

# PHOTONICS NEWS

Company Newsletter of LASER COMPONENTS (UK) LTD

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## MVmicro DIG - now with Microcontroller Technology!

The popular MVmicro machine vision line laser has been used extensively in industry thanks to its crisp, uniform



intensity line, ideal for use with machine vision camera systems. Due to this success we have expanded the series to include a microcontroller which further extends the MVmicro's capabilities!

The RS-232 compatible connector can be used to configure the laser allowing complete control over parameters such as output power and automatic temperature

shutdown. In addition to this the user can now monitor parameters such as operating hours, temperature, and diode current.

In addition to changing module settings such as digital and analogue modulation and variable power adjustment, the modules can also be programmed with custom settings defined by you to best perform in your product!

The MVmicro DIG is available in multiple designs such as single or parallel multiple lines; all with homogenous intensity. The MVmicro DIG is a compact  $\varnothing 19 \times 90$ mm module which operates from 5-30VDC via an M12 connector. The lasers can be focussed by hand and feature a locking ring to ensure the focus does not slip during use.

Webcode: [UK52-0740](#)

## Space Contracts for Photline Modulators

LASER COMPONENTS' partner Photline are providing modulators for two space missions. Photline 1064nm phase modulators are being integrated in the rangefinders of the two satellites of the GRACE2 NASA mission. The GRACE2 mission will be launched in 2017 and will measure variations in gravity over Earth's surface, producing regularly updated maps of the gravity field with a 20 times improved accuracy compared with the current measurement system.

Photline are also providing the space equipment manufacturer TESAT-SPACECOM with customised phase and intensity modulators for its new generation of Laser Communication Terminal (LCT) used for



inter-satellite optical communication. The use of external modulation will allow the implementation of a new modulation format (BPSK) and lead to improved data-rates and bit error rate.

Webcode: [UK52-0960](#)



Wishing everyone a wonderful end to 2015 and a prosperous 2016. Whether at Photonics West or later in the year at Photonex or Photon, we look forward to meeting you to discuss your photonics requirements.

Chris Varney  
Managing Director

## COUNT<sup>®</sup>T

In time-correlated single photon counting (TCSPC), single photons are not only counted, but the time of detection is also determined based on a reference signal. Here, a laser pulse generally serves as a reference. This method is a statistical counting method.



TCSPC is used in particular in fluorescence lifetime measurements. This method is often compared to a stop watch: a laser pulse excites a sample (time start); just a few pico or nanoseconds later, a "fluorescence photon" is released (time stop). This time is recorded in a histogram. After many start-stop passes, a conclusive histogram is created that displays the intensity of the fluorescence depending on time.

The COUNT<sup>®</sup>T is equipped with an avalanche photodiode (active area of 150 $\mu$ m) produced in house and features a high detection efficiency of >80% and a temporal resolution of up to 350ps. In addition to fluorescence lifetime measurement (FLIM), the timing module is used in time-resolved fluorescence and single-molecule spectroscopy, as well as LIDAR applications.

Webcode: [UK52-0290](#)

## HOLO/OR DOE Sale

LASER COMPONENTS and partner HOLO/OR are pleased to announce the "End-of Year" sale. We would like to offer you this opportunity to try our products with improved prices. As of today, a 15% discount applies to orders (15% discount applies to 1 piece per part code) placed before 31st December 2015, for items in HOLO/OR's stock inventory.

Webcode: [UK52-0031](#)

Dear colleagues

We have added new products following customer requests, such as our COUNT<sup>®</sup>T for counting photons, L-CUBE for simple laser delivery of range finding and LIDAR applications, increased flexibility of phosphor cards, more patchcord choices, and a new packaged lead-salt detector, just to name a few. Packed in this issue of Photonics News are no less than 12 new product features, just in time for the festive time of year.



## CW Laser Diodes - Blue

With a wide range of applications like measurement technology, sensor technology, medical technology and military applications, CW laser diodes have proved to be extremely useful. Blue laser diodes are available at 405nm wavelength and 20mW power output. These diodes feature a photodiode to monitor and adjust the power and are integrated in a hermetically sealed TO-56 package.

New 450nm blue laser diodes emit a strong beam with an optical output power of up to 1.6W. Another important laser diode, the single transverse mode semiconductor laser with a high modulation bandwidth emits a 488nm beam with an output power of 60mW which makes them extremely beneficial in biomedical applications.

