



kaleidescape

HDMI and the Kaleidescape System

Technical Note

A High-Definition Multimedia Interface® (HDMI®) connection is required to take full advantage of the advanced audio and video capabilities of Kaleidescape players. This document explains the benefits of an HDMI connection, the process used to establish this connection, and basic troubleshooting steps.

Benefits of HDMI

There is strong momentum in the consumer electronics industry to encourage the use of HDMI. Blu-ray Discs can use the Image Constraint Token (ICT), which can trigger content downsampling on component video output to no more than 540p, even on existing Blu-ray players. In some parts of the world, satellite television providers only provide HDTV signals using HDMI output, and other television providers will likely follow this precedent.

The HDMI connection on a Kaleidescape player offers several compelling advantages.

- ▶ HDMI allows Kaleidescape players to upscale DVD content to 720p, 1080i, or 1080p. (DVD CCA licensing terms prohibit sending upscaled DVDs over analog outputs, e.g., component video.)
- ▶ HDMI output must be used to benefit fully from the video processing capability of a Kaleidescape player.
- ▶ 1080p video and 24 frame per second playback of Blu-ray movies is available only with an HDMI connection.
- ▶ Bitstream pass-through of lossless audio codecs such as DTS-HD Master Audio™, Dolby TrueHD and multichannel linear PCM is available only via HDMI.
- ▶ Audio can be delivered along with video using a single HDMI cable, which simplifies installation and configuration.

- ▶ Kaleidescape players automatically determine the best video configuration settings using HDMI plug-and-play information from the display device. This means player default settings rarely have to be changed.
- ▶ Kaleidescape players add detail enhancement for HDMI which further improves image quality.

Understanding HDCP

High-bandwidth Digital Content Protection (HDCP) is a copy control method. When an HDMI source (e.g., a Kaleidescape player) is connected to an HDMI sink (e.g., a display device), the two devices exchange authentication information to check that the transmission of audio and video between the devices is permitted.

If the display device is unable to authenticate itself, the HDMI source is not permitted to send content, even at a lower resolution. When the video settings change, the HDMI source stops sending the content until the display device has re-authenticated itself.

HDMI ports must support HDCP, but this is optional for DVI ports. So if a display device has both HDMI and DVI inputs, use the HDMI input, rather than an HDMI-to-DVI adapter.

Connecting a Kaleidescape Player using HDMI

Use the following procedure to connect a Kaleidescape player via HDMI.

1. Update the firmware for each HDMI device, including display devices and A/V receivers and processors to the latest version. Updates often improve HDMI connection reliability.
2. Verify that all cables are certified High Speed cables.

Certified High Speed cables have been tested to 340 MHz and can successfully handle 1080p signals. Uncertified or Standard Speed cables might only be tested to 75 MHz, which is the equivalent of a 1080i signal.
3. Use a dedicated HDMI input rather than a HDMI-to-DVI adapter if possible. DVI does not support audio, and is more prone to issues with HDCP.
4. Set the sharpness on the display device for the input used by the Kaleidescape player as low as possible. Kaleidescape players can apply sharpness to DVDs according to detail enhancement settings (see step 7).

Disable any edge enhancement setting in the display.
5. Set the display device for 1:1 pixel mapping by selecting the dot-for-dot, pixel-by-pixel, or equivalent viewing mode. This setting helps prevent the display from scaling the video image. Scaling video images twice typically degrades picture quality.

6. Select the **COMPONENTS** tab in the installer pages of the browser interface, click the **SETTINGS** button for the player, and select the **VIDEO** tab.

Verify that the **PRIMARY VIDEO OUTPUT** is set to **HDMI** and that **Use Highest Available Resolution** is selected for all media formats. These are the default settings. Click **OK** to save the video settings.

If changes are made during playback, stop and restart the movie to see the results. If the default settings do not produce the desired results, see [Overriding Plug-and-Play Information on page 6](#).

