PHOTONICS NEWS

LASER COMPONENTS USA, Inc. Magazine #39 ▪ 11|17 laser-components.com

made by Laser Components

We ♥ light

High-Power Laser Optics

PbS/PbSe in High Volume

x-InGaAs Array Test System

Positioning/Measuring with Lasers

Optical Fiber Cladding Modes Stripper

UPCOMING EVENTS

4th International WORKshop on Infrared Technologies

Tempe, Arizona

November, 08–09, 2017

SPIE Photonics West

The Moscone Center, San Francisco, CA

Jan 30–Feb 01, 2018

Booth 1931

MD&M West

Anaheim, CA

February, 6–8, 2018

Booth 3539

Content

Production Sites

4 **Laser Modules for Industrial Image Processing**
The MV-Modules edition 2017 is completely new

6 **FLEXPOINT Laser Modules**
Quality guaranteed

8 **Employees Part of Standard Committees and Research Projects**
Customers can count on high technology

10 **Laser Optics Fitting the World's Largest Laser**
High power is what you can expect

12 **Fiber-Optic Assemblies**
Developed and produced in Olching

14 **Lead Salts Detectors in High Volume**
Cutting edge technology from the US

16 **Avalanche Photodiodes and Pulsed Laser Diodes**
News from the US and Canada

18 **Pyroelectric Detectors**
New pyros with differential amplifiers

Development

20 **Product Development**
Reaching your goals

Product News

22 **Keep Up to Date**
New products from LASER COMPONENTS and partners

LASER COMPONENTS®

Photonics News is published by

LASER COMPONENTS USA, Inc.
116 South River Road, Building C
Bedford, NH 03110, USA
Phone: (603) 821 7040
Fax: (603) 821 7041
www.laser-components.com
info@laser-components.com

US Manufacturing: Adding Value to the Economy & People

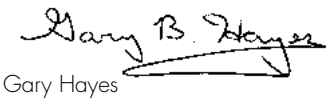
Ever since LASER COMPONENTS established the US sales office in 2000, we have been striving to develop creative solutions for today's complex manufacturing demands. Today, the LASER COMPONENTS GROUP includes multiple US manufacturing locations adding value to the US job market and increasing our strong presence in the US. We understand the business culture of our customers, and therefore can hone in on customer product requirements, engineering requirements, and end customer requirements; all helping to have a quick turnaround time for information and product specifications. We are essentially closer to our customers both geographically and technologically.

Economically, having strong US roots also allows us to help new technology flourish. So, not only are we distributing and effectively facilitating business requirements, we are also supporting great US-based talent and engineering, the creation of next generation product development, and a melting pot of great minds.

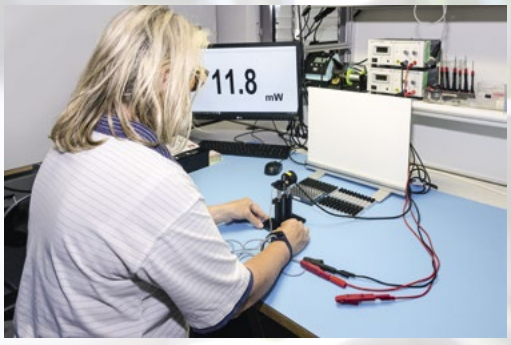
A great example of how we continue to bring great minds together is our upcoming IR WORKshop. Based on a proven concept in Germany, we brought this event to the US so that scientists, engineers, and industry leaders can brainstorm and communicate about the advancements in the IR industry. SPIE Photonics West is another example of our US presence where customers can meet with our colleagues and international suppliers.

We wanted to share this information with you and have decided to dedicate this Photonics News edition to the various key technologies and developments we have in-house. Visit us at one of our events or give us a call and explore how we can help you and your business. We can achieve so much more when we are a group of collective minds.

Sincerely,



Gary Hayes
CEO/General Manager, LASER COMPONENTS USA, Inc.



FLEXPOINT laser modules are produced at two locations in Germany. This task is exciting because the laser modules are so different. In addition, these products are constantly being further developed. Daily tasks are, therefore, in constant flux and measuring stations continually adapted.

New Laser Modules for Industrial Image Processing

FLEXPOINT MV - Edition 2017: Positioning and Measuring with Lasers

WEB US39-074

We are introducing the completely revised versions of the successful line laser series: MVfemto, MVpico, and MVnano. The MV18 series is entirely new: In these line lasers, an M18 thread is integrated on the module housing. Find out more about these new FLEXPOINT MV modules:

Focus mechanism. The new focus mechanism allows easier operation, and the focus level can be precisely set. This new mechanism results in a higher beam pointing stability and a low drift in the line position.

New Focus Options. Choose between a variety of optics to obtain a suitable combination of line thickness and depth of focus: DLSE, DLE, DL, Standard, TS1, and TS2.

Cos⁴-Correction. The Cos⁴ law describes the natural attenuation of light toward the edge during application of imaging optics. For applications with a large field of view (FOV), we correct the power distribution along the line: Increased power at the edge and decreased power in the middle of the laser line compensate the errors in the objective and lead to a homogeneous power distribution on the camera chip.

Kelly Child: +1 603 821 7040
kchild@laser-components.com

Variations. In addition to the standard version with an adjustable focus, these lasers are also available immediately in other variations:

- Cost-reduced version with a fixed focus
- Versions in which the optics and laser are separate from the electronics in order to integrate them into systems with a restricted amount of space
- MV modules without control electronics are available for integration in camera systems.

Additional Options. These lasers can be ordered in the future with an internal microcontroller and serial interface in order to make adjustments on your own or to readout operational conditions in the laser, such as, for example, the operating hours, temperature, and operating current.

As known from the preceding series, these lasers are available with various wavelengths: blue (405/450 nm), green (520 nm), red (635/660/685 nm), and NIR (785/830/850 nm). The output power levels extend to 100 mW, depending on the laser diode.