Webcode: [UK52-0480](#)

## Green Laser Diodes - PLT5 510

The PLT5 510 from Osram Opto Semiconductors has a wavelength of 515nm and achieves power levels of up to 10mW.

Laser diodes in the red spectral range can be used in laser distance measurement devices that are based on the phase shift principle. These laser diodes are operated with a very high modulation bandwidth, which is why DPSS lasers in the green spectral range are not suitable.

The PLT5 is an inexpensive 10mW laser diode that makes this application possible. Its green laser light - with a wavelength of 515nm - is more advantageous than red light because the human eye can see green light far better than red light.

A further advantage is the user-friendly TO-56 housing with an integrated monitor photodiode which allows stable operation up to 60°C.

This operating temperature is also suited for laser levelling instruments for tasks that can be performed both indoors and outdoors under direct sunlight.

Further application fields include: pilot lasers, laser projectors, laser shows, biomedical and medical technology, and measurement technology.

Webcode: [UK52-1480](#)

## Visualize - Bringing Lasers to Light

The popular Visualize product line from LASER COMPONENTS serves as a low cost alternative to beam profilers. Visualize can be an invaluable tool for alignment, location and visualisation of laser radiation outside of the visible spectrum, using a phosphor based scintillator screen to convert ultraviolet and infrared into visible light.

The range consists of three core products: VISualize, which produces a yellow / red emission when exposed to blue-NIR, perfect for viewing visible sources when using laser protective eyewear. VisualizeIR, which allows for safe visualisation of continuous wave or pulsed NIR, and UVisualize, which converts UV radiation to visible yellow light.

Each variant of the Visualize range is available in three formats: the laminated converter card - a budget format suitable



for low power lamp and laser use; disc and wand - an ergonomic design, perfect for situations where frequent component positioning is required; and finally the optical bench mount head, which features a high degree of adjustability and a rugged 40mm active area, making it the perfect solution for component positioning and beam profiling - complete with alignment target.

Webcode: [UK52-0510](#)

## L-CUBE

We are delighted to introduce our new pulsed laser diode module - the L-CUBE. These modules include our powerful pulsed laser diodes and are available in different wavelengths for example, 850nm (up to 10W), 905nm (up to 200W), and 1550nm (up to 40W).



With a compact housing these modules come as a complete unit and do not need external devices. They are relatively easy to operate and require only a trigger signal and a 12V DC supply. These modules feature short rise and fall times and have an excellent temperature stability making them extremely useful in a wide range of applications like range finding, LIDAR, security barrier, ceilometer, illumination, medical applications.

One of the advantages of these modules is the reduction in cost as the pulse power and pulse length can be adjusted via control voltage, hence giving the user more flexibility to operate the module thereby allowing parameters to be changed.

Custom versions of all the CUBE models are available upon request.

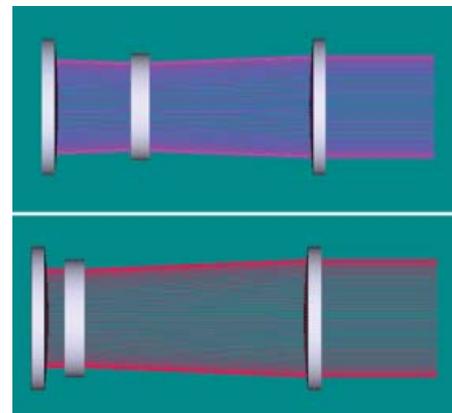
Webcode: [UK52-0410](#)

## DOE Fine Tuner for Lasers 266-1064nm

For many applications there is a need to fine tune the output parameters of the laser, with diffractive optical elements the laser output can be controlled very precisely but without flexibility.

HOLO/OR have developed a novel solution: a DOE tuner for wavelengths between 266 and 1064nm.

Depending on the type of diffractive element, the tuner module can be placed before or after DOE. The basic principle is to finely adjust the beam diameter, this in turn can adjust the spot size or, in the case of multi spots, the separation angle.



Top picture: configuration x1.1

Bottom picture: configuration x1.2

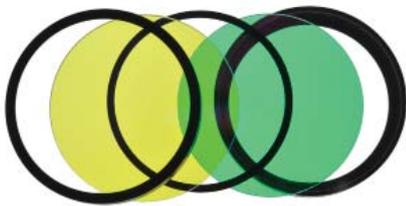
Webcode: [UK52-1031](#)



## RapidBand Filters

LASER COMPONENTS' partner Omega Optical are pleased to announce the launch of the new RapidBand stock programme, providing fast delivery for hundreds of bandpass filter combinations in a standard 25mm diameter ring that is just 3.5mm thick.

