



kaleidescape

Kaleidescape Strato

Installation Guide

February 2016

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Contents

Overview	6
Kaleidescape Strato Movie Player	6
Supported Configurations	7
What's in the Box	8
Front Panel Button	8
Front Panel Error Indicators	8
Physical Installation	9
Planning the Installation.....	9
Ventilation and Clearance	9
Power Requirements	9
Network Requirements.....	9
Audio and Video components	9
Installing Strato	10
Tabletop / Shelf Installation.....	10
Rack Installation	10
Audio and Video Connections	12
Network Connection	13
Power Connection and Startup	13
System Configuration.....	14
First-Time Setup	14
Wired network connection (recommended).....	14
Wireless network connection	16
Adding Strato to an existing Encore system.....	17
Activating your Strato.....	18
Configuring Settings.....	20
Onscreen Settings Menu	20

Browser Interface Settings Page.....	21
Getting the Most out of Strato	22
About 4K Ultra HD, HDMI 2.0, and HDCP 2.2.....	22
About Chroma Sampling.....	23
HDMI Cables.....	24
HDMI Best Practices	24
Best Quality, Single Connection	24
Best Quality, Dual Connection.....	24
Very Good Quality, Single and Dual Connections	25
1080p	25
Verifying HDMI Performance	26
Supported 4K Ultra HD Modes	27
Supported HDMI Features.....	28
HDMI Video Output Status	29
Troubleshooting HDMI Connections	32
Check Connections	32
Check Device Settings	32
Check Device Software/Firmware	32
Check HDMI Capabilities	32
Check HDCP Status	32
Try Alternate Cables.....	32
Reduce HDMI Speed.....	33
Changes in the HDMI Display Chain During Playback.....	35
Control Systems	36
Communication	36
Kaleidescape Control Devices	36
Kaleidescape Remote	36
Kaleidescape App for iPad	37

Kaleidescape Child Remote	38
Third Party Control Devices	38
IR Remote Control.....	38
Touch Panels	39

Overview

The Kaleidescape Strato Installation Guide describes how to set up and configure Strato, and add new components to an existing installation.

Kaleidescape Strato Movie Player

The Kaleidescape Strato Movie Player is a 4K Ultra HD movie player with high dynamic range (HDR) capability. It is available in versions with and without internal movie storage. Strato is a member of Kaleidescape's Encore product family, which also includes the Alto Movie Player, the Terra Movie Server, and the Disc Server.

When purchased without internal storage, Strato is intended to be used as part of a larger system that includes other components with movie storage.

A Strato with internal movie storage can store and play up to 100 4K Ultra HD, 200 Blu-ray quality, or 900 DVD quality movies on its internal hard drive.

Strato is easy to set up, comes with a comprehensive movie guide including unique features like scene and song bookmarks, and provides amazing convenience without compromising quality.

Strato enables you to:

- ▶ Download and play 4K Ultra HD movies from the Kaleidescape Movie Store with audio and video quality superior to that found in many commercial theaters
- ▶ Download Blu-ray quality and DVD quality movies with identical fidelity to those optical formats
- ▶ Store up to 100 4K Ultra HD, 200 Blu-ray, or 900 DVD-quality movies for instant access and playback
- ▶ Use the comprehensive Kaleidescape Movie Guide to easily navigate your collection and directly access memorable scenes

Strato supports easy integration into audio, video, and whole-house control systems.

Supported Configurations

Strato can be used by itself as a complete Kaleidescape system, or it can be used with other Kaleidescape Encore family components, including additional Strato or Alto players, Terra servers, and Disc Servers.

Strato and Alto are both available in versions with and without internal movie storage. In a multi-zone system, up to four Alto or Strato players with internal storage may be used.

Beyond four zones, the system must include one or more Terra servers, and some or all of the players must be the no-storage versions.

Kaleidescape recommends that a large system be designed such that all of its storage is in the Terra servers (*i.e.*, using only players without internal storage), because Terra can support more simultaneous playback streams. However, if circumstances dictate, you can still use up to four players with internal storage provided that all other players are no-storage versions.

Up to two Disc Servers can be added to a system. If the system has one or more Terra servers, that limit is removed, and there is no set limit to the number of Disc Servers a system can have. You should consult with Kaleidescape before specifying a multi-vault system to ensure that system performance will be acceptable with your planned configuration.

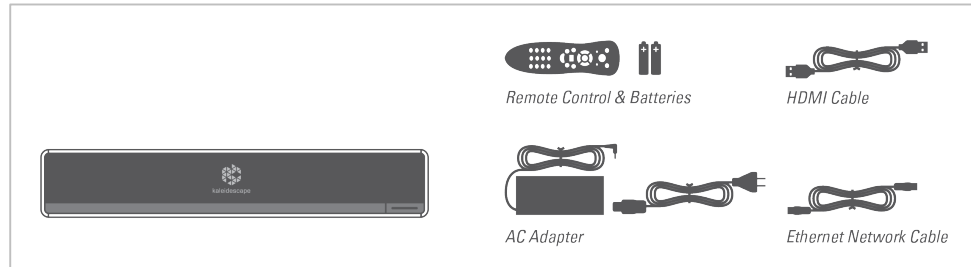
Gigabit Ethernet connections are required for all components in a multi-component system. 100Base-T Ethernet networks are not recommended for systems that include Strato players, because of the bandwidth required for 4K Ultra HD.

Strato has built-in Wi-Fi, which may be used when Strato is installed as a standalone, single-component Kaleidescape system.

What's in the Box

The following accessories are packaged with Strato:

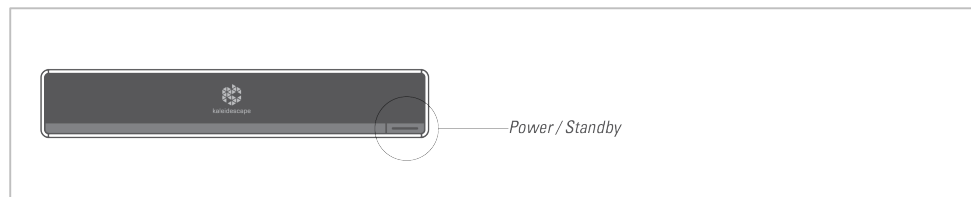
- ▶ 1x Shielded Ethernet Network Cable
- ▶ 1x HDMI Cable
- ▶ 1x AC Adapter
- ▶ 1x Remote Control
- ▶ 2x Batteries



Front Panel Button

There is one button located on the front panel of Strato:

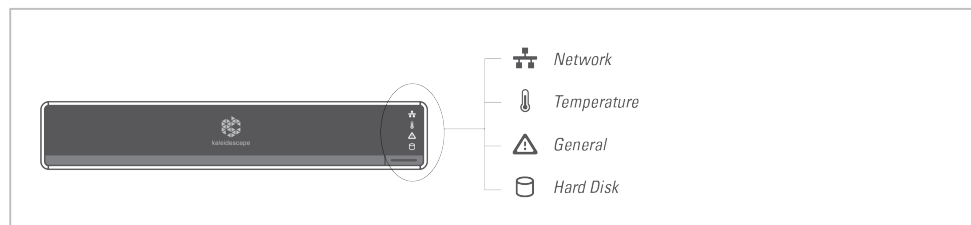
- ▶ Power/Standby – turns Strato on or off or places Strato in standby



Front Panel Error Indicators

There are four error indicators located on the front panel of Strato. These error indicators illuminate briefly during system startup, but otherwise are only visible in the event of a problem:

- ▶ Network – indicates that Strato encountered a network error
- ▶ Temperature – indicates Strato temperature is too hot or too cold
- ▶ Hard disk – indicates the hard disk drive inside Strato has a failure
- ▶ General – illuminates in conjunction with other indicators. If illuminated by itself, check the system's Browser Interface for details.



Physical Installation

Planning the Installation

Ventilation and Clearance

Use the following guidelines when installing system components to ensure proper clearance and ventilation. These guidelines apply to all installations including rack mounting. (Rack-mount hardware sold separately.)

1. Mount components in a location with adequate ventilation.
2. Check for proper grounding if installing components in a rack.
3. Maintain a 2 in. (5 cm) clearance in back and a 1 in. (2.5 cm) clearance in front and on the sides.

Power Requirements

Kaleidescape component power supplies are universal input and operate on any nominal line voltage between 100–240 V, and frequency between 50–60 Hz. Verify that power outlets are grounded, preferably shielded from power surges and brownouts.

Kaleidescape recommends a grounded outlet with a high-quality surge protector for the power source for players and servers. A UPS is optional.

Network Requirements

A Gigabit Ethernet network is recommended, and is required when Strato is used with any other Kaleidescape components. Connect Strato using a shielded Ethernet cable. The built-in Wi-Fi may be used when Strato is used as a single-component standalone system.

Audio and Video components

Before beginning the installation, determine the type of the display and audio equipment that will connect to your Strato.

Strato supports the following outputs:

Video

- ▶ High-Definition Multimedia Interface (HDMI). HDMI 2.0 and HDCP 2.2 are required for 4K Ultra HD content. HDMI 2.0a is required for HDR.

Audio

- ▶ HDMI (Digital stereo or multi-channel)
- ▶ Coaxial (Digital stereo or multi-channel)
- ▶ Optical (Digital stereo or multi-channel)

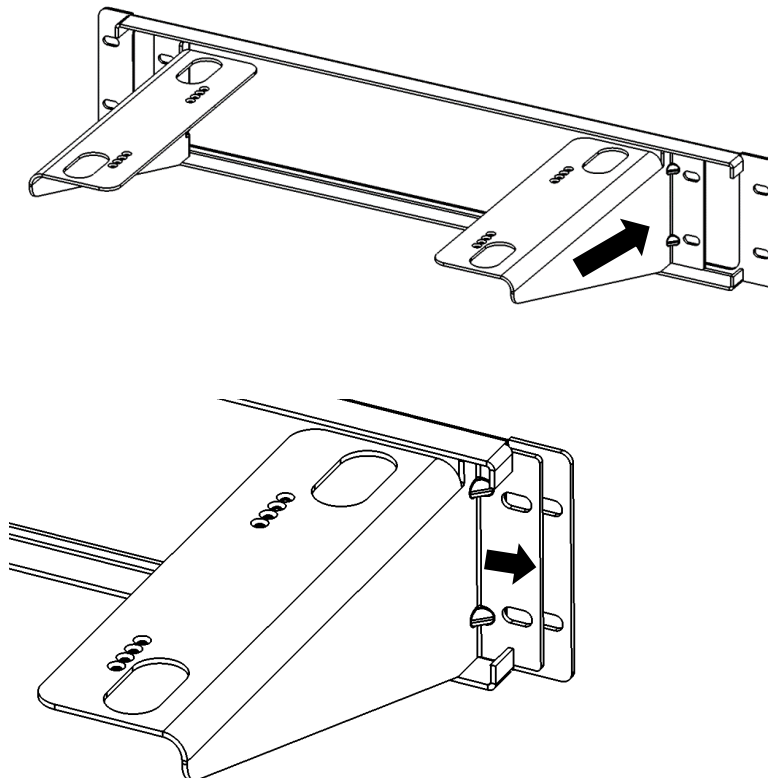
Installing Strato

Tabletop / Shelf Installation

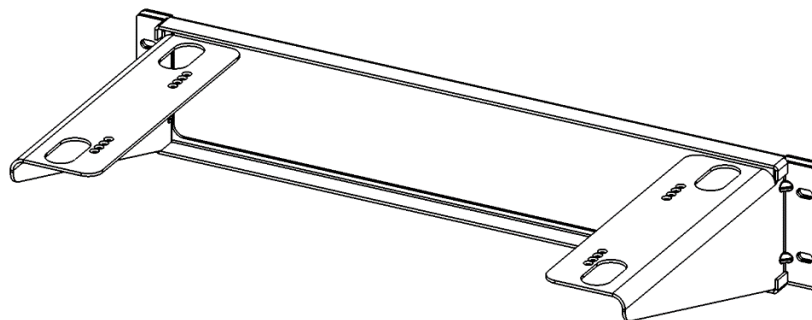
1. Choose a suitable location that is sturdy enough to hold Strato. Strato weighs approximately 15 pounds.
2. Place Strato onto the tabletop or shelf. Strato ships with feet attached.
3. Installation is complete. You may now proceed to the Audio and Video Connections section below.

