

PROJECTION SELECTION GUIDE

Choosing the technology behind the experience



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Cover image: **Al Wasl Plaza**, Expo City Dubai, UAE

Partner: Creative Technology Middle East

> Photo courtesy of Expo 2020 Dubai

HOW DO YOU KNOW IT'S THE RIGHT PROJECTOR?

Selecting the right projector is a lot like buying a car. You know how much you can spend, what you need it to do, and some of the different models you want to explore. But here's where it gets tricky: once you sift through all the available features and options, which model is the right fit?

The same thinking applies to display technology: how do you choose the right projector when there's so much choice? A great way to get started is to have a firm handle on your "must-haves": the criteria you will use to guide you through the selection process.

What's important to my project?

It all starts with that question. And if you can answer it, you have the information to help you find the right projector for your application or venue. It's the question that helps you determine the right price, right brightness, and right performance for your needs. It helps guide you as you consider different projector models. You can fine-tune your requirements and narrow down your options when you consider things like the characteristics of the space where your projector will operate and the nature of your content.

There is no one-size-fits-all solution

Every application and every venue is different. That means choosing the right projector comes down to your application, the environment where you plan to use it, and what you're trying to achieve. There's a lot to consider, so let's dive into what you need to know when selecting your next projector.





TAKE TIME TO DO YOUR HOMEWORK

Before you start to talk about all the technology options with a consultant, systems integrator, or do your own research, spend some time looking at the environment you'll use it in.



- 1. How much ambient light natural or artificial – is in your space?
- 2. What are you projecting on a wall, screen, building, or landmark? What are the dimensions?
- 3. How big is the room?
- 4. How far is the projector from the projection surface?
- 5. What's the viewing distance? Will people be close to the projected image? Or will they sit or stand at a distance?
- 6. Are there any potential obstructions to the projector's light path?

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These factors will help determine your specifications for brightness, resolution, contrast, and lens throw distance. It will also help you determine how many projectors you need and their placement.

For example, the closer your audience is to the display, the higher the resolution you need so the image doesn't appear pixelated. If your space is limited, an ultra short throw (UST) lens is invaluable, as it lets you locate the projector close to the screen and still get a bright, large image. Most Christie® projectors include a UST lens within their lens suite.

rium kinetic wall, Kogakuin University, Japan Partners: Ushio Lighting nc., CIMA Co., Ltd., and P.I.C.S. Co., Ltd

Size can matter

Size and weight won't trump image quality and functionality, but they can influence your decision. If you need a projector that's easier to move around or you have a space-limited environment, then you may want to consider a smaller, lighter model.

The combination of a compact form factor and the ability to operate your projector in any orientation (not every projector can do that) allows you to locate it precisely where it needs to be for optimal screen coverage and performance.

What about noise?

If your audience is far from the projector, you probably don't need to think too much about the sound level. But what if the projector is close by?

Agency, Regeneration: Black Cinema 1898-1971

Academy Museum of Motion Pictures, USA

Photo by Joshua Wh<mark>ite,</mark>

Museum Foundation

JW Pictures / © Academy

No one wants to distract from the audience's experience or increase the amount of noise already in the room, so the projector's sound level is now part of your decision.

So, what does that mean as you consider noise? 30dBA is considered to be whisper-quiet, while 40dBA is equated to quiet library sounds.

Environmental factors

You know where the audience will be and where the projector needs to go. Now we need to take a look at the environmental factors that can affect your projector.

Surreal water feature,

Expo City Dubai, UAE

Photo courtesy of

Expo 2020 Dubai

Partner: WET

Will the projector be placed indoors or outdoors?

Do you need to contend with dust, heat, or humidity?

If you face demanding environmental conditions, you may need a projector with a sealed optical path or a dust-resistant optical engine. Even more extreme environments may require an enclosure to ensure optimal and reliable operation.

Deloitte

use your projector.

Will it be used rigorously, going from one facility or venue to another?

Do you need to operate it for long run times, maybe even 24/7?

Answering these questions will help determine if you need characteristics like rugged design, high-usage capability, or a longer operational life.



Deloitte's Investor Relations and Governance Awards event, Portugal Partner: Europalco

How robust does your projector need to be?

