

LTS 9110

Laser Diode Test System

Product Features

Up to 5000 L/I/V data points
generated in seconds

Drive current ranges of 200/500mA
and 2/4A

32W output temperature controller

Built-in optical power meter and
detector head

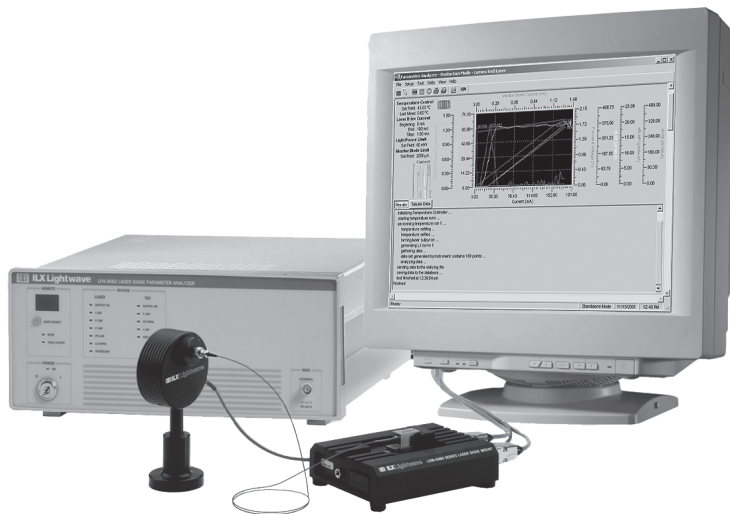
Powerful workstation computer with
monitor

SPA-9000 Windows® Software

Laser diode mount and cables

The LTS-9110 Laser Diode Test System combines the LPA-9080, SPA-9000, a leading edge control computer, and your choice of laser diode fixture and optical power/wavelength measurement head all into one complete package. You choose the instrument: the LPA-9082 for applications requiring up to 500mA laser drive current or the LPA-9084 if you need up to 4A. Both versions contain a 32W temperature controller for precise temperature control of internal Peltier coolers and a precision power meter with 16-bit resolution. L/I, V/I, and other associated curves of up to 5000 data points can be generated and stored in seconds.

The LPA-9080 Series Parameter Analyzer, when combined with the SPA-9000 Windows®-based parametric analysis software, forms the ideal system for fast and accurate parametric analysis of laser diodes. This system has been optimized for precise high speed L/I/V curve generation, making it the ideal parametric test solution for incoming inspection, production line testing, and R&D applications.



A Dedicated System for Testing Laser Diodes

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A Dedicated System for Laser Diode Testing

The LPA-9080 Series is the industry's only laser diode controller and power meter specifically dedicated to parametric analysis applications. Accurate, low noise drive current, laser diode protection, and fast L/I/V curve generation are available in one instrument, eliminating the need for an expensive, multiple instrument configuration with complex triggering and programming details.

The laser diode controller in the LPA-9080 contains proven ILX laser diode protection features including adjustable compliance voltage up to 10 V, output shorting relay, and fast shut off circuitry.

Sophisticated Power and Wavelength Measurement Capabilities

The power meter in the LPA-9080 contains ILX's precision power measurement capabilities with full 16-bit resolution. The LTS-9110 System includes your choice of OMH-6700B Series Power and Wavelength Measurement Heads, providing accurate power measurements as well as a power-averaged wavelength measurement. Measurement heads are available to provide accurate optical power measurement from -90dBm to +40dBm, and a wavelength range of 350nm to 1700nm. Our patented integrating sphere technology also eliminates polarization dependencies in your measurement. A wide range of fiber optic connectors are also available to support fiber-based applications.

Powerful SPA-9000 Software

The SPA-9000 software contains a Test Wizard for creating laser diode test configurations. The software's flexibility allows for user customization of screen-based and printed test output. The built-in Microsoft Access® database provides easy data

analysis, report generation, or export of data to other enterprise applications.

The SPA-9000 software also has a Manual Control mode for operating the LPA-9080 as a laser diode controller with internal power meter. For more information on the SPA-9000 software, visit our website at www.ilxlightwave.com.

