

# Matrix Series

Air traffic control simulation  
Flight simulation  
Heavy machinery simulation  
Vehicle operation  
Ship bridge simulation  
Homeland security  
Operations training  
Construction  
Architecture  
Engineering



## Powerhouse simulation display solutions

Today's simulation environments are more demanding than ever before. With extreme specifications including high contrast and brightness, and the need to project onto a variety of screen shapes and sizes... each system is unique. The Christie Matrix Series is purpose-built to handle even the most challenging of today's simulation display requirements.

Offering the highest resolution and the highest contrast ratios, the Christie Matrix Series is based on DLP® technology and offers a range of 2300 to 7000 ANSI lumens. Our SuperCR™ technology

provides contrast ratios up to 5000:1 allowing for low black levels for incredibly accurate night scene images. Combined with the highest color uniformity and features such as Christie Twist™ image warping and edge-blending, RGB color matching, full control of gamma curves and grayscale tracking, high input bandwidth and less than one frame of propagation delay, the Christie Matrix Series is suited to many simulation applications and is also an ideal CRT replacement solution.

The Christie Matrix Series – true-to-life simulation.

**CHRISTIE®**



## Display technology

Featuring high-quality DLP® technology and true SXGA+ (1400 x 1050) and full HD (1920 x 1080) resolutions, the Christie Matrix Series is highly reliable and will accept signals from VGA to QXGA (2048 x 1536) resolution. DLP® technology delivers high brightness and unsurpassed color, brightness uniformity and control capabilities. As well, this proven digital technology is low maintenance and completely compatible with 4:3, 5:4 and 16:9 content.

## Image quality

The Matrix S+5K and all Matrix HD projectors are driven by Xenon illumination and deliver superior image quality and the ability to color-match multiple projectors for extremely bright, color rich, uniform images – whether multiple projectors on a single screen, or multiple tiled screen displays. The Matrix 3000 features dual Osram P-VIP® lamps for increased brightness, reliability and cost-effective operation. The Matrix S+2K, Matrix S+5K and All Matrix HD models utilize a Color Purity Filter (CPF™) to enable enhanced color saturation, color matching and superior black levels for unsurpassed day and night scene blending.

New for 2008, the Christie Matrix S+2K and HD2 include an extended contrast iris to provide even more realistic night scene operation.

## Image processing

With 10-bit image processing, the Christie Matrix Series offers high bandwidth signal processing for excellent reproduction of the source without motion artifacts and smearing. For added ease of blending in tiled applications, Digital Black Level Adjustment (DBLA™) lets the user match the blended (gutter) black levels with the non-blended black levels.

## Ease of use

A user-friendly Graphic User Interface (GUI) makes operation and set-up of these projectors uncomplicated. Multiple control options let the user choose what's best for their application – built-in, IR and wired remote keypad; RS-422 or RS-232 control; or through ChristieNET™ via an Ethernet port. Motorized lens functions provide power focus, zoom, horizontal and vertical offset – all at the touch of a button. Auto set-up recognizes sources and sets up correct brightness, contrast and position.

## Serviceability

Operation and maintenance of the Christie Matrix Series is easy as well with lower power consumption, fewer lamp changes and less down-time. Field-alignable DMDs and a cleanable optical engine put full control in the hands of the user. Replacement lamp costs are low and Christie offers the best warranties on the market – 2 years parts and labor (excluding lamp).

## Standard accessories

- IR keypad (w/batteries)
- Power cord
- Christie Twist™ image warping module with enhanced edge-blending
- User manual

## Optional accessories

- Fixed and zoom lenses available with throw ratios from 0.67:1 to 7.3:1
- Matrix S+2K, Matrix S+5K, Matrix 4000 and Matrix HD series have two optional slots for analog/digital modules
- Remote control wired extension
- Remote IR sensor
- Ethernet, RS-232, RS-422 cables
- Service manual
- KoRE™ 10-bit librarian
- Lens adapter (for competitive lens)

## Benefits

- Purpose-built for simulation environments
- Optimized for complex arrays where color matching is very critical
- Can be used on motion platform simulation systems
- Small, compact designs

► The Christie Matrix Series features the widest source compatibility and has built-in Ethernet networking for full compatibility with ChristieNET™ for total projector monitoring and control capabilities.



