

# TUNABLE LASER SOURCES

NEW LPB1100 • NEW LPB1300 • NEW LPB1550

**AccuSource**  
Electronics  
Your Source for Quality Pre-Owned  
Electronic Test Equipment



## FEATURES – BENEFITS

Mode-Hop Free for Smooth and Accurate Wavelength Tuning  
High Power Output for Low Noise Measurements and Real-Life Signal Emulation  
Wide Spectral Range to Fully Characterize Designs within the Wavelength Window of Interest  
Amplitude Modulation and Mode-locked Operation for Non-Continuous Wave Test Requirements  
Fine Tuning for Precise Wavelength (Frequency) Resolution

## APPLICATIONS

Characterization of Fiber Optic Components (Splitters, Couplers, Bragg Grating, etc.)  
Characterization of Optical Amplifiers (EDFAs, etc.)  
Testing of Optical Communication Transmission Systems  
Emulation of DWDM Optical Signals

For your local Tektronix representative see the list in the back of this catalog or outside the U.S. call: 1-503-627-1916, inside the U.S. call: 1-800-426-2200.

CE

GPB  
IEEE-488

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C and with Tektronix Standard Codes and Formats.

### LPB1100 AND LPB1550

The Tektronix LPB series tunable laser sources provide engineers with the ability to fully characterize their optical designs over a broad wavelength range at real-life power levels. There are three instruments in the series to provide customers with the performance and flexibility needed for today's optical applications:

The LPB1100 is an economically priced general-purpose bench-top optical source. This unit offers many of the features seen in the high-performance LPB1300 and LPB1550 models in a more compact package. The standard configuration features 10 pm resolution and a 1500 to 1570 nm wavelength range at 0 dBm output power. A variety of options allow users to choose a different wavelength range covering 1530 to 1600 nm, improved wavelength resolution (1 pm), and +6 dBm power output, making it a full-featured instrument for any application.

The LPB1550 is a high-performance tunable laser with features that satisfy the most stringent optical testing requirements:

- ▶ Mode-hop free operation guaranteed over a 70 nm range, which ensures smooth and accurate wavelength sweeps

- ▶ Extremely smooth scans over 100 nm, with an unsurpassed 1 pm resolution, allows for extremely fine analysis over the spectral range
- ▶ A full range of amplitude modulation capabilities and mode-locked operation which satisfies many modulation requirements
- ▶ Wavelength fine tuning down to sub-MHz resolution
- ▶ Coherence control capability

The standard configuration features a 1500 to 1600 nm wavelength range at 0 dBm output power. There are three wavelength range options and two power output options that enable users to designate an instrument that meets the exact requirements needed for their specific applications.

The LPB1300 has the same performance features as the LPB1550 but this laser source is optimized for applications where characterization is needed in the 1300 nm wavelength region. The standard configuration features a 1260 to 1330 nm wavelength window that can be modified to 1360 to 1420 by choosing Option 1W.

All of the tunable lasers have an intuitive user interface and can be completely controlled through either the IEEE Std 488.1-1987 interface

or via an RS-232 interface. Each unit also has an optional LabView driver to aid the development of software for remote control applications. There is also a polarization maintaining output option for applications that are sensitive to polarization variations.

The Tektronix Tunable Laser Diode Sources use an external cavity design that guarantees long-term top performance without any adjustments. The cavity is self aligned, a key feature for long-term stability. In most laser cavities, minute changes in the position of the optical elements, caused by mechanical drifts over time, can rapidly degrade both the power and the spectral purity. In contrast, the patented cavity design uses a dihedral rear reflector made with a 180° folding prism that acts as a “2D corner cube,” which enables the resonator to remain perfectly in tune, irrespective of small misalignments. As a result, these instruments have no fine adjustments that might require periodic “tweaking”, and can maintain top performance over time.

These instruments also incorporate optical heads that are constructed entirely of Invar, a zero-thermal-expansion metal. No temperature control of any kind is required for the instrument, to perform to full specifications. Instant start-up and low power dissipation are also benefits of this design.

