MITSUBISHI ELECTRIC
Changes for the Better

for a greener tomorrow eco Changes

HOME CINEMA HC9000D

MITSUBISHI ELECTRIC CORPORATION

NUEVO

HC9000D

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)
- 2x**HDMI** 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

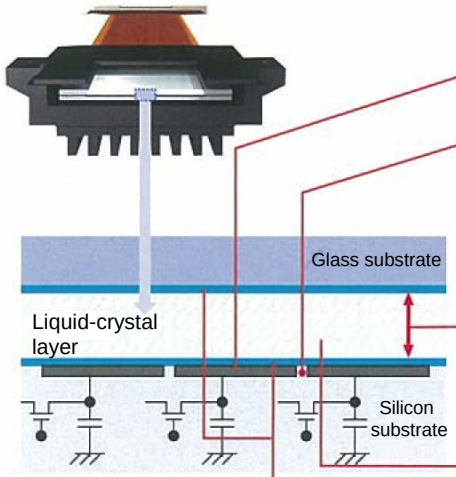
Advanced Liquid-crystal Device Provides Smooth, High-definition Cinema Theater-like Images and Rich Color Reproduction

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)

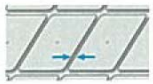
Reflective Liquid-crystal Panel Technology



Cross-sectional diagram

Full HD display panel
(1,920 x 1,080 pixels (horizontal x vertical)
7μm pitch

Narrow space between pixels (0.25μm)
High reflection ratio/Grid is negligible



Enlarged image of display panel (view from above)

Thin liquid-crystal cell (2.0μm) without spacer
Response speed: 2.0ms*
Contrast ratio enhanced

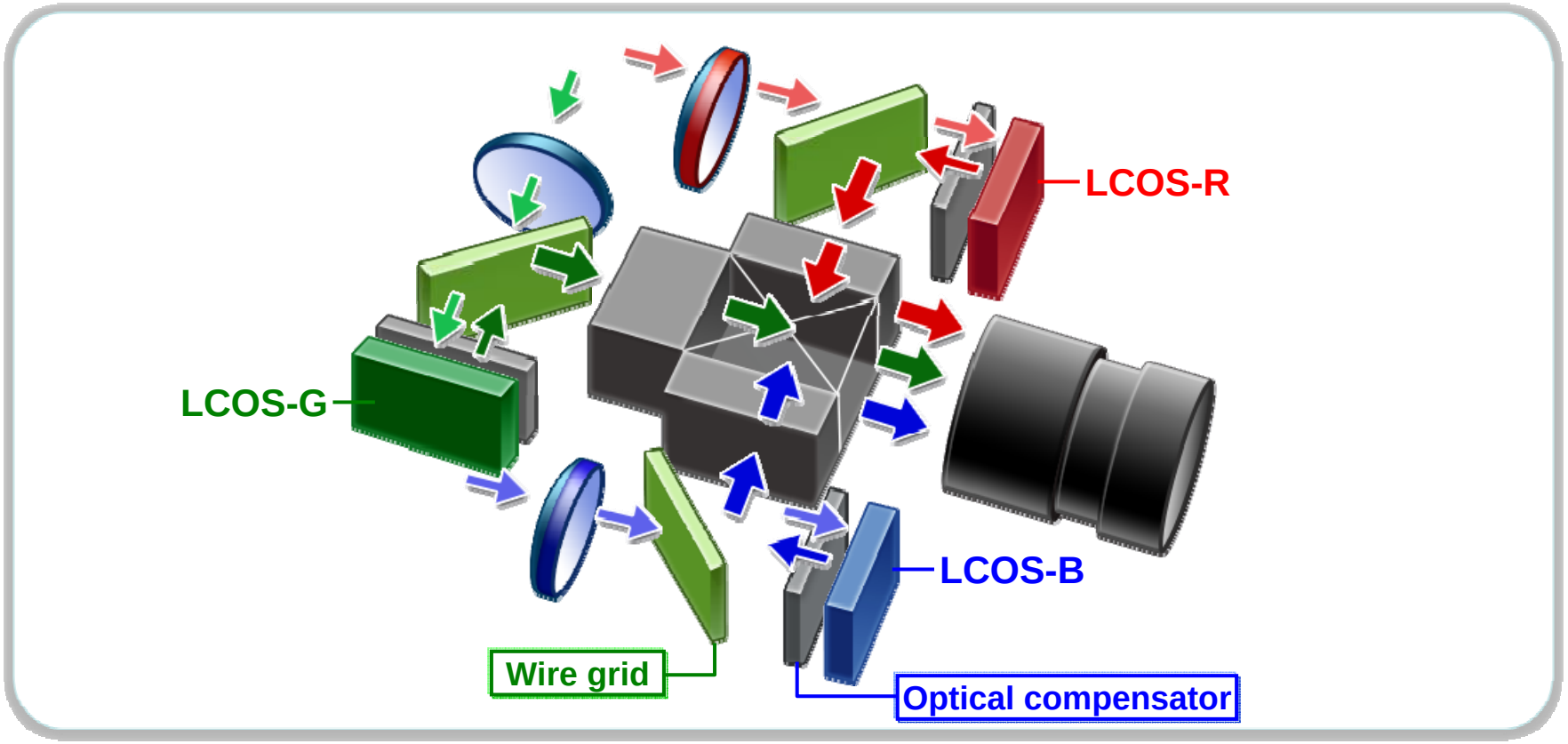
Liquid crystal vertical alignment (normally black)
Contrast ratio enhanced

Inorganic alignment film
Light resistance enhanced

* For both rise and fall times. 2.5ms for VPL-VW200, HW15.