Rack Installation

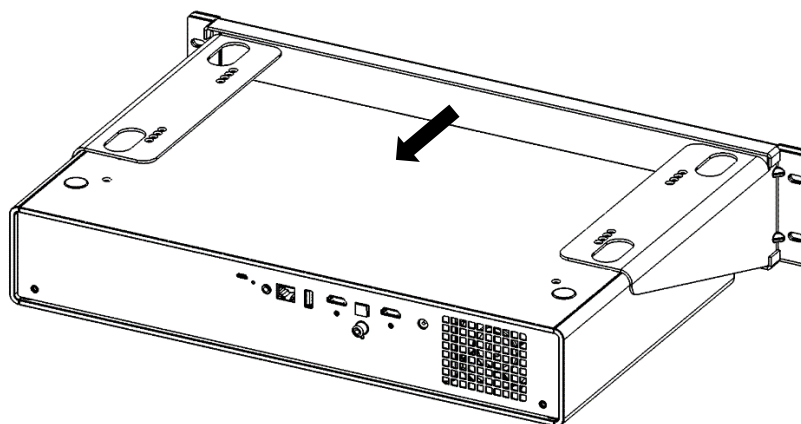
1. Installing Strato in a rack requires the Strato rack-mount kit (KMOUNT-STRATO), sold separately.
2. Strato requires two rack units of space. Determine a location in the rack to install Strato.
3. Place Strato upside down on a soft, clean surface.
4. Assemble rack sides into front panel as shown:



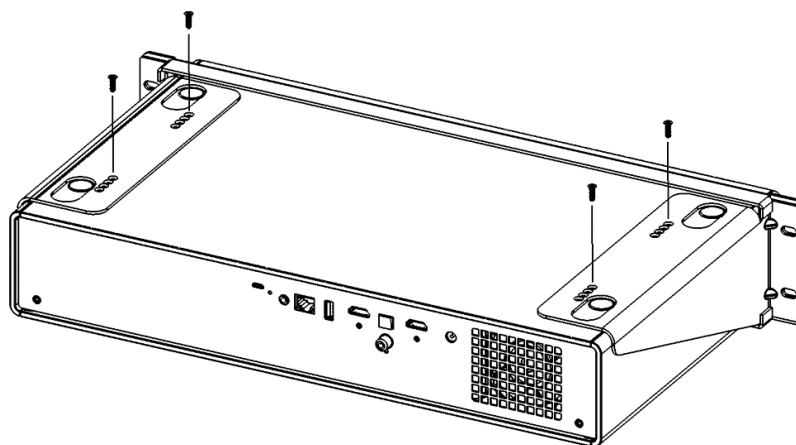
Completed Assembly:



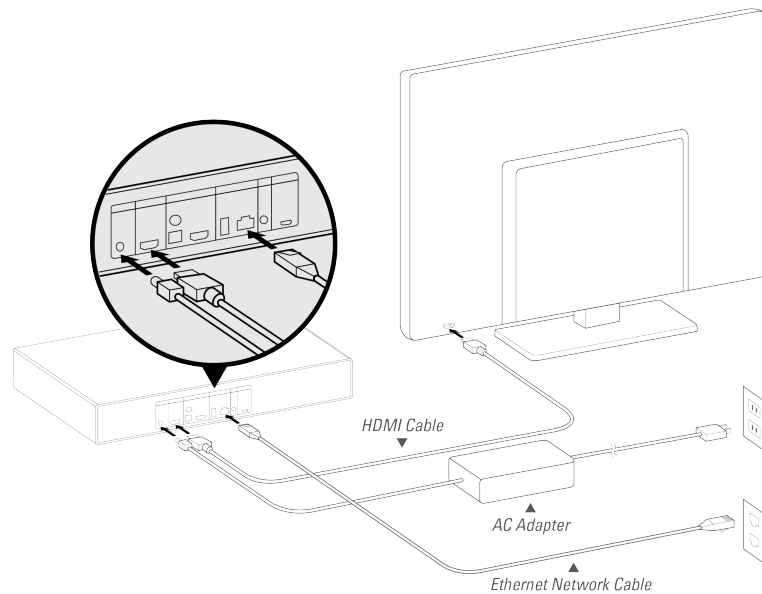
5. Remove and keep the four flat head screws installed near Strato's feet on its bottom surface.
6. Place rack ear assembly over the unit and gently slide into position. Four positions are available, depending upon the desired reveal. In the front most position the player face will protrude by $\frac{3}{4}$ " (recommended). In the rear most position the face of the player will be flush with the front of the rack ears.



7. Install the saved flathead screws ensuring both sides are in the same position.



Audio and Video Connections

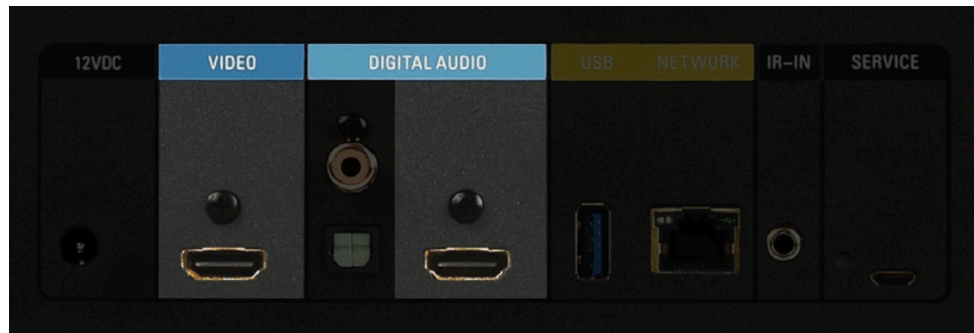


Connect network, audio and video cables before connecting the AC adapter.

In order to play 4K Ultra HD content with Strato, the display must support HDMI 2.0 and HDCP 2.2. High Dynamic Range (HDR) content requires HDMI 2.0a and an HDR-capable display that supports the SMPTE HDR standard.

When the HDMI signal passes through other components before reaching the display (e.g. an audio receiver), all of those components must also support HDMI 2.0 and HDCP 2.2. Otherwise, Strato will have to reduce the video quality to accommodate the limits of those components.

For this reason, Strato has two HDMI ports. The primary HDMI port (labeled VIDEO) carries both video and audio information. The secondary HDMI port (labeled DIGITAL AUDIO) carries audio information only.



If the audio equipment does not support the necessary HDMI capabilities, you should connect the *display* directly to the VIDEO HDMI port, and connect the *audio equipment* to the DIGITAL AUDIO HDMI port. This will ensure that you achieve the highest possible video and audio quality.

If using a single HDMI connection, be sure to connect to the VIDEO HDMI port. The secondary HDMI port does not support video output.

Network Connection

A wired Gigabit Ethernet network connection is recommended, and is required if any other Kaleidescape components are used with Strato, including other players, a Terra server, or a Disc Server. Connect Strato using a shielded Ethernet cable. If using a single Strato player by itself, you can use the built-in Wi-Fi if a wired connection is not possible.

Power Connection and Startup

After making the audio, video and network connections, make sure your television is set to the correct HDMI input, then connect Strato's AC adapter. You should see the Kaleidescape logo on the display, and after a few minutes, the initial setup menu appears.

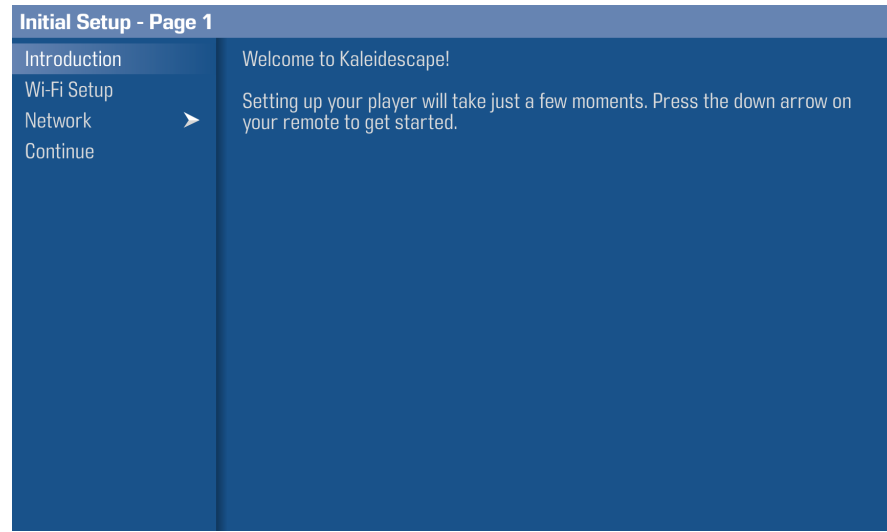
If you do not see the Kaleidescape logo and the setup menu, first check that Strato has power. Check the AC adapter's connection, and make sure that the Kaleidescape logo on the front of the player is glowing. If it is not, try pressing the power button, located in the lower right corner of the front panel.

Ensure that the display is connected to Strato's primary HDMI port (labeled VIDEO). The secondary HDMI port is audio-only. Double-check that the correct input is selected on the display. If there are other devices in the video chain, like audio receivers or switches, ensure that they are configured properly. You may want to try connecting directly to the display to rule out compatibility issues with intermediate devices.