7. Select the **VIDEO** tab again. Go to **Show Advanced Video Settings**. Set the appropriate amount of detail enhancement required for the viewing environment.

The browser interface has information on the recommended setting for several common installation scenarios. This setting takes effect immediately during playback, which allows the installer to try several settings to determine the best level. See [Figure 1](#). Click **OK** to save the video settings.

Note: The detail enhancement setting is only available if HDMI is selected as the primary video output.

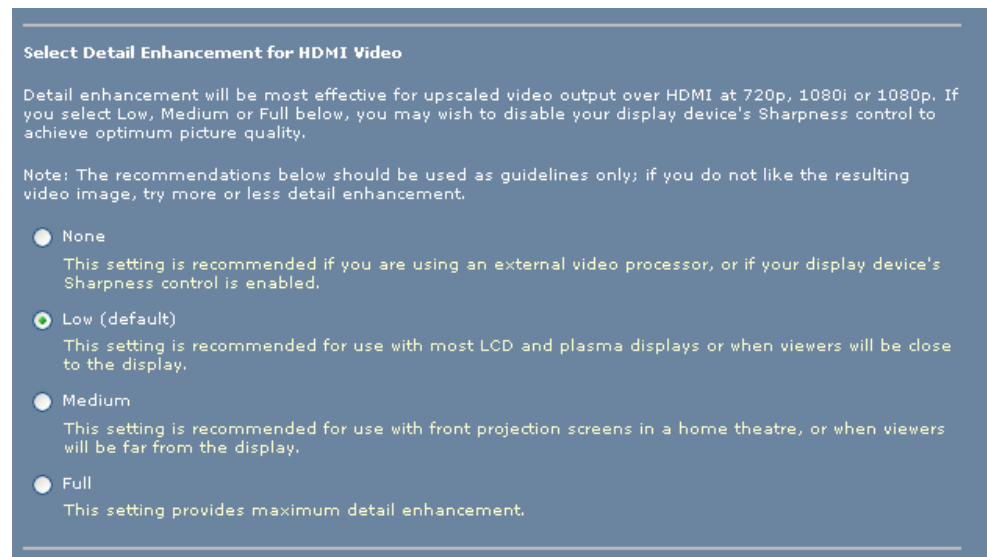


Figure 1 Detail Enhancement for HDMI Video Settings

HDCP Repeater Device Limit

HDMI sources must recognize HDCP encryption keys from all downstream devices, including repeaters (e.g., switchers and splitters) and sinks (e.g., display devices). For example, a source device connected to a splitter connected to four televisions must be able to recognize five keys: four from televisions and one from the splitter.

Kaleidescape players with HDMI support up to 37 downstream devices.

Multichannel Audio

Bitstream multichannel audio tracks can be sent over an HDMI connection.

M-Class Players

M-Class players can send audio over HDMI as either multichannel linear PCM or as a bitstream passed through for decoding in the receiver. To configure a preference for HDMI audio decode mode, select the **COMPONENTS** tab in the installer pages of the browser interface, click the **SETTINGS** button for the player, and select the **AUDIO** tab. See [Figure 2](#).

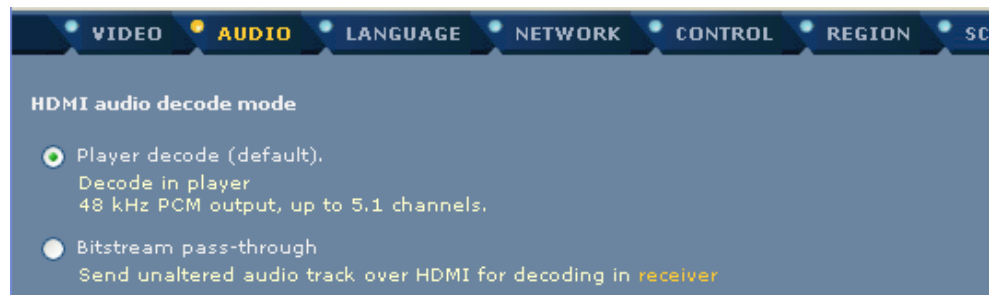


Figure 2 AUDIO Settings for M-Class Players

Select **PLAYER DECODE** (default) to hear Blu-ray secondary audio, or when coaxial, optical or analog audio outputs are used. **PLAYER DECODE** sends 48 kHz PCM output over HDMI, up to 5.1 channels depending on the content.

