SONY

- Product Information-

SRX-R515P

SRX-R320SP

3D glasses

Sony 3D Polarising System for SRX-R320SP and SRX-R515P Projection Systems

2nd Edition

Sony Digital Cinema 4K

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Document revised: January, 2014

1. Introduction

Sony offers the ability to work with a choice of 3D technologies for digital cinema including; the Sony 3D polarising system (based on Sony's own polarising filters, Sony 3D dual lens system, together with Sony approved 3D polarising glasses) as well as the ability to work with the RealD polarising system. Please see the following for selected compatibility with 3D technologies.

- Customers now have a choice of 3D polarising technologies and commercial models to suit their business needs - based on the Sony 3D and RealD options
- The Sony 3D polarising system is developed for use with the SRX-R320SP projection system for larger screens and the SRX-R515P projection system for smaller screens.
- As with all 3D Polarising Systems, the Sony 3D Polarising System requires the use of a silver screen. 3D polarising systems also require certain general installation requirements to be met e.g. confirming suitability of projection window glass for polarising effects.

The SRX-R320SP has a different, optical block from the SRX-R320P projection system to tailor it for the Sony 3D polarising filter characteristics, but otherwise they are virtually identical projectors for 2D and 3D operation. Similarly, the Sony polarising filters are not compatible with the SRX-R320P system which has an optical block matched to RealD polarising filters.

Compatibility with new Sony 3D polarising system			
Projector	SRX-R515P 	SRX-R320SP 	SRX-R320P 
Compatibility with Sony 3D polarising system	✓	✓	✗
Compatibility with RealD polarising system	✗	✗	✓

New for 2014, Sony has also launched a new, more cost effective, set of 3D glasses matched to the Sony 3D polarising filters and carrying the Sony Digital Cinema 3D branding to differentiate to audiences theatres using the Sony system from other options.

Product/ordering codes:

- 3D glasses Adult
- 3D glasses Child

2. Projector Model SRX-R320SP

The SRX-R320**SP** is a relatively new model in the SRX-R320 series of projectors. The SRX-R320**SP** is optimised for use with the Sony 3D polarising System.

The SRX-R320**SP** (P for “package”) system comprises;

- New optical block configuration optimised for the Sony 3D polarising filters
- Otherwise identical to the SRX-R320P (electronic parts and physical parts), except for the optical block

Projector	SRX-R320SP 	SRX-R320P 
Compatibility with Sony 3D polarising system	✓	✗
Compatibility with RealD polarising system	✗	✓

Customers should select the SRX-R320 Series model to match the 3D polarising technology they intend to use.

Due to the difference in optical block configuration between the SRX-R320P/SRX-R220 and SRX-R320SP, it is not possible for existing SRX-R320P or earlier SRX-R220 installations to utilise the Sony 3D system based on the Sony 3D polarising filter.

The Sony 3D polarising system is NOT backwards compatible with SRX-R320P/SRX-R220 because of the differences in optical block configuration.

3. Key Selling Points of Sony 3D Polarising System

- **Easy-on-the-eye Sony 3D performance with no flashing**
  Sony's unique dual lens system displays 3D movies at their native 2K resolution. The dual lens combined with 3D technology projects the Left and Right eye images simultaneously to achieve crisp 3D images, giving none of the flashing issues associated with systems that use "triple flash" 3D image technology.

  Please see Appendix 10.3 for further explanation.

- **High Frame Rate Compatible**
  Both SRX-R320SP and SRX-R515P are compatible with the latest High Frame Rate DCP's. The SRX-R320SP requires an optional HFR license, LSM-A1. HFR capability is included in the SRX-R515P core functionality as standard.

- **Cost effective with no license fee**
  The Sony 3D Polarising System can be purchased and does not apply a license fee to customers.

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- **Full colour quality in 3D**
  Sony Projectors operating in 3D mode with the dual lens, display images with full 12-bit, 4:4:4 colour quality. Many competing systems have to reduce colour quality to 10-bit, 4:2:2 level when displaying 3D.

- **Established track record**
  Although new to the cinema market in Europe, the Sony 3D polarising system and SRX-R320SP combination has wide scale deployments in Japan, Korea and China. The same performance for 3D is applied to the SRX-R515P.

