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Research & Development

Sony Develops Highly Efficient RGB Laser Light Source Module for Large Screen Projectors

Realizes high output power of 21W with a package size of just 530cc

Tokyo, Japan, March 8, 2010 - Sony Corporation ('Sony') today announced the development of a RGB laser light source module suitable for large screen projectors such as digital cinema projectors. The module incorporates high power lasers of the three primary colors: Red Green and Blue (RGB) with a combined output power of 21W (equivalent to 5,000 lumens), in a single package measuring just 530cc, among the industry's smallest^{*1}.



<External view of module>

The newly developed RGB laser module uses semiconductor diodes for the red and blue lasers, and a compact, high power solid-state SHG*2 laser for the green. Both the red and green lasers were developed internally by Sony. The three lasers generate output power of 10W for red, 6W for green, and 5W for blue, resulting in a total of 21W. Furthermore, energy conversion ratios for the lasers range from 15 to 22% (18% on average), representing extremely high efficiency for power visible lasers. This high energy conversion ratio also realizes low energy consumption within the module itself.

This module can be used as the light source for a range of projectors, from 1,000 lumen home theater projectors to 10,000 lumen large screen projectors, and even digital cinema projectors. This is due to the scalability of the module design, which outputs collimated light beams*3 for each of the three colors, enabling multiple modules to be stacked. When used in place of the xenon lamps which are the light source for projectors today, this module realizes the following key advantages based on the strengths of its advanced laser technology.

Key features of projectors incorporating this module

- (1) Higher brightness (realized by stacking multiple modules).
- (2) Extended light source lifespan.
- (3) Lower power consumption.
- (4) Higher contrast, wider color gamut.
- (5) Miniaturization of optical components such as prisms.

Sony will transfer technology related to this module to Sony Manufacturing Systems Corporation (SMS), a fully owned subsidiary of Sony Corp, and commence sample shipments in the second half of 2010.

Key features

1. Realizes high light output power of 21W with a package size of just 530cc.

Semiconductor diodes are used for the red and blue lasers, while a compact and high power solid state SHG² laser is used for the green. Both the red and green lasers were developed internally by Sony.

The output power of the three lasers are 10W for red, 6W of green and 5W of blue, realizing a total output power of 21W.

2. Low power consumption achieved through high energy conversion efficiency.

Realizes energy conversion ratio of 15 to 22% (18% on average), representing very high efficiency for high power visible lasers. In the red and blue semiconductor lasers, this is achieved through the high quality of the semiconductor laser crystal, and thermally efficient laser chip mounting technology. In the green laser, it is achieved through a proprietary laser structure which enhances wavelength conversion efficiency.

As a result of these developments, low power consumption of 110W at 5,000 lumen output has been achieved. Furthermore, the reduction in heat emissions resulting from this high efficiency enable the cooling mechanisms required for the operation of the lasers to be simplified and reduced.

3. Extended lifetime of over 10,000 hours.*4

A further advantage of this laser-based light source is that it delivers a lifespan of over 10,000 hours (between 3 to 20 times longer than xenon lamps). By limiting the need for lamp replacement and exchange, this enables maintenance costs to be reduced.

*1 Based on Sony research for laser modules with output power of over 1W for each color. (As of March, 2010)

*2 Second Harmonic Generation wavelength conversion .

*3 Collimated light beams are light beams with minimal divergence.

*4 Time elapsed to reach half the initial output power based on constant current operation.

Specifications of newly developed RGB laser module

	Module Specifications
Size	152mm x 114mm x 30.5mm
Light Output Power	Total 21W (at 5,000 lumens)
Lifetime	over 10,000hours

	Laser Specifications		
	Red	Green	Blue
Wavelength	642nm	532nm	464nm
Light output power	10W	6W	5W
Energy Conversion Ratio	22%	15%	15%
Divergence angle (vertical)	2 mrad	2 mrad	2 mrad
Divergence angle (horizontal)	36 mrad	30 mrad	40 mrad

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