

## LBC 8000 – A MODULAR LASER BAR CHARACTERISATION SYSTEM



LBC 8000 is a fully configurable, all-in-one laser diode bar and laser bar stack characterization system for R&D laboratories and industry. It is designed to measure and analyze all major characteristics of laser diodes in a fast and reproducible way. It is an ideal tool for data sheet generation, quality control, failure analysis and research activities with semiconductor emitters. LBC 8000 is designed to operate class IV laser diodes, therefore it is equipped with required safety interlocks and optical enclosure.

LBC 8000 has a modular construction making customizable tool to meet various needs required by different activities. LBC 8000's little brother LDC 5000 is designed to measure wide variety of single emitter laser diodes and LEDs.

### MAJOR CONTRIBUTIONS

With respect to laser bar parameter characterization, the LBC 8000 system provides an outstanding list of analysis features, which are mostly divided into the subsets as follows:

- LIV and derived analysis units
- Beam far field profile analysis
- Spectral analysis
- Nearfield & smile analysis

Comparable systems in market provide up to two parameter sets considering the feature list above.

Secondly, the LBC 8000 provides a wide operating range in terms of drive current, temperature and wavelength range.

Thirdly, the system is a set-up for an enhanced test station due to the components selected by experts. Accordingly, the whole system is fulfilled to meet high quality standards and modularity as stated in the table of technical data

Key part of the system is easy to use software, C# written, that can be used to make, store and run fully configurable measurement recipes. User can easily run complicated measurement routines and analysis with single click. Software stores data and analysis results to SQL- database and to cvs-files readable with different software's. In addition software can generate customizable datasheet in pdf file or hard copy.

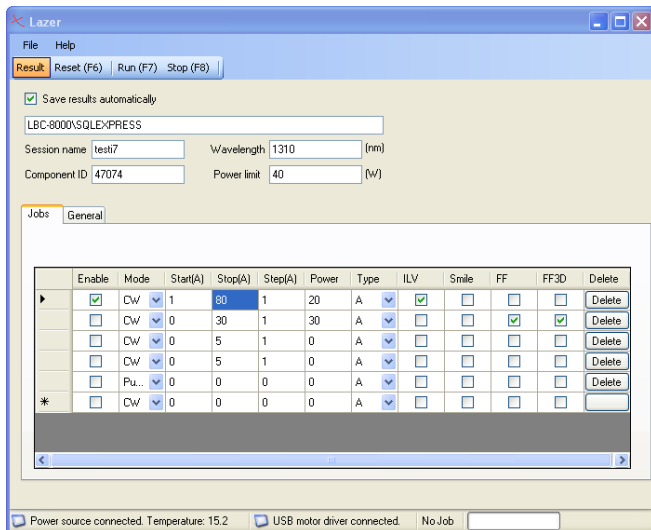


Fig.1. Test batch waiting for execution

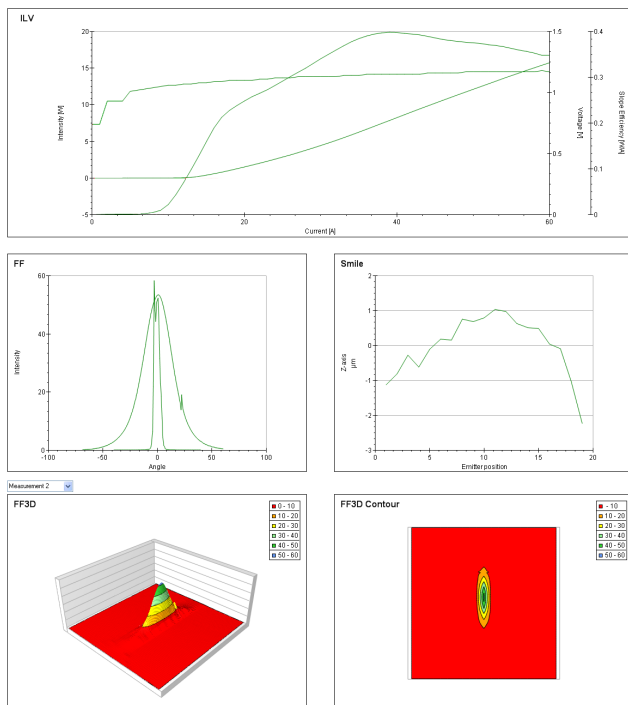


Fig.2. Results from ILV, 2D & 3D Far Field and Smile Measurements

## SYSTEM CONFIGURATION

The overall configuration is configurable based on customer needs and budget.

### LIV-measurement

#### Standard range

- Multiple laser driver options are available up to 125 A/24 V DC operation. These units provide DUT voltage measurement with 10 mV resolution and 3  $\mu$ A photodiode resolution for power measurement.
- Pulsed current up to 220 A with 40  $\mu$ s-1 ms pulse width.

