

ULTRAFAST NEWS

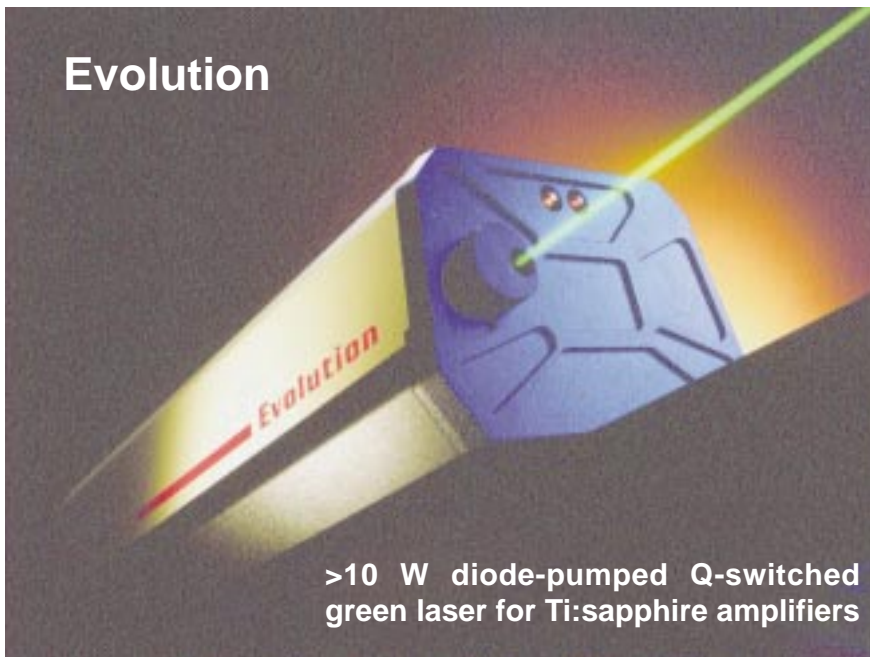


Our product offering has grown significantly over recent years. Many customers may be familiar with our mechanical components, optics or fibre-related products. You may not be aware of our significant offerings in the area of Ultrafast Lasers and accessories. Ultrafast News summarises this range.



Positive Light

Positive Light has built a significant reputation in the areas of tunable ultrafast, tunable narrow bandwidth and high power solid state lasers. Advanced diagnostics are also offered.



Evolution

>10 W diode-pumped Q-switched green laser for Ti:sapphire amplifiers

Evolution is a high-energy, diode-pumped Nd:YLF laser system. Its performance is impressive: 7mJ per pulse at 1kHz and 10 watts of average power from 2-5 kHz. The low thermal lensing and natural birefringence of Nd:YLF provide superior beam pointing stability and allows for a straightforward resonator design.

Because Evolution uses Nd:YLF as the gain medium, it delivers the high energies needed for pumping Ti:sapphire regenerative amplifiers. What's more, it delivers a flat-top beam that remains unchanged over a wide range of pump power levels and repetition rates.

Evolution has all the advantages and performance characteristics associated with DPSS lasers: long diode life (>10,000 hours); exceptional stability and the convenience of requiring only a standard AC power source.

Evolution Specifications

Repetition Rate	up to 10 kHz
Power (Watts)	6.0 at 1 kHz 10.0 at 2 kHz
Wavelength	523nm
Beam Diameter	3 mm (nominal)
Energy Stability	<3% (\pm p/p)
Polarization	Linear, horizontal



- Regenerative Amplifier Systems
- Long pulse laser Systems
- Relay imaged solid-state amplifiers
- Custom packaged lasers
- Laser components

Positive Light has supplied a range of custom, solid-state lasers to leading edge research laboratories throughout the world.

With more experience in the custom laser business than anyone else, the staff at Positive Light are uniquely suited to address those applications which demand uncompromised performance. They design and build lasers based on customer supplied parameters critical to the application. With a template to include wavelength, energy, pulsewidth and linewidth, their engineering team designs a laser system which is precisely tailored to the customer's needs. Equipped with a complete array of time-tested components and accessories, no detail is overlooked in supplying a system which combines performance and reliability.

