

Block's next generation Quantum Cascade Lasers have been redesigned to deliver 6x power increase, orders of magnitude tighter thermal and temporal stability, and powerful electronics with unique pulse design capabilities. The LaserTune-M furnishes the ability to control multiple lasers seamlessly to provide extra-broad wavelength coverage spanning much of the infrared spectrum with a single control module.

This turnkey, benchtop instrument can be configured with from 1 to 4 QCL lasers of your choice and configured with a variety of cooling hardware options. The system is simple to set up, and with our convenient control software you will be up and illuminating your experiments within minutes of unboxing. With new power efficient, compact, and modular control electronics, the Block Engineering LaserTune-M provides the ultimate selection of flexible programming options from wavenumber ramps, steps, or holding, and dynamic pulse lengths and duty cycles which enable you to actively manage average power at each wavenumber.

Further, we are adding new wavelength range options regularly so that there is an optimal QCL solution for every set of application requirements. The following data summarizes the optical and mechanical specifications of these systems:



LaserTune-M for Research and Evaluation

Designed to incorporate up to four tunable Quantum Cascade Lasers, this user configurable and comprehensive instrument enables rapid benchtop application testing. With customizable waveform programming and trigger-In/Out interface, this system seamlessly integrates with your experimental setup. Multiple configurations including numerous laser options and cooling via passive heat sink, active fan, or water jacket are available based on application requirements.

Product Highlights

- Widely tunable over selectable subset of 800-1710 cm^{-1}
- Select 1 to 4 Multiplexed QCLs to suit application requirements
- Now with interleaved fire capability
- Program WN sweeps, step functions, and static WNs
- High duty cycle options (increased avg. power)
- Superior stability (thermal & temporal)
- Passive cooling options
- Streamlined programming and control

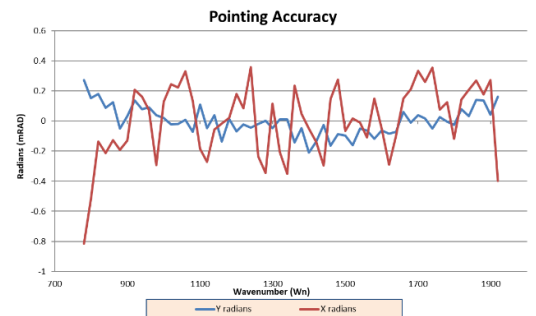
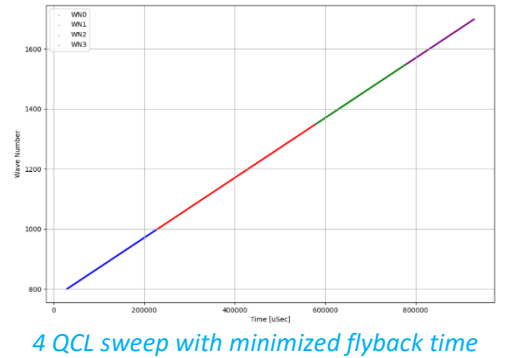
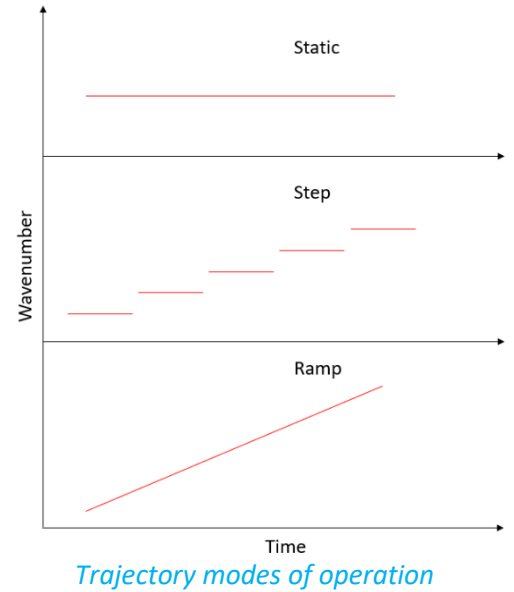
Miniature QCL laser modules inside

Featuring the smallest available QCL housing and passive cooling options, this novel module simply integrates into compact instruments and comes in a variety of infrared ranges.