- **Directly compatible with the SRX-R320SP and SRX-R515P**
  The Sony 3D Polarising System is directly compatible with the SRX-R320SP and SRX-R515P.

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4. System Configuration for 3D

The main components of the Sony 3D polarising system combined with Sony projection systems are;

SRX-R320SP PLUS • **LKRL-A002 PACK** (*Short Throw Lens + Polarising Filters) OR • **LKRL-A003 PACK** (*Long Throw Lens + Polarising Filters)	**SRX-R515P** PLUS • **LKRL-A502 PACK** (*Short Throw Lens + Polarising Filters) OR • **LKRL-A503 PACK** (*Long Throw Lens + Polarising Filters)
 LKRL-A002 PACK + SRX-R320SP	 LKRL-A502 PACK + SRX-R515P
 LKRL-A003 PACK + SRX-R320SP	 LKRL-A503 PACK + SRX-R515P

	Sony approved 3D polarising glasses	
		
Ordering code:	**3D glasses Adult**	**3D glasses Child**

Polarising systems for 3D require the use of a silver screen to maintain the polarisation of the image reflected from the screen.

***** See section 4.1 for throw ratio data.

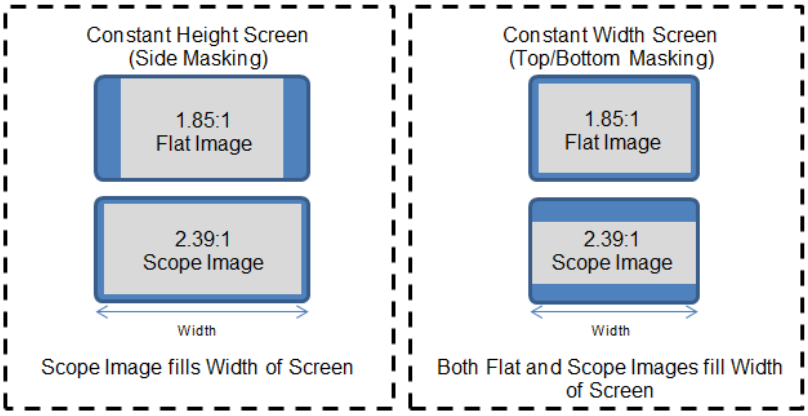
4.1 Choice of 3D Dual Lenses

When choosing a 3D Dual Lens for the Sony 3D Polarising System, the different screen formats need to be considered;

- Constant Height (Side Masking) – Screen is 2.39:1 aspect ratio

OR

- Constant Width (Top/Bottom Masking) – Screen is 1.85:1 aspect ratio



In either mode, the Zoom Ratio = **Throw distance / Largest Screen Width**.

A lens can then be selected from the tables below.

	SRX-R320SP 3D Polarising System Lenses		
Screen Format	**3D lens model**	**Zoom ratio**	**Horizontal shift**
Side masking	LKRL-A002 PACK	1.1 ~ 1.9	0%
	LKRL-A003 PACK	1.9 ~ 4.0	0%
Top/bottom masking	LKRL-A002 PACK	1.4 ~2.46	0%
	LKRL-A003 PACK	2.46 ~ 5.0	0%

	SRX-R515P 3D Polarising System Lenses		
Screen Format	**3D lens model**	**Zoom ratio**	**Horizontal shift**
Side masking	LKRL-A502 PACK	1.03 ~ 1.85	+/-7%
	LKRL-A503 PACK	1.7 ~ 3.76	+/-7%
Top/bottom masking	LKRL-A502 PACK	1.3 ~2.33	+/-7%
	LKRL-A503 PACK	2.14 ~ 4.73	+/-7%

