PHOTONICS NEWS

Company Newsletter of LASER COMPONENTS (UK) LTD

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Issue 36

Machine Vision Lasers

Special Design and Standard Products

FLEXPOINT® MV Laser Modules in all Varieties

With the new FLEXPOINT® MVmicro and FLEXPOINT® MVpico series, LASER COMPONENTS has set the standard for line lasers in image processing.

The MVmicro lasers were developed for stand-alone applications. Their housings measure Ø19mm by 65mm long. The MVpico lasers are optimised for integration in smart cameras. These small components are characterised by even smaller housings, measuring Ø10mm by 50mm long. Both types of lasers are available with different wavelengths and an output power from a few milliwatts up to 100mW.

The classification of these lasers in the correct laser class is an important aspect for every user. It is the goal of every image processing developer to obtain the maximum amount of output power while complying with laser class 2 or 2M regulations.

You can rely on our experience!

Due to a special measurement process, the MVmicro and MVpico lasers are classified in a lower laser class, i.e. they are available with more power and still meet laser class 2 or 2M specifications. For example, a laser with a 20° fan angle can be classified in laser class 2M if it has an output power of up to 20mW. Each laser must be inspected individually.

Webcode: UK36-0740

Dear Colleagues

It is now 25 years since LASER COMPONENTS started business with the supply of laser optics. Whilst this remains the backbone product of the company, in house manufacture has increased from 15% to 50% over the last 10 years, thus making the company a manufacturer as well as a distributor. The latter remains key for providing complimentary components to our customers, both innovative niche and standard products. This harmony means we can supply more than just a component, but two or three that work together within a customer's system.

These solutions together with business system enhancements leads the way for LASER COMPONENTS to be your preferred partner, to be there during the difficult times not just the good. We wish everyone a very pleasant end to the year with seasonal wishes to all.

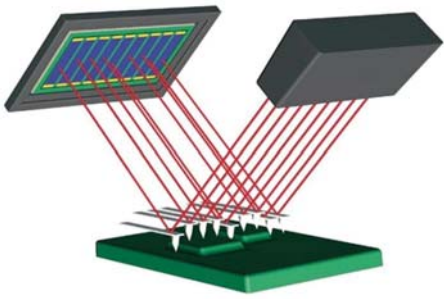
Chris Varney
Managing Director

3D Measurement with SiTek PSD-Array

LASER COMPONENTS announce the extension of their standard range of Position Sensing Detectors (PSDs) from SiTek, Sweden, with a PSD array.

The PSD array consists of 16 parallel one-dimensional PSD elements on the same chip. By utilising the triangulation technique the reflection of a laser line or multiple laser spots onto the PSD array will provide information about the contour of the illuminated object. The possibility for simultaneous readout of the 16 elements together with the fast response of each element makes the PSD array suitable for applications like high speed 3D contour measurements and measurements of parallel, moving objects such as cantilevers.

To ensure high sensitivity the gap between the elements has been minimised giving a fill factor of more than 97%, but still with the low crosstalk and same high linearity as SiTek's other one-dimensional PSDs. In order to preserve the performance under stray light conditions the PSD array has been designed with SiTek's unique built in stray light elimination feature, a patented design which eliminates the decrease in speed and linearity normally attributable to stray light.



The PSD array is delivered in a 34 pin dual in line type ceramic package measuring 2.5mm in length but can be custom designed to any length and/or number of PSD elements.

Webcode: UK36-0230

Preview: Digital Thermopiles

The Dexter Research Center is currently developing a new thermopile family with a digital readout based on the I2C protocol. This development is meant to be used as a "work horse" and not necessarily as a high-end solution. The family will consist of single, double, and quadruple detectors including a corresponding selection of band-pass filters. Preliminary datasheets can be expected in March 2012. Those wishing to participate in the development programme, please contact us.
Webcode: UK36-0340

Cooled PbSe Multicolour Detectors

CAL Sensors expanded the series of multiple channel detectors with filters with the addition of a thermoelectrically cooled version. Compared to the uncooled version, the sensitivity and performance have been increased.

The detectors are primarily used in gas measurement technology. In the standard version of the PbSe multicolour detector, gas filters are integrated to filter for hydrocarbons (3.34µm), CO2 (4.26µm), and CO (4.60µm). The full width half maximum is 140nm each. A reference filter at 3.85µm with a full width half maximum of 200nm is also integrated.
Webcode: UK36-0311

Lead Salt Lasers Last Time to Buy

Effective December 31, 2011, LASER COMPONENTS will discontinue production of cryogenically cooled MIR laser diodes, extended to next March for existing customers.

The first PbSe lasers were produced in the late '60s; they reached their technological heyday in the '80s and early '90s. Both the fundamental scientific and high-resolution gas measurement technology communities originated via tunable diode laser spectroscopy (TDLS).

The necessity of cryogenic cooling in single-mode operation has always hindered wide industrial use. Consequently, TDLS did not achieve its commercial breakthrough until used in the NIR range.

