



Filters for Applications in Space - Rosetta Mission: Europe's Comet Chaser

LASER COMPONENTS supplied a network of telescopes with "comet filters" in preparation for Rosetta's comet-chasing mission. These are astronomical narrow band optical filters with centre wavelengths between 308nm and 684nm with bandwidths between 4nm and 12nm. These telescopes help create a global network to be set up that delivers data for comet target identification and has proved to be of great value, in particular during an extremely critical phase of the project.

Originally the "Wirtanen" comet was the intended rendezvous for Rosetta, but delays in providing a launch vehicle led scientists to select another target and chose the "67P Churyumov-Gerasimenko" comet.

As many know the robotic space probe

Rosetta arrived at the comet in August after a ten year flight in space, passing by Mars in 2007 then two other asteroids in 2008 and 2010 respectively, to gain appropriate speed and trajectory to reach 67P Churyumov-Gerasimenko.

This comet is "fresh" and produces large amounts of dust and gas. For the first time in the history of space research a probe landed on a comet. A small lander called Philae left Rosetta to land on the comet to take measurements on site. Unfortunately it is thought that harpoons failed to operate that were intended to anchor the probe and instead it bounced on impact then landed in an unfavourable location and orientation to charge its batteries via its solar panels. After performing some experiments the batteries drained.

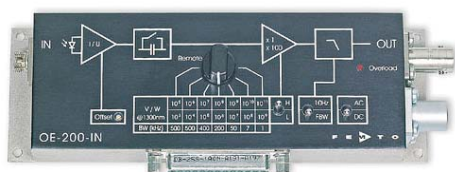


Despite this setback the Rosetta comet chaser was the most ambitious space mission to be started in Europe, and we are proud to have contributed to this mission.

Webcode: [UK48-0850](#)

The Only Photoreceiver you'll Ever Need!

Why buy many photoreceivers for different light levels when you could buy one for most lab applications?



The OE-200 available from LASER COMPONENTS is unique, providing a variable gain from 10^3 to 10^{11} V/W;

allowing for measurements in the mW to fW range at bandwidths of up to 500kHz ideal for measurements in the sub μ s region. With switchable AC/DC coupling, and the capability of manual and opto-isolated remote control by a PC, the OE-200 is perfectly suited as an all-purpose lab photoreceiver.

Available with Si, UV-Si, and InGaAs photodiodes.

Webcode: [UK48-0620](#)

Shorter Dead Times with COUNT® Modules

The dynamic range of single photon detectors is an important parameter. We have reduced the dead time of the COUNT® photon counters from 55ns to 42ns, resulting in a maximum count rate of more than 23MHz.

In addition, the tolerance range of the supply voltage has increased, allowing the COUNT® module to react less sensitively to voltage peaks and small deviations in the supply voltage. The detectors are operated at 12V.

Webcode: [UK48-0290](#)



Dear Colleagues

There's quite a buzz with the Rosetta mission grabbing the headlines but as our lead article describes, despite the challenges of such missions, we are delighted to have been part of the project. Of course it isn't just about the Rosetta mission, these optical filters are being used to look for any comet. We need to know about any that might come perilously close to Earth!

In this issue we provide details of our very own DLaTGS pyroelectric detectors (used in FTIR spectrometers for example or specialised gas sensors), a laser alignment tool, and even shorter dead time single photon counting modules with our COUNT®. Working together with our manufacturing partners either as a distributor or a manufacturer ourselves we aim to supply any photonic component from UV to FIR, whether it be a light source, optic like lenses or fibres, or detector. With our leading edge components you can build leading edge instruments.

I wish everyone a successful end to the year.

Yours sincerely

Chris Varney
Managing Director



Complex Coating Designs

Coated laser optics are used to optimise the characteristics of the laser beam however, losses occur at each surface due to reflection. To keep these losses to a minimum the number of optics in a system should be kept as low as possible. LASER COMPONENTS offers laser optics with complex coatings on both sides. For a long time this has been almost impossible to achieve - the temperatures required to apply the second complex coating would heat the first coating and cause cracking.

This effect is only worsened by the complexity of the second coating, the more complex the coating the more layers are required. This directly translates to length of exposure to extreme temperatures. Our complex coating designs are manufactured to customer specifications; there are a large number of combinations available. Laser optics with complex coatings on both sides are commonly used in resonators and polarisers.

