



## LASER COMPONENTS Pyro Group, Inc. – New Production Facility in Florida

### In-house Production of Pyroelectric Detectors

The LASER COMPONENTS Group is expanding its activities in the area of IR components and has taken over the majority of the U.S. manufacturer Microwatt Applications, LLC, the specialist in the development and production of pyroelectric detectors.

This acquisition clearly strengthens the goal of the LC Group to offer our customers as wide a range of IR detector technologies as possible made in house. Microwatt's employees have many years of experience in the development and production of pyroelectric detectors, providing Laser Components with excellent know-how. The company's founder, Alan Doctor, is one of the most renowned experts in the area of pyroelectric detectors, and now he is the general manager of the Laser Components Pyro Group, Inc.

With its office in Florida, U.S.A., the Laser Components Pyro Group is a subsidiary of the Laser Components Detector Group (DG).

These two companies complement each other perfectly because the Detector Group is already active in the production of InGaAs PIN detectors and IR emitters.

#### Product Range

In Florida, pyroelectric detectors are manufactured based on  $\text{LiTaO}_3$ , which is used in industrial gas analysis, medical technology, flame analysis, and process technology. Our premium product is pyrodetectors with DLaTGS as the detector material. They are suited for use in FTIR spectrometers and are also gaining importance in THz applications.

To meet the demands of increasing market expansion, we will be investing: The facility in Florida will be enlarged, and the production and R&D departments expanded. All inquiries regarding IR detectors can be addressed to:

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**INTERNATIONAL  
YEAR OF LIGHT  
2015**

### International Year of Light 2015

LASER COMPONENTS is proud to celebrate the International Year of Light 2015 with you. In fact, we are actually having a good time talking about it and learning how others around the world are experiencing it. Our approach is more of a "grass roots" public education. Not only with people involved in our photonics community but more so with local friends, students, associates – the common person.

As an example, I recently had an electrician at my home installing a generator. We started talking about electrons, then moving to photons, I explained that this is the International Year of Light. Wow – did he light up! We had a fantastic discussion about light and its impact on our lives in so many ways. Here at LASER COMPONENTS we are talking with everyone we can about this topic. Everyone we talk to gets excited to discuss it. Not only to learn about what we do here but to share their experiences and perspective of how light impacts their lives and the world. It seems like light is an infinite topic.

So join us, as we join others around the world to celebrate the International Year of Light 2015.  
[www.light2015.org](http://www.light2015.org)

*Gary B. Hayes*

Gary B. Hayes  
CEO/General Manager





## Good to Know

### IBS – Unlimited Possibilities

The IBS method makes many things possible: it allows different spectral requirements to be fulfilled with a single coating. The number of layers that can be applied is almost limitless.

### Customized to Meet Your Needs

In new products, complex spectral profiles are first simulated and then custom produced. The design possibilities are endless. Let your imagination run free: we will take care of how to best meet your specification needs. For example, what do you think of a dichroic coating that can also guarantee certain reflections of other wavelengths?



## Complex Coatings Applied on Both Sides For Fewer Optics in a System

Many coated optics are built into laser systems to optimize the characteristics of the emitted laser beam. However, losses are produced at each glass surface. Thus, the goal is to reduce the number of optics to a minimum. This not only increases the efficiency of the entire system but reduces its size as well.

The solution to this problem is to produce laser optics that are coated on both the front and the back. From a technical standpoint, this was almost impossible to achieve for a long time in complex coatings: The coating on the second side heated the first coating and often caused it to crack. This problem was more pronounced the more complex the coatings became (i.e., the more layers the first coating had).

### Front and Back with Complex Coatings

New technologies available at Laser Components now make it possible to equip the front and back of laser optics with complex coatings. The following combinations are possible examples:

For applications in resonators, it makes sense to use optics with a dichroic coating on the front, for example a coating that is highly reflective for 1064 nm and simultaneously allows the passage of pump light. The back can be highly or partially reflective for the same or another wavelength.

It is also possible to combine a polarization coating on one side and a mirror coating on the other side. It would be conceivable to use a thin-film polarizer at 45° for 1064 nm, the back side of which is also coated for coupling in another laser wavelength.

### Polarizers with the Highest Extinction Ratios

Polarization coatings on both sides of an optic are used if the polarization effect has to be increased and the highest extinction ratios are required that could not be achieved otherwise with a coating applied to just one side.