Reflective Liquid-crystal Panels Plus High-contrast Optical Engine

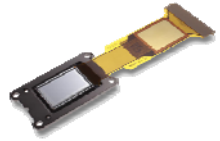
In addition to the well-established wire grid, newly developed optical compensators are incorporated. As a result, outstanding contrast has been realized. Additionally, The 16-level lens adjustment for the fixed iris ensures the optimal countermeasure for stray light, enabling the realization of much 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

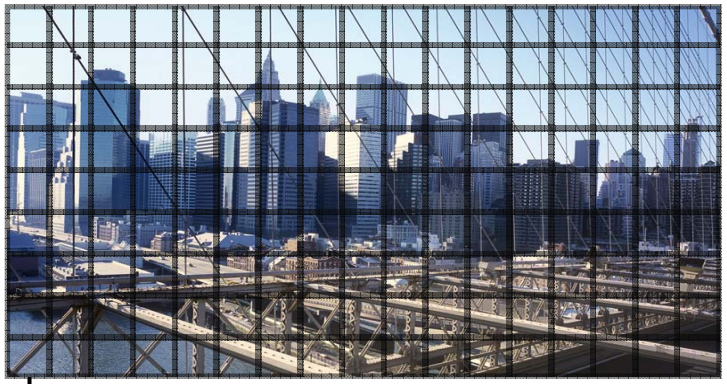
Grid patterns* commonly become more noticeable as screen size increases. We have successfully suppressed the pattern by optimizing the structure between pixels, achieving a pixel gap of only 0.25µm.
High Aperture Ratio of 93% Enables Reproduction of Smooth, Cinema-like Images.
***The visible lattice due to gaps between pixels.**

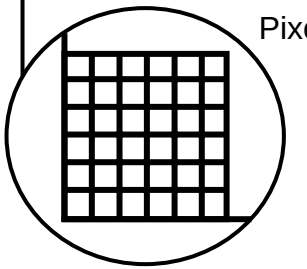
SXRD



Comparison of grid pattern prominence

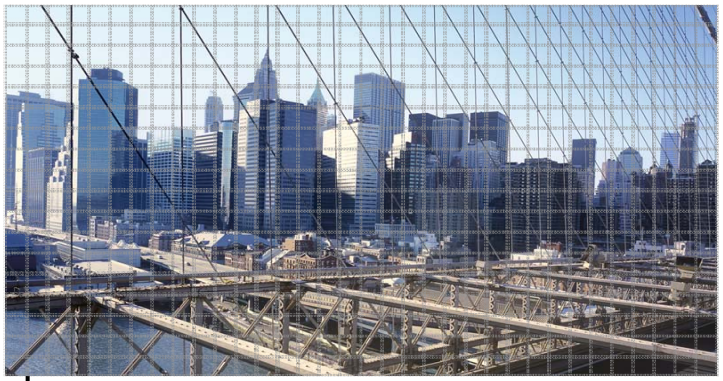
Transmissive liquid-crystal panel

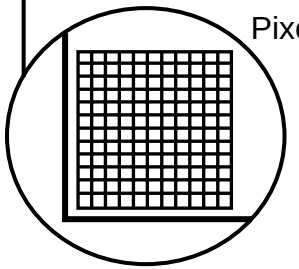




Pixels: 1,280 x 720
(horizontal x vertical)

Reflective liquid-crystal panel





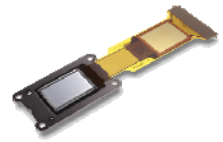
Pixels: 1,920 x 1,080
(horizontal x vertical)

Space between pixels reduced (0.25µm).
Grid pattern is less noticeable.

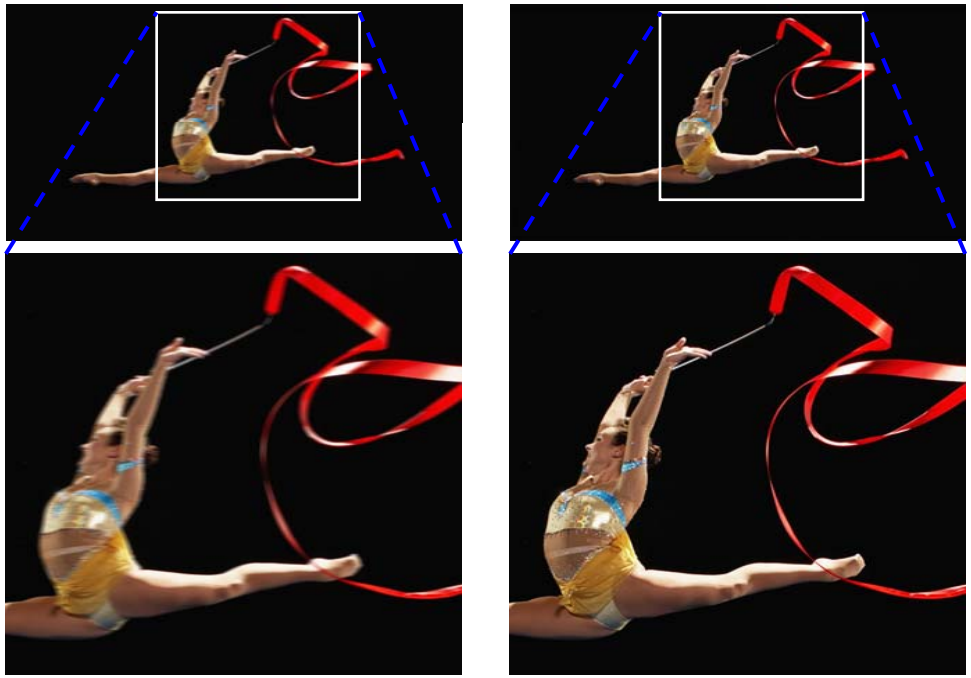
Clear, Low-blur Projection of Scenes with Fast Movements - 2.0ms* High-speed Response -

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.

