

## TUNABLE MID IR LASER SYSTEM – LS-03-D

The Cascade Scientific LS 03 D is an affordable Quantum Cascade Laser Driver capable of operating at high power and duty cycle. Variable pulse lengths from 10ns up to 5µs allow the laser to be operated either in true pulsed or quasi-CW modes and high efficiency peltier cooling enables laser temperatures down to -45 °C to be attained. Two units, the laser module and the control module, combine to provide unparalleled levels of performance in a compact and robust package suitable for both laboratory and OEM applications.

### Applications

- High resolution laser spectroscopy
- Gas monitoring
- Combustion diagnostics
- Bio-marker detection



### Features

Aesthetic design subject to change without prior notice

- High resolution (0.01 cm<sup>-1</sup>)
- High power output (up to 100mW)
- User-swappable QCL's for increased flexibility and spectral coverage
- Pulsed operation with up to 8 cm<sup>-1</sup> (50 nm) continuous wavelength tuning
- Electronic driver providing low noise voltage supply and stable thermoelectric control
- USB connectivity for 'plug and play' with stand alone Windows based control software
- Labview drivers provided for easy integration into experiments
- Integrated TEC control facilities for optional detector module

### Characteristics

Parameter	Ratings
Laser Current (I)	0 - 20 A
Pulse Width	<1µS
Rise / fall time	10nS
Pulse Repetition Frequency	<100KHZ
Duty Cycle standard	5% @ 20 A
Laser Temperature Range	-30°C to +50°C

### Laser Wavelengths availability

Wavelength (µm)	Wavenumber (cm <sup>-1</sup> )	Gases Detectable
4.42	2260	CO2
4.48	2230	CO2, N2O
4.86	2058	CO2, CO
4.87	2055	CO2, CO
5.25	1904	NO, H2O
5.45	1835	NO
6.13	1631	NO2
6.29	1590	NO2, NH3
7.43	1345	SO2, H2S, CH4
7.62	1313	N2O, CH4, H2S
7.85	1274	H2O, CH4, N2O, C2H2, H2S
7.87	1270	H2O, CH4, N2O, C2H2, H2S
10.09	990	NH3

### Options

- High speed Digitiser

## MID IR LASER MODULE – LM-03-D

The Cascade Laser Module houses the hermetically sealed laser package. The module can be supplied with either a forced air or water cooled heat sink, which ensures excellent cooling performance from the inbuilt peltier element. Design features, such as integrated pulse circuitry and enhanced RF screening, allow unprecedented levels of performance in terms of pulse stability, pulse amplitude, duty cycle and repetition rate. As an option, interchangeable Anti-Reflection coated ZnSe micro optics can be selected, giving a low aberration 4mm diameter collimated output beam.

### Features

- Fast and simple laser exchange
- On board EPROM storage of individual laser characteristics
- Integrated pulse circuitry to minimise mismatch and enhance rise/fall time
- Low noise high bandwidth current monitor
- Optional water cooled heat sink for enhanced cooling performance
- Interchangeable ZnSe micro-optics modules for beam circularisation and beam expansion



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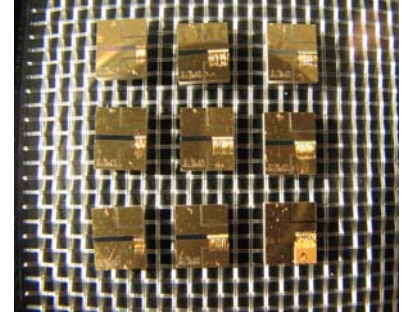
### Characteristics

Parameter	Ratings		Units	Comment
Laser Current (I)	0 - 20		A	
Pulse Width	10 - 5000		ns	
Rise / fall time	< 5		ns	
Pulse Repetition Frequency	< 5		MHz	
Duty Cycle Standard	5 @ 20 A 25 @ 5 A		%	DC = 2000mA
Duty Cycle High Power	10 @ 20 A 50 @ 5 A		%	DC = 2000mA
Pulse Voltage Droop	< 5		%	Into 2 Ohm load
Laser Temperature Range	-30 ... +50 -45 ... +50		° C	Air Cooled Water Cooled
Peltier	25 Watt / Delta 60° C 16 Watt / Delta 80° C			1 stage 2 stage
Weight	300	800 with forced air heatsink	g	
Dimensions	65 x 30 x 65	65 x 65 x65 with forced air heatsink	mm	L x W x H
Housing Material	Anodised Al			
Laser Surmount compatibility	Compact (6 x 5 x 2) Standard (19 x 7 x 2)		mm	L x W x H