Next on the list of considerations is how you'll

From the boardroom to the spectacular

Will your content mostly include spreadsheets and presentations? Or will you display colorful, detailed visuals?

The more sophisticated your content, the more important color fidelity is. Look for projectors that have technology that boosts color performance, so it's more balanced, uniform, accurate - and more realistic. For example, with Christie BoldColor[™] and BoldColor+[™] technology on several of our laser projectors, they can create the color balance needed to accurately reproduce colorful images without sacrificing brightness.

If your application needs the most lifelike, pure, and vibrant onscreen colors, RGB pure laser projection technology has the widest color gamut available. It can reproduce real-world colors and dramatically enhance your audience's visual experience.

Video

Montreal Museum

of Fine Arts. Canada

Photo ©

Nicolas Ruel

Projectors with frame rates of 60 Hz and above significantly reduce the motion blur that can happen with lower frame rates. Some models offer even higher image quality by projecting native 4K resolution content at 120 Hz or 2K at 240 Hz.

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LET YOUR CONTENT GUIDE YOU

Now that you've taken a close look at your environment, your next consideration is your content.

Since displaying video is standard these days, a projector's frame rate plays a big role in how dynamic (moving) content looks on screen.

If you want to display 3D content, higher frame rates of 4K at 60 Hz per eye not only reduce motion blur but also help to make the visual experience more comfortable. This means more sensitive viewers are less likely to experience the nausea or headaches they've had when watching content at lower frame rates.



MULTI-PROJECTOR SYSTEMS

More projectors, more considerations

Medium and large-scale experiences, complex projection surfaces such as domes and buildings, or obstacles in the light path, often dictate the need for multi-projector arrays.

These arrays are required to get the brightness, resolution, and screen coverage necessary to deliver a quality visual experience.

What are some of the considerations for a multi-projector system? Let's take a look:

- Who's using the equipment?
 And how tech-savvy are they?
- > Will the equipment need to be moved often?
- What is the size and type of your screen or projection surface? Is it flat, curved, a wave, or a dome? Or is it a building or landmark?
- > What type of content will you display?

Depending on your answers to these questions, you may want to look at automated alignment technology.

If you need to move your multi-projector array into a different room before using it or set the projectors up for a live event, built-in warping and blending or stacking capabilities will allow you to adjust the content on the fly so it appears as intended – perfectly aligned and seamless. Most Christie® projectors have <u>Christie Twist</u>[™] built-in, so you can easily map pixels onto any projection surface and maintain proper geometry and accurate pixel-to-pixel alignment. <u>Christie Mystique</u>[™] takes this a step further and automates the warping and blending process. You save hours of painstaking work with just a few mouse clicks: the camera-based software automatically aligns, stacks, and blends multi-projector systems in minutes with consistent accuracy.

Managing a multi-projector system, whether you have five or 250 projectors, can take a lot of time and effort. You can improve your team's productivity with projector monitoring and control software. With this kind of software tool, they can perform repetitive processes, remotely power-up and powerdown projectors, and quickly diagnose and resolve issues in real-time, all from one central laptop. As you consider your projector options, check out the various manufacturers to see if they offer this software.

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A complimentary download: Christie® Conductor is an advanced monitoring and control software solution for Christie Crimson, M 4K RGB Series, and Griffyn® Series projectors. Learn more

THE BIGGER PICTURE

Power, operational efficiency, and maintenance

Maintaining your investment

The good news? Most commercial projectors on the market today are laser or RGB pure laser, so the need to replace lamps every few thousand hours is officially history!

Beyond replacing parts over time, it's important to compare products to find out how easy it is to perform maintenance tasks without removing the projector from its installation. For instance, will you need to take your projector down to replace a filter, or can you access the filter while your projector is mounted? When you need to run diagnostic tests, will you be able to access controls easily? Is the light source field-replaceable, or will you have to return the projector to the manufacturer? The answers to these questions could be deciding factors in your purchase.

Hidden savings

Price is always a factor, but you also need to consider how much it will cost to run your projector. Determining the operational efficiency of a projector can help you identify potential cost savings.