SXRD



Comparison of different response speeds

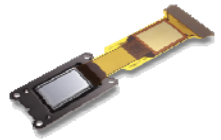


Conventional

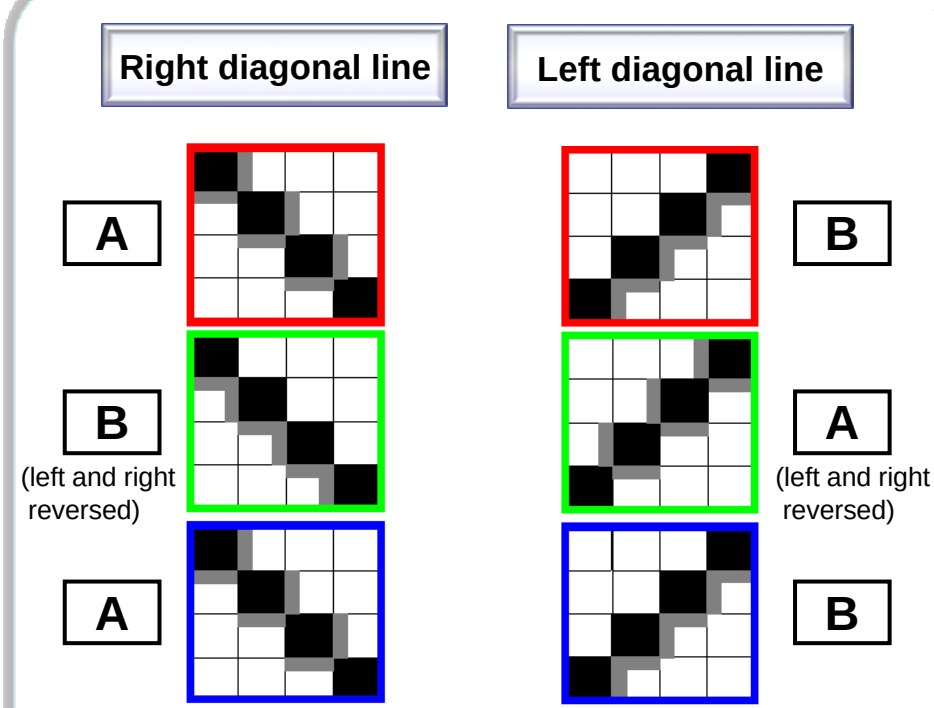
Reflective liquid-crystal panel

View When Projected on Screen (Example)

SXRD

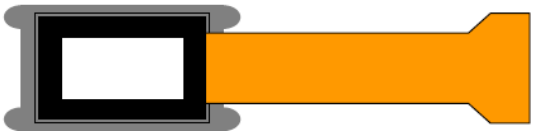


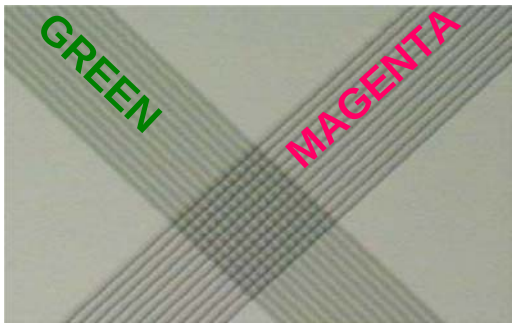
- During optical alignment, the panel reflection mode is different for each color.
- Small color differences are generated based on the display pattern.



Screen view (example)

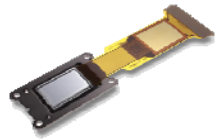
RED : no change
GREEN : left and right reversed
BLUE : no change



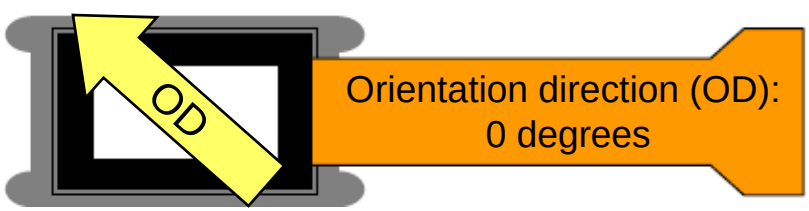


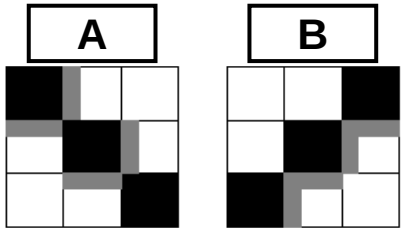
Method for Correcting the Display of Colored Diagonal Lines

SXRD

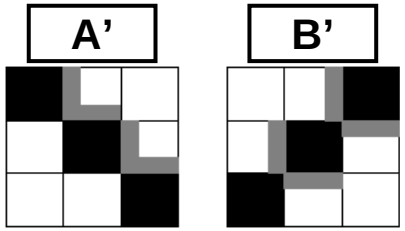


- Using two directions of liquid-crystal orientation, the orientation direction projected onto the screen is matched for the three colors, preventing coloration.





