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TECHNOLOGY

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NEW TECHNOLOGY

Upgrading to laser projection

Walter Burgess of Power Technology explains how third-party laser projector upgrades offer a practical cost-effective solution for cinemas

CT's Managing Editor pulled my leg a few weeks ago over a statement in one of our recent Illumina advertisements — 'email us today and never buy a bulb again!' These are unashamedly the words of a marketing man rather than an engineer, but as an engineer who has spent a working lifetime with lasers I really do believe the time has come when converting your xenon lamp projector to use a laser light source has become a realistic prospect, both technically and financially.

THE TIME IS RIGHT

In 2017, RGB laser projection really has "come of age". According to IHS, over 175 laser-illuminated projectors are installed globally. Buying a new projector is not the

only path to having technical superiority in your theatre. At the 2016 IBC Conference in Amsterdam, I was able to get across the message from Power Technology that buying a new laser-illuminated projector is not your only option if you want to take advantage of laser technology. Of the world's 150,000+ cinema screens, thousands of projectors are now outside of their manufacturer's warranty period. While they may provide faithful service for many years, some owners are not content with merely providing the same audience experience they have for the past decade. They are looking for innovative ways to provide a better experience for their audiences. They have begun to question how laser-illuminated projection can be applied to existing equipment.

MANUFACTURERS DISAGREE

While exhibitors have been considering how to enable projector upgrades to their equipment with third party light sources, projector manufactures have been trying to figure out how to prevent equipment owners from using third party equipment. Naturally, projector manufacturers want to protect their market share. They prefer to sell exhibitors a new projector or their own laser-based retrofit kits. They even try to scare exhibitors away from choosing the third party technology. This protects their bottom line. But the recommendation of the projector manufacturer may not always be the best business choice for the exhibitor — that is where companies such as Power Technology and Cinemeccanica come in.

Let us take a look at a few of the common objections that projector manufacturers throw up to discourage exhibitors from using third party light engines. This may help owners whose projector warranties have expired to consider whether benefits of the upgrade outweigh potential 'risks'.

PROJECTOR ELECTRICAL SAFETY

In the case of laser light source manufacturers, both Power Technology and Cinemeccanica have decades of experience making equipment powered by 120V or 240V AC. Power Technology traces its roots to 1969 while Cinemeccanica's history begins in 1920. Neither company would be in business if they made products that didn't comply with accepted safety standards. CE, UL and TUV certifications are not a large hurdle for a company that has certified products for many decades. Additionally, no significant modifications to the projector's electronics are made.