Computer System is Part of the Package

A Dell® Optiplex® computer system is provided as part of the LTS-9110 Package to control all aspects of your testing regimen. The system consists of a 2.8GHz Intel® CeleronD® processor with 256MB of RAM, and a 40GB hard drive with Microsoft® Windows® XP Pro SP2 and SPA-9000 preinstalled in a small form factor desktop case. A 17" CRT monitor, a standard 104 key USB keyboard, and 2 button mouse are included as well. Communication between the computer and the LPA-9080 is accomplished through a National Instruments® GPIB card, giving you a powerful platform from which you can base your testing requirements. The whole system has been preconfigured and tested prior to shipment, so you simply need to connect the cables, turn the system on, and begin testing.

A Complete Testing Solution

To complete your LTS-9110 System, you choose from our wide selection of laser diode mounts. The laser mounts provide convenient connections to the LPA-9080 and handle variation in laser diode pin-outs through user configurable connections.

Results You Can Count On

Whether your application is fast, accurate production line testing, reliable incoming laser diode inspection, or an exacting research and development application, the LTS-9110 delivers a powerful testing solution aimed at increasing your productivity and profitability.

Detector Head

Model Number	Input Type	Wavelength Range	Power Range
OMH-6703B	Free-Space or Fiber	400-1100nm	-50 to +20dBm
OMH-6708B	Free-Space or Fiber	800-1600nm	-50 to +20dBm
OMH-6722B	Free-Space or Fiber	400-1100nm	-40 to +30dBm
OMH-6727B	Free-Space or Fiber	900-1650nm	-40 to +30dBm
OMH-6732B	Free-Space or Fiber	350-530nm	-40 to +30dBm
OMH-6780B	Fiber-Coupled	830-1100nm	-40 to +30dBm
OMH-6790B	Fiber-Coupled	830-1000nm	-30 to +40dBm
OMH-6795B	Fiber-Coupled	1200-1650nm	-30 to +40dBm

* Please review the OMH-6700B brochures for more details on the power/wave head specifications.

Specifications¹

DRIVE CURRENT OUTPUT

	LPA-9082		LPA-9084	
Output Current Range:	0–200mA	0–500mA	0–2000mA	0–4000mA
Setpoint Resolution:	4μA	10μA	40μA	80μA
Setpoint Accuracy (% of FS):	±0.05%	±0.05%	±0.05%	±0.05%
Temperature Coefficient:	<50ppm/°C	<50ppm/°C	<100ppm/°C	<100ppm/°C
Short-Term Stability (one-hour): ²	<2ppm	<20ppm	<20ppm	<20ppm
Long-Term Stability (24-hours): ³	<40ppm	<40ppm	<40ppm	<40ppm
Noise and Ripple: ⁴				
High Bandwidth Mode:	<4μA rms	<4μA rms	<15μA rms	<20μA rms
Low Bandwidth Mode:	<2μA rms	<2μA rms	<10μA rms	<10μA rms
Transients:				
Operational: ⁵	<3mA	<3mA	<4mA	<4mA
1kV EFT/Surge: ⁶	<8mA/<12mA	<8mA/<12mA	<10mA /<8mA	<10mA /<8mA

COMPLIANCE VOLTAGE ADJUST

Range:	0–10V	0–10V	0–10V	0–10V
Resolution:	50mV	50mV	50 mV	50 mV
Accuracy (over the range):	±2.5% 10 to 202mA	±2.5% 10 to 505mA	±2.5% 40 to 2020mA	±2.5% 80 to 4040mA

DRIVE CURRENT LIMIT SETTINGS

Range:	1–202mA	1–505mA	10–2020mA	10–4040mA
Resolution:	1mA	2mA	10mA	20mA
Accuracy:	±2mA	±5mA	±20mA	±40mA

PHOTODIODE FEEDBACK

Type:	Differential	Differential	Differential	Differential
PD Reverse Bias:	0–5V Adjustable	0–5V Adjustable	0–5V Adjustable	0–5V Adjustable
PD Current Range:	5–5000.0μA	5–5000.0μA	5–10,000μA	5–10,000μA
Output Stability: ⁷	±0.02%	±0.02%	±0.02%	±0.02%
Accuracy, Setpoint (% of FS):	±0.05%	±0.05%	±0.05%	±0.05%