By calculating power requirements and heat load or energy efficiency, you can begin to determine your infrastructure needs and operating costs, both of which can help offset the purchase price. Because laser and RGB pure laser projectors are much more efficient than traditional lamp-based technology, they cost less to run – something to consider if you want to replace your aging lamp-based equipment!

Al Wasl Plaza. Expo City Dubai, UAE

Partner: Creative Fechnology Middle Eas

Photo courtesy of Expo 2020 Dubai



THE PRICE THAT'S RIGHT

Almost without fail, customers consistently cite cost as a high priority when evaluating projection technology. And while price is important, it's simply the starting point as you narrow down the field.

Finding a projector to fit your budget isn't the hard part. The real challenge is finding a projector that offers everything you're looking for without spending more than you need on unnecessary extras or spending too little and sacrificing benefits.

Does that mean you need a big budget for the best projection option for your project? Sure, a larger budget means you get more bells and whistles, but that may not be what your project needs. There are many 1DLP® and 3DLP® projection options that offer great image quality, reliable performance, and efficient operation.

Finding a cost-effective, best-fit solution means considering a manufacturer's full range of projection options and looking at where solutions overlap in terms of features. Doing this will help you find the most affordable projector that's also the best value for your dollars.

What's behind the sticker price

Here's a good rule of thumb when shopping for a projector: the higher the brightness, the higher the price. However, a heavy-hitting projector doesn't always come with a hefty price tag. With more budget-friendly 1DLP projectors, you can find several that offer high-brightness, wide aspect ratio, and stellar image quality to suit your project.

It's also important to look for projectors with comprehensive connectivity, integration with thirdparty systems, and a variety of lens options.

At the higher end of the scale is 3DLP technology. It's designed for higher performance, larger-scale visuals, and more complex or demanding environments, which you'll see reflected in the purchase price. Since 1DLP projectors have fewer digital micromirror devices (DMDs) compared to 3DLP projectors, you'll find this contributes to their lower cost. Learn more about 1DLP and 3DLP and their differences in this guide's 'Decoding 1DLP and 3DLP' section.

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The value of the brand

When choosing a reliable brand, your top consideration should be how their technology supports successful day-to-day operation, followed closely by the manufacturer's reputation and commitment to service for the life of the projector.

Total cost of ownership

Any discussion about pricing should include total cost of ownership so you get a more comprehensive look at the investment you're making. When you start to factor in performance efficiency, the maintenance schedule, and the cost to replace consumables such as filters, the discussion broadens further. If you need a projector that stays on for extensive lengths of time or operates in a high-use, demanding environment, you want a professional-grade projector with advanced electronics and sealed optics. As we mentioned earlier, sealed optics reduce the possibility of dust or fog on the focal plane and minimize maintenance costs for the projector's operational life.

Laser illumination life span

Another consideration for your investment is the projector's lifetime. Laser projectors deliver 20,000 hours of reliable operation before reaching 50% brightness, while the lifespan of RGB pure laser light sources is at least 25% longer. Christie® RGB pure laser projectors, such as the Griffyn® Series and M 4K RGB Series, offer 25,000 hours of optimal performance when run at maximum brightness and 50,000 hours when run at 60% brightness.

Warwick Arts Centre, University of Warwick, UK Partners: AVM, GVAV Photo courtesy of Andy Gray @ashmorevisuals Gas

M 4K RGB Series and **Griffyn Series** RGB pure laser projectors operate for 25,000 hours to 50% brightness when run at maximum power.

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Christie RGB pure laser light sources are field-replaceable, allowing you to extend the life of your projector.









Yinji Animal Kingdom, China Partner: Wincomn Technology

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Decoding 1DLP and 3DLP

DLP (Digital Light Processing) projectors use DLP chips called DMDs (Digital Micromirror Devices) with millions of microscopic reflection mirrors – one for each pixel in an image.

As the name suggests, 1DLP® laser projectors use just one DLP® chip (or DMD) and place a rapidly spinning color wheel between the chip and a light source to produce an image. This can also be achieved electronically with LEDs or RGB pure laser as the light source. On the other hand, 3DLP® uses one DMD for each primary color of light – red, green, and blue – which are optically converged to produce a single, full-color image.