The effect of lateral electrolysis is in the black display “lower right”

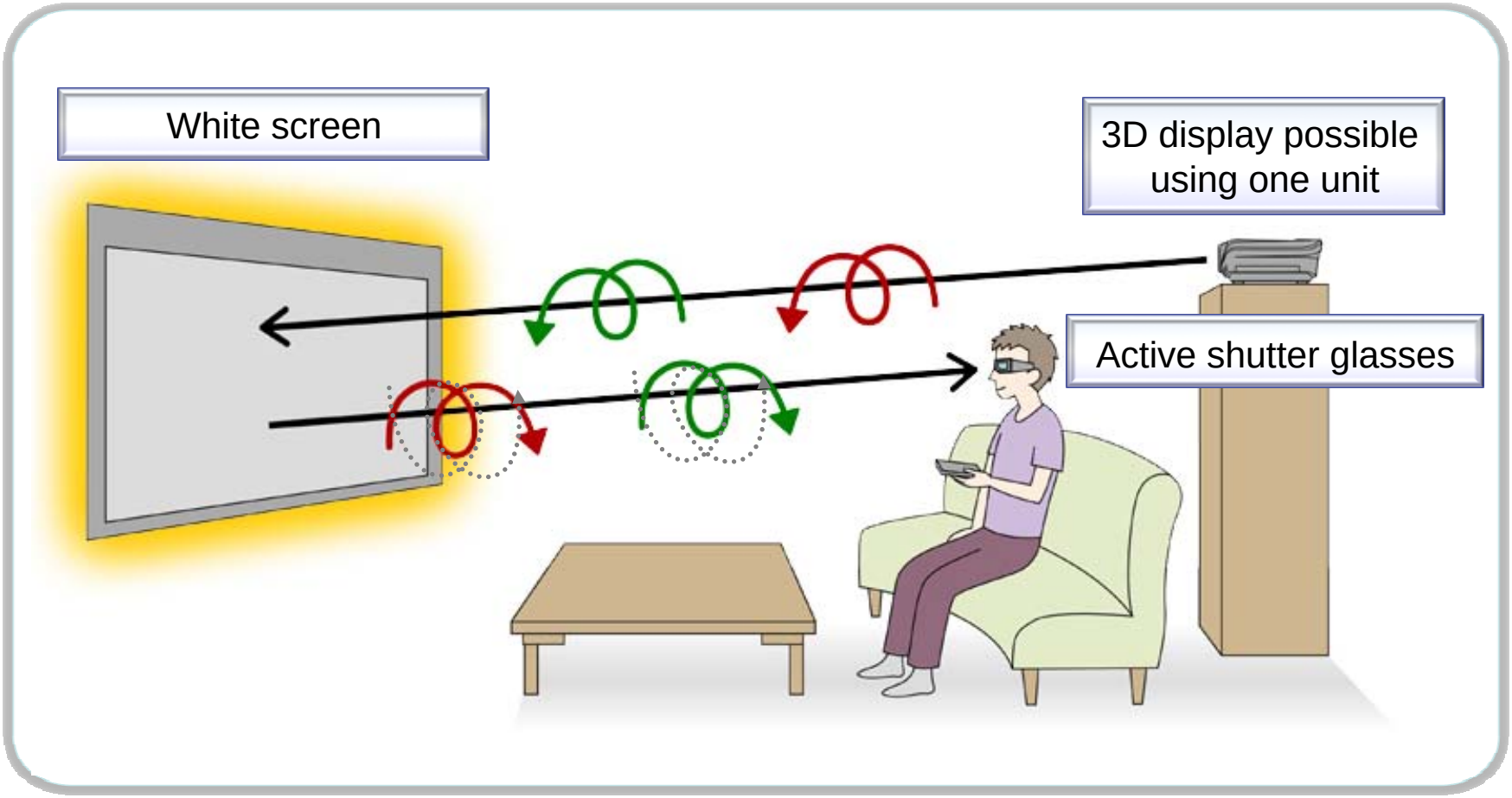


The effect of lateral electrolysis is in the black display “upper right”