EXTERNAL ANALOG MODULATION

Input:	0–10V, 1 kΩ	0–10V, 1 kΩ	0–10 V, 1 kΩ	0–10 V, 1 kΩ
Transfer Function:	20mA/V	50mA/V	200mA/V	400mA/V
Bandwidth (3 dB)				
High Bandwidth: ⁸	DC to 1MHz	DC to 1MHz	DC to 250kHz	DC to 250kHz
Low Bandwidth: ⁹	DC to 15kHz	DC to 15kHz	DC to 10kHz	DC to 10kHz

MEASUREMENT

Output Current				
Range:	0–200.00mA	0–500.00mA	0–2000.0mA	0–4000.0mA
Resolution:	0.01mA	0.01mA	0.1mA	0.1mA
Accuracy:	±0.05% of FS	±0.05% of FS	±0.1% of FS	±0.1% of FS
Photodiode Current				
Range:	0–5,000μA	0–5,000μA	0–10,000μA	0–10,000μA
Resolution:	0.1μA	0.1μA	1μA	1μA
Accuracy:	±2μA	±2μA	±4 μA	±4μA
Forward Voltage				
Range:	0.000–10.000V	0.000–10.000V	0.000–10.000V	0.000–10.000V
Resolution:	1mV	1mV	1mV	1mV
Accuracy: ¹⁰	±2mV	±2mV	±2mV	±2mV

CURRENT SOURCE NOTES

- All values relate to a one-hour warm-up period.
- Over any one-hour period, half-scale output.
- Over any 24-hour period, half-scale output.
- Measured optically, evaluating noise intensity of a laser diode into a photodetector with 150kHz Bandwidth.
- Maximum output current transient resulting from normal operational situations (e.g., power on-off, current on-off), as well as accidental situations (e.g., power line plug removal).
- Maximum output current transient resulting from a 1000V power-line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196. Request ILX Application Note #3.
- Maximum monitor photodiode current drift over any 30-minute period. Assumes zero drift in responsivity of photodiode.
- 300mA setpoint, 60mA modulation current.
- Small signal specification is for typical 10% modulation depth. Large signal specification assumes 50% modulation depth at mid-scale output.
- Four-wire voltage measurement at the load. Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load and cable used.

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Specifications¹

TEMPERATURE CONTROL OUTPUT¹

Temperature Control Range: ²	-100.0°C to +199.9°C	
Thermistor Setpoint	Resolution	Accuracy³
-20°C to 10°C ⁴	0.001°C	±0.2°C
10°C to 40°C ⁵	0.05°C	±0.2°C
40°C to 70°C ⁵	0.2°C	±0.2°C
AD590 & LM335 Setpoint	Resolution	Accuracy
-20°C to 50°C	0.01°C	±0.1°C
Short-Term Stability (one-hour): ⁷	<0.004°C	
Long-Term Stability (24-hours): ⁸	<0.01°C	
Output Type:	Bipolar, constant current source	
Compliance Voltage:	>8V DC	
Short Circuit Output Current:	4A	
Maximum Output Power:	32W	
Current Noise and Ripple: ⁹	<1mA rms	
Current Limit		
Range:	0-4A	
Set Accuracy:	±0.05A	
Control Algorithm:	Smart Integrator, Hybrid PI	

TEMPERATURE SENSOR

Types	
Thermistor:	NTC (2-wire)
IC Temperature Sensor:	AD590/LM335
RTD Sensor: ¹⁰	Pt100/Other 100Ω RTD
Thermistor Sensing Current:	10μA/100μA
Sensor Bias:	AD590=8V, LM335=1mA, RTD=0.8mA ¹⁰
Usable Thermistor Range:	25-450,000Ω, typical
Typical Sensor Output: ¹¹	
AD590 Current Output:	I(25°C)=298.2μA, I _T =μA/K
LM335 Voltage Output:	V(25°C)=2.73V, V _T =10mV/K
RTD (Pt100) Resistance:	R(25°C)=109.73Ω
User Calibration	
Thermistor:	Steinhart-Hart, 3 constants
IC Sensors and RTD	Two-point