## MID IR QUANTUM CASCADE LASERS – QC-02-XXXX

### Features

- **Beam divergence at emitting facet of the Product:** Mean optical output power ( $P_m$ ) guaranteed in a full solid angle of  $60^\circ$ .
- **Single mode suppression ratio:** SMSR of the Product over the laser gain spectrum of the Product:  $\geq 25\text{dB}$
- **Mean optical output power:**  
Optical output power ( $P_m$ ) during  $t$  pulse  $\geq 100\text{ mW}$   
Optical output power decay ( $P_{\text{decay}}$ ) from start to end of  $t$  pulse :  $\leq 50\%$



### Operating Parameters:

- **Current and Voltage:**  
Pulse current ( $I_c$ ): up to 4 Amps  
Pulse voltage ( $V_c$ ): up to 16 Volts  
Current threshold ( $I_{th}$ ): up to 2 Amps
- **Duty cycle, pulse repetition frequency and reciprocal wavelength scan:**  
Operating duty cycle ( $DC_c$ ): up to 5%  
Pulse duration ( $t_{\text{pulse}}$ ): up to 800ns  
Pulse repetition frequency (PRF): up to 100KHz  
Wavenumber scan during  $t_{\text{pulse}}$  ( $U_s$ ): over  $2\text{cm}^{-1}$
- **Operating and environmental temperature:**  
Product sub-mount temperature (T):  $-30^\circ\text{C} \leq T \leq 35^\circ\text{C}$

### Wavelengths and associated measurable gases with strong absorption bands in these regions

Wavelength ( $\mu\text{m}$ )	Wavenumber ( $\text{cm}^{-1}$ )	Gases Detectable
4.42	2260	CO <sub>2</sub>
4.48	2230	CO <sub>2</sub> , N <sub>2</sub> O
4.86	2058	CO <sub>2</sub> , CO
4.87	2055	CO <sub>2</sub> , CO
5.25	1904	NO, H <sub>2</sub> O
5.45	1835	NO
6.13	1631	NO <sub>2</sub>
6.29	1590	NO <sub>2</sub> , NH <sub>3</sub>
7.43	1345	SO <sub>2</sub> , H <sub>2</sub> S, CH <sub>4</sub>
7.62	1313	N <sub>2</sub> O, CH <sub>4</sub> , H <sub>2</sub> S
7.85	1274	H <sub>2</sub> O, CH <sub>4</sub> , N <sub>2</sub> O, C <sub>2</sub> H <sub>2</sub> , H <sub>2</sub> S
7.87	1270	H <sub>2</sub> O, CH <sub>4</sub> , N <sub>2</sub> O, C <sub>2</sub> H <sub>2</sub> , H <sub>2</sub> S
10.09	990	NH <sub>3</sub>

## DIGITISER AV1500– SINGLE CHANNEL 8-BIT 1 GSPS



Front



Back

The AV1500 high-speed digitizer/averager is a plug-and-play A/D converter designed with hassle-free instrument-to-PC interfacing. The AV1500 can digitise one channel with 8-bit precision over voltage ranges from  $\pm 10$  mV to  $\pm 1.5$ V. The card is capable of sampling 650 MHz bandwidth signals. In addition, the device is capable of co-adding data up to 65 655 times 2048 points giving an effective precision of 16Bit using onboard FPGA averaging.

### Applications

- High speed instrumentation
- Automotive testing
- Mixed signal test
- Radar
- Metrology
- Medical
- Biotechnology
- Defence & Security
- Life sciences
- Semiconductor testing

### Characteristics

Parameter	Ratings	Units	Comment
Sampling rate	1	GS/s	
Input Bandwidth	650	MHz	@3db
Signal Input	50	Ohm	SMA Gold plated
Signal Input Range	10 to 1500	mV	
Gain Setting	-10 to 35	dB	Adjustable
Offset	5	V	FS 16bit adjustable
Max. Input Voltage	1.5	V	DC
Power	+12	V	
Power Consumption	5	W	@12V
Acquisition memories	2	Kpoints	Upt to 64KHz averager mode

Trigger		
Internal trigger	TTL	DC to 600MHz
Trigger Input	50Ohm	SMA Gold plated
Mode	Edge positive	

PC requirements	
Processor	500MHz
Memory	256MB
O/S	Win XP SP2
Software	Labview