

# OptoBERT™ OPB-X110

## 11 Gbps Optical & Electrical Bit-Error-Rate Tester (BERT)



### Overview

The OPTELLENT OptoBERT™ OPBX110 is a cost-effective easy-to-use 10G optical and electrical bit-error-ratio tester (BERT) for R&D and manufacturing environments as well as field installations. The OPBX110 incorporates an internal reference clock, a pattern generator, clock recovery circuits, and a BER analyzer, in one compact module that provides both electrical and optical interfaces at data rates up to 11.5 Gb/s. The OPBX110 is offered with an RS-232 or USB interface and a standard 2-year warranty.

An intuitive Graphical User Interface enables easy point-and-click operation. Software drivers are available for incorporating the OptoBERT into test automation suites using programs like LabVIEW, VisualBASIC, VEE.

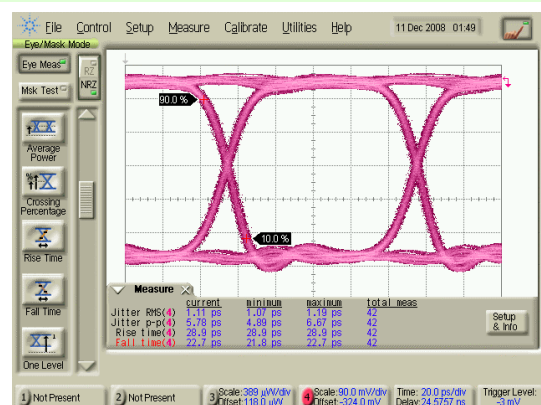
BER test data from the OptoBERT are output directly into a spreadsheet file without any programming. Reported statistics included BER, 1's/0's in error, Errored Seconds, and Error-Free Seconds.

### Applications

- ▶ Testing of optical transceiver modules (SFP+, XFP, X2, Xenpak, XPAK), transponders, linecards, and subsystems
- ▶ Testing of opto-electronic components and devices (TOSA, ROSA, lasers, etc...)
- ▶ Testing of Gb/s ICs, PCBs, electronic modules, subsystems, and systems
- ▶ Serial bus and high-speed backplane design
- ▶ Installation testing and troubleshooting in optical transport networks

### Key Features

- ▶ **Integrated Generator and Analyzer**
- ▶ **Internal Reference Clock**
- ▶ **Internal Clock Recovery**
- ▶ **External Reference Input for Jitter Injection**
- ▶ **Electrical and Optical Interfaces**
- ▶ **Multiple Patterns: PRBS, Stress, and User-defined**
- ▶ **Statistics: BER, Errored Seconds, 1's in Error**
- ▶ **Intuitive GUI and Automated Test Report**
- ▶ **Easy-to-Use, Compact and Cost-Efficient**
- ▶ **2-year Warranty**



