

JVC

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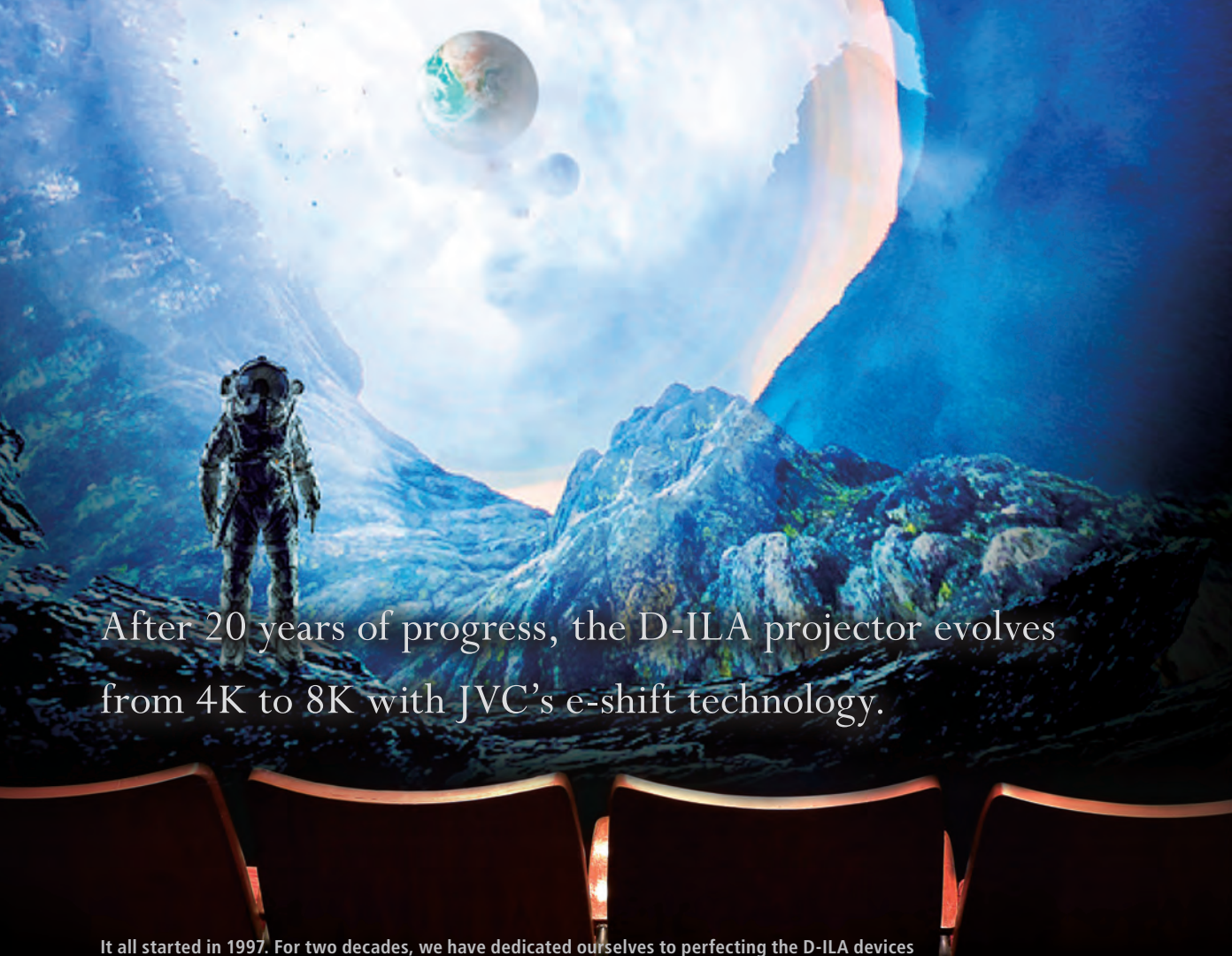
JVC

D-ILA Projectors
DLA-NX9/DLA-N7/DLA-N5

8K
e-shift
4K D-ILA HDR
High Dynamic Range



GO FURTHER, BE THE FIRST



After 20 years of progress, the D-ILA projector evolves from 4K to 8K with JVC's e-shift technology.

