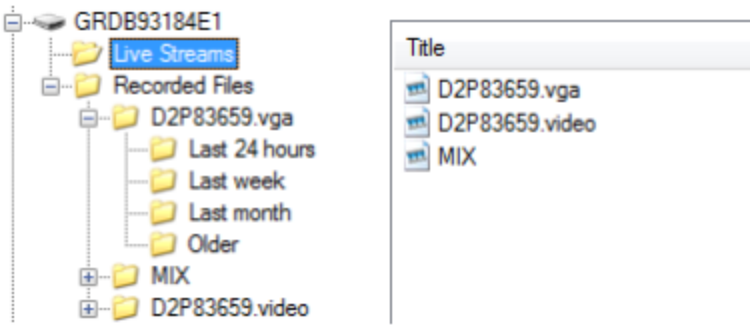
Live streams

When you open the device from Windows Media Player, you'll see a list of the available channels you can stream under the Videos tab. The channel names are the same as they are in the admin interface. From other digital media players, the channel list can be under a **Live Streams** folder.

With Windows Media Player, double click to open any channel and press Play to start the stream. Using your digital media player, select a live stream and press play.

Recorded files

Recorded files are shown in the Recorded Files folder. Files are organized by the channel or recorder from which they were recorded. Windows Media Player shows the recorder files side by side with the channels and other digital media players show the recorded files in a file tree format, see below.



UPnP can also be used to directly play a recording to the digital media player, or to set a media player to automatically play a particular live stream after reboot of the Standalone VGA Grid. See Stream content using UPnP and Play directly to a media player.

Play directly to a media player

If your digital media player is UPnP enabled, the Standalone VGA Grid can play direct the media player to play recorded files, without browsing through menus in the player.

Recorded files must be in MPEG-TS format and use the supported codecs: H.264 with MP3 or AAC audio. Having a viewer password could prevent the ability to use UPnP.

To play directly to a media player:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Ensure **Share recorded files through UPnP** is enabled on your Standalone VGA Grid and for the channel or recorder you wish to share. (See Enable UPnP.)
4. Go to the recorded files list for the desired channel or recorder. (See View list of recorded files.)
5. From the list of files, select the file you want to play and click on the **Play To** icon for the file; a list of visible digital media players is displayed.
6. Select a media player; the recording plays on the screen(s) connected to the media player.

Auto-restart playback to a UPnP device

In unmanned situations such as industrial applications and digital signs, it is useful to automatically have a stream played to a digital media player, even if the Standalone VGA Grid restarts.

To configure auto-restart of a stream to a media player:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.
4. Scroll to the Play on service start section.
5. Select a stream to use from the **Live stream** drop-down list.
6. Select a digital media player from the **Player** drop-down list. (Digital media players on your network that support UPnP playback will automatically appear in the drop-down list.)
7. Click **Apply**.



Only a single stream and player combination can be configured for auto play. The channel's UPnP configuration must be enabled for it to appear.

Change UPnP device name

You can configure the UPnP server name that appears for your Standalone VGA Grid. By default, if you left the server name field blank when enabling UPnP, the server name is the system's serial number.

To change the UPnP server name:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.
4. Highlight and delete the text in the **Server name** field, if any.
5. Type a new server name. Use characters A-Z, a-z, 0-9, _, :, @, ^, #, -. {}, [], ().
6. Click **Apply**; the name changes.

Samples of stream settings

When choosing your stream settings it is important to consider the stream content. When streaming fast moving video it's best to choose a higher bitrate and frame rate versus streaming a slide presentation where you can save on bandwidth and system processing by lower the bitrate and frame rate. Stream setup is a matter of balancing quality and system resource usage.

To help you to achieve this balance the following tables list the recommended settings when streaming video and slide content from a PC, Mac or tablet.

Streaming video content

The table below provides suggested settings to maximize your video quality while minimizing system resource usage when streaming video content from a PC, Mac or tablet.

Setting	PC and Mac	Tablet
Codec	H.264	Motion JPEG
Video encoding preset	Hardware accelerated	
Video encoding profile	Main	
Enhanced compatibility mode (h.264 slicing for RTP)	Disable for PC Enable for Mac	
Key frame interval	2 sec	
Limit frame rate	30	30
Bitrate	2000 Kbits for HD 3000 Kbits for Full HD 3000 kbits for ~ HD; 4000 kbits for ~ Full HD (Mac)	auto
Rate control mode	Balanced	
Audio format	PCM 22 KHz	

Streaming slide content

The table below provides suggested settings to maximize your stream quality while minimizing system resource usage when streaming slide content from a PC, Mac or tablet.

Setting	PC and Mac	Tablet
Codec	H.264	Motion JPEG
Video encoding preset	High Quality	
Video encoding profile	High	
Enhanced compatibility mode (h.264 slicing for RTP)	Disable for PC Enable for Mac	
Key frame interval	2 sec	
Limit frame rate	15	15
Bitrate	3000 kbits for ~ HD; 4000 kbits for ~ Full HD	auto
Rate control mode	Balanced	
Audio format	PCM 44 KHz	

PART 4: Record

Your Standalone VGA Grid encodes the video and audio it captures. Not only can you stream this content, but you can also simultaneously record it. In fact, if you're streaming a picture in picture layout or low quality streams, you may even want to create separate channels to also record each input at full frame size and with a high bitrate so you have the best possible digital media for future re-use or post-processing.

If you choose to record your channels, Standalone VGA Grid stores the recorded files on the system's amply-sized hard drive and provides you a variety of automatic or manual mechanisms to download the files.

This section discusses the following topics related to recording:

- What is a recording?
- Recorders
- Recorded files
- File and recording transfer
- Local FTP server

What is a recording?

Your Standalone VGA Grid can record the output from each channel. (See Recorders for information on creating multi-track recorders using multiple channels.) Recordings are very robust and crafted so that even in the case of accidental system shutdown, recording files are closed off and playable.

You can choose to record simultaneously while streaming, or record without streaming.

This section describes the following topics for creating and configuring recordings via the web interface.

- Recording basics
- Record a channel via the web interface
- Record with a recorder
- Configure recording file size and type
- Restart recording
- Control recording with a mouse

Recording control is easily performed through the Web admin interface, but can also be set up for third party tools using our APIs. See Control with HTTP commands and Control with RS-232 / serial port for information on controlling recordings with third party tools.

See Recorded files to learn how to download the recorded files.



Recording can also be controlled via the tablet interface. See **Control recording via the tablet interface**.

Recording basics

While recording a channel or recorder, a new file is created each time the maximum time or size limit is met. Additionally, when recording a multi-channel recorder or a multi-source layout channel, a new file is created if an additional source is added to the recorder.

Physically removing the source (e.g. unplugging it) or otherwise interrupting the signal to the source does not affect recording, and the recording will include the configured No Signal image.

You can choose to create AVI, MP4, MOV or MPEG-TS recordings. See Configure recording file size and type to learn how to change the recorded file type.

The MOV file type created by Standalone VGA Grid requires a relatively newer player for playback. Epiphan has tested with the following players.

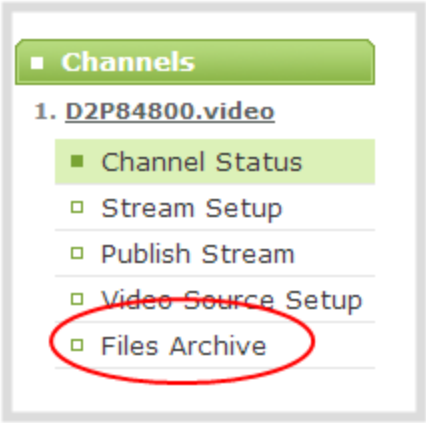
Operating System	Tested Players
Mac OS	• QuickTime 10.3 (for 1080p streams) • QuickTime 10.3 (for streams less than 1080p) • VLC 1.0.0+ (for all streams)
Windows	• QuickTime 7.6.6+ • VLC 2.1.5+ • Windows Media player 12+ (except MOV files)
Linux	• MPlayer • VLC 2.0.8+
Android	• DICE 2.0.21 • VLC 0.9.9+ (works only with MOV files that have no audio)
HTML 5 Browsers (Windows)	• Google Chrome 37+ (works with MOV and MP4 files using H.264 codec)

Record a channel via the web interface

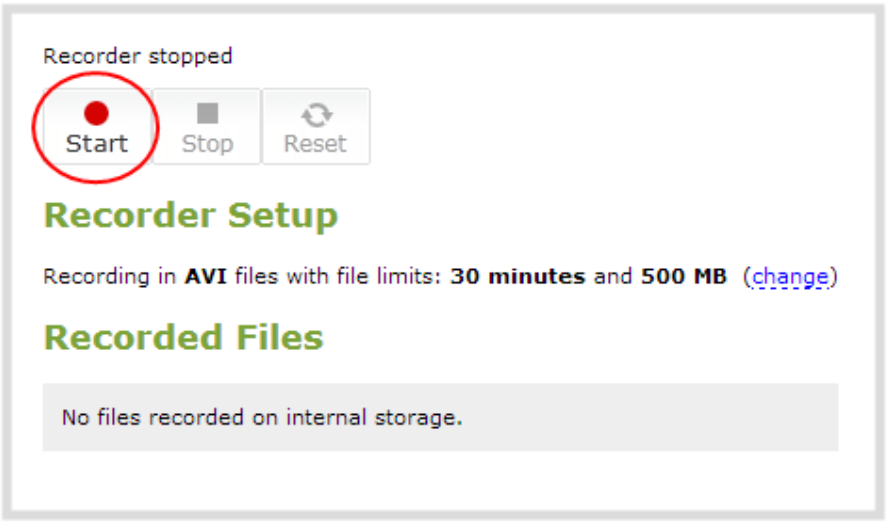
Each channel has a configuration page that allows you to start, stop and configure recordings.

To start and stop channel recording:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Click the name of the desired channel; the channel menu expands.



4. Click the **Recording** link for the channel; the Recording page appears.
5. To start recording:



a. Click the **Start** button; the recording starts and a timer indicates how long it has been recording.



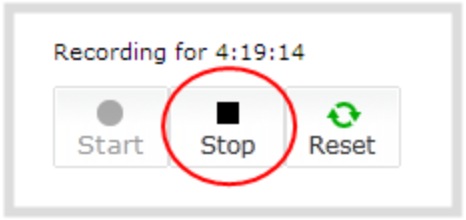
If the Start button is not active, there are no active sources for this channel or recorder. Check your inputs to ensure signals are working as expected.

b. You may browse away from the page without affecting the recording. When the page refreshes, the channel number is displayed in red to indicate recording is underway.



c. The system continues to record this channel (and any concurrent recordings) until it is stopped. If the system runs out of storage space, the oldest recorded file is deleted to make room for the new recording. The recording is broken into multiple files as defined by the channel configuration. SeeConfigure recording file size and type.

6. To stop recording:



a. Click the **Stop** button on the given channel's Recording page. The channel number changes to black next time the web interface is refreshed (by clicking a link or refreshing the page).

Configure recording file size and type

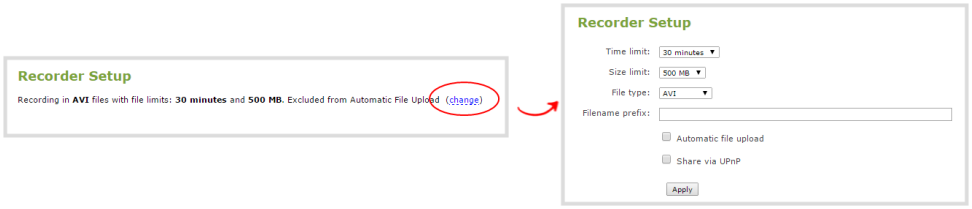
By default, recorders and channels record to AVI files. When the recording reaches 30 minutes in length or a file size of 500 MB (whichever occurs first), the system closes the current recording file and opens a new one. This is done seamlessly with no loss in recorded data.

You may find it useful to have recordings divided this way for ease of download, but you may also want to change the recording limits to be larger or smaller to meet your individual situation.

Additionally you can configure the file type (AVI, MP4, MOV or MPEG-TS) and the prefix for all recordings (the suffix is the date and time of the recording) and you can exclude a channel or recorder's recordings from automatic upload.

To change the recording configuration:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. For a channel recording:
    a. Click the desired channel; the channel menu expands.
    b. Click the **Recording** link for the channel; the Recording page opens.
4. For a recorder:
    a. Click the desired recorder link from the Recorders section; the recorder configuration page opens.
5. Click the **change** link under Recorder Setup; the recorder setup section expands. (The setup page looks slightly different for Recorders, but the options are the same.)



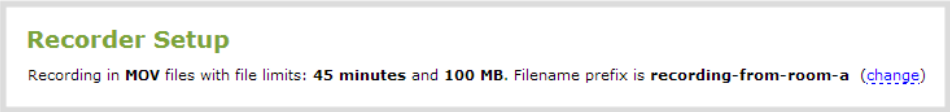
6. Select a time limit for the recording from the **Time limit** drop down.
7. Select a file size limit from the **Size limit** drop down.

> Tip: If you don't know what size to select, do some test recordings to get an idea of the file sizes you can expect. If you want to guarantee the recording lasts to a given time limit, select a file size that is far larger than you saw in your tests.

8. Select a file type from the **File type** drop down.
9. If desired, enter a prefix for the recordings. All new recording files for this channel or recorder will be prefixed with the text you enter.

> Tip: It's best to avoid spaces in file names. Use underscores or hyphens to separate words.

10. If desired, click the check box to exclude this channel or recorder from automatic file uploads. (See File and recording transfer for information on automatic uploads.)
11. Click **Apply**; the changes are saved and the recorder setup displays the new configuration.



The table below describes the options available for recording file configuration.

Table 21 *Recording File Configuration Fields*

Label	Description / Options
Time limit	Specifies the length of time the system waits before the recording file is saved and a new one is started (assuming the size limit has not yet been reached). Values range from 5 minutes to six hours.
Size limit	Specifies the file size a recording can become before it is saved and a new one is started (assuming the time limit has not yet been reached). Values range from 50 MB to 64 GB.
File type	Specifies the recording file type. Select from AVI, MP4, MPEG-TS, or MOV. Choose MPEG-TS for UPnP playback. - MP4 and MOV are fragmented formats with fixed 10 s intervals. - MPEG-TS does not support PCM audio encoding.
Filename prefix	Specifies how the recordings are named. Recording files start with the given prefix followed by the date and time. The channel or recorder name is used if no prefix is given. Allowed characters: A-Z, a-z, 0-9, _, , #, -, [], ().
Automatic file upload	Select this if you want this channel or recorder to be part of any scheduled automatic uploads. (See File and recording transfer for information on automatic uploads.)
Share via UPnP	Select this if you want this channel or recorder to be avialable via UPnP. If global UPnP is not enabled when you select this checkbox, a link appears to let you to fix it. Click the link and click **Apply** to make the global UPnP change save your recording configuration changes.

Control recording with a mouse

You can physically control recording start/stop by connecting a USB mouse to your Standalone VGA Grid.

To control recordings with a mouse:

1. Power on the system.
2. Connect a USB mouse to a USB port on the system.
3. Click the left mouse button once to start recording; recording starts (on all channels and recorders). If desired, check the web interface to see that recording is started.
4. Click the left mouse button again to stop recording. If desired, check the web interface to see that recording is stopped.

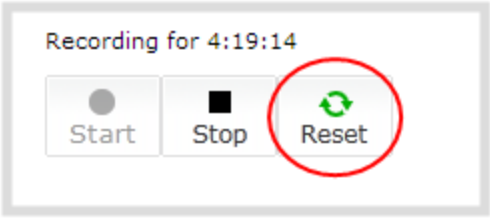
Restart recording

Recording files are automatically saved and new ones opened for writing when they reach the configured time or size limit, when the channel or recorder name is changed, or when changes are made to the stream.

You cannot download files from the system while they are being recorded, so from time to time you may need to close the current recording and restart a new one to facilitate file downloads. The system supports this through the recording reset option, which closes the current recording file and opens a new one without missing any frames.

To close the current recording and start a new file:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. For a channel recording:
    a. Click the desired channel; the channel menu expands.
    b. Click the **Recording** link for the channel; the Recording page opens.
4. For a recorder:
    a. Click the desired recorder link from the Recorders section; the recorder configuration page opens.



5. Click the **Reset** button next to the stop button; the current file is stopped and a new one begins.
6. Refresh the page to see the new recorded files list.

Recorders

Your Standalone VGA Grid can record the output from each channel and, using Recorders, it can also record multiple channels together in a single multi-track file.

Recording multiple channels at once ensures the recordings are started and stopped at the same time, resulting in perfect synchronization. Once the recording is complete, you can automatically use one of the system's file synchronization methods to copy it off the server, or you can use our built-in tool to split the file into individual tracks for post-processing.



You only need to create recorders for multi-track recordings. For single channel recordings, see **Record a channel via the web interface**.

This section describes the following topics for creating and managing multi-channel recorders.

- Add a recorder
- Change the channels recorded by a recorder
- Record with a recorder
- Rename a recorder
- Delete a recorder

See What is a recording? to learn how to create recordings and configure recording file sizes.



If you upgraded from a previous firmware release that included an all-in-one recorder, your all-in-one recorder is now listed under the **Recorders** section of the web interface. Your recordings are preserved and any URLs used to access the all-in-one recorder previously through the HTTP API correctly map to the new location.

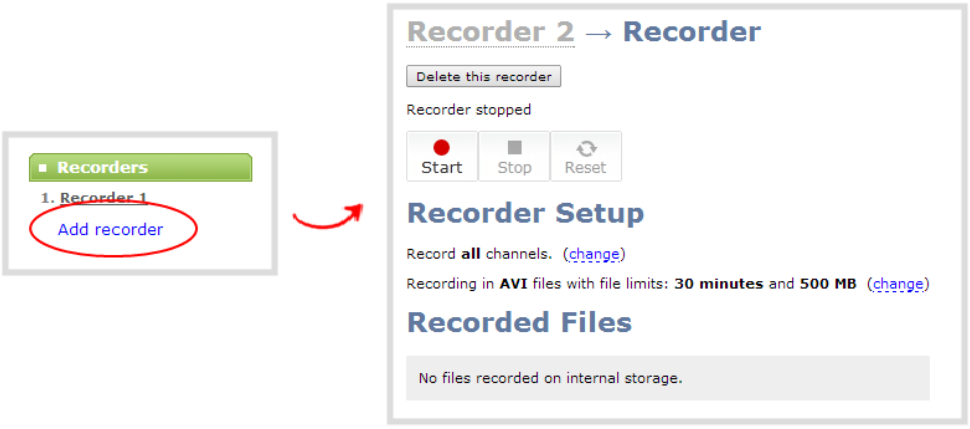
Add a recorder

Each channel has its own built-in recorder that is accessible from the Recording link. If you want to record several channels simultaneously to a multi-track file, create a new recorder.

To add a new recorder:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. Click the **Add recorder** link from the Recorders section; a new recorder is created and the recorder configuration page opens. By default this recorder uses the next available number and records all channels.



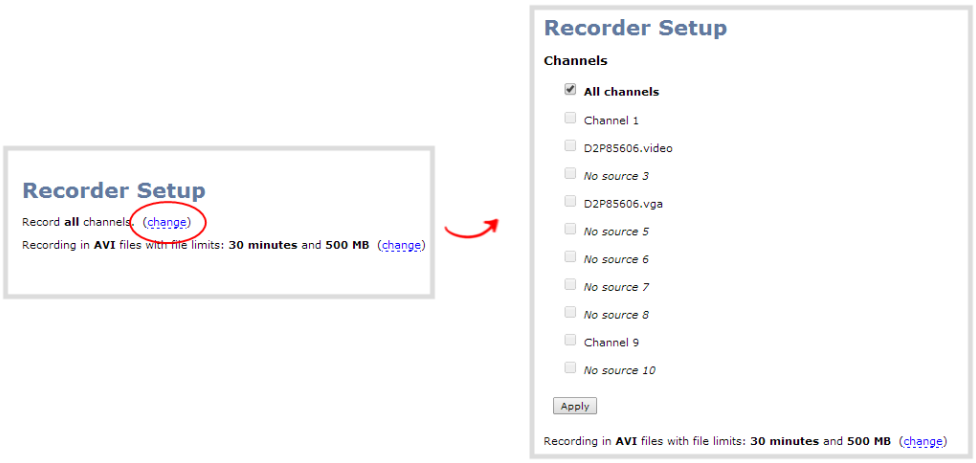
Change the channels recorded by a recorder

By default when you create a new recorder, it records all the channels configured on the system. If new channels are added, they are automatically added to the recorder.

If you wish to record a subset of channels to a single multi-track file, you can edit the channels recorded by a recorder.

To change the channels recorded by a recorder:

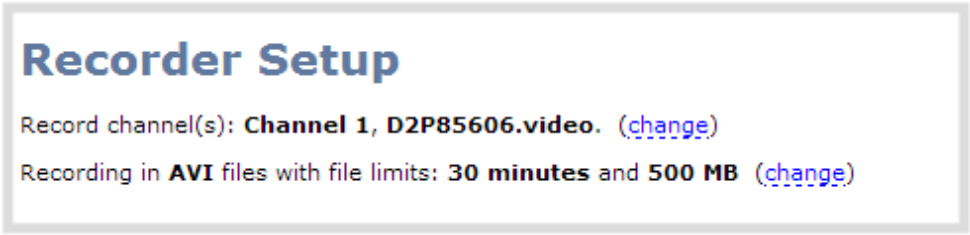
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the desired recorder link from the Recorders section; the recorder configuration page opens.
4. Click **change** next to the list of what is currently being recorded.



5. If the all channels box is selected, click it to deselect it; the other check boxes are enabled.
6. Click the check boxes for the desired channels.

> Channels with no active video source are displayed in italics. You can include these channels in your channel selections for the recorder.

