HC9000D

- Videoproyector 0,61" 3-SXRD (16:9 Panorámico)
- Resolución Full HD 1920x1080 con visión 3D
- Luminosidad 1100 ANSI Lumens
- Contraste 150.000:1
- Ratio de proyección: 1,5-2,8:1
- Lámpara 230W - Hasta 4000 horas (modo low)
- 2xHDMI ver. 1,4.
- Digital Keystone Corrección Vertical & Horizontal
- Cinema filter
- Color Matching
- Ultra high Auto Iris Diamond Black
- Lentes de vidrio de dispersión
- Sólo 22dBA

Dimensiones (An x Al x Pr): 480x197x528mm
Peso 15Kg
Lámpara: VLT-HC9000LP
TAMBIÉN DISPONIBLE CHASIS BLANCO: HC9000DW

Color : Midnight Black
Introduction

Mitsubishi Electric home theater projectors produced to date incorporate devices that utilize digital light processing (DLP®) and 3LCD technologies.

The new high-end model introduced here offers 3D compatibility, superior high contrast, true black reproduction and high-speed response (2ms). Reflective liquid-crystal panels manufactured by Sony Corporation are adopted, providing a high aperture ratio and clear image reproduction equivalent to that of DLP®-based units.

Entry-level models will continue to utilize DLP® technology, which offers superior cost performance.
Features of Newly-developed Reflective Liquid-crystal Panel

Advanced Liquid-crystal Device Provides Smooth, High-definition Cinema Theater-like Images and Rich Color Reproduction

Cutting-edge liquid-crystal device design technology now enables the production of reflective full high-definition (HD) panels*.

Reflective liquid-crystal panels consist of a liquid-crystal layer on top of a silicon substrate. In contrast to conventional glass-substrate liquid-crystal panels, which project images by allowing backlight to pass them, these devices utilize displays that reflect light.

High brightness and contrast, and high-speed response are provided through the application of liquid-crystal vertical alignment and advanced processing technologies in panel development. Diverse images such as those of movies and digital HD broadcasts are clearly reproduced clearly, with the quality of the original.

*1,920 x 1,080 pixels (horizontal x vertical)
Reflective Liquid-crystal Panels Plus High-contrast Optical Engine

In addition to the well-established wire grid, newly developed optical compensators are incorporated. As a result, outstanding contrast has been realized. Additionally, The 16-level lens adjustment for the fixed iris ensures the optimal countermeasure for stray light, enabling the realization of much deeper blacks. Additionally, the use of auto-iris realizes a high contrast of 120,000:1.
Negligible Grid Pattern Ensures Clearer Images Even on Large Screens

Grid patterns* commonly become more noticeable as screen size increases. We have successfully suppressed the pattern by optimizing the structure between pixels, achieving a pixel gap of only 0.25μm.

High Aperture Ratio of 93% Enables Reproduction of Smooth, Cinema-like Images.

*The visible lattice due to gaps between pixels.

Comparison of grid pattern prominence

Transmissive liquid-crystal panel

![Transmissive liquid-crystal panel](image)

Pixels: 1,280 x 720
(horizontal x vertical)

Reflective liquid-crystal panel

![Reflective liquid-crystal panel](image)

Pixels: 1,920 x 1,080
(horizontal x vertical)

Space between pixels reduced (0.25μm).
Grid pattern is less noticeable.
Clear, Low-blur Projection of Scenes with Fast Movements
- 2.0ms* High-speed Response -

A liquid-crystal cell thickness of less than 2μm has been realized, enabling a high-speed response of 2.0ms.
In scenes where colors change momentarily or there are quick motions, clear images with minimal blurring can be enjoyed.

Comparison of different response speeds

Conventional

Reflective liquid-crystal panel
During optical alignment, the panel reflection mode is different for each color.
Small color differences are generated based on the display pattern.
Method for Correcting the Display of Colored Diagonal Lines

Using two directions of liquid-crystal orientation, the orientation direction projected onto the screen is matched for the three colors, preventing coloration.

SXRD incorporates two directions of liquid-crystal orientation, thereby preventing the generation of color when diagonal lines are displayed.
3D Compatibility

Conceptual Diagram

White screen

3D display possible using one unit

Active shutter glasses
Current Status of 3D Broadcasting

- **Full HD×2ch frame sequential system**
  - Right-eye images 60P display
  - Left eye images 60P display
  - Amount of data per eye: 1,920×1,080 pixels

- **Side-by-side system**
  - Merit: Transmission possible with conventional broadcasting
  - Demerit: Horizontal resolution halved

- **Top and bottom system**
  - Merit: Transmission possible with conventional broadcasting
  - Demerit: Vertical resolution halved

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**Active shutter glasses**

3D-BD Disk → 3D-BD Player → Active shutter glasses

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**Current Status of 3D Broadcasting**

- Full HD×2ch image compression/recording
- Full HD×2ch playback

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**Current Status of 3D Broadcasting**

- Top and bottom system
  - Merit: Transmission possible with conventional broadcasting
  - Demerit: Vertical resolution halved

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**Current Status of 3D Broadcasting**

- Full HD×2ch playback

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**Current Status of 3D Broadcasting**

- Left eye images
- Right-eye images

---

**Current Status of 3D Broadcasting**

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**Current Status of 3D Broadcasting**

- Full HD×2ch image compression/recording
- Full HD×2ch playback

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**Current Status of 3D Broadcasting**

- Left eye images
- Right-eye images
240Hz Drive Reduces Crosstalk to Absolute Minimum

Using the 240Hz panel drive, image transfer is completed in 1/240sec, and in the next 1/240sec, only the R image or L image can be removed.

