Matrix Series

CHRISTIE®

True-to-life simulation

The goal for high performance simulation is to accurately and consistently replicate an environment where trainees can safely practice routines and tasks that can't be repetitively performed in the real world.

Factors such as geometry, image blending and warping, resolution, color and brightness uniformity, latency and overall reliability and sustainability are key criteria that must be addressed when designing integrated solutions. The Christie Matrix Series, provides the tools so customers can scale their displays into large arrays to achieve high resolution over wide fields of view, while providing reliability, long life, quality and ease of use.

The Christie Matrix line employs two alternative illumination technologies: Xenon arc-lamps and LEDs.

Christie – changing the way you view simulation.

Xenon illumination

Designed and engineered for complex blended arrays where color matching and uniformity are critical, the Christie Matrix Series of Xenon projectors offers WUXGA (1920 x 1200), HD (1920 x 1080) and SXGA+ (1400 x 1050) resolution. This series delivers the highest consistent performance utilizing 3-chip DLP® technology – the best solution for simulation environments where clarity of fast moving content is critical.

The small compact series' design includes built-in geometric warping and edge-blending capabilities and unique proprietary purpose-built features that create scalable, high resolution displays. A broad range of specifically-designed high performance lenses, optional input modules, mounting systems and customized structures, networking capability and other peripherals provide the flexibility you need for your unique application. Christie Matrix Series 3-chip DLP® Xenon projectors are engineered for use in motion platform simulation systems.

Display technology

Built on high-quality 3-chip DLP® technology the Christie Matrix Series of Xenon projectors are highly reliable and accept signals from VGA to QXGA (2048 x 1536) resolution.

With proven reliability, high brightness, excellent color and brightness uniformity and display control coupled with ease of use and low maintenance, the Christie Matrix Series exceeds simulation market requirements for projection display. This proven digital technology features a low maintenance design with over 650,000 hours Mean Time Between Failure (MTBF) on each DMD. It is also completely compatible with 4:3, 5:4 and 16:9 content.

High quality graphics and image processing

Christie's simulation display solutions present a faithful reproduction of the source – a true-to-life view of the training environment. With 10-bit image processing, the Christie Matrix Series offers high bandwidth signal processing for excellent reproduction of the source without motion artifacts, smearing or additional latency. For added ease of blending in tiled applications, Digital Black Level Adjustment (DBLA™) lets you match the blended black levels with the non-blended black levels.

The Christie Matrix Series Xenon projectors offers 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.

High contrast, low black levels

A high contrast ratio and the capability of low black levels are necessary for the accurate display of night mode simulation scenes. An extended iris option further improves aperture range and provides even more realistic night scene operation.

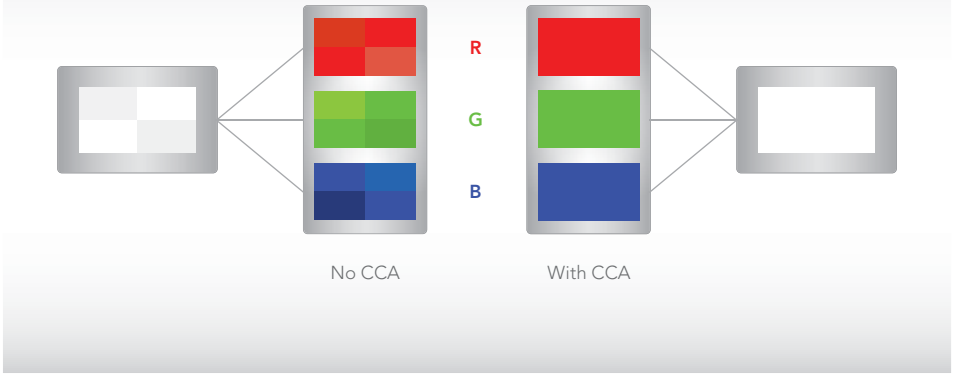
Ease of use

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 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.

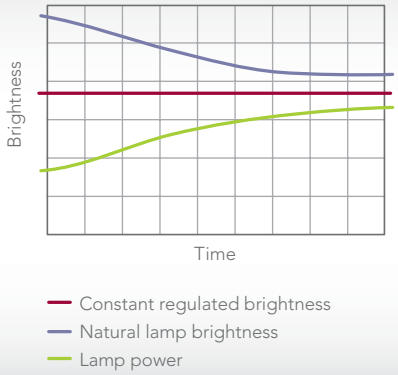
Serviceability

Operation and maintenance of the Christie Matrix Series Xenon projectors are easy too 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 (including light engine).