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## Which Material for Your Detector?

### Panchromatic InGaAs or Silicon?

At longer wavelengths panchromatic InGaAs has a higher temperature stability than silicon and is thus a viable alternative in laser applications at approximately 1,000 nm.

The sensitivity range of our new InGaAs PIN diodes – IG17, IG22, and IG26 – not only covers the SWIR spectral range but the visible range as well. This characteristic is referred to as “panchromatic”. An example of IG22 is shown in Fig. 1.

In a measurement application, this signal should depend on disturbance factors as little as possible

in order to be as independent of the environmental temperature as possible. With silicon, this property exists in wavelengths that are less than 900 nm; the temperature coefficient of the sensitivity is constant at <0.1%/K and can be corrected using software.

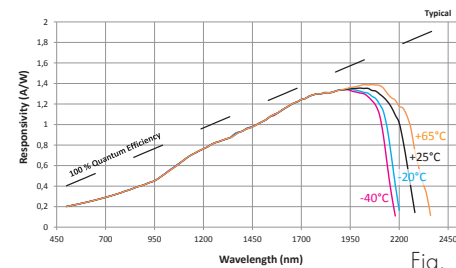


Fig. 1

The longer the wavelengths are, the faster this dependency increases and the more difficult it becomes to make a software correction.

This effect is particularly disturbing in laser applications at approximately 1,000 nm. Here InGaAs presents a viable alternative to silicon.

The signal loss is marginal. The IG17 series components exhibit a constant temperature coefficient of <0.1%/K at 1,000 nm. According to the tests we ran, the IG22 series is, at a value of approximately 0.002%/K, even more temperature independent and should thus definitely be considered for use. Fig. 2 shows the corresponding spectral behavior of the temperature coefficient.

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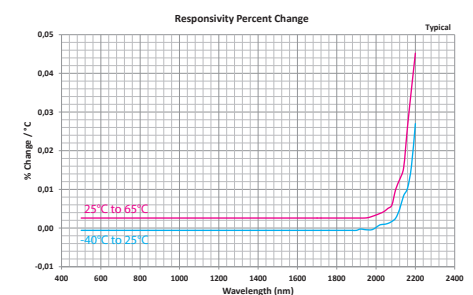


Fig. 2



## Made for Image Processing

### LEDs with Pattern Generators

 LASER COMPONENTS has offered FLEXPOINT® MV series image processing lasers for 3-D triangulation for many years.

Structured light – for example, line, grid, and cross-hair patterns – is often required for measurement tasks.

We are asked time and again about sources that do not exhibit speckle effects such as those common to lasers. To be able to meet the needs of our customers, our partner Blau Optoelektronik developed LED-based illumination sources with pattern generators.

These patterns can be produced according to customer specifications – even for single pieces. They include simple lines, parallel multi-lines, grids, and cross-hairs; other patterns can be generated on short notice.


For our product launch, we offer modules with wavelengths in red, green, or blue and with different patterns.

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## Stability and Laser Class Guaranteed

### 520 nm Laser Modules for Medical Technology

 Laser modules with 520 nm laser diodes that emit directly are being used more and more in medical technology – quite often as a replacement for 532 nm solid-state lasers. All FLEXPOINT® laser modules are now available with 520 nm laser diodes.

The 520 nm FLEXPOINT® modules are also equipped with a photodiode, which offers the following advantages:

#### Performance Stability across a Given Temperature Range

The output power is kept constant at  $\pm 5\%$  – across the entire operating temperature range between 0°C and 50°C. Comparable modules achieve

only  $\pm 10\%$ . Due to this level of stability, we can guarantee compliance with critical laser classes.

#### Single Fault Safety

An additional monitoring circuit guarantees real single fault safety: this is absolutely crucial in the medical field.

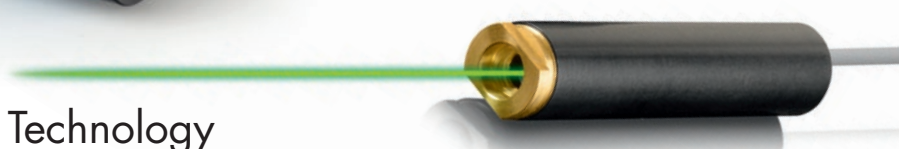
#### Power Adjustment and Modulation

The output power can be adjusted analogously using a control wire and a voltage signal (0-5 V). The photodiode significantly improves the linearity of the adjustment range. In addition, we offer the option of digital or analogous modulation, as well as pulse width modulation.