These lasers can be customized to comply with the eye-safety laser classes 1 and 2. Options such as digital modulation or analogous power settings complete the options available when placing an order. ■

MACHINE VISION
FLEXPOINT

FLEXPOINT Laser Modules

A True Success Story

Many aspects of life would be unimaginable without laser modules. They are used as pilot lasers, alignment aids, or in digital image processing. In modern Industry 4.0 control systems, they are an important component in the production processes of tomorrow.

We have been manufacturing FLEXPOINT laser modules since 1987. Our strength lies in the production of custom modules. In fact, we develop custom modules in individual pieces or in series production. You provide us with your specifications in terms of wavelength, beam profile, power level, housing, connection, and power distribution and we will customize your module.

No Two Modules Are Alike

Our FLEXPOINT laser modules are as unique as our customers' systems. We often modify existing products to meet very specific demands. We have a myriad of components and housings available in stock that we often recombine to create a new model.

Our internal R&D team takes over new developments:

It is All a Matter of the Right Combination

Our R&D team consists of physicists and engineers from different fields who collaborate on the development of various products. Each team member brings his own knowhow to the table when analyzing customer demands.

An active exchange of experience dominates in our meetings, which we hold regularly. In this atmosphere, we can find the right solution quickly, even for complex issues.

Our developers use Solid Edge® or Trace Pro® software in the implementation of their ideas to simulate mechanics and beam guidance down to the smallest detail. We even develop the electronics in house and certify them as prototypes.

Quality – More than Just a Promise

LASER COMPONENTS' FLEXPOINT modules are quality products that are far superior than the cheap, mass-produced products from the Far East.

A high standard of quality depends on many factors and begins with the selection of components. Our suppliers are subject to the same strict standards that we set for ourselves: we certify our suppliers' components using our own lifetime tests via the laser modules.

Our suppliers carry out volume production of the components developed by us – electronics and mechanics. We profit from the high standards of our engineering pool and from the short communication lines that guarantee personal consultations and quick delivery; even for small quantities. There are several optoelectronics companies with which we have enjoyed long-term partnerships.

We track the product flow of all our components in house and guarantee complete protection against electrostatic discharges according to DIN EN 61340-5-1 - from receiving, to quality control, and storage.

Extensive Testing

Our customers measure the quality of their modules based on long-term stability. We guarantee compliance with specifications throughout a long lifetime and test the durability of the entire system, which consists of a diode, electronics, and housing.

Each FLEXPOINT model is subject to an accelerated lifetime test in which we allow the modules to age under various thermal conditions. Of course, all FLEXPOINTs are CE certified and comply with RoHS.

Certified Laser Classification

The reliable assignment of laser classes helps in the proper handling of modules and prevents harmful radiation damage. Therefore, we measure each new FLEXPOINT model according to DIN EN 60825-1 and assign it to the appropriate laser class. To ensure that errors do not occur, we voluntarily have our measuring stations certified by external specialists on a regular basis. Additionally, knowing radiation damage can lead to serious health issues, we approach the issue seriously. Our technical director is, therefore, also involved in the standardization committee on laser and electro-optical systems. Our quality promise does not end with delivery. We assign each batch of FLEXPOINT modules an individual identification number. This makes it possible to track the components used in the individual modules clearly and unambiguously. In the unlikely event that an error occurs, we are able to retrace the cause of the problem quickly and find a solution to resolve it.

