G&H

ELECTRO-OPTICS

PRODUCT & SOLUTIONS

GUIDE



G&H: A PHOTONICS SPECIALIST

G&H solves complex challenges for our customers by developing innovative photonics solutions that enhance performance, reliability, and efficiency. We are an award-winning name in the photonics industry with global reach and an established heritage dating back 75 years.

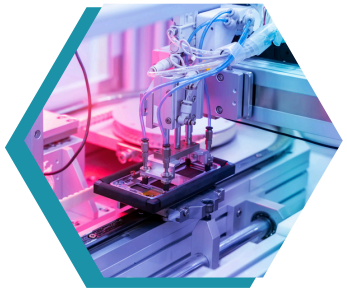
Emerging applications increasingly employ photonics as the enabler. Our customers require specialized, reliable and high-performance solutions. G&H pushes the boundaries in these key areas and provides differentiating product solutions. We maintain close and long-lasting relationships with our customers.

G&H is a photonics technology business headquartered in Ilminster Somerset, UK with operations in the USA and Europe.

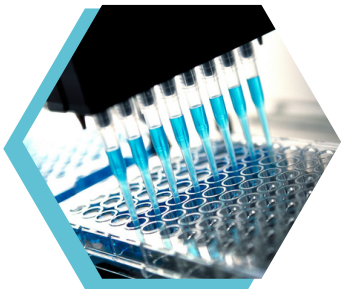
A BETTER WORLD WITH PHOTONICS.



Aerospace & Defense



Industrial & Telecom

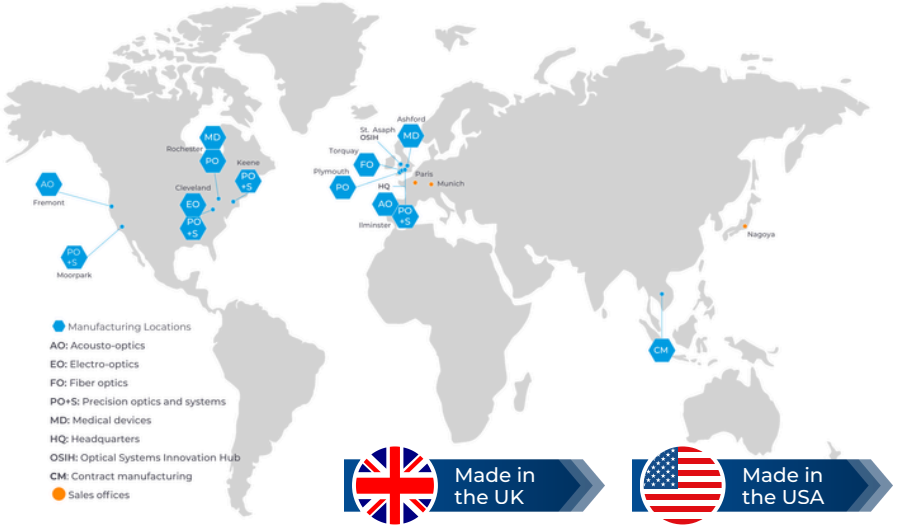


Life Sciences

Gooch & Housego PLC
Dowlish Ford, Ilminster
TA19 0PF , UK

Contact us:
+44 1460 256440
sales@gandh.com
gandh.com

BROAD GLOBAL EXPERTISE



Made in the UK

Made in the USA



Ilminster, UK
49,679 ft²
4,615 m²



Fremont, USA
40,000 ft²
3,716 m²



Keene, USA
12,800 ft²
1,189 m²



Cleveland, USA
80,000 ft²
7,432 m²



Rochester, USA
43,226 ft²
4,015 m²



Moorpark, USA
50,000 ft²
4,645 m²



Plymouth, UK
22,000 ft²
2,043 m²



Torquay, UK
41,000 ft²
3,850 m²



St. Asaph, UK
9,149 ft²
850 m²



Ashford, UK
30,000 ft²
2,787 m²

G&H employs over 1,000 skilled employees across 10 manufacturing and design facilities. We also have 3 sales offices and a contract manufacturing partner in Thailand.