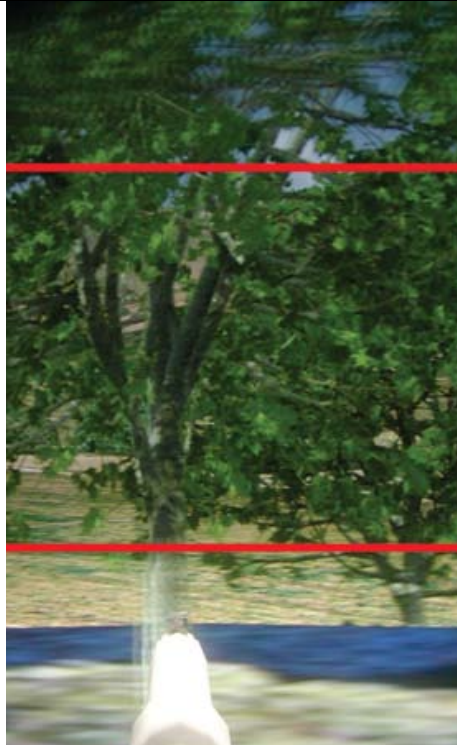
◀ The Canadian Marine Institute (CMI) is part of the Memorial University of Newfoundland, and is Canada's foremost fisheries and marine training facility. Established in 1964, the complex is used extensively for training a variety of scenarios ranging from applications based around navigating the Atlantic Ocean at various times of the day (both full daylight and night-time scenarios), as well as difficult winter and Arctic environments.

The Christie TotalVIEW™ solution operated by CMI is a Full Mission Bridge Simulator (FMB) comprised of a full 360° field-of-view screen that is 24' tall, with the ship bridge being mounted on a full motion platform. The upgraded display now produces almost 15 million pixels, and is powered by Christie Matrix Series projectors – the world's leading purpose-built DLP® simulation projection technology. The TotalVIEW™ solution also features Christie Twist™ – a state-of-the-art edge-blending and image warping technology.

## Inputs

The Christie Matrix Series offers installation flexibility and compatibility with any data, video or HDTV source in use today, from VGA to QXGA. The multi-standard video decoder and horizontal and vertical scaling of all inputs gives the user the ability to connect to virtually anything.

- RGBHV/YPbPr via 5 BNC
- DVI-I for Digital/analog/RGB/YPbPr (HDCP)
- One composite video, one S-video
- Two RS-232 ports, one RS-422 port and one GPIO port
- On-board ChristieNET™ connectivity (RJ45)
- Built-in backlit keypad and IR remote control



## Christie AccuFrame™

The unique advanced electronics in all 3-chip Matrix Series projectors come standard with AccuFrame™ to accurately display high speed simulation content for the most true-to-life displays.

An industry first, Christie AccuFrame™ was developed specifically for the simulation market. It's able to nullify image artifacts (such as smearing or double image perception) in high speed simulation. A fully adjustable electronic solution, it supports various frame rates and environments, delivering the most accurate frame display. Tested against other types of projection systems in daylight, night time and with Night Vision Goggle (NVG) stimulation Christie clearly 'owns the night' with stimulated NVG compatibility and the most realistic viewing.

▼ The Christie Matrix Series features user-replaceable lamp modules with adjustable lamp power for lower brightness.

▼ With an extremely high SuperCR™ ratio of up to 5000:1 full field – with the motorized IRIS, users can adjust for high contrast ratio and better black levels, for any given application.

▼ An optional suite of specifically-designed lenses includes both fixed and zoom lenses ranging from 0.67:1 to 7.3:1 zoom and features a durable lens mount with motorized horizontal and vertical offset. With quick lens insertion, the Christie Matrix Series is easy to work with.







► Image warping and enhanced edge-blending with Christie Twist™

**Software Features**

**Christie Twist™      Christie Twist™ Pro**

Custom warping, edge-blending of multiple projectors (up to 6 projectors)	✓	✓
Display control points and warp lines on projector	✓	✓
Add, delete, copy and paste multiple warps and blends on a single projector	✓	✓
Module with operating software included	✓	✓
Easy-to-use GUI that runs on an external PC	✓	✓
Allows up to a 10' x 10' grid	✓	✓
Control from any PC via Ethernet or RS-232 protocols	✓	✓
Includes Christie Twist™ Virtual Remote	✓	✓
Blends are defined with a black and white curve pair for each edge of the screen	✓	✓
Masks are defined with a mask curve for each edge of the screen	✓	✓
Has a blend calculation feature	✓	✓
Contains online help and printed manual plus an electronic PDF version on the CD	✓	✓
Single license of Christie Twist™ Pro		✓
Supports single or multiple projectors simultaneously		✓
Allows an unlimited and arbitrary number of grid lines		✓
Advanced edge-blending		✓
Gradient preview of edge-blends		✓
Brightness uniformity control		✓
Display control points and warp lines on projector		✓
AutoSave		✓
Projector control through Twist™ software interface		✓

**Christie Twist™ – manage arrayed projectors easily**

Christie Twist™ is a powerful, easy-to-use tool that allows users to manage arrayed projectors so they can display virtually any image, anywhere.