Comprehensive Color Adjustment (CCA™)



Lamp Power Management (LPM™)



▲ Unique series features

Unique series features

Color Temperature Control (CTC™)
Provides the flexibility to adjust color temperature with a range from 3200-9300K for finite control over color uniformity.

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 propagation delay between projector input and display, the result is realistic, real-time simulation. 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 1500-2000:1 for vivid, dynamic image reproduction and low black levels for accurate night-scenery mode.

Color Purity Filter (CPF™)
Enables enhanced color saturation, color matching and superior black levels for unsurpassed day and night scene blending.

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.

▲ An optional suite of specifically-designed lenses includes both fixed and zoom lenses ranging from 0.67:1 to 11.2:1 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.

▲ The widest source compatibility – includes built-in Ethernet networking for full compatibility for projector monitoring and control capabilities.

▲ User-replaceable Xenon lamp modules with adjustable lamp power for lower brightness.

▲ With an extremely high SuperCR ratio of up to 2000:1 full field – with the motorized IRIS, you can adjust for high contrast and better black levels, for any given application.

LED illumination

LED illumination and 1-chip DLP® technology enables new capabilities in Night Vision Goggle (NVG) training. It is the first simulation projection display system to provide simultaneous and independent control over both the visible and near-IR spectrum using LED illumination. The unique lamp-less illumination system offers unprecedented reliability and years of continuous operation, plus it's virtually maintenance-free.

Built on a stable, long-life platform that doesn't use polarization filters or fade over time, it has no consumables and features extraordinarily long life, quality and ease of service.

The Christie Matrix StIM™ is an intelligent image display that features Christie ArrayLOC™ – the real-time processing and calibration technology that enables individual projectors to become intelligent display nodes in a larger arrayed system.

Christie ArrayLOC self-adjusts in as little as two seconds. It synchronizes and balances the color and brightness levels, reducing the amount of time, labor and costs associated with maintaining a simulation display.

▲ ArrayLOC constantly monitors brightness and color balance levels.

▲ In as little as two seconds, ArrayLOC synchronizes all projectors in the array.

▲ 50,000 hours MTBF on LED illumination package (Christie Matrix StIM).

Unique features

InfraRGB

Unique InfraRGB™ illumination removes the restrictions of a lamp. The projector can be oriented in portrait, landscape or anywhere in between to more optimally cover the overall display. The projector can be mounted on any one of five sides, including the back, resulting in greater installation flexibility.

It can also be built into installations with limited access since no routine maintenance is required.

Christie InfraScene™

Christie has developed a unique capability of processing and displaying near-infrared content for true-to-life NVG stimulation called InfraScene™. The unique infrared function allows for the simultaneous, and independent, display of both visible light and near-infrared projection from a common display engine. This creates a practical, deployable, real-world simulation system that enables new training capabilities such as utilizing real NVGs.

Display technology

At the core of the projector is a single DMD with a 650,000 hour Mean Time Between Failures (MTBF). When combined with solid state illumination, it provides unmatched picture reliability along with a filter-free design for a low total cost of ownership. A reliable, accurate picture that will stand the test of time. Unlike other standard single-chip DLP® projectors, with LED illumination there are no rainbow, or strobe effects, no artifacts and higher reliability for overall projector performance.

Contrast

A scalable, arrayed simulation system that creates practical, high resolution displays and produces an extraordinary dynamic contrast ratio. Real-time modulation of the LEDs allows new levels of flexibility and system performance unachievable with other digital projection technologies.

InfraScene™

RoHS Compliant

Christie Matrix SIM

Built on the same stable, long-life RGB-LED illumination platform as the Christie Matrix StIM, the Christie Matrix SIM offers a virtually maintenance-free option for commercial aviation, and other training applications where NVG stimulation is not required.

With the Christie Matrix SIM, the civil aviation sector now has a viable display solution that meets FAA standards and boasts low sustainment costs, low operating costs, real-time auto-calibration and a low latency. The Christie Matrix SIM simulation projection system has been successfully integrated and proven on commercial simulators with FAA qualification approval for complete unrestricted training, meeting the stringent FAA CRF Part 60 Qualification Performance Standards.