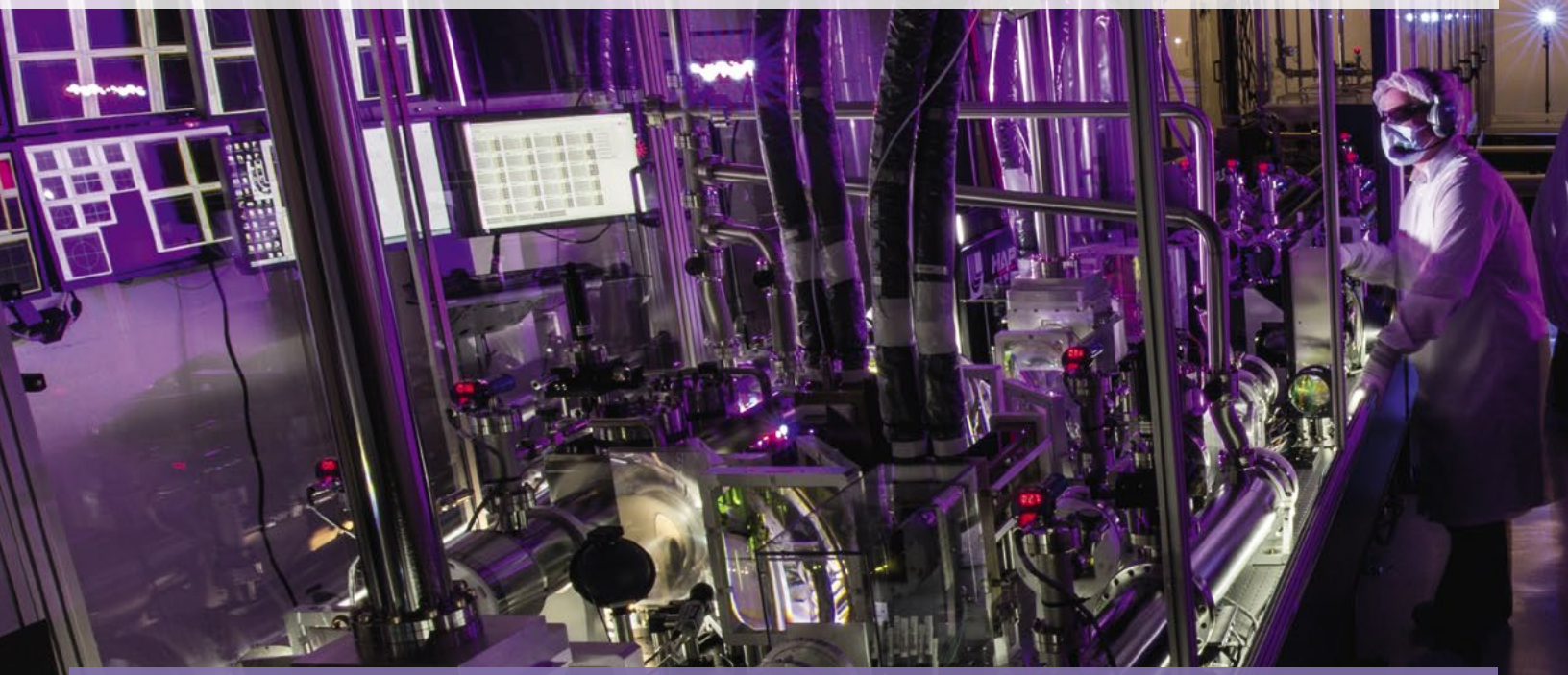
Successful with High-End Products

In the high-tech industry, reliability, precision, and quality often carry more weight than the production of large quantities at low cost. In addition, we are familiar with the latest developments in the industry. As part of Industry 4.0, our products are able to be integrated into state-of-the-art control systems. The fundamentals of data communication and the control of key parameters are implemented in a digital laser controller. This is why companies specializing in medical technology, engineering, and the automobile industry rely on laser modules from LASER COMPONENTS. ■

Laser Optics for the Highest Possible Energy Densities

Everybody is familiar with the scene in Goldfinger in which the antagonist attempts to slice James Bond 007 in half with a laser beam. In 1964, this film was pure science fiction. Just one year earlier, the first CW laser had been developed – at a power level of approximately 1 mW. This is not even strong enough to cut through a sheet of paper.

Lasers in the kW range are now a part of everyday industrial life and would not fascinate people anymore at the movie theater. For research purposes, the first devices are in use with several hundred terawatts. However, neither welding lasers nor fusion reactors can function properly without proper optics. At high power levels and energy densities, the expectations are high.



Setting Standards in Committees and Research Projects

Our Clients Can be Sure to Get the Latest Technology

"We use state-of-the-art plasma-assisted coating methods, actively participate in research projects, and set standards by partaking in the DIN Standards Committee."

Our activities are diverse. We make sure to use state-of-the-art coating methods and produce dielectric coatings with high laser damage thresholds for high-power lasers.

We create custom designs using modern software tools that derives the layer sequence and then transfers it directly to the coater.

In addition to the electron beam method, we also use plasma-assisted methods that are characterized by low drift: This includes both ion beam sputtering (IBS) and plasma ion assisted deposition (PIAD). We are not only well equipped with coating chambers, with which we are able to implement all standard methods, but measurement technology is one of our strengths as well.

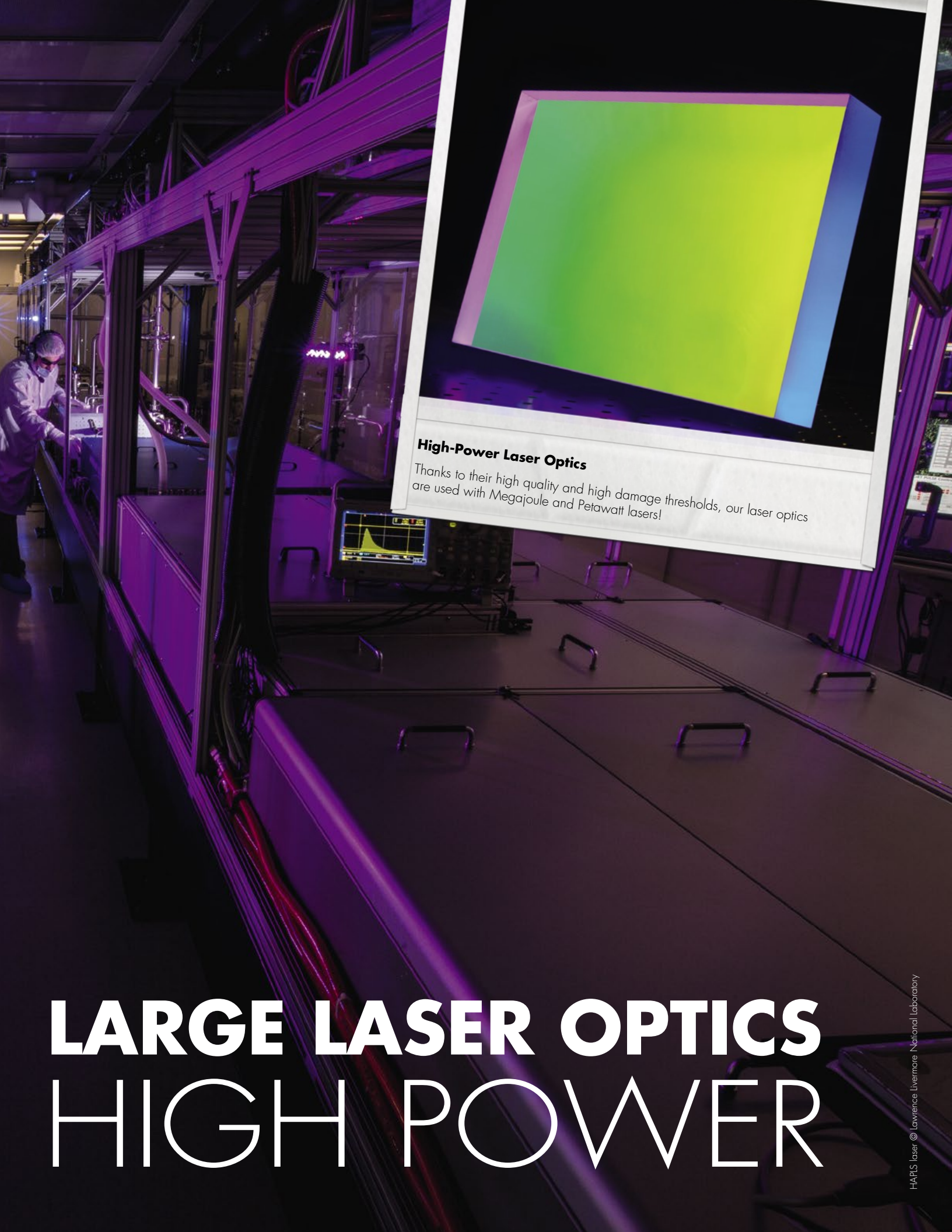
This makes it possible for us to ensure process safety: the coaters are fully automated and computer assisted, and the layer composition is monitored online during the coating process.