Select **BITSTREAM PASS-THROUGH** to send Blu-ray soundtracks over HDMI at the highest bandwidth possible (up to 192 kHz or 7.1 channels) at the expense of other features.

The lossless audio formats available on Blu-ray Discs, such as Dolby TrueHD, DTS-HD Master Audio and 7.1-channel PCM, exceed the capabilities of coaxial, optical and analog audio outputs. These formats are output without alteration only over HDMI, and only when using the **BITSTREAM PASS-THROUGH** mode.

Be sure to click **OK** to save the HDMI audio decode mode setting.

Non-M-Class Players

To configure the audio output preference for non-M-Class players, select the **COMPONENTS** tab in the installer pages of the browser interface, click the **SETTINGS** button for the player, and select the **AUDIO** tab. See [Figure 3](#) for audio settings for non-M-Class players.



Figure 3 AUDIO Settings for Non-M-Class Players

Prior to KEAOS 3.7, only Dolby Digital soundtracks decoded into stereo were sent over HDMI, and DTS Digital Surround™ soundtracks were not sent at all. Updating to version 3.7 does not change the behavior of existing players, but this feature can be enabled in the installer pages of the browser interface. See [Figure 4](#).

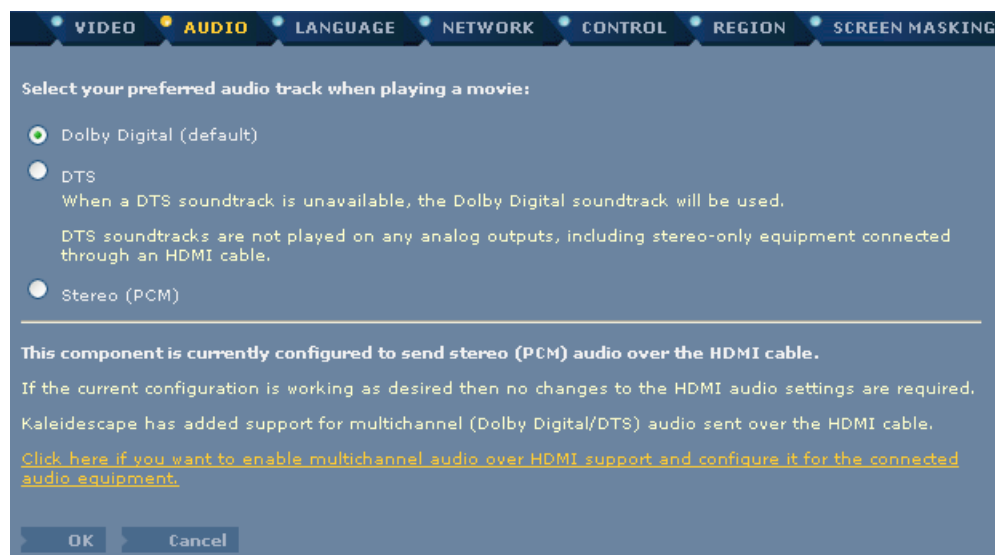


Figure 4 AUDIO Settings for Players Installed prior to KEAOS 3.7

Overriding Plug-and-Play Information

Display devices and A/V receivers and processors connected via HDMI provide capability information automatically via EDID. This information determines which audio formats the player sends to the receiver, and the video resolution the player sends to the display device. In rare cases, it is necessary to override the capabilities because of an inaccurate EDID or an EDID that was corrupted by an HDMI extender or switcher.

