PHOTONICS NEWS

Company Newspaper of the LASER COMPONENTS Group

January 2012
Issue 27

Improved Fiber Coupling

Maximum Detection Efficiency for Photon Counters

In applications in which single photons must be detected, such as in spectroscopy, confocal or STED microscopy, single molecule detection, and quantum cryptography, it is not only important to achieve an extremely low dark count rate of the detector, but a detection efficiency that is as high as possible. Each percent counts. Depending on the version, the COUNT modules exhibit efficiencies of >80% at 670 nm and >50% at 405 nm.

These very good detection rates should not be compromised by additional optical elements such as those required in fiber coupling. In modules with FC connectors a special GRIN lens is integrated that images single photons from the fiber onto the detector chip.

The lenses have been optimized with a double-sided AR coating using our in-house IBS coater. This broadband coating from 400 –1100 nm has a reflection of less than 1.5%, and has thus led to a reduction in losses in detection efficiency.

Because the coating process is performed in house, we are able to provide further optimization for special spectral ranges. Reflections of <<1% with AR coatings in the range from 400 nm to 900 nm or from 600 nm to 1100 nm can be implemented according to customer specifications.

For COUNT^{blue} modules with increased sensitivity in the blue to yellow spectral range, we designed a special AR coating option that has a reflection of under 1% from 350 nm to 700 nm. Starting the end of 2011, this coating will be available on a standard basis.

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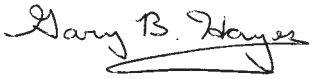
Fiber Coupled Pulsed Laser Diodes – NEW

Pulsed Laser Diodes at 1550 nm with fiber optic coupled output have long been sought after for many years. LASER COMPONENTS is happy to now introduce our new product line of fiber coupled PLD's to the photonics community. Produced by LASER COMPONENTS Canada, these lasers are remarkable in high chip-to-fiber coupling efficiency with fiber cores on the order of 100 microns. Building on our newly developed technology to accurately place cylindrical lenses in close relation to the laser chips for fast axis collimation of the laser beams, this same technology is now utilized to accurately position and fix optical fibers near the lasers output facet.

With robust configurations that withstand large temperature ranges and harsh environment, the fiber output allows more flexible and uniform beams enabling simplified optical systems. Designers of rangefinders, medical devices, illumination sources and scientific experiments in the photonics community will benefit from this technology.

At Photonics West & BiOS 2012, LASER COMPONENTS will introduce our new product line of Fiber Coupled Pulsed Laser Diodes. We invite you to visit our booth to discuss the specifications, your applications and view our other lasers & optical components.



Gary B. Hayes
CEO / General Manager

Universal Current Amplifier Has Undergone Technical and Optical Facelift

The Flexibly Adjustable Power Amplifier iAMP-700

Intuitive Operational Concept

All parameter settings can be carried out via a keypad and an LCD display as well as via a digital interface and, for example, a PC. The compact, EMC-compatible housing allows the use of the amplifier next to the source which can access a bias voltage in the range from -10 V to +10 V directly from the iAMP-700.

With the iAMP-700 we offer a programmable current amplifier for the frequency range of up to 720 kHz from our in-house production facility. Due to its adjustable amplification of 10^2 to 10^{11} V/A it is optimally suited for applications in which a conversion from small currents to manageable output voltages is required. The connection can be switched between AC and DC.

With its very high, low-noise amplification range and easy operation, the iAMP-700 is equally suited for use as a preamplifier and an output amplifier. It can be used as a universal laboratory amplifier, pulse amplifier, preamplifier for lock-ins, and A/D converter as well as for automatic measurements.

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High-power VCSEL

2 mW Single-mode & Single-polarization VCSEL

Philips Technologie GmbH U-L-M Photonics (ULM) is offering a high performance 850 nm single-mode single-polarization VCSEL: ULM850-B2-PL-S0101U

This product features high optical power of 2.0 mW in single-mode (>10 dB SMSR) and controlled single-polarization operation! In addition, the operating voltage is very low at only 2.0 V and the ESD threshold voltage is as high as 100 V. The circular farfield offers a small divergence of well below 20° (full angle, $1/e^2$).

ULM850-B2-PL-S0101U is the ideal laser source for consumer and industrial sensing applications, where output power in excess of 1 mW is required. The VCSEL is available in bare die format or packaged in TO46. The small footprint of only 200 x 200 µm² is enabling very compact and cost-effective system solutions. Please contact LASER COMPONENTS for further information.