It all started in 1997. For two decades, we have dedicated ourselves to perfecting the D-ILA devices and technologies resulting in the finest D-ILA projectors of our time. D-ILA projectors that project realistic images with their overwhelmingly high native contrast, high resolution and wide colour gamut have gained support from projection and video enthusiasts and received many prestigious awards. Always looking ahead, in 2018 we succeeded in the development of a refined 4K native device. What's more, combining the latest 4K native device and exclusive e-shift technology, the world's first 8K/e-shift home theatre projector is now here and ready to immerse your senses. A new challenge for the 21st year. At JVC KENWOOD we will continue to pursue the possibilities of D-ILA projection.

1997 Developed the first D-ILA device



New series 8K e-shift

DLA-NX9 D-ILA Projector

- World's first 8K/e-shift technology*
- Equipped with new 0.69-in 4K D-ILA devices
- Newly developed digital driver LSI for native 4K device
- 100 mm Large-diameter, high-resolution all-glass lens
- 2,200 lm Light Output
- 100,000:1 Native Contrast Ratio
- 1,000,000:1 Dynamic Contrast Ratio
- Supports High Dynamic Range (HDR10, HLG) content
- Supports Wide Colour Gamut (DCI-P3)
- High-quality Performance assured: THX 4K display

* As of August 30, 2018; as a home theatre projector capable of displaying 8K-resolution images.



DLA-N7 D-ILA Projector

- Equipped with new 0.69-in 4K D-ILA devices
- Newly developed digital driver LSI for native 4K device
- 65 mm-diameter high-resolution all-glass lens
- 1,900 lm Light Output
- 80,000:1 Native Contrast Ratio
- 800,000:1 Dynamic Contrast Ratio
- Supports High Dynamic Range (HDR10, HLG) content
- Supports Wide Colour Gamut (DCI-P3)



DLA-N5 D-ILA Projector

- Equipped with new 0.69-in 4K D-ILA devices
- Newly developed digital driver LSI for native 4K device
- 65 mm-diameter high-resolution all-glass lens
- 1,800 lm Light Output
- 40,000:1 Native Contrast Ratio
- 400,000:1 Dynamic Contrast Ratio
- Supports High Dynamic Range (HDR10, HLG) content
- Available in 2 colours: White and black



Combination of Technologies that Realize 4K Native and 8K/e-shift Projection

■ 8K Home Theatre Projection Achieved by Combining Native 4K and “e-shift” Technology



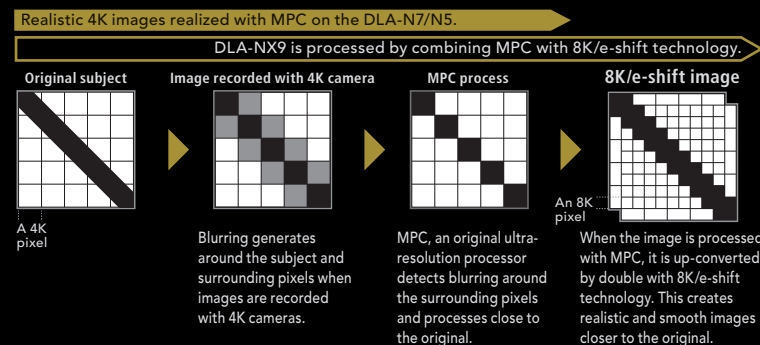
8K e-shift

“e-shift” is JVC’s proprietary high-resolution display technology that shifts a pixel by 0.5 pixels vertically and horizontally to achieve 4 times the pixel density of the original content. Ahead of the competition, JVCKENWOOD developed the 4K/e-shift technology in 2011. Ever since, this technology has evolved and received a favourable response for its high resolution near native 4K using the FHD device. The 8K/e-shift technology adopted for the DLA-NX9 combines the “e-shift” technology with another proprietary technology, Multi Pixel Control, to convert Full HD and 4K-resolution images into 8K-equivalent resolution (8192 horizontal by 4320 vertical). The result is an eye-opening, high-definition display that is very close to the original subject*1.