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

3D Compatibility

Conceptual Diagram



Current Status of 3D Broadcasting

Full HD×2ch
image compression/recording

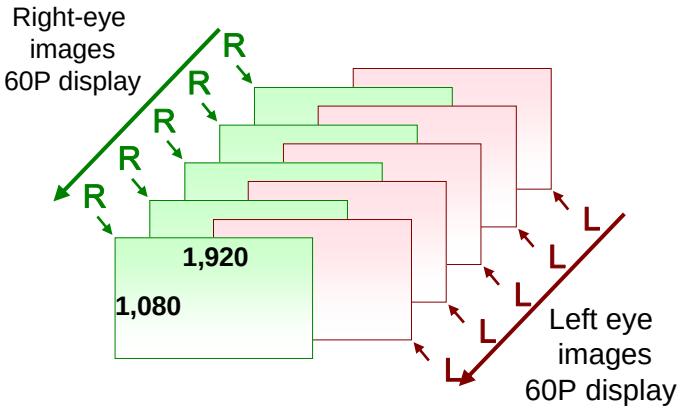
3D-BD Disk

Full HD×2ch
playback

3D-BD Player

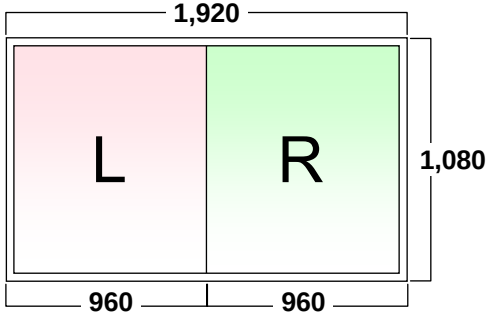
Active shutter glasses

Full HD×2ch frame sequential system



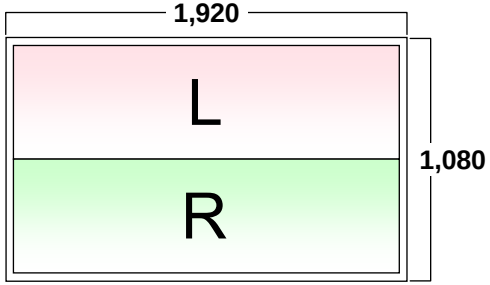
Amount of data per eye
1,920×1,080 pixels

Side-by-side system



Merit: Transmission possible with conventional broadcasting
Demerit: Horizontal resolution halved

Top and bottom system

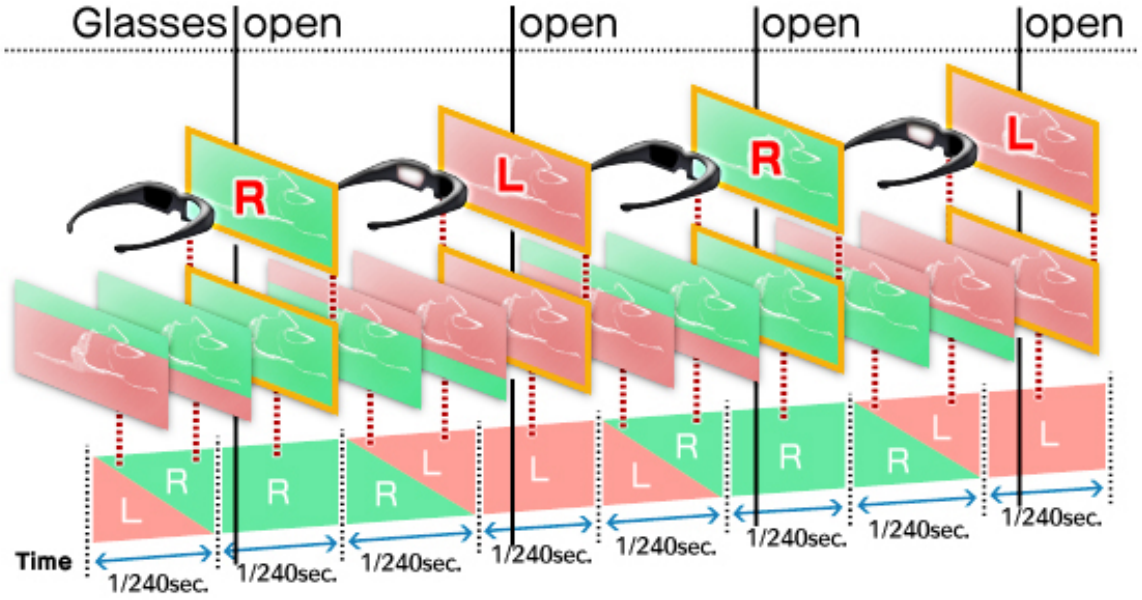


Merit: Transmission possible with conventional broadcasting
Demerit: Vertical resolution halved