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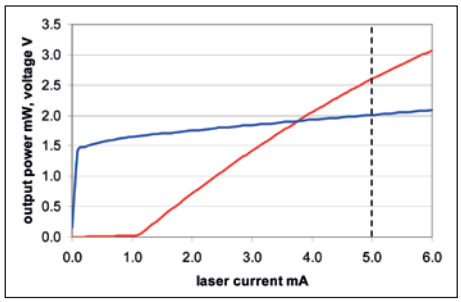
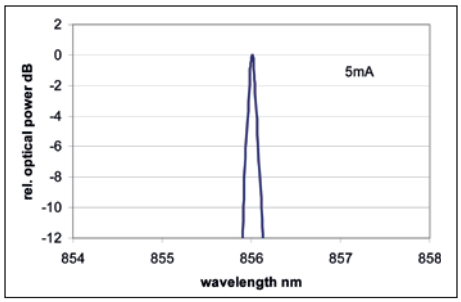




New Model

Low-noise APD Receivers

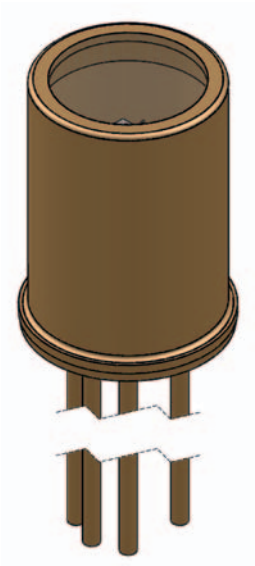
The simplest way to use a detector is with a receiver circuit. Here the quality is judged according to the amount of noise produced. Our extremely low-noise silicon and InGaAs APDs offer the optimal prerequisites for detectors. For the entire system, however, the amplifier noise is the dominant source of noise.

To reduce the overall noise of the detector/amplifier module, the capacitance connected to the amplifier has to be as small as possible. This is achieved by making the connections as short as possible.

H0 series. Our team of developers put a lot of work into this. In our new H0 series of APD receivers, the name is our goal. The inherent noise of the receivers should be zero. Although this is physically not possible, our developers came very close to meeting this goal.

Depending on the integrated feedback resistor, a bandwidth from DC up to 80 MHz can be achieved. If the SAR500, our Si APD with a diameter of 500 µm, is integrated, the module has a noise equivalent power (NEP) of only 4.86 fW/√Hz at an amplification of 3 x 10^7 V/W. With the 80 µm or 200 µm InGaAs APD of the IAG series, the following values can be achieved: 1.1 x 10^6 V/W @ 0.47 pW/√Hz.

Due to the very compact, modified TO-5 housing with a diameter of approximately 5 mm, the H0 series APD receivers can be integrated into small systems with which, for example, distances can be measured or the smallest light signals detected.



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Not Just Mini, But Pico

Smallest Laser Used in Image Processing

With the FLEXPOINT® MVpico series LASER COMPONENTS presents the smallest line laser used in industrial image processing. Due to its small dimensions of just 53 mm in length and 10 mm in diameter, the lasers are optimally suited for integration in 3D image processing sensors.

The MVpico is available at four wavelengths: 635 nm, 650 nm, 660 nm, and 785 nm. The maximum output power is 100 mW. Operation of FLEXPOINT® modules is notoriously simple; all that is required is a supply voltage between 4.5 and 30 VDC. Optionally, the power can also be adjusted using a control wire. Moreover, the laser modules can be triggered using a second control wire. The handling is particularly noteworthy. The line generated is focused without having to remove the line optic; furthermore, the power distribution is homogeneous along the line.

We also offer custom solutions!

All FLEXPOINT® laser modules are produced in house in Germany. Customizing laser modules to meet your specifications is part of our daily operations. Thus, the MVpico can be modified to suit your application. Inquire with us! Whether modifications need to be made to the output power, the housing, or other elements, often is more possible than you think!

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So Small and Already a Laser – New Wavelengths Available

Surprisingly Inexpensive: Complete Laser Modules

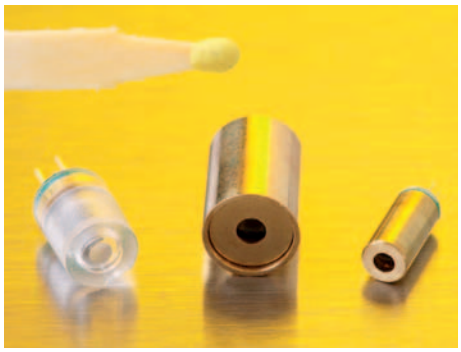
Laser modules designed for the consumer market are often – for lack of space and financial means – self assembled. Laser diodes, collimators, and drive electronics are commonly assembled.

