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Contents

1 About LTS256B/99

The Laser Test System LTS256B/99 is a Burn In Unit with integrated Measurement and Data Acquisition System.

1.1 System Description

The Laser Test System LTS256B/99 consists of following main subsystems shown in Fig.1.

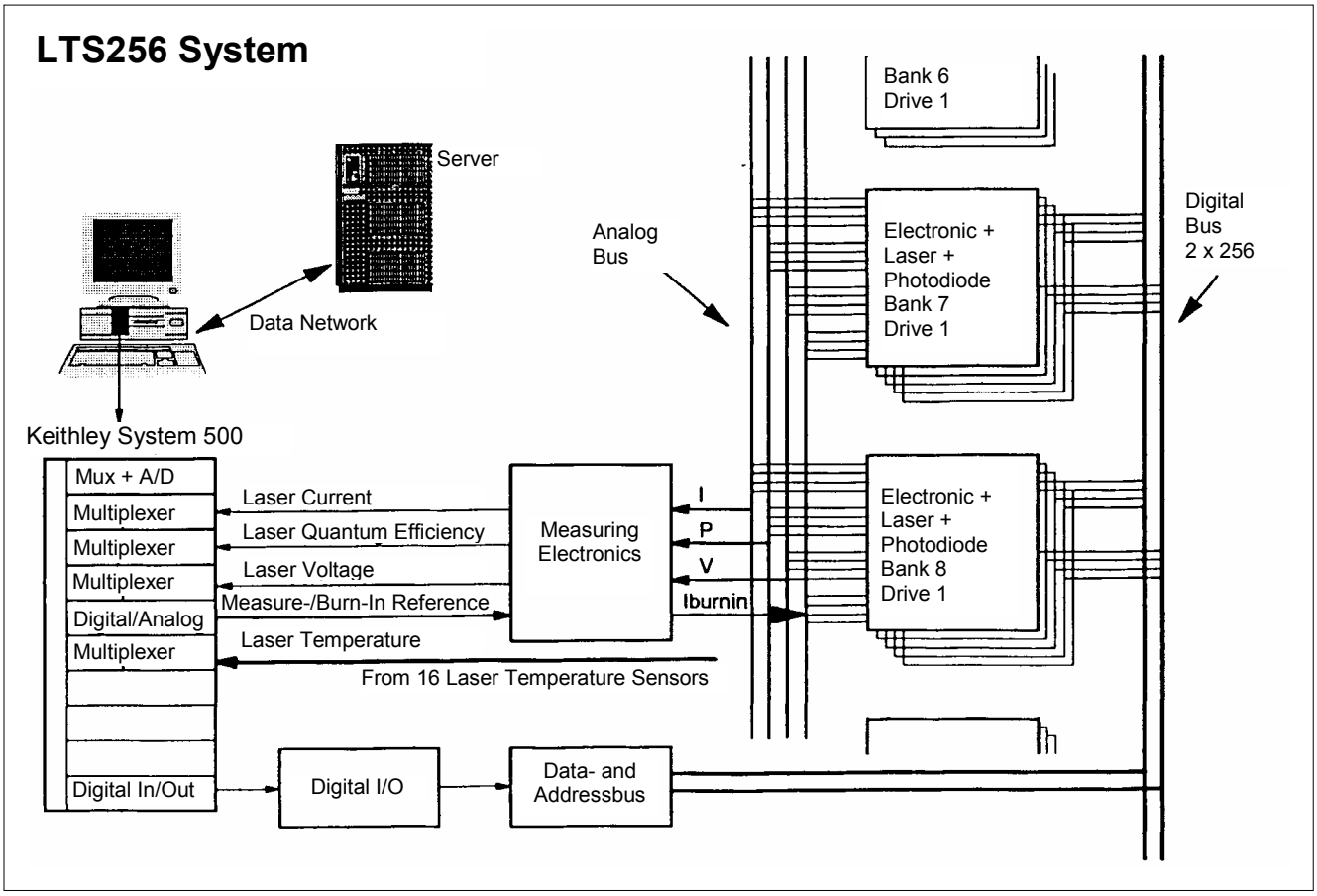

Fig 1: Block Diagram

256 Lasers can be tested simultaneously with LTS256B/99. The lasers are soldered and bonded on Submounts.

1.2 Submount Holder

The Submount is placed in a Submount Holder, which enables the best handling (that is transporting, contacting, placing on different Test & Burn-In Systems), see Fig. 2. The Submount Holder provides electrical and thermal contact over ceramic plate with Au-Layers which is pressed on the Submount by spring force.