7. Click Apply; the changes are reflected in the recorder configuration page.



Record with a recorder

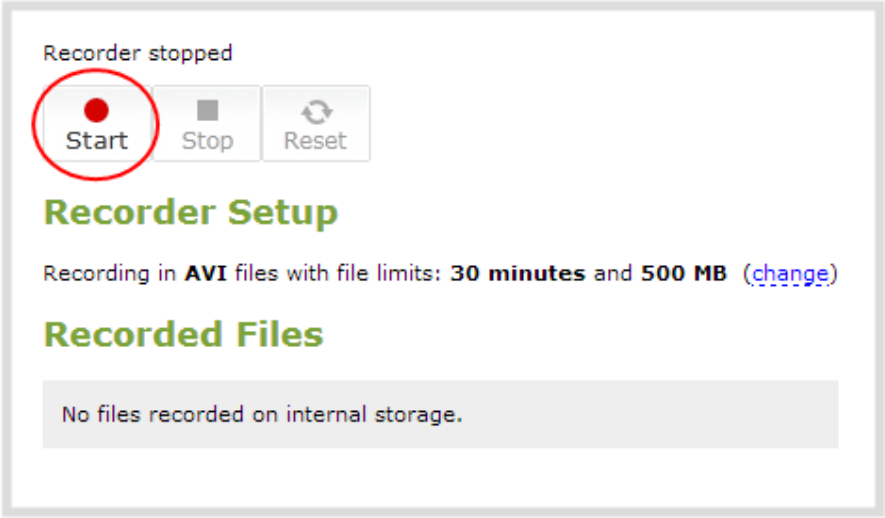
Recorders are stopped and started via their configuration page. Multiple recorders and channel recordings can occur concurrently.

The number of channels being recorded is displayed below the recording stop/start buttons. To configure the channels being recorded, see Change the channels recorded by a recorder.

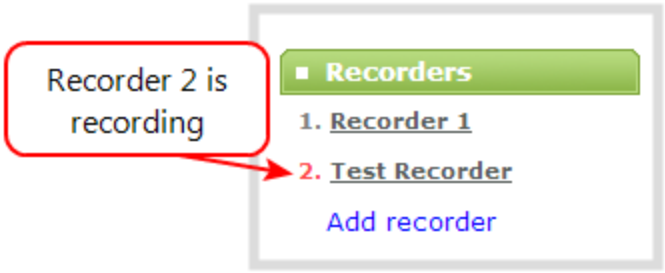
To start and stop recorder:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.

3. Click the name of the desired recorder; the recorder configuration page appears.
4. To start recording:

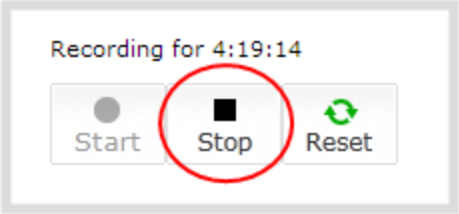


   a. Click the **Start** button; the recording starts and a timer indicates how long it has been recording.
   b. You may browse away from the page without affecting the recording. When the page refreshes, the recorder number is displayed in red to indicate recording is underway.



   c. The system continues to record this recorder (and any concurrent recordings) until it is stopped. If the system runs out of storage space, the oldest recorded file is deleted to make room for the new recording. The recording is broken into multiple files as defined by the recorder configuration. See Record with a recorder.

5. To stop recording:



a. Click the **Stop** button on the given recorder's configuration page. The recorder number changes to black next time the web interface is refreshed (by clicking a link or refreshing the page).

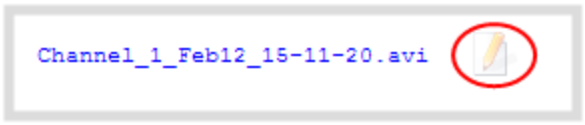
Rename recorded files

Recording files are named based on the filename prefix specified during configuration. If needed, you can rename them to something more descriptive.

You can also change the default naming mechanism. See Configure recording file size and type for more details about setting filename prefixes.

To rename recordings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Find the recordings by channel or by recorder. See View list of recorded files.
4. Select the pencil and paper icon next to the filename you wish to change.



5. Type the new file name and press enter when finished.

The web interface keeps track of the filename extension (i.e. .avi) so you do not need to include it when renaming the file.

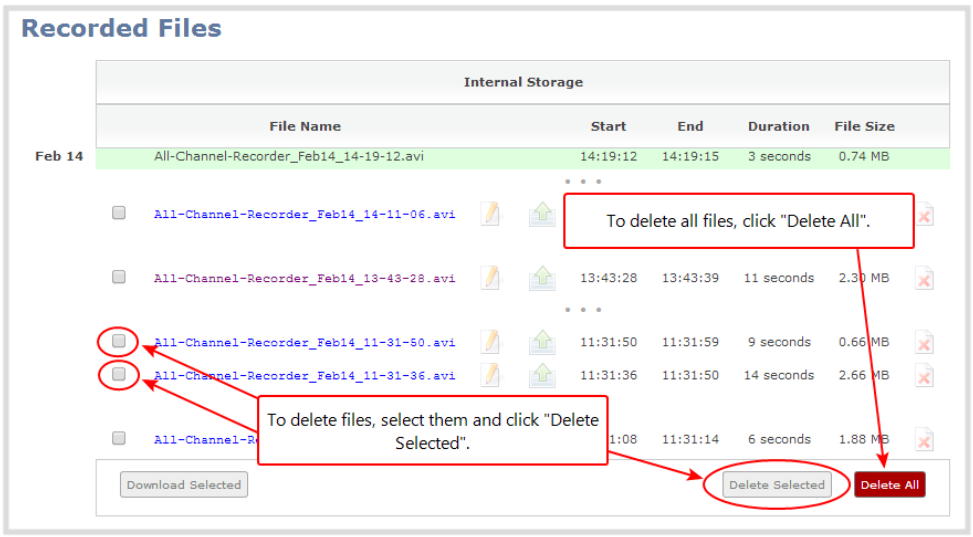
Delete recorded files manually

Recordings can be manually deleted via the web interface. You can delete one file at a time, select multiple files for a given recorder or channel and delete those, or you can delete all recordings for a channel or recorder.

If you want to delete all the files on the system, follow this procedure for each channel and recorder listed in the web interface.

To delete recordings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Find the recordings by channel or by recorder. See View list of recorded files.



4. To delete an individual file:
    a. Click the X icon to the right of a file entry to request deletion; a confirmation dialog appears.
    b. Click OK on the confirmation dialog.
5. To delete multiple files for the current channel or recorder:
    a. Select the check box next to the recordings you wish to delete from this channel or recorder.
    b. Click **Delete Selected**; a confirmation dialog appears.
    c. Click **OK** on the confirmation dialog.



The list may not update immediately. You can refresh the list by reloading the Recording page (for channels) or the recorder settings page (for recorders).

6. To delete all files for the current channel or recorder:
    a. Click **Delete All**; a confirmation dialog appears.
    b. Click **OK** on the confirmation dialog.



The list may not update immediately. You can refresh the list by reloading the Recording page (for channels) or the recorder settings page (for recorders).

Recorded files

Recordings you make of channels or with recorders are stored on the system's internal hard drive. The Standalone VGA Grid has a finite amount of available hard drive storage space. Though it is enough space to hold a lot of recordings, it will eventually run out of space if recordings are added but never removed. When this happens, the system deletes the oldest recorded files to make room for new recordings.

You can use a variety of methods to automatically transfer files from the system to local network storage. Alternatively you can manually select individual recordings to transfer or delete.

This section discusses the following manual file management topics.

- View list of recorded files
- Download recorded files manually
- Extract tracks from a recording
- Rename recorded files
- Delete recorded files manually

For information on automatic file transfers, see File and recording transfer.

View list of recorded files

Recordings for Standalone VGA Grid are stored for each channel and each recorder separately. To view all the recordings stored, follow the procedures below for all channels and all recorders you have configured.

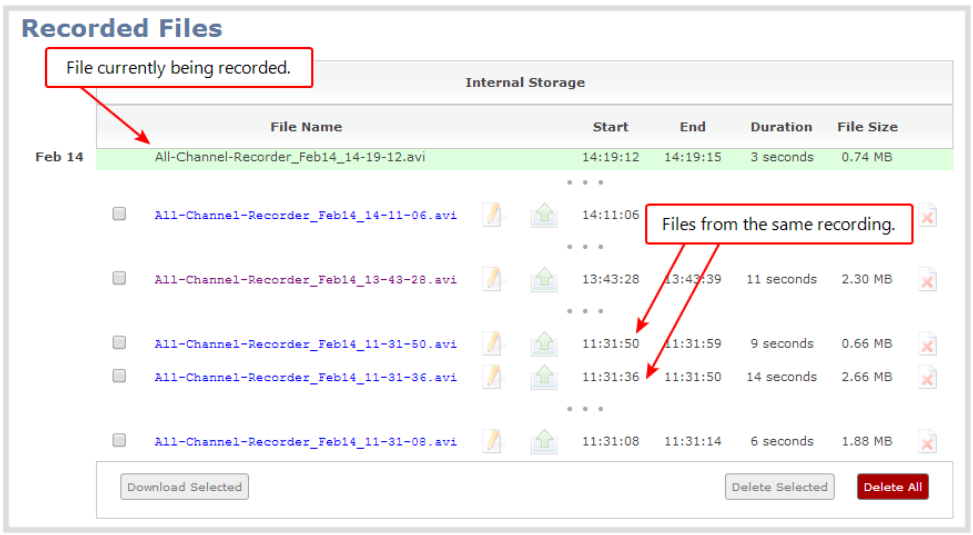
To view the recordings for a channels or recorders:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. To view files recorded for a channel:
    a. Select a channel from the Channels section; the channel menu expands.
    b. Select the **Recording** link for your channel; the Recording page appears.
4. To view files recoded for a recorder:
    a. Select the recorder from the Recorders section; the recorder page appears.
5. If there are no files:
    a. A message indicates there are no recorded files (for this channel).



6. Otherwise:
    a. All files for this channel are listed, sorted by date.

    Files that are part of the same recording session are listed one after another. Three dots appear between files of different recording sessions. The file currently being recorded (if applicable) is shown at the top of the list. It cannot be modified or downloaded until it has finished recording.



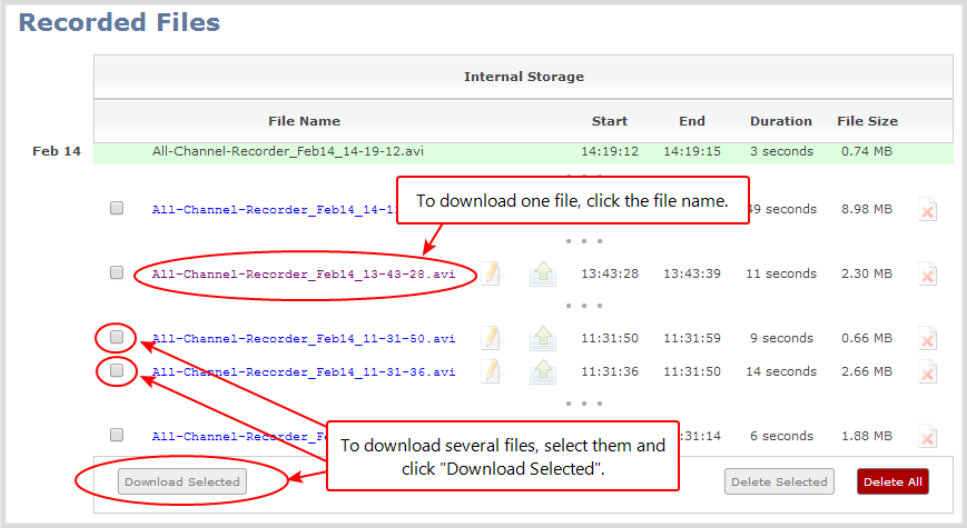
Download recorded files manually

Recordings can be manually downloaded from the web interface. You should consider deleting them from internal storage after you complete the download. See Delete recorded files manually, below.

This procedure explains how to download files to your admin computer. See File and recording transfer for information on transferring files to a USB drive connected to the system.

To download recordings to your admin computer:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Find the recordings by channel or by recorder. See View list of recorded files.



4. To download an individual file:
    a. Click the name of a recording file to download it.
5. To download multiple files:
    a. Select the check box next to the recordings you wish to download from this channel or recorder.
    b. Click **Download Selected** to download a zip file containing the selected recordings.

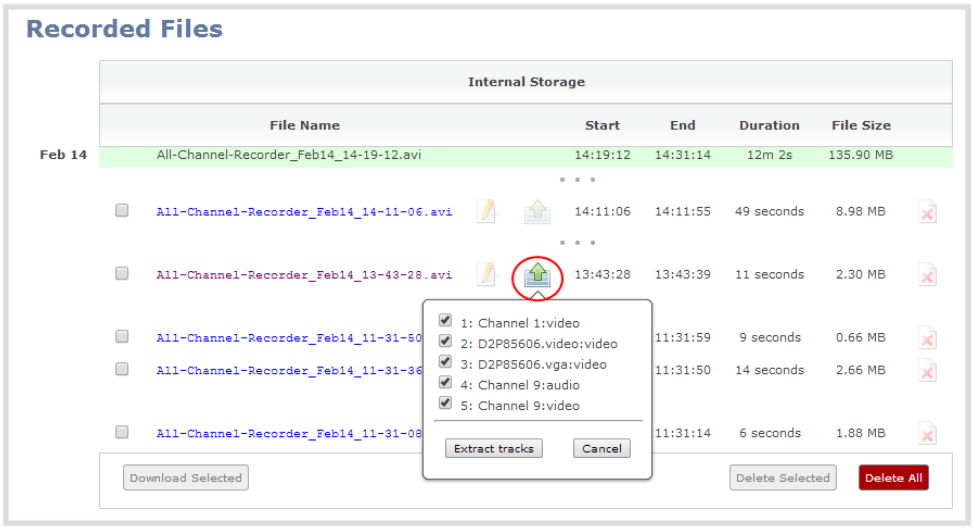
Extract tracks from a recording

Recorders combine multiple channels and audio sources together in a single multi-track file. If desired, you can create a copy of a recording with only select tracks. This feature is supported for .AVI, .MP4 and .MOV recordings only (MPEG-TS does not support track extraction).

Specific track versions of recorded files are not included in any automatic file transfers and need to be downloaded manually by clicking the extracted track filename. See **Download recorded files manually**

To create a duplicate recording file with only select tracks:

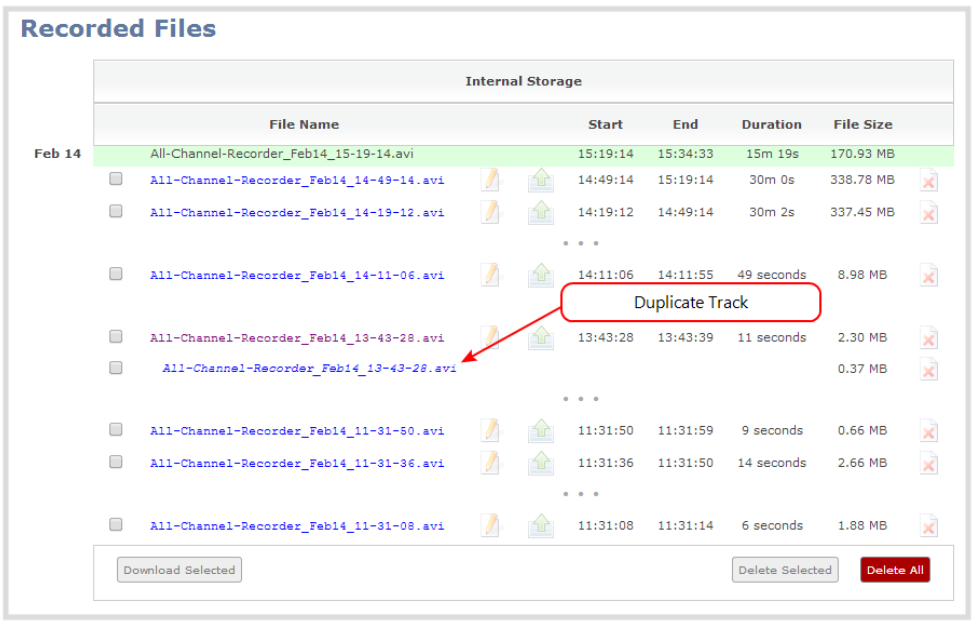
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Select the recorder from the Recorders section; the recorder page appears.
4. Find the file you want to duplicate and click the up arrow icon next to it; a list of tracks appears.



5. Select the track(s) you want to extract.

Tip: To deselect all tracks, click the check box for the top track, then hold SHIFT and click the check box for the bottom track.

6. Click **Extract tracks**; a duplicate of the recording is made with only the selected tracks.



Only one duplicate recording is saved per recording file. If you create a second duplicate recording, it will overwrite the previous copy. Download the file with your extracted tracks to preserve it.

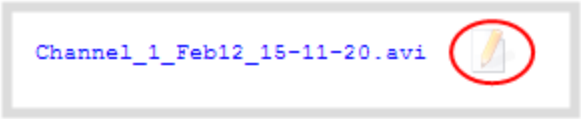
Rename recorded files

Recording files are named based on the filename prefix specified during configuration. If needed, you can rename them to something more descriptive.

You can also change the default naming mechanism. See Configure recording file size and type for more details about setting filename prefixes.

To rename recordings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Find the recordings by channel or by recorder. See View list of recorded files.
4. Select the pencil and paper icon next to the filename you wish to change.



5. Type the new file name and press enter when finished.

The web interface keeps track of the filename extension (i.e. .avi) so you do not need to include it when renaming the file.

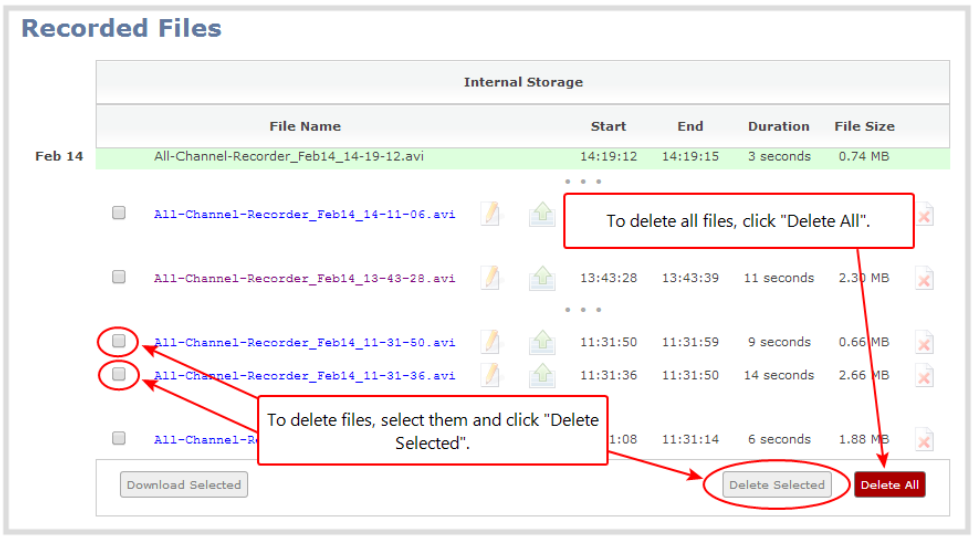
Delete recorded files manually

Recordings can be manually deleted via the web interface. You can delete one file at a time, select multiple files for a given recorder or channel and delete those, or you can delete all recordings for a channel or recorder.

If you want to delete all the files on the system, follow this procedure for each channel and recorder listed in the web interface.

To delete recordings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Find the recordings by channel or by recorder. See View list of recorded files.



4. To delete an individual file:
    a. Click the X icon to the right of a file entry to request deletion; a confirmation dialog appears.
    b. Click OK on the confirmation dialog.
5. To delete multiple files for the current channel or recorder:
    a. Select the check box next to the recordings you wish to delete from this channel or recorder.
    b. Click **Delete Selected**; a confirmation dialog appears.
    c. Click **OK** on the confirmation dialog.

The list may not update immediately. You can refresh the list by reloading the Recording page (for channels) or the recorder settings page (for recorders).

6. To delete all files for the current channel or recorder:
    a. Click **Delete All**; a confirmation dialog appears.
    b. Click **OK** on the confirmation dialog.

The list may not update immediately. You can refresh the list by reloading the Recording page (for channels) or the recorder settings page (for recorders).

File and recording transfer

Your Standalone VGA Grid can be configured to automatically upload recordings from local storage to a network storage location or an attached USB drive.

We call this process Automatic File Upload or AFU for short.

This section discusses the following generic automatic upload topics:

- Automatic file upload (AFU) overview
- Choose files to include in AFU
- Enable and set timing for AFU

And the following specific configurations based on the location of upload:

- AFU to an FTP server
- AFU using RSync
- AFU using CIFS
- AFU to a secure FTP server
- AFU using SCP
- AFU or copy to USB drive
    - Automatic
    - As a one-time copy
    - Manually

Lastly, this section describes how to view file upload logs and manage the AFU queue:

- View the AFU log
- Manage the AFU queue

Automatic file upload (AFU) overview

Standalone VGA Grid can automatically upload files to an accessible off-system storage location.



Do not reboot Standalone VGA Grid with USB stick inserted. Doing so will result in a failure to boot.

The following types of off-system storage are supported for AFU: **FTP**, **CIFS**, **RSync**, **SFTP**, **SCP** and **USB Drive**.



Only **one** type of AFU can be used at once.

Files are uploaded once (i.e. are automatically not re-uploaded during future sessions) and a log is kept showing the file transfers (see below for details on viewing the log). The first transfer occurs after the configured amount of time expires or after the current file completes recording. If connection is lost during the transfer, the transfer is automatically restarted when the connection is reestablished.