If you require a specific custom laser, then please contact us with your specification. We'd be happy to discuss this with you.

Single Shot Autocorrelator

The SSA is designed to measure the second order autocorrelation of amplified ultrashort laser pulses with durations ranging from less than 100 femtoseconds to several picoseconds. The SSA operates over a broad range of energies and wavelengths making it well suited to a variety of laser systems including: Ti:sapphire, Nd:YAG, Nd:glass, Cr:LISAF and dye amplified systems.



- Pulsewidth measurement in either femtosecond or picosecond mode
- Wavelength coverage from 500nm to 1100nm
- Compatible with most types of ultrafast amplifiers

Ultrafast Laser Spectrometer

The ULS is an economical, fully functional spectrometer for measuring the spectrum of ultrafast laser pulses. This 0.457 meter f/6 instrument eliminates the need to dedicate expensive spectrometers and OMA systems to laser bandwidth monitoring. The broad spectral range makes the ULS ideal for bandwidth monitoring of lasers based on Ti: sapphire, Cr:LiSAF, Nd:YAG or Nd:YLF

Spectral resolution	0.02nm
Dispersion	0.59mm/nm
Spectral range	480-1080nm

Custom Solid-state Laser Systems



Examples of custom lasers offered by Positive Light include:

- Nd:YAG and Nd:YLF with outputs from 300µJ at 50kHz to 2J at 20 Hz
- Nd:Glass lasers with near diffraction limited outputs exceeding 25J
- Tunable Ti:sapphire systems with output powers >1TW
- Regenerative amplifier systems with pulsewidths from 20fs to 200ps
- Q-switched lasers with pulsewidths from 5ns to 500ns and average powers to 50W
- 2TW Nd:glass CPA system producing 2J/1ps pulses at 1.05µm
- Custom pulse lasers for demanding applications

Frequency Resolved Optical Gating (FROG)

The FROG measures amplified ultrashort laser pulses to provide real-time qualitative pulse information with a pulsewidth measurement range of 30fs to 200fs. Based on a technique for measuring the time-dependent (or equivalently, frequency-dependent) intensity and phase of a pulse, FROG is a rugged and simple instrument to use. Unlike a spectrometer or autocorrelator, FROG can reveal both spectral and autocorrelation information simultaneously. Another feature is the use of PG geometry for automatic phase matching and easy alignment. Because it can operate on a single shot basis, it is a very useful tool for Chirped Pulse Amplification laser systems or any solid-state lasers that operate at low repetition rates.

Energy Requirement	>100mJ
Beam diameter range	2-10mm
Wavelength range	750-900nm
Pulsewidth range	30fs-200fs
Polarisation	Linear, horizontal

Time-BandwidthTM P r o d u c t s

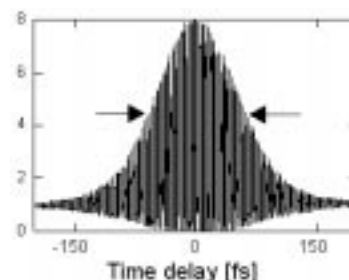
Time-Bandwidth Products were founded in early 1995 to commercialise recent developments in diode-pumped ultrafast laser systems. They are a spin-off from the Ultrafast Laser Physics group at the Swiss Federal Institute of Technology (ETH) in Zurich. Time-Bandwidth have pioneered the commercialisation of Semiconductor Saturable Absorber Mirrors-SESAMs. Saturable absorbers used in the past to passively modelock a laser were typically organic dyes. These suffered from short lifetime and complicated handling which limited their deployment out of the laboratory environment. Time-Bandwidth integrates SESAMs into the mirror structure of their lasers. Combined with diode-pumping, they offer true solid-state femtosecond or picosecond pulses from a portable, small footprint package.