System Configuration

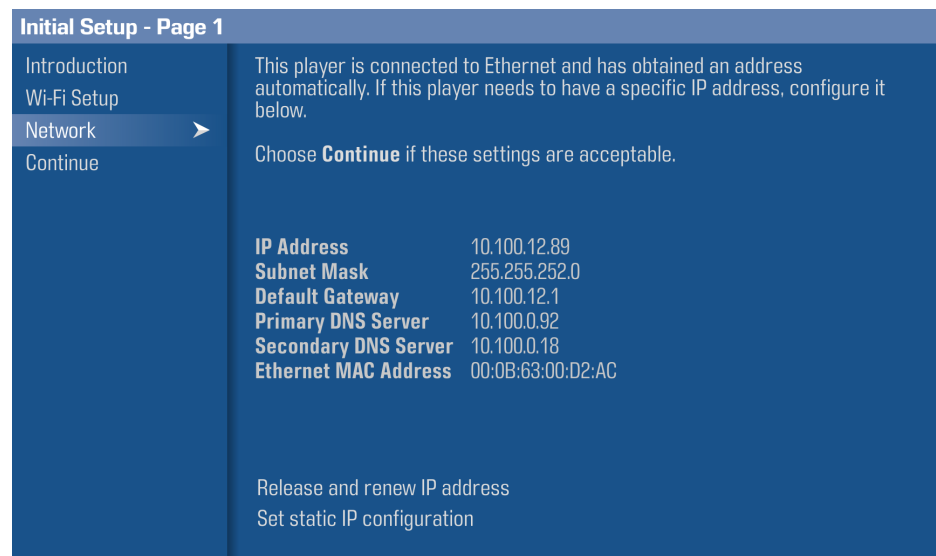
First-Time Setup

After installing your Strato, you will be prompted to set it up using the onscreen display. Connecting to your network (via a wired or wireless network connection) and activating your Strato is required.

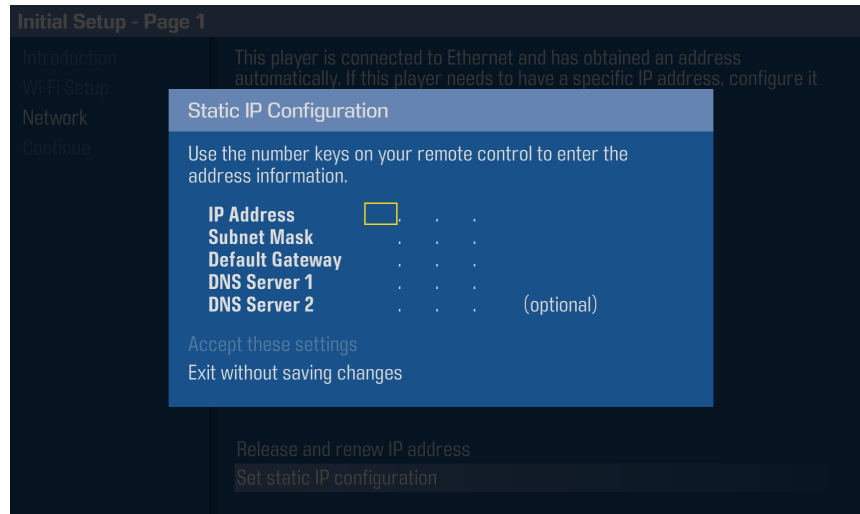


Wired network connection (recommended)

Scroll past the **Wi-Fi Setup** option and select **Network** from the onscreen menu. In most cases, Strato will automatically obtain an IP address from a DHCP server.

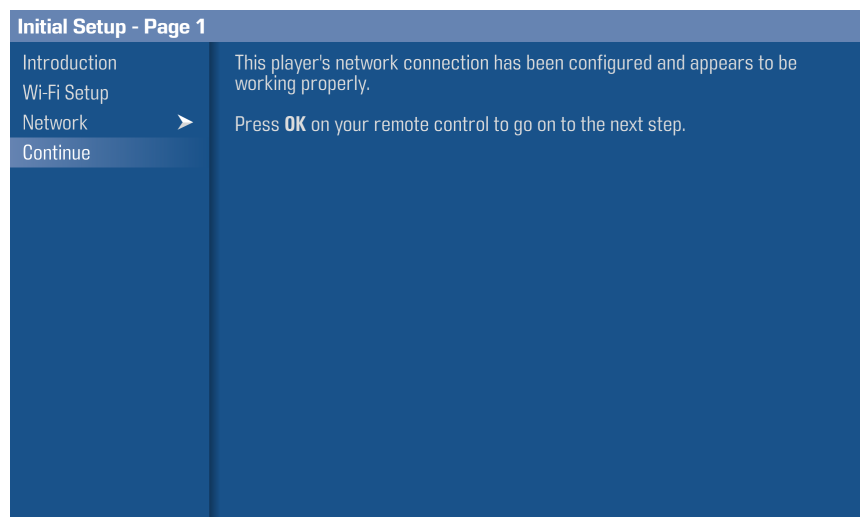


If you wish to set a static IP address, select **Set static IP configuration** and enter your network information.



Select **Accept these settings** to save the information entered.

After a valid network connection is set up, select **Continue** to proceed to the next step.



Wireless network connection

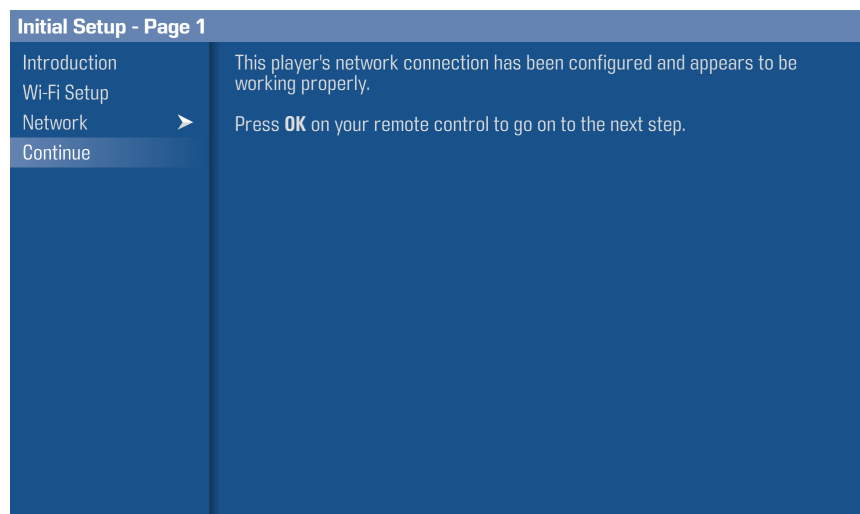
Skip this section of the document if you are using an Ethernet connection.

To use the built-in Wi-Fi feature, make sure that no Ethernet cable is connected to Strato. (Ethernet always takes precedence over Wi-Fi.) Select the **Wi-Fi Setup** option.

A list of available wireless networks will be displayed. Select the one you would like to connect to, and enter the username (if applicable) and password. If your Wi-Fi network is not displayed, select **Connect to another network** to enter its information.

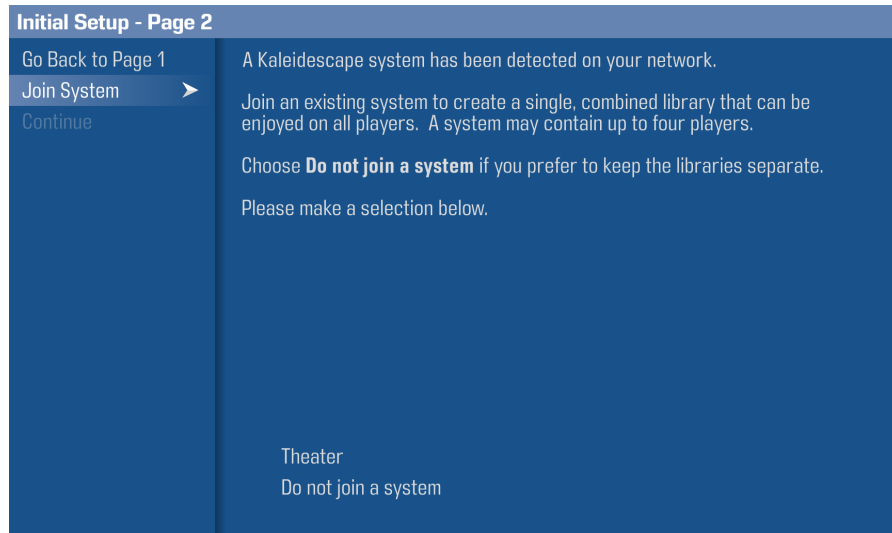


After a valid network connection is established, a checkmark will appear next to the name of the connected Wi-Fi network. Select **Continue** to proceed to the next step.



Adding Strato to an existing Encore system

If you are adding your Strato player to an existing Encore system, once you've configured the network connection and chosen **Continue**, you should see the Join System page:



If you don't see this page, ensure that your Strato is on the same local area network as the existing system, and that the existing system is powered on. Then, choose **Go Back to Page 1** to return to the network setup screens, then **Continue** again.

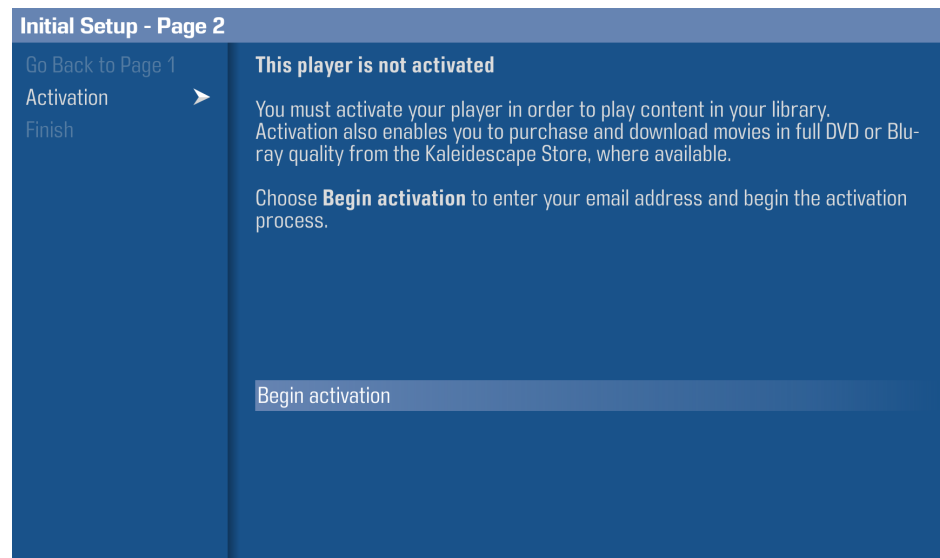
Highlight the system you want the Strato to join, and press OK on the remote. Once you have selected the system to join, setup is complete, and you can select **Finish** to begin using your Strato.