RELIABILITY

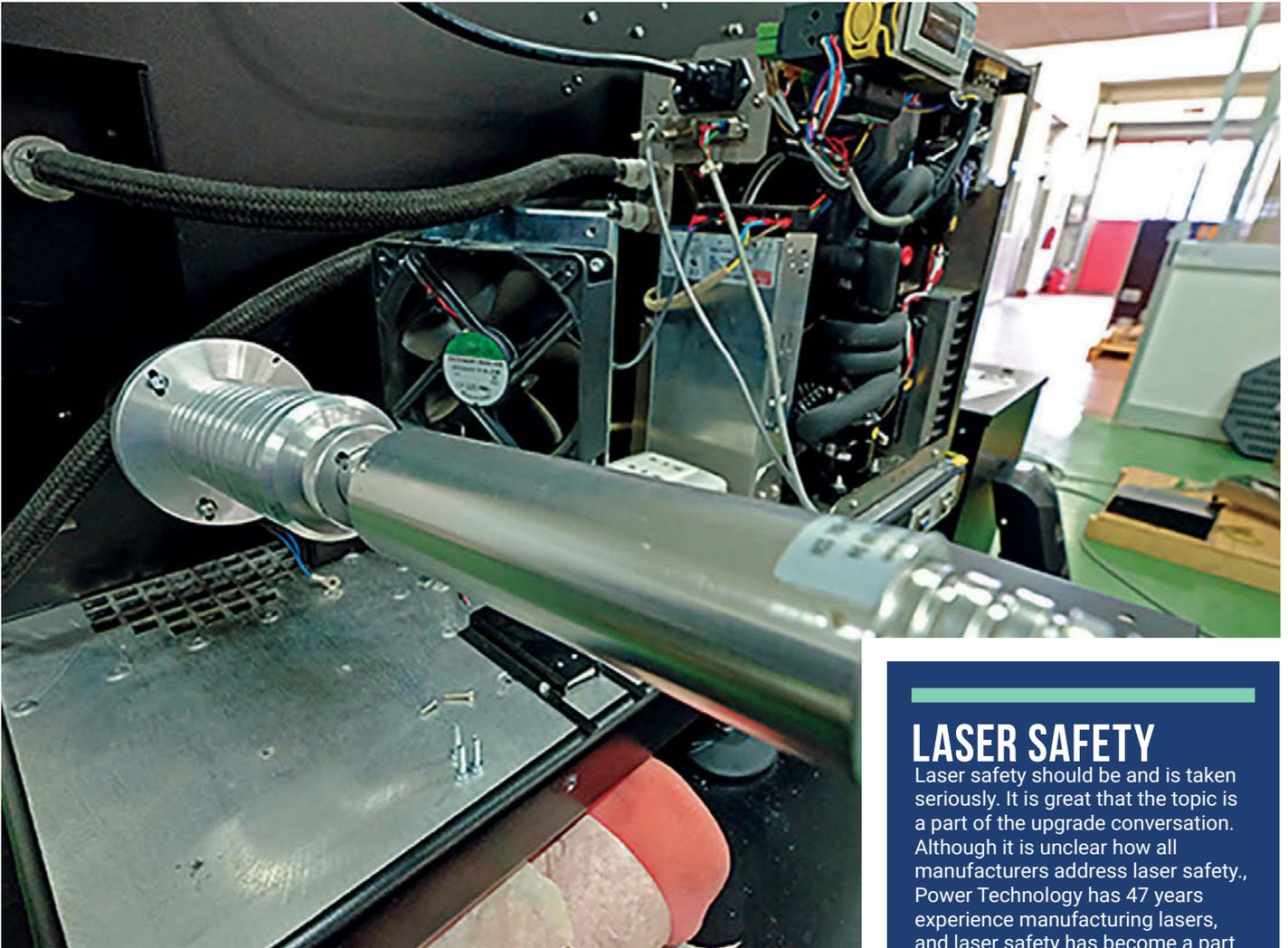
Projector manufacturers may present concerns about the reliability of third party equipment. It is natural to be sceptical if you

A SOLUTION WITH 40% MARKET SHARE?

Upgrading existing projectors with third party light sources is now a viable solution used to improve viewer satisfaction. One Chinese exhibitor, Jinyi Cinemas has signed an agreement with the Italian firm Cinemeccanica to supply 100 retrofit kits. If installed today, a hundred screens represents an approximately 40% growth in the number of RGB laser projection systems globally. Laser retrofits or upgrades are hard to ignore when they have a 40% market share. Over the past few years, owners of existing (used) projectors have learned all about the benefits that laser illumination can offer. These include:

 Wider color gamut, more vivid colors	 Increased audience satisfaction	 50% savings on electricity	 Eliminating the expense of replacing Xenon bulbs
 Cooler electronics last longer	 Your investment lasts even longer	 Laser light sources can be transferred to another projector.	 Extended projector life

Many exhibitors want these benefits but are unwilling or unable to pay for a new laser based projector with integrated light source. Upgrading their existing projector with a new laser based source of light meets many of the exhibitor's requirements.