A DLP projector with Full HD resolution (1920 pixels wide x 1080 pixels high) would use either one or three DMD chips (1DLP or 3DLP) made up of 1,080 rows of mirrors, with each row containing 1,920 microscopic mirrors. At the other end of the spectrum, a native 4K projector (4096 x 2160 pixels) uses 4,096 rows of mirrors with 2,160 microscopic mirrors.

There's also pixel-shifting technology – but more on that later! 3DLP offers superior image quality, but 1DLP projectors are edging closer and closer to 3DLP performance: their brightness capabilities are increasing, 4K UHD resolution is becoming more common, contrast levels are improving, and color reproduction is getting better and better.

When you see massive projections on the side of a building, lifelike images wrapped onto non-traditional canvases, or large-scale live events, this is most likely 3DLP projection in action. With 3DLP, you also typically have higher frame rate options for superior dynamic image quality. And when it comes to brightness, hue, and saturation, 3DLP is the best in the industry.









Pixel-shifting technologies

Pixel-shifting technology is used in projectors to enhance image quality and resolution by simulating a higher resolution than the projector's actual native resolution.

It works by rapidly shifting pixels in the projected image by a fraction of a pixel, thus creating "in between" pixel locations in the same positions as the pixels would have been in the target higher resolution image. This process is done at high speed and is imperceptible to the naked eye.

For example, a 1080p projector with pixel-shifting technology can simulate a 4K UHD resolution using a 4-way actuator by shifting the pixels in a 2x2 grid pattern, essentially projecting four different 1080p images that are slightly offset from each other to create the appearance of a higher resolution.

The resulting 4K UHD image is visually appealing and detailed, and it frequently satisfies the needs of many applications, but it has a slightly softer appearance than a native 4K image (4096 pixels x 2160 pixels) which provides a higher level of detail and sharpness and a higher pixel density to provide a more lifelike, immersive visual experience.

Dream Island Paradise, China Partner: Zhongqing Yingye Group

Using pixel-shifting technology, Christie[®] M 4K25 RGB and 4K22-HS projectors achieve 4K UHD resolution (3840 x 2160), and the M 4K+25 RGB achieves 4K UHD+ (3840 x 2400)..



Are all laser projectors the same?

Laser projectors fall into two categories: laser phosphor (the majority of laser projectors on the market today) and RGB pure laser. Although both use laser diodes as light sources, each processes light in a different way.

With RGB pure laser projectors, you get the pinnacle of laser-illuminated projection for bright, detailed visuals, and vibrant, pure colors.



Laser phosphor projectors

Laser phosphor projectors offer several other benefits, including reduced energy consumption and instant on/off capabilities.



RGB pure laser projectors

With RGB pure laser projectors, you get the pinnacle of laserilluminated projection for bright, detailed visuals, and vibrant, pure colors.









LASER PHOSPHOR

Laser phosphor projectors use blue laser diodes as their primary light source. They shine onto a spinning yellow phosphor wheel. The light emitted from the wheel is separated into red and green, while the blue light passes directly through a segment in the wheel.

Advanced projectors use a direct red to boost the low output of red. These projectors deliver good color performance for Rec. 709 but can't offer the same color performance as RGB pure laser projection.

RGB PURE LASER

RGB pure laser projectors use individual red, green, and blue laser diodes set at specific wavelengths to create pure colors, making it possible to achieve approximately 98% of the Rec. 2020 color space for a more expansive color experience.

High brightness combined with this exceptional color reproduction capability makes RGB pure laser projection superior to laser phosphor projection.