## Pattern Generator

Parameter	Min	Typ	Max	Units
<b>Data Output (Electrical)</b>				
Output Type	Differential			
Output Format	NRZ			
Termination	AC-Coupled			
Data Patterns	<ul style="list-style-type: none"> <li>• <b>PRBS:</b> 2<sup>7</sup>-1, 2<sup>23</sup>-1, 2<sup>31</sup>-1; 101010...pattern</li> <li>• <b>Pre-defined:</b> K28.5, CJPAT, CRPAT (Optional)</li> <li>• <b>User-defined:</b> 128 bits to 2000 bits; 128 to 50000 bits (Optional)</li> </ul>			
Data Rates (Using the internal clock source)	<ul style="list-style-type: none"> <li>• <b>Preset:</b> 0C-192/ STM-64 (9.95328 Gbps); Infiniband (10Gbps), 10GbE (10.3125 Gbps), 10GFC (10.519 Gbps); G.709 (10.709 Gbps); 10GbE with FEC (11.096Gbps), 10GFC with FEC (11.317Gbps)</li> <li>• <b>Custom Preset:</b> Special Data rates requested by customers (Optional)</li> <li>• <b>Variable:</b> Any Rate from 9.5 to 11.5Gbps (Optional)</li> </ul>			
Data Rate Range	9.5		11.5	Gbps
Extended Data Rate Range (optional)	4.75		5.75	Gbps
	2.37		2.87	Gbps
Frequency Accuracy			± 50	ppm
Output Amplitude (Differential)	Fixed (Standard)	600	1000	mV <sub>p-p</sub>
	High Output Version, Fixed (Option)		1800	mV <sub>p-p</sub>
	Variable Output Amplitude (Option)	300	1800	mV <sub>p-p</sub>
Data output variable delay (Optional)	-	-	1	UI
Data Rise Time, (20 – 80%) <sup>(1)</sup>		20		ps
Data Fall Time, (20 – 80%) <sup>(1)</sup>		20		ps
Data Output RMS Jitter <sup>(1)</sup>		1.4		ps
Error Injection	Single error; 10 <sup>-7</sup> , 10 <sup>-8</sup> , 10 <sup>-9</sup>			
Connector	50Ω Nominal, SMA Female			
<b>Data Output (Optical)</b>				
Interface	MSA-Compliant XFP Transceiver housing			
Wavelength	850nm, 1310nm, 1550nm, DWDM			
Optical Connector	LC			
<b>Clock Output</b>				
Output Type	Differential			
Termination	AC- Coupled			
Output Amplitude (peak-to-peak)			300	mV <sub>p-p</sub>
Connector	50Ω Nominal, SMA Female			
<b>Trigger Output</b>				
Output Amplitude	300			mV <sub>p-p</sub>
Output Type	Single-ended, AC-coupled			
Connector	50Ω SMA Female			

(1) Measurements based on PRBS<sup>23</sup>-1 data at 9.95328 Gbps (OC-192)

## Error Analyzer

Parameter	Min	Typ.	Max	Units
<b>Data Input (Electrical)</b>				
Input Type	Differential			
Termination	AC-Coupled			
Data Patterns	<ul style="list-style-type: none"> <li>• <b>PRBS:</b> 2<sup>7</sup>-1, 2<sup>23</sup>-1, 2<sup>31</sup>-1; 101010...pattern</li> <li>• <b>Pre-defined:</b> K28.5, CJPAT, CRPAT (Optional)</li> <li>• <b>User-defined:</b> 128 bits to 2000 bits (Optional); 128 bits to 50000 bits (Optional)</li> </ul>			
Data Rates	Same as pattern generator			
Data Input <sup>(1)</sup> Differential	100		1000	mV p-p
Clocking Mode	Built-in clock recovery			
Pattern Synchronization	Automatic			
Connector	50Ω SMA Female			
<b>Data Input (Optical)</b>				
Interface	XFP housing provided as a standard feature MSA-Compliant XFP Transceiver (Optional)			
Detector Type	p-i-n or APD (Optional)			
Optical Input <sup>(1)</sup> p-i-n			0.5	dBm
APD			-7	dBm
Wavelength	850nm, 1310nm, 1550nm, CWDM, DWDM			
Fiber Type	Multimode and Single Mode Fiber			
Optical Connector	LC			

(1) Measurements based on PRBS<sup>23</sup>-1 data at 9.95328 Gbps (OC-192)

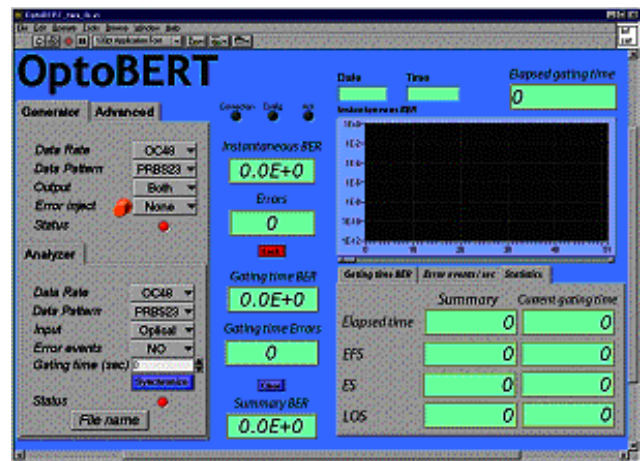
## System & General Specifications

PARAMETER	MIN	MAX	UNIT
Chassis Electrical Voltage	100	240	VAC
Current Drain at Normal Voltage		2.5	A
Operating Temperature Range	5	45	°C
Storage Temperature Range	-40	70	°C
Dimensions (L x W x H)	300 x 240 x 64		mm <sup>3</sup>
	12 x 9.5 x 2.5		inch <sup>3</sup>
Optical Interface	Standard XFP housing		
PC Interface	RS232		
Standard Warranty	2 years		