With our LC-LMD series, we offer an appropriate and uncomplicated alternative: Complete laser modules, inexpensive, and the smallest design available worldwide.

The large resonance on the market coupled with a high demand has led to the production of further types of modules that are now available in our product portfolio.

From laser modules that have a diameter of 3.3 mm and a length of 7 mm to focusable modules to coaxially aligned lasers, many additional applications can be implemented.

In addition to the 650 nm laser modules that have already been introduced, versions are



also available in the following wavelengths: 635 nm, 780 nm, and 850 nm.

Ask us about individual pieces as well as large production volumes!

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Product Discontinuation

End of Lead Salt Laser Production

Lead salt lasers have been widely used for high resolution IR spectroscopy since the 1970's. Laser Components has been actively supporting the research community and has been a major supplier of these tunable diode lasers. Many researchers have recently focused on newer Quantum Cascade technology and the demand for lead salt lasers has been steadily declining. Due to lack of demand, LASER COMPONENTS will discontinue production of lead salt lasers by the end of March 2012.

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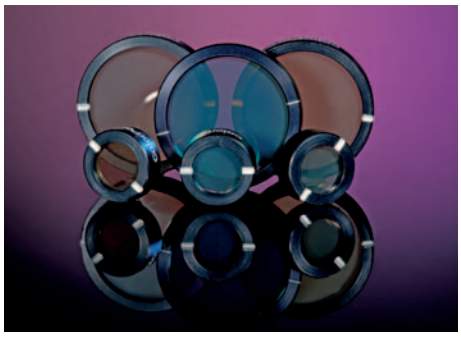
Newest Member of the colorPol® Family

CODIXX's colorPol® NIR

CODIXX extends the colorPol® polarizer product family with a new product covering the near infrared range - the colorPol® NIR. With the steady raise of applications in the NIR range like matter analysis or thermography, this polarizer closes the last gap in the near infrared range. This filter comes with a large bandwidth and provides high extinction ratios of >10,000 : 1 (40 dB) within 1200 nm – 3000 nm and >1,000 : 1 (30 dB) within 1000 nm – 3000 nm. Transmittance as high as 87% (without AR coating) underscores the high performance of this polarizer. CODIXX, a manufacturer of optical polarizers for the infrared, the visible, and UV spectral range has been on the cutting edge of optical nanotechnology since it was founded in 1998 and LASER COMPONENTS USA is their exclusive North American Distributor.



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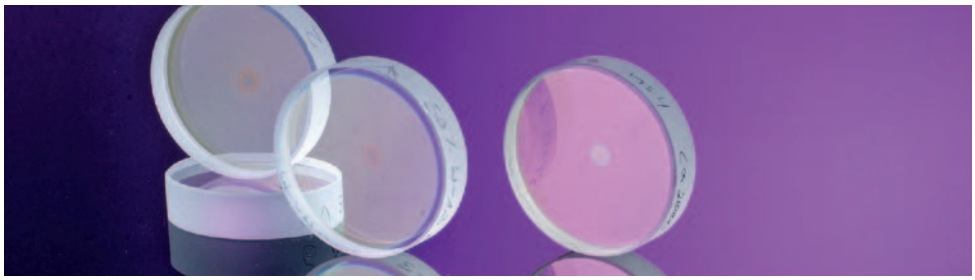
Not Only Suited as an Output Coupler for Unstable Resonators

Are You Familiar with Gaussian Mirrors?

LASER COMPONENTS is one of the few manufacturers that can produce Gaussian mirrors also known as graded reflectivity mirrors (GRMs). The special coating is characterized by a degree of reflection that falls off in a Gaussian-shaped curve starting from the center of the optic.

Customers can choose almost any shape the Gaussian curve should take. The reflection values in the center range from a few percent to a maximum of 85%. Gaussian mirrors are extremely stable in the laser and suited for high power levels.



Fields of Application

They are used, in particular, as output couplers in unstable resonators where they help to reduce the beam divergence at high pulse energies. They are also used to generate laser beams with a very homogeneous power distribution, which are required for illumination tasks, in material processing, or medical applications. To produce high pump efficiency, Gaussian mirrors are, furthermore, used in frequency-doubled systems.

Gaussian Mirrors by LASER COMPONENTS

In the past few years, manufacturing costs have been significantly reduced as a result of optimized production processes. Mirrors at 1064 nm, in particular, are available inexpensively at very short delivery times. Discuss the advantages with our product specialists!

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Upcoming Trade Shows

SPIE Photonics West

SPIE Photonics West 2012
South Hall, Booth 517

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