PLUTO+ (FKZ13N13208). As part of PLUTO+, we check layer systems for 2.1 µm and 2.9 µm. We focus on the examination of plasma and its effect on coated substrates. This results in process-relevant plasma parameters.

Together with our partners, we are currently working on new process diagnostics and are testing innovative standard concepts for industrial coating processes.

Nano-RuGIT (FKZ KF2638302NT4). We are responsible for the design of next-generation pulse compression gratings, as well as the development, production, and measurement of coatings with a high laser damage threshold. We take new approaches to the designs created for PIAD and IBS. Together with our cooperation partners, we structure layer systems and test them with respect to their effect on short-pulse lasers.

DIN Standards Committee
Furthermore, our technical director, Dr. Lars Mechold, is a member of the DIN Standards Committee on precision mechanics and optics NA 027-01-18 AA. DIN is responsible for establishing and revising standards, for example, for the measurement of damage thresholds.



High-Power Laser Optics

Thanks to their high quality and high damage thresholds, our laser optics are used with Megajoule and Petawatt lasers!

LARGE LASER OPTICS
HIGH POWER

HAPLS laser © Lawrence Livermore National Laboratory

Optics for Lasers of the Future

High Power Requires State-of-the-Art Coating Methods

WEB US39-001

When the first lasers were developed almost 60 years ago, the power limits reached into the milliwatt range. Today, the optics industry uses continuous wave lasers that emit several kilowatts; in addition, research centers use enormous pulsed laser devices that emit several hundred terawatts. Contrary to the general trend toward miniaturization, laser optics are getting larger and larger at increasing output power levels. For optics manufacturers such as LASER COMPONENTS, there is great potential in precision optics with high damage thresholds.

High laser output power requires low absorption of laser optics

The optics industry uses continuous wave (cw) lasers for welding and cutting. Producing the optics required for this purpose is a complex process because the high output power requires particularly robust components.

Compared to other areas of application, absorption in the ppm range has serious consequences in high-power lasers: The absorbed light produces heat in the substrate and coating. Damage can occur because optical components do not conduct heat well. Temperature fluctuations can lead to the focal point "wandering" and no longer remaining in the processing plane. This is referred to as a thermal lens.

How the absorption affects the laser beam can be determined via the calorimetric measurement of the surface temperature or via a reference beam.

What can you do to solve the problem of absorption? With substrates that are low in OH and an optimal coating selection, optics with very low absorption rates can be produced. The use of so-called TLC optics™ is relatively new. A method that has been used successfully for decades in infrared optics is here transferred to laser light.

Optics for the largest lasers in the world

Nuclear fusion and cancer research require high-energy lasers in the megawatt and petawatt range that support science in making breakthroughs. There are a handful of gigantic facilities in use. The most well-known facility in Europe is most likely the Laser Mégajoule near Bordeaux. In 2014, the first of 22 beamlines went into operation. Another one will be added each year until 2025. The lasers used in these facilities break all records in terms of dimension with which we are familiar in the optics industry. This becomes apparent from the size of the building alone. Each of the four laser halls is 100 m long and 30 m wide. The number of components used is also immense: for complex beam guidance, for example, 10,000 optics are required in various sizes [1].

[1] http://www-lmj.cea.fr/fr/installation/index.htm

LASER COMPONENTS manufactures optics with diameters of up to 390 mm for these scientific institutions. To carry this out successfully, it is first necessary to select the right substrate and coating material.

Not all substrates are low in absorption, suited for the desired sizes, and at the same time smooth enough. The surface roughness may only be a few Ångström at the most, and the surface figure must range in the area of λ/10.

Furthermore, a coater is required that can handle large substrates and ensure highly homogeneous coatings even on large diameters. We check this regularly by taking distribution measurements.

In good shape, even under pressure

In plasma-assisted processes, the packing density of the vapor-deposited coatings is particularly high. Depending on the diameter-to-thickness ratio of the substrates, this can lead to slight deformations in the substrates. It is possible to correct this effect by taking the proper measures: Either it is necessary to use an appropriately pre-bent substrate or to apply another coating to the backside of the substrate that reverses this effect. It is crucial to have a production team that is experienced in practical applications and knows how to get the desired results.

Experience and scientific curiosity

With our high-quality laser optics, we deliver practice-based solutions for the challenges of the present; however, LASER COMPONENTS also always has the future in mind: Together with industrial partners and renowned research institutes, we collaborate nationwide on developing the technologies and processes of tomorrow.

This combination of development, production, experience, and research curiosity is the secret of our success at LASER COMPONENTS. It allows us to meet even the most complex technical requirements. It also provides us the security of tackling each new challenge: Our sales engineers and developers work closely with our customers on innovative solutions for applications of the future. ■

Huyen Vu: +1 603 821 7040
hvu@laser-components.com

Fiber-optic Assemblies

Manufactured in-house

LASER COMPONENTS has been manufacturing fiber-optic assemblies and patch cords for over 20 years. Our specialty is the assembly and processing of large-core fibers, such as those used in sensor technology, spectroscopy, and medical technology. Customizations are our standard. Our development engineers work hand in hand with the production team to accomplish complex tasks. Polishing methods from optical precision technology ensure the highest quality; this has been confirmed by reputable customers worldwide. In addition, there are various measurement and testing equipment for the assessment of output power, optical parameters, end faces, stability, and an in-house laser laboratory.