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



Crosstalk is minimized

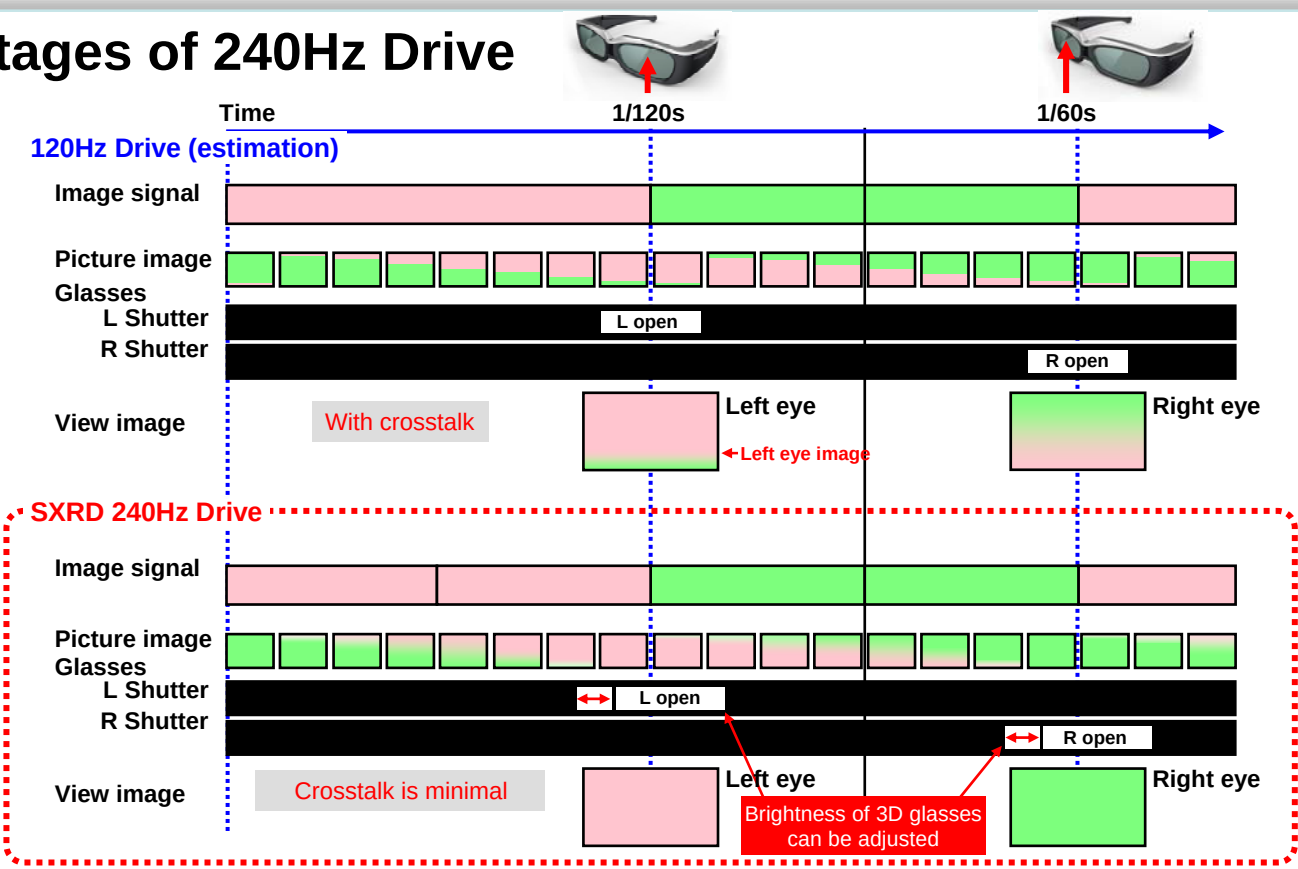
Glasses' shutter space can be increased

Brightness can be adjusted

240Hz Drive Reduces Crosstalk to Absolute Minimum

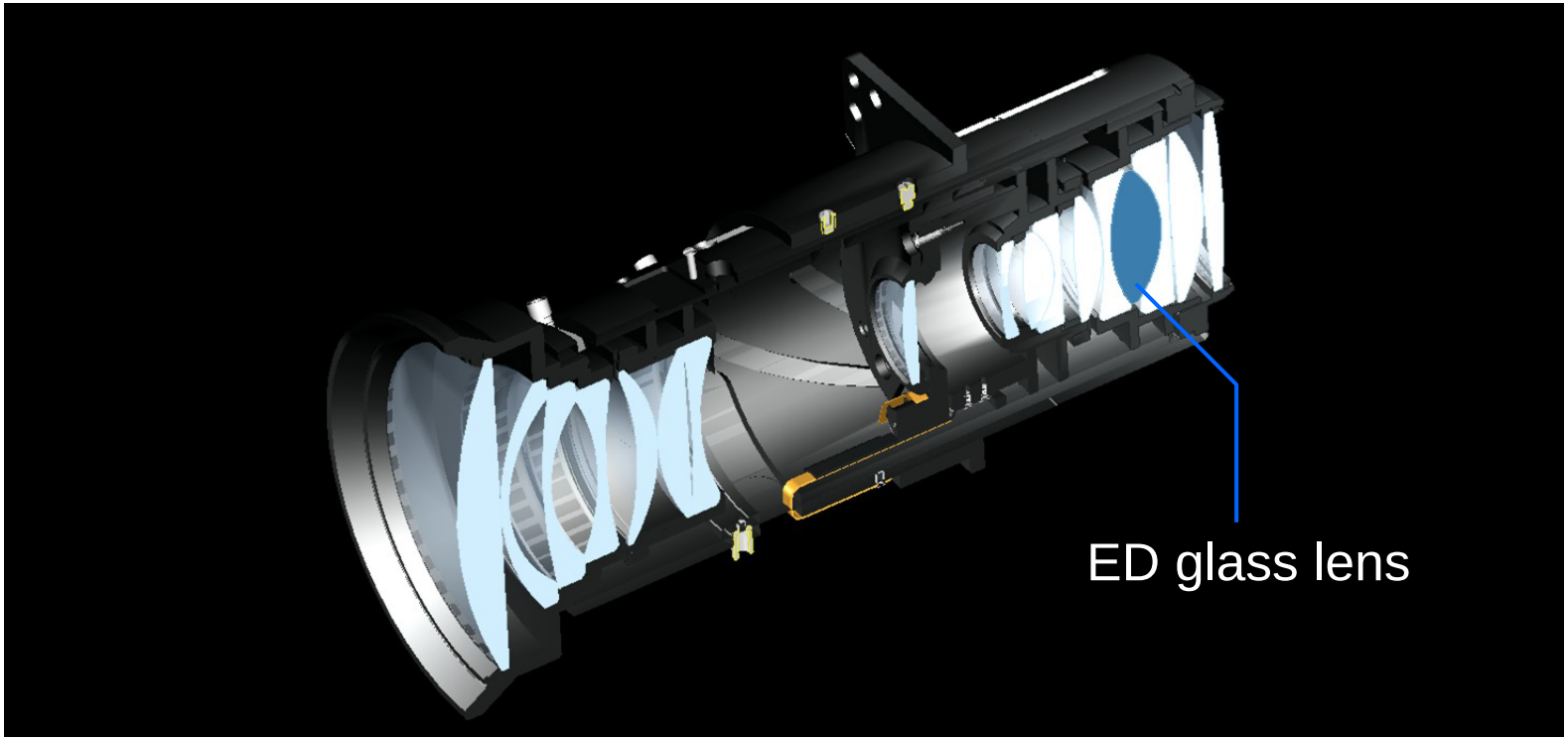
As 1/240sec is required for transfer of L1 signal using a 120Hz drive, transfer of next R1 signal must begin immediately. Using a 240Hz drive, nearly all the L1 signal can be transferred in 1/240 sec, so only the image of L1 can be received in the remaining 1/240sec.
It is also possible to save time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