Override settings for M-Class players are provided in the video settings and advanced audio settings on the installer pages of the browser interface. See [Figure 5](#).

Select Video Mode For Each Media Format

These video modes are used for the **primary** video output only:

Media Format	Video Mode
Onscreen display	Use Highest Available Resolution ▼
NTSC DVD	Use Highest Available Resolution ▼
PAL DVD	Use Highest Available Resolution ▼
Blu-ray Disc	Use Highest Available Resolution ▼

HDMI capability override

Automatic detection of the receiver's capabilities should give the best results. These advanced overrides should be used only when capabilities are misreported by the receiver.

	Auto detect (default)	Receiver supports	Receiver does not support
PCM 7.1 Channel	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
PCM 5.1 Channel	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
DTS-HD MA, DTS-HD HRA	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dolby TrueHD	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dolby Digital Plus	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
DTS	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dolby Digital	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 5 Video and Audio Override Settings

Troubleshooting

Use the following information to troubleshoot most common problems encountered with an HDMI connection.

Problem	Probable Cause	Solution
Image appears heavily pixelated or blocky	Display device is improperly processing image aspect ratio.	Set aspect ratio to dot-for-dot, pixel-by-pixel , or equivalent.
A line appears in the image (often green or white)	Display device is processing image aspect ratio improperly.	Set aspect ratio to dot-for-dot, pixel-by-pixel , or equivalent.

Problem	Probable Cause	Solution
No image is present, display device reports no signal, or image flickers during playback	1. Damaged or defective cable	Replace cable.
	2. Display device is set for another resolution.	If display has a resolution setting, set to automatic or set correctly manually.
	3. HDCP failure	<ul style="list-style-type: none"> • Confirm display device supports HDCP. Update display device firmware, if possible. • Use direct HDMI connection rather than DVI adapter.
	4. Cable is too long.	Test with a shorter Certified High Speed HDMI cable. If successful, investigate extenders or other options.
Image disappears repeatedly, and eventually disappears completely	HDCP failure	<ul style="list-style-type: none"> • Update display device firmware, if possible. • Use an HDMI splitter or extender that reclocks the signal. Insert between the player and display.
The Kaleidescape onscreen user interface or preloaded HD content is displayed, but DVD and Blu-ray movies are not	HDCP failure	<ul style="list-style-type: none"> • Confirm display device supports HDCP. Update display device firmware, if possible. • Use direct HDMI connection rather than DVI adapter. • Try a different cable.
Audio on HDMI cable is only stereo, but multichannel audio is desired	Kaleidescape player was installed under KEAOS 3.6 or earlier, multichannel audio using HDMI has not yet been enabled.	<p>Select COMPONENTS tab in the browser interface, click the SETTINGS button for the player, select the AUDIO tab. Enable MULTI-CHANNEL AUDIO USING HDMI.</p> <p>Force the bitstream by selecting ALWAYS SEND MULTICHANNEL AUDIO.</p>

Problem	Probable Cause	Solution
No audio on HDMI cable	DTS Digital Surround soundtrack is playing, and audio output is stereo (which, if player is not M-Class, does not support DTS Digital Surround).	Select the COMPONENTS tab in the browser interface, click the SETTINGS button for the player, select the AUDIO tab. Change Audio track preference to DOLBY DIGITAL .

Kaleidescape Support

For additional information about HDMI and the Kaleidescape System, contact Kaleidescape Support.

- ▶ Send email message to support@kaleidescape.com.
- ▶ Call the support line at **+1 (650) 625-6160**.

Be prepared to provide the serial number of the Kaleidescape server (located on the back of the server). Serial numbers are printed on labels located on the backs of all components and behind the front panels of 3U and 5U Servers.

The Kaleidescape website always has the latest support updates.

<http://www.kaleidescape.com>