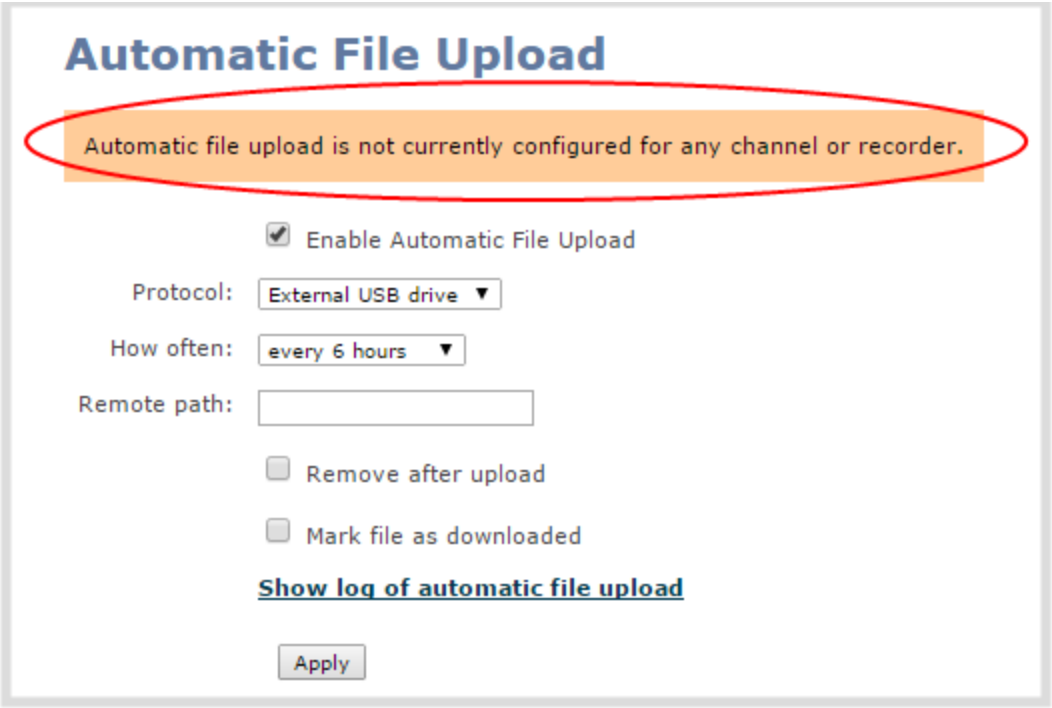
By default, channels and recorders are not configured to support automatic file upload for their recorded files. You must enable this feature for each channel or recorder you wish to include in your automatic file transfers.

If recorded files are selected for upload while the AFU is at maximum upload capacity or when the AFU is unavailable, they are added to an upload queue. Files and their relevant information are displayed in a list format, and each file will be uploaded when upload capacity becomes available.

Choose files to include in AFU

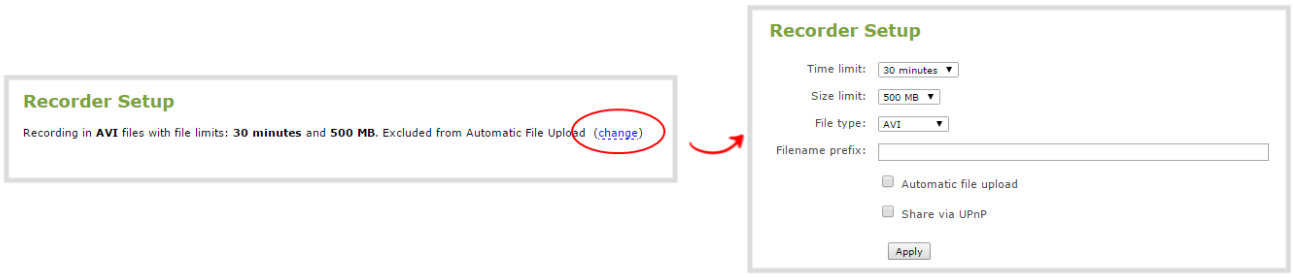
When configuring automatic file upload (AFU) you need to tell the system which channels and recorders you want included in the upload schedule.

When you log into the system and attempt to configure your desired type of AFU you see the following warning in the Automatic File Upload configuration page if no channels or recorders are configured to be part of AFU.

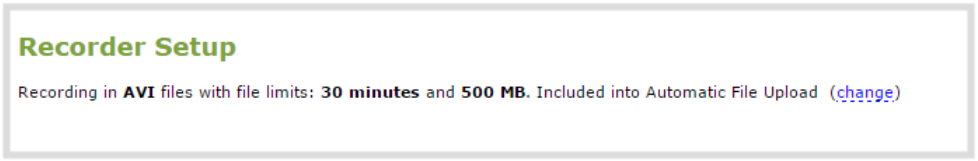


For each channel or recorder you want to add to your AFU schedule:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. For a channel recording:
    a. Click the desired channel; the channel menu expands.
    b. Select the **Recording** link for the channel; the Recording page opens.
4. For a recorder:
    a. Click the desired recorder link from the Recorders section; the recorder configuration page opens.
5. Select the **change** link under Recorder Setup; the recorder setup section expands. (The setup page looks slightly different for Recorders, but the options are the same.)



6. Check the **Automatic file upload** check box.
7. Click Apply; the Recording page is refreshed and the new settings are reflected.



Now that AFU is enabled for your desired set of files, enable AFU and configure your desired mechanism.

Enable and set timing for AFU

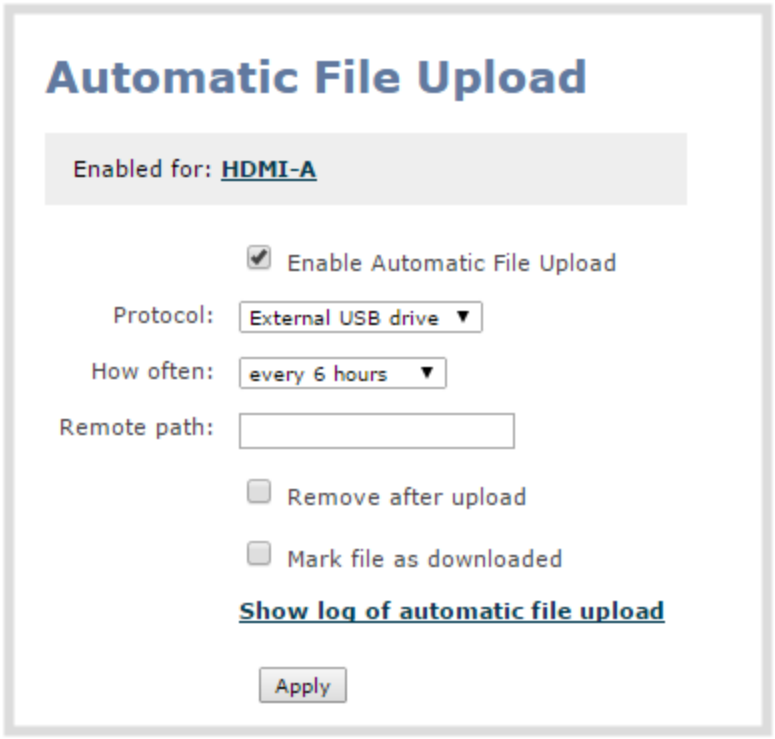
After configuring the channels and recorders to include in your AFU schedule, you must enable AFU and configure the frequency of transfers.



Files saved before you complete automatic file upload configuration are not part of the automatic upload. Manual file transfer is required for these files. See **Download recorded files manually**.

To enable and configure frequency automatic uploads:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select **Automatic File Upload** from the Configuration section; the Automatic File Upload configuration page opens.



If your screen does not indicate that AFU is enabled for at least one channel or recorder, return to **Choose files to include in AFUEnable and set timing for AFU**

4. Select the **Enable Automatic File Upload** checkbox.
5. Specify how often automatic updates should happen.

   The first transfer occurs after the specified amount of time expires, or after the current file completes recording. I.e. if the value is set to every hour and five videos are saved the first hour, those five videos are uploaded after the first hour, and one hour later the videos saved in the second hour are uploaded.

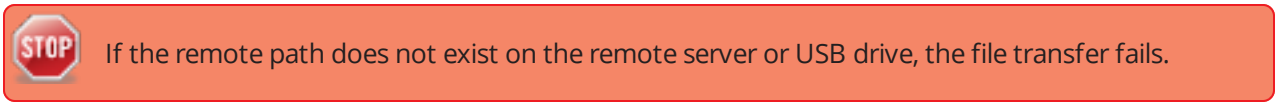
   The following table describes the available options.

Table 22 *Automatic File Upload Interval Options*

Name	Description
On file rotation	The system uploads each file after it stops recording it. You can control file size and length to determine when files are done recording. You can also use the reset button to close the current file and open a new one. See Configure recording file size and type.
Every hour	The system uploads completed recordings every hour.

Name	Description
Every 6 hours	The system uploads completed recordings every six hours.
Every 12 hours	The system uploads completed recordings every 12 hours.
Every 24 hours	The system uploads completed recordings every 24 hours.

6. Indicate the remote path, if desired. If no path is specified, the files are copied to the root folder of the destination file system.



7. If desired, check **Remove after upload** to have the files deleted from local storage when upload completes.
8. If desired, check **Mark file as downloaded** to have the color of the file link in the recording list change to show the files are downloaded. This only applies if the files are not deleted after upload is complete.
9. Select the protocol or destination for upload. The following table describes the options.

Table 23 *Automatic File Upload Interval Options*

Name	Description
FTP Client	The system uploads to an FTP server.
RSync Client	The system uploads to a network location using RSync to copy the file.
CIFS Client	The system uploads to a network location using CIFS (also known as SMB or samba) such as a shared folder on a Windows machine.
SFTP Client	The system uploads to a secure FTP server. Authentication is done either by password or uploaded SSH key.
SCP Client	The system performs secure copy (SCP) to a remote server. Authentication is done either by password or uploaded SSH key.
External USB Drive	The system uploads to a USB drive connected directly to the system.

10. Follow one of the procedures below to configure your selected protocol or transfer type.
    - AFU to an FTP server
    - AFU using RSync
    - AFU using CIFS

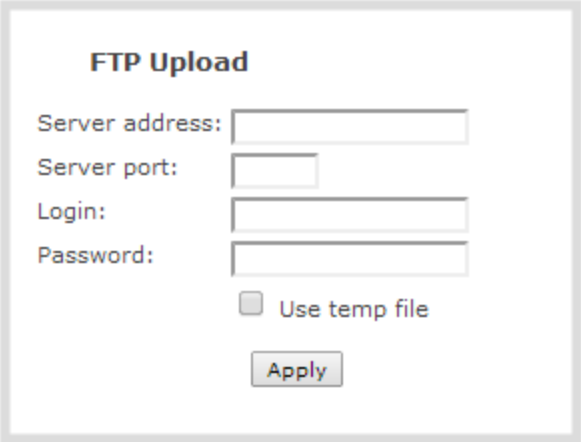
- AFU to a secure FTP server
- AFU using SCP
- AFU or copy to USB drive

AFU to an FTP server

This procedure assumes you have completed the steps in Enable and set timing for AFU and wish to continue with configuration of upload to an FTP Server.

To configure upload to an FTP server:

1. Select **FTP Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your system is configured with DHCP or has a valid DNS configuration (see Configure DHCP), you can use the server's fully qualified domain name instead of the IP address.
3. Specify the **Server Port** used for the target FTP server. The standard port is 21.
4. Enter the FTP account username in the **Login** field.
5. Enter the FTP account password in the **Password** field; the characters are masked with dots.
6. Select **Use temp file** to name files with a temporary filename extension (.part) on the server until upload is complete.
7. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to an FTP server.

Table 24 FTP Automatic Upload Configuration Options

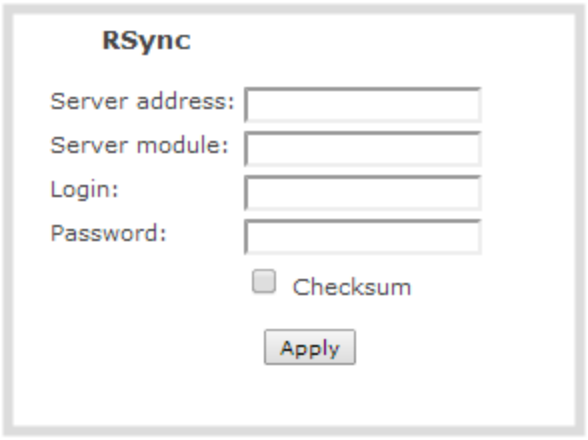
Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the FTP server.
Server port	The port used by the target FTP server. Standard port is 21.
Login	Username for the FTP server.
Password	Password for the FTP user.
Use temp file	Causes files to be named with .part extension on the server during active upload. When the upload completes, the file is renamed to the appropriate extension (.mov, .mp4 or .avi).

AFU using RSync

This procedure assumes you have completed the steps in Enable and set timing for AFU and wish to continue with configuration of upload using RSync.

To configure upload using RSync:

1. Select **RSync Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your system is configured with DHCP or has a valid DNS configuration (see Configure DHCP), you can use the server's fully qualified domain name instead of the IP address.

3. Specify the **Server module**. This is the name of the shared folder on the server. If needed, request this value from your network administrator.
4. Specify a username for the RSync Server in the **Login** field. The user must have write permissions for the module.
5. Specify the password for the user in the **Password** field; the value is masked by dots.
6. If desired, select the **Checksum** check box to add a checksum validation to the transfer between the system and the recipient server.
7. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to an RSync server.

Table 25 *RSync Automatic File Upload Configuration Options*

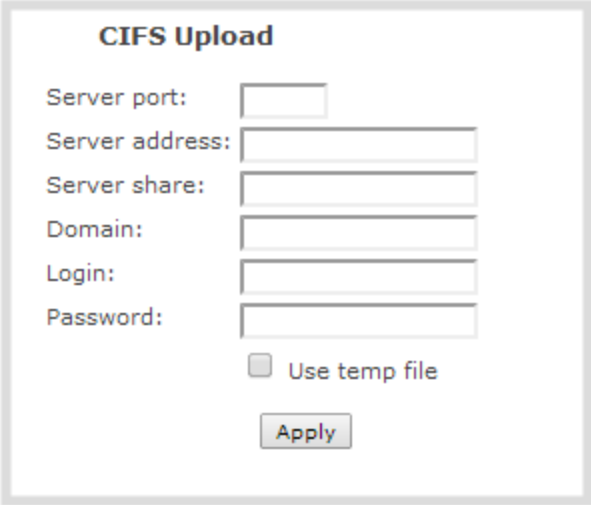
Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the RSync server.
Server module	The name of the shared folder on the RSync server.
Login	Username for the RSync server.
Password	Password for the RSync user.
Checksum	Select to enable checksum checking during file transfer. This increases the time taken to transfer, but also increases reliability of the transfer.

AFU using CIFS

This procedure assumes you have completed the steps in Enable and set timing for AFU and wish to continue with configuration of upload using CIFS (also known as SMB or samba).

To configure upload using CIFS:

1. Select **CIFS Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your system is configured with DHCP or has a valid DNS configuration (see Configure DHCP), you can use the server's fully qualified domain name instead of the IP address.
3. Enter the target **Server port**, if you have configured the server to use something non-standard. Leave this value blank to use the default port.
4. Specify the **Server share**. This is the CIFS share name or the name of the shared folder on the server. If needed, request this value from the network administrator.
5. If the system is in a different domain than the server or if it is part of Active Directory, enter the **Domain name** of the CIFS server.
6. Specify a username for the CIFS Server in the **Login** field. The user must have write permissions for the share folder.
7. Specify the password for the user in the **Password** field; the value is masked by dots.
8. Select **Use temp file** to name files with a temporary filename extension (.part) on the server until upload is complete.
9. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to a CIFS server.

Table 26 *CIFS Automatic File Upload Configuration Options*

Name	Description / Options
Server Port	The CIFS server port. Leave blank to use the default port, or enter the port used for your CIFS server.

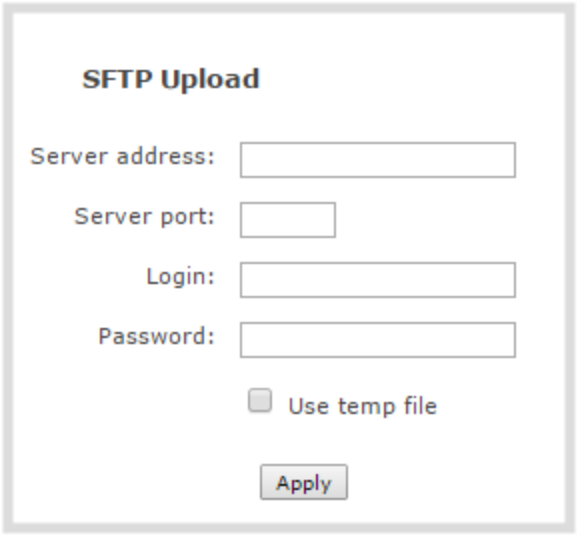
Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the CIFS server.
Server share	The name of the shared folder on the CIFS server.
Domain	The CIFS server's Windows domain or Work Group name . Needed if the server is part of Active Directory or a Domain Controller.
Login	Username for the CIFS server.
Password	Password for the CIFS user.
Use temp file	Causes files to be named with .part extension on the server during active upload. When the upload completes, the file is renamed to the appropriate extension (.mov, .mp4, .ts or .avi).

AFU to a **secure** FTP server

This procedure assumes you have completed the steps in Enable and set timing for AFU and wish to continue with configuration of upload to a secure FTP Server (SFTP).

To configure upload to a secure FTP (SFTP) server:

1. Select **SFTP Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your system is configured with DHCP or has a valid DNS configuration (see Configure DHCP), you can use the server's fully qualified domain name instead of the IP address.
3. Specify the **Server Port** used for the target SFTP server. The standard port is 22.
4. Enter the SFTP account username in the **Login** field.
5. Enter the SFTP account password in the **Password** field; the characters are masked with dots. (Alternatively you can choose to use a private key instead of a password for authentication.)
6. Select **Use temp file** to name files with a temporary filename extension (.part) on the server until upload is complete.



For secure file transfer you can upload an SSH identity for your Standalone VGA Grid. This key must be trusted by the destination server. Details for generating the key and setting up this trust are beyond the scope of this document.

7. If desired, scroll down to the section labelled **SSH identity for SCP and SFTP clients**.
    1. If no identity is uploaded, or to upload a new identity (overwrites the old identity):
        a. Click **Choose File**; a file selection dialog opens.
        b. Select the private key file from your hard drive and click **Open**.



The system accepts RSA keys for SSH-1; DSA, ECDSA, EC25519 and RSA for SSH-2. Keys must be in **OpenSSH** format.

        c. Click **Upload** to upload the file.
    2. Use the **Test your key** field to test your uploaded key against the secure server, if desired.
8. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to a SFTP server.

Table 27 *SFTP Automatic Upload Configuration Options*

Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the SFTP server.
Server port	The port used by the target SFTP server. Standard port is 22.
Login	Username for the SFTP server.

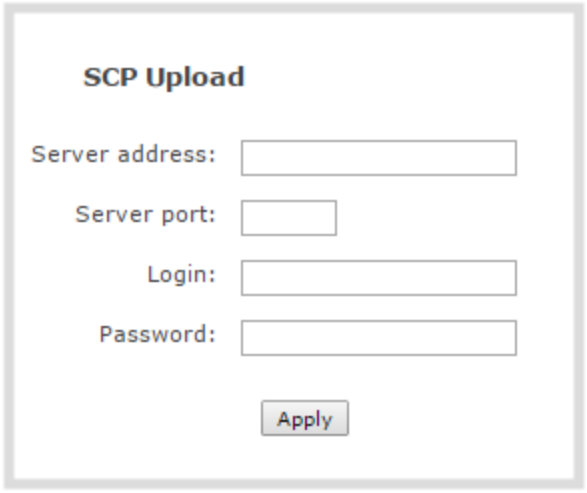
Name	Description / Options
Password	Password for the SFTP user.
Use temp file	Causes files to be named with .part extension on the server during active upload. When the upload completes, the file is renamed to the appropriate extension (.mov, .mp4 or .avi).

AFU using SCP

This procedure assumes you have completed the steps in Enable and set timing for AFU and wish to continue with configuration of upload via secure copy (SCP).

To configure upload via SCP:

1. Select **SCP Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your system is configured with DHCP or has a valid DNS configuration (see Configure DHCP), you can use the server's fully qualified domain name instead of the IP address.
3. Specify the **Server Port** used for the destination SCP server. The standard port is 22.
4. Enter the SCP account username in the **Login** field.
5. Enter the SCP account password in the **Password** field; the characters are masked with dots. (Alternatively you can choose to use a private key instead of a password for authentication.)

For secure copy you can upload an SSH identity for your Standalone VGA Grid. This key must be trusted by the destination server. Details for generating the key and setting up this trust are beyond the scope of this document.

6. If desired, scroll down to the section labelled **SSH identity for SCP and SFTP clients**.
    1. If no identity is uploaded, or to upload a new identity (overwrites the old identity):
        a. Click **Choose File**; a file selection dialog opens.
        b. Select the private key file from your hard drive and click **Open**.

        The system accepts RSA keys for SSH-1; DSA, ECDSA, EC25519 and RSA for SSH-2. Keys must be in **OpenSSH** format.

        c. Click **Upload** to upload the file.
    2. Use the **Test your key** field to test your uploaded key against the secure server, if desired.
7. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload using SCP.

Table 28 *SCP Automatic Upload Configuration Options*

Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the destination server.
Server port	The SCP port used by the target server. Standard port is 22.
Login	Username for the SFTP server.
Password	Password for the SFTP user.