Illustration of 240Hz drive reproducing a 3D image

- Glasses’ shutter space can be increased
- Brightness can be adjusted
- Crosstalk is minimized
As 1/240sec is required for transfer of L1 signal using a 120Hz drive, transfer of next R1 signal must begin immediately. Using a 240Hz drive, nearly all the L1 signal can be transferred in 1/240 sec, so only the image of L1 can be received in the remaining 1/240sec. It is also possible to save time for opening the shutter of the 3D glasses.

Advantages of 240Hz Drive

- **120Hz Drive (estimation)**
  - Time: 1/120s, 1/60s
  - Image signal
  - Picture image
  - Glasses: L Shutter, R Shutter
  - View image: With crosstalk

- **SXRD 240Hz Drive**
  - Time: 1/120s, 1/60s
  - Image signal
  - Picture image
  - Glasses: L Shutter, R Shutter
  - View image: Crosstalk is minimal

Brightness of 3D glasses can be adjusted.
Newly Developed Full HD-compatible 1.8× Powered Zoom Lens

A key element in projector performance is the lens. The lens incorporated in the HC9000D has a 6-piece/17-cluster structure including an extra-low dispersion (ED) lens that is more expensive and has higher functionality than standard glass lenses. The result is optimization of the peripheral focus and minimization of chromatic aberration.
Powered Lens Shift (V±100%, H±45%) Suitable for Mounted Models

- Powered wide-range lens shift (vertical: max. 100%, horizontal: max. 45%)
- 1.8× powered zoom lens capable for projecting between 3.4 - 6.1m using 100-in screen

Powered Lens Shift Function (Vertical: 100%, Horizontal: 45%)

*Max. values for vertical/horizontal lens shift cannot be set simultaneously (see table on right).
Applying motion vector analysis technology, highly accurate images are created utilizing data from the previous and next images. As a supplement to existing images, the optimal number of frames is created according to the content. Video distortion is suppressed in all directions, and even for movie software (24p frame rate), crystal-clear images are projected while maintaining the sensation of a film-based source.

**Frame Rate Convertor for 24P Movie Software**

<table>
<thead>
<tr>
<th>Input signal</th>
<th>Frame creation</th>
<th>60-frame movie images</th>
<th>Conventional</th>
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<tbody>
<tr>
<td>1/60s</td>
<td>Image signal with 2-3 pull-down correction</td>
<td>Image converted to original 24 frames</td>
<td>Fast movement is blurred</td>
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<tr>
<td>A</td>
<td>A</td>
<td>A F F F</td>
<td>Fast movement is displayed clearly</td>
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<tr>
<td>1/120s</td>
<td>Images converted to original 24 frames</td>
<td>Images interpolated , 120 frames/sec displayed</td>
<td>Images interpolated , 120 frames/sec displayed</td>
</tr>
<tr>
<td>A B C D E F G H</td>
<td>Images interpolated , 96 frames/sec are displayed</td>
<td>Images interpolated , 120 frames/sec displayed</td>
<td>Images interpolated , 120 frames/sec displayed</td>
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</tbody>
</table>

60-frame image (e.g. TV broadcasts) 24-frame image (e.g. BD/DVD software)
High-quality Interlace/Progressive Conversion/Scaling

Equipped with IC Made by Integrated Device Technology (IDT) Inc. (previously Silicon Optix)

Compatible for projecting content with different resolutions such as Blu-ray (1,920×1,080) and DVD (720×480).

The resolution of some contents such as DVDs requires conversion to 1,920×1,080. The higher the conversion precision, the higher the image quality. This processing is performed by the HQV IC produced by IDT and highly evaluated for its image processing performance. High-definition, DVD and other images are reproduced with high picture quality.
Color Management Function Enables Preferential Color Reproduction

A color management function is equipped allowing independent adjustment of the hue, color intensity and brightness for R (Red), G (Green), B (Blue) C (Cyan), M (Magenta) and Y (Yellow).

*Images created to clearly show the effects of this function.
### Screen (16:9)

<table>
<thead>
<tr>
<th>Diagonal Size (inch)</th>
<th>Width (cm)</th>
<th>Height (cm)</th>
<th>Default Height</th>
<th>Projected Image (H)</th>
<th>Distance from Screen</th>
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<td>Shortest (Wide)</td>
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### Movable V Position from Default Position

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<th>Diagonal Size (inch)</th>
<th>Movable V Position from Default Position</th>
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<td>+/-100% (3:1 - -3:1)</td>
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### Movable H Position from Default Position

<table>
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<tr>
<th>Diagonal Size (inch)</th>
<th>Movable H Position from Default Position</th>
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<tbody>
<tr>
<td></td>
<td>+/-45%</td>
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</table>

Max.Zoom(Wide) : \( y = \frac{x(35.24952 - 84)}{1000} \)  
Min.Zoom(Tele) : \( y = \frac{x(63.44914 - 84)}{1000} \)