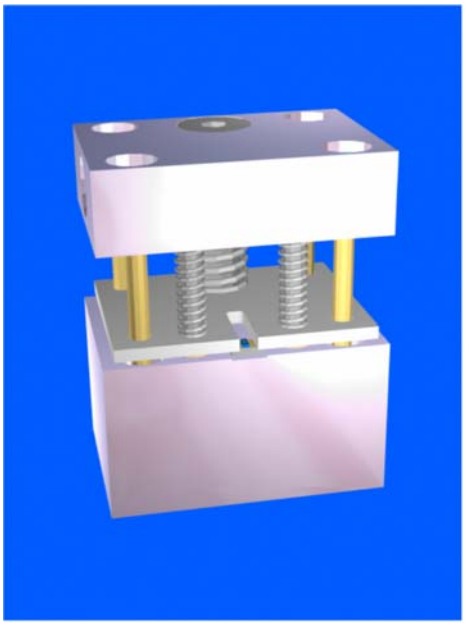

Fig. 2: Submount Holder

1.3 Heated Plates

The 256 slots (for laser connection) are placed on 16 heated plates. Therefore on each heated plate there are 16 Submount Holder Slots with 4 pins for electrical contact where the lasers can be held and connected. Ventilation with pure air is integrated in each Submount Holder Slot (Fig. 3).
Each Submount Holder (with one laser on Submount inside) is pressed on the heated plate (one bolt has to be turned on). Two goals are reached by it: as the first an optimal heat transfer between the Submount Holder and the heated plate (thermal connection) and as the second the electrical connection of the laser to the 4 power supply pins.
Each heated plate is equipped with a heater, whose power is controlled with one thermo regulator. The temperature can be set for each heated plate separately, with certain restrictions by it. If the same temperature is wished on all the heated plates, the set value of temperature can be put in at only one regulator (master); the other regulators (slaves) take over the new value of temperature automatically.

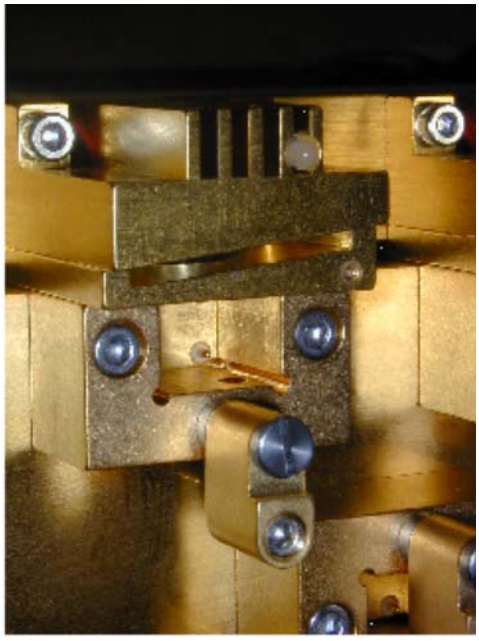

Fig. 3: Submount Holder Slot and Photodiode Holder

1.4 Photodiode Holder

The laser light passes through a gray filter, the light yield is measured with a Si-Photodiode. This gray filter attenuates the light to prevent the photo diode of being overcharged.
One two-colored LED is placed on the photo diode Holder as control lamp. If the LED doesn't shine, it means the Slot (the laser) is not powered. If the LED shines red, it means that the Burn In Current is switched on (but there is no measurement) and green light means the laser is powered and the measurement is on.

1.5 Data Acquisition System

The data acquisition is performed with measurement components that is with multiplexer and signal converter boards. Afterward the data is digitalised at one central processing unit and transported to the PC.
As data acquisition the system 500 of Keithley Instruments® is in use, consisting of A/D, D/A and digital I/O boards.

2 Burn-In Mode

The Burn-In-Current has to be set in the Software Menu. The same value of Burn In Current is used for all 256 lasers and can be set between 100 mA and 1000 mA. A Burn In Current flows only if the corresponding slot is activated. In this case the LED on the Photodiode Holder shines red.

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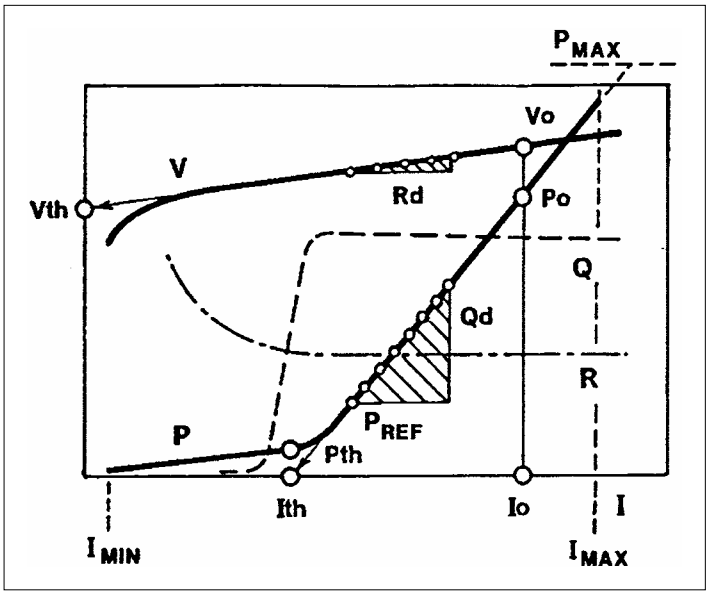
3 Measurement

The laser is not just supplied with Burn In Current. In adjustable time intervals, the lasers are also measured completely. Fig. 4 gives an overview over the measuring data.