MANUFACTURING CAPABILITIES

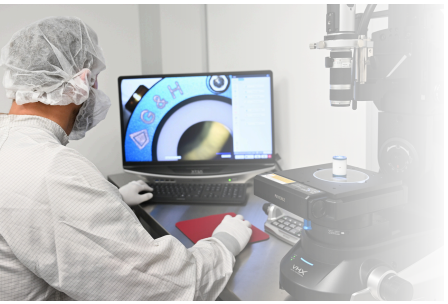
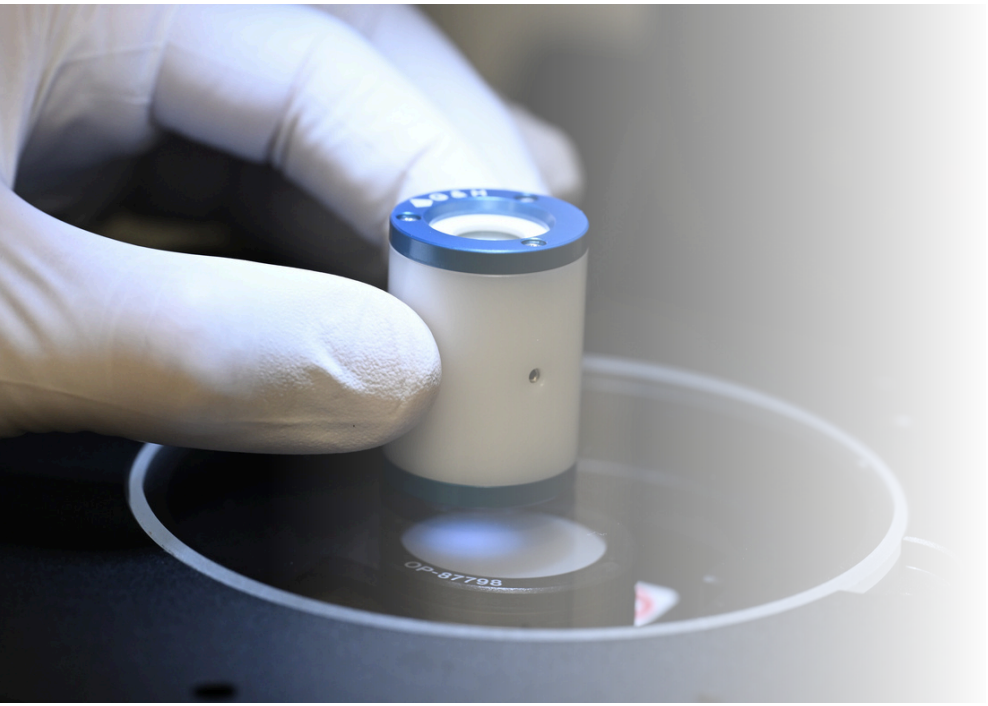


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G&H ELECTRO-OPTICS

Established in 1973, G&H's Cleveland facility is dedicated to electro-optic device manufacturing and crystal growth. We offer an extensive range of electro-optic solutions covering applications spanning the spectrum from the ultraviolet to the infrared. With 50 years of expertise in device design and internal crystal growth, we possess the unique qualifications to meet our customers' Pockels cell requirements effectively.