Our Fields of Work

Laser Power Transmission. One of our core competencies is the manufacturing of fiber-optic assemblies for laser power transmission. This field is dominated by SMA and D80 connectors, as well as custom coupler designs with large-core fibers ($\varnothing_{core}$: 100-1000 µm). We manufacture free-standing SMA connectors with centricities of the free-standing fiber of <5 µm.

There are many different combinations of connectors, cables, and cladding/jacket options available. For example, if you require high heat conductivity, we select copper ferrules. To achieve maximum transmission capacity, we equip patch cords with an AR coating in house. To remove unwanted cladding modes, we offer our mode-strip technology. This was developed by us in house for new applications in high-power transmission with single fibers.

Sensor Technology. The triumph of miniaturization and flexibility in sensor technology requires new solutions in light transmission via optical fibers. In collaboration with our customers, we are able to expand the limits of possibility.

Medical technology. We also manufacture assemblies for medical applications and are certified via our management system according to ISO 13485. In a state-of-the-art cleanroom environment, we develop and manufacture medical fiber assemblies for applications in surgery, dentistry, dermatology, lithotripsy, tattoo removal, and magnetic resonance imaging. In addition, we also manufacture traditional large-core fibers, polarization-maintaining (PM), single-mode, and multi-core fibers that can be processed and assembled with all connector types.

Spectroscopy. Flexible fiber technology is also required in spectroscopy: either as single-fiber transmission or as a fiber bundle. The transmitted wavelengths that extend into the deep UV range are quite fascinating.

Industrial applications. Fibers are increasingly being used in industry for data transmission, control, and light transmission. In addition to glass fibers, plastic optical fibers (POFs) are also in demand.

Fiber-optic developments. Our development and production teams at LASER COMPONENTS work hand in hand. We combine knowledge gained in the areas of electronics and laser technology with technical know-how in mechanics, housing technology, and fiber-optic connection and component technology. This allows us to respond quickly to customer needs regarding the design, development, and production of submodules and modules; and to also find solutions for complex requests and projects.

MODE-STRIP ASSEMBLIES

"Mode-strip connectors are designed for high-power lasers and were developed by us in house; they are currently part of production!"

Light transmission in optical fibers is physically based on the principle of total internal reflection. Theoretically speaking, the light is reflected multiple times without loss at the interface between the fiber core and fiber cladding. Practically speaking, the fiber cable is imperfect, and small amounts of power can enter the fiber cladding (cladding modes). This presents a challenge in the transmission of high optical power: Just 2–3% is sufficient to destroy the fiber cable.

The mode-strip connector developed by us in house contains a mode stripper, which literally strips the optical fiber of its cladding modes and conducts the generated heat away from the fiber via a cooling element.

Our mode-strip assemblies prevent the thermal destruction of the fiber connector.

Mode-strip Assemblies for Many Applications

Optical fiber patch cords with mode-strip connectors are used in particular in the area of high power transmission (e.g., in laser material processing or in the optical pumping of fiber lasers via laser diodes).

Customers also inquire with us when they require high optical beam quality without cladding modes or when thermal hotspots must be avoided in the fiber cladding.

WEB US39-013

Huyen Vu: +1 603 821 7040
hvu@laser-components.com

Mode-Strip Assemblies

These connectors filter unwanted cladding modes out of the fiber cover. Cooling ribs are integrated so that your connector does not overheat.

Production Sites ■ Arizona, USA

PbS/PbSe detectors, in the 3–5 micron wavelength range, with custom specifications lead to top-performing instrumentation. Optical chopping frequency, bias voltage, and other critical parameters can be optimized.

PbS/PbSe DETECTORS

LASER COMPONENTS Detector Group

Lead Selenide and Lead Sulfide IR Photodetectors are developed and manufactured in Tempe, Arizona.

The product-focused research team at the LASER COMPONENTS Detector Group (LCDG) in Tempe, AZ has been developing semiconductor photodetectors since its inception thirteen years ago. LASER COMPONENTS GmbH in Germany, a leader in the infrared detector market, has been selling lead salt devices since 1986. Accordingly, it was a natural progression that the latest development at LCDG would be the PbS and PbSe product lines, combining broad industrial application knowledge with experienced and progressive research capabilities.

As with all LASER COMPONENTS company commitments, the development team hired key specialists with decades of PbS and PbSe research and production experience. They had access to the Center for Photonics Innovation at Arizona State University (ASU), a group of laboratories with the latest and most sophisticated equipment available. Concurrently, a manufacturing space full of new and advanced equipment was built at the Detector Group facility. Now, with the new knowledge and production lines united, the results have been remarkable!

Using cutting edge device manufacturing technology, that includes large wafer semiconductor processing capability, the Detector Group is producing PbS and PbSe chips in high volume. This corresponds with the latest hermetic sealing technology and the newest available testing equipment being used for all packaged devices. Additionally, new development projects are ongoing at ASU. These strengths combine to provide the best-selling price versus device sensitivity in the industry. LASER COMPONENTS is dedicated to spearheading revolutionary lead salt infrared detector development to both meet and surpass future customer needs.

WEB US39-923

Susan Wells: +1 603 821 7040
wells@laser-components.com

- The LASER COMPONENTS Detector Group (LCDG) has been developing semiconductor detectors in Phoenix since 2004
- We are specialists in manufacturing IR devices
- In addition to the in-house capability of manufacturing PbS/PbSe, we have development programs with Arizona State University (ASU)
- From the ASU/LCDG development programs we have developed the following:
  - State-of-the-art device manufacturing technology
  - Large wafer semiconductor device processing capability
  - Best selling price vs. device sensitivity in the industry
  - Latest technology in hermetic sealing and testing equipment is used as our standard processes

APD & PLD

LASER COMPONENTS Detector Group

Our avalanche photodiodes are developed and manufactured in Tempe, Arizona.