Integrator

Laser 1

Laser 2



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Compare Christie projection technologies

	1DLP laser	3DLP laser	3DLP RGB pure laser
Brightness range	5,000 to 23,750 ISO lumens	31,500 ISO lumens	15,750 to 50,000 ISO lumens
Light source composition	Laser phosphor with spinning color wheel	Laser phosphor	Solid-state RGB (red, green & blue) pure laser
Illumination performance to 50% brightness	20,000 hours	20,000 hours	25,000 hours at max brightness 50,000 hours at 60% brightness
Overall image quality	*	**	***
Resolution	WUXGA, 4K UHD	WUXGA	4K UHD/UHD+, True 4K
Color space	Rec. 709	Rec. 709 and DCI-P3	Rec. 709, DCI-P3 and Rec. 2020
How do they produce light?	 Typical laser projectors have blue laser diodes that shine onto a spinning yellow phosphor-coated wheel. The yellow light emitted is separated into red and green, and the blue light passes directly through a segment in the wheel. The red, green, and blue colors are sent to the DLP[®] chip, which sends the light through the lens and onto the projection surface. Laser projectors with a red laser use the additional red laser diode instead of a red LED to produce better overall saturation and realistic color. This is the basis of Christie BoldColor[™] and BoldColor+[™] technology. 		• Red, green, and blue laser diodes operate at specific wavelengths to produce pure colors – making RGB pure laser the only projection technology capable of reproducing approximately 98% of the Rec. 2020 color gamut.

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Museum of Science and Technology in Islam

King Abdullah University of Science and Technology, Saudi Arabia

Partner: Stage Audio Works (Pty) Ltd.

Want to explore more?

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<u>Click</u> to learn more about laser projection technologies

HOW IMPORTANT IS COLOR FIDELITY?

Achieving proper color balance for accurate reproduction without sacrificing brightness is the sweet spot of color fidelity.

However, not every situation demands the same level of color accuracy. It comes down to your application's subtle nuances and requirements and the content you plan to display. So, if you are simply displaying a presentation, spreadsheet, or video content, then the Rec. 709 and DCI-P3 color gamuts that laser projectors deliver likely meet your needs and help make your content look great.

Some laser projectors offer enhanced color performance, so when you're doing your research, watch for products that can simultaneously produce accurate color and high brightness. Christie[®], for example, uses BoldColor[™] and BoldColor+[™] technology on v arious 1DLP and 3DLP laser projectors in our line-up.

If your goal is to completely immerse your audience in a hyper-realistic experience or you need to perfectly replicate brand or IP (Intellectual Property) colors, RGB pure laser projectors may be what you need. As the only projection technology that can achieve approximately 98% of Rec. 2020, RGB pure laser blows open the color palette and gives you free rein to bring your vision to life. Rec. 2020 produces 75.8% of all the colors the human eye can see in comparison to DCI-P3's 53.6% and Rec 709's 35.9%. In other words, Rec. 2020 offers you more than twice the color of Rec. 709 and 41% more than DCI-P3.





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Color gamut	Illumination type
Rec. 2020	RGB pure laser – the only projector illumination technology that supports Rec. 2020
DCI-P3 (Digital Cinema Initiative)	• Xenon lamps • Some laser phosphor
Rec. 709 (HDTV)	Mercury lampsLaser phosphor

A color volume comparison of Rec. 2020, DCI-P3, and Rec. 709, and where they fall on the CIE 1931 chart. The CIE 1931 chart represents all the colors humans can see.

NEED TAA-COMPLIANT PRODUCTS?

The Naval Academy Athletic Association, USA Partner: Dimensional

Innovations

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Make sure the products you're considering check that box and deliver the performance your application requires. Another factor to consider is whether the manufacturer or integrator can provide in-field service and support by certified personnel with security clearances.

> Learn about Christie's TAA-compliant technology and services.

THE SUPPORT AND SERVICE YOU NEED

When you choose a reliable brand, your top consideration should always be the successful day-to-day operation of your equipment. You also want to consider a manufacturer's reputation and commitment to service. You want to know you can count on them for the life of your projector and to ensure you continually deliver the highest quality visual experiences.

Working alongside our extensive global partner network, <u>Christie</u>[®] <u>Professional Services</u> has the capabilities to safeguard your investment. They're ready to support you with immediate technical support, reliable onsite services, remote monitoring and management, or extended parts coverage.

AV solutions provider checklist

Besides selecting a manufacturer that offers a wide range of high-performing display and processing products to suit even the most demanding applications, this basic checklist helps you zero in on the right AV solutions provider:

- Are they familiar with servicing and supporting your type of application?
- Do they have expertise in fulfilling complex installations?
- Can they offer a simple and seamless process to cover concept, design, and installation?
- Can they provide additional tools and software to optimize projector performance?
- Do they back up their products with responsive customer care, expert technical support, comprehensive warranties, and global professional services?