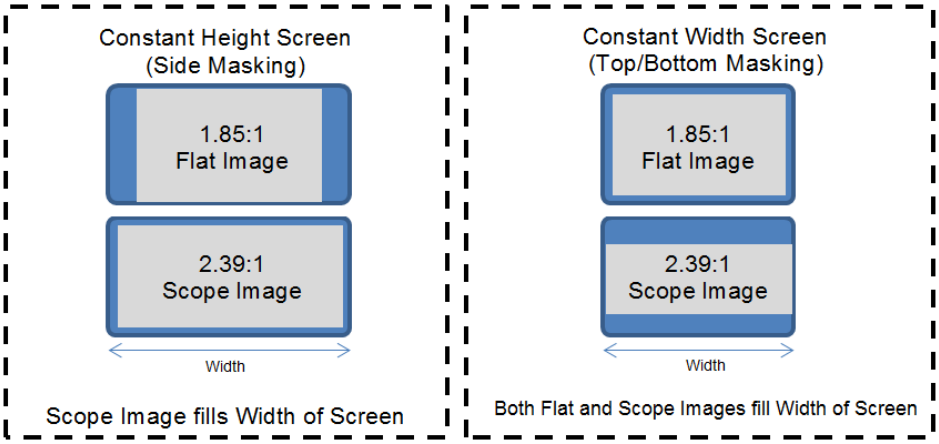
4.2 Maximum Screen Sizes for 4.5ft-L brightness

The maximum screen size of the Sony 3D Polarising System, varies depending on the screen mode;

- Constant Height (Side Masking) – Screen is 2.39:1 aspect ratio

OR

- Constant Width (Top/Bottom Masking) – Screen is 1.85:1 aspect ratio



For a reference brightness of 4.5ft-L, the maximum screen widths for the different image formats and masking type are detailed in the table below. Note the criteria below the table. Greater screen widths can be accommodated at higher initial lamp power settings. The below details are based on Flat Screens (NOT Curved Screens);

SRX-R320SP 3D Polarising System Screen Coverage		
Lamp (kW)	Side Mask	Top/Bottom Mask
4.2	14.6m	11.6m
3	12.3m	9.8m
2	10m	8m

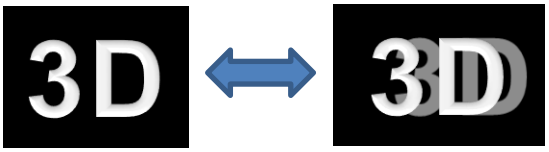
SRX-R515P 3D Polarising System Screen Coverage		
Lamp (W)	Side Mask	Top/Bottom Mask
6 x 450	12.3m	10.1m
6 x 330	10.9m	8.7m

* Maximum screen sizes are indicative and actual results will be dependent on individual installation conditions. The above has been calculated using the following conditions of 2.2 gain silver screen, 80% lamp power and 93% projection window transmittance. Individual installation conditions will affect actual performance, such as; tolerances for screen gain, port glass, required electronic masking, horizontal and vertical offset, Key-stoning, etc.

5. Sony Approved 3D Glasses

Correct performance of the Sony 3D Polarising System is not only dependent on the Sony 3D Polarising Filters and 3D Dual Lens, but also the use of 3D Polarising glasses that are matched to the projectors polarising filters.

There are many sources of 3D Polarising Glasses but Sony cannot guarantee the image quality if non-approved 3D glasses are used. The usage of non-approved 3D glasses may give inaccurate color imagery or excessive crosstalk (also known as “ghosting”).

Original Image  Crosstalk (ghosting) Example

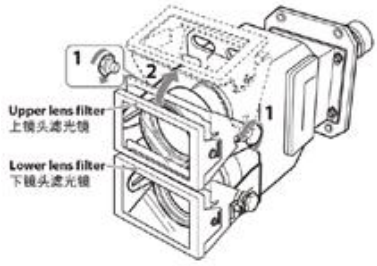
Ordering Information

Order Code	Description
3D glasses Adult	Box of Adult size 3D Polarising Glasses (50 pieces per box)
3D glasses Child	Box of Child size 3D Polarising Glasses (50 pieces per box)

6. Handling the 3D polarising filters

The 3D polarising filters are shipped as a pair, comprising an upper lens filter and a lower lens filter.

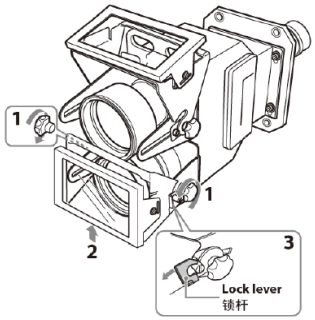
A 1, 2



Handling the upper lens filter (Fig. A)

1) Loosen the screws on the left and right of the upper lens filter.
2) Lift the upper lens filter.
3) Tighten the screws that were loosened in step 1 to secure the upper lens filter.