CONTACT US

Ilminster, UK

Dowlish Ford
Ilminster, UK
TA19 0PF
+44 1460 256400

Global headquarters

Cleveland, US

676 Alpha Drive
Highland Heights, OH
44143
+1 216 486 6100

Electro-optics

G&H Germany

Germanenstraße 3
Kaufering, Germany
86916
+49 8191 9797372

Sales office

G&H France

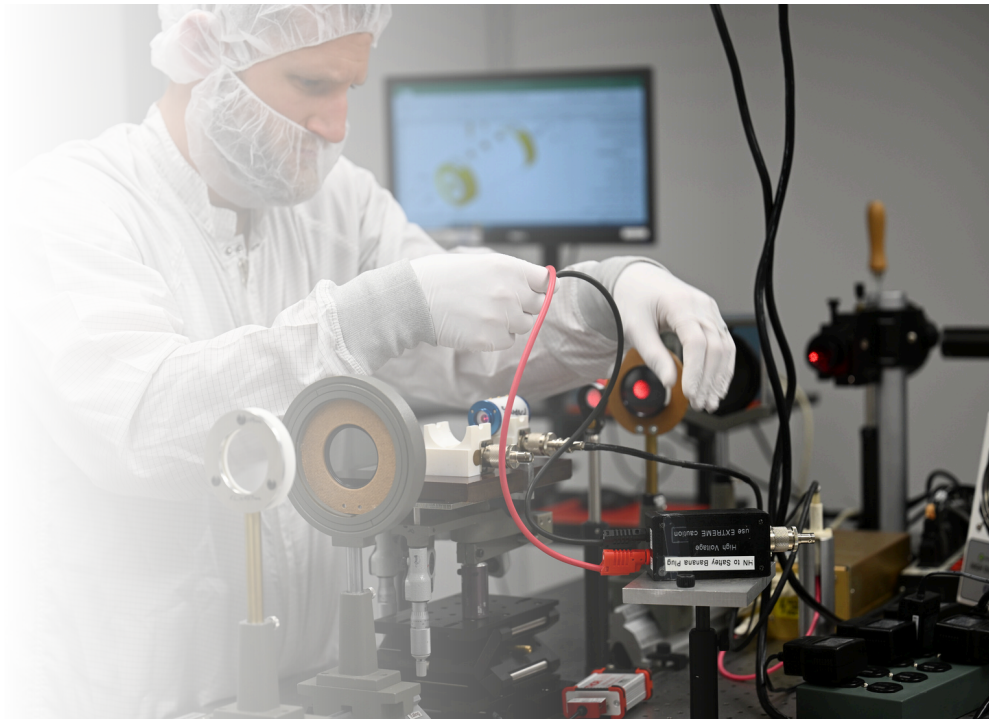
4 rue René Razel
Saclay, France
91400
+33 1 69 20 34 32

Sales office

G&H Japan

Level 4, 3-2-3 Sakae
Nagoya, Japan
460-0008
+81 90 5615 2610

Sales office



POCKELS CELLS

Reliable polarization control for high power and high repetition rates

Pockels cells are used in a variety of laser modulation applications benefitting from rapid/dynamic polarization control, Q-switching, light intensity control, intensity-modulation, dynamic waveplates, dynamic coupling of light in and out of optical systems and light switching.

Leveraging proprietary crystal growth and fabrication techniques, along with extensive expertise in electro-optic device design, we produce superior longitudinal and transverse electrode configuration Pockels cells in Lithium Niobate ($LiNbO_3$), β-barium borate (BBO), cadmium telluride (CdTe), and potassium dideuterium phosphate (KD*P). The selection of material and design for each application is influenced by factors such as wavelength, average and peak power, repetition rate, internal contrast ratio, voltage contrast ratio, beam size, and half-wave voltage, ensuring optimal performance.

Our Pockels cells exhibit market leading intrinsic and voltage contrast ratios, up to and exceeding 15000:1 for best performance and long, field-proven lifetime for lowest cost of ownership.

KD*P Pockels cells: IMPACT, CENTAUR, QX & TX series

We offer small and large aperture KD*P Pockels cells, frequently used for applications under 10 kHz repetition rate. The popular, compact Impact series delivers reliable performance at high contrast ratios for OEM integration, while the Centaur series packages the same performance in a larger footprint as a drop-in replacement for the widely deployed QX series. Devices in the large aperture TX series are designed for use as optical isolators, protecting beam lines in ultra-high power laser systems.

Our dedicated small and large crystal growth tanks produce KDP boules with deuterated levels of ordinary, 70%, 95%, and 99%. These boules are harvested and processed into Pockels cell crystals as well as frequency converters, including those used for inertial confinement fusion (ICF) at the National Ignition Facility (NIF).