A list of IR lasers available in stock can be found on our web site.
Webcode: UK36-0750

Maximum Detection Efficiency for Photon Counters

Improved Fibre Coupling

In applications in which single photons must be detected, such as in spectroscopy, confocal or Stimulated Emission Depletion (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 670nm and >50% at 405nm.

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 fibre onto the detector chip.

The lenses have been optimised with a double-sided AR coating using our in-house IBS coater. This broadband coating from 400-1100nm 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 optimisation for special spectral ranges. Reflections of <1% with AR coatings in the range from 400nm to 900nm or from 600nm to 1100nm 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 350nm to 700nm. Starting the end of 2011, this coating will be routinely available.

Webcode: UK36-0290

Expansion of Capacity at Omega Optical, Inc

For the Demanding, but Inexpensive

Our partner, Omega Optical, Inc., was the first filter manufacturer to use dual magnetron reactive sputtering (DMRS) technology – with success. Product demand is so high that currently a further powerful DMRS unit is being installed.

The advantages of this modern technology include high evaporation rates and, subsequently, short process times as well as high stability and reproducibility – both within a wafer and from batch to batch. Almost 40 years of experience in filter coatings combined with modern, inexpensive technology give Omega a competitive edge.

All of the filters manufactured by Omega using DMRS technology are sold under the description "QuantaMAX." Steep edges and low pass-band ripples are not just limited to the most common designs. This technology can be used wherever high demands are

placed on filters, such as in Raman spectroscopy, image processing, or clinical chemistry, to name a few application fields. The new unit has proven to be particularly profitable for medium and large quantities, which is then reflected in competitive prices for our customers.

Webcode: UK36-0850

Hermetic Feedthoughs for Optical Fibres

With the hermetic feedthroughs for optical fibres, optical signals can be easily delivered into a vacuum or pressure chamber. Pressures of up to 1000bar and a vacuum as little as 10^{-9}mbar are not a problem.

Different versions for single-mode and multi-mode fibres are available. In multi-mode fibres, core diameters of 50µm to 1000µm can be achieved. In single-mode fibres, it is possible to also use polarisation-maintaining fibres.

Standard feedthroughs are available with the following connectors:

- FC/PC and FC/APC connectors in SM and PM fibres
- ST and SMA connectors in MM fibres

Mounting these feedthroughs on a chamber bulkhead is achieved using a simple mounting flange that holds the feedthrough in place with a counter nut. To meet the specifications required of vacuum technology, our product range was expanded to include CF flange and KF flange versions.

The hermetically sealed feed-throughs are available as coupler and as in-line versions. Special designs that include customer-supplied specialty fibres, multiple channel designs, and optical/electrical hybrid feedthroughs are available upon request.

Webcode: UK36-0110

MEMS Optical Switches

The multimode switches available in four spectral bands are based on a proprietary micro-mechanical/micro optical design. This provides low insertion losses, high repeatability in readings and a wide range of suitable applications.

These switches feature newly improved reduced insertion losses, broad spectral range tolerances, switching times as short as 2.0ms and high optical isolation.

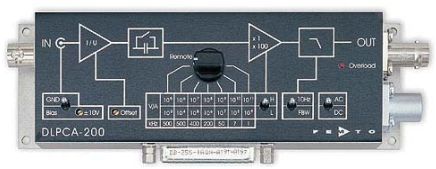
Available in multi mode, or single mode, with a full range of switching states these switches can be controlled via RS232, USB or Ethernet interfaces. A variety of sizes are available, ranging from small 1x2 switches to larger 5x16 switches, housed in small custom packages or 19" racks. Other sizes available upon request.

Webcode: UK36-1110

DLPCA-200: the 'All-rounder' Current Amplifier

The DLPCA-200 variable gain current amplifier proves to be a good choice for many research applications; as a result the DLPCA-200 is one of the most popular off-the-shelf amplifiers offered by FEMTO. The DLPCA-200 can be switched from 1 x 10^3 to 1 x 10^{11}V/A, and so is suitable for detection of signals from between sub-pico amps to milli amps range. The bandwidth of the device is DC to 500kHz, making phase amplification possible by connecting in series with a lock-in amplifier.

Other features of the DLPCA-200 include switchable bandwidth for DC measurements,



adjustable bias voltage, adjustable offset, switchable AC/DC coupling and remote / manual interface.

Webcode: UK36-0620

Modulator Flip Flop and Delay Line Modules

In addition to it's complete range of modulator drivers and RF amplifiers, Photline Technologies has developed new RF connectorised modules.

The DFF-DG-30 is a D-type Flip Flop (DFF) module which is primarily intended for retiming of high data rate signals. The DFF-DG-30 retimes and reshapes single ended input data streams into differential output data streams.

It is also useful to drive dual drive LiNb03 modulators and when associated with other logical circuits for application such as: NRZ/RZ conversion, DPSK and DQPSK differential encoding, phase detection in PLL loops or memories.