B 1, 2, 3



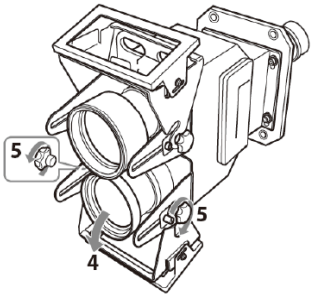
Handling the lower lens filter (Fig. B)

1) Loosen the screws on the left and right of the lower lens filter.
2) Lift the lower lens slightly to float the lock lever near the right side screw.
3) Pull the lever toward you to release while supporting the lower lens filter with one hand.

Note

When the lock lever is released, the lower lens filter may move downward suddenly, which may cause surrounding to be damaged. Be sure to support the filter with your hand to prevent that.

4, 5



4) Move the lower lens filter down carefully.
5) Tighten the screws that were loosened in step 1 to secure the lower lens filter.

7. Specifications

. Comparison between SRX-R515P and SRX-R320SP is below:

	SRX-R515P	SRX-R320SP
Projector head		
Resolution (pixels)	4096 (H) x 2160 (V)	4096 (H) x 2160 (V)
Projector contrast ratio	Average 8,000:1	Over 2,000:1
Lamp technology	High pressure mercury	Xenon **(Same models as SRX-R320P)**
Max. Light output (lumens)	15,000 with 6 x 450W lamps 11,000 with 6 x 330W lamps	20,000 with 4KW lamp (x1) 15,000 with 3KW lamp (x1) 10,000 with 2KW lamp (x1)
Power requirements	AC 200~240V, 50/60Hz, single phase	AC 200~240V, 50/60Hz, single phase
Power consumption (max.)	• 4.3kW with 6 x 450W lamps • 3.2kW with 6 x 330W lamps	• 5.4KW with 4KW lamp • 4.2KW with 3KW lamp • 3.0KW with 2K lamp
Inputs	• 2 x HDMI • PCIe from XCT-S10 storage (media block is integral to projector)	• 1 x DVI-D (HDCP) • 1 x open slot for optional HDMI, DVI-D or HD-SDI input boards • Media block input over LVDS x 2
Outputs	• Audio output 1: 8 channel unbalanced (D-sub 25-pin) • Audio output 2: AES/EBU digital, 16 channels (D-sub 25-pin) GPIO: GPI x 8, GPO x 16	• Audio output 1: 8 channel unbalanced (D-sub 25-pin) • Audio output 2: AES/EBU digital, 16 channels (D-sub 25-pin) • GPIO: GPI x 8, GPO x 16
Media block & storage		
Compression format	JPEG2000 (DCI)	JPEG2000 (DCI)
Decryption format	RSA 2048 bit, AES (DCI)	RSA 2048 bit, AES (DCI)
Playback	• 2K 2D: 24/25**/29.97/30/48/50**/60fps • 2K 3D: 24/25**/29.97/30/48/50**/60fps • 4K 2D: 24/25**/30 fps	• 2K 2D: 24/29.97/30/48/50/60fps • 2K 3D: 24/29.97/30/48*/50*/60*fps • 4K 2D: 24/25/30 fps
Digital audio format	24 bits, 48/96KHz,Linear PCM	24 bits, 48/96KHz,Linear PCM
Ingest	USB 3.0 (30 min 106GB)	USB 2.0 (55 min 160GB)
Max. bit rate	500Mbps	250Mbps
XCT-S10 Storage capacity	4TB total storage, expandable to 8TB	2TB total/1.7TB useable storage
HDD storage structure	Modified RAID 6	Modified RAID 6
Power consumption	240W max. for XTC-S10 storage unit	
Physical		
Dimensions (mm)	Projector: 546W x 570H x 1015D Server: 443W x 131H x 547D	700W x 640H x 1250D (Media Block/server is internal)
Weight	Projector: 150Kg Server: 24Kg	Projector195Kg + Media Block 24Kg
Lens mounting	Bayonet	4 x lens bolts