Mode hops plague most tunable laser designs and are quite bothersome in many user applications. Their most conspicuous manifestation is in the power-vs-wavelength characteristic at a constant diode current, which exhibits significant stair-like glitches that can create measurement discrepancies. Less obvious, but potentially more troublesome, are the sudden unpredictable, and non-reproducible 40 pm wavelength jumps, which make the sweep discontinuous, preclude accurate calibration, and make testing of very narrow-band components impossible. The scanning mechanism in the Tektronix bench instruments, with only one moving part, is configured such that the cavity length is a fixed multiple of the wavelength at all times. This guarantees a large range of smooth spectral sweep, free of any mode hop.

## CHARACTERISTICS

### TUNING

	LPB1100	LPB1300	LPB1550
<b>Wavelength Range (standard)</b>			
P = 0 dBm	1500 to 1570 nm	1260 to 1330 nm	1500 to 1600 nm
P = 6 dBm (Option P6)	1520 to 1560 nm		1530 to 1590 nm
P = 10 dBm (Option PX)			1535 to 1585 nm
<b>Modified Wavelength Range (Option 1W)</b>			
P = 0 dBm	1530 to 1600 nm	1360 to 1420 nm	1520 to 1620 nm
P = 6 dBm (Option P6)	1550 to 1590 nm		1540 to 1600 nm
<b>Modified Wavelength Range (Option 2W)</b>			
P = 0 dBm			1540 to 1640 nm
P = 6 dBm (Option P6)			1580 to 1620 nm
<b>Modified Wavelength Range (Option 3W)</b>			
P = 0 dBm			1480 to 1580 nm
P = 6 dBm (Option P6)			1510 to 1570 nm
Mode Hop Spacing	>30 nm	>40 nm	>70 nm
Absolute Wavelength Accuracy	±0.2 nm	±0.2 nm	±0.2 nm
Tuning Repeatability (typical)	±0.01 nm	±0.005 nm	±0.005 nm
Wavelength Setting Resolution	0.01 nm	0.001 nm	0.001 nm
Optical Frequency	±2 GHz (Option 1C)	±2 GHz	±2 GHz
Fine Tuning (typical)			
Tuning Speed (typical)	10 s (70 nm)	0.5 s (40 nm)	1 s (100 nm)

### LASER OUTPUT

	LPB1100	LPB1300	LPB1550
Power Stability (P = 0 dBm, 1 hour)	±0.01 dBm	±0.01 dBm	±0.01 dBm
Line Width (typical)			
Coherence Control OFF	150 kHz	150 kHz	150 kHz
Coherence Control ON (typical)	>100 MHz (Option 1C)	>100 MHz	>100 MHz
Side Mode Suppression Ratio	>45 dB	>45 dB	>45 dB
RIN (typical)	< -145 dB/Hz	< -145 dB/Hz	< -145 dB/Hz
Low-frequency Modulation	10 kHz to 8 MHz	DC to 8 MHz	DC to 8 MHz
High-frequency Modulation		30 kHz to 1 GHz	30 kHz to 1 GHz
Mode-lock Frequency (typical)		5 GHz	5 GHz

### INTERFACES

	LPB1100	LPB1300	LPB1550
Optical Connector	FC/APC	FC/APC	FC/APC
Output Fiber*	SMF-28™ (yellow)	SMF-28™ (yellow)	SMF-28™ (yellow)
Return Loss (typical)	-60 dB	-60 dB	-60 dB
Programmability			
IEEE Std 488.1-1987	yes	yes	yes
RS-232C	yes	yes	yes

\* With Option 1M a polarization maintaining fiber (blue) is used.

## GENERAL CHARACTERISTICS

### ENVIRONMENTAL

#### Temperature Range –

Operating: +15 to +30°C (+60 to +85°F).  
 Nonoperating: -20°C to +70°C (0 to +160°F).

#### Altitude –

Operating: Up to 2,000 m (6,500 ft.).  
 Nonoperating: Up to 5,000 m (16,400 ft.).

### EMC COMPLIANCE

EN 55011 Class A.  
 EN 50082-1.