The advantages of LED illumination and DLP® technology in the Christie Matrix SIM include unprecedented image quality, stability and reliability at the point of purchase and over the extensive lifetime of the display. A wide color gamut, excellent color saturation and greater flexibility to manage color space to best fit application requirements offers image generators enhanced capabilities for producing images that are closer to reality than with traditional lamp-based projectors. As well, the high-bandwidth capabilities of LED and DLP® ideally complement each other and allow for higher levels of both static and dynamic image fidelity.

With no moving parts, no lamp to change, and low power requirements, the Christie Matrix SIM offers the highest level of reliability and long life, with a solid-state LED illumination source rated up to 60,000 hours MTBF.

The Christie Matrix SIM is an intelligent display utilizing Christie ArrayLOC™, technology that self-adjusts color and brightness levels in real-time and offers rock-solid system stability. Combined with long life expectancy, this significantly reduces maintenance efforts and ownership costs for years of virtually maintenance-free operation resulting in more uptime and more training.

Sustainability

Lower power consumption directly translates to reduced operating heat, less cooling requirements and cost savings in electricity for an extremely low sustainment cost. No consumables means years of continuous operation.

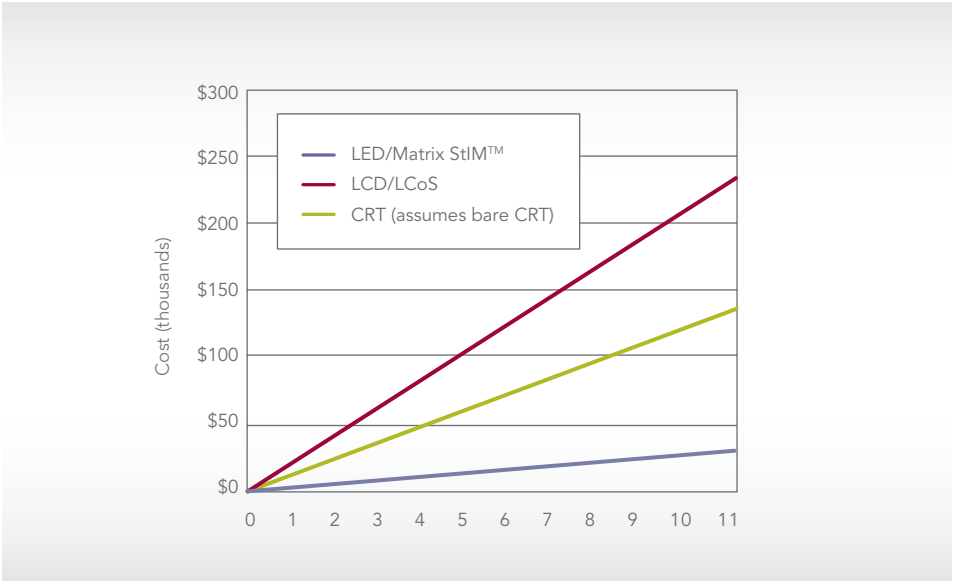
Ease of use

Another industry first, Christie ArrayLOC™ manages the brightness and color space of all projectors within an array in real time, with no additional latency. With an unprecedented level of display solution stability and reliability, there is no need to rebalance the display manually and no lamp changes are required.