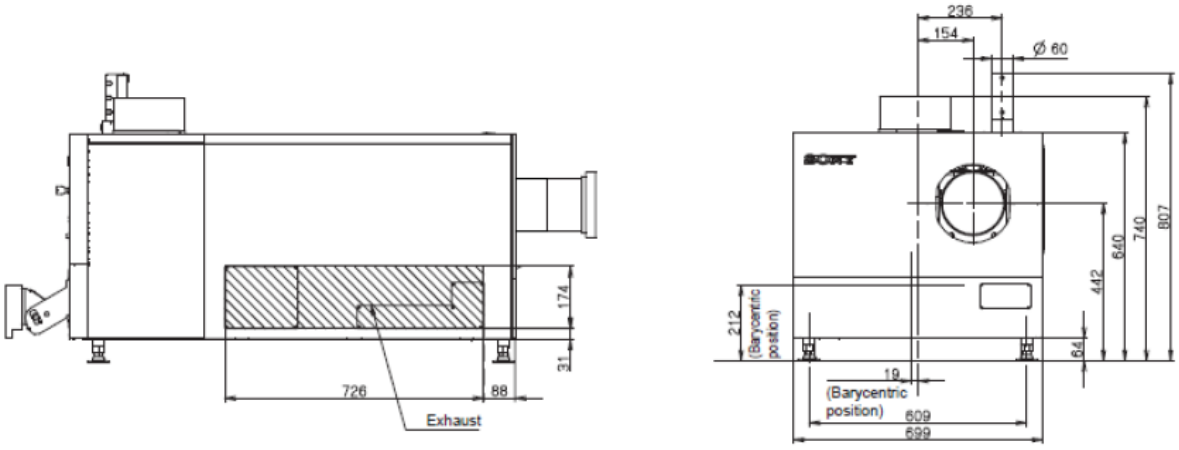
***** High Frame Rate in 3D available on LMT-300 with V2.50 firmware and above. Requires LSM-A1 license

****** Not all frame rates will not be available at initial launch

******* Specifications subject to change without notification

8. Installation considerations

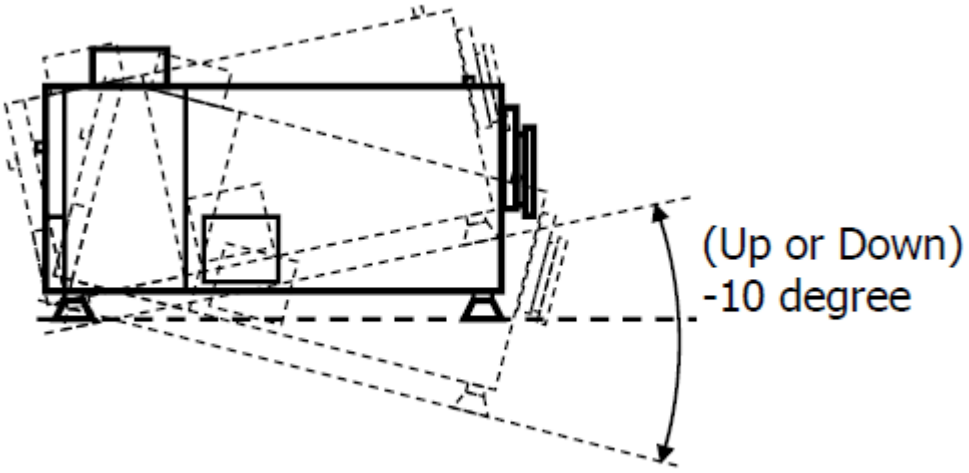
8.1 SRX-R320SP dimensions (same as SRX-R320P)



Unit; mm

8.2 Tilt

The SRX-R320SP has the same maximum tilt angle of an SRX-R320P.



8.3 Access panels

The SRX-R320SP employs the same chassis and panel configuration as the SRX-R320P with the chassis enclosed by side, front and rear panels locked down by a single locking panel. The key for the top panel is unique to each projector.

9 Ordering Information

The table below highlights the list of items to be ordered to configure the systems.

Projection system	* SRX-R320SP includes: • SRX-R320S projector • LMT-300 Media Block • LKRA-003 Touch Panel
2D lens	LKRL-Z211 or LKRL-Z214 or LKRL-Z219
Sony 3D System	LKRL-A002 PACK or LKRL-A003 PACK
Approved 3D Polarising Glasses	3D Glasses Adult – box of 50 Adult size glasses 3D Glasses Child -- box of 50 Child Size Glasses

OR

Projection system	** SRX-R515P includes: • SRX-R515 projector • XCT-S10 Media Block, • LKRA-007 Touch Panel
2D lens	LKRL-Z511 or LKRL-Z514 or LKRL-Z519
Sony 3D System	LKRL-A502 PACK or LKRL-A503 PACK
Approved 3D Polarising Glasses	3D Glasses Adult – box of 50 Adult size glasses 3D Glasses Child -- box of 50p3nybryn02 Child Size Glasses

Please Note:

* Lamps for SRX-R320SP are available from USHIO, PHILIPS, and OSRAM.