BBO Pockels cells: CHIRON series

We recommend BBO Pockels cells for applications over 10 W average power and for repetition rates above 10 kHz. Our low-loss designs employ transverse electric field geometry with dual crystals to minimize drive voltage. We also offer custom options include single crystal cells, 3-crystal cells requiring 50% less voltage, and cells with water-cooled apertures for high average power operation. Our high-performance model, the Chiron series, offers superlative performance with respect to extended exposure (24 hours) and at high repetition rate (>1 MHz) while maintaining a high contrast ratio.

CdTe Pockels cells: IRX series

Mid-infrared Q-switching applications use CdTe for wavelengths up to 12 µm and repetition rates up to 100 kHz. Our water-cooled designs feature packaging with reduced ambient light sensitivity to allow power handling greater than 10 W and are available with application specific anti-reflection (AR) coatings. Optional patented designs for environmental protection and high average power are available.

Lithium niobate Pockels cells: 7100 series

We grow and polish high quality $LiNbO_3$ (LN) crystals in-house for low wavefront distortion and apply electrodes for use in transverse mode (i.e., electric field perpendicular to the optic or z-axis) electro-optic devices. Our LN crystals offer high extinction ratio, very low transmission loss, low switching voltage and temperature stability throughout a wide temperature range. High-performance antireflective (AR) coatings are applied to each face, reducing loss to ≤0.2% per surface while withstanding high optical power (500 MW/cm2 upon request).

Proprietary temperature-stable versions: TS, XTS series

We have developed proprietary temperature-stable (TS and XTS) versions of our Q-switch products to allow operation over a wide range of temperatures while maintaining excellent contrast ratio. Typical $LiNbO_3$ Q-switches suffer from pyro-electric charge buildup at low temperatures, leading to premature lasing. G&H Engineers have solved this problem with a proprietary technique that increase the conductivity of our lithium niobate crystal faces. This dissipates unwanted charge preventing pyro-electric charge buildup. This unique technology enables critical applications in, for example, defense and aerospace.

Application focus

G&H's Lithium Niobate Q-Switches are employed in rangefinders and target designators.

	Wavelength (nm)	Damage threshold	Size (mm)	Extinction ratio	Wavefront distortion	Product code
7100-2	1064	200 MW/cm²	9x9x25	≥20:1 @ 633nm	≤λ/8 @ 633nm	99-48205-01
7100-4	1064	300 MW/cm²	7.4x7.4x21	≥20:1 @ 633nm	≤λ/8 @ 633nm	99-48202-01
7100-11A	1064	300 MW/cm²	9x9x25	≥20:1 @ 633nm	≤λ/8 @ 633nm	97-00970-03
7100-4 TS	1064	300 MW/cm²	7.2x7.4x21	≥20:1 @ 633nm	≤λ/8 @ 633nm	99-48302-12
7100-01 XTS	1064	300 MW/cm²	9x9x25	≥20:1 @ 633nm	≤λ/8 @ 633nm	97-00970-13
7100-11	1064	500 MW/cm²	9x9x25	≥20:1 @ 633nm	≤λ/8 @ 633nm	97-00970-10

Application focus

G&H's Pockels Cells find applications in amplifiers, CO2 lasers, laser fusion, materials processing, medical and aesthetic laser systems, metal annealing, micro-machining, optical switching, petawatt lasers, and regenerative amplifiers.

	Wavelength	Voltage contrast ratio	Aperture (mm)	Optical material	Compatible G&H drivers	Product code
Impact series	300-1300nm	>2000:1 @ 1064nm	8-13	KD*P	Q- / R-Drive™	IMP xxx
Centaur series	300-1300nm	>2000:1 @ 1064nm	8-25	KD*P	Q- / R-Drive™	CQX xxx
QX series	300-1300nm	Varies	9.25-19.5	KD*P	Q- / R-Drive™	QX xxx
TX series	300-1300nm	Varies	19.5-99	KD*P	HVR-Drive/Sys	TX xxx
Chiron series	300-1600nm	>500:1 @ 1064nm	3.25-7	BBO	R-Drive™	TA xxx
IRX series	3-12µm	>500:1 @ 10.6µm	3-7, 4x10	CdTe	HVR-Drive/Sys	IRX xxx