RapidBand filters are constructed by combining longpass and shortpass edges produced at 10nm increments from 400nm to 700nm. These are assembled in a unique, proprietary air-spaced ring designed to meet the size and quality requirements for many optical systems, and are ideal for applications from fluorescence microscopy to rapid



prototyping. Longpass and shortpass edge filters can also be ordered as RapidEdge filters, and are mounted in the same 25mm ring.

RapidBand filters are manufactured with durable dual magnetron sputtered coatings, and will have 85% typical transmission, OD5 average and OD4 minimum blocking from UV-1100nm for silicon detectors, a minimum 20.9mm clear aperture, and  $\frac{1}{4} \lambda$  TWD @ 633nm. Theoretical spectral curves of the finished bandpass filters are available, calculated from measured edge filter spectra.

Choose from over 350 possible RapidBand combinations and more than 50 longpass and shortpass RapidEdge filters, all with minimal lead time! Additional edge filters and bandpass combinations will be added as the programme's inventory is expanded. We believe our selection, quality, price, and delivery times will make this your first choice for stock filters.

Webcode: [UK52-0850](#)

## Industrial Laser Modules

We are pleased to present the ILM12F series; a focusable Industrial Laser Module with enhanced features from our standard laser diode modules. The ILM12F series is built in to a threaded housing for an M12x1 fit, allowing users to screw the laser directly into structures or brackets with M12x1 thread holes. The Connector is a 4-pin M12 connector which provides a secure and sealed fit to prevent dust and water ingress. The laser modules are rated

## Expanded Production Facility

We have expanded our in-house production facility for fibre optic cables and now include single-mode cables and polarisation-maintaining fibres. The standard cables are equipped with FC/PC or FC/APC



connectors and can be produced for the standard telecom wavelength at 1550nm to a wavelength of 450nm. Other connector types are available upon request. We also manufacture IEC-specified patch cords and pigtailed as well as connector assemblies on other fibres types, including special fibres. The R&D team can provide the complete development of customised fibre optic modules.

We can offer the highest precision, especially in patch cords for short wavelengths that have small core and mode-field diameters in the range from 3-4 $\mu$ m. Our careful manufacturing techniques are backed by an extensive range of measurements equipment and more than 15 years of experience in the assembly of optical fibres. The patch cords are ideally suited for applications in sensor technology or spectroscopy, in measurement modules, pump lasers, and data transmission.

Webcode: [UK52-0110](#)

## Lead Selenide Detectors in a TO-46 Housing

With immediate effect, we now offer a PbSe detector in a 4.7mm TO-46 housing. Up to now, the smallest available size was an 8.3mm housing. This new component has a 1mm detector and is available under the designation PB45S10104S. Prototypes are already available in stock for delivery.

Webcode: [UK52-0331](#)

to IP 54 to allow operation in dusty or wet environments such as ship building yards, saw mills, and metal foundries, and can be built to produce a dot, line, or crosshair pattern. To enhance visibility in different environment the laser modules are available in both red and green. They are operated simply by applying 4.5-30VDC (10-30VDC for green) to the laser.

Webcode: [UK52-1740](#)

## Cost Effective Solution for Avalanche Photodiodes

We have been manufacturing APDs since 2004, and now include our new range of inexpensive Si APDs in an SMD package. These APDs are optimised for wavelength ranges between 400nm-1100nm with dimensions 3.1mm x 1.8mm x 1mm. Responsivity is optimised for 905nm pulsed laser diodes.

The SAH series is based on epitaxial structure with short rise times from 250ps-300ps and are available in active area diameters of 230 $\mu$ m and 500 $\mu$ m.

These APDs feature extremely low noise and high quantum efficiency. With a large multiplication gain and wide operating temperature range, these APDs are particularly used for optical communication system, speed measurement, laser radar guns, and security scanners, as well as for use in test and measurement systems in industry and medicine.

Webcode: [UK52-0350](#)

## Position Sensing Modules

Our range of Position Sensing Modules (PSMs) has been used extensively as an easy to integrate position measuring tool for applications such as straightness alignment, flatness monitoring, and real-time position feedback for positioning systems. The PSM series is available with active area sizes up to 45x45mm for two-dimensional measurement, or 60mm one-dimensional measurement. Fitted with an RS-232 serial connector the PSM series is easily connected to your circuitry, system, or our application ready Position Amplifier Boards, to provide a measurable output voltage.