Optical Specifications

Laser Rating (IEC 60825)	Infrared: Class 3B (configuration dependent) Vis pointing: Class II
Spectral Linewidth	$<2 \text{ cm}^{-1}$ (typical)
Spectral Accuracy / Repeatability	$<2 \text{ cm}^{-1} / <\pm 0.2 \text{ cm}^{-1}$ (typical)
Pulse Power	Up to 500 mW wavenumber range and combining optics dependent, 30-150ns pulse widths
Average Power	Up to 75 mW (15% Duty), wavenumber range and combining optics dependent
Pulse to Pulse Stability	Stdev $< 1.5\%$ pulse-to-pulse (typical)
Average Power Stability	$< \pm 0.1\%$ average over 1 hour (at 25C)
Beam Quality	TEM00 (nominal)
Beam Diameter	2 x 4mm, collimated output
Beam Divergence	$< 5 \text{ mrad}$ (typ.)
Pointing Stability	$< \pm 1 \text{ mrad}$ standard, tighter pointing stability available on request
Polarization	Vertically polarized; 100:1 extinction
Wavenumber Stability	$< \pm 0.2 \text{ WN}$ over 1 hour (at 25C)
Power vs Temperature Stability	$< \pm 0.01\%$ per $^{\circ}\text{C}$ (typ. 10-65C)
WN vs Temperature Stability	$< 0.01 \text{ WN}$ per $^{\circ}\text{C}$ (10-65 C, baseplate temperature)



Typical pointing accuracy, 4 QCL system

*Performance specifications are supported by extensive lab testing.
Application note with test details is available upon request.*

Electrical Specifications

Power Requirements	100 - 240 VAC, 50/60 Hz, 25 W (typ.)
Control Interface	Linux command line interface
Laser Communication	Ethernet
Analog Trigger Control (SMA)	Internal Trigger – Begin sweep by software command External Trigger – 2.5-3 V _{in} for initiation of trajectory operation Sync Out - Pulse Trace and Envelope options
Pulse Width	30 – 150 ns; 10 ns resolution with internal & external triggering
Pulse Repetition Frequency	Up to 1 MHz – effective 4 MHz available with 4 QCLs interleaved
Duty Cycle Max.	8-15% QCL P/N dependent, passive cooling
Wall Power Conversion Efficiency	2% electronics to laser output (10% Duty Cycle) [laser conversion efficiency]
Programming/Control Circuit	Supplies power conditioning, programming interface, serial control, thermal management, trigger in/out, and safety interlock.

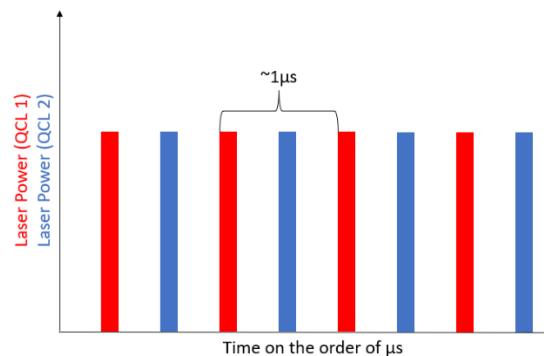


Illustration of the new Interleaved Mode

Physical Specifications

Dimensions	9.2 x 10.3 x 8.5 in (D x W x H) (Passive cooling) 233 x 261 x 217 mm (D x W x H) (Passive cooling)
Weight	7.3 kg [With optics, 4 QCL version, configuration dependent]
Temp Range (amb.), Operating	10°C to 35°C, passive cooling 10°C to >40°C, active cooling
Temp Range, Storage	-10°C to 55°C
Humidity Range, Operating	0 – 90% Rh, non-condensing
Cooling Requirements	Heat management internal to the laser package is provided with standard control electronics. Built in heat sink, no active cooling required.

Mechanical Footprint