▲ Cinemeccanica's conversion — both third party vendors and projector manufacturers offer retrofit solutions

don't know the quality built into another company's product. In the case of American and Italian companies, you should expect the quality level to exceed the exhibitor's needs. Both countries have a long and solid reputation for quality manufacturing. In the case of Power Technology, its analytical and instrumentation lasers often operate 24 hours a day, 365 days a year for more than 30,000 hours. Projector reliability is actually improved by upgrading to laser illuminated projection.

- By remotely installing the light source separately from the projector (it is connected via fibre optics), the amount of heat generated inside the projector is reduced by more than 90%.
- This cooler environment is ideal for electronics. Electronics that are in cool environments are proven to last longer.
- In this way, upgrading to laser projection can extend the life of projectors and can possibly delay the next projector upgrade cycle by years.

Projector Warranty is an issue that should be considered while evaluating your upgrade options. Exhibitors whose projector warranties have expired have the

easiest decision. Since the warranty has already expired, the decision is down to the quality of customer experience they want and cost of ownership. Exhibitors whose projector is still under warranty will want to compare the benefits of upgrading to the risk of losing their warranty. It is certain that projector manufacturers will void the warranty of the projector once upgraded with a third party's laser light source.

PROJECTORS CAN CLEARLY BE REPAIRED

Integrators and service companies have provided repair services since the dawn of digital cinema. No-one expects a projector to become unserviceable. Repair services and repair frequency might be reduced based on the heat issues discussed above. For projectors under Virtual Print Fee programs, manufacturers may have special upgrade offers.

Overall, projector manufacturers face the same problems as third party light source manufacturers. The same engineering constraints and the same laws of physics apply to anyone who upgrades the projectors. Given the limited number of projector architectures, the third party light →

LASER SAFETY

Laser safety should be and is taken seriously. It is great that the topic is a part of the upgrade conversation. Although it is unclear how all manufacturers address laser safety, Power Technology has 47 years experience manufacturing lasers, and laser safety has become a part of the company's fabric.

➡ It has two Certified Laser Safety Officers on staff including its VP of operations. He has actively participated in writing of laser safety regulations for 11 years by serving on the ANSI Z136 ASC committee. He also serves on the Regulatory committee within the Laser Illuminated Projector Association.

➡ Power Technology only ships products that meet safety standards and only when the proper registration and documentation is complete.

➡ Ultimately, laser safety is everyone's responsibility. The light source manufacturer is liable for certain safety problems. It is in their best interest to make safe products.

➡ Power Technology guides exhibitors and integrators on the relevant laser safety regulations that they must follow. There is no additional cost for those general services. Additionally, projector integrators and service personal are well trained in laser safety before they are ever dispatched to an exhibitor's site.

SOLUTIONS FROM BARCO AND CINEMECCANICA

▶ The Barco retro-fit unit carries the laser light source and cooling unit on top of the projector. Barco, whose xenon projectors have been unique in having a beautifully engineered separate removable lamphouse, are currently advertising "If you already own a Barco DP2K-15C digital cinema projector, you can now also benefit from laser technology, simply by replacing your current lamp house with a laser phosphor module. This offers a future-



proof and cost-effective way to upgrade your technology while providing superior image quality."

▶ Cinemeccanica offers its 'badge-engineered' Barco-based models together with its LUX external laser light unit which feeds its output via a fibre optic fibre directly into the optical light path of their projectors. A major cinema chain in Russia has recently adopted this solution in many of its cinemas. It is noticeable that Cinemeccanica is advertising 'easy retrofitting for any digital projector', and it is not only working at the low end — it offers a modular 6P RGB laser light source to satisfy even the brightest projectors.



source often looks similar to the projector manufacturer's own laser light sources. For example, Christie, Power Technology, Cinemeccanica, and IMAX all use fibre optics to deliver light from a remote source.