AFU or copy to USB drive

The system is equipped with USB ports that can be used to copy files from internal storage to external USB flash drives or hard drives. An example use of this feature is to provide speakers with a copy of their presentation before they leave the presentation venue.

The external drive must be formatted with one of the following file systems:

- FAT16
- FAT32
- XFS
- EXT2
- EXT3
- EXT4

- NTFS

Only the first attached USB drive is used for automatic file upload. If more than one USB drive is attached before system power up, behavior is unpredictable.

File transfer to a USB drive occurs in one of the following ways. This section describes the procedures.

- AFU to a USB drive
- One-time copy/move of all recorded files to USB drive
- Manually copy recorded files to USB drive
- View available USB storage space
- Safely eject the USB drive

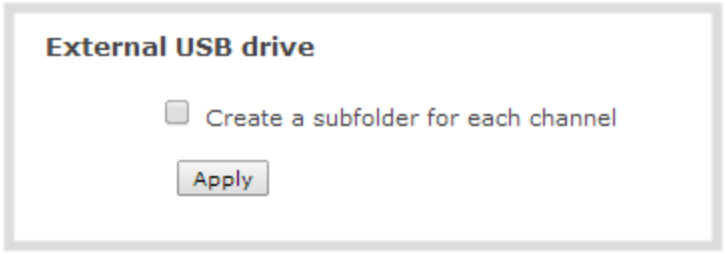
Only one copy or move to USB operation is permitted at a time, even though the UI may appear to let you start a second one. Please wait until the first is complete before starting a new operation.

AFU to a USB drive

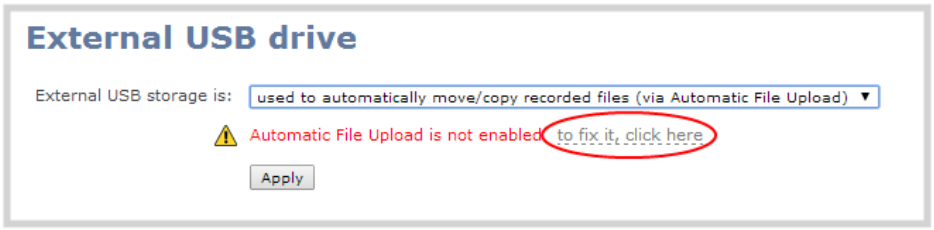
This procedure assumes you have completed the steps in Enable and set timing for AFU and wish to continue with configuration of upload to a USB drive.

To configure automatic upload to a USB drive:

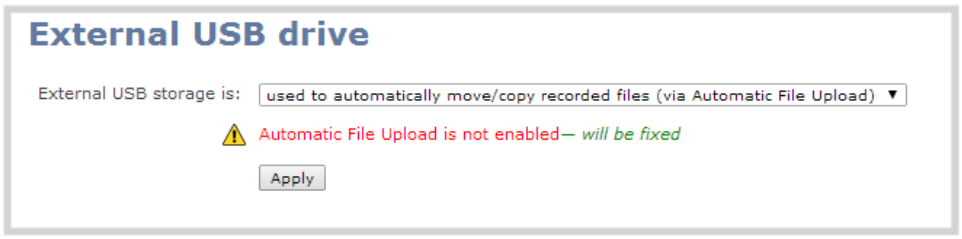
1. Insert the properly formatted USB drive into one of the system's USB ports.
2. Select **External USB Drive** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



3. If your Automatic File Upload setting conflicts with your new USB drive setting, a message is displayed.



4. Click the fix link.



Using the fix link disables any other type of automatic file upload you have configured. When you are done with USB uploads, return to the **Automatic File Upload** configuration page and re-configure FTP, RSYNC, or CIFS.

5. Select **Create a subfolder for each channel** to have recordings organized by channel.
6. Click **Apply**; the changes are saved.

One-time copy/move of all recorded files to USB drive

When configured to make a one-time copy of files, the system will automatically begin to copy files to an inserted USB drive, starting with the newest recording. Files will continue to copy until all are copied, the specified maximum number of files is copied, or the target drive runs out of storage space.

The file currently being recorded (if any) cannot be transferred until recording is completed.

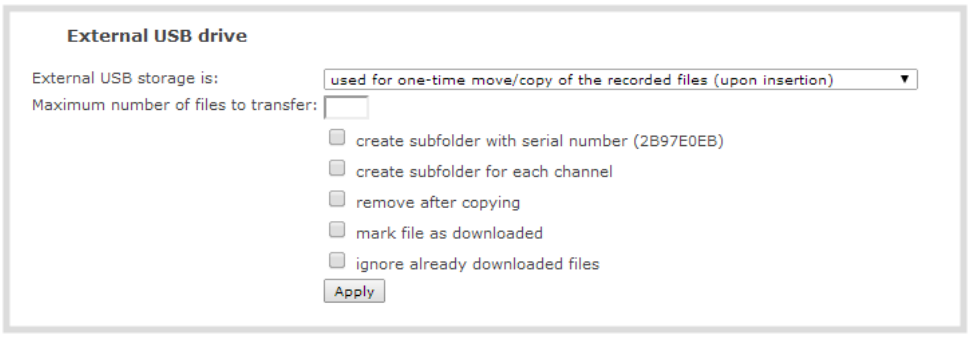
This procedure is separate from automatic file upload and does not need any pre-configuration in the automatic file upload page.

Ideally only USB drives with visible activity indicators should be used.

To configure a one-time copy of all recorded files to a USB drive:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.

2. Login as admin.
3. Select the **External USB Drive** link in the Configuration section; the External USB Drive configuration page is displayed.
4. Select **used for one-time move/copy of the recorded files (upon insertion)** from the drop down list.



5. Select the appropriate check boxes based on the descriptions provided in the following table. If your USB drive does not have activity indicators it is suggested you select either remove after copying or mark file as downloaded so you know when the transfer is complete.

Table 29 *One-Time Transfer/Copy to External USB Drive Options*

Name	Description
create subfolder with serial number (<serial>)	If checked, the transfer process creates a sub-folder with the system's serial number on the USB drive. This is useful if you are using the same drive to collect recordings from multiple systems and want to know which system they came from.
create subfolder for each channel	If checked, the transfer process creates a sub-folder for each channel and recorder (within the subfolder for the serial number, if that option is also selected). Files are copied to their respective folders.
remove after copying	If checked, the file(s) are removed after being copied to the USB drive. Checking this box makes the transfer a move instead of a copy.
mark file as downloaded	If checked, the files that are downloaded are marked with a downloaded icon when viewing file lists. This has no effect if remove after copying is checked.
ignore already downloaded files	If checked, files that were previously downloaded or marked as downloaded are not included in subsequent downloads.

6. Click **Apply**; the changes are saved.

If a conflict is reported regarding the Automatic file upload, go to the Automatic File Upload configuration page and disable automatic file upload or switch it to a non-USB based upload type. Repeat the steps above.

7. Insert the properly formatted USB drive into one of the system's USB ports; the drive is recognized and the transfer begins. If the drive has an activity indicator light, it flashes during the transfer.
8. When the activity light stops flashing, remove the USB drive.
9. If your USB drive does not have activity indicators:
    a. Check the **Recording** list for each channel and the **Recorded Files** list for each recorder to verify if there are files that have yet to be copied.
    b. Safely eject the USB drive when you are satisfied all files have been copied, or if you see the USB drive is out of storage space (View available USB storage space).

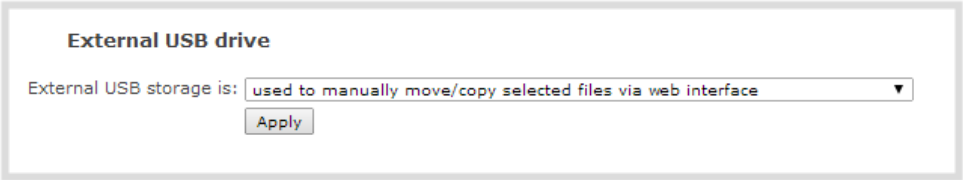
Manually copy recorded files to USB drive

You can manually copy recorder files to a USB drive connected to the Standalone VGA Grid.

This procedure is separate from automatic file upload and does not need any pre-configuration in the automatic file upload page.

To manually copy recorded files to a USB drive:

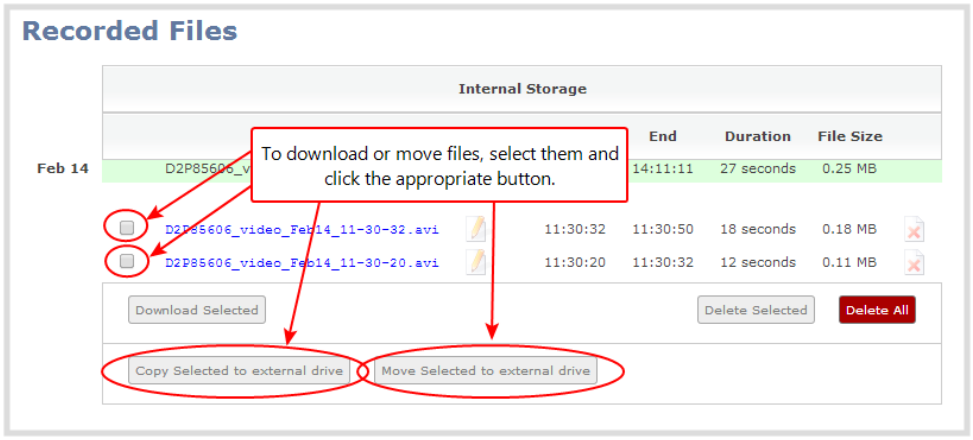
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **External USB Drive link** in the Configuration section; the External USB Drive configuration page is displayed.
4. Select **used to manually move/copy selected files via web interface** from the drop down list.



5. Click **Apply**; the changes are saved.

If a conflict is reported regarding the Automatic file upload, go to the Automatic File Upload configuration page and disable automatic file upload or switch it to a non-USB based upload type. Repeat the steps above.

6. Insert your USB drive in an available USB port on the system. (It is recommended you only use one USB drive at a time.)
7. To download files for a specific channel:
    a. Select the desired channel from the Channels list
    b. Click the **Files Archive** link for the selected Channel
8. To download files for a recorder:
    a. Select the desired recorder from the Recorders list
9. Select the check box next to the files you wish to download. In the example below the topmost file is still recording and cannot be downloaded.



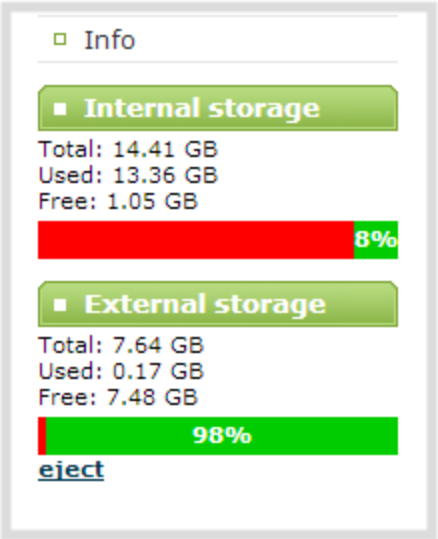
10. To copy the files to the USB drive:
    a. Click **Copy Selected to external drive**
11. To move the files to the USB drive (i.e. erase the files after the copy)
    a. Click **Move Selected to external drive**
12. Repeat the steps to select a channel or recorder and copy or move files to the external drive until you have copied all the files you wish.
13. Follow the steps to Safely eject the USB drive.

View available USB storage space

When you insert a USB drive in an available port of the Standalone VGA Grid and select an **External USB Drive** action other than **ignored** (i.e. manual copy, automatic copy, etc), the total and free space are calculated and displayed in the Web Interface.

To see the available USB storage space:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Insert your USB drive in an available USB port on the system. (It is recommended you only use one USB drive at a time.)
4. Scroll to the bottom of the Web Interface page; external USB storage is displayed under internal storage space.

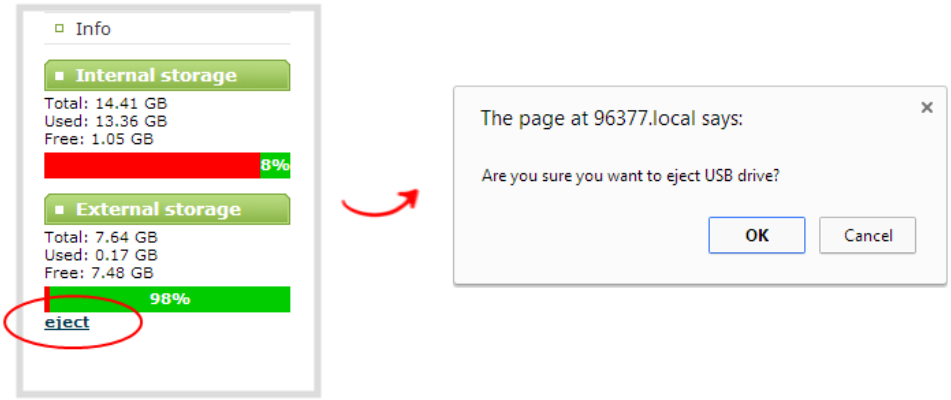


Safely eject the USB drive

When you have completed work with the USB drive you can safely eject it by using the link at the bottom of the Web Interface page.

To safely eject the USB drive:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Scroll to the bottom of the Web Interface page; click the eject link below external storage space.



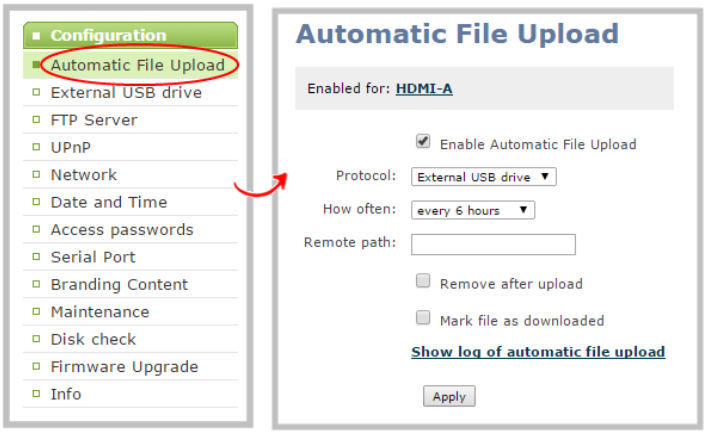
4. When prompted, click OK to confirm that you want to eject the USB drive.
5. Disconnect the USB drive from the system.

View the AFU log

A log is kept of automatic file uploads.

To view the log:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select **Automatic File Upload** from the Configuration section; the Automatic File Upload configuration page opens.



4. Click the **Show log of automatic file upload** link; the log page opens. Note the page is blank if there are no logs present.

5. Click the browser's back button when you are done.

Manage the AFU queue

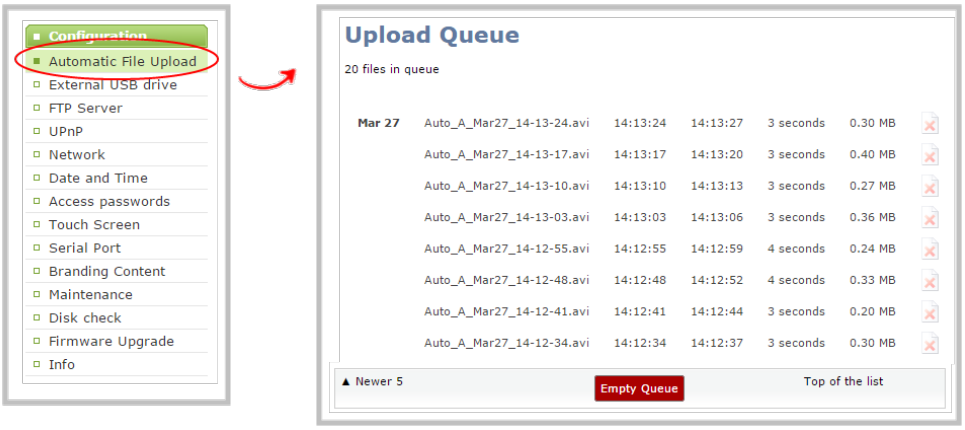
The AFU queue displays a list of recording files waiting to be uploaded. Individual file details can be viewed using the web interface.

Access the AFU queue

Accessing the AFU queue allows you to view the list of files queued for upload using the web interface.

To access the AFU queue:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. From the web interface, click **Automatic File Upload**; if there are files to be uploaded, they are displayed under the Upload Queue header.

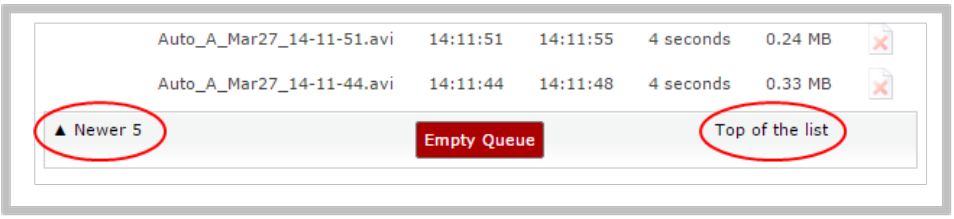


View content in the AFU queue

There are several buttons in the web interface that allow you the ability to control how you see your queued content.

To control how you view content in the AFU queue:

1. Navigate to the bottom of the upload queue list and manipulate the list view using the **Newer 5** and **Top of the List** buttons.



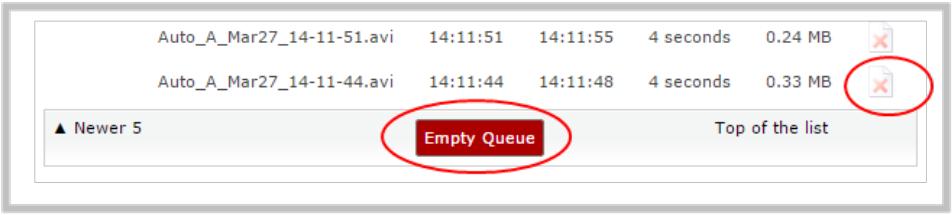
The upload queue can display only 15 files at one time. Additional content is still stored and is viewed in increments of five files using the **Newer 5** button.

Delete content in the AFU queue

Files can be deleted from the upload queue, either individually or as a group.

To remove content from the upload queue:

1. Navigate to the bottom of the upload queue and click **Empty Queue** to delete the entire upload queue, or click the red 'X' icon at the end of each row to remove files individually.



Local FTP server

Standalone VGA Grid can act as an FTP server, allowing you to manually or automatically connect to the system and download recordings. Depending on configuration of the FTP server, you may also be able to remotely delete files after download, maximizing available system storage.

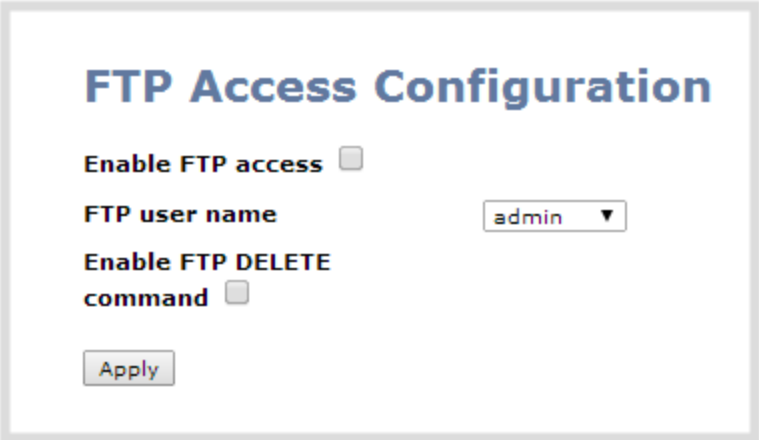
This section discusses the following FTP Server topics.

- Configure the local FTP server
- Using the local FTP Server

Configure the local FTP server

To configure your sysetem's local FTP server:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **FTP Server** link in the Configuration menu; the FTP Server configuration page opens.



4. To enable the FTP server:
    a. Select the **Enable FTP access** check box.
    b. Select a user from the **FTP user name** drop down.

The ftp password is the regular access password for the selected user. See **User administration** for details on user names and passwords.

c. Click **Apply**.

5. To allow the FTP user to delete files:
   a. Select the **Enable FTP DELETE command** check box.
   b. Click **Apply**.

Any currently logged in ftp users must log out and back in again to have access to the command.

6. To disable the FTP server:
   a. De-select the **Enable FTP access** check box.
   b. Click **Apply**.
7. To disable file deletion by FTP:
   a. De-select the **Enable FTP DELETE command** check box.
   b. Click **Apply**.

Any currently logged in users will continue to have access to the delete command until they log out and log in again.

The following table summarizes the options for configuring the local FTP server.

Table 30 *FTP Server Configuration Options*

Name	Description / Options
Enable FTP access	The check box controls whether or not the system acts as an FTP server. By default this is disabled.
FTP user name	Select one of the system users: admin, operator, or viewer. The ftp password will be the access password for the selected user. By default the admin user is selected.
Enable FTP DELETE command	Controls whether or not FTP users can delete files. By default file deletion is not permitted.

Using the local FTP Server

Once you have configured a local FTP server, you can use the tool of your choice to download files from the system.

The system stores files in a folder structure with a folder for each channel and a folder for each recorder. Channel folders are labeled video<channel number> (i.e. video3 for channel 3). Recorder folders are labeled videom<recorder number> (i.e. videom1 for the first recorder). Channel and recorder numbers are displayed next to the name of the channel or sources in the web admin interface. See Channels and Recorders.