With a response range of 400-1100nm these PSMs can be used with both visible and NIR laser sources to suit your applications needs. In addition filters can be provided which screw directly in to the module to remove stray light from your measurements. The modules feature  $\frac{1}{4}$ -20 or 8-32 mounting holes ideal for stands and optics benches to provide a secure fit with minimal movement, ensuring accurate and repeatable measurements.

Webcode: [UK52-0770](#)



## Developments in Optical Fibres for Medical and Industrial Applications

Many of the demands for medical and industrial applications come from the variety of wavelengths or high optical powers required.

We can provide a wide range of fibre types including sapphire for Er:YAG lasers and hollow core for infrared wavelengths, as well as a range of silica and plastic optical fibres.



Hollow core fibres use a high reflective coating on the inner surface to confine the light and overcome the high attenuation of silica at long wavelengths. Cleanliness of the inner surface can be maintained by using a ZnSe window in the connector.

Other types of connector designed for high optical power, with free-standing fibre or end caps for beam expansion, can be used with conventional or large core fibres to accommodate the optical powers required.

We can design and manufacture complete custom solutions from a wide range of fibre/connector combinations with AR coatings, and provide fibre couplers.

Webcode: **UK52-1110**

### See us at

Photonex West  
February 16 - 18, 2016  
The Moscone Center, San Francisco  
Booth 2023

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## HSA-X Series

Femto have launched the updated HSA-X series. The series has been redesigned due to some of the key components in these amplifiers being discontinued. The updated series shows improved performance and ensures a long period of availability.

### Amplifier HSA-X-2-40:

In the updated version of the model HSA-X-2-40 (2GHz bandwidth, 40dB gain) a different internal topology has been used in order to maintain and improve key characteristics. As a result this amplifier is inverting (i.e. a positive input voltage will show up as a negative voltage at the output). In order to indicate this important characteristic a new type designation HSA-X-1-2-40 has been given.

In most applications, the phase relationship (inverting/non-inverting) is of minor importance. If however some sort of heterodyning is used in an experiment or system, this property can be very important

### Naming Convention:

#### HSPR

High Speed Photoreceiver. This acronym replaces "HSA-X-S" which did not refer to photoreceivers.

#### X

Differentiation to the HSA-Y series

#### I

Inverting (positive input voltage - negative output voltage)

#### 1G4 or 2G

Bandwidth 1.4GHz respectively min. 2GHz

#### SI or IN

Si respectively InGaAs photodiode

#### FC

Optical connector: Fibre Connector

#### FS

Optical connector: Free Space

### Overview:

Previous Model	New Model	Characteristics of the New Model
HSA-X-2-40	HSA-X-1-2-40	- higher bandwidth - inverting - better input matching coefficient S11 - better output matching coefficient S22 - smaller 1/f noise - lower broadband noise at the output
HSA-X-S-1G4-SI-FC	HSPR-X-I-1G4-SI-FC	- inverting
HSA-X-S-1G4-SI-FS	HSPR-X-I-1G4-SI-FS	- better output matching coefficient S22 - smaller 1/f noise - lower broadband noise at the output
HSA-X-S-2G-IN-FC	HSPR-X-I-2G-IN-FC	Remark: Bandwidth is unchanged (limited by the photodiode)
HSA-X-S-2G-IN-FS	HSPR-X-I-2G-IN-FS	

and require e.g. a software fix to restore the functionality.

Some OEM customers have built systems using the HSA-X-2-40 or photoreceivers HSA-X-S. In order to give these customers time to integrate the new inverting models in their system, Femto have stocked the discontinued components used in these models. Within an estimated scope of approximately 5 years the existing model HSA-X-2-40 (non-inverting) will be available unchanged.

In general using the new inverting HSA-X-1-2-40 is recommended. This particularly holds true for OEM customers who are in the development phase of a new system and who target a long product lifecycle.

### Photoreceiver Series HSPR-I:

The photoreceiver series HSA-X-S is based upon the amplifier HSA-X-2-40. For the same reasons as for the amplifiers, the photoreceivers will also be offered in two versions. The new series is called HSPR-X-I.

Webcode: **UK52-0620**



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