Development Expertise

We have been developing semiconductor detectors in Phoenix since 2004. The Detector Group is our specialist for customer developments with individual configurations, resulting in high-performance silicon photodiodes and InGaAs avalanche photodiodes for use in the detection of the smallest amounts of light.

APD Line Arrays for LiDAR and Scanner Applications

At the beginning of 2017, our APD line arrays were introduced for the first time: the low-noise APD arrays made of silicon are assembled in a monolithic row. We offer our customers a standard component with twelve elements that are only 40 µm apart; In addition, our line arrays can be manufactured according to customer requirements.

Matt Robinson: +1 603 821 7040
robinson@laser-components.com

WEB US39-952

LASER COMPONENTS CANADA

Production Site for Pulsed Laser Diodes (PLDs) Now Certified for Automobile Applications

Certified for Automobile Applications

The Canadian production site obtained AEC-Q101 environmental and operation certification for automobile applications. This is further evidence that we work exclusively with high-quality materials and precise production methods. AEC-Q101 certification is part of the production part approval process (PPAP) that was developed for the high-power triple-junction PLD 905D1S3J09UA.

Introducing the QuickSwitch Pulsed Laser Diode

QuickSwitch PLDs, which emit particularly short pulses, are Canada's latest highlight. In distance measurement, they make it possible to measure distance with greater precision.

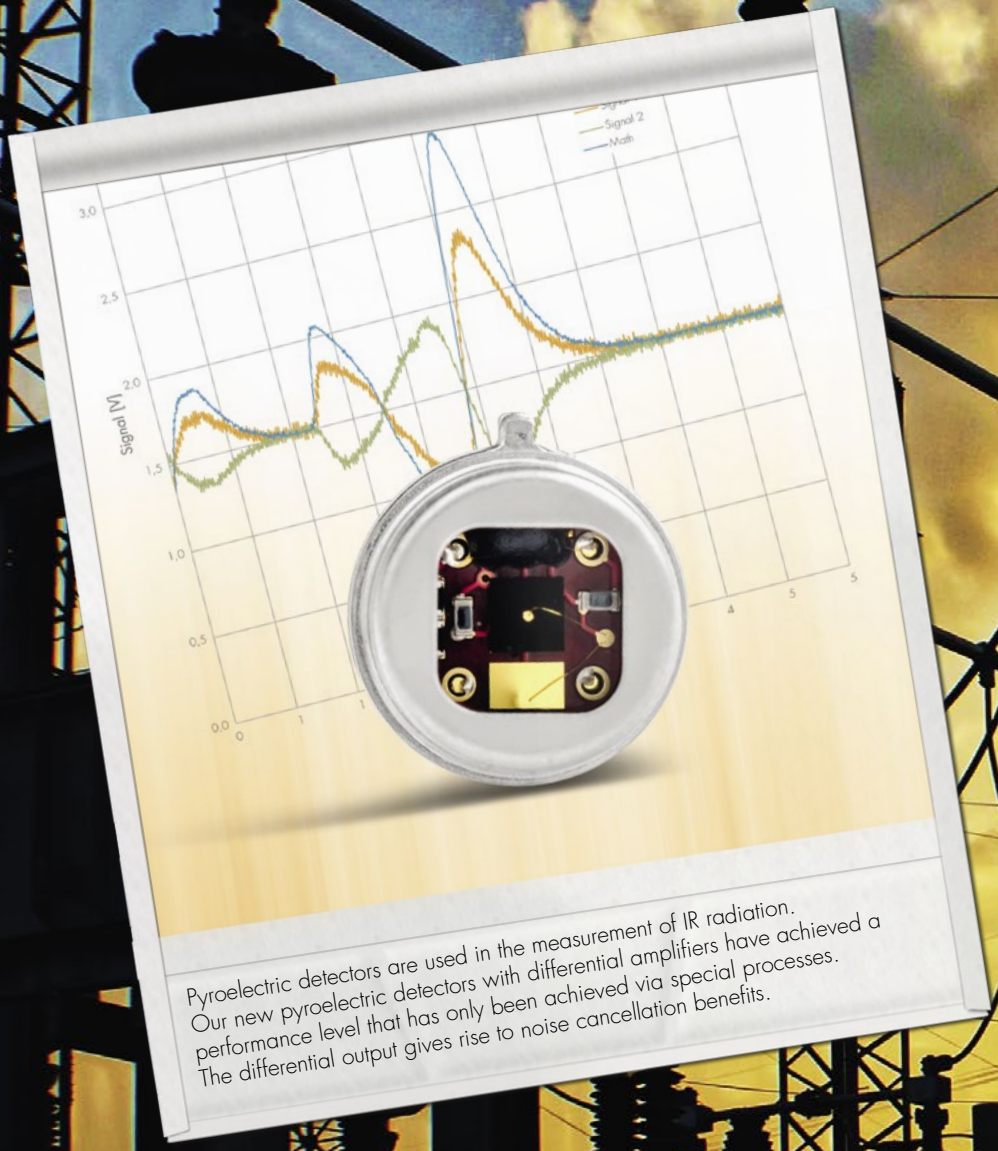
The laser diode and the high-speed switching electronics are assembled into the compact TO-56 housing of the QuickSwitch PLD. Short wire bonding makes it possible to achieve a current path with low inductance, which is necessary for pulse lengths of less than 3 ns. At the same time, this element delivers current peaks that are high enough to produce optical power levels of several tens of watts.

Paul Buettner: +1 603 821 7040
buettner@laser-components.com

WEB US39-950

QuickSwitch PLD and APD line array

For autonomous driving or for room surveillance with laser scanners, innovative and reliable components are necessary.