*1: The projector does not support 8K signal input.

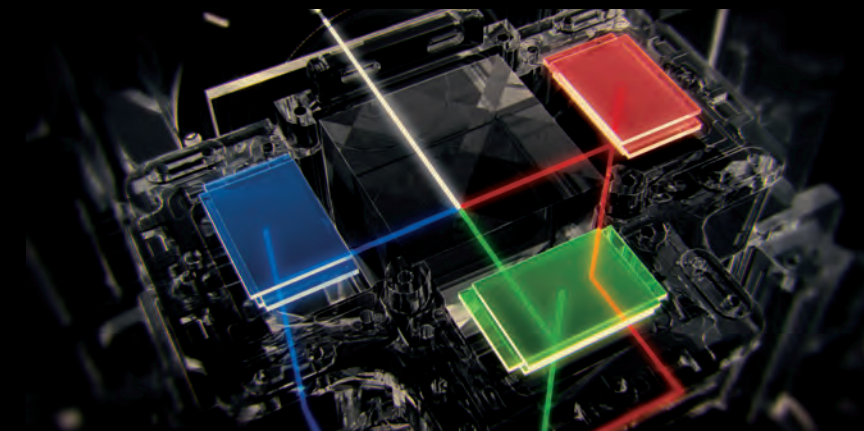
■ Multiple Pixel Control & 8K/e-shift Processing

All D-ILA projectors feature original high-performance image processing technology, Multiple Pixel Control (MPC) that detects blurring generated from images taken with 4K cameras. Through analysing and correcting with an original algorithm, the MPC is an image processing technology capable of accurate reproduction closer to the original. Compared to conventional band processing, MPC achieves the utter reality of 4K quality by detecting and processing images in a higher frequency range to achieve exceptional presence and bokeh – creating almost 3D feeling. On the high-end model DLA-NX9, the image processed with MPC is up-converted using 8K/e-shift technology to double the image information for displaying more realistic and smooth images closer to the original.

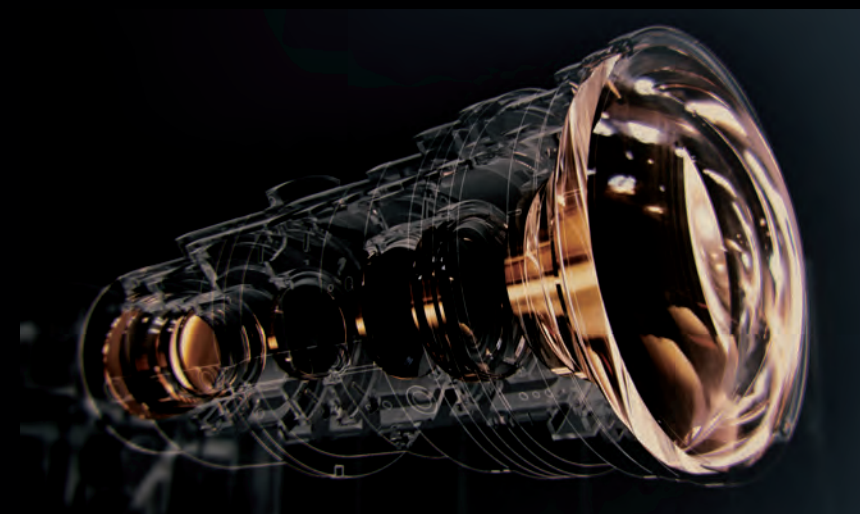


■ Equipped with refined 0.69" native 4K D-ILA device and newly developed digital driver LSI for native 4K device