### SAFETY COMPLIANCE

#### Electrical –

EN 61010-1/A2.  
 ANSI/ISA Std S82.01. (UL 3111-1).  
 CAN/CSA-C22.2 No. 1010.1-92.

**Laser –**  
LPB1550 & 1300: EC60825-1. (Class 3A), 21CFR, part 1000 (Class IIIb).  
LPB1100: EC60825-1. 21CFR, part 1000 (Class I).

**POWER**

**Line Voltage –** 100 V AC or 240 V AC  $\pm 10\%$ .  
**Line Frequency –** 50 to 60 Hz  $\pm 5\%$ .

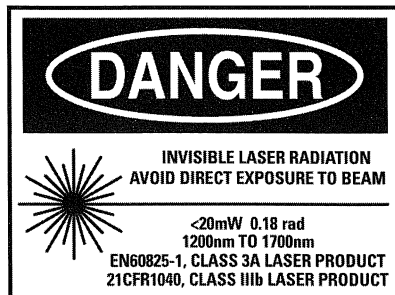
**PHYSICAL CHARACTERISTICS**

**LPB1300 and LPB1550**

Dimensions	mm	in.
Height	133	5.2
Width	448	17.6
Depth	370	14.6
<b>Weight</b>	<b>kg</b>	<b>lb.</b>
Net	12.2	26.9

**WARRANTY**

One year parts and labor.



**ORDERING INFORMATION**

For price information: Outside the U.S. contact your local Tektronix representative, inside the U.S. see the price list in the back of this catalog.

**LPB1100 TUNABLE DIODE LASER SOURCE.**

**Includes:** User Manual, FC/APC to FC/PC Single-mode Fiber Optic Cable, US Power Cord, Calibration Data, Certificate of Traceable Calibration.

**LPB1100 OPTIONS**

- Option 1C –** Coherence control and fine tuning.
- Option 1L –** LabView driver.
- Option 1M –** Polarization maintaining output.
- Option 1S –** 1 pm resolution.
- Option 1W –** 1530 to 1600 modified wavelength range.
- Option P6 –** +6 dBm output power.

**LPB1300 TUNABLE DIODE LASER SOURCE.**

**Includes:** User Manual, FC/APC to FC/PC Single-mode Fiber Optic Cable, US Power Cord, Calibration Data, Certificate of Traceable Calibration.

**LPB1300 OPTIONS**

- Option 1L –** LabView driver.
- Option 1M –** Polarization maintaining output.
- Option 1W –** 1360 to 1420 modified wavelength range.

**LPB1550 TUNABLE DIODE LASER SOURCE.**

**Includes:** User Manual, FC/APC to FC/PC Single-mode Fiber Optic Cable, US Power Cord, Calibration Data, Certificate of Traceable Calibration.

**LPB1550 OPTIONS**

- Option 1L –** LabView driver.
- Option 1M –** Polarization maintaining output.
- Option 1W –** 1520 to 1620 modified wavelength range.
- Option 2W –** 1540 to 1640 modified wavelength range.
- Option 3W –** 1480 to 1580 modified wavelength range.
- Option P6 –** +6 dBm output power.
- Option PX –** +10 dBm output power.

**MEASUREMENT SERVICE OPTIONS**

- Option C3 –** Three years of calibration services.
- Option R3 –** Three years of repair protection.
- Option D3 –** Three year test report (with Opt. C3).

**INTERNATIONAL POWER PLUGS**

- Option A1 –** Universal Euro 220 V, 50 Hz.
  - Option A2 –** United Kingdom 240 V, 50 Hz.
  - Option A3 –** Australian 240 V, 50 Hz.
- See page 619 for description.

**RECOMMENDED ACCESSORIES**

- Laser Output Safety Lock Keys –** Order 105-1125-00.
- Cable, Fiber Opt.; Singlemode Polarization Maintaining (Blue Jacket) –** Order 012-1566-00.
- Cable, Fiber Opt.; Singlemode FC/APC to FC/PC (Yellow Jacket) –** Order 012-1564-00.

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