** Lamps for SRX-R515P are available from Sony.

10 Appendix

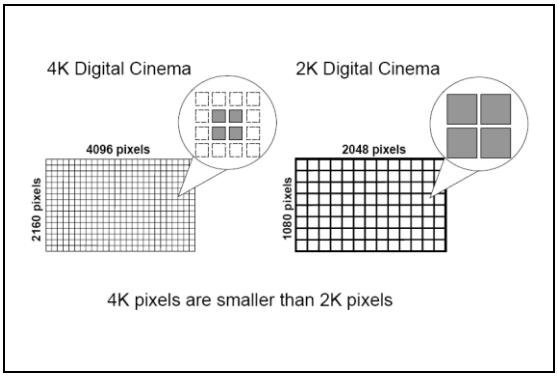
10.1 4K Resolution (4096 x 2160) pixels

Sony Digital Cinema 4K projectors deliver true 4K resolution which is the highest image quality standard defined by the DCI specification.

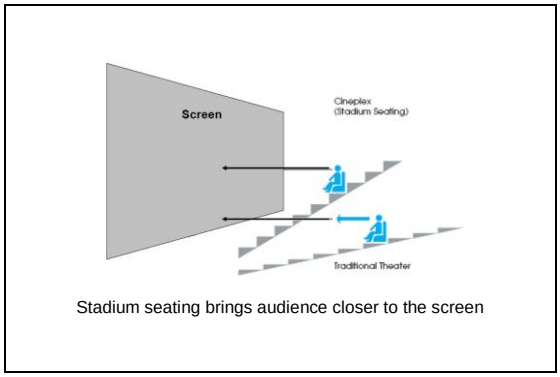
An increasing number of cinematographers are choosing to digitise their film negatives at 4K during the movie post production process to capture every detail in the film image. Additionally, an increasing number of leading movie makers are choosing to shoot with the new generation of 4K digital cameras such as the Sony F65.
When the final movie file is released as a 4K DCP (Digital Cinema Package file) instead of 2K DCP and exhibited on a 4K projector, then this super fine detail is preserved from camera right through to cinema screen and the cinema audience gets to enjoy exactly the same experience as the director and cinematographer.

- Extremely high native resolution enables the accurate display of the very highest resolution pictures to create more realistic images.

- Small pixel size combined with small gaps between the pixels are critical to creating realistic images, especially where audiences will be very close to the screen such as in auditoriums with Stadium style seating. For any given screen size, pixels from Sony 4K projectors are approximately ¼ the size of the pixels from 2K projectors to allow more detail to be displayed and make the pixel structure of the projector invisible to the audience.



4K pixels are smaller than 2K pixels

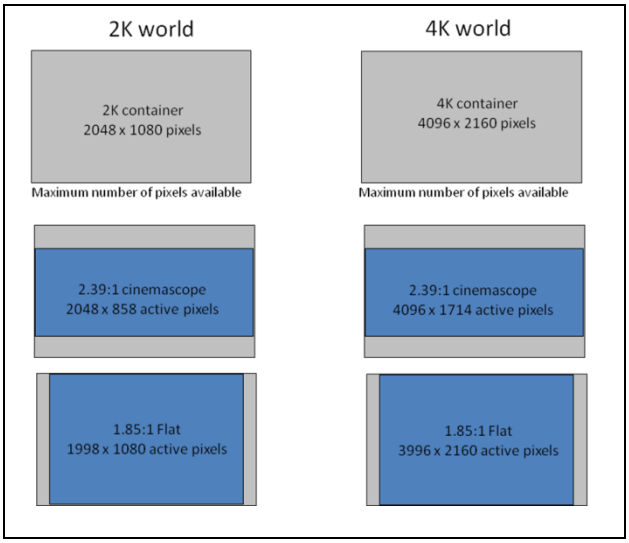


Stadium seating brings audience closer to the screen

4K resolution offers additional benefits for movies distributed in 2.39:1 format.

