

Playing High Frame Rate Content on the Christie IMB-S2 Instruction Sheet

This document provides information and procedures for playing High Frame Rate (HFR) content on a Christie IMB-S2. The information in this document is also applicable to Solaria One and Solaria One+ projectors.

Prerequisites

- The correct Solaria Main Software version must be installed on the projector in which the Christie IMB-S2 is installed. This table lists the minimum software versions required for HFR playback on Christie projectors:

Christie Projector Model	Minimum Software Version Required
Solaria One/Solaria One +	Solaria Main Software 4.0.0 (2)
CP2210	Solaria Main Software 3.1.0 (3)
CP2220/CP2230	Solaria Main Software 3.1.0 (3)
CP4220/CP4230	Solaria Main Software 3.1.1 (1)

To determine the Solaria Main Software version installed on your projector, tap **Menu > About** on the projector touch panel controller (TPC). The Solaria Main Software version information appears in the **Package Version #** field. For optimum performance, upgrade the Solaria Main Software to the most recent version provided on the www.christiedigital.com website.

- If you are using a Christie IMB-S2 to play HFR content, you must have Christie IMB-S2 Main Software v1.1.0 (44) or later installed and a HFR license (108-445104-01).

To determine the Christie IMB-S2 Main Software version installed on your projector, on the projector TPC tap **Menu > Christie IMB > Status**. The Christie IMB-S2 Main Software version information appears in the **IMB Version** field. For optimum performance, upgrade the Christie IMB-S2 Main Software to the most recent version provided on the www.christiedigital.com website.

To purchase a HFR license, contact Christie customer service. Once you receive your license, install it:

- Copy the license to a USB flash drive.
- On the projector TPC, tap **Menu > Christie IMB > System > Licenses**.
- Insert the USB flash drive with the HFR license into the USB port on the side of the TPC.
- Select a license file and tap **Add**.

What is HFR Content?

HFR content is content that plays at a frame rate of 48 frames per second (fps) or higher. HFR content is often associated with 3D content that plays at 48 fps/eye or higher. The most popular high frame rates are 48 and 60 fps/eye.

HFR and the Christie IMB-S2

The Christie IMB can play 2D, standard 3D, and 3D high frame rate (HFR) content in the same playlist without inserting channel changes between clips. If a playlist contains 3D content, the entire playlist is played in 3D mode. To play 3D content, you must select a 3D channel on the projector.

When playing a mix of regular and HFR content, these limitations in the projection system can affect the playback of 3D content:

- Flash rate of the digital micromirror devices (DMDs)
- Flash rate limitations of the 3D system
- Spin up and spin down time of wheel-based 3D systems

Play Content with Different Frame Rates

Traditional 3D content is mastered at 24 frames/sec per eye. On most 3D systems, this content is triple flashed. To triple flash content on a Christie projector, select a frame rate multiplier setting of **6:2** in the **Frame Rate N:M** field of the 3D Control screen on the projector touch panel controller (TPC).

For HFR content, the specifications of the projection system determine the achievable flash rate of the 3D content:

Frame Rate	Maximum Flash Rate	3D Setting	Flashes/sec
24 fps/eye	Triple	6:2	144
48 fps/eye	Double	4:2	192
60 fps/eye	Single	2:2	120

As content with different frame rates plays, the flash rate changes to match the flash rate of the content. To achieve this flash rate transition, the Christie IMB-S2 uses one of three default 3D files to quickly adjust the 3D settings of the Integrated Cinema Processor (ICP) to different frame rates.

This table lists the default Christie 3D files and the type of HFR content each file is associated with:

3D File name	Description	Frame Rate Range
3D24.3D	3D settings for 24 fps/eye 3D content	23 fps/eye – 30 fps/eye
3D48.3D	3D settings for 48 fps/eye 3D content	31 fps/eye – 50 fps/eye
3D60.3D	3D settings for 60 fps/eye 3D content	51 fps/eye – 60 fps/eye

The transition from one flash rate to another occurs instantaneously during the blank time when the Christie IMB-S2 is transitioning from one clip to another. The default 3D files control all of the projector 3D settings including:

- Frame Rate N:M
- Dark Time
- Output Delay
- Phase Delay
- 3D Sync Polarity

If the default 3D files are not removed from the ICP, the ICP 3D settings are controlled by the default 3D files and not the 3D settings specified on the **3D Control** page of the Channel Setup screen of the TPC. If you change the 3D settings of a channel during playback, the 3D settings revert to the settings of the appropriate 3D file the next time the frame rate changes.

If you remove the default 3D files from the ICP, the 3D settings specified on the **3D Control** page of the Channel Setup screen of the TPC determine how 3D content is displayed. If you remove the default 3D files, the flash rate of different 3D content in a playlist is not automatically adjusted.

Customize the Default 3D Files

You must customize each of the default 3D files to match the capabilities of your 3D system. Typically, you only need to customize the default 3D files once. You use the interface included with Solaria Main Software to modify the default 3D files. For the most current settings, see the documentation provided by the manufacturer of your 3D system.

1. On the projector TPC, tap **Menu > Advanced Setup > High Frame Rate 3D File Setup**.
2. Select a 3D frame rate file in the **Current 3D File** list.
If a 3D frame rate file is not listed, tap **Save** to save the settings and apply a name to the file.
3. Complete these fields:

Field	Description
3D Sync Input Mode	Specifies whether a specific frame of input data has left eye or right eye data. Select Use Line Interleaved (first line=Left,second line=Right) . When specified, the ICP de-interleaves each line into the left image or right image in memory as specified. Line interleave can be used with PsF 3D data (left and right data for one field, then left and right data for second field).
L/R Display Reference	Specifies which frame of eye data to display during a specific display frame. This signal is referenced to the display frame rate which is specified by the Frame Rate N:M. Select Not Used .