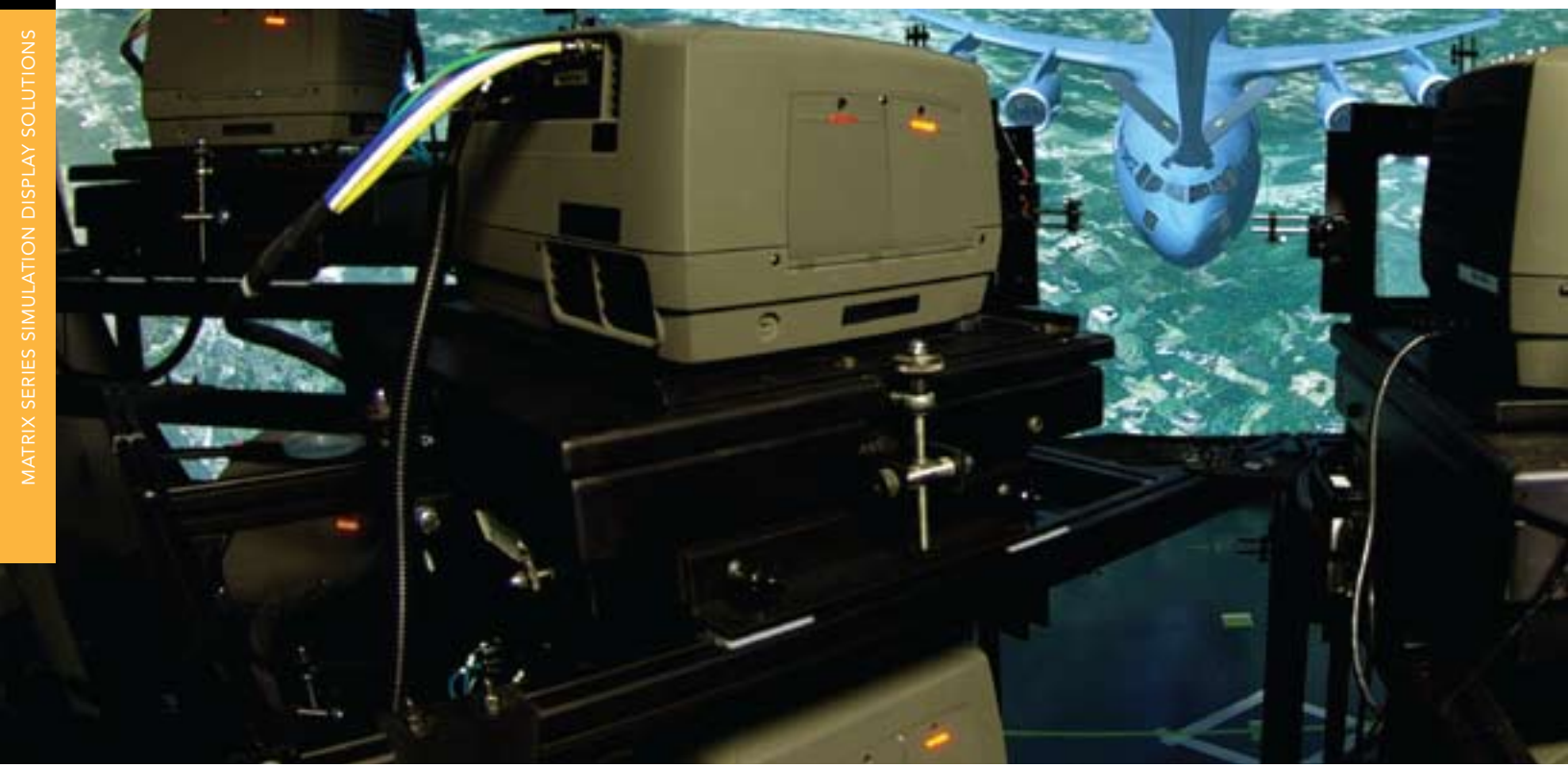
Minimum Processing Latency (MPL™)

With less than a single frame of propagation delay between projector input and display, the result is realistic, real-time simulation. This is critical to simulate real-time interaction between trainee and simulation imagery.

▲ Boeing chose the award-winning Christie Matrix StIM as the projection system technology for a multi-million dollar display system upgrade for their Apache Longbow Crew Trainer (LCT) simulator program.



▲ With 50,000 hours MTBF on the illumination package, no moving parts, no lamps or filters to change, operation is virtually maintenance-free. High MTBF and ease of support contribute to a noticeably low cost of ownership and savings in sustainment costs.



Christie AccuFrame™

With unique advanced electronics, all Christie Matrix Xenon projectors come standard with Christie 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 is able to nullify image artifacts (such as smearing or double image perception) in high speed simulation. A fully adjustable electronic solution to >6ms, it supports various frame rates and environments, delivering the most accurate frame display. Tested against other types of projection systems Christie clearly 'owns the night' with stimulated NVG compatibility and the most realistic viewing.

Christie AccuFrame enables the removal of perceived "double imaging" of content due to image frame perception in the eye.
Offers accurate frame display for non-CRT projectors for use in fast simulation environments.
Fully adjustable to support various frame rates and environments.

