400G Bit Error Ratio Tester

PBT8856 Datasheet V1.8

High performance 8×56 Gbps bit error ratio tester;

Applicable to the bit error analysis and Eye Diagram quality tests of 100G/200G/400G optical transceivers;

Support FEC simulation analyzer;

Content

1 Product Description

Semight PBT8856 is a high-performance Bit Error Ratio tester (BERT) which can be used for physical layer characterization and consistency test. It covers 100/200/400GbE and CEI-56G standards by virtue of support for 4-level pulse amplitude modulation (PAM4) and non-return-to-zero (NRZ) signals, as well as up to 30 Gbaud symbol rate (equivalent to 60 Gbps).

Benefiting from its excellent signal quality (fast rise/fall time, low jitter), rich optional features (FEC analyzer, extendable data rates, etc), it ensures strong performance and flexibility for the pre-research, design, and production testing of high-speed serial circuit products.

The programmable pattern generator (PPG) can provide 3-Tap/7-Tap FIR tuner to compensate the loss of the transmission signal. The bit error detector (ED) is equipped with built-in equalizer to ensure the signal integrity of the link. Moreover, the built-in clock recovery circuit ensures the stability and the accuracy of the bit error testing in the harsh and complex test environment.

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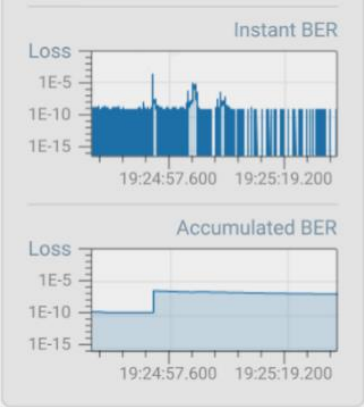
2 Key Features and Advantages

Key Features

- Wide Data Rate Range: 20.625~30 Gbaud;
- RS-FEC simulation analyzer with Pre/Post BER statistic and Margin alarm;
- Enhanced quality analysis on RX signal: Histogram & SNR measurement;
- Independent Control: Each channel can be independently configured with NRZ/PAM4, amplitude and equalization;
- Flexible Switching: Input and output polarities can be switched flexibly;
- Supports high-swing output, along with 3/7-tap emphasis tuner, and Inner-Eye tuner with independent control on each PAM4 level;
- Rich Test Patterns: PRBS7~31Q; SSPRQ /JP03A /JP03B /CJT /LIN /Square Wave/Custom Defined Patterns, etc;
- Supports software-controlled MON Clock output port switching;

Comprehensive Capabilities

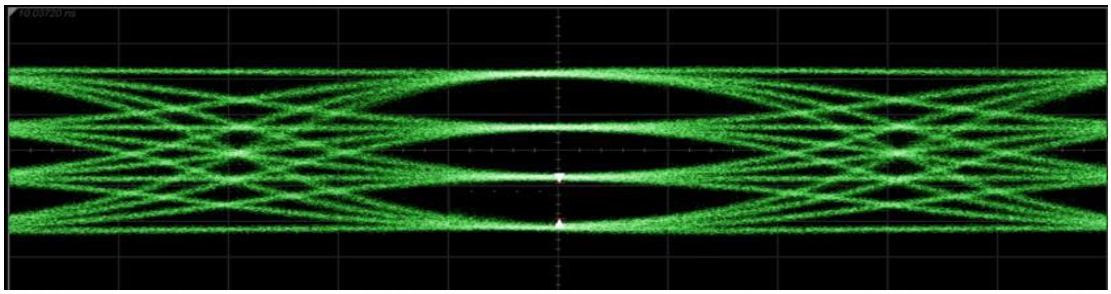
- Support FEC error correction analyzer;
- Support Histogram & SNR measurement;
- Support ultra-fast and high-precision BER sampling (<10ms);



Ultra-fast BER sampling mode (<10ms)

Excellent Signal Quality

- Rapid rise and fall time; low intrinsic jitter;
- Good RX sensitivity as low as <100mV;



SSPRQ Pattern @26.5625 Gbaud, differential eye diagram

Fully Match ATE Application Scenarios

- With powerful and flexible database management capabilities, it aids in the in-depth analysis of data for research and development purposes.
- Can be remotely controlled via either Lan or USB port by invoking external APIs (LabVIEW, C#).

3 Technical Specification