2K is often regarded as being (2048 x 1080) pixels but this is a maximum figure and real movies are distributed as 1.85:1 Flat at (1998 x 1080) active image pixels and 2.39:1 Scope at (2048 x 858) pixels - which means the vertical resolution in Scope is less than HDTV format images which are (1920 x 1080) pixels.

4K images in both Flat and Scope formats are always well above the resolution of HDTV regardless of image format and always offer much greater detail than the best HDTV pictures.



10.2 Displays 4K and 2K movies and HD Video

Sony 4K media blocks replay both 4K and 2K resolution DCPs (movie files). 2K movie files in 2D at (2048 x 1080) pixels are automatically up-converted to 4K equivalent images by the projector. Sony 4K projectors display 2K movies in 2D to their best advantage due to the up-conversion process. Up-converted content benefits from the smaller pixel size of the 4K projector compared with 2K projectors and the tiny gaps between pixels on the Sony SXRD display device resulting in a more natural image.

Sony 4K projectors have the facility to input “Alternative Content” allowing High Definition video to be input directly into the projector head. 2D High Definition video at (1920 x 1080) pixels from a number of Alternative Content sources such as Blu-ray players, games consoles and satellite receivers will also be automatically up-converted to 4K equivalent images by the projector.

10.3 Easy-on-the-Eye single projector 3D performance

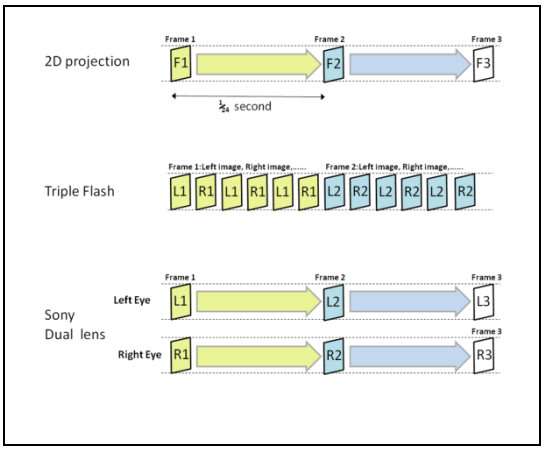
Due to the high data rates involved, 3D movies are always released at 2K resolution. 3D movies are not released as 4K DCPs.
This allowed Sony to take a new approach to single-projector 3D presentation by utilising the ultra-high resolution of its SXRD 4K image display panel.

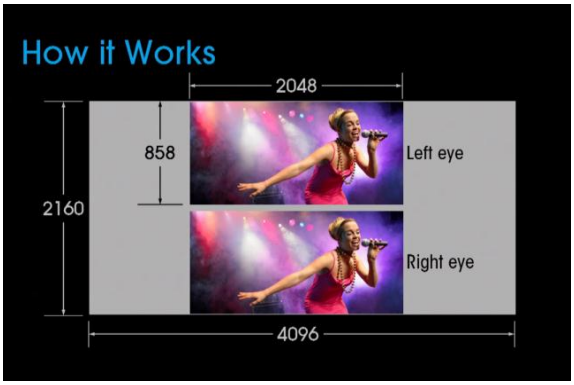
The most commonly used single-projector solutions for cinema utilise the ‘triple-flash’ technique to project the Left and Right eye images in succession through a single lens. This involves taking the Left and Right eye images for each movie frame and repeating them alternately at three times the server playback rate during the projection process. The x3 increase in display frame rate is chosen to be at a high enough level that the viewer should not perceive the flicker between alternating Left and Right

eye images out of the same lens. The process requires the viewer's brain to do the work to integrate the rapid, alternating display of Left and Right images into a single image.

The Sony single-projection solution for 3D uses a unique dual lens to simultaneously display both Left and Right eye images on the screen. The viewer is presented with the Left and Right eye images over-laid so the brain is not required to work to integrate two images together as with the triple flash system.

The Left and Right images from the 3D content are simultaneously displayed at their native 2K resolution (2048 x 1080 pixels) on the 4K SXRD display panel at their native frame rate of 24 frames per second. The dual lens projects and converges the two images on the screen for Easy-on-the-Eye 3D.





Example: Displaying 3D scope images

SONY