This tool allows for pixels to be mapped to any projection surface with proper geometry and perfect pixel to pixel alignment. Christie Twist™ provides the enhanced warping and expert blending required for multiple projectors to operate as a single, uniform display.

Controlled by an easy-to-use Graphic User Interface, users can expertly control and edge blend multiple curved images seamlessly. Images can be warped to fit virtually any dimension or shape display.

► **Christie Twist™ Pro**

An optional upgrade, Christie Twist™ Pro software offers the following additional capabilities:

- Single license supports an unlimited number of projectors per array
- Allows an unlimited and arbitrary number of grid lines
- Advanced edge-blending
- Rotate and flip capabilities
- Gradient preview of edge blends
- Brightness uniformity controller



► Light output control (LiteLOC™)

Constant brightness tracking monitors lamp output and automatically adjusts power to ensure continual, uniform brightness.



Digital Color Management (DCM™)

The Christie Matrix Series comes standard with a specially designed optical system with a very tight ± 5nm tolerance for primary colors, making multi-channel adjustments between multiple projectors easy to accomplish.

Color Temperature Control (CTC™)

Provides the flexibility to adjust color temperature with a range from 3200K – 9300K.

Custom Gamma Adjustment (CGA™)

Offers full control of gamma curves, as well as white, black and grey levels to ensure digitally accurate colors and greyscale tracking.

Primary Color Adjustment (PCA™)

Provides individual RGB color matching for multi-channel applications to eliminate color variations across multiple screens for uniform, color-matched projector arrays.

Minimum Processing Latency (MPL™)

With less than a single frame of the propagation delay between projector input and display, the result is sharp, vibrant images without loss of detail. Minimum delay between input and projection display is critical to simulate real-time interaction between trainee and simulation imagery.

SuperCR™ contrast ratio

With the internal variable contrast aperture, contrast ratios range from 1500-5000:1 for vivid, dynamic image reproduction and low black levels for accurate night-scenery mode.

Spatial Light Image Construction (SLIC™)

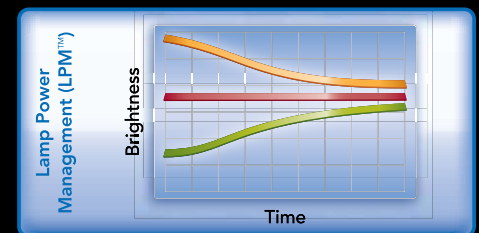
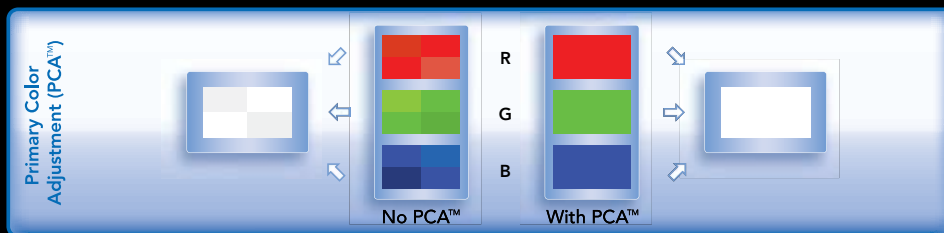
The Christie Matrix Series manufacturing ensures high-quality convergence and registration between red, green and blue DMDs.

Color Purity Filter (CPF™)

A standard feature on the Christie Matrix S+2K and all Matrix HD the CPF™ enables superior color for both dark scenes in night time simulation and bright scenes in daytime simulation.

Lamp Power Management (LPM™)

Provides users with the ability to adjust power to the lamps for a consistent and uniform brightness, to monitor and manage the lamp operation in the display. Brightness adjustments can be made from center to edge across the image up to 100% uniformity.