Advantages of 240Hz Drive



Newly Developed Full HD-compatible 1.8× Powered Zoom Lens

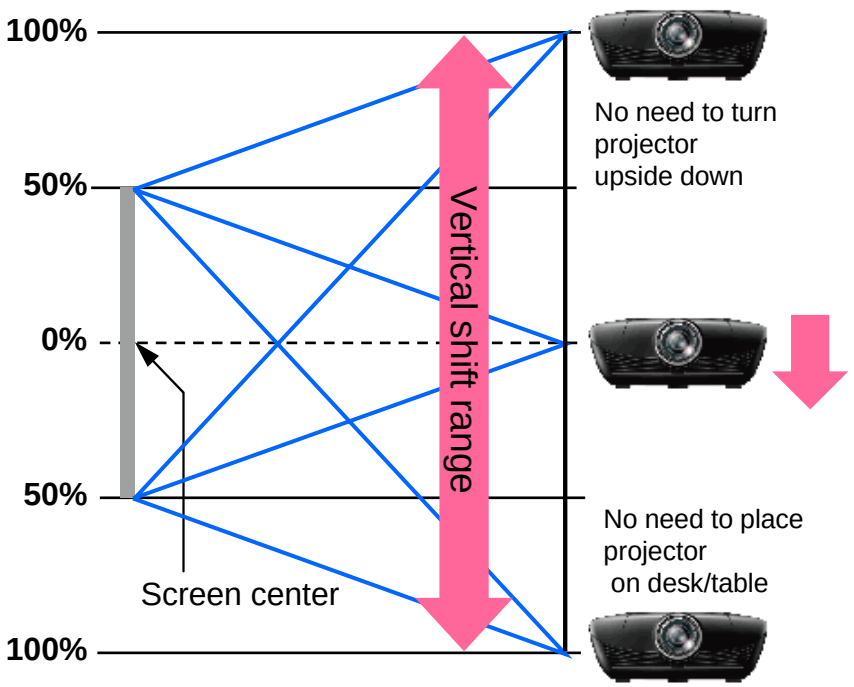
A key element in projector performance is the lens. The lens incorporated in the HC9000D has a 6-piece/17-cluster structure including an extra-low dispersion (ED) lens that is more expensive and has higher functionality that standard glass lenses. The result is optimization of the peripheral focus and minimization of chromatic aberration.

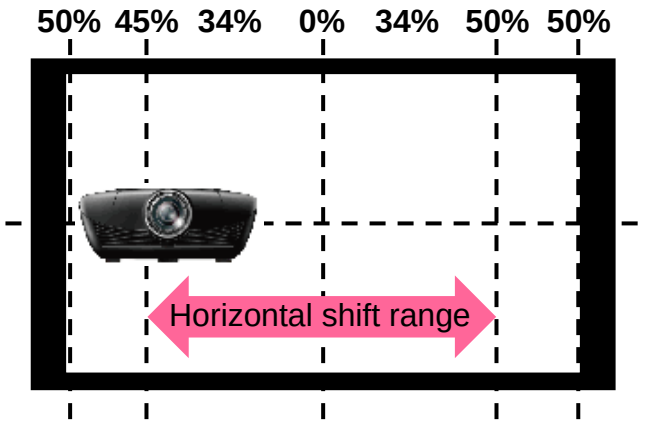


Powered Lens Shift (V±100%, H±45%) Suitable for Mounted Models

- 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%)