D-ILA projectors continue to evolve for the better. And, the projection device is at the heart of the projector. The latest three models feature an original native 0.69" 4K D-ILA device, which was first adopted on model DLA-Z1 (released in December 2016); this device has been improved with process refinements on planarization and reflection efficiency to achieve higher contrast and brightness. Additionally, a dedicated driver LSI was also enhanced to simultaneously drive each of the three (R/G/B) native 4K D-ILA devices at high-speed 120fps. This ultra high-speed driving is enabled by adopting the latest high bandwidth memory (HBM) technology and uses a silicon interposer to process a large amount of data instantaneously. Furthermore, stable high-quality image projection can be achieved by equipping the new driver LSI with an original frame rate converter and various device correction functions. As a result, precise and smooth image projection unique to 4K native can be achieved with the combination of a new device and new driver LSI.

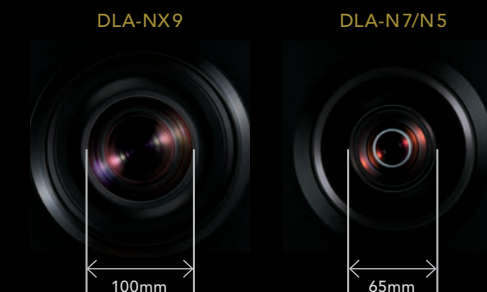


■ 18-element 16-group all-glass 100mm diameter large-calibre high-resolution lens with full aluminium lens barrel



The DLA-NX9 is equipped with an 18-element, 16-group all-glass lens featuring a full aluminium lens barrel. In order to project high-resolution images to every corner of the screen with the 100 mm diameter lens offering wide lens shift of $\pm 100\%$ vertically and $\pm 43\%$ horizontally, the projector adopts five ED lenses that take into account differences in the R/G/B refractive index to reduce chromatic aberration and colour fringing when lens shift kicks in to deliver precise reproduction of 8K-resolution projection.

The DLA-N7 and DLA-N5 models feature a 17-element, 15-group all glass lens with 65 mm diameter to project fully focused 4K native resolution to all corners of the screen.



The Power to Project HDR Images Brighter, Higher Contrast, and Wider Gamut

Bright

High-quality, Clear Picture
with Brightness



Maximum brightness of 2,200 lm*2 can be achieved by combining a 265 W ultra high-pressure mercury lamp and a highly efficient optical engine. Also, combining with the D-ILA device that features a narrow gap between pixels for optimum use of light, a powerful yet finely detailed and smooth image projection can be achieved.

*2: Achieved on the DLA-NX9. 1,900 lm for the DLA-N7 and 1,800 lm for the DLA-N5.

High Contrast

Realizing Images Full of Presence
with D-ILA's High Contrast



JVC's original D-ILA device combined with an optical engine equipped with a wire grid results in a high native contrast ratio of 100,000:1*3. Input signals are analysed with an original algorithm that is combined with Intelligent Lens Aperture, which automatically controls the black level of the image to achieve a dynamic contrast ratio of 1,000,000:1*3. The synergetic effect based on the dynamic range stemming from high-brightness, delivers sensational 4K video full of reality.

*3: Figures for the DLA-NX9. The DLA-N7 offers 80,000:1 native contrast ratio and 800,000:1 dynamic contrast ratio; the DLA-N5 offers 40,000:1 native contrast ratio and 400,000:1 dynamic contrast ratio.

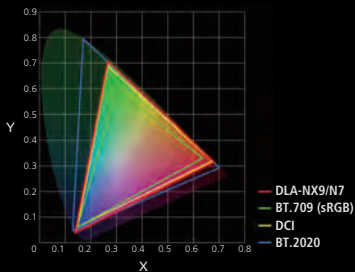
Wide Gamut

Reproduction of Vivid Images
through a Wide Range of Colours



By using a new cinema filter, the projector achieves not only 100% coverage of the BT.709 but also coverage beyond the DCI-P3*4 display range used in film production. HDR content found on media such as UHD Blu-ray Discs adopts a much wider colour gamut compared to conventional content. Three new D-ILA projectors that feature wide gamut allow for more accurate reproduction of the natural gradations in images of the sky and the sea, as well as differences in the colour contrast between subjects such as flowers of a deep crimson or rose colour, or the different shades of green on tree leaves, which presented difficulties in the past.