Activating your Strato

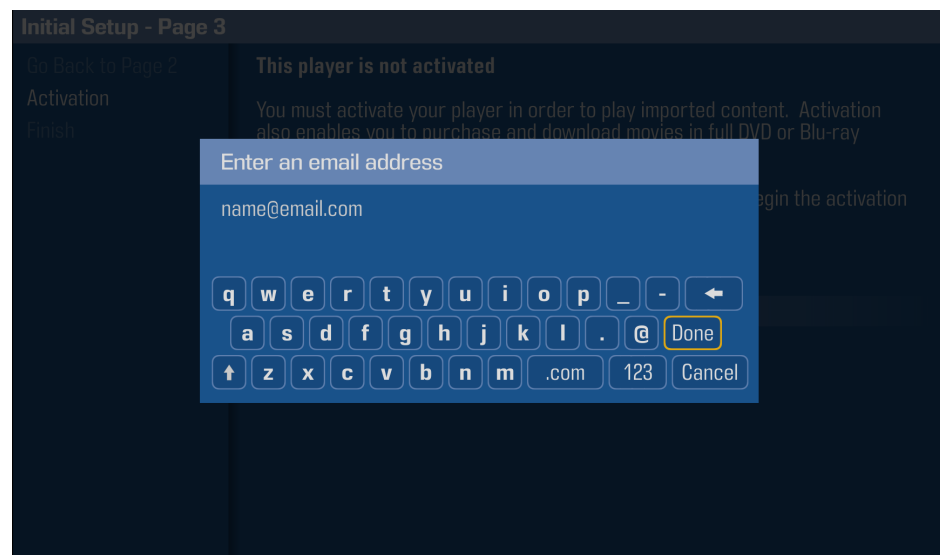
If you added your Strato to an existing Encore system above, you should not see this screen. You can skip this section of the document.

If you are not adding your Strato to an existing Encore system, then you need to activate it in order to use all of its features. To activate your Strato, select **Begin Activation** from the **Activation** page on the onscreen menu.

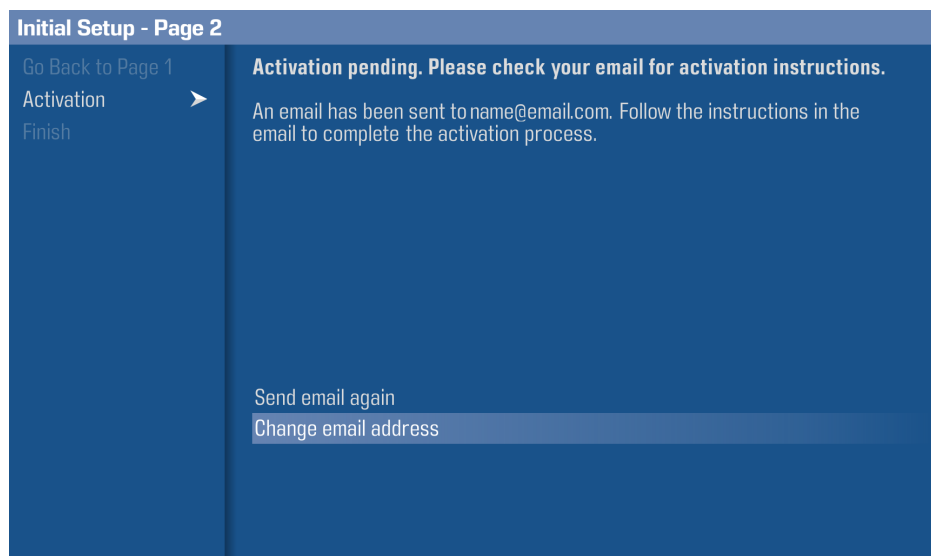
*Note: For testing and calibration purposes, activation can be skipped by selecting **Finish** despite this option appearing unavailable.*



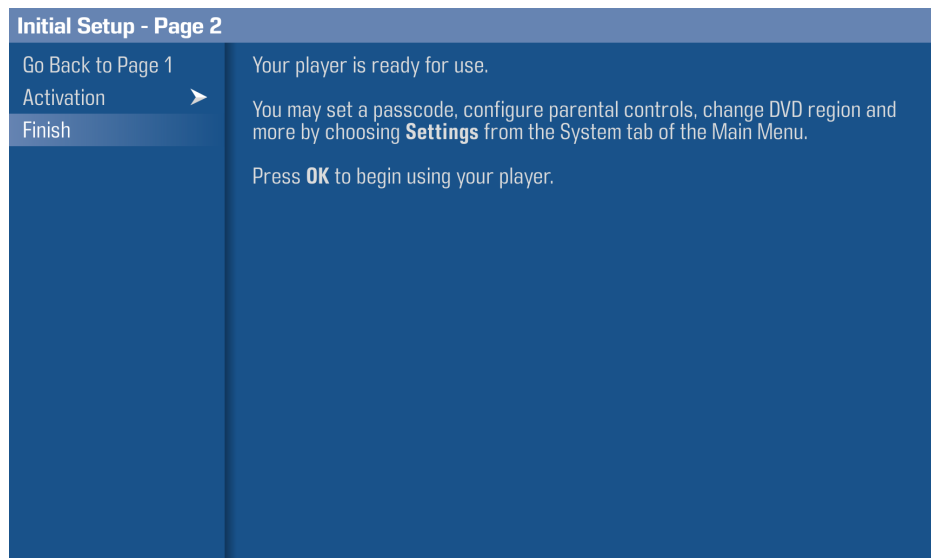
Enter the email address of the system owner using the onscreen keyboard, and then select **Done** on the keyboard. Check your email for registration instructions.



If the email is not received within several minutes, check the spam or junk folder. If the email still cannot be located, select **Send email again** to resend the email, or **Change email address** to send the email to a different email address. You must complete the online activation steps to enable full functionality of Strato, including the ability to download movies.



Once the email address has been submitted, the **Finish** option in the onscreen menu will be available. Select **Finish** to exit the initial setup menu and start using your Strato.

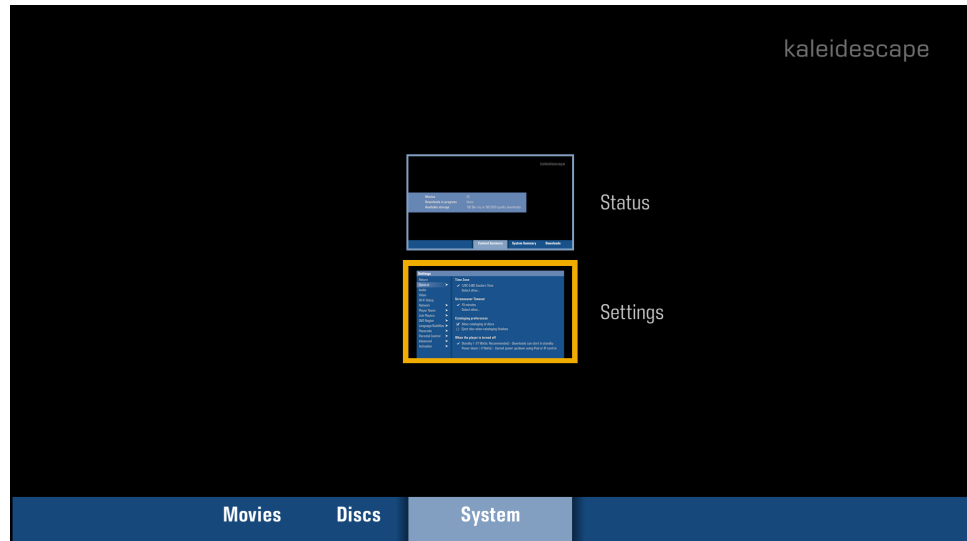


Configuring Settings

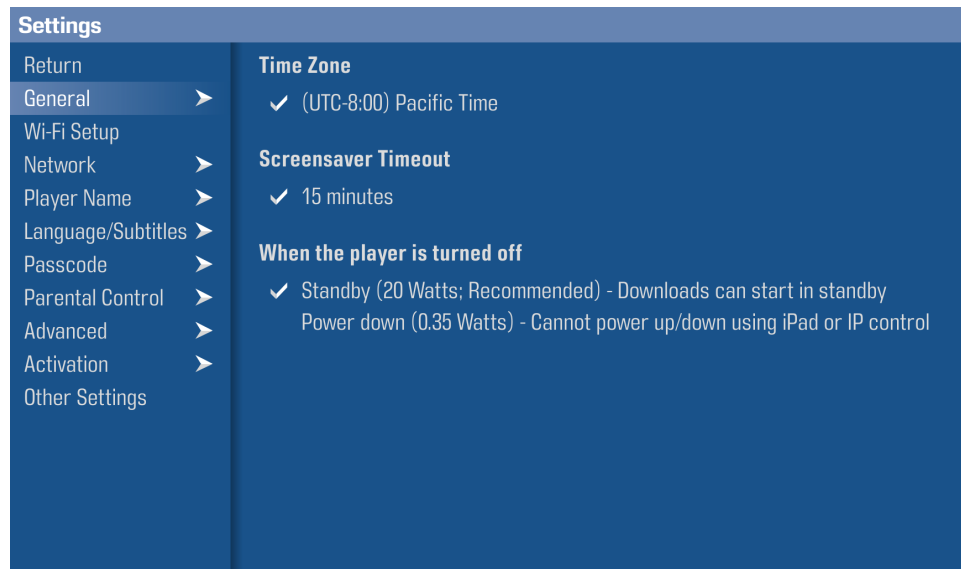
Most of Strato's settings are configured in the onscreen *Settings* menu. However, video and audio settings, settings related to IR and IP control, and component linking are all accessed via the system's Browser Interface.

Onscreen Settings Menu

To access this menu, press the **MENU** button on your Kaleidescape remote, scroll to the **System** tab, and select **Settings**.



The *Settings* menu is navigated in the same way as the initial setup menus.

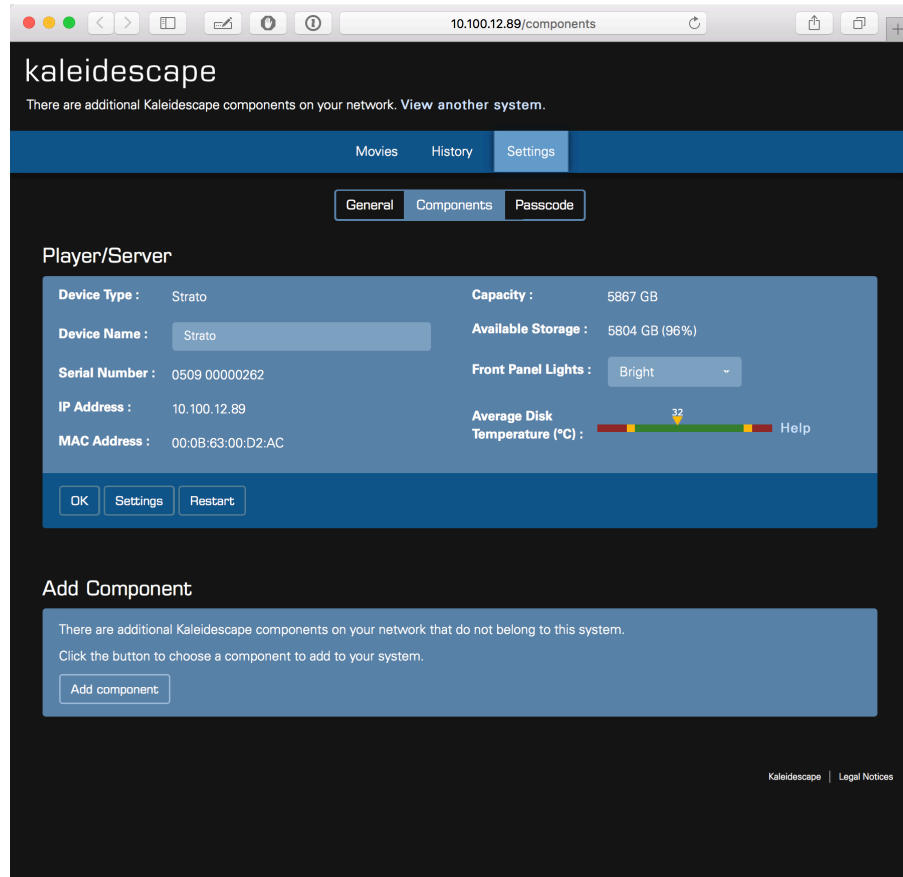


Browser Interface Settings Page

To access this page, use a web browser on your computer or mobile device. You can easily find the correct URL by going to the onscreen *Settings* menu and choosing the **Other Settings** option. This option displays the URL to access the settings in the Browser Interface.