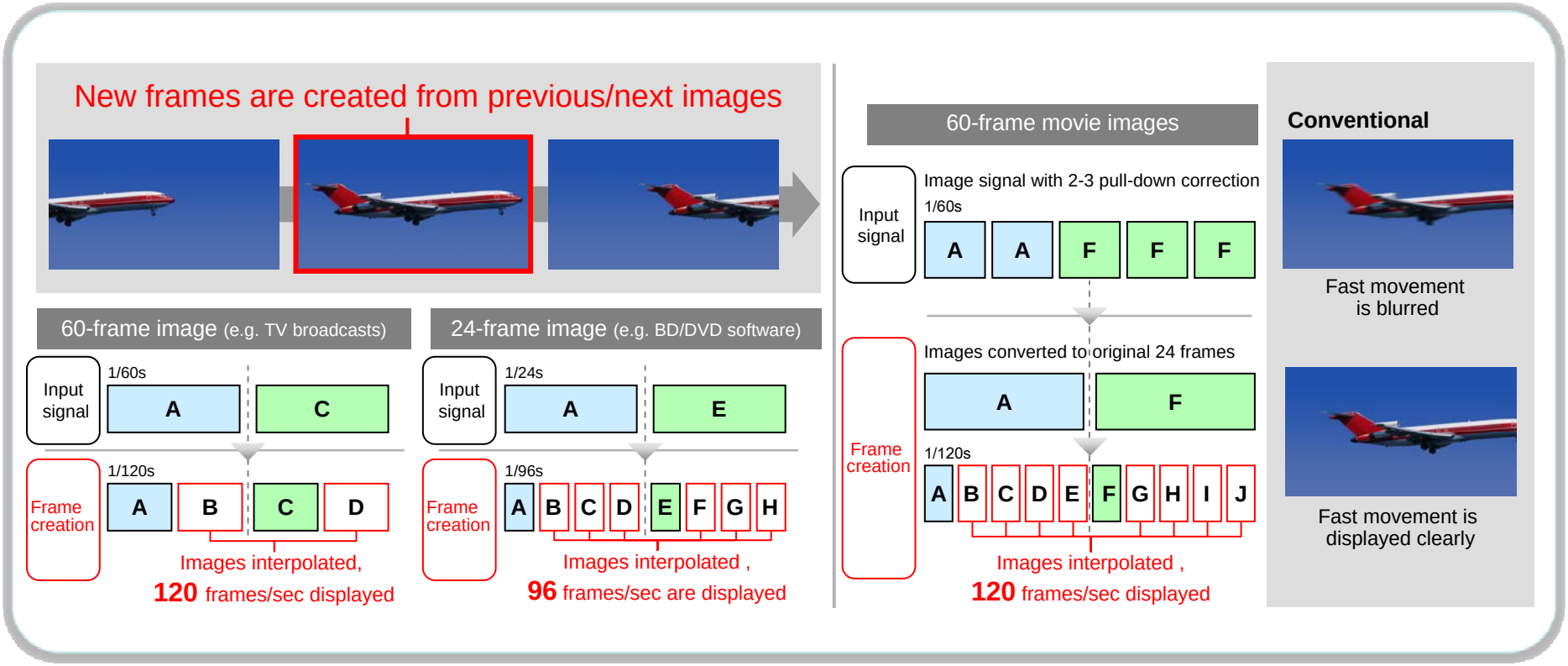
Interrelationship between vertical/horizontal lens shift

Lens shift (vertical)	100%	80%	60%	40%	20%	0%
Lens shift (horizontal)	0%	15.3%	26%	34%	40%	45%

*Max. values for vertical/horizontal lens shift cannot be set simultaneously (see table on right).

Frame Rate Convertor for 24P Movie Softwar

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.



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.

HQV

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).

Before adjustment

After adjustment

*Images created to clearly show the effects of this function.

Screen(16:9)						Default Height		Distance from Screen			
Diagonal Size		Width		Height		Projected Image(H)		Shortest(Wide)		Longest(Tele)	
inch	cm	inch	cm	inch	cm	inch	cm	inch	**m**	inch	**m**
50	127	44	111	25	62	-12	-31	66	**1.7**	122	**3.1**
60	152	52	133	29	75	-15	-37	80	**2.0**	147	**3.7**
70	178	61	155	34	87	-17	-44	94	**2.4**	172	**4.4**
80	203	70	177	39	100	-20	-50	108	**2.7**	197	**5.0**
90	229	78	199	44	112	-22	-56	122	**3.1**	222	**5.6**
100	254	87	221	49	125	-25	-62	135	**3.4**	246	**6.3**
110	279	96	244	54	137	-27	-68	149	**3.8**	271	**6.9**
120	305	105	266	59	149	-29	-75	163	**4.1**	296	**7.5**
150	381	131	332	74	187	-37	-93	205	**5.2**	371	**9.4**
200	508	174	443	98	249	-49	-125	274	**7.0**	496	**12.6**

+/-100%(3:-1 - -3:1)

+/-45%

Screen(16:9)		Movable V Position from Default Position									Movable H Position from Default Position								
Diagonal Size		Down				Up	Down				Up	Left				Right	Left				Right
inch	cm	inch					cm					inch					cm				
50	127	25	<-	0	->	25	62	<-	0	->	62	20	<-	0	->	20	50	<-	0	->	50
60	152	29	<-	0	->	29	75	<-	0	->	75	24	<-	0	->	24	60	<-	0	->	60
70	178	34	<-	0	->	34	87	<-	0	->	87	27	<-	0	->	27	70	<-	0	->	70
80	203	39	<-	0	->	39	100	<-	0	->	100	31	<-	0	->	31	80	<-	0	->	80
90	229	44	<-	0	->	44	112	<-	0	->	112	35	<-	0	->	35	90	<-	0	->	90
100	254	49	<-	0	->	49	125	<-	0	->	125	39	<-	0	->	39	100	<-	0	->	100
110	279	54	<-	0	->	54	137	<-	0	->	137	43	<-	0	->	43	110	<-	0	->	110
120	305	59	<-	0	->	59	149	<-	0	->	149	47	<-	0	->	47	120	<-	0	->	120
150	381	74	<-	0	->	74	187	<-	0	->	187	59	<-	0	->	59	149	<-	0	->	149
200	508	98	<-	0	->	98	249	<-	0	->	249	78	<-	0	->	78	199	<-	0	->	199

Max.Zoom(Wide) : y=(x*35.24952-84)/1000
Min.Zoom(Tele) : y=(x*63.44914-84)/1000

x:Diagonal Size of Screen (inch)
y:Throw Distance (m)