■ Natural lamp brightness ■ Constant regulated brightness ■ Lamp power

	Matrix S+2K	Matrix 3000
Image	<ul style="list-style-type: none"> <li>• 3-chip 0.95" DMD</li> <li>• SXGA+ (1400 x 1050) native resolution</li> <li>• 2500 ANSI lumens (±10%)</li> <li>• 90% brightness</li> <li>• Color Purity Filter (CPF™)</li> <li>• SuperCR™ contrast – 1500-2000:1 full on/off, 450:1 ANSI min</li> <li>• New feature for summer 2008 – extended contrast iris for more realistic night scene operation</li> </ul>	<ul style="list-style-type: none"> <li>• Single-chip 0.95" DMD</li> <li>• SXGA+ (1400 x 1050) native resolution</li> <li>• 3000 (dual) 1500 (single) ANSI lumens (±10%)</li> <li>• 90% brightness</li> <li>• Color Purity Filter (CPF™)</li> <li>• SuperCR™ contrast – 1500-5000:1 full on/off, 300:1 ANSI min</li> </ul>
Dimensions (excluding lens)	<ul style="list-style-type: none"> <li>• Weight: 75 lb (34 kg)</li> <li>• Shipping weight: 120 lb (54.4 kg)</li> <li>• Size (LxWxH): 22.3 x 26.0 x 12.3" (566 x 660 x 313mm)</li> </ul>	<ul style="list-style-type: none"> <li>• Weight: 36 lb (16 kg)</li> <li>• Shipping weight: 45 lb (20.4 kg)</li> <li>• Size (LxWxH): 14.7 x 20.1 x 10.1" (374 x 510 x 257mm)</li> </ul>
Lamp	<ul style="list-style-type: none"> <li>• 500W CERMAX® Xenon lamp module</li> <li>• 1500 hours (typical) lifetime</li> <li>• LiteLOC™</li> </ul>	<ul style="list-style-type: none"> <li>• Dual Osram P-VIP® 300W</li> <li>• 2000 hours (typical) lifetime</li> <li>• LiteLOC™</li> </ul>
Power requirements	<ul style="list-style-type: none"> <li>• 100-240 VAC @ 50/60 Hz</li> <li>• Power consumption: 1000W max</li> <li>• Thermal dissipation: 3412 BTU/hr</li> <li>• Operating current: 10A @ 100 VAC, 5A @ 200 VAC</li> </ul>	<ul style="list-style-type: none"> <li>• 100-240 VAC @ 50/60 Hz</li> <li>• Power consumption: 480W (dual); 840W (single)</li> <li>• Thermal dissipation: 3210 BTU/hr</li> <li>• Operating current: 8.4A @ 100 VAC (dual); 4.8A @ 100 VAC; 2A @ 200 VAC (single)</li> </ul>
Specialty features	<ul style="list-style-type: none"> <li>• Motion platform capable (available build to order)</li> </ul>	

	Matrix HD2	Matrix HD4
Image	<ul style="list-style-type: none"> <li>• 3-chip 0.95" DMD</li> <li>• SXGA+ (1920 x 1080) native resolution</li> <li>• 2300 ANSI lumens (±10%)</li> <li>• 90% brightness</li> <li>• Color Purity Filter (CPF™)</li> <li>• SuperCR™ contrast – 1500-2000:1 full on/off, 450:1 ANSI min</li> <li>• New feature for summer 2008 – extended contrast iris for more realistic night scene operation</li> </ul>	<ul style="list-style-type: none"> <li>• 3-chip 0.95" DMD</li> <li>• SXGA+ (1920 x 1080) native resolution</li> <li>• 5000 ANSI lumens @ 200-240VAC, 4000 ANSI lumens @ 100-120 VAC (±10%)</li> <li>• 90% brightness</li> <li>• Color Purity Filter (CPF™)</li> <li>• SuperCR™ contrast – 1500-2000:1 full on/off, 450:1 ANSI min</li> </ul>
Dimensions (excluding lens)	<ul style="list-style-type: none"> <li>• Weight: 75 lb (34 kg)</li> <li>• Shipping weight: 120 lb (54.4 kg)</li> <li>• Size (LxWxH): 22.3 x 26.0 x 12.3" (566 x 660 x 313mm)</li> </ul>	<ul style="list-style-type: none"> <li>• Weight: 75 lb (34 kg)</li> <li>• Shipping weight: 120 lb (54.4 kg)</li> <li>• Size (LxWxH): 22.3 x 26.0 x 12.3" (566 x 660 x 313mm)</li> </ul>
Lamp	<ul style="list-style-type: none"> <li>• 500W CERMAX® Xenon lamp module</li> <li>• 1500 hours (typical) lifetime</li> </ul>	<ul style="list-style-type: none"> <li>• 1.0kW CERMAX® Xenon lamp module</li> <li>• 1500 hours (typical) lifetime</li> <li>• LiteLOC™</li> </ul>
Power requirements	<ul style="list-style-type: none"> <li>• 100-120 VAC and 200 to 240 VAC @ 50/60 Hz</li> <li>• Power consumption: 1000W</li> <li>• Thermal dissipation: 3412 BTU/hr</li> <li>• Operating current: 10A @ 100 VAC, 5A @ 200 VAC</li> </ul>	<ul style="list-style-type: none"> <li>• 100-240 VAC @ 50/60 Hz</li> <li>• Power consumption: 1600W max</li> <li>• Thermal dissipation: 5460 BTU/hr</li> <li>• Operating current: 10.4A @ 100 VAC, 8A @ 200 VAC</li> </ul>
Specialty features	<ul style="list-style-type: none"> <li>• Motion platform capable (available build to order)</li> </ul>	<ul style="list-style-type: none"> <li>• Motion platform capable (available build to order)</li> </ul>