## Software

The OptoBERT™ OPBX110 software runs on Windows 98/2000/NT/XP and VISTA over USB or RS-232 serial interface via an RJ-45 Connector provided on the front panel.

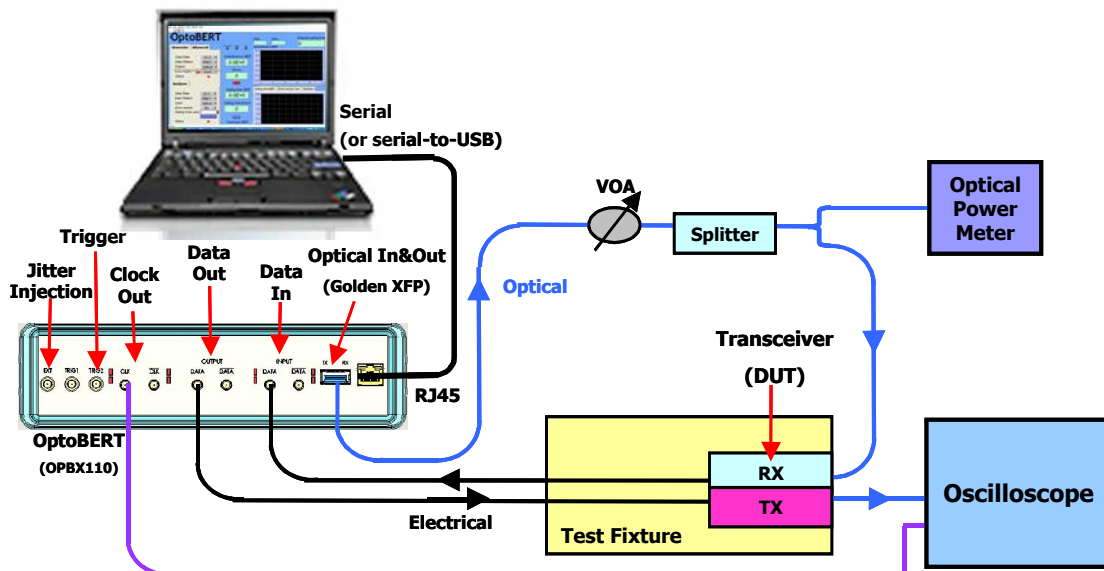
Software drivers are available for incorporating the OptoBERT into test automation suites using programs like C++, LabVIEW, VisualBASIC, and HP VEE.



## Manufacturing Test of Transceiver Modules

Example: Rx: Sensitivity measurement

Tx: Output mask test with oscilloscope



## Ordering Information

OPBX110-X-X- X-X

- D: Variable data output delay
- X: other Custom Options
- 0: No Optical Transceiver;
- 1: Optical Transceiver (XFP) 850nm
- 2: Optical Transceiver (XFP) 1310nm
- 3: Optical Transceiver (XFP) 1550nm
- 4: Optical Transceiver (XFP) DWDM with High-sensitivity APD Receiver
- A: Standard Electrical Output Amplitude
- B: High Electrical Output Amplitude, Fixed
- V: Variable Electrical Output Amplitude
- P: Preset Standard Data Rates
- C: Custom Data Rates
- V: Variable Data Rate
- E: Extended Data Rates (5G, 2.5G ranges)

### Accessories Included

- User Software
- User Manual
- Power cord
- PC Interface cable

**Example: OPBX110-P-A-2:** 10G OptoBERT, Preset data rates, 500mV Output Amplitude, 1310nm XFP

Specifications are subject to change without notice.

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