To change settings of your player, click the “Settings” button below the player’s MAC address.

You can also use the **Add component** button if you need to add additional components to your system, such as a Terra server or a Disc Server.



Getting the Most out of Strato

Strato is a high performance source device, capable of playing 4K Ultra HD content encoded at data rates of 100 megabits per second (Mbps) or higher. It supports 10-bit color, and high dynamic range (HDR) content. Taking full advantage of Strato's capabilities requires careful attention to HDMI connections, cabling, and configuration.

This section discusses background information on HDMI and HDCP, and best practices that will help you to maximize Strato's performance within the larger A/V system.

In particular, we discuss cases where using the second HDMI port will allow you to achieve maximum video and audio quality, even when audio equipment does not support HDMI 2.0 and/or HDCP 2.2.

We also include some information on ensuring your installation is ready for HDR. We conclude with a brief tutorial covering the use of Strato's new HDMI Capabilities tool in the Browser Interface.

About 4K Ultra HD, HDMI 2.0, and HDCP 2.2

Achieving Strato's highest video output quality requires a display capable of receiving and displaying that signal. As well, if Strato is connected to the display via intermediate devices (such as an audio processor, an A/V matrix switcher, an active HDMI cable, or an HDMI extender), every device in that chain must support the required HDMI and HDCP versions in order to display 4K Ultra HD at full fidelity.

The earliest 4K displays may not be able to display 4K Ultra HD content from Strato at all, and other displays may be able to display 4K Ultra HD content, but be unable to handle all of the latest features. This section describes the features present in 4K displays, and how Strato will interoperate with those displays.

First and foremost, HDCP 2.2 copy protection is required to play any 4K Ultra HD content with Strato. Some early 4K display devices do not support HDCP 2.2, and will not be able to display 4K Ultra HD content when used with Strato. Consult with the display's manufacturer to see if an upgrade is available.

If a display does not support HDCP 2.2 copy protection, but does support HDCP 1.x, Strato will down-scale the 4K Ultra HD content and output it at up to 1080p resolution.

Strato also requires HDMI 2.0 to properly display 4K Ultra HD content and the Kaleidescape onscreen display. One might expect that a display that supports HDCP 2.2 is also an HDMI 2.0 display, and vice-versa. Unfortunately, the situation is more complicated.

Some HDMI 2.0 displays do not support HDCP 2.2. Also, some HDMI 2.0 displays only support data transfer at 10.2 gigabits per second (Gbps), rather than the maximum 18 Gbps included in the HDMI 2.0 spec. The lower speed places some limits on how Strato displays 4K Ultra HD content.

Note that some equipment describes HDMI bandwidth in terms of frequency rather than data rate. A 10.2 Gbps connection or cable may also be called 340 MHz, and an 18 Gbps connection may also be called 600 MHz.

The chart below summarizes how HDMI and HDCP capabilities affect Strato playback.

Table: Strato output according to display capabilities

	HDCP 1.x	HDCP 2.2
HDMI 1.3 and below	1080p 24/30/60	N/A
HDMI 1.4	1080p 24/30/60	2160p 24/30 <i>Not recommended. OSD performance will be degraded and some content will display poorly.</i>
HDMI 2.0 @ 10.2 Gbps	1080p 24/30/60	2160p 24/30 10-bit color 2160p 60 8-bit color
HDMI 2.0 @ 18 Gbps	1080p 24/30/60	2160p 24/30/60 10-bit color <i>Kaleidescape OSD can be rendered with 4:4:4 chroma</i>
HDMI 2.0a @ 10.2 Gbps	1080p 24/30/60	2160p 24/30 10-bit color HDR possible with HDR display 2160p 60 8-bit color
HDMI 2.0a @ 18 Gbps	1080p 24/30/60	2160p 24/30/60 10-bit color HDR possible with HDR display <i>Kaleidescape OSD can be rendered with 4:4:4 chroma</i>

Note: in countries using PAL format, content is displayed at 25 or 50 frames per second rather than 30 & 60.

About Chroma Sampling

In addition to bit depth, another factor in how images are displayed is how the color information is represented. This is usually expressed in terms of three numbers separated by colons, like 4:4:4 or 4:2:0.

The details of this notation are beyond the scope of this document, but in summary, 4:4:4 has discrete *luma* (brightness) and *chroma* (color) information for every pixel in an image. 4:2:0 has discrete luma for every pixel, but the chroma is averaged across 2x2 clusters of pixels.

4:2:0 significantly reduces the amount of data required for each frame, so a 4:2:0 signal requires less bandwidth than a 4:4:4 signal. In a moving image, the difference in chroma resolution is not perceptible to most viewers.

4K Ultra HD movie content is encoded as 4:2:0 (as are Blu-ray and DVD discs and Blu-ray quality and DVD quality downloads), so a 4:2:0 connection does not compromise video playback quality.

The Kaleidescape onscreen display can be rendered with 4:4:4 chroma on displays that support it, if the HDMI connection supports 18 Gbps. This will produce the most detail when looking at images in the onscreen display, such as the Movie Covers view.

HDMI Cables

Carrying an 18 Gbps signal reliably requires a good quality cable. Kaleidescape recommends cables that meet the following specification:

- HDMI High-Speed cable tested to at least 20 Gbps
- Conductors that are 26 AWG or larger
- Double Shielded

Note that conductor size (represented as AWG) can be a little confusing. As the AWG number goes *down*, the conductor gets *larger*. A 22 AWG wire is larger than 24 AWG, which is larger than 26 AWG, and so on. Look for HDMI cables where the AWG number for the conductors is 26, 24, 22, or lower.

Kaleidescape has not identified any active copper cables or HDMI extender baluns that support 18 Gbps at this point. A number of these cables do support 10.2 Gbps and may be appropriate when used with displays that are limited to 10.2 Gbps.

Similarly, when using fiber optic cables, be aware that the electronics in some fiber optic cables can only accept 10.2 Gbps. Choose cables that have been tested to carry the full 18 Gbps signal.

HDMI Best Practices

Best Quality, Single Connection

In an ideal installation, Strato would be connected to a display that supports HDMI 2.0a at 18 Gbps with HDCP 2.2. If the signal is routed through an audio receiver, it would also support both HDMI 2.0a at 18 Gbps and HDCP 2.2. Such an installation allows for maximum video quality at all 4K Ultra HD frame rates.

Best Quality, Dual Connection

Another common situation is one in which the display supports HDMI 2.0 or 2.0a at 18 Gbps with HDCP 2.2, but the audio receiver either does not support HDMI 2.0 and HDCP 2.2, or supports HDMI 2.0 at only 10.2 Gbps. You can still achieve maximum video quality in such a system by using the second (audio-only) HDMI port.

When the display supports HDMI 2.0 and HDCP 2.2, but the audio equipment does not, connect the display directly to Strato's primary (VIDEO) HDMI port, and

connect the receiver or audio processor to the secondary (DIGITAL AUDIO) HDMI port. This dual connection allows the full video capability of Strato to be delivered to the display, while still providing full fidelity audio to the receiver.

Very Good Quality, Single and Dual Connections

If the display supports HDMI 2.0 and HDCP 2.2, but at 10.2 Gbps, Strato can still output 4K Ultra HD, including 4K Ultra HD at 60 frames per second. However, at 60fps, video will be limited to 8-bit color.

With such a display, configuring Strato to “Allow Display Mode Changes” in the Video tab of the browser interface’s Settings dialog will allow Strato to switch to 24 frames per second for film content. At 24 fps, Strato can output 10-bit color even over a 10.2 Gbps link for displays that support it, so the image for film content is identical to what you would see on an 18 Gbps connection.

As with the 18 Gbps connection options described above, you can connect the audio equipment to the second HDMI port to if the audio equipment has HDMI or HDCP limitations that the display does not.

Even if the display only supports a maximum of 10.2 Gbps, consider choosing cables that are tested to work at 18 Gbps or higher, especially when cables are run in-wall or in other difficult to replace installations. This will help to ensure a smoother upgrade path to a new display in the future.

1080p

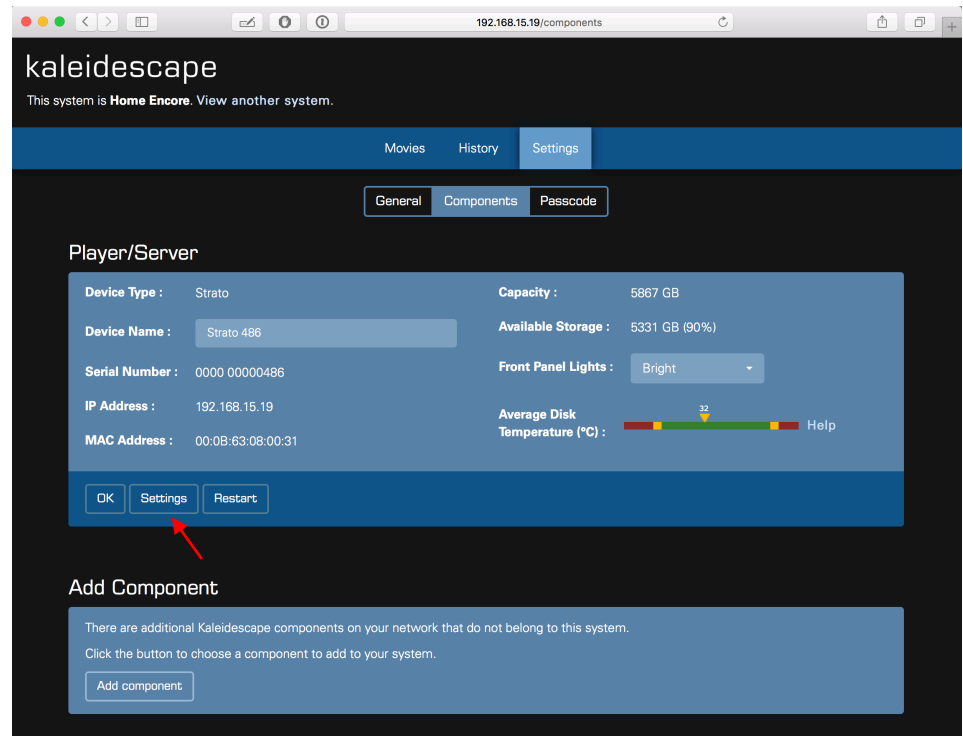
Strato provides a great experience with a 1080p display. 4K Ultra HD content is down-scaled for display at 1080p, and the Kaleidescape onscreen display runs at a full 60 fps. Using Strato with a 1080p display is a good choice in an installation that has a mix of 4K and 1080p displays, especially if the 1080p displays may be upgraded over time. If you can use 18 Gbps-capable cables, a later upgrade should also go more smoothly.