Laser Characteristics (P-I-V-Curve)

I	Laser Current
$P_{(I)}$	Laser Efficiency (optical)
$V_{(I)}$	Laser Voltage
$Q_{(I)}$	Differential Efficiency
$R_{(I)}$	Differential Resistance

Laser parameter

P_0	Laser Efficiency
V_0	Laser Voltage
I_0	Laser Current
I_{tch}	Threshold Current
P_{ith}	Threshold Optical Efficiency
V_{etch}	Threshold Voltage
A_d	Differential Efficiency
R_d	Differential Resistance
T	Temperature

Fig. 4: Measuring Results

Before measurement is started, miscellaneous adjustments can be performed. For example the number of measurement points, min. and max. value of Burn In Current, etc. can be set.
During the measurement, the LED shines green on the corresponding photo diode Holder.

4 Software

The operating system for the PC is DOS 7.0. The program module for Data Acquisition System (controlling, simple calculations, etc.), is written in assembler. The Measuring Data are placed in a spread sheets and delivered for further calculations. This program module is written in the language APL2, which is especially suitable for complex calculations (for example Threshold Current, Threshold Voltage, Optical Quantum Efficiency calculated with one weighted regression, etc. , see Fig.6)
The Menu navigation and the display presentation are also written in APL2.

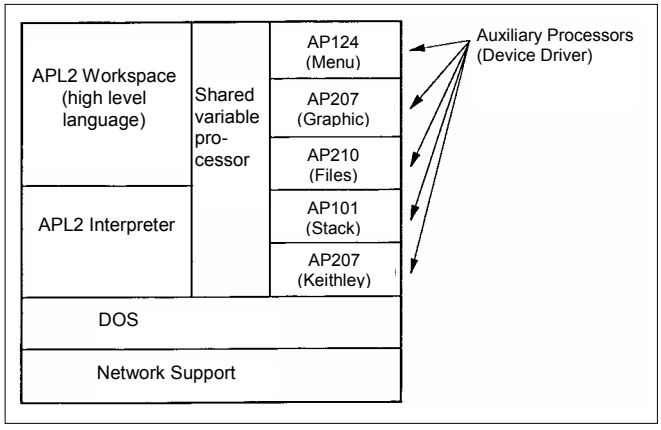


Fig. 5 Software Modules

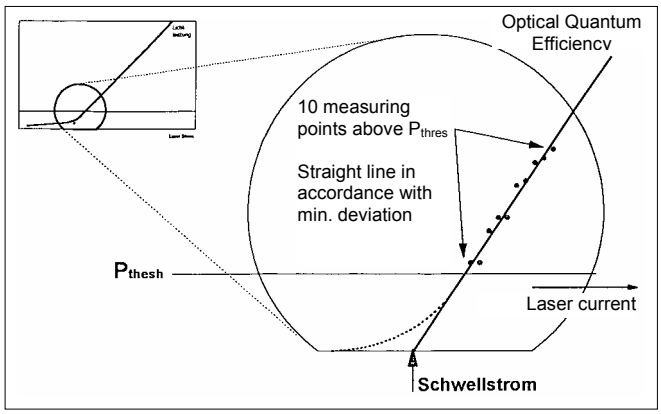


Fig. 6: linear Interpolation

5 Technical Data of LTS256B/99

5.1 General Data

Number of Slots:	256
min. Burn-In Current at one Slot:	100 mA
max. Burn-In Current at one Slot:	1000 mA
max. Burn-In Voltage:	3.0 V
min. measured Current:	1 mA
max. measured Current:	1000 mA
measured Voltage:	0..5V

5.2 Temperature Control

Temperature range:	50 °C ... 120°C
Temperature stability:	±0.1 °C
Precision of measurement:	±2 °C

5.3 Dimensions

Height:	2290 mm
Width:	600 mm
Depth:	900 mm
Weight:	ca. 400 kg

5.4 Power Supply Considerations

Main Input Voltage U_{IN}:	3 x 400 VAC / 50 Hz
Power Demand P_{IN}:	9.8 kVA