Applications

- Seeding amplifiers
- Two-photon microscopy
- Photocathode illumination
- Pump-probe spectroscopy
- Electro-optic sampling
- Opto-electronic testing
- Multi-photon Spectroscopy

Features

- Passive modelocking
- Turn-key operation
- Efficient air-cooled operation
- Pico or Femtosecond pulses
- All solid-state design
- Low-cost & maintenance
- Expandable & Customisable

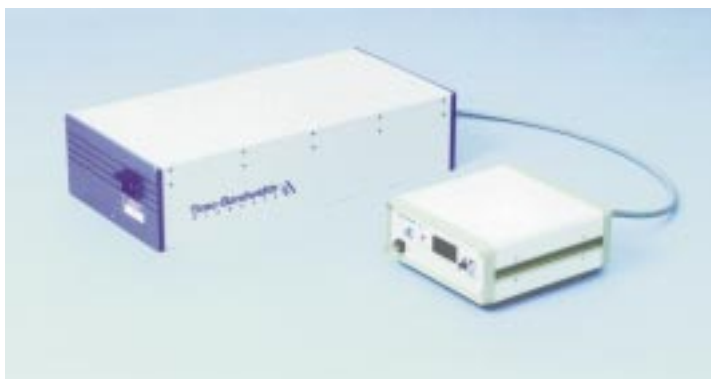


Typical interferometric autocorrelation of the LSX-100

TIGER

Mode-locked Femtosecond Ti:sapphire Laser

The Tiger Ti:sapphire ultrafast laser system provides mode-locked femtosecond pulses in a package combining both the laser cavity and a compact diode-pumped green pump laser. The Tiger offers a simpler, lower-cost approach for femtosecond pulse generation compared to other Ti:sapphire mode-locked systems.



Specifications	TIGER-100	TIGER-200
Centre wavelength, nominal	840 nm	
Tunability	±10 nm	
Average power	>100 mW	>200 mW
Repetition rate, standard	100 MHz	
Free-running frequency drift	<10 kHz/hour	
Spatial mode	TEM00	
Pulsewidth, max	<100 fs	
Time-bandwidth product	<0.36	
Amplitude noise, rms	<1%	
Polarization, linear	>100:1, horizontal	

GE-100

Mode-locked Diode-pumped Picosecond Laser

The series GE-100 are passively mode-locked diode-pumped solid state laser systems. Using Time-Bandwidth's semiconductor saturable absorber mirror design, they offer distinct advantages over established techniques such as acousto-optic mode locking.

Wavelengths and Host material	1064-YAG;1064-VAN; 1047-YLF;1053&523-YLF
Average Power	75-500mW available
Repetition Rate	100MHz
Pulsewidth	6ps-12ps

FEMTO-X

Mode-locked Diode-pumped Femtosecond Laser

The series Femto-X are also passively mode-locked diode-pumped solid-state laser systems using SESAM technology.

Two models are available. LSX-100 uses Cr:LiSAF as host material and GLX-200 which uses Nd:glass.

Specifications	LSX-100	GLX-200
Centre wavelength	840nm	1058nm
Tunability	±10nm	±10nm
Average Power	>35mW	>50mW
Repetition Rate	100MHz	100MHz
Pulsewidth	75fs	150fs

JAGUAR

Integrated Nd:YAG Picosecond Regenerative Amplifier System >0.5mJ per pulse at 1064nm, 30ps pulsewidth

The Jaguar regenerative amplifier system is a compact source of high-energy picosecond pulses featuring an optical head with a fully-integrated diode-pumped seed laser and amplifier. The Jaguar can provide pulse energies approaching 1 millijoule and repetition rates into the kilohertz range at a wavelength of 1064nm.

Seed oscillator The Jaguar uses TBP's new Pico diode-pumped mode-locked laser.

All diode-pumped amplifier The simple robust, diode-bar DCP(Direct-Coupled Pump) approach developed and proven by Lightwave Electronics provides the 'engine' in the regenerative amplifier.