### Spectrum measurement

Three different options are available each having its advantages. Optimum, but also most costly solution is to combine optical spectrum analyzer (OSA) and spectrometer because OSA delivers utmost accuracy and spectrometer delivers very fast measurement cycle. However also monochromator can be used in some applications since it is inexpensive and it can be configured to reach high resolution and accuracy. See technical data comparing different solutions.

### Farfield measurement

One of the most important properties of the emitter is the shape and divergence of the Far Field (FF). LBC 8000 can measure FF with scanning arm setup from broad range of wavelengths at high power. Due innovative custom electronics, measurement cycle is fast, accurate and has high dynamic range. Typically  $0.045^\circ$  resolution is used and measurement time can vary from seconds (vertical and horizontal line measurement) to tens of seconds (high resolution mapping).

### Nearfield measurement

Measurement of the near field gives important information about internal operation of emitter. It can detect filamentation or current spreading problems and therefore provide feedback to the fabrication process. LBC 8000 can be equipped with CCD microscope in order to easily and safely measure near field.

Near field measurement can be equipped with smile measurement option which measures vertical deviation of emitters along laser bar. Typical accuracy of measured vertical position is as high as  $\pm 0.1 \mu$ m. The smile measurement is done in seconds and does not require time consuming precision lens alignment for each measure.

## MODULAR LASER SAMPLE FIXTURES

The system features modular and easily exchangeable laser bar fixture system. Adapters for CS-mount, Microchannel stack and Chip on Carrier are available as standard options and customized adapters can be made on order.

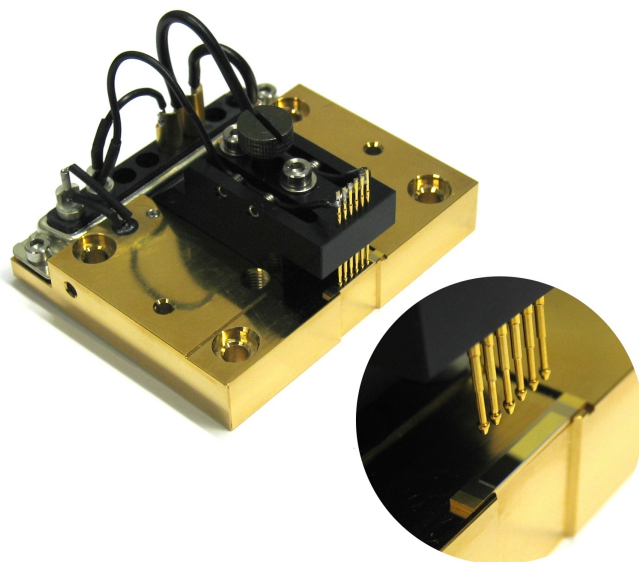


Fig.3. Fixture for Chip on Carrier laser bars



## DELIVERY, PRICING, CONTACT DETAILS

Due to the modular structure, LBC 8000 can be customized as per the customer's preferences.

We shall be pleased to make a proposal and at the same time provide you pricing and delivery time information. Please contact Nanofoot:

Contact: [jukka.viheriala@nanofoot.fi](mailto:jukka.viheriala@nanofoot.fi); or call + 358-50-595 4147

Web: [www.nanofoot.fi](http://www.nanofoot.fi)

## TECHNICAL DATA

Spectrum measurement			
	OSA	Spectrometer	Monochromator
Cost	From high to very high	Costly, unless wavelength is suitable for Si CCD	Low
Resolution	Extremely high, down to 10pm	Average starting from 1nm, High if narrow measurement band	Average, high if narrow band measurement is satisfactory
Dynamic range	Extremely high	Average	Average
Requires fiber alignment	Typically yes	No	No
Wavelength range	600nm to 2400nm	200nm to 1700nm	Almost any
Measurement speed	Medium	Instant	Fast

Laser driver specifications			
	Option LD1	Option LD2	Option LD3
CW current	18 A	70 A	125 A
Pulsed current	40 A	160 A	220 A
Hard pulse current	18 A	70 A	125 A
Setpoint resolution	10 mA	10 mA	10 mA
Setpoint accuracy	0.1%+10 mA	0.1%+80 mA	0.1%+120 mA
Compliance voltage	35V	30V	24V
Noise and ripple	<10 mA RMS	<40 mA RMS	<60 mA RMS
Pulse widths	40 $\mu$ s to 1 ms	40 $\mu$ s to 1 ms	40 $\mu$ s to 1 ms
Pulse widths for HPulse	1 ms to 2 s	1 ms to 2 s	1 ms to 2 s
Voltage reading resolution	10 mV	10 mV	10 mV
Voltage reading accuracy	+/-0.05% +20 mV	+/-0.05% +20 mV	+/-0.05% +20 mV

Temperature control		
	Option TC1	Option TC2
Type	Air-to-Water chiller	Water-to-Water chiller
Maximum cooling capacity	400 W	600 W
Temperature range	10..60 °C	10..60 °C
Temperature setpoint resolution	0.1 °C	0.1 °C