## Matrix S+5K

- 3-chip 0.95" DMD
- SXGA+ (1400 x 1050) native resolution
- 5000 ANSI lumens @ 200-240 VAC, 4000 ANSI lumens @ 100-120 VAC (±10%)
- 90% brightness
- SuperCR™ contrast – 1500-2000:1 full on/off, 450:1 ANSI min

- Weight: 75 lb (34 kg)
- Shipping weight: 120 lb (54.4 kg)
- Size (LxWxH): 22.3 x 26.0 x 12.3" (566 x 660 x 313mm)

- 1.0kW CERMAX® Xenon lamp module
- 1500 hours (typical) lifetime
- LiteLOC™

- 100-240 VAC @ 50/60 Hz
- Power consumption: 1600W max
- Thermal dissipation: 5460 BTU/hr
- Operating current: 12A @ 100 VAC/8A @ 200 VAC

- Motion platform capable (available build to order)

## Matrix HD7

- 3-chip 0.95" DMD
- SXGA+ (1920 x 1080) native resolution
- 7000 ANSI lumens (±10%)
- 90% brightness
- Color Purity Filter (CPF™)
- SuperCR™ contrast – 1500-2000:1 full on/off, 450:1 ANSI min

- Weight: 80 lb (36.3 kg)
- Shipping weight: 125 lb (56.7 kg)
- Size (LxWxH): 22.3 x 26.0 x 12.3" (566 x 660 x 313mm)

- 1.2kW CERMAX® Xenon lamp module
- 1500 hours (typical) lifetime
- LiteLOC™

- 200-240 VAC @ 50/60 Hz
- Power consumption: 2000W max
- Thermal dissipation: 6825 BTU/hr
- Operating current: 10A @ 200 VAC

- Motion platform capable (available build to order)



## Matrix 4000 (available build to order)

- 3-chip 0.95" DMD
- SXGA+ (1400 x 1050) native resolution
- 6000 ANSI lumens @ 200-240 VAC, 5000 ANSI lumens @ 100-120 VAC (±10%)
- 90% brightness
- Color Purity Filter (CPF™)
- SuperCR™ contrast – 1500-2000:1 full on/off, 450:1 ANSI min

- Weight: 75 lb (34 kg)
- Shipping weight: 120 lb (54.4 kg)
- Size (LxWxH): 22.3 x 26.0 x 12.3" (566 x 660 x 313mm)

- 1.0kW CERMAX® Xenon lamp module
- 1500 hours (typical) lifetime
- LiteLOC™

- 100-240 VAC @ 50/60 Hz
- Power consumption: 1600W max
- Thermal dissipation: 5460 BTU/hr
- Operating current: 10.4A @ 100 VAC/8A @ 200 VAC

- Motion platform capable (available build to order)

## Regulatory approvals

- These products conform to the following regulations related to product safety, environmental requirements and electromagnetic compatibility (EMC): FCC Part 15, Subpart B Class A; CISPR22/EN55022; CISPR24/EN55024 UL 60950-1 First edition; CAN/CSA-C22.2 No 60950-1-03 First edition; IEC60950-1:2001 2002/95/EC RoHS

## Limited warranty

- Projector: 2 years parts and labor (including lamp engine)
- Contact an authorized Christie representative for full details of our limited warranty

Military simulation and aviation specialists, CAE recently completed their third upgrade of the Central Air Traffic Control School (CATCS) simulator at RAF Shawbury. Replacing old Electrohome Marquee 8500 CRT projectors, the five compact Christie Matrix 2000's are pole-mounted in the original positions vacated by the Marquees. The display itself is 13.5m wide and 2.16m high at SXGA resolution, creating a 210-degree panoramic Field-of-View of the virtual airfield. This entire environment simulates the movement of 3D aircraft and vehicles around the airfield.

As Flt Lt Dave Harvey, in charge of the base's VIS/SIM facility explained, "There was a requirement for upgrading the projectors, based on feedback received from the instructors. The next logical step after CRT projection was into DLP®. We asked CAE to investigate and come up with a solution, and they recommended the Christie Matrix 2000."

← Fed from five Evans & Sutherland simFUSION image generators, the projectors must deliver unprecedented realism and minimize downtime.

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