Ease of use All diode-pumping and an integrated optical platform means turn-key operation.

Specifications	Jaguar-CW-250	Jaguar-QCW-500
Wavelength	1064nm	1064nm
Pulsewidth, typical	25ps	25ps
Pulse energy @ 100Hz	>0.25mJ	>0.5mJ
Average power, typical at 2kHz	>0.5W	
Oscillator repetition rate	100MHz	100MHz
Amplifier repetition rate	0-5kHz	0-100Hz

PICOLO

Compact Diode-pumped Picosecond Laser Oscillator

The Picolo laser oscillator provides mode-locked picosecond pulses with high repetition rates in a simple robust price-competitive package. Based on the proven GE-100 laser design, the Picolo offers several key advantages compared with other mode-locked laser systems.

The Picolo is a fixed OEM-style laser. The user has the option to specify repetition rate from 75MHz to 500MHz. Options include fibre-coupling.



Wavelength	1064nm
Average Power	>250mW
Pulsewidth	<8ps

LIGHTWAVE[®]

E L E C T R O N I C S



Lightwave Electronics is the largest independent manufacturer of diode-pumped lasers. The Series 131 Ultrashort Pulse Actively-Mode-Locked laser provides picosecond pulses with wavelengths near 1000 nm and a standard 100 MHz repetition rate. Other pulsewidths and repetition rates are available to the user's specification. These pulses have low amplitude noise and low timing jitter for precision pulse applications.

Applications

- Seed Source for Amplifiers
- Laser Synchronization
- Photodetector Testing
- Electro-Optic Sampling
- Spectroscopy
- Nonlinear Optics

Features

- Standard 100 MHz repetition rate
- Optional 75 to 250 MHz rep rates
- Pulse width <10 ps (YLF), <18 ps (YAG)
- Optional pulse widths to over 200 ps
- Timing jitter < 1 ps
- Compact (50 cm long, for any rep rate)
- Optional locking to 10 MHz reference
- Hands-off operation

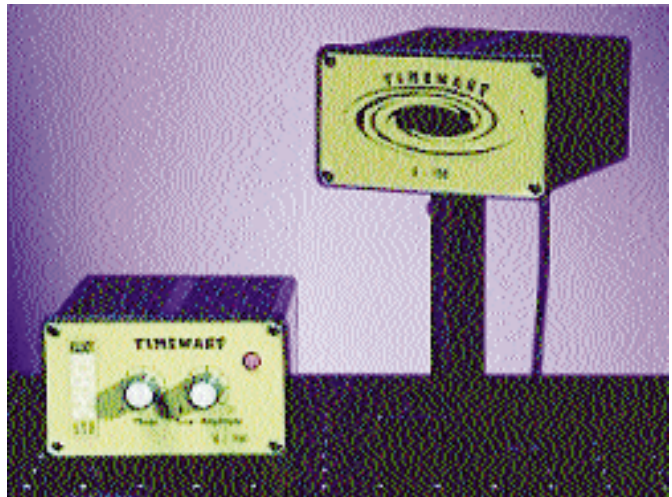
Specifications

Model:	131-1047-200	131-1053-200	131-1064-200
Wavelength	1047 nm	1053 nm	1064 nm
Spatial Mode	TEM ₀₀	TEM ₀₀	TEM ₀₀
Std Rep Rate	100 MHz	100 MHz	100 MHz
Average Power	> 200 mW	> 200 mW	> 200 mW
Pulse Width	< 10 psec	< 12 psec	< 18 psec

TIMEWARP

- Low cost Autocorrelator
- 2 photon absorption
- Simple alignment

Timewarp is a unique autocorrelator design utilising a Michelson interferometer to produce the autocorrelation signal. This is recombined on a GaAsP LED, where 2 photon absorption occurs and the autocorrelation signal appears as an electrical signal.



Timewarp is manufactured by Elliot Scientific under exclusive license from St. Andrews University.