Verifying HDMI Performance

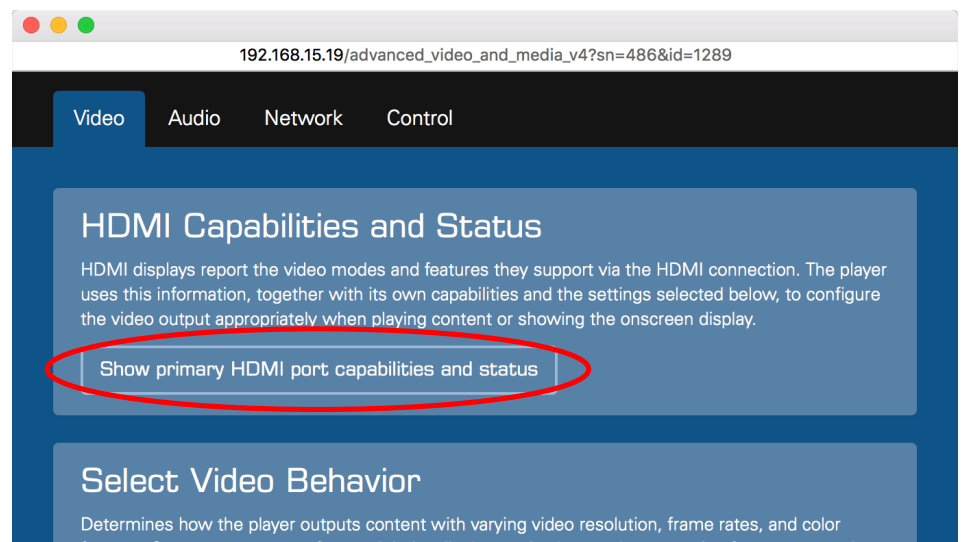
Once your Strato has been connected and configured, it's a good idea to verify that you are seeing the expected video resolution and frame rate.

Strato includes a new tool to help you ensure that things are working as expected. Go to the system's Browser Interface, and click on the Settings tab. You should see the Components page.

In the section for your Strato, click the Settings button:



In the window that opens, click the “Show primary HDMI port capabilities and status” button:

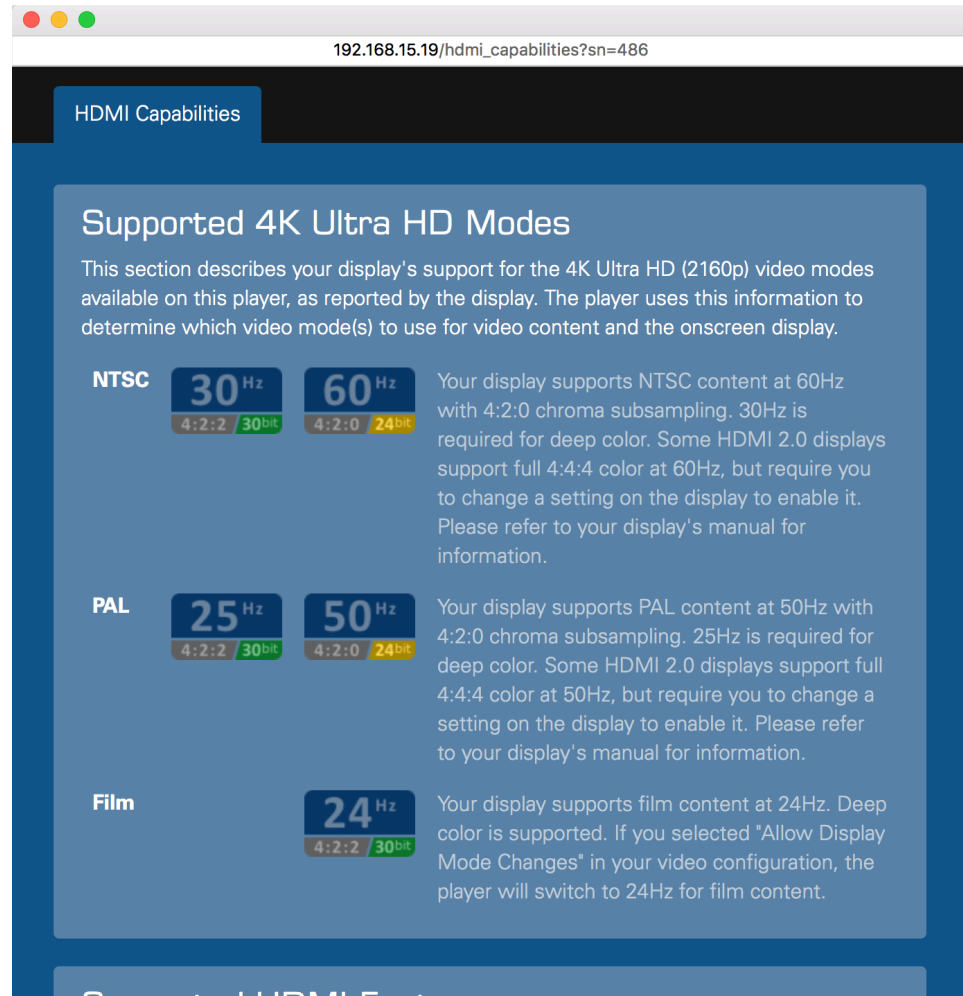


You will see a new “HDMI Capabilities” view, divided into three sections:

- Supported 4K Ultra HD Modes
- Supported HDMI Features
- HDMI Video Status

These sections are described below.

Supported 4K Ultra HD Modes



This section summarizes the 4K Ultra HD capabilities of the device(s) connected to the primary HDMI port, as detected by Strato. If Strato is connected directly to the display, then this shows the capabilities that the display is reporting. If Strato is connected to the display via an audio processor, an HDMI switch or matrix, or other intermediate equipment, then this section shows the capabilities of the combined display chain, including any limitations imposed by the intermediate devices.

This section is divided into NTSC, PAL and Film sections. The icons provide a quick summary of the display’s capabilities for each of these formats. The paragraphs in the right column give more detail.

Note that when you see “30 bit” or “24 bit”, this refers to the number of total bits of color information. These same modes are often called “10 bit” and “8 bit”, which refers to the number of bits for each color component. Since the signal has three color components, 10 bits per component equals 30 bits, etc.

Supported HDMI Features

192.168.15.19/hdmi_capabilities?sn=486

4:2:2 / 30 bit

color is supported. If you selected "Allow Display Mode Changes" in your video configuration, the player will switch to 24Hz for film content.

Supported HDMI Features

This section lists the HDMI features of this player that are supported by your display, as reported by the display.

HDCP	1.x 2.2	Your display supports HDCP 2.2. You can play protected content in full 4K Ultra HD resolution.
HD/UHD Resolutions	720p 1080i 1080p 2160p	Your display is 4K Ultra HD capable.
TV Standards	NTSC PAL Film	Your display supports the playback of NTSC (North American) and PAL (European) content, and can play film content in its native 24Hz format.
Deep Color	Yes	Your display supports deep color.
Audio	No	Your display cannot accept audio over the HDMI link.

HDMI Video Output Status





This section details the copy protection, resolution, TV standard and color capabilities of the display, and indicates whether audio is accepted by the display. Note that it is normal for HDCP 1.x to be rendered with a line through it when HDCP 2.2 is supported, because of how Strato detects HDCP. When HDCP 2.2 is active, Strato cannot detect whether the display also supports HDCP 1.x.

HDMI Video Output Status

192.168.15.19/hdmi_capabilities?sn=486

HDMI Video Output Status

This section lists the status of your player's HDMI Video output port. If any content is being played, the parameters of the content are also displayed.

	Media	Output	Status
System	 OSD	Active	The HDMI connection is functioning normally.
Protection	 N/A	HDCP 2.2	HDCP is not required for this content.
Resolution	 N/A	2160p	The onscreen display is being rendered at the resolution shown.
Frame Rate	 N/A	59.94 Hz	The onscreen display is being rendered at the frame rate shown.
Chroma	 N/A	YUV 4:2:0	The chroma resolution of the onscreen display is being reduced for output. ?
Deep Color	 N/A	24-bit (No)	The onscreen display does not use deep color.
Colorspace	 N/A	Not applicable	The onscreen display is being rendered in the colorspace shown.

The colors used in the table above denote the effect of the change in the output parameters on the quality of the video. The meaning of each color is given in the legend below.

Passthrough




The parameter is being sent through without adjustment

Increase



The parameter is being sent through with minimal effect on quality

Reduction



The parameter is being sent through, but some quality may be lost

Problem



There is a problem with the output that must be addressed

Dismiss

Refresh

This section shows the output status of the HDMI port, as of when the window was opened or refreshed. It works when displaying the onscreen display, and while playing content, so you can use it to confirm that 4K Ultra HD content is being displayed at full resolution, that 1080p content is being up-scaled, and that the expected frame rates and color information are being output.

The colored indicators show whether content is being passed through in its native format, if it is being up- or down-scaled, or if there is a problem. The status text gives more details

Click the Refresh button at the bottom of the window to easily update the status information, for example when trying different types of content.

The example above shows Strato connected to a 4K projector, displaying the onscreen display. This particular projector does not support 18 Gbps HDMI 2.0, so the onscreen display is being rendered at 60 frames per second with YUV 4:2:0 color sampling and 8-bit color.

Here is another example:

The screenshot shows a web browser window with the address bar displaying `192.168.15.19/hdmi_capabilities?sn=486`. The main content area is titled "HDMI Video Output Status" and includes a descriptive paragraph. Below this is a table with four columns: **System**, **Media**, **Output**, and **Status**. The table lists various parameters and their current states, each preceded by a colored square icon. A legend at the bottom explains the meaning of these colors: dark blue for Passthrough, green for Increase, yellow for Reduction, and red for Problem.

	Media	Output	Status
System	Playback	Active	The HDMI connection is functioning normally.
Protection	HDCP 2.2 required	HDCP 2.2	HDCP is required and enabled.
Resolution	2160p	2160p	The content is being passed through at its original resolution.
Frame Rate	23.976 fps	59.94 Hz	Film content is currently being converted to 60Hz. ?
Chroma	YUV 4:2:0	YUV 4:2:0	The content is being played at its full chroma resolution.
Deep Color	30-bit (Yes)	24-bit (No)	Deep color information is not being sent to your display. ?
Colorspace	Rec. 709	Rec. 709	The content is being displayed in its native colorspace.