Pyroelectric detectors are used in the measurement of IR radiation. Our new pyroelectric detectors with differential amplifiers have achieved a performance level that has only been achieved via special processes. The differential output gives rise to noise cancellation benefits.

DIFFERENTIAL PYROS

Pyroelectric Detectors with Differential Amplifiers

First Choice for IR Applications – Signal-to-Noise Ratio Significantly Increased

Pyroelectric detectors are designed for use in NDIR and FTIR spectroscopy, IR laser-based measurement technology, pyrometry, and flame and fire detection. There are many good reasons for the application of pyroelectric components: they are inexpensive, reliable, robust, and have, as thermal detectors, a high sensitivity from short to long IR wavelengths. LASER COMPONENTS will be introducing new and improved pyroelectric detectors at the Sensor+Test: the LD2100 series with a differential amplifier.

Pyroelectric crystals generate positive and negative charge carriers simultaneously on opposing sides. The LD2100 series is the first series in which both crystal sides are amplified separately: the useful signals add up linearly, which means that they are doubled. The noise portions only add up statistically; altogether there is a net gain in the signal-to-noise ratio!

Compared to the bestseller L2100 series, we were able to double the signal in the new LD2100 pyrodetector series – at the same time the noise was kept almost constant at a low level. Our R&D team has reached deep into its bag of tricks and modified the components used accordingly. The actual improvement of the signal-to-noise ratio is, therefore, significantly greater than the purely theoretical value of 1.4. Our pyroelectric detectors with differential amplifiers have two additional advantages: External interference signals are eliminated by calculating the difference. These detectors can, therefore, be used in critical environments with electric fields. Furthermore, the LD2100 series make simple circuitry possible in which the signal output can be directly applied to the input of a differential AD converter.

Jim Dell: +1 603 821 7040
dell@laser-components.com

WEB US39-922

LASER COMPONENTS Pyro Group has developed and manufactured pyroelectric detectors in Stuart, Florida, U.S.A. since 2014. In the newly built production facility, pyroelectric detectors made of $LiTaO_3$ and DLaTGS are produced.

Dr. Alan Doctor's R&D team promotes fundamental improvements that have led to the creation of pyroelectric detectors with differential amplifiers, for example.

Another focus is the further development of custom products.

Design Center at LASER COMPONENTS

We are often asked about what makes LASER COMPONENTS so unique. On the previous pages, you have gained some insight into our very different production facilities. All areas of production enjoy a vast professional network; in addition, we have a cross-disciplinary R&D department in Germany that is active in our core technological areas. This combination of different competencies makes us quite special.

The following infographic shows the typical development process – from an idea to series production and beyond, including product care. The range of development projects is a challenge that we gladly face: This makes it possible to carry out both customizations in general and bilateral, protected ideas. ■

Optical Technologies

We are experienced in various polishing methods for glass substrates and with dielectric coatings: from design to production. Our expertise includes plasma-induced processes and ion beam sputtering processes.

Fiber Technologies

SM, PM, and MM assemblies: We combine different materials and connectors and manufacture at the highest level of quality. To produce fiber optics for use in medical technology, we have a cleanroom that meets the ISO requirements for class 7 at our disposal.

Optoelectronic Technologies

The development of optoelectronic technologies requires cross-disciplinary knowledge: we are competent and bundle knowledge from the areas of mechanics, optics, and electronics to complete complex tasks in a short amount of time.

RESEARCH & DEVELOPMENT

01

IDEA

We are all creative, but sometimes the formulation of an idea is challenging:
We support our customers and bring solution-oriented approaches to paper.

02

NDA

Ideas must be protected: Together we clarify the framework for an NDA. We edit your proposal directly or suggest our own draft.

03

SPECIFICATION

The expectations of the development result must be defined and confirmed: For this purpose, we will gladly create a specification sheet.

04

IMPLEMENTATION

Let the fun begin! We work project oriented, with milestones and schedules – and keep you informed of interim results.

05

VERIFICATION

The results are documented in a detailed manner, and the test certificates serve as proof of achievement of a milestone.

06

SAMPLE APPROVAL

Sample approval is carried out by the customer – in the previously specified application.

07

SERIES PRODUCTION

The move toward production is a particular challenge. The process definitions are key; the component is transferred to production in close collaboration with our specialists.

08

PRODUCT CARE

We are always open to hearing your thoughts and experiences: Further developments are often based on feedback from our customers.

New Products

New IR Polarizers

The Right Choice for Optical Devices

WEB US39-085

CODIXX is announcing new colorPol® N-series, made for laser wavelengths of 1310 nm, 1490 nm and 1550 nm. CODIXX polarizers are characterized by high contrast, high transmission, and broad spectral bandwidth. Dimensions and other specifications are possible according to customer requirements. ■

Mike Tuohy: +1 603 821 7040
tuohy@laser-components.com

CODIXX colorPol®

IR Laser Diodes for Use in Gesture Recognition

250 mW Single-mode Laser Diodes

WEB US39-050

Applications in medical technology, printing, and safety technology (IR illumination) require powerful laser diodes that have a longitudinal single-mode beam profile.

Arima Lasers' ADL-83Y51TL is a very good and inexpensive laser diode that is used, for example, in gesture recognition.

The ADL-83Y51TL emits in the NIR range at 830 nm and has a cw power of 250 mW. In pulse operation, it can be overdriven to up to 500 mW.

The small, compact TO-56 housing is hermetically sealed and allows for an operational temperature of up to 60°C. A monitor photodiode is integrated for power control and stabilization purposes. ■

Carol Howard: +1 603 821 7040
howard@laser-components.com

Lumics LuOcean Mini 8 Series

Small Diode Laser Modules featuring High Power

Lumics

WEB US39-091

LASER COMPONENTS USA is announcing the addition of the newly released LuOcean Mini 8 series of high power fiber-coupled diode laser modules to its product offering in the Americas.