Whether you're outfitting a single room, an entire facility, or tackling a multi-venue technology rollout, remember to establish your vendor requirements.





THE RIGHT **PROJECTOR** ISN'T ALWAYS THE BIGGEST OR THE BEST

To find a best-fit solution, considering a manufacturer's full range of projection options and where solutions overlap in terms of features, helps you find the most affordable and best-value option for your dollars and ensure it's the right projector for the job.

When you take the time to formulate what you want to achieve, the characteristics of your environment, your technical requirements, as well as researching products on the market, it pays off every time. Ultimately, the right projector is the projector that's right for your application.

Contact us

Museum of Image and Sound of Ceará, Brazil

Partners: Seal Telecom and ALCom Engenharia

Focus on affordability

Small- to medium-scale There's no need to sacrifice reliability and quality with our budget-friendly projectors. You get value and professionalgrade performance!



Inspire Series

7,150 – 9,600 lumens 4K UHD or WUXGA resolution 1DLP | Laser

Dust-resistant, whisper-quiet, built-in warping and blending, and equipped with a fixed motorized zoom lens.



Captiva DWU500S

5,000 lumens WUXGA resolution 1DLP | Laser

Quiet, compact, ultra short throw projector for spacechallenged environments.



Balance between performance and price

Medium-scale

Achieve the right balance between performance-driven technologies, valueadded features, and an attractive total cost of ownership.



GS Series

6,750 – 14,250 lumens WUXGA resolution 1DLP | Laser

Built-in warping and blending, RealBlack[™] for excellent contrast, a motorized interchangeable lens suite and an ultra short throw lens option.



Jazz Series*

17,800 - 23,750 lumens WUXGA resolution 1DLP | Laser

Powered by Texas Instrument's 0.8" HEP DMD for high brightness and improved color at an incredible price. Remarkably small chassis weighing <65lbs (<30kg), dynamic contrast of 25,000:1, and nine interchangeable lenses, including ultra short throw.*



M 4K RGB Series

15,750 and 25,300 lumens 4K UHD/4K UHD+ resolution 3DLP | RGB pure laser

3DLP performance, incredible form factor, "all-in", state-of-theart TruLife+[™] electronics with all the inputs you need, ~98% of the Rec. 2020 color gamut for more real-world colors, built-in warping and blending, intelligent motorized lens suite and ultra short throw fixed lens.



The ultimate visual experience

Large-scale

From projection mapping spectaculars to theme park dark rides, the possibilities are limitless with our high-brightness, high-performance projectors.



Crimson Series

31,500 lumens WUXGA resolution 3DLP | Laser

3DLP® performance, TruLife[™] electronics, enhanced color performance with BoldColor[™], built-in warping and blending, and an intelligent motorized lens suite.



THERE'S A **CHRISTIE** PROJECTOR TO FIT YOUR NEEDS

HS Series

7,600 – 23,650 lumens 4K UHD or WUXGA resolution 1DLP | Laser

Enhanced color performance with BoldColor or BoldColor+[™], RealBlack for excellent contrast, built-in warping and blending, support for passive polarized 3D on select models, and a full suite of lenses that includes ultra short throw.



Griffyn Series

36,500 and 50,000 lumens True 4K resolution 3DLP | RGB pure laser

3DLP performance, "all-in" connectivity, state-of-the-art TruLife+ electronics with all the inputs you need, ~98% of the ec. 2020 color gamut for more real-world colors, built-in warping and blending, intelligent motorized lens suite, and ultra short throw fixed lens.

IT'S A BIG DECISION

Choosing the right projector for your application doesn't have to be a daunting task. Contact us, and we'll put you in touch with a Christie® expert who can walk you through the process – from determining all your requirements to helping you find the right projector for the job and for your budget.

> Vision Pavilion, Expo City Dubai, UAE Partner: AVI-SPL Photo courtesy of Expo 2020 Dubai

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We're here to help!





christiedigital.com

For the most current specification information, please visit <u>christiedigital.com</u>

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