The colors used in the table above denote the effect of the change in the output parameters on the quality of the video. The meaning of each color is given in the legend below.

- Passthrough** (Dark Blue): The parameter is being sent through without adjustment
- Increase** (Green): The parameter is being sent through with minimal effect on quality
- Reduction** (Yellow): The parameter is being sent through, but some quality may be lost
- Problem** (Red): There is a problem with the output that must be addressed

The example above shows Strato playing 4K Ultra HD film content on the same projector. Strato has been set to minimize display mode changes, so it is

converting the 24 fps film content to 60 fps. At 60 fps, this projector is not able to accept deep color, so Strato is sending standard 24-bit (8 bits per component) color to the display.

With this projector, the installer should consider configuring Strato to allow display mode changes when starting movie playback. This would allow Strato to switch to 24 frames per second on film content, which would in turn allow Deep Color information to be passed to the display.

One final example:

192.168.15.19/hdmi_capabilities?sn=486

HDMI Video Output Status

This section lists the status of your player's HDMI Video output port. If any content is being played, the parameters of the content are also displayed.

	Media	Output	Status
System	Playback	Active	The HDMI connection is functioning normally.
Protection	HDCP 2.2 required	HDCP 2.2	HDCP is required and enabled.
Resolution	1080p	2160p	The content is being upscaled for output. ?
Frame Rate	23.976 fps	59.94 Hz	Film content is currently being converted to 60Hz. ?
Chroma	YUV 4:2:0	YUV 4:2:0	The content is being played at its full chroma resolution.
Deep Color	24-bit (No)	24-bit (No)	The content's full bit depth is being sent to your display.
Colorspace	Rec. 709	Rec. 709	The content is being displayed in its native colorspace.

The colors used in the table above denote the effect of the change in the output parameters on the quality of the video. The meaning of each color is given in the legend below.

Passthrough The parameter is being sent through without adjustment

Increase The parameter is being sent through with minimal effect on quality

Reduction The parameter is being sent through, but some quality may be lost

Problem There is a problem with the output that must be addressed

In the example above, Strato is playing Blu-ray quality content, which is natively 1080p. In addition to converting the frame rate from 24 frames per second to 60, it is also up-scaling the content to 2160p.

Troubleshooting HDMI Connections

If Strato is connected to a display using high quality cables that satisfy the specification given earlier in this document, and if all components support HDMI 2.0 and HDCP 2.2, problems should be rare. However, if they do occur, here are some things you can try.

Check Connections

Some display devices and A/V components do not support HDMI 2.0 and HDCP 2.2 on every port. Ensure that you are using an HDMI port that supports both HDMI 2.0 and HDCP 2.2.

Check Device Settings

Some display devices modify their HDMI behavior based upon user settings. For example, some Samsung displays have an “HDMI UHD Color” setting that has to be enabled before the display will accept an 18 Gbps signal.

Check Device Software/Firmware

4K Ultra HD – especially at 18 Gbps data rates – is a new and demanding format. Some displays, audio processors, or other components may need software or firmware updates to handle it properly. Check with manufacturers to ensure that the software in all of your components is up to date.

Check HDMI Capabilities

Use the HDMI Capabilities Tool described in the previous section. Verify that the “Supported 4K Ultra HD Modes” and the “Supported HDMI Features” match the published specifications of your display device. If they do not, the display may be incorrectly reporting its capabilities, or an intermediate device (audio processor, active HDMI cable, etc.) may not match the capabilities of your display. Double check the intermediate devices. You can also consider using the Advanced Video Settings (described below) to override some features.

Check HDCP Status

If the onscreen display works properly, but you get video dropouts or no picture at all when playing a movie, the problem may be related to HDCP copy protection. The onscreen display does not require HDCP, but movie playback does. The HDMI Capabilities Tool should give you an indication of HDCP status during movie playback (click Refresh if necessary).

Try Alternate Cables

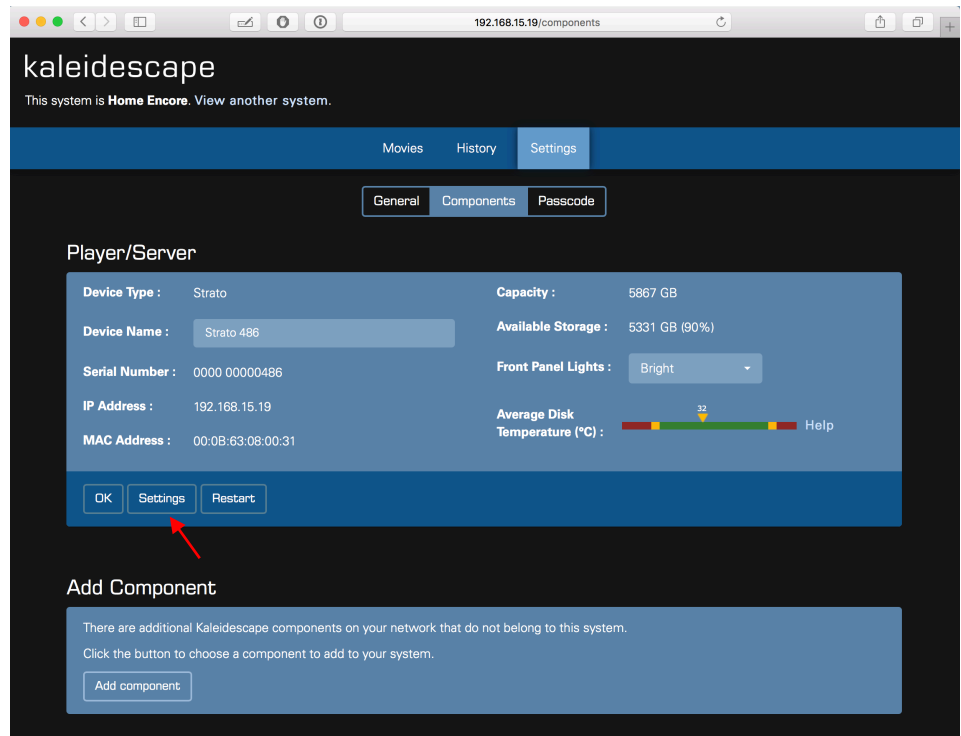
Problems with signal integrity, such as signal loss in a long cable, may also affect Strato’s ability to detect display capabilities and achieve an HDCP connection with the display. Try connecting Strato to the display using a different cable, or try temporarily relocating Strato and using a shorter cable that meets the requirements in this document to see if the problem goes away.

Reduce HDMI Speed

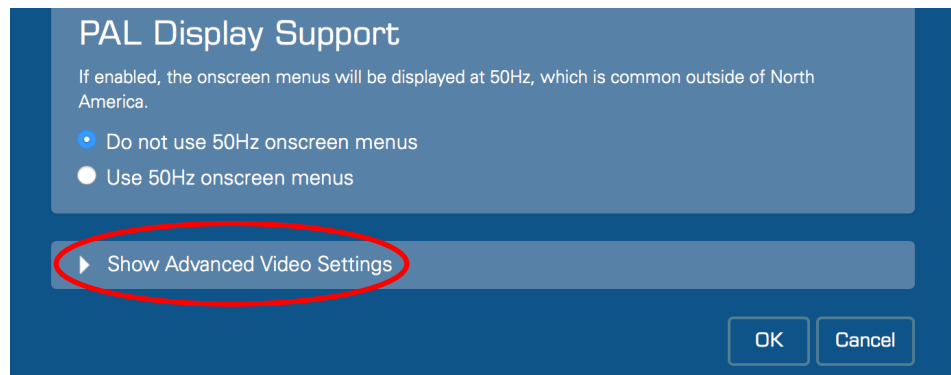
Intermittent problems are almost always related to signal integrity. The display and intermediate devices may all support 18 Gbps connections, but the cable may be unable to carry that speed reliably. You can try temporarily forcing Strato to use 10.2 Gbps instead. This can help to identify whether the problem is related to signal transmission.

To force Strato to use 10.2 Gbps, go to the system's Browser Interface, and click on the Settings tab. You should see the Components page.

In the section for your Strato, click the Settings button:



In the window that opens, scroll to the bottom and click “Show Advanced Video Settings”:



Scroll down to the “4K Ultra HD Support” section, and click the radio button next to HDMI 2.0 10.2Gbps, then click OK.

192.168.15.19/advanced_video_and_media_v4?sn=486&id=1289#advanced_section

Deep Color Support

The player detects the display's Deep Color capability automatically. Use this setting only in cases where a display or other device in the HDMI chain is incorrectly reporting its Deep Color capability.

- ☒ Detect Deep Color support automatically (default)
- ☐ Display supports Deep Color
- ☐ Display does not support Deep Color

4K Ultra HD Support

The player detects the display's 4K Ultra HD capability automatically. Use this setting only in cases where a display or other device in the HDMI chain is incorrectly reporting its 4K Ultra HD capability.

Note: If the display supports HDMI 2.0 but an intermediate component like an audio receiver does not, you should connect the HDMI 1 output directly to the compatible display and connect the audio receiver to the HDMI 2 audio-only output.

- ☒ Automatic (default)
The player automatically detects the capabilities of the display, using the EDID information provided over HDMI.
- ☐ HDMI 2.0 18Gbps
The display and all intermediate devices and cabling are HDMI 2.0 compatible and are rated for 18Gbps/600MHz. Devices in this category are sometimes labeled as "50/60Hz 4:4:4", "2160p/60 4:4:4", or similar.
- ☒ HDMI 2.0 10.2Gbps
The display and all intermediate devices and cabling are HDMI 2.0 compatible but are limited to 10.2Gbps/340MHz. Devices in this category are sometimes labeled as "50/60Hz 4:2:0", "2160p/60 4:2:0", or similar. HDBaseT 2.0 devices are limited to 10.2Gbps.
- ☐ HDMI 1.4
The display and all intermediate devices and cabling are 4K Ultra HD or 2160p rated and capable of 10.2Gbps/340MHz operation, but one or more devices are not HDMI 2.0 compatible. Devices in this category are sometimes labeled as "2160p 24/25/30Hz", or "2160p/30" or similar.
- ☐ Display does not support 4K Ultra HD
The display or one of the intermediate devices does not support 2160p or is not capable of 10.2Gbps/340MHz operation. Selecting this option disables 2160p output from the player.

OK Cancel

Once you've clicked OK to save the setting, stop your content if it was playing, and then try playing your content again.

The advanced settings can also be used to compensate for problems that arise when a display or intermediate device does not correctly report or pass EDID information.

Changes in the HDMI Display Chain During Playback

In certain installations (typically involving an HDMI matrix switch), it is possible for an HDMI device to join the display chain while movie playback is occurring. For example, a second zone may select the same video source.