TEC MEASUREMENT

Temperature	Range ¹²	Resolution	Accuracy
10μA Setting: ¹³	-99.9°C to 199.9°C	0.01°C	±0.1°C
100μA Setting: ¹⁴	-99.9°C to 199.9°C	0.01°C	±0.05°C
Thermistor Resistance			
10μA Setting:	0.01 to 450.00kΩ	0.01kΩ	±0.05%
100μA Setting:	0.001 to 45.000kΩ	0.001kΩ	±0.05%
TE Current:	-4.000 to 4.000A	0.001A	±0.04A
Voltage: ¹⁵	-10.000 to 10.000V	1mV	±30mV

POWER METER

Detector Current	
Range:	50, 100, 500nA; 1, 5, 10, 50, 100, 500μA; 1, 5, 10mA
Accuracy:	5% of FS (50-500nA) 1% of FS (1μA to 10mA)
Short-Term Repeatability: ¹	0.5% of FS (50-500nA) 0.1% of FS (1μA to 10mA)
Maximum Input Signal:	10 mA
Detector Bias:	0-10.1V, user programmable
Responsivity:	Read in from detector or calibration files
Power Limit Setting:	
LPA-9082	Software selectable, 0.01-1000mW
LPA-9084	Software selectable, 0.01-5000mW
Power Limit Resolution:	0.01mW

TEMPERATURE CONTROL NOTES

- All values relate to a one-hour warm-up period.
- Software limits of range. Actual range possible depends on the physical load, thermistor type, and TE module used.
- Accuracy figures are quoted for a typical 10kΩ thermistor and 100μA current setting. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
- Using 10kΩ thermistor, on 10μA setting.
- Using 10kΩ thermistor, on 100μA setting.
- Accuracy depends on the sensor model selected, the calibration standard, and the user-defined configuration of the instrument.
- Over any one-hour period, half-scale output, controlling an LDM-4412 mount at 25°C, with 10kΩ thermistor, on 100μA setting.
- Over any 24-hour period, half-scale output, controlling an LDM-4412 mount at 25°C, with 10kΩ thermistor, on 100μA setting.
- Measured at 1A output over a bandwidth of 10Hz to 10MHz
- When used with TSC-599 RTD Sensor Converter.
- Nominal temperature coefficients, I_T and V_T, apply over the rated IC temperature sensor range.
- Software limits of display range.
- Using a 100 kΩ thermistor, controlling an LDM-4412 mount over -30°C to 25°C.
- Using a 10kΩ thermistor, controlling an LDM-4412 mount over 0°C-90°C.
- Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used.

POWER METER NOTES

- Data taken every 10 seconds over 10 minutes, ½ scale constant current input, all ranges, 25°C.
- <65% relative humidity, non-condensing for ranges 50, 100, 500nA and 1μA.

GENERAL

Connectors	
Photodiode Monitor and	
Current Source:	9-pin, female D-connector
TE Controller/Sensor:	15-pin, female D-connector
Photodetector Head:	26-pin, female D-connector
External Modulation:	BNC
GPIB Interface:	Meets ANSI/IEEE Std 488.1-1987, 488.2-1987
Size (HxWxD):	4" x 8.5" x 13.4" 102mm x 216mm x 340mm
Power Requirements:	100 - 115/220 - 240V, 50/60Hz, 3.0/1.5A Supply voltage fluctuations are not to exceed 10% of the nominal supply voltage
Humidity ² :	<80% relative humidity, non-condensing
Temperature:	0°C to +40°C operating; -40°C to +70°C storage/transportation
Weight:	13lbs (6kg) (9082), 14lbs (6.5kg) (9084)
Laser Safety Features:	Key switch, interlock and output delay (meets 21 CFR 1040.10)

In keeping with our commitment to continuing improvement, ILX Lightwave reserves the right to change specifications without notice and without liability for such changes.

 **ILX Lightwave**
Laser Diode Instrumentation & Test Systems

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