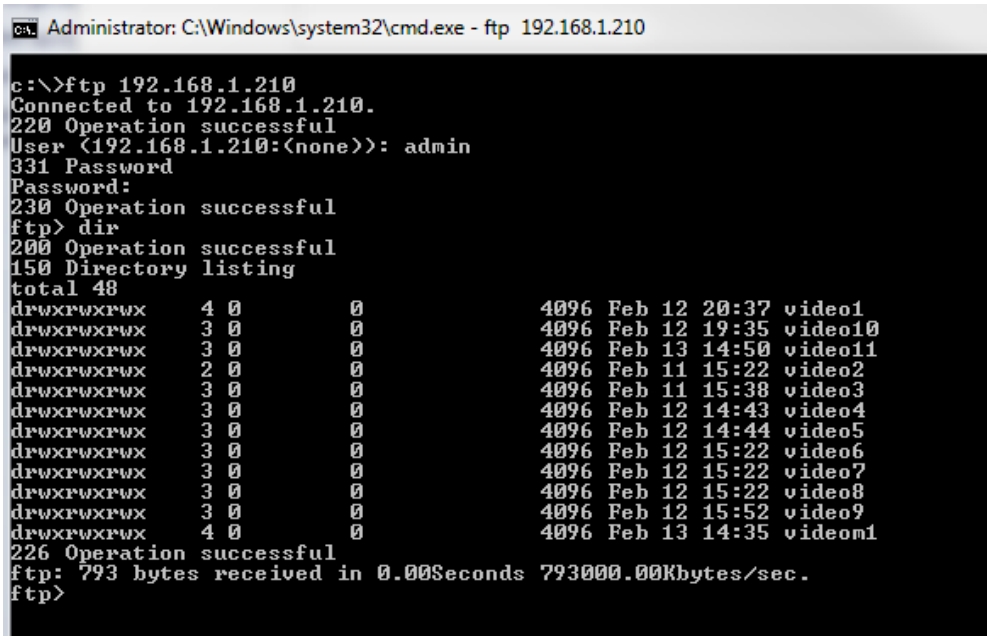
To get started you will need:

- The IP address of your system (found in the **Network** configuration menu)
- An FTP tool
- The username and password for your FTP user (See Configure the local FTP server)

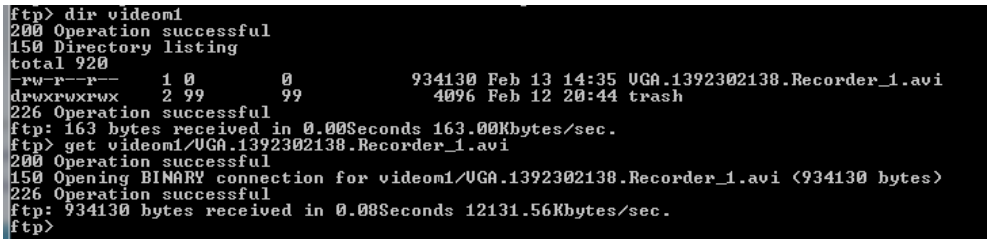
In the example below, the IP address of the Standalone VGA Grid is 192.168.1.210, the username is admin, there is no password, and the Windows command line ftp utility is used.

To connect to the FTP server:

1. Open a command window on Windows (alternatively open a terminal window on Linux/Mac, or open your FTP utility of choice).
2. Establish an ftp connection using the command: ftp 192.168.1.210.
3. Provide the username: admin (provide the username of your FTP user).
4. Provide the password: (provide the correct password for your FTP user); the connection is opened.
5. Use the dir command to see the file structure.



6. Use dir or your tool's GUI to look in each folder for recordings.
7. Use get or your tool's transfer mechanism to transfer files to your computer.



8. If enabled in the FTP configuration page, delete the file after downloading it by issuing the delete command, or using your tool's delete mechanism.



If the delete command is not enabled, attempting to delete a file will result in an Unknown Command error.

PART 5: Maintenance

This section covers topics that will keep your Standalone VGA Grid running smoothly. It also covers the mobile/tablet operator interface and ways to configure and operate your system using third party tools via HTTP or RS-232.

Specific topics covered are:

- Mobile / tablet operator interface
- Power down and system restart
- Save and restore device configuration
- Perform factory reset
- Firmware upgrade
- Support
- Storage disk maintenance
- Third party integration

Mobile / tablet operator interface

Epiphan's tablet interface is designed for touch-screen devices. Use your tablet or mobile device to perform confidence checks and basic operator tasks such as verifying disk space or starting and stopping recording.

This section describes procedures for the following topics:

- Connect to the tablet interface
- Confidence monitoring using the tablet interface
- Verify disk space via the tablet interface
- Control recording via the tablet interface
- Switch to the full admin interface

Connect to the tablet interface

To get started with the tablet interface you can connect to it in one of the following ways.



The device connecting to the tablet interface must be on the same network as the Standalone VGA Grid or must be physically connected to it via USB.

- Use the browser over Ethernet
- Use tethering on your device
- Use the mobile version of Epiphan Connect

Use the browser over Ethernet

You can connect to the tablet interface with a browser on your admin computer, tablet, or touch-screen device.

To connect to the tablet interface:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Modify the URL in the browser to have /m after the existing text and press Enter; the tablet interface opens. (If you forget the /m, the system will direct you to the mobile or standard interface, depending on information sent by your device's browser).

```
http://<ip address of system>/admin/m
 or
http://<serial number of device>.local/admin/m
```

For example: http://192.168. 1.163/admin/m *or* http://95dd40d5.local/admin/m

In the future you can go directly to the IP address above and login from the mobile interface without ever seeing the usual admin interface.

Use tethering on your device

You can use tethering on your mobile device or tablet to connect to the tablet interface. This option requires some configuration through the full admin interface.

To configure use of tethering (perform this once):

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.
4. Select **No tethering** or any option except **Disabled** from the **Use phone/tablet connection**. See Tether to a mobile network for descriptions of the options.
5. Click Apply.

To use your mobile device or tablet via tethering:

1. Turn on tethering on your device. (See device user manual for instructions.)
2. Connect the device to your Standalone VGA Grid via USB.
3. Use the EpiphanConnect utility (from the Google Play or Apple App store) to find the system and open the tablet admin interface.

Use the mobile version of Epiphan Connect

Epiphan has iOS and Android versions of the Epiphan Connect discovery utility. The mobile versions of the discovery utility automatically open the tablet interface when connecting to the Standalone VGA Grid for administration.

See instructions below for installing the application. The iOS version is available from the Apple App Store and the Android version is available from the Google Play store.

To install the application on your iOS or Andriod device (perform this once):

1. Open the App Store (for Apple devices) or Google Play store (for Android devices).
2. Search for **EpiphanConnect** (all one word).
3. Download and install the free Epiphan Connect application.

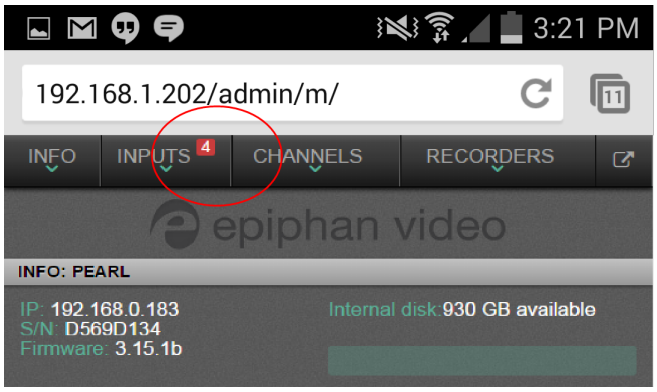
To connect to the device:

1. Once Epiphan Connect is installed, connect to the wifi network where you can access your Standalone VGA Grid.
2. Launch Epiphan Connect; the application searches your network and shows you a list of available Epiphan systems.
3. Find your system in the list. If you have several Epiphan systems, look for the serial number of the one to which you'd like to connect.
4. Select the system by touching the system name; a login prompt is presented.
5. Login as admin or operator; the tablet interface appears.

Confidence monitoring using the tablet interface

When connected to the tablet interface, you can use the **INPUTS** section to monitor the inputs to your system. An auto-updating snapshot of video inputs and an audio level meter is provided for each source.

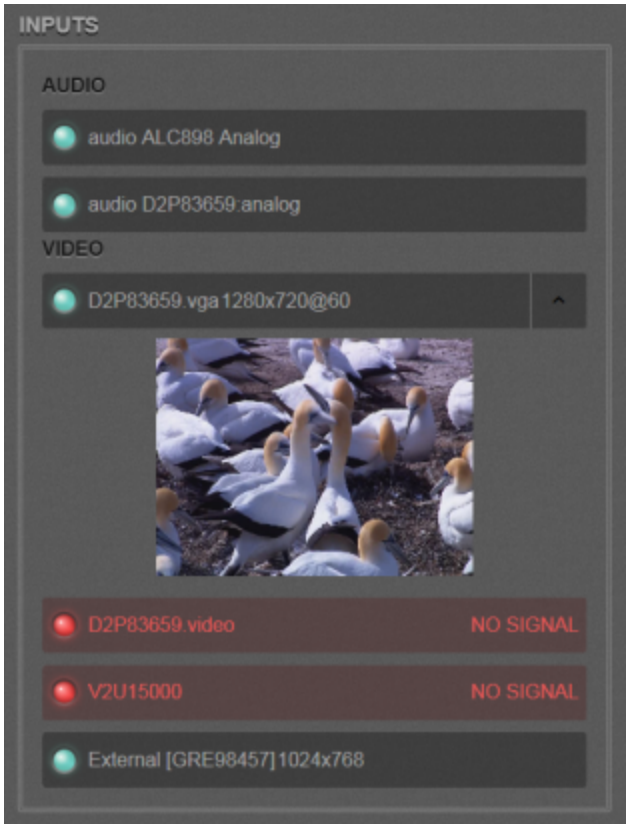
The top of the tablet interface gives you a warning if there are video inputs with no signal. In the example below, 4 video inputs have no signal.



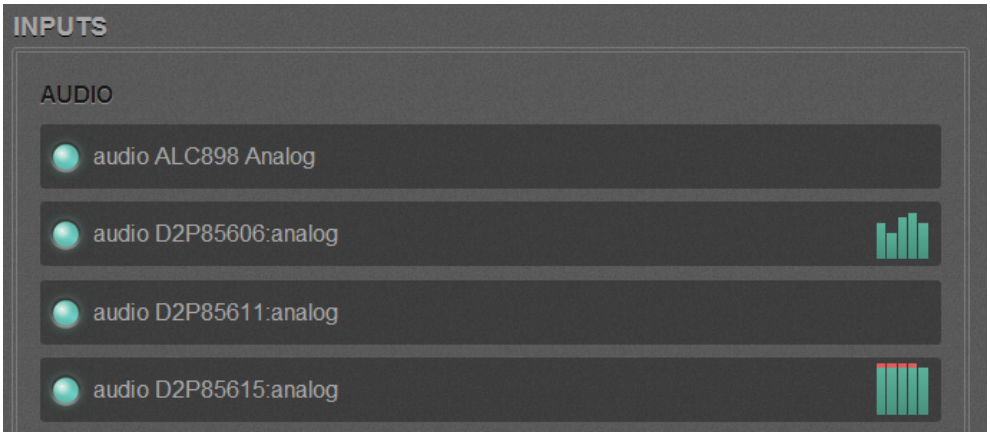
For more detailed information, you can look at each input individually.

To monitor each input:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Scroll to the **INPUTS** section.



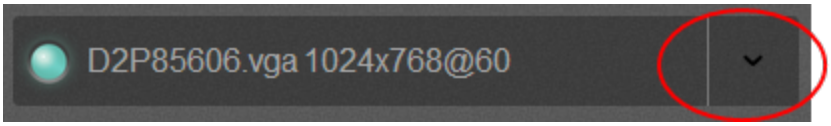
4. For audio inputs without signal, nothing appears in the audio input bars.
5. For audio inputs with signal, the level is shown next to the source name in the audio input bar.



6. If a video source has no signal, the name appears red and a note next to the name says NO SIGNAL.



7. If the source has a signal, it's frame size and frame rate are displayed beside the source name.
8. View a preview of the source by clicking the down arrow in the row for source. (The names of the sources match the names set in the main admin interface.)



Verify disk space via the tablet interface

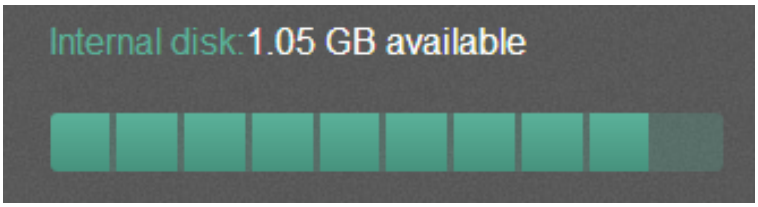
The **INFO** section of the tablet interface lets you know the firmware version, serial number and IP Address of your system. It also shows you the currently available disk space.

To monitor inputs:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Scroll to the **INFO** section; the currently available disk space is shown.



4. If disk space is low, the green bar will be nearly full.



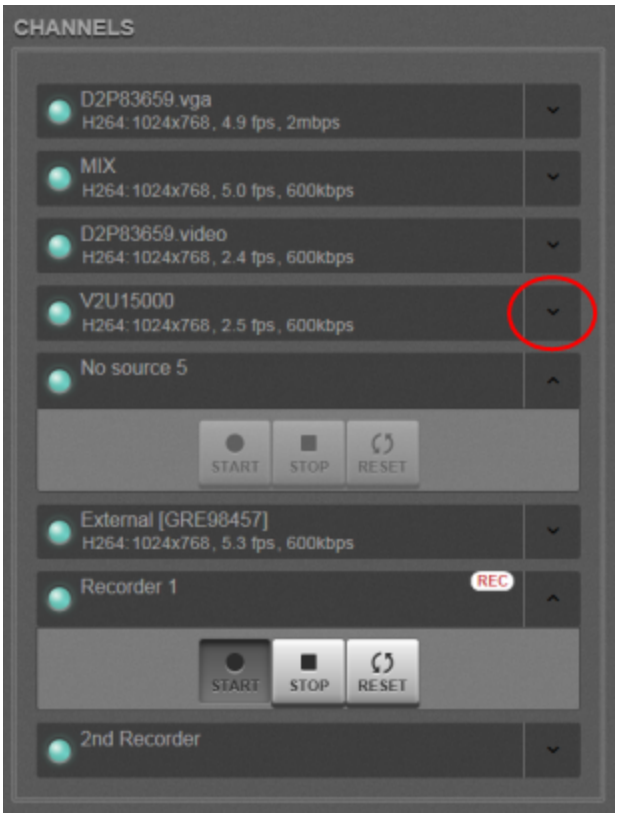
Control recording via the tablet interface

The tablet interface provides a simple way to control recording for your Standalone VGA Grid. You can control recordings for both channels and recorders from the same interface.

To control recording from the tablet interface:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.

3. Scroll to the **CHANNELS** section.

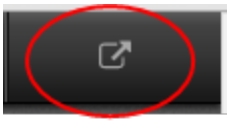


4. Find the channel or recorder from the list under CHANNELS. (The names of the channels and recorders match the names set in the full admin interface.)
5. Click the down arrow in the row for the desired channel or recorder.
6. Use the **START**, **STOP**, and **RESET** buttons to control recording.

Switch to the full admin interface

To switch from the tablet interface to the full admin interface:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Click the arrow button at the top right of the screen. Depending on the width of the screen, the button may say extended view.





Power down and system restart

This section covers the following topics:

- Restarting the device via the web interface
- Shutting down the device via the web interface
- Shutting down the device manually

Restarting the device via the web interface

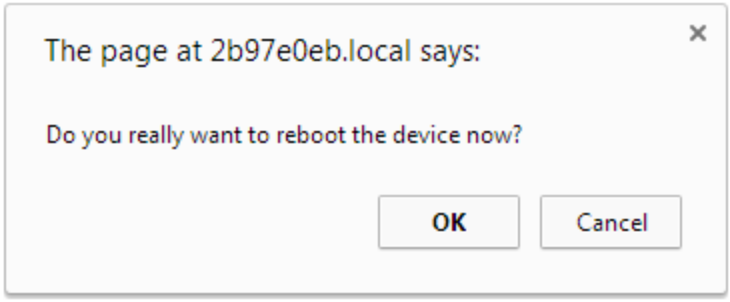
Standalone VGA Grid's web interface allows you to reboot the system.

To restart the system:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Click the **Reboot Now** button; a confirmation dialog appears.



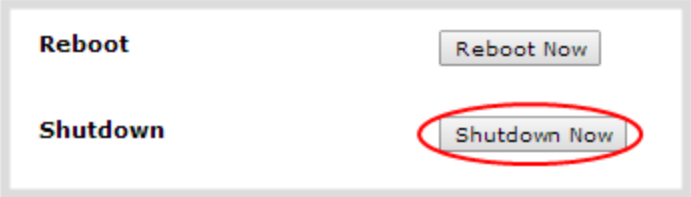
5. Click **OK**.

Shutting down the device via the web interface

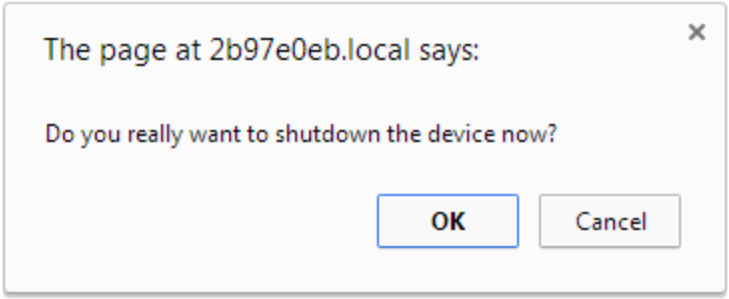
The Standalone VGA Grid web interface allows you to shut down the system.

To shut down the system:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Click the **Shutdown Now** button; a confirmation dialog appears.



5. Click OK.

Shutting down the device manually

You can manually shut down the Standalone VGA Grid via the button physically located on the system.

To shut down the system manually:

1. Unlock the front panel.
2. Press and release the power button on the system to initiate a safe power down; the system shuts down.



If the system is unresponsive, press and hold the power button for 4 seconds to force an immediate power down.

Save and restore device configuration

After completing configuration of your Standalone VGA Grid, it is good practice to save the system configuration so you may restore it at a later date (i.e. after a change that wasn't wanted, or after a factory reset). In addition to full configuration backups, you can also save and restore configuration preset groups - see Configuration presets for details about that feature.

This section covers the following topics:

- Save device configuration
- Load a saved device configuration

Save device configuration

Standalone VGA Grid's web interface allows you to save the current system configuration to your admin computer's hard drive. It's good practice to do this before making any major changes to a working configuration and before doing a firmware update.



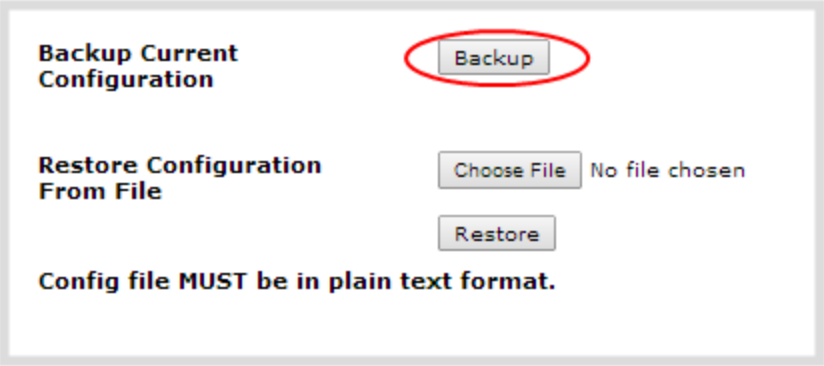
The resulting backup file includes all non-default configuration settings for the system, except the user passwords which are reset when a configuration is restored.



Configuration backup files are only guaranteed to work with the same firmware version with which they were created. Normally there is no issue loading an older configuration file on a newer release, but the reverse is not true and there are exceptions where older configuration files are not supported in a new release.

To save the current system configuration:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Click the **Backup** button next to Backup Current Configuration; the system performs a backup and depending on your browser the file is either automatically downloaded or you are asked to save the file.



5. Save the file in a secure location.
6. Rename your saved configuration file to indicate the specifics of the configuration, if desired.

Load a saved device configuration

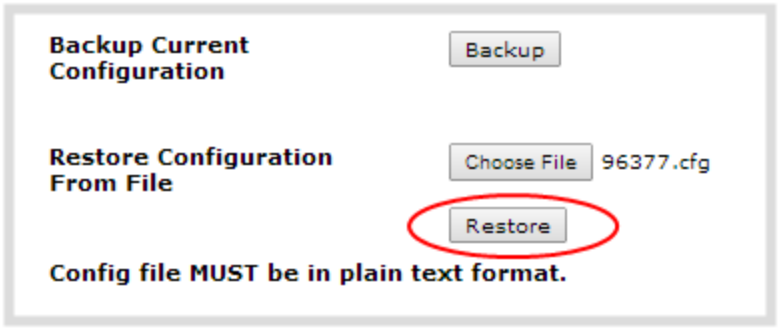
After making changes to the system configuration, you may find that the results are not what you expected or that they serve a different need and you wish to return to a previous configuration. Via Standalone VGA Grid's web interface you can load a previously saved configuration file.

Configuration files are by default named <serial number>.cfg. You may have more than one configuration file saved from the system. Select the correct configuration file and know where it is accessible from your local computer before starting this procedure.