The DLL-RF-30 is an adjustable delay line connectorised module that is used for digital and analogue applications and adds a user adjustable delay from 05 to 140ps.

The DLL-RF-30 operates from a single voltage +5V power supply and is equipped with K type RF connectors.

Webcode: UK36-2110

Inexpensive POF Fibres as Bare Fibres or Cables Attractive Prices

Polymer optical fibres (POFs) are used in applications such as illumination, sensor technology, and data transmission. Price pressure in POF applications is constantly on the rise. LASER COMPONENTS has responded to this trend by offering a new POF at low cost.

These fibres are available as bare fibres and cables at diameters of 250µm to 3000µm. They exhibit such important features as narrow diameter tolerance, bending radius, and excellent optical properties.

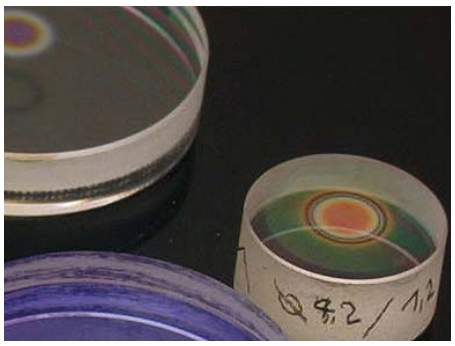
POF fibre assemblies are also available directly from our in-house production facilities. They can be supplied with all common connectors such as SMA, FC, ST, or SC. Request a sample today and see for yourself the kind of quality we offer.

Webcode: UK36-3110

Output Coupler and 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 characterised 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 centre range from a few per cent to a maximum of 85%. Gaussian mirrors are extremely stable in the laser and suited for high power levels.



Applications

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.

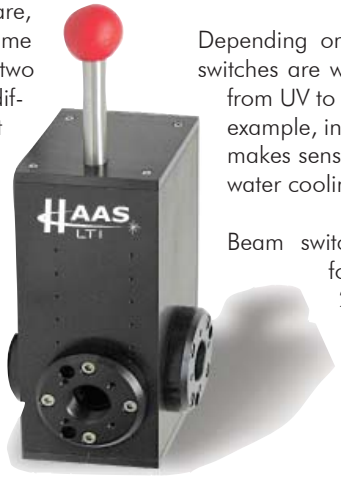
Gaussian Mirrors by LASER COMPONENTS

In the past few years, manufacturing costs have been significantly reduced.

Webcode: UK36-0010

Laser Beam Switches

A beam switch directs the laser beam in one direction or the other. Beam switches are, therefore, useful if the same laser has to be used on two different occasions at two different work stations – but at the same power!



This so-called time sharing is achieved by deflecting the laser beam through a flexibly mounted mirror. This deflection unit is mounted on precise linear tracks and ensures an exact and reproducible adjustment. In automated units, the switching is carried out through pneumatic control, with approximately 250ms response time. In less complex units, the switching can also be carried out manually.

Depending on the mirror used, the beam switches are well suited for all laser classes from UV to IR. In higher power lasers, for example, in CO2 lasers starting at 1kW, it makes sense to use beam switches with a water cooling system.

Beam switches are available with the following apertures: 19mm, 25mm, 38mm, and 50mm. The mirrors used should have a diameter of 1" to 75mm.

Webcode: UK36-0950

Seasonal Sale - DOEs at a Discount Rate

Holo/OR, our long-time partner for diffractive optical elements, has an attractive discount available that we would like to pass along to you. Iindividual elements available in stock are on offer at a special discount rate* for orders placed by December 15, 2011. All interested parties who have always wanted to test a diffractive optical element in their research and development projects should take advantage of this offer to receive an inexpensive test sample.

A summary of the standard elements available in stock can be found under the given web code. If you are uncertain which element is the right one for you, please do not hesitate to contact us directly. Let us know your requirements, and we will provide you with an offer with detailed specifications.

Webcode: UK36-0031

New Wavelengths from 1350nm to 1550nm

Our exclusive partner, SemiNex Corporation, is one of the leading suppliers of high power laser diodes in the 1470nm to 1550nm spectral range, the most efficient and powerful single emitters available on the market worldwide today!

Based on these chips, a novel, compact laser system is available with an optical output power of up to 25W in continuous wave (cw) operation. The available cooling system is relatively small and quiet. Without the need for water cooling, it can compensate for a power loss of up to 200W with ease, making it possible for extended periods of use without overhearting. Versions available:

- 10, 15, 20, and 25 watt optical cw output power
- 1350nm, 1450nm, 1470nm, 1532nm, and 1550nm emitting wavelength

The output power can be coupled into a 375µm, 400µm, or 50µm fibre. A red, 650nm pilot laser can also be integrated into the system which makes direct use in medical technology or material processing possible. Further applications include DPSS pump lasers, military applications, and aerospace technology.

Webcode: UK36-0490

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