The 520 nm laser modules are available as dot, line, or cross-hair lasers. The output power ranges from  $<1$  mW to 25 mW. The laser modules can be modified and adjusted according to customer specifications.


These lasers are used to position patients in CT or MRT applications and as pilot beams in high-power medical lasers.

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## COUNT® S – The Inexpensive Photon Counter

### Passively-Quenched COUNT®

 Effective immediately, a new photon counter has been added to the COUNT series: The COUNT® S features the high quantum efficiency of the other models and a significantly larger active area of 500  $\mu\text{m}$ . These photon counters are passively quenched and thus the most inexpensive alternative.

A dead time of approx. 1  $\mu\text{s}$  yields a maximum count rate of up to 1 Mcps. The dark count rates of the COUNT® S series range between 1000 cps and 5000 cps and tie in directly with actively quenched COUNT®s.

Incoming photons produce electrical pulses in the detector that are then readout using the TTL output. A PSU, which is available on an optional basis, completes the plug-and-play module. All models are also available with an FC/PC fiber coupling.

Our passively-quenched COUNT® S series is particularly well suited for research and school internships. For example, in the field of quantum optics and quantum information, due to the large active area, they are easier to focus on than the actively-quenched COUNT® series and the price is significantly lower.



The following versions are available and differ only in their dark count rates: COUNT® 1000S, COUNT® 2000S, COUNT® 5000S.

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## Now With Increased Features

### Lumics' LuOcean™ Mini Series

Lumics' LuOcean™ Mini series offers the most innovative product range in diode laser based devices for medical and industrial applications.

Based on Lumics' 20+ years experience in diode laser technology, with fully in-house chip design and module production, the compact LuOcean™ Mini modules guarantee outstanding footprint/performance ratio and feature now a widely increased variety of individual customization solutions:

- Mono/dual wavelength modules combined in one device as standard products
- Triple/quadruple wavelength modules on request as per customers' requirements
- Choice between red or green pilot laser
- Optional red laser beam up to 400 mW
- Fiber detection sensor (inductive or mechanical)
- Monitor photodiode (voltage or current signal)
- User-exchangeable exit protection window



- Possibility to have key-options doubly-implemented to ensure redundancy for special safety requirements
- Choice of internal temperature sensor (NTC, PT1000/PT100, LM35)
- OEM driver board available

The LuOcean™ Mini modules deliver powers from 7 W to 50 W and covers wavelengths from 793 nm to 1470 nm. Available fiber core sizes range from 100 µm to 600 µm, depending on power and application.

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## Expanded R & D And In-House Production Of PbS And PbSe Detectors

### New Expanded Booth at Photonics West 2015

This year we have expanded our booth size to 20'x30' – the largest booth we've ever had in the USA! It will be well staffed to answer all your technical questions: Not only has our booth size been expanded, we will also be announcing the significant expansion of our research, development and production capabilities with the addition of the PbS and PbSe infrared detector product lines. The new facility is a welcomed addition to the existing Laser Components Detector Group (LCDG) site located in Tempe, AZ. The 3–5 micron wavelength

response of these Lead Salt detectors will complement the existing infrared components portfolio that includes the InGaAs PIN Photodiodes and Pyroelectric Detectors already manufactured by the Laser Components Group.

This latest company addition demonstrates our continued commitment to providing customers with the choice of selecting the best detector for their specific application. Every indication points to LCDG becoming the technology leader in detector manufacturing. To learn more, please stop by our booth

# SPIE. PHOTONICS WEST

Visit us at booth #2023

during Photonics West and speak to one of our engineers regarding our focus in infrared technologies. We will have technical staff in our booth representing ALL our product offerings: Photodiodes, Optics, Fiber Optics, Laser Diodes, Laser Modules, Diode Laser Systems, Photon Counters, Measurement Devices, as well as IR Components. Looking forward to meeting you and helping you with your specific application requirements. Photonics West 2015 – Booth # 2023.

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