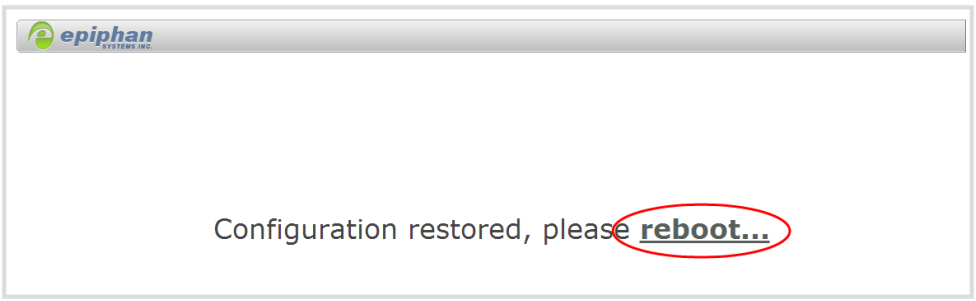
Backup files include all non-default configuration settings for the system, except the user passwords. All passwords are reset to blank after the configuration is loaded.

To load a saved system configuration:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Click the **Choose File** button beside Restore Configuration from File; you are prompted to choose the configuration file.
5. Select the desired configuration file from storage on your local computer and click **Open**.



6. Click the **Restore** button; the system configuration is restored and a new page appears asking you to reboot the system.



7. Reboot the system by clicking the link in the message on the web page, or by using the power button on the system; when the system comes back up the restoration is complete.
8. Login as admin (with no password).
9. Reset your user passwords. See User administration.

Perform factory reset

If you've been testing with your Standalone VGA Grid and are ready to reset it back to factory settings, you can do this through the web interface.

This section covers the following topics:

- Restore factory configuration via the web interface

Restore factory configuration via the web interface

The web interface allows you to restore the factory configuration to return your Standalone VGA Grid back to the original settings it had when you purchased it.

Restoring the factory settings erases everything on the system. This includes all your source settings, channels, configuration presets, network settings and all saved files.

Consider using the factory default configuration preset if you want to preserve files. See **Configuration presets**.

EDIDs are **not** restored to factory settings with the factory resets. Re-apply factory EDIDs manually using the Source's configuration page.

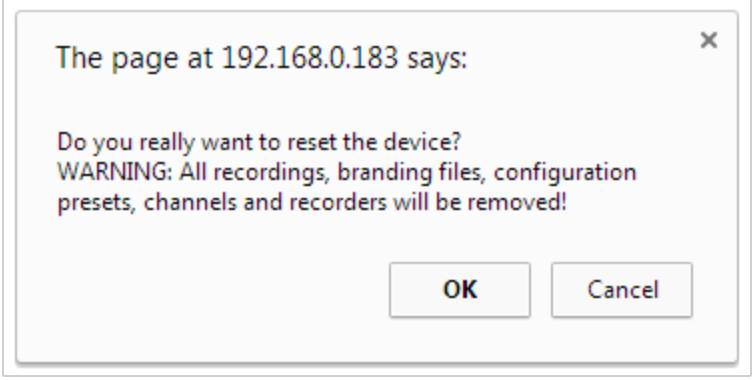
Only proceed if you know this is what you want to do.

To restore the factory configuration via the web interface:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Click the **Reset** button next to **Factory Reset**; a warning dialog appears asking you to confirm this destructive action.



5. Click **OK** on the warning dialog; the system resets to factory defaults and reboots.
6. Wait for the system to reboot and begin re-configuration.

Firmware upgrade

Epiphan will from time to time issue an updated firmware revision to bring new features to your Standalone VGA Grid. To take advantage of these new features, you will need to install the new firmware on the system.

This section covers the following topics:

- Check for firmware updates
- Install firmware

Check for firmware updates

When you register your product with Epiphan you are given a choice to be notified by email of firmware updates for your system. If you selected this choice, you will be notified of updates applicable to the Standalone VGA Grid.

If your Standalone VGA Grid has internet access, you can check for updates directly by following the procedure below.

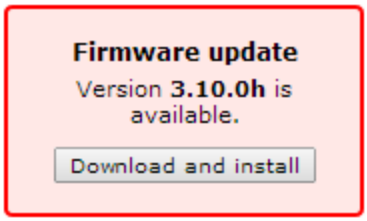
The system will also automatically check for firmware updates if the **Maintenance** page option **Enable connection to maintenance server** is checked.



This is the preferred method of checking for firmware updates. The built-in firmware update mechanism checks for updates that match your specific product and hardware revision.

To check for new firmware:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
4. Click the check for updates link next to your current firmware version; the system connects to Epiphan servers to look for updates.
5. If an update is found a red box appears in the top left side of the web interface with a link to download and install the firmware.



6. Follow the steps below to download and install the firmware.

Install firmware

When you've received a new firmware file from Epiphan's support team, schedule a time where you can update the firmware without negatively impacting viewers or file recordings.

It is good practice to take a backup of your current configuration before applying a firmware update. In the rare case that you wish to downgrade the firmware, you will be able to apply this configuration backup and restore your previous state. See **Save and restore device configuration**.

There are two ways to install new firmware: from a the download link via the web interface, or from a file provided by Epiphan.

Installing new firmware takes a few minutes. Broadcasting and recording is not available until the upgrade is complete.

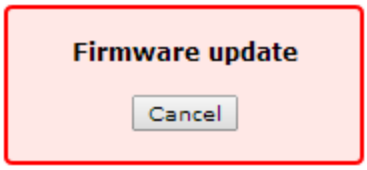
Install firmware directly from the web interface:

If your Standalone VGA Grid has internet access, the easiest method of installing new firmware is to use the download link provided when you check for new firmware.

To download new firmware directly:

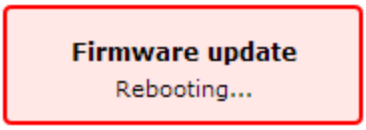
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Save a copy of the current system configuration, if desired. See Save and restore device configuration.
4. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
5. Click the check for updates link next to your current firmware version; the system connects to Epiphan servers to look for updates.

6. Click **download** from the red box that appears at the top left of the admin interface; the firmware is downloaded and immediately starts to install and the firmware update box changes to have a cancel button.



Do not interrupt power to the system during the firmware upgrade.

7. When the firmware update is complete, the message lets you know it is going to reboot.



8. Wait for the system to restart. Depending on the upgrade, a disk rebuild may be required, causing the restart process to take much longer than usual.
9. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
10. Login as admin.
11. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
12. Verify that the firmware version is the expected new version.

Although unexpected, it is possible the firmware update fails. In this case, collect system information such as device serial number and, if known, the previous firmware version along with the new firmware version and contact info@epiphan.com

Install firmware from a file

Before getting started, ensure you have the firmware file accessible from your admin computer.

To install new firmware from a file:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. Save a copy of the current system configuration, if desired. See Save and restore device configuration.
4. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
5. Note the current firmware version listed.
6. Click the **Choose File** button next to Select firmware upgrade file; a file selection box opens.
7. Select the firmware upgrade file from your local computer.
8. Click **Apply**; the file is uploaded. The system unpacks and verifies the file. If the file is valid, the upgrade begins.



Do not interrupt power to the system during the firmware upgrade.

9. Wait for the system to restart.
10. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
11. Login as admin.
12. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
13. Verify that the firmware version is the expected new version.

Although unexpected, it is possible the firmware update fails. In this case, collect system information such as device serial number and, if known, the previous firmware version along with the new firmware version and contact info@epiphan.com

Support

Epiphan provides a complimentary one-year support plan with your purchase (starting one year from the original product shipment date) as well as two extended support plans, SupportPlan and SupportPlan+. Both plans add two more years to extend the support to three years from original product shipment date.

To contact Epiphan support:

- **Email**: support@epiphan.com
- **Online chat**: www.epiphan.com/support (Monday to Friday between 9am and 5pm Eastern)
- **Call**: 1-877-599-6581 / 613-599-6581

From time to time, Epiphan support may ask you for logs from your system. Follow the instructions in this section to download the log files for support.

- Download logs and "allinfo"

Standalone VGA Grid also supports remote troubleshooting by Epiphan's support team. This service is only available to systems covered by SupportPlan+.

Remote support allows Epiphan to assist in troubleshooting issues you experience with the system and can also assist with resetting lost admin passwords. No private information is sent to the Epiphan maintenance server.

By default, all systems are setup with remote support configuration enabled.

This section describes procedures for the following topics:

- Configure remote support
- Disable remote support

Remote support is only provided for systems covered by SupportPlan+. For more information about our service plans, see www.epiphan.com/supportplan.

Download logs and "allinfo"

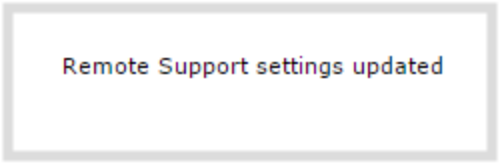
If requested by Epiphan support, you can download the logs files and/or "allinfo" data from your system. These files help our support team troubleshoot problems.

To download the logs and allinfo file:

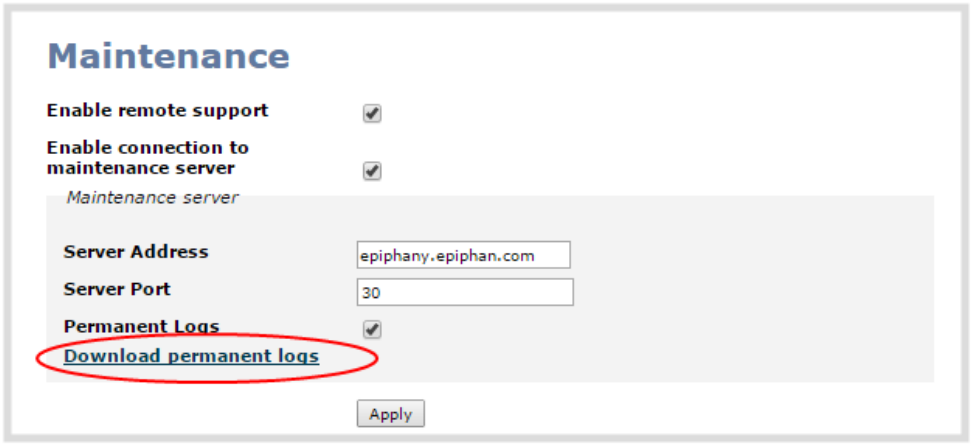
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Select the **Permanent Logs** check box.
5. Click **Apply**; the page updates to let you know the changes were applied.



6. Select the **Maintenance** link again; the maintenance page opens.



7. Click **Download permanent logs**; a zip file containing system logs begins to download.
8. From your browser, run the allinfo script; a file is saved to your computer.

http://<ip address of your system>/admin/allinfo.cgi

9. Share the log files and allinfo results with Epiphan support.

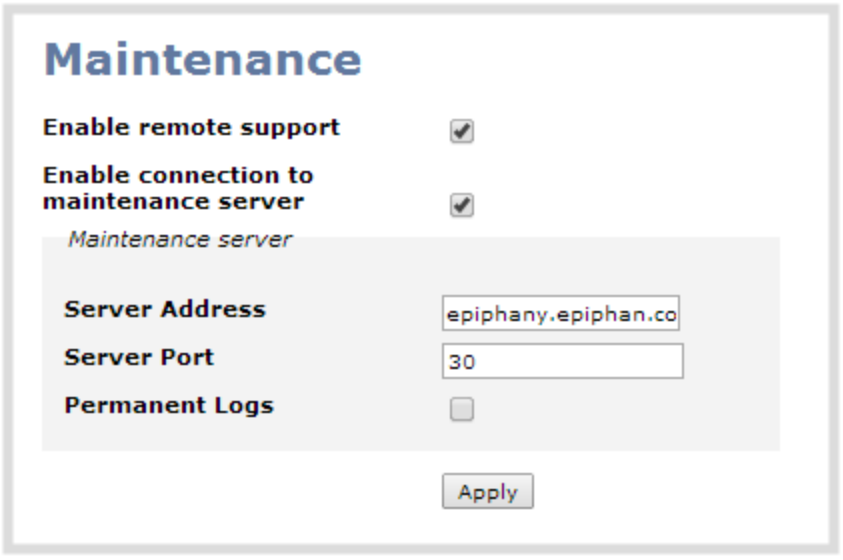
Configure remote support

Remote support is configured by default to connect to the Epiphan maintenance server with the domain name epiphany.epiphan.com. The system must be able to resolve this domain name to connect to the server and permit remote support. Remote support uses port 30, therefore this port must be available for communication. If your system is protected from the Internet by a firewall, speak to your network administrator to configure the firewall appropriately.

Remote support is available from Epiphan only if your device is covered by SupportPlan+.

To configure remote support:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Click **Enable remote support** if the check box is not selected. This setting controls incoming links from Epiphan.
5. Click **Enable connection to maintenance server** if the check box is not selected. This setting configures outgoing links to Epiphan.
6. Ensure the **server address** is epiphany.epiphan.com, unless Epiphan support directs you to change it.
7. Ensure the **port** is 30, unless Epiphan support directs you to change it.
8. Click **Apply**.
9. Test that the system can access the maintenance server:
    a. Select the **Network** link under Configuration.
    b. Type epiphany.epiphan.com **Network Diagnostics** box.
    c. Click **ping**.
    d. Ensure the result shows an IP address for epiphany.epiphan.com and report any packet loss to Epiphan support.
10. If the system cannot reach the maintenance server, check the network settings (see Configure DHCP) to ensure DHCP is selected or a DNS server is listed and try again. Consult with your network administrator if problems persist.
11. If the system reaches the maintenance server, ensure your firewall, if you have one, has port 30 open for the system.
12. Confirm with Epiphan support that they are able to access your Standalone VGA Grid for remote troubleshooting.

Disable remote support

By default, remote support is on. If you want to turn it off, you may use the following procedure.



Disabling remote support for the Standalone VGA Grid removes the ability for Epiphan to reset a lost admin password. If you forget the admin password and remote support feature is off, you will need to return the system to Epiphan for reprogramming.

To disable remote support:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Click **Enable remote support** check box to deselect it. This prevents incoming links from Epiphan.
5. Click **Enable connection to maintenance server** to deselect it. This prevents outgoing links to Epiphan.
6. Click **Apply**.

Storage disk maintenance

Your Standalone VGA Grid is equipped with one or more hard drives for storage of recordings. Occasionally, maintenance is required for these disks. This section describes procedures for the following topics:

- Check disk storage space
- Schedule disk check
- Perform disk check
- Rebuild or replace storage disks
- Verify RAID storage
- Read data from removed storage disks

Check disk storage space

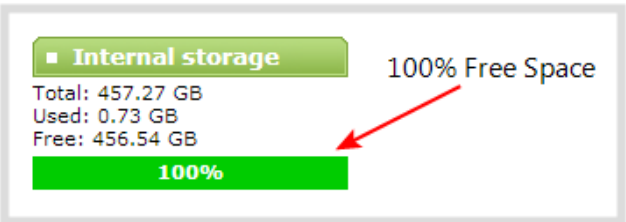
Standalone VGA Grid has a finite amount of storage . By default, the standalone and networked version have 3 TB of storage. This storage space holds a lot of recordings, but it can get full. It's a good idea to monitor your current disk usage.

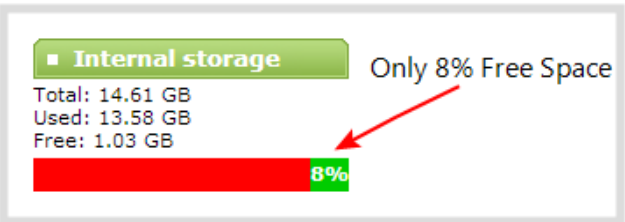
If available storage is low, consider removing some unneeded recordings or setting up an automatic file transfer with deletion after transfer. See Recorded files and File and recording transfer.

Disk space can also be checked via the tablet interface. See **Verify disk space via the tablet interface**.

To check disk storage space:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin or operator.
3. Check the **Internal Storage** section at the bottom of the menu column. The bar will be mostly green if there is lots of space left, or mostly red if storage space is nearly full.





4. If available storage is low, take action to remove files as discussed in Recorded files and File and recording transfer.

Schedule disk check

A disk maintenance schedule is used to check the system storage drives for errors. Two values are supplied, one to specify the number of system restarts that should occur before disk check, and the second to specify the number of months before performing a disk check. The disk check happens based on whichever event occurs first.

For example, the restart setting is set to 50 and the months setting is set to 6. If six months pass and less than 50 restarts happened, a disk check will occur on the next restart. However if you do 50 restarts in one month, the disk check will happen after the fiftieth restart.



Disk check occurs during start up and can cause a lengthy delay in starting up the system.

To set the disk check schedule:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Disk Check** link in the Configuration menu; the disk maintenance page opens.
4. Set the **number of restarts to occur before the next check**. Set to 0 if you don't want to force a disk check after a specific number of restarts.
5. Set the **number of months to pass before the next check**. Set to 0 if you don't want to force a disk check after a specific number of months.
6. Click **Save**.

Perform disk check

A disk maintenance schedule is used to periodically check the system storage drives for errors. If you prefer, you can run the disk check manually at a time that is convenient for you.

Running the disk check manually resets the timers for the scheduled disk check (i.e. next check won't happen automatically until either the number of restarts or months passes).

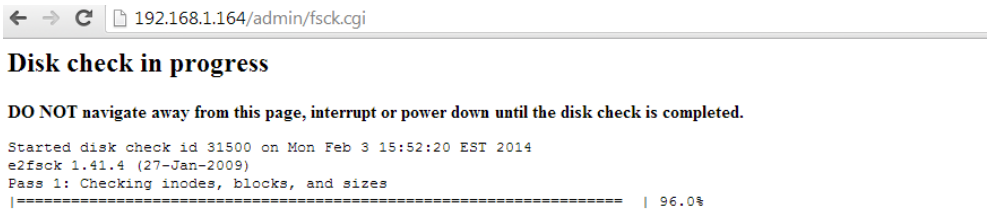


If the system is recording when you start a disk check, it will stop recording and resume after the check is complete. Frames presented during the disk check are not part of any recording.

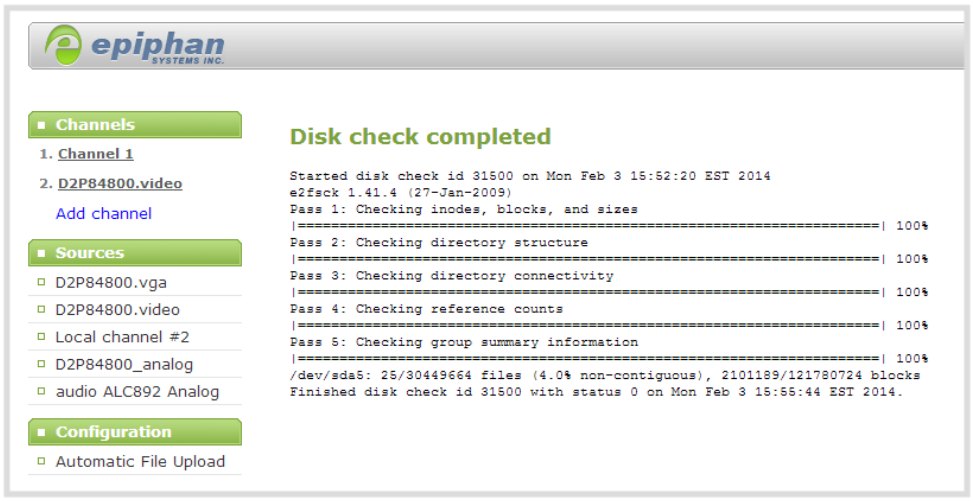
To start a manual disk check:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Disk Check** link in the Configuration menu; the disk maintenance page opens.
4. Click the **Check Now** button; a new page opens showing you the progress of the disk check.





5. When the disk check is complete, the main page returns and a summary is shown.



6. If any unrecoverable errors are detected, contact Epiphan support.

Rebuild or replace storage disks

The rackmount Standalone VGA Grid can be optionally configured with storage configured in a RAID array. Periodically you may wish to clean the RAID array to start from scratch, or you may want to introduce new disks in place of the old ones.

When working with RAID arrays it is important to keep the disks in sets that contain the same data so the RAID will continue to perform. For that reason you should name your disk sets, i.e. set A, set B, etc.

If you need to revert from a multiple-disk RAID array to a single storage drive, all recordings must be copied off Standalone VGA Grid and the other drive need to be completely removed from the system. The system must then be rebooted before a "build disk" is performed on the remaining drive.

When purchasing a new disk set, ensure that the drives in the new set are identical (brand, size, and type).

To change the disk set:

1. Power down the Standalone VGA Grid.
2. Open the front panel of the system (the panel key may be required).
3. Remove the old drives, starting with the second drive from the left, moving to the right.

   Do not remove the left-most drive. This is the system drive and is not swappable.

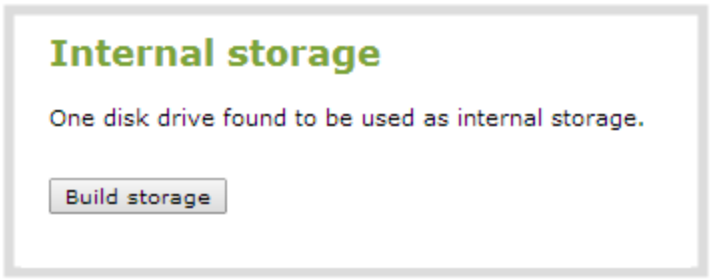
4. Seat the replacement drive set into the drive bays.
5. Power on the system.
6. Follow the steps below to rebuild the storage disks.

See Read data from removed storage disks for information on reading data from the removed drives.

Rebuilding the storage disk set is a destructive process that erases everything from the disks. Proceed with caution.

To rebuild the storage disks (erasing all data):

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
1. Select the **Disk Check** link in the Configuration menu; the disk maintenance page opens.
2. Scroll to the bottom of the page to the Internal Storage section:
    a. If no RAID drives are detected, you do not have a storage RAID, but you can rebuild the current drive, deleting all saved recordings.



b. If two or more drives are detected, you are prompted to select a type of **RAID array**.