Christie Twist™

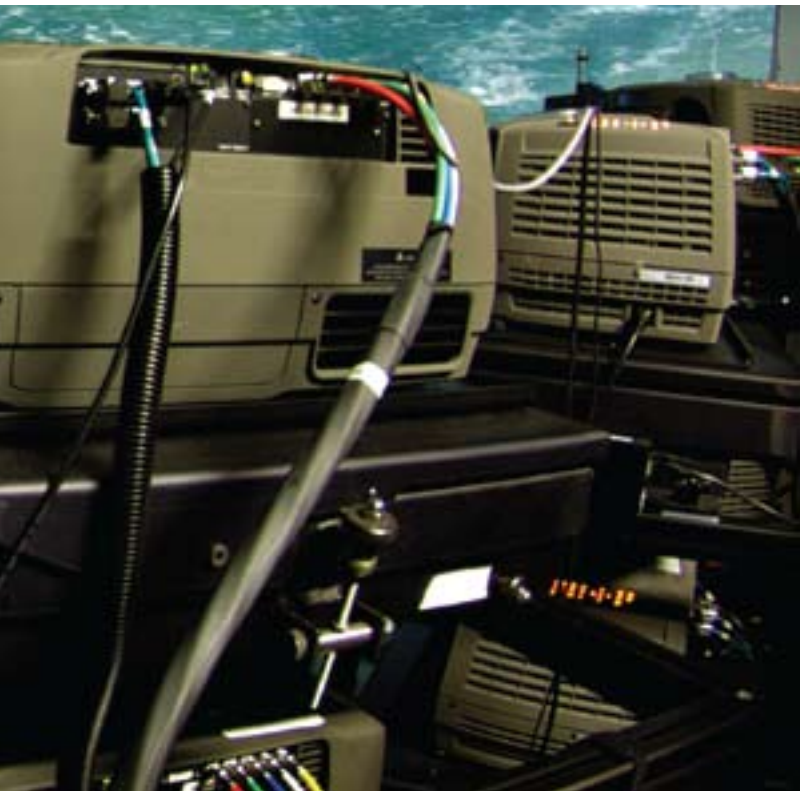
Christie Twist™ allows users to manage arrayed projectors to display virtually any image, anywhere. This powerful and easy-to-use tool allows for pixels to be mapped to any projection surface with proper geometry and perfect pixel-to-pixel alignment. Christie Twist provides the enhanced warping and expert 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:

Single license supports an unlimited number of projectors per array
Allows up to 31 points on a grid
Advanced edge-blending
Rotate and flip capabilities
Gradient preview of edge blends
Brightness uniformity controller

▲ Image warping and enhanced edge-blending with Christie Twist.



◀ Christie was selected by the US Air Force Air Education and Training Command (AETC) and QuantaDyn Corporation to power its two Boom Operator Weapons System Trainer (BOWST) mission trainers, located in Altus AFB in Oklahoma.

The BOWST trainers offer high resolution and a seamless 220˚ x 55˚ field of view for visual acuity and a true-to-life simulation environment of aerial refuelling for KC-135 boom operators. The simulators provide realistic feedback, and sophisticated auditory and visual cues that effectively can reduce in-flight training time by up to 33 percent.

▲ Without Christie AccuFrame

▲ With Christie AccuFrame

▲ Without LiteLOC

▲ With LiteLOC

Christie Twist™ software features	Basic	Pro
Custom warping, edge-blending of multiple projectors (up to six projectors)	•	•
Display control points and warp lines on projector	•	•
Add, delete, copy and paste multiple warps and blends on a single projector	•	•
Module with included operating software	•	•
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	•	•
Supports single or multiple projectors simultaneously		•
Allows up to 31 points on a grid		•
Advanced edge-blending		•
Gradient preview of edge-blends		•
Brightness uniformity control		•
Display control points and warp lines on projector		•
AutoSave		•
Projector control through Christie Twist software interface		•

Corporate offices

Christie Digital Systems USA, Inc
USA – Cypress
ph: 714 236 8610

Christie Digital Systems Canada Inc.
Canada – Kitchener
ph: 519 744 8005

Independent sales consultant offices

Spain
ph: +34 91 633 9990

Italy
ph: +39 (0) 2 9902 1161

South Africa
ph: +27 (0) 317 671 347

Worldwide offices

United Kingdom
ph: +44 (0) 118 977 8000

Germany
ph: +49 2161 664540

France
ph: +33 (0) 1 41 21 44 04

Eastern Europe and
Russian Federation
ph: +36 (0) 1 47 48 100

United Arab Emirates
ph: +971 (0) 4 299 7575

India
ph: (080) 41468941 – 48

Singapore
ph: +65 6877 8737

China (Shanghai)
ph: +86 21 6278 7708

China (Beijing)
ph: +86 10 6561 0240

Japan (Tokyo)
ph: 81 3 3599 7481

Korea (Seoul)
ph: +82 2 702 1601

Certified System
ISO 9001
ISO 14001
Kitchener, Ontario

DLP
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For the most current specification information, please visit www.christiedigital.com

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