For resonator applications, the dichroic coating is usually on the front (a DPSS example: the coating would reflect 1064nm light but allow through the pump wavelength) the rear coating can then be highly or partially reflective for either the same or another wavelength. It is also possible to combine a polarisation coating on one surface and a mirror coating on the other. An example could be a thin film polariser coating for use at 45 degrees at 1064nm, the rear side of the optic could be coated to allow for coupling of another wavelength.

Polarisation coatings are required on both sides of an optic in applications when the polarisation effect has to be increased, as well as when high extinction ratios are necessary that cannot be achieved otherwise. Contact us if you have a requirement for such complex coatings - we may just have the solution.

Webcode: [UK48-0010](#)

Optomechanical Accessories

Whatever your optical set up, we can provide optomechanical accessory components to suit your needs. We provide a wide portfolio of products including positioning tables and magnetic tables along with mounts for laser modules, filters and lenses. If it's not in the catalogue, don't worry! Give us a call and we will be happy to help.

Webcode: [UK48-0940](#)

High-Tech with DLaTGS

The basic material of pyroelectric detectors with the highest performance level is DLaTGS (i.e., deuterated and L-alanine-doped triglycine sulphate). The D^* of DLaTGS is typically 2.5 times higher than in LiTaO_3 detectors. DLaTGS detectors have a high detectivity, even at high frequencies, and a wide spectral sensitivity range from UV to THz wavelengths that is only limited by the detector window used.

The Curie temperature of DLaTGS is 61°C and thus more than 10K higher than TGS (triglycine sulphate). This is achieved by the process of deuteration, the complete replacement of all hydrogen atoms by deuterium atoms.

Additional doping with L-alanine increases the sensitivity of detectors and prevents permanent depolarisation when heating beyond the Curie temperature.

Currently, there are four different detector series available that are used in various applications. The LCDT-5000 series is directed at users who would like to combine their detectors with their own electronics (external FET for voltage mode or low-noise operational amplifiers for current mode). The LCDT-5100 series is designed for low-frequency applications in the range of 10...100Hz and utilises an integrated JFET with an extremely low leakage current and

a high Ohm resistor. The LCDT-5500 series includes a low-noise JFET and a high D^* , and designed for FTIR applications. The LCDT-5500CM series detectors include an integrated operational amplifier, operate in current mode, and are the best choice for FTIR applications in the frequency range of 1...4kHz, for which a large output signal and a high noise-to-signal ratio are required.



Our detectors possess thinned-down elements and optionally feature a special absorbing black coating with a low thermal mass that offers a wide spectral response at a simultaneously high speed.

All detectors are not only available with different diameters of their active surfaces (e.g., 1.0mm, 1.3mm, 2.0mm, or 3.0mm) but rectangular and square shapes as well. Standard housings include, for example, TO-5, TO-66, and TO-37.

Webcode: [UK48-0330](#)

Beam Delivery Components

Mechanical stability is an important part of laser materials processing. LASER COMPONENTS provides beam

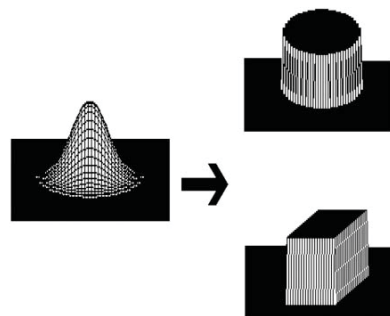


delivery components you can trust. We supply a large range of components designed for CO_2 and fibre delivered lasers, including specialist parts such as process heads for micromachining. We can also machine bespoke parts for specialist systems.

Webcode: [UK48-0032](#)

Beam Shaping DOEs

For applications where it is imperative that the shape of the laser beam is controlled, for example cutting, welding or drilling, the quality of your optics is paramount. Our beam shaping Diffractive Optical Elements (DOEs) include four families of top hat (angular, focal, stable and polychromatic) as well as a repertoire of custom designs. Using in-house software to optimise the designs and state of the art photolithography techniques to etch the diffractive pattern; this results in excellent control over the energy distribution.