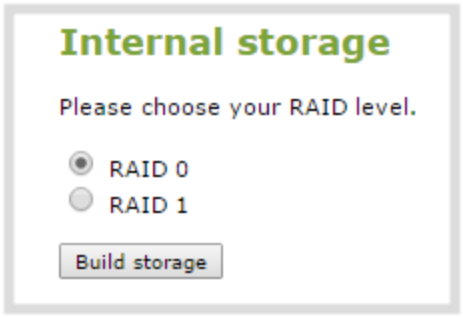
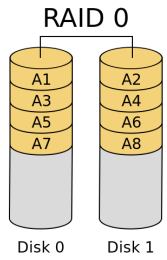
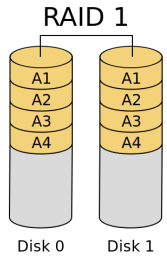
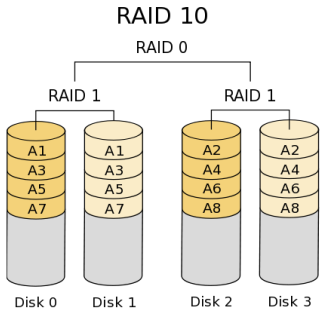
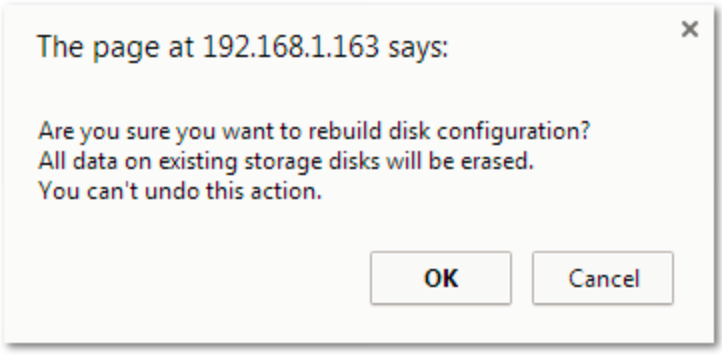


Table 31 *RAID Array Types*

Label	Description	Diagram
RAID 0	Block level striping writes data across multiple disks in parallel. This configuration divides the storage between multiple drives; provides read/write performance improvements but does not provide fault tolerance. This configuration supports systems that have two, three or four disks.	
RAID 1	Mirroring copies all data to a secondary disk. This configuration provides fault tolerance (data is available from one drive when the other drive fails) but has normal read/write speeds.There is less total storage space since two complete copies of the data is stored. This configuration supports systems that have two disks.	
RAID 1+0 (RAID 10)	Mirroring and striping configuration creates a striped set in a mirrored set. This option uses four disks to combine improved read/write performance with redundancy. This configuration supports systems that have four disks.	

b. Select your desired **RAID array** type.

2. Click **Build Storage**; you are asked to confirm that you want to erase the storage drives and rebuild.



3. Click **OK** on the confirmation dialog; a message appears indicating the rebuild is underway. Internal storage is not available during rebuild. You are unable to save any recordings.



The rebuild takes less than 5 minutes, the page automatically refreshes to provide the current status.

4. When the rebuild is complete, the message box indicates whether or not it was successful.



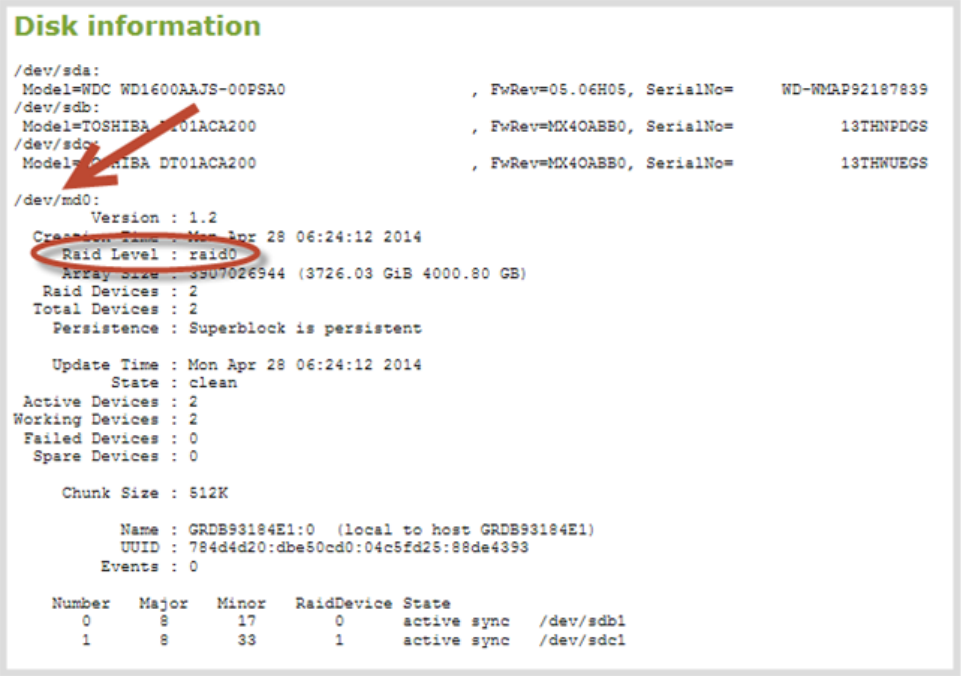
5. In the unlikely event that the rebuild was not successful, you may try it again, and if still not successful, contact Epiphan support.

Verify RAID storage

The rackmount Standalone VGA Grid can be optionally configured with storage configured in a RAID array. Use the strategies described here to determine if you are using a RAID array and if it is in good health.

To check if the disks are configured for RAID:

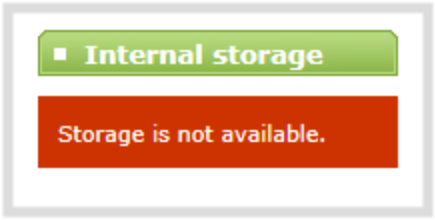
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Disk Check** link in the Configuration menu; the disk maintenance page opens.
4. Scroll to the Disk information section of the page.
5. If RAID is configured, the disk information contains a line item for /dev/md0. The RAID configuration level is shown next in the /dev/md0 statistics.



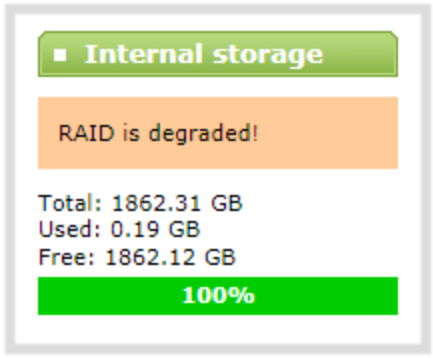
To check RAID integrity:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.

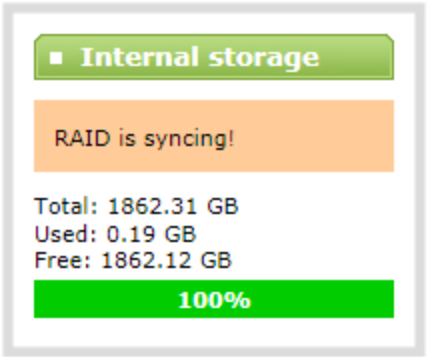
3. Scroll to the Internal Storage section at the bottom of the menus on the left side of the page.
4. If the RAID configuration is sound, the internal storage section reports statistics for the storage, but shows no errors.
5. If using RAID 0 and one of the disks is down, the following error is displayed. Rebuild or replace the disks to recover.



6. If using RAID 1 and one of the disks is down, the following warning is displayed. Consider replacing the disk pair at your earliest convince.



7. If using RAID 1 and a disk has recently been replaced, the system lets you know it is synchronizing data to the new disk.



Read data from removed storage disks

Standalone VGA Grid storage drives use an ext4 file system and can only be read with a computer running Linux.

If using multiple drives and one of the drives fails or is removed, then the RAID needs to be rebuilt. The files stored on the remaining drive(s) will need to be downloaded via web interface, AFU or FTP prior to RAID rebuild.

These steps describe how to read the recorded files from the removable storage drives using Ubuntu.

Depending on your exact version of Linux, the steps you follow may differ slightly from the steps below.

To read the recorded files:

1. Install Linux on a workstation where the drives will be installed (Ubuntu or Debian are recommended. RedHat/CentOS/Fedora are also supported).
2. Confirm mdadm tool is installed, if not, install it. For Ubuntu/Debian use apt-get, for RH/CentOS use yum.
3. Turn off the workstation and connect the storage drives (if using RAID 1 you can attach just one drive).
4. Start the workstation.
5. If only one drive of a RAID 1 set is connected:
    a. Open a terminal window and enter the following in the command line to determine the name of the disk:

    ```
    sudo fdisk -l
    ```

    b. Issue this command to build the disk:
    (In the example, the disk name is /dev/sbd1. Your disk name may be different.)

    ```
    sudo mdadm –assemble /dev/md0 /dev/sdb1
    ```

    c. The following message appears:

    ```
    mdadm: /dev/md0 has been started with 1 drive (out of 2).
    ```

6. Verify that RAID is started. At the command line, enter:

```
sudo mdadm -D /dev/md0
```

7. Verify that the output is similar to this, with the disk in a clean state and the correct RAID level indicated:
   (Only one disk is used in the example. If you are using multiple disks, the output will be a bit different.)

```
/dev/md0:
Version : 1.2
Creation Time : Thu Jan 16 12:55:36 2014
Raid Level : raid1
Array Size : 499975360 (476.81 GiB 511.97 GB)
Used Dev Size : 499975360 (476.81 GiB 511.97 GB)
Raid Devices : 2
Total Devices : 1
Persistence : Superblock is persistent
Update Time : Thu Jan 23 12:03:03 2014
State : clean, degraded
Active Devices : 1
Working Devices : 1
Failed Devices : 0
Spare Devices : 0
Name : BFR0B8CBCD3:0
UUID : 556b7f41:e0c45623:923eda4b:1242121f
Events : 19
Number Major Minor RaidDevice State
0 8 49 0 active sync /dev/sdd1
1 0 0 1 removed
```

8. The new drive is generally automatically mounted. If the drive does not auto mount, enter the following in the command line, substituting the name of your device instead of /dev/md0, if needed:

```
sudo mkdir /mnt/raid; sudo mount /dev/md0 /mnt/raid
```

9. If using a graphical interface in Linux, browse to the location of the drive in File Manager. Otherwise, use a terminal window to change directories (cd) into the drive.
10. Browse to the /mnt/raid folder (or the appropriate folder name) in File Manager.
11. All recordings are kept in a folder hierarchy matching the channels and recorders you created via the web interface. Channels are listed by their channel number as video<channel number> (i.e. video1 for channel 1) and recorders are listed by their recorder number with the videom prefix (i.e. videom2 for recorder 2).

Third party integration

Standalone VGA Grid has a comprehensive set of APIs to allow integration with third party tools.

You can use either the HTTP or RS-232 commands to configure your system exactly how you need it. For example you can start and stop recordings, you can configure meta data on a channel, or even change a channel's frame size and encoding settings.

The following topics are covered in this section:

- Control with RS-232 / serial port
- Control with HTTP commands
- Configuration keys for third party APIs

Control with RS-232 / serial port

Standalone VGA Grid presents an RS-232 / serial port control interface for integration with existing control room and board room equipment. This section covers the following topics:

- Connect and configure the RS-232 cable
- Control the Standalone VGA Grid with RS-232
- RS-232 / Serial port command examples

Connect and configure the RS-232 cable

To connect your control equipment to the Standalone VGA Grid you will need a standard RS-232 null-modem cable and a USB to RS-232 serial adapter cable. Adapter cables are not included with the Standalone VGA Grid. Only certain adapter chipsets are supported, Epiphan recommends this adapter cable from Startech.

To connect the serial port cable:

1. Attach the null modem cable to the control interface.
2. Connect the null modem cable to the serial port on the back of the system.

The only configuration available for the serial port is flow control. Flow control changes the rate of data transfer over the cable. Some communication settings are static and cannot be changed. The static settings are:

- Baud rate set at 19200
- Parity set to none
- Stop bits set to one

To configure serial port flow control:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the admin interface.
2. Login as admin.
3. Select the **Serial Port** link in the Configuration menu; the serial port configuration page opens.
4. Select **Hardware**, **Software**, or **None** from the drop-down menu. Refer to the table below for a description of the options.

Table 32 *Serial Port Flow Control Options*

Label	Description / Options
Hardware	A hardware handshake mechanism is used for flow control. This is also called RTS / CTS flow

Label	Description / Options
	control. Select this when your control terminal requires it (see control terminal manual).
Software	A software handshake that uses XON/XOFF characters to control the flow of data. Select this when your control terminal requires it (see control terminal manual).
None	No flow control is used. Only select this if your control terminal requires it (see control terminal manual).

5. Click **Apply**.

Control the Standalone VGA Grid with RS-232

You can use the null-modem cable and your control terminal software to issue commands to the Standalone VGA Grid such as when to start or stop recording, or to retrieve or set the value for various settings.

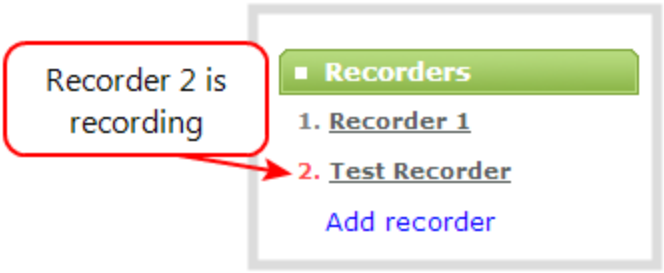
Each command sent to the Standalone VGA Grid via RS 232 must be terminated with a line feed (LF) character (ASCII code 10). Your software may need to be configured to add the line feed to each command.

Some commands require a *channel* or *recorder* name as an argument. In those commands, the channel or recorder name is separated from the command name by a period, as shown in the table. The channel name value can be either the name or the index of the recorder or channel. Use of the index is recommended.

A channel's index is found by looking at the Channels list in the web interface. In the screen capture below, the channel with index 1 is currently recording (it's index number is red). To address this channel via RS-232 commands, use the index 1.



For commands requiring a recorder index, determine your recorder's index by combining the recorder's number with the prefix m. In the example below, the second recorder's index is 2. To access this recorder via RS-232 commands, use the index m2.



The table describes the RS-232 commands supported by the Standalone VGA Grid.

Table 33 *Supported RS-232 Commands*

Command Name	Description
Recording Commands	
START.<channel> START.<recorder>	Starts recording for the provided channel or recorder. This can alternatively be accomplished with the following set commands: SET.<channel>.rec_enabled=on SAVECFG If the channel is already recording, the current recording file is closed and a new file is started.
START	Starts recording for all channels and recorders. For channels already recording, the current recording file is closed and a new file is started. There is no RS-232 command to restart recording or to send a second START command while recording is active.
STOP.<channel> START.<recorder>	Stops recording for the provided channel or recorder. This can alternatively be accomplished with the following set commands: SET.<channel>.rec_enabled="" SAVECFG
STOP	Stops recording for all channels and recorders.
SNAPSHOT.<channel>	Takes a snapshot image of the current channel (supported only if the channel is configured to use the Motion JPEG codec). Snapshots are saved with recording files on the system.
SNAPSHOT	Takes a snapshot image of all channels (supported only for channels configured to

Command Name	Description
	use the Motion JPEG codec). Snapshots are saved with recording files on the system.
Configuration Commands (see Configuration keys for third party APIs for available keys)	
GET.<channel>.<key> GET.<recorder>.<key>	Gets the saved value of a given parameter for the specified channel or recorder.
SET.<channel>.<key> SET.<recorder>.<key>	Sets the value of a given parameter for the specified channel or recorder. The value is not saved until the SAVECFG command is sent.
SAVECFG	Saves the parameters modified by the SET command.
Status Commands	
STATUS.<channel> STATUS.<recorder>	Reports the recording status of the specified channel or recorder. Status is one of: • RUNNING • STOPPED • UNINITIALIZED
STATUS	Reports the recording status of each channel and recorder. Status is one of: • RUNNING • STOPPED • UNINITIALIZED
FREESPACE	Reports the free storage space, in bytes.
RECTIME.<channel> RECTIME.<recorder>	Reports the elapsed recording time for the current file on the specified channel or recorder.
RECTIME	Reports the elapsed recording time for the current file on each channel.

Additionally, the system automatically reports its status changes back along the RS-232 connection using the following automatic messages:

Table 34 *RS-232 Status Changed Messages*

Command Name	Description
STATUS.<channel> <status>	Provides the status of the recording service for the channel's as one of: • Running • Stopped • Uninitialized The Uninitialized status is sent when there is an internal error. Check the system for more details.

RS-232 / Serial port command examples

The following examples demonstrate how to use some of the RS-232 commands supported by the system. The list of supported SET and GET parameters are found in Configuration keys for third party APIs .

Each command sent to the Standalone VGA Grid via RS 232 must be terminated with a line feed (LF) character (ASCII code 10). Your software may need to be configured to add the line feed to each command.

For values with spaces, enclose the value in quotation marks. For empty values, use empty quotation marks with nothing between.

You must always follow a "SET" command in RS-232 with the "SAVECFG" command. Otherwise the new configuration setting(s) will not take effect. See "SET" examples below.

1. To start recording on channel 2:

```
START.2
```

2. To stop recording on channel 2:

```
STOP.2
```

3. To start recording on all channels and recorders:

```
START
```

4. To get the value of the frame size (resolution) for channel 2:

```
GET.2.framesize
```

5. To set the frame size (resolution) on channel 2, enclose the parameter in quotes to preserve the spaces:

```
SET.2.framesize="640 x 480"
SAVECFG
```

6. To enable broadcasting audio on channel 2:

```
SET.2.audio=on
SAVECFG
```

7. To disable broadcasting audio on channel 2:

```
SET.2.audio=""
SAVECFG
```

Control with HTTP commands

Standalone VGA Grid has an HTTP API interface for configuration and control by a third party application or with a script that sends commands to the system as a series of URLs. This section covers the following topics:

- HTTP command syntax
- HTTP command examples

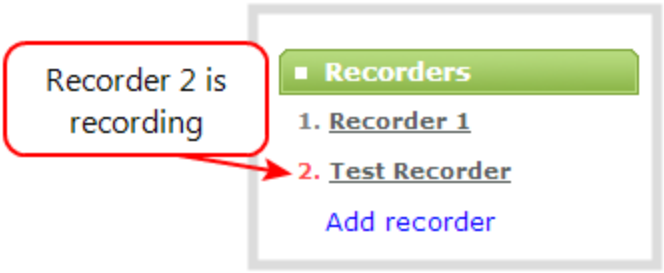
HTTP command syntax

Control of the Standalone VGA Grid by HTTP is done by sending commands to one of two URLs and specifying the target configuration item. Syntax for the get and set commands follows.

Many commands require a *channel* or *recorder* index as an argument. A channel's index is found by looking at the Channels list in the web interface. In the screen capture below, the channel with index 1 is currently recording (it's index number is red). To address this channel via http commands, use the index channel1.



For commands requiring a recorder index, determine your recorder's index by combining the recorder's number with the prefix *channelm*. In the example below, the second recorder's index is 2. To access this recorder via http commands, use the index channelm2.



To Get configuration settings:

http://<address>/admin/channel<N>/**get_params.cgi**?key

(or for recorders, add 'm' before the recorder number, i.e. channelm1 for recorder 1)
http://<address>/admin/channelm<N>/**get_params.cgi**?key

To Set configuration settings:

http://<address>/admin/channel<N>/**set_params.cgi**?key=value

(or for recorders, add 'm' before the recorder number, i.e. channelm1 for recorder 1)
http://<address>/admin/channelm<N>/**get_params.cgi**?key

Where <address> is the IP address of the system, channel<N> is the channel number (i.e. channel2 for channel number two), channelm2 for recorder two, key is the key for the configuration item being checked or changed (see the list in Configuration keys for third party APIs), and value is the value to set for the configuration item.

Multiple requests at once

You can include multiple key/value pairs in a single command by separating the statements with &.

For example, the key for product name is product_name and the key for firmware version is firmware_version. To send a request for both the product name and the firmware version, use the following command:

http://<address>/admin/channel1/get_params.cgi?product_name&firmware_version

Or, to turnoff publishing (set to 0) and set the bitrate (vbitrate) to 256,000:

http://<address>/admin/channel1/set_params.cgi?publish_type=0&vbitrate=256K

Third party applications like wget

If you're using a third party application like wget to send commands to the system, always include the admin username and password when viewing or setting configuration items.

The syntax for wget commands is shown below. Specify your system's IP address, password and the key(s) or value(s) you wish to query. Note your system may require use of single quotes around the password to handle special characters such as exclamation marks.

get_param using wget:

wget --http-user=admin --http-passwd=<password> http://<address>/admin/channel<N>/get_params.cgi?<key>[&<key>]

set_param using wget:

wget --http-user=admin --http-passwd=<password> http://<address>/admin/channel<N>/set_params.cgi?<key>=<value>[&<key>=<value>]

HTTP command examples

Some configuration of the Standalone VGA Grid can be done by non-interactive http commands. The following examples demonstrate how to use wget to exercise some of the HTTP commands supported by the system.



For values with spaces, encode space as %20. i.e.: set_params.cgi?framesize=640%20x%20480

The examples assume a system IP address of 192.30.23.45 and admin password pass123.

1. To get the type of stream being published and frame size for channel 1:

   wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/channel1/get_params.cgi?publish_type&framesize

2. To set the publish stream type to RTMP Push (6) and at the title “System Stream” for channel 2:

   wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/channel2/set_params.cgi?publish_type=6&title=System%20Stream

3. To start recording on channel 2:

   wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/channel2/set_params.cgi?rec_enabled=on

4. To stop recording on channel 2:

   wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/channel2/set_params.cgi?rec_enabled=""

5. To start recording on recorder 2:

```
wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/channelm2/set_params.cgi?rec_enabled=on
```

Configuration keys for third party APIs

Using HTTP or RS-232, you can send commands to the system to query or configure the system. For the RS-232 and HTTP syntax see Control with RS-232 / serial port and Control with HTTP commands.