*4: DCI-P3 coverage is featured on the DLA-NX9 and DLA-N7.



Support for HDR (High Dynamic Range)



HDR (high dynamic range) content contains more data including an extended brightness range, 10-bit gradation and a wide BT.2020 colour gamut. For this reason, high basic performance is required for precise reproduction by the projector. With D-ILA projectors, HDR content are optimally reproduced with “high-brightness, high contrast, and wide gamut” to enjoy high quality HDR content as you’ve never experienced in the past. Moreover, in addition to HDR10 content, which is found on UHD Blu-ray Discs, the projector automatically detects the Hybrid Log-Gamma (HLG) signal, a technology used widely in broadcasting, allowing the user to view in an optimum picture mode.

Input	HDMI 1
Source	2160p 60
Color Space	YUV 12bit
Colorimetry	BT.2020
HDR	HDR10(ST.2084)
Max CLL/Max FALL	1000 / 400 nits
Lamp Time	20 H
Soft Ver.	v1.00

Colour gamut information

HDR gamma information

Max CLL/FALL mastering information

Displaying content info such as Max CLL or Mac FALL when reproducing HDR10

Automatic Adjustment with Auto Tone Mapping*5

The Auto Tone Mapping function featured on the latest models automatically adjusts each content based on the values in the mastering data, such as Max CLL and Max FALL*6, which indicate the brightness of the HDR content. Image quality is automatically adjusted for optimal viewing of various HDR images with different brightness.

*5: Content without mastering info is set at fixed level or can be adjusted manually.
*6: Max CLL (stands for Maximum Content Light Level); Max FALL (stands for Maximum Frame Average Light Level)



Auto Tone Mapping function screen display

Functional Beauty to Clearly Project Images Boasted by D-ILA

■ Stately Form that Matches the New Generation Model

Adopting the legendary centre paneling of the D-ILA projectors, the new form has no decorative lines but only features simplicity for the pursuit its functionality. Symmetrical design centred on the lens that is set in the core conveys a stately form with a sharp impression that fits the new generation models.



■ Installation Mode

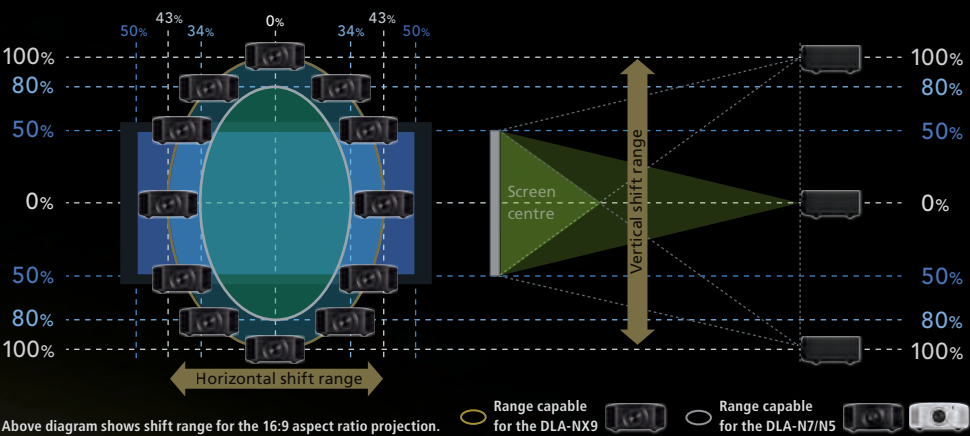
These projectors are equipped with "Installation Mode" that allows users to centrally manage settings related to installation in order to enjoy projected video best suited for each environment. As shown in the graphical interface on the right, nine settings for Lens Control, Pixel Adjustment, Mask, Anamorphic on or off, Screen Adjust, Installation Style, Keystone, Pincushion, and Aspect can be adjusted. Additionally, ten different mode settings can be stored in memory that can be named as desired. Installation modes stored in memory for various environments can be called up immediately.