Wavelength range	700 - 1250 nm
Pulse Measurement range	<15 - 500 fs
Sensitivity	>2 mW and <8 mW average
Polarisation	Insensitive
Price (exc VAT)	£3500



Picosecond Optical Pulse Generator

- Economical picosecond source
- Fibre bandwidth testing
- Photon counting
- Spectroscopy
- <50ps pulsewidth
- Wide wavelength range
- Internal or external triggers

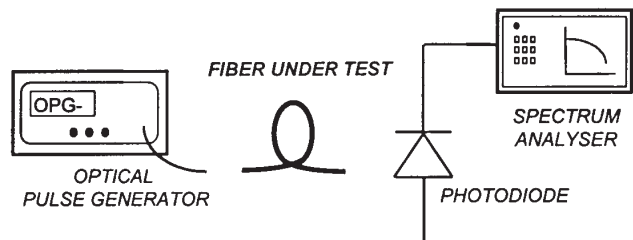
The OPG Series of optical pulse generators provide an economical source of ultra short picosecond optical pulses, at user-specified wavelengths. They are directly coupled into 50 micron fibre. Pulses can be delivered at pre-set rates or can be externally triggered.

Specifications

Pulse Width (typical)	35ps
Internal Rep Rate	6 settings to 1MHz
External Trigger Input Freq.	1MHz ±10%
Peak Power (typical)	25mW, 80mW
Wavelength	650nm, 785nm or user specified

Fibre Bandwidth Testing

The OPG-series can be used to simplify fibre bandwidth measurements. The output from the OPG is used in the frequency domain by simple Fourier transform and normalisation of the pulsed output. The bandwidth of the fibre can then be directly read from the spectrum analyser.



NEOS Technologies specializes in innovative products for laser modulation

and deflection systems. NEOS offers the industry's most complete line of shuttering systems, Bragg cells, laser scanners, and intracavity devices for laser Q-switching, mode-locking and pulse-picking.

NEOS TECHNOLOGIES

Acousto-Optic Modulators & Deflectors

- Mode-lockers
- Cavity-dumpers
- Q-switches
- Pulse-pickers

Fax-Back

Help us keep you informed about our products.
Please complete this form and fax to Elliot Scientific.

01582 766340

Please send me more information about the following products:-

- Positive Light solid state lasers
- Time-Bandwidth mode-locked lasers
- Lightwave Electronics diode-pumped lasers
- NEOS Technologies acousto-optic modulators
- Optronics Ireland Picosecond Pulse Generator
- Elliot Scientific **TIMEWARP** autocorrelator
- CVI laser optics & mirrors
- Elliot/Martock products
- Elliot/Thorlabs components
- Other



My area of work is

Contact details

Name Title

Department Position

Company/Institution

Address

..... Postcode

Telephone Fax

E-mail Remove me from mailing list YES / NO

My areas of interest include (please tick all that apply)

- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Optomechanics | <input type="checkbox"/> Optics | <input type="checkbox"/> Monochromators | <input type="checkbox"/> Acousto-optics |
| <input type="checkbox"/> Positioning equipment | <input type="checkbox"/> Fibre optics | <input type="checkbox"/> Lasers | <input type="checkbox"/> Ultrafast lasers |
| <input type="checkbox"/> Laser diagnostics | <input type="checkbox"/> Cryogenic/magnetic measurements | <input type="checkbox"/> Transmitters/receivers | <input type="checkbox"/> Fibre test equipment |
| <input type="checkbox"/> Temperature measurement | <input type="checkbox"/> Oscilloscopes/power supplies | <input type="checkbox"/> Piezo actuators | <input type="checkbox"/> Preamplifiers |

Elliot Scientific Ltd.

3 Allied Business Centre, Coldharbour Lane, Harpenden, Herts AL5 4UT, United Kingdom
Tel: 01582 766300 Fax: 01582 766340 E-Mail: elliott@elliotsc.demon.co.uk <http://www.elliotscientific.com>