Using a "SET" command in RS-232 must always follow with the "SAVECFG" command for the new configuration setting(s) to take effect.

When setting keys to values with spaces use the following syntax.

For RS-232:

Enclose in quotes: SET.2.framesize="640 x 480"

For HTTP:

Encode each space as %20: set_params.cgi?framesize=640%20x%20480

The following sections describe the API keys supported by the system in each of these categories:

- System-level settings keys (read-only)
- System-level settings keys (read/write)
- Recording configuration keys
- HTTP server configuration keys
- IP-based access control configuration keys
- UPnP configuration keys
- SAP configuration keys
- Frame grabber configuration keys
- Broadcast configuration keys
- Channel encoder configuration keys
- Channel layout configuration keys
- Configuration keys for third party APIs
- Configuration keys for third party APIs

- Audio configuration keys
- Stream publishing configuration keys
- RTSP announce configuration keys (Publish type 2)
- RTP/UDP configuration keys (Publish type 3)
- MPEG-TS configuration keys (Publish types 4 and 5)
- RTMP push configuration keys (Publish type 6)
- Content metadata configuration keys

The list of supported keys is also available for viewing from your system. Browse to the following URL (where <address> is the IP address of the system):

```
http://<address>/admin/http_api.cgi
```

System-level settings keys (read-only)

The following read-only system-level setting keys are supported. The channel number can be omitted from the command when requesting the value for these keys.

Table 35 *Supported Read-Only System-level Settings Configuration Keys*

Key	Values	Description
firmware_version	String, including the text FIRMWARE_ VERSION=.	The system's firmware version. The value is read-only.
mac_address	String	The system's mac address. Useful for debugging. The value is read-only.
product_name	String	The product's name. Useful to confirm you are communicating with the right product or for debugging purposes. The value is read-only.
vendor	Epiphan Video	Name of the vendor. The value is always "Epiphan Video". The value is read-only.

System-level settings keys (read/write)

The following read/write system-level setting keys are supported. The channel number can be omitted from the command when requesting the value for these keys.

Table 36 *Supported Read/Write System-level Settings Configuration Keys*

Key	Values	Description
frmcheck_ enabled	on empty string ("")	Enables or disables automatic firmware update checking. To enable firmware update checking, set to on. To disable firmware update checking, set to an empty string ("").
description	string	To give this system a name in the Epiphan discovery utility, specify a description string.

Recording configuration keys

The following recording settings are supported. When using,, specify the channel or recorder you wish to configure.

Table 37 *Supported Recording Configuration Keys*

Key	Values	Description
rec_enabled	on empty string ("")	Enables or disables recording. To enable recording, set to on. To disable recording, set to an empty string ("").
rec_format	avi mov mp4 ts	Specifies the format of the saved file.
rec_prefix	string	Specifies a prefix for the recorded filenames.
rec_sizelimit	integer	Specifies the file size limit, in kilobytes (kB).
rec_timelimit	integer	Specifies the time limit before a new recording file is created.

Key	Values	Description
		Time limit value is returned in the same unit of time in which it was entered in the admin web interface. (e.g. if you configured the parameter in the admin web interface to be 6h, the command will return "6" accordingly).

HTTP server configuration keys

The following settings are supported for configuration of the HTTP server run by the system.

Table 38 *Supported HTTP Server Configuration Keys*

Key	Values	Description
http_port	integer	Specifies the HTTP server port.
http_sport	integer	Specifies the HTTP server SSL port (HTTPS port).
http_usessl	on empty string ("")	Enables or disables HTTPS (SSL Server) To enable SSL, set to on. To disable SSL, set to an empty string ("").

IP-based access control configuration keys

The following settings are supported for configuring allowed and denied IP addresses for the system ONLY, not for individual channels. See Restrict viewers by IP address for more information on Allow and Deny lists.

Table 39 *Supported IP-Based Access Configuration Keys*

Key	Values	Description
allowips	string: comma-separated list of IP addresses and/or ranges. empty string("")	Specifies the IP addresses to permit access. To restrict access, provide a list of permitted IP addresses. To clear allowed IP restriction, set to an empty string ("").
denyips	string: comma-separated list of IP addresses and/or ranges.	Specifies the IP addresses to deny access. To restrict access, provide a list of denied IP addresses. To clear denied IP restriction, set to an empty string ("").

Key	Values	Description
	empty string("")	

UPnP configuration keys

The following settings are supported for UPnP streaming.

Table 40 *Supported UPnP Streaming Configuration Keys*

Key	Values	Description
share_archive	on empty string ("")	Enables sharing of recorded files via UPnP. To enable sharing files over UPnP, set to on. To disable sharing files over UPnP, set to an empty string ("").
share_livestreams	on empty string ("")	Enables sharing of the live stream via UPnP. To enable stream sharing over UPnP, set to on. To disable stream sharing over UPnP, set to an empty string ("").
server_name	string	Specifies the UPnP server name. To use the system name, set to an empty string ("").

SAP configuration keys

The following settings are supported for SAP sharing.

Table 41 *Supported SAP Configuration Keys*

Key	Values	Description
sap	on empty string ("")	Enables sharing of recorded files via SAP. To enable sharing files over SAP, set to on. To disable sharing files over SAP, set to an empty string ("").
sap_channel_no	integer	Specifies the SAP channel number.
sap_group	string	Specifies the SAP group name.
sap_ip	string	Specify the SAP annoucement IP.

Frame grabber configuration keys

The following configuration settings are supported by the system. See Configure a sourcefor more information on each variable.

Table 42 *Supported Frame Grabber Configuration Keys*

Key	Values	Description
gain	0...255	Specifies ADC gain adjustments. 0 is brightest, 255 is darkest.
hshift	-999...999	Specifies horizontal shift. For shifts to the left, use positive values. For shifts to the right, use negative values.
offset	0...63	Specifies ADC offset. 0 is brightest, 63 is darkest.
phase	0...31	Specifies phase adjustments for VGA signals. Generally not used unless value is provided by Epiphan support.
pll	-999...999	Specifies PLL adjustment. Changes the number of pixels in the line.
tune_interval	0...9999	Specifies the number of seconds between auto-adjustments. To disable auto-adjustments, set to 0.
vshift	-20...20	Specifies vertical shift. For shifts up, use positive values. For shifts down, use negative values.

Broadcast configuration keys

The following broadcast configuration settings are supported.

Table 43 *Supported Broadcast Configuration Keys*

Key	Values	Description
bcast_disabled	on empty string ("")	Enables or disables the broadcast. To disable broadcast, set to on. To enable broadcast, set to empty string ("").
rtsp_port	1000...65535, but not 5557	Specifies the port for RTSP streaming. Note port 5557 is used for network discovery and cannot be used for streaming.

Key	Values	Description
streamport	1000...65535, but not 5557	Specifies the port used for streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
ac_override	on empty string ("")	Overrides the global stream access settings or uses global stream access settings. To use global stream access settings, set to empty string (""). To override global stream access settings, set to on.
ac_viewerpwd	string	Specifies the password for Viewers.
ac_allowips	integer	Displays a list of the allowed IP addresses for live streams
ac_denyips	integer	Displays a list of the denied IP addresses for live streams

Channel encoder configuration keys

The following encoder settings are supported for each channel. For more information on individual items listed, see Configure encoding .

Table 44 *Supported channel encoder configuration keys*

Key	Values	Description
autoframesize	on empty string ("")	Enables or disables use of the current signal's resolution as the frame size. Is switched to off if a frame size is manually specified. To use current signal's frame size, set to on. To specify frame size directly, set to empty string ("").
codec	h.264 mpeg4 mjpeg	Specifies the stream codec.
fpslimit	1-60	Specifies the frame per second limit. Set to your desired limit.
framesize	640 x 480 720 x 400 720 x 480 720 x 576 768 x 576 1024 x 768	Specifies the frame size in pixels. Set to desired size, refer to description above on handling white space in the value.

Key	Values	Description
	1152 x 864 1280 x 720 1280 x 768 1280 x 960 1280 x 1024 1360 x 768 1360 x 1024 1600 x 1200 1920 x 1200 2048 x 2048 2560 x 1600	
nosignal	default filename empty string ("")	Enables or disables the "No Signal" message if no signal is found. To use the default no signal message, set to default. To use a custom no signal message, specify the filename (file must already be uploaded to the system). To disable the no signal message, set to empty string ("") deprecated
slicemode	on empty string ("")	Enables or disables H.264 slicing for RTP. To enable slicing, set to on. To disable slicing, set to empty string ("").
vbitrate	Integer integerK (i.e. 64K) integerM (i.e. 1M)	Gets or changes the video bit rate in kbit/s. Short forms such as 64K or 1M can be used.
vbufmode	1 (low delay) 2 (storage)	Specifies the broadcast compression level. For low delay when streaming, specify 1. For best results or recording, set to 2.
vencpreset	0 (Software) 5 (Hardware Accelerated)	Specifies a video encoding preset. For software, set to 0. For hardware acceleration (recommended), set to 5
vkeyframeinterval	integer	Interval time in seconds between key frames in the encoded stream.
vprofile	66 77 100	Specifies the h.264 video profiles. For Baseline profile, select 66. For Main profile, select 77.

Key	Values	Description
		For High profile, select 100.
qvalue	0...100	Specifies quality for M-JPEG videos.

Channel layout configuration keys

The following settings are channel layout configuration.

To work with layouts, you need to know the integer identifier for the layout. To find your layout's identifier, select the layout from the web UI and look for the identifier in the browser's url bar.

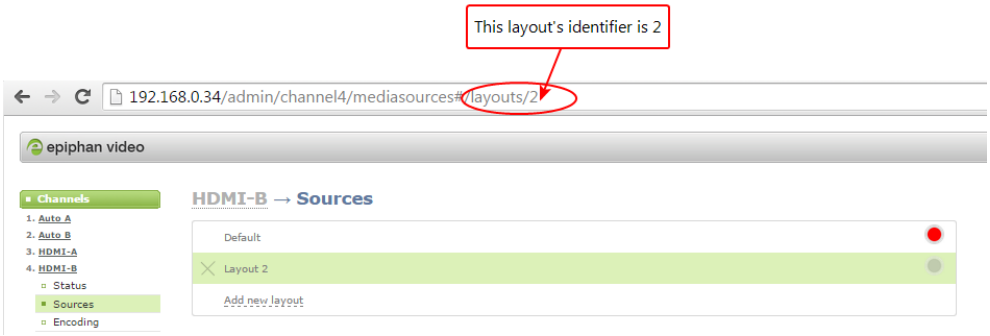


Table 45 *Supported channel layout configuration keys*

Key	Values	Description
active_layout	integer	Specifies which layout is currently active for the specified channel.

All logo configuration keys are deprecated.

Audio configuration keys

The following audio configuration keys are supported. For more information on individual items listed, see Configure Encoding (Multi-source).

Table 46 *Supported Audio Configuration Keys*

Key	Values	Description
audio	on empty string ("")	Enables or disables audio for the stream. To enable audio, set to on. To disable audio, set to an empty string ("").

Key	Values	Description
audiobitrate	32 64 96 112 128 160 192	Specifies the audio bitrate for the stream. Not applicable for PCM audio codecs.
audiochannels	1 (mono) 2 (stereo)	Specifies the number of audio channels. For mono, set to 1. For stereo, set to 2.
audiopreset	CODECS: pcm_s161e (PCM) libmp3lame (MP3) libfacc (AAC) RATES: 32 64 96 112 128 160 192	Specifies an audio code preset in the format CODEC;RATE. i.e. libfaac;128

Stream publishing configuration keys

The system supports the following stream publishing settings. For more information on publishing the stream, see What is streaming?.

Table 47 *Supported Stream Publishing Configuration Keys*

Key	Values	Description
publish_type	0 (do not publish) 1 (via Epiphan.tv) 2 (RTSP Announce) 3 (multicast RTP/UDP) 4 (multicast MPEG-TS	Specifies the type of stream publishing, if any.

Key	Values	Description
	over UDP) 5 (multicast MPEG-TS over RTP/UDP) 6 (RTMP push) 7 (Wowza Streaming Cloud) 8 (Original Livestream)	

RTSP announce configuration keys (Publish type 2)

The following settings are supported when the publish type is set to RTSP Announce. For more information on RTSP and these settings, see What is streaming?.

Table 48 *Supported RTSP Announce Configuration Keys*

Key	Values	Description
announce_by_tcp	on empty string ("")	Enables or disable RTSP over TCP. To enable TCP transport, set to on. Otherwise, set to empty string ("").
announce_host	string	Specifies the RTSP server address. Set to the appropriate IP address.
announce_name	string	Specifies the RTSP resource name. (This field is named Mount Point in the web interface.)
announce_ password	string	Specifies the password for the RTSP server's user.
announce_port	1000...65535, but not 5557	Specifies the RTSP server port to connect to for streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
announce_ username	string	Specifies the username for the RTSP server. Value is provided by the RTSP server.

RTP/UDP configuration keys (Publish type 3)

The following settings are supported when the publish type is set to RTP/UDP. For more information on RTP/UDP and these settings, see What is streaming?.

Table 49 Supported RTP/UDP Configuration Keys

Key	Values	Description
unicast_address	string (IP address)	Specifies the unicast/multicast address.
unicast_aport	1000...65535, but not 5557	Specifies the UDP port for RTP/UDP audio streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
unicast_vport	1000...65535, but not 5557	Specifies the UDP port for RTP/UDP video streaming. Note port 5557 is used for network discovery and cannot be used for streaming.

MPEG-TS configuration keys (Publish types 4 and 5)

The following settings are supported when the publish type is set to MPEG-TS. For more information on MPEG-TS and these settings, see What is streaming?.

Table 50 Supported MPEG-TS Configuration Keys

Key	Values	Description
unicast_address	string (IP address)	Specifies the unicast/multicast address.
unicast_mport	1000...65535, but not 5557	Specifies the UDP port for MPEG-TS streaming. Note port 5557 is used for network discovery and cannot be used for streaming.

RTMP push configuration keys (Publish type 6)

The following settings are supported when the publish type is set to RTMP Push. For more information on RTMP and these settings, see What is streaming?.

Table 51 Supported RTMP Annouce Configuration Keys

Key	Values	Description
announce_host	string	Specifies the RTMP server address. Set to the appropriate IP address.
announce_name	string	Specifies the RTMP resource name. (This field is named Mount Point in the web interface.)
announce_ password	string	Specifies the password for the RTMP server's user.

Key	Values	Description
announce_port	1000...65535, but not 5557	Specifies the RTMP server port to connect to for streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
announce_ username	string	Specifies the username for the RTMP server. Value is provided by the RTMP server.

Content metadata configuration keys

The following keys are available for configuration of the content's metadata.

Table 52 *Supported Content Metadata Configuration Keys*

Key	Values	Description
author	string	Specifies the name of the author for the stream/recording. Refer to description above on handling white space (spaces) in the string.
comment	string	Specifies a comment for the stream/recording. Refer to description above on handling white space (spaces) in the string.
copyright	string	Specifies the copyright for the streaming/recording. Refer to description above on handling white space (spaces) in the string.
title	string	Specifies the title for the stream/recording. Refer to description above on handling white space (spaces) in the string. (This string can be displayed by certain viewing applications by looking at the stream's metadata information.)

Troubleshooting

Use the follow table for help if you are experiencing problems or unexpected behavior from your Standalone VGA Grid.

Problem	Action(s) to Resolve
Not sure if the connected video inputs are being captured.	Check each source's input from the source preview in the Web Interface.
No sound is coming from an audio source.	Verify that you are using the correct audio input by following the steps in Configure encoding . OR Check the audio meter from the tablet UI (accessible from any web browser). See Mobile / tablet operator interface.
Too much noise is present in the audio output.	Modify the **Input Amplifier Volume** parameter in the Audio menu. Start with setting it to 40% and reduce until the noise is no longer present. See for details on this setting.
Image quality is poor or insufficient.	The following tips can help improve image quality: 1. Ensure the source resolution is used as the output or recorded resolution. Up-scaling and down-scaling can affect picture quality. 2. Increase the **Bitrate** value and/or decrease the **Limit frame rate** value in the Encoding menu. See Configure encoding .
Frames per second are lower than expected.	The following tips can help improve frames per second (fps): 1. Increase **the Limit frame rate** value and/or decrease the **Bitrate** value in the Encoding menu. See Configure encoding . 2. Reduce the number of actions happening simultaneously on the system (i.e. if streaming, recording, and copying files, consider waiting to copy files until after streaming and recording are complete). 3. Enter a low negative value (i.e. -5) in the Frame Grabber's Vertical Shift field.

Problem	Action(s) to Resolve
	4. Reduce the number of channels encoding data. 5. Ensure the hardware-accelerated H.264 encoding preset is chosen for all channels.
Stream won't play in my media player or browser.	Verify that the Stream Type matches with the media player used and that you have the correct url or SDP file for the player. See Stream content using HTTP or RTSP and Stream to a media player. If you still cannot see the stream, try disabling your local computer firewall. If the issue is still not resolved, contact Epiphan Support at support@epiphan.com.
The stream interrupts or the image breaks up.	The following tips can help diagnose image problems: 1. Ensure the source resolution is used as the output or recorded resolution. Up-scaling and down-scaling can affect picture quality. Configure encoding . 2. Increase the **Bitrate** value and/or decrease the **Limit frame rate** value in the Encoding menu. See Configure encoding . 3. Check network settings including filters, routers and application settings. Packet loss can result in stream failure.
Recording issues.	If recording will not start, check the Disk Status Information to see if the system is out of disk space. See Check disk storage space and Recorded files.
Firmware upgrade fails.	Reboot the system and try again. If the problem persists, contact Epiphan support at support@epiphan.com.

Limitations and known issues

This section includes known issues or limitations that affect functionality or usability and ways that you can work around these limitations.

Affecting encoding

- **Limitation**: When audio is enabled on an SDI source where video is already being captured, it takes up to 15 seconds for the system to detect the audio. Once detected, the audio is properly synchronized with the video.
  Workaround: Start the SDI signal with audio enabled, or check to ensure audio is detected before streaming or recording.
- Encoding with MPEG-4 sometimes results in poor quality.
  Workaround: From the channel's stream setup, increase the video bitrate to improve picture quality.
- Video bitrate for MJPEG streams is larger than the configured value.
  Workaround: Verify the actual bitrate on the channel's channel status page when there are connected viewers. If lower bitrates are important, select another codec.
- For VGA sources only, some wide-mode resolutions are not correctly identified and result in a slightly squished image (e.g. for a 1360x768 source, the detected resolution may be 1024x768).
  Workaround: This issue is related to the video output hardware. Test your source to see if it exhibits the issue. If possible, avoid using wide-mode for VGA displays that exhibit this issue.
- The automatically calculated frame size for HD VGA sources is occasionally incorrect.
  Workaround: This problem is caused due to cable degradation or poor cable connection. Re-seat or exchange your VGA cable. If the problem is still not resolved, visit the Epiphan Pearl support page for a custom EDID to resolve the issue.

Affecting streaming and recording

- When switching layouts while streaming or recording it's possible to have a small number of frames (approximately 100ms worth) repeated in the stream or recording file, and over the same time period a small number of frames from the new layout skipped.
  Workaround: If dropped frames are problematic for your application, avoid the layout switching feature.

Affecting the web interface

- It is possible to name two or more channels with the same value. Use of automatic file transfer and UPnP is unpredictable if this occurs.
  Workaround: Ensure each channel has a unique name.
- The automatic file upload (AFU) file queue shows a maximum of 15 files, Newer 15 and Top of the list buttons do not work. All files are transfered, even though they are not listed.
  Workaround: Wait for the queue to have fewer files in the list.

Affecting other areas

- Due to changes in the way channel layouts are created, some HTTP and RS-232 remote layout commands are no longer available 3.15.3. These include values for setting the text overlay, logo, logo positioning, keep aspect ratio and no signal image.
  Workaround: Update your scripts to avoid using these commands. See the manual for a full list, affected API keys are listed as deprecated.
- When using Internet Explorer to view the web admin interface, cached versions of pages are sometimes displayed instead of the most recent version of a page. This affects the Sources configuration page most and may cause the user to think a new layout or changed layout has gone missing.
  Workaround: Refresh the page by pressing Ctrl-F5.

Previous releases and features

This section outlines the features introduced with previous product release.

Release 3.14.4 features

- Live Streaming via Wowza Cloud

Release 3.14.3 features

- Configuration presets
- Stereo audio encoding
- Support for 256 kbps and 320 kbps audio sampling
- LDAP support
- SCP and SFTP file transfer

Release 3.14.1 features

- SDI source support
- HDMI audio support
- 48 kHz audio support
- Hardware acceleration for H.264 encoding
- Simplified H.264 video encoding presets
- Configurable EDID
- MP4 support
- Improved channel configuration menu

Release 3.12 features

- RTMP live streaming
- SAP Announce
- Enhanced layout for multiple source channels
- RAID 10 support
- Enhanced Internal Storage Diagnostics

Release 3.11 features

- Multiple multi-track, multi-channel recorders
- Multiple audio sources
- Audio source mixing
- Precision time protocol (PTP) synchronization
- Custom recording file names
- AAC audio codec
- MPEG-TS streaming for IPTV
- Universal plug and play (UPnP) support for streaming media players
- Visual stream feedback and simplified picture-in-picture layout
- Stream branding and custom no signal image
- Preservation of source aspect ratio
- Customizable stream background color (matte)
- Personalized stream metadata
- Introducing the mobile / tablet operator interface
- Discovery of Epiphan devices
- Mobile tethering

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March 28, 2014

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