Installation Mode and Memory graphical interfaces

■ Lens Shift

Flexible installation is made possible thanks to the wide lens-shift function. As described in the diagram below, wide shift ranges are offered vertically and horizontally that help to deliver natural projected images without distortion.



■ Other Features

• Screen Adjustment Mode

Screen Adjustment Mode is one of the nine Installation Modes described above. When the user selects a setting that best suits the screen being used from the Screen Adjustment Mode settings, the projector adjusts the image with natural colour balance to match the screen. The mode is compatible with the latest models offered by the world's major screen manufacturers*7.

*7: Please refer to JVC website for a comparison table of primary screens and adjustment modes

• Digital Keystone and Pincushion Function*8

The new projectors feature Digital Keystone and Pincushion Function. Digital Keystone adjusts keystone distortion that occurs when the projector is placed in a tilted position; Pincushion Function adjusts to curved screens.

*8: Digital Keystone and Pincushion Function cannot be used simultaneously. Keystone adjustment corrects only in the vertical direction. Pincushion Function may not operate properly when the projector is applied with wide lens shift.

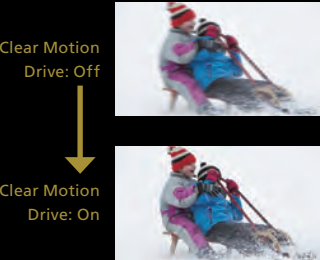
• Anamorphic Mode

A 2.35:1 aspect ratio for wide cinematic films can be enjoyed by combining the projector with a third-party anamorphic lens to create dynamic picture reproduction just as can be seen in a movie theatre. Additionally, these projectors feature a mode to extend the width to fully match the newly installed 17:9 panel.

Rich Processing Technologies and Functions Capable of Supporting Various Video Sources

■ Exceptional motion image processing achieved with renewed Clear Motion Drive

The interpolation algorithm for JVC's original Clear Motion Drive technology that reduces ghosting has been revamped to improve compensation accuracy in the periphery of intersecting objects. The improved algorithm now refers to more frames to increase precision of motion prediction and also reduces frame latency. Additionally, when Clear Motion Drive is set to "low", it recreates the natural 24fps signal processing adopted on films, while pursuing an effect like de-juddering without a sense of discomfort. Added with Motion Enhance technology that optimally controls the driving performance of D-ILA drives by image characteristics, the projector is capable of reproducing much smoother moving 4K images.



■ Low Latency Mode

An increasing number of new generation game consoles capable of outputting high-spec 4K game images are now available, which leads to an increased demand among users who want to play 4K/HDR games on a big screen. D-ILA projectors feature an improved Low Latency Mode that ensures faster response with PC and game console content that require severe timing link between operation and on-screen image.

■ Complies with the HDCP 2.2 standards to enable 18Gbps 4K signal input

The projectors are capable of receiving full spec 4K signals including 4K/60P 4:4:4, 4K/60P 4:2:2/36-bit and 4K/24P 4:4:4/36-bit as the units comply with the latest HDMI standard with 18 Gbps transmission band-width compatibility for reproducing more vivid colours with more precise gradation. In order to be compatible with copyright-protected content such as OTT video services and the UHD Blu-ray Discs, the projectors comply with the latest HDMI standard and HDCP 2.2.

■ Auto Calibration Function

Using an optical sensor and a proprietary software^{*9}, optimum calibration can be applied in just a few easy steps to match the changes in optical characteristics caused by the installation situation of the projector. Auto-Calibration optimises all essential elements found in the image, including colour balance, gamma characteristics, colour space, and colour tracking.

^{*9}: An optical sensor and proprietary software, which is downloadable from JVC website, are required to perform auto calibration function. Refer to the JVC website for details.