Webcode: [UK48-0031](#)



STRAIGHTliner - Laser Alignment Systems

To supplement our range of high accuracy laser modules we have developed the STRAIGHTliner series which allows one to quickly and easily measure straightness, evenness along an axis,



and minute movements in an easy to use package.

STRAIGHTliner ECO

The STRAIGHTliner ECO features a coloured LED reference display which can be used to align your system to within 1/10th of a

millimetre. As the measurement is carried out continuously the STRAIGHTliner ECO is not only used for making measurements but also in real-time too.

STRAIGHTliner PRO

The STRAIGHTliner PRO is designed for high-precision alignment applications where accuracy as high as 1/1000th of a millimetre is needed. The PRO system includes a wireless Bluetooth connection where the laser position can be monitored in real-time. The measurement and depiction of the laser spot on the target is continuous in the software allowing for live high-precision alignment up to 100m away from the target.

Both the ECO and PRO systems include a precision laser module where the laser spot deviates less than 1mm at 20m from the mechanical axis of the housing.

Webcode: [UK48-0770](#)

Optimised Centricity in Free-Standing Fibres

In laser technology, optical output power often has to be coupled into optical fibres, and with as little loss as possible. Fibres with core diameters between from 200µm to 1500µm are commonly used to transmit laser power. We can assemble these fibres with either SMA or D80 connectors according to your custom requirements.

To avoid unwanted scatter from stray light, it is necessary to assemble ferrules with free-standing fibres by using a shorter ferrule. This allows any misdirected light that does not couple into the fibre to pass outside the ferrule and is effectively 'beam dumped' into the void surrounding the ferrule within the connector package.

One quality criterion in such assemblies is the centricity of the fibre core to the ferrule's outer diameter. This plays a particularly important role in connectors without a keyway, like those used in polarisation maintaining (PM)

fibres. In production, we achieve an excellent centricity of <10µm. This has a major advantage in field applications because assembled cables can be changed without any adjustment. To reduce the amount of reflections at the air/glass interface, we can also coat the fibre end faces if requested. The transmission of AR-coated fibres is improved by 3.5% to 4% per face.



Webcode: [UK48-0110](#)

New High Speed OEM Laser Diode Driver

LASER COMPONENTS, in partnership with its long term partners PicoLAS, has released a high speed laser diode driver designed for the high speed operation of "typical" laser diodes for OEM applications. This driver is capable of providing up to 1A of stable current, 300kHz of analogue modulation and feedback for monitor photodiodes in a 30x20x10mm package.

Along with features such as current regulation to protect your laser diode from overshoots and over current, and protection from transients through regulation of the current rise time, the LDP-VRM-01-12 CA can help you get to production faster, eliminating development costs and reducing assembly time.

Webcode: [UK48-0550](#)

LEDs with Pattern Generators for Image Processing

We have been building FLEXPPOINT® Machine Vision (MV) laser modules for 3D triangulation and surface mapping for many years.

Structured light, such as grid patterns, lines, and crosshairs, is often required for measurement tasks. We are asked time and time again about a structured light source that would not exhibit speckle effects such as those common to lasers. To meet this requirement we have developed LED-based illumination sources with pattern generators.

These LED modules can be customised to your specification and feature a wide range of patterns including single or multiple lines, grids, crosshairs, and much more with red, green, or blue wavelengths!

Webcode: [UK48-0740](#)

Fibre Pigtailed 520nm Laser Diodes

PD-LD has successfully coupled 5mW of green light from a 520nm laser diode into a tiny 2.2µm core diameter fibre. Naturally it is a challenge to achieve good coupling efficiency with 2.2µm core fibre. However, for many applications a true single-mode beam is a priority. Applications for such a device would be for alignment of IR laser systems such as CO₂ and Nd:YAG systems often as an alternative to red alignment lasers, appearing multiple times brighter to the human eye whilst ensuring eye safety.