Field	Description
Frame Rate N:M	<p>Sets how many frames to display per number of frames that form one complete image. Settings for common 3D systems:</p> <ul style="list-style-type: none"> • RealID: 3D24 (6:2), 3D48 (4:2), 3D60 (2:2) • Dolby 3D Wheel: 3D24 (6:2), 3D48 (4:2), 3D60 (2:2) • MasterImage: 3D24 (6:2), 3D48 (2:2), 3D60 (2:2) • XpanD 3D: 3D24 (6:2), 3D48 (4:2), 3D60 (2:2) <p>Increase the display frame rate to reduce flicker from your source(s).</p>
L/R Display Sequence	<p>Defines the frame order (L-R or R-L) required for 3D perspective. This option only has meaning when the Frame Rate factor M is equal to 2. For this case, 2 input frames of data are required to constitute a complete frame of image data. This parameter tells the system which frames go together to make a complete image.</p> <p>Select Left (L1R1 L2R2...).</p>
3D Sync Polarity	<p>Keeps 3D stereo sync output the same as input (true) or reversed (inverted).</p> <p>True: 3D L/R sync output from GPO matches L/R sync input. Inverted: 3D L/R sync output from GPO is the opposite of sync input (left = right, right = left).</p> <p>Settings for common 3D systems:</p> <ul style="list-style-type: none"> • RealID: 3D24 (True), 3D48 (True), 3D60 (True) • Dolby 3D Wheel: 3D24 (True), 3D48 (True), 3D60 (True) • MasterImage: 3D24 (True), 3D48 (True), 3D60 (True) • XpanD 3D: 3D24 (True), 3D48 (True), 3D60 (True)
Dark Time (µS)	<p>Creates a blank time interval between left and right frames to allow for LCD shutter glasses, Z screen, or rotating 3D wheel to synchronize the output. See Dark Time and Output Delay Notes below. Valid values are 0 to 65535. Tap Launch Dialog <input type="text"/> to enter the dark time value.</p> <p>Settings for common 3D systems:</p> <ul style="list-style-type: none"> • RealID: 3D24 (430), 3D48 (430), 3D60 (430) • Dolby 3D Wheel: 3D24 (780), 3D48 (N/A), 3D60 (N/A) • MasterImage: 3D24 (1157), 3D48 (1736), 3D60 (1736) • XpanD 3D: 3D24 (1100), 3D48 (1100), 3D60 (1100)
Output Delay (µS)	<p>The non-image time in Microseconds (µS). Offset 3D stereo sync output in relation to dark time interval. Valid values are -32768 to 32767. A positive offset adds a delay and a negative offset starts playback early.</p> <p>Tap Launch Dialog <input type="text"/> to enter the output delay value.</p> <p>Settings for common 3D systems:</p> <ul style="list-style-type: none"> • RealID: 3D24 (-120), 3D48 (-120), 3D60 (-120) • Dolby 3D Wheel: 3D24 (0), 3D48 (0), 3D60 (0) • MasterImage: 3D24 (0), 3D48 (0), 3D60 (0) • XpanD 3D: 3D24 (-200), 3D48 (-200), 3D60 (-200)

Field	Description
Phase Delay (deg)	<p>The degree of reference between the left and right sync output. Valid values are -180 and 180. Tap Launch Dialog  to enter the phase delay value.</p> <p>Settings for common 3D systems:</p> <ul style="list-style-type: none"> • RealD: 3D24 (0), 3D48 (0), 3D60 (0) • Dolby 3D Wheel: 3D24 (0), 3D48 (0), 3D60 (0) • MasterImage: 3D24 (0), 3D48 (0), 3D60 (0) • XpanD 3D: 3D24 (0), 3D48 (0), 3D60 (0)

4. Tap **Save**.

Set the 3D Transition Time

It can take some wheel-based 3D systems such as Dolby and MasterImage several seconds to adjust to a new frame rate. During the adjustment period, the projector output is blanked. Use the Christie IMB-S2 3D Device Delay setting to set the amount of delay (black time) to apply during 3D transitions. This delay is applied every time a frame rate transition occurs.

1. On the projector touch panel controller (TPC), tap **Menu > Christie IMB > System**.
2. Tap **Config Files** in the left pane.
3. Tap **Enable Delay** in the **3D Device Delay** area.
4. Select the delay time in seconds in the **Delay (Sec)** list.
5. Tap **Save**.

HFR and 3D Playback on Multiple Projectors

When projecting 3D or HFR content on multiple projectors with static polarizers (for example, Christie Duo), each projector displays a left or right image. You do not need to configure 3D files for 3D or HFR playback and you do not need to select the **Enable 3D** option on the projector touch panel controller (TPC). To verify **Enable 3D** is not selected:

1. On the projector TPC, tap **Menu > Channel Setup > 3D Control**.
2. Clear the **Enable 3D** check box if it is selected.

If your multiple projector configuration uses an active shutter system such as XPAND 3D, each projector alternates between the left and right image. With this configuration, you must configure the 3D files, define the 3D channels, and select **Active Dual Enabled** on the TPC. To select **Active Dual Enabled** on the master projector:

1. On the projector TPC, tap **Christie IMB > System > Multi Projector**.
2. Select **Enabled** to the right of **Active Dual Enabled**.

This option is not available if **Master IMB Enable** is not selected.