If the first zone supports HDMI 2.0 and HDCP 2.2 but the newly added zone does not, the addition of the second zone will cause the HDCP 2.2 link to become invalid. Video in the first zone will go blank, and the second zone will also see no video signal. If playback is stopped and then resumed, Strato will have an opportunity to reconfigure the HDMI output and playback may be able to proceed (although at reduced resolution for 4K Ultra HD content).

Try to avoid situations in which different HDCP and HDMI versions may come and go to avoid disruptions to the viewing experience.

Control Systems

There are several Kaleidescape options available for controlling Strato.

- Kaleidescape Remote (included)
- Kaleidescape App for iPad (free download)
- Kaleidescape Child Remote (optional purchase)

Strato can also be controlled by several types of third party control devices.

- Infrared (IR) remotes
- Home control systems (which may include touch panels, handheld remotes, mobile apps, etc.)

Kaleidescape provides control modules along with touch panel templates and sample programs for most leading control systems. Kaleidescape also provides databases and IR codes for popular IR remotes.

For specific product support including modules and reference manuals, go to <http://www.kaleidescape.com/support/control-systems>.



Communication

A control device can communicate with Strato with IR, or by using a simple text-based protocol over the network.

For more information on control connections, refer to the *Kaleidescape System Control Protocol Reference Manual* at www.kaleidescape.com/go/control-protocol and the IR Hex codes at www.kaleidescape.com/go/ir-hex.

Kaleidescape Control Devices

Kaleidescape Remote

Strato comes with a backlit IR remote control. It features one-button access to features such as **Intermission** and **Shuffle**, while the **Movies** button () toggles views between *List*, *Covers* and *Collections*. The **Music** button () provides quick access to the *Songs* collection.

The **Volume** and **Mute** buttons can be programmed to control the volume on the TV or other audio device:

1. Press and hold the **Info** and **Pause** buttons at the same time. When the indicator light at the top of the remote begins blinking, release the buttons. The indicator light stays on. The Kaleidescape Remote is now in programming mode.

2. Place a remote that already controls the volume flat on a table with the Kaleidescape Remote about 6 inches (15 cm) away.



3. The following steps have to be repeated for the **Mute** button and both **Volume** buttons.
 - Check that the indicator light is still on. If it is off, repeat Step 1.
 - Press and release the button on the Kaleidescape Remote for the function you want to program.
 - Press and hold the button for the same function on the remote that already controls the volume for two seconds.
 - The indicator light on the Kaleidescape Remote blinks twice to indicate success. If the indicator light blinks four times, try again.
4. When finished, press the **OK** button on the Kaleidescape Remote. The indicator light blinks twice to confirm programming is complete.

Learn more in the [Using the Kaleidescape Remote Reference Guide](#).

Kaleidescape App for iPad

The Kaleidescape App for iPad provides an immersive experience for browsing and searching your collection of movies. The app extends the Kaleidescape experience to the iPad, displaying your movie collection with vivid high-resolution cover art, synopses, and other details.

The Kaleidescape App for iPad includes volume controls and a Return button for integration with other control systems. The following is a typical use case for the Return button:

- The user is running a home control app on an iPad and wants to use their Kaleidescape System.
- The user chooses the Kaleidescape source within the home control app.
- The controller app configures the A/V equipment for use with the Kaleidescape System, and launches the Kaleidescape App for iPad by opening a specific URL.
- The user can browse movies and music, play any selection, and control the Kaleidescape System from within the Kaleidescape app.
- When the user is finished with the Kaleidescape app, they can tap the Return button and a message appears containing an option to return to the controller app.
- The user taps the popover option to return to the controller app.

The home control app must use the special URL in order to enable the Return button. For help, refer to [Integrating with the Kaleidescape App for iPad](#).

Kaleidescape Child Remote

When the Child Remote is used, the onscreen user interface automatically switches to the simplified child user interface, eliminating all text-based menus in favor of pure graphical navigation of movie covers.

In addition to the preprogrammed Kaleidescape Child Remote, the child user interface commands can be sent to any programmable controller. Refer to [IR Control Hex Codes for Kaleidescape Systems](#) or the [Kaleidescape System Control Protocol Reference Manual](#).

Third Party Control Devices

Kaleidescape provides a wide range of templates, modules, and sample programs for control systems from several manufacturers.

Some manufacturers also provide templates, modules and IR libraries to control Kaleidescape systems.

Control devices can be simple IR remotes or touch panels.

IR Remote Control

The simplest control device is a generic IR remote control for a DVD player.

IR Code Sets

The Kaleidescape movie player supports two major infrared remote control code sets.

- Code set used by Toshiba DVD players and other manufacturers including Philips, Magnavox, Zenith, Onkyo, and Marantz
- Code set used by Kenwood DVD players

Types of Remotes

IR remotes (other than the Kaleidescape Remote) fall into the following basic categories:

- Pre-programmed
- Learning
- PC Programmable

Pre-programmed Remotes

Pre-programmed remotes only require setting the remote to control a Toshiba or Kenwood DVD player. Custom buttons that jump directly to Kaleidescape menu selections are not available.

Learning Remotes

Learning remotes can be used two ways: as a general remote with a Toshiba or Kenwood code set, or set to accept (learn) Kaleidescape-specific commands

from a device that can generate these commands (for example, the Kaleidescape Remote).

PC Programmable Remotes

PC Programmable remotes can support commands specific to the Kaleidescape interface and provide a more complete experience. The manufacturer provides software that allows the remote to be programmed via a computer. This type of programming often allows IR codes to be imported in hex format (usually copying and pasting the codes into a text box), or from a Philips CCF file.

For a list of all IR codes (in hex) or CCF format available from Kaleidescape, or for the CCF file, go to www.kaleidescape.com/go/ir.

Templates are available for download for RTI, URC, and Elan remotes.

Kaleidescape is also included in IR code database libraries for URC, Logitech Harmony and Opus.

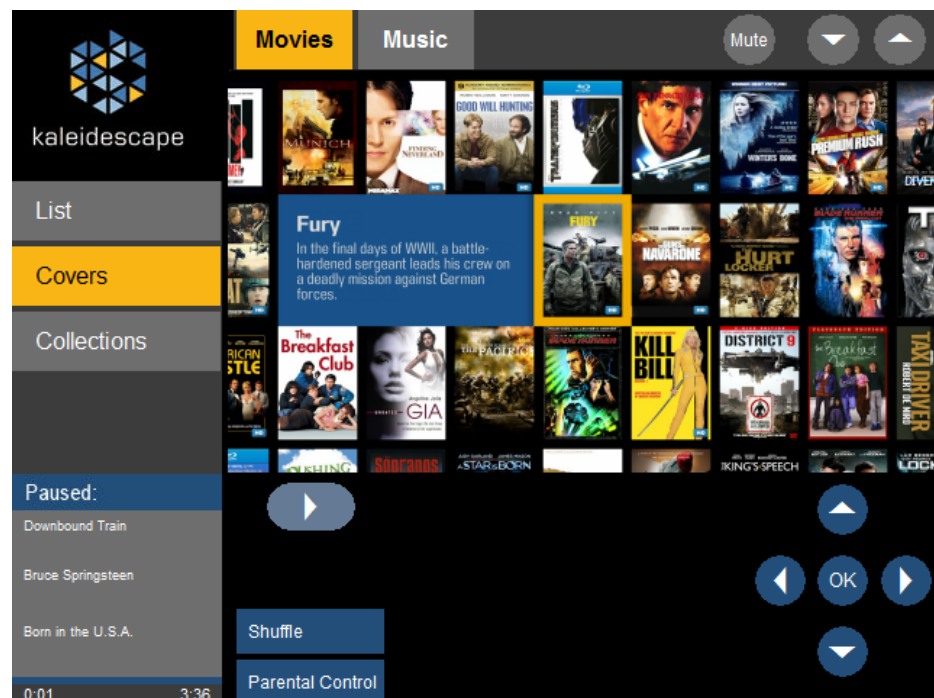
Touch Panels

Kaleidescape supports several variations of touch panel control, including:

- Onscreen Display with Video
- Onscreen Display without Video

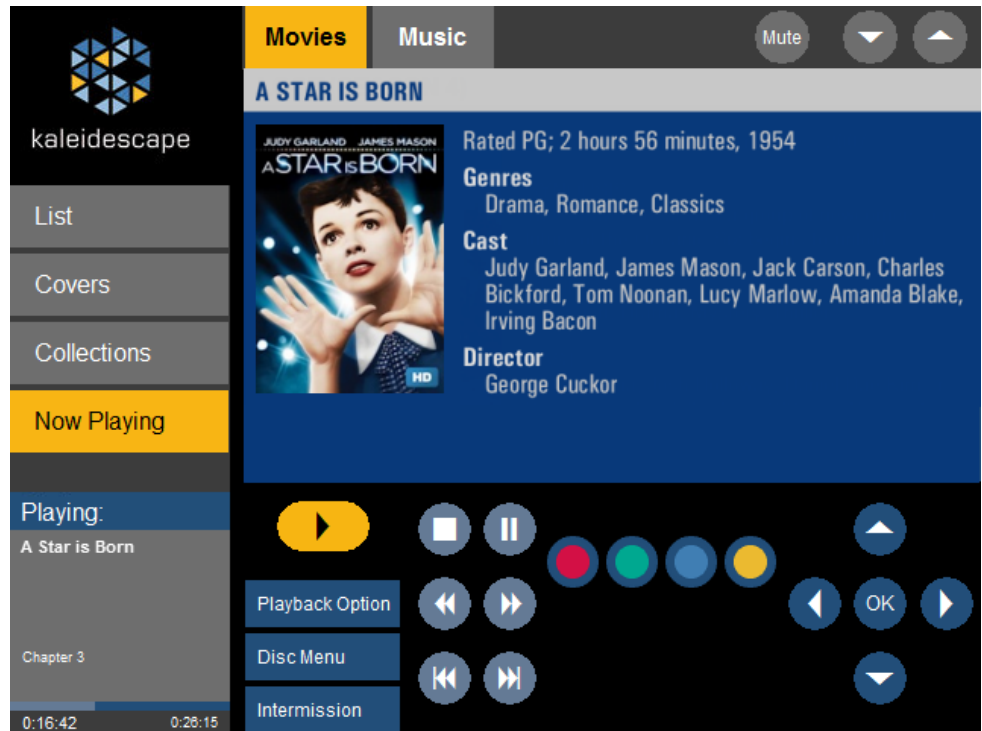
Onscreen Display with Video

Onscreen Display with Video (OSD Video) displays the Kaleidescape onscreen display on the touch panel, along with other controls, by using a video window on the touch panel. Touching the video display makes selections or navigates menus. OSD Video provides the richest user experience and is the implementation suggested by Kaleidescape whenever possible.



Onscreen Display without Video

Onscreen Display without Video (OSD No Video) provides supplemental information with text-based details for content. The touch panel replicates the details pages for movies while browsing the onscreen display.



When selecting the touch screen for an installation, consider whether a video display is present and the technical capabilities of the touch panel. Installations can require more than one type of touch panel interface to provide the best control for every zone.

For more information, go to www.kaleidescape.com/support/control-systems.