PERFORMING THE UPGRADE

One frequently asked question is how the upgrade is performed. This is a natural question and is the result of trade secrets that surround the upgrade process. No equipment manufacture wants to give away its intellectual property, but in general it is acceptable to describe the process this way:

- The projector is inspected prior to installation to guarantee its hardware quality is acceptable. This is generally done during a site survey weeks or months prior to installation.
- A light source is installed in the booth
- The fibre optic delivery fibre is routed

between the light source and the projector.

- The delivery fibre is joined to the projector. There is some considerable engineering expertise involved here.

A unique projector conversion kit is engineered and manufactured for each model of projector. Contrary to what some think, it isn't acceptable simply to shove the fibre optic up to the projector's "integrating rod" — it is rather more complicated! But manufacturers such as Power Technology have worked out optimum solutions. The final element is integration to the Theater Management System or other onsite kit.

MORE BRIGHTNESS? NOT A GOOD IDEA

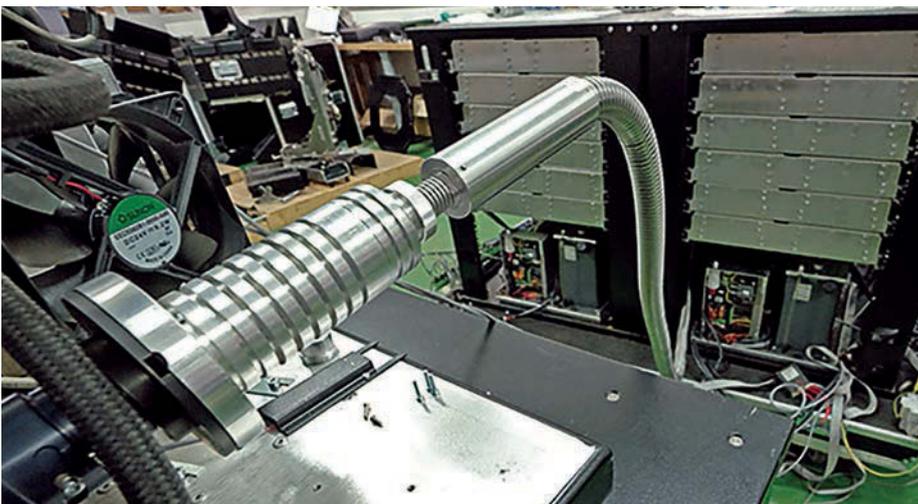
During the upgrade process it is often asked — can I get more brightness from my projector? The answer should be "No". Bulb-based projectors were designed with a specific and finite amount of cooling for the

Texas Instruments DLP chip. This determines the maximum lumen rating of the projector, and was entirely appropriate for Xenon light sources. If a company like Power Technology were to shine 50% more light on the DLP chip, the cooling system would be inadequate to dissipate the additional heat load and the chip would fail. However, if you have been using 2kW bulbs in a 4kW projector, the laser could be configured to replace the 4kW bulb. There is also a good chance that our cooler-running laser light units will actually prolong the lifetime of the projector.

DIFFERENT LASER SOLUTIONS

From examining the news articles about RGB laser projection installations it is clear that RGB laser is a great solution for large screens. Smaller screens needing less than 20,000 lumens are being served well by projectors using phosphor-based light sources. Retrofit solutions are also becoming popular for smaller projectors.

With all of these options to evaluate, it is clear you do not need to replace the entire projector to achieve better image quality and higher customer satisfaction levels. Exhibitors can replace just the light source of their projector to achieve these goals. And you don't have to stop at converting a single projector — once you make the decision to convert more than two it could make sense to consider converting your whole multiplex. Illumina laser lightfarm technology allows for a single central laser source to deliver light around the building to each projector, giving exactly the amount of illumination needed for each screen and providing significant cost savings. **CT**
For more details, email WABurgess@powertechnology.com



▶ The Cinemeccanica retrofit conversion - showing the optical fiber bundle that brings the laser light generated by the double rack at the rear of the picture to where it connects to the projector's light-pipe.