Webcode: [UK48-0420](#)

DFB Triplexer Modules

The 1mW triplexer laser module was designed for use in fibre-optical testing devices for which several wavelengths are required. The wavelengths 1310nm, 1490nm, and 1550nm, which can be used simultaneously, are integrated into a small housing and coupled into an SM fibre. The series includes the option of photodiodes for example the triplexer, TRI-L2P1-15.13.IN incorporates lasers with wavelengths of 1550nm and 1310nm, as well as an InGaAs PIN PD into a small main-body footprint of 12.50 x 19.05 x 13.70mm, and coupled with a 9/125µm single-mode fibre pigtail for easy board mounting. The output power is 0.5mW. The main advantages of the Triplexer module are its compact, economical by unit cost and cost of system integration.

Webcode: [UK48-1420](#)

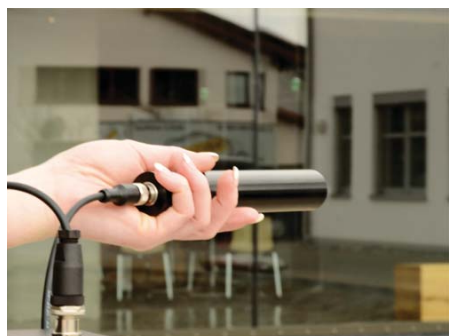


Long Range Affordable Alignment - FLEXPOINT® LR series

Ask any engineer about antenna alignment, security tower alignment, long range camera pointing, or large scale machinery adjustment - these are common applications an engineer has to tackle, and over large distances the smallest adjustment can throw an entire system out of alignment - a nightmare situation...

Long range alignment has always been a tricky task and with the industry turning to lasers for the solution, we have met this requirement with an exciting product!

The FP-LR is designed with a special lens system such that between 10m and 200m distances it will produce beam diameters of 0.5mm to 12mm respectively! The module is



focusable to allow the user to adjust the spot size to a minimum at the working distance. The FP-LR is available with optical powers of 1 or 5mW in 635nm (red) or 520nm (green), providing one with the flexibility to use the correct colour and power in the environment!

FP-LR laser modules are built with an IP54 protection class, meaning you can use your long range alignment laser in harsh environments without the worry of dust damaging the unit.

The FP-LR modules feature an M12 connector for use with a specialised wall adaptor or a handy battery pack, which includes a recharger for 8 hours remote use!

Webcode: **UK48-1740**

794.7nm and 852.1nm VCSELs for Miniature Rubidium and Cesium Atomic Clocks

Modern electronics such as secure communication links, high speed networks, and positioning systems require incredibly precise measurements of time, now increasing the demand for miniaturised atomic clock technology in a consumer market.

We are proud to offer single-mode VCSELs which are optimised for resonant Rubidium excitation at 794.7nm and for resonant Cesium excitation at 852.1nm (894.3nm on request). Precise selection criteria enable optimised excitation efficiency, and high modulation frequencies allowing coherent population trapping (CPT) with a power

consumption as low as 5mW. To enable an extended operating temperature range we offer diodes being packaged in a TO46-can, including a miniature thermoelectric element.



Webcode: **UK48-0830**

Laser Safety Eyewear

We can supply a complete range of laser safety eyewear designed to completely block laser light from reaching your eyes or to reduce the amount of light allowed to pass through your eyewear to an eye safe level allowing alignment of high power laser beams.

Our generous selection of frames includes styles such as the sleek wraparound for a close fitting and low profile style, over spectacle designs which accommodate for prescription eyewear, classic goggles which accommodate thicker filters for maximum protection, and Intense Pulsed Light (IPL) for

applications such as laser therapy, patient eye protection, and other light based therapies.

To assist you with selecting the correct laser safety eyewear LASER COMPONENTS provides a filter calculation service to determine the best filter for your laser, all you need to do is tell us your laser specification and from this we can list the most suitable filters along with a wide range of frame styles which can accommodate them.

Webcode: **UK48-0520**

UV/IR Viewers

For applications where a very precise alignment of an invisible beam is required, our viewers provide superior clarity. These viewers utilise top-of-the-range photocathodes for a superb spectral range covering 180-1550nm. With an ergonomic

handle, sleek black body and an easy to use trigger button these viewers make a perfect addition to any laser laboratory.

Webcode: **UK48-0511**



We make every effort to ensure the information printed is correct; however, we cannot accept any liability for the accuracy or any consequential loss that might be incurred by using this information. Unless otherwise specified, prices are ex Chelmsford, whilst stock lasts.

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