Ultra-compact in size but with power up to 110 W, the LuOcean Mini 8 guarantees unmatched performance-to-footprint ratio. Available from 670 nm up to 1940 nm, the LuOcean Mini 8 gives materials processing equipment designers an edge in NIR based processing applications.

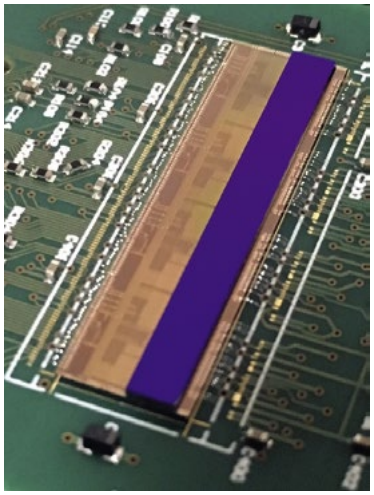
The LuOcean Mini 8 is also designed to serve as a key enabling component inside laser based medical instruments used in therapy, dental procedures, dermatology and veterinary applications.

Each module is individually configurable and can be built with multiple wavelengths, sensors, OEM drivers and heat management solutions, giving the OEM designer a high level of control over their laser output. ■

Carol Howard: +1 603 821 7040
howard@laser-components.com

Xlin-FC InGaAs Line Arrays

Advances in low-noise and high-speed performance up to 400 kHz



WEB US39-192

Xenics will present their revolutionary development in InGaAs line arrays at both the LASER COMPONENTS IR WORKshop and SPIE Industry Events at Photonics West.

The new Xlin-FC series is a high-performance InGaAs line array featuring low noise and - at the same time - a world-record 400 kHz line rate at 512, 1024 or 2048-pixel resolution. The detector uses flip-chip (FC) hybridization and operates in low illumination conditions thanks to the in-house developed highly sensitive Read-Out Integrated Circuit (ROIC).

The high-speed line rate is a boon for the biomedical research community using SD-OCT. For example, it reduces the 3D capturing time of human eye Fovea from now 5–10 seconds to much less than a second. SWIR wavelengths penetrate deeper than the visible ones due to less scattering and permits imaging below the retina. ■

Susan Wells: +1 603 821 7040
wells@laser-components.com

Arima's A4 Series: New APC Laser Diodes for More Safety

If the beam becomes harmful, the laser diode automatically switches off

WEB US39-150

With its new A4 series, Arima Lasers has significantly improved the automatic power control (APC) of its compact APC laser diodes. Whenever an eye-safe radiation beam is required, this new model offers additional protection: If an internally set operating current level is exceeded, the laser diode shuts down automatically.

The latest laser diodes are insensitive to electrostatic discharges of up to 10 kV and guarantee a stable output power at supply voltages of 2.5 to 6.0 VDC. As in its predecessor, the control is located as an ASIC on the same chip as the photodiode and the emitting laser diode, and it is integrated in compact TO housings (3.3 mm or 5.6 mm).

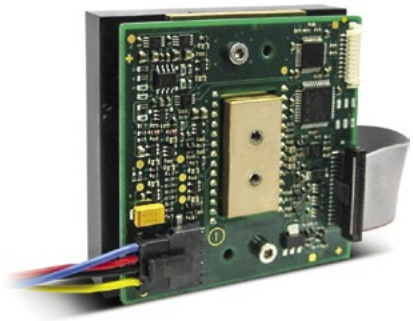
These laser diodes are available in different wavelengths between 635 nm and 850 nm.

APC laser diodes are used, for example, in high-precision measuring devices. ■

Kelly Child: +1 603 821 7040
kchild@laser-components.com

OEM Electronics for x-InGaAs Line Arrays

TEESS: Electronics and Software Support Complex Operation



WEB US39-092

Line arrays are complex components that require precise control. Our x-InGaAs arrays are based on previous standard models that have been modified to facilitate industrial application. Unfortunately, this means that they are not compatible with the electronics commonly available on the market. Therefore, we offer our customers an OEM solution that we have developed: TEmpe Electronics & Software Set (TEESS).

TEESS is a modular assembly kit and consists of the following components: a sensor board, a central unit in a metal housing, a heat sink socket for the array, a set of cables, and convenient software.

The sensor board takes care of correct addressing, converts the analog output signal of the x-InGaAs line sensors into a digital signal, and communicates with the central unit.

TEESS is available for all companies and institutions. ■

Jim Dell: +1 603 821 7040
dell@laser-components.com

LASER COMPONENTS USA, Inc.
116 South River Road, Building C
Bedford, NH 03110, USA

RETURN SERVICE REQUESTED

PRSRT STD
U.S. Postage
PAID
Permit #425
Manchester, NH

SPIE. PHOTONICS WEST

Free Workshops at the Industry Events

Sponsored by LASER COMPONENTS

Wednesday, January 31, 2018 ■ Marriott Marquis

How to Specify High-power Laser Optics and Polarizers

Specifying the correct optical component may determine the success of an application. This session focuses on high-power laser optics and polarizers, their functional principles, essential properties, and corresponding effects depending on the application. ■

Instructors from:
CODIXX and LASER COMPONENTS

Part I
8:30–10:00 am

From Pulsed Lasers in LiDAR to White Laser Light

The first workshop will zoom in on driving FET-based Pulsed Laser Hybrid Circuits and Silicon APD array structure and operation. To close this session, we will provide an overview of a next generation white laser light module that produces high luminance, incoherent, broad spectrum white light. ■

Instructors from:
SoraaLaser and LASER COMPONENTS

Part II
11:00 am–1:30 pm

What are the Best New IR Technologies

This session will provide an overview of the different types of IR detectors available on the market today & cover their usage in industrial gas sensing applications, spectroscopy, radiation thermography and non-destructive inspection processes. ■

Instructors from:
Xenics and LASER COMPONENTS

Part III
1:30–5:00 pm

spie.org/PW/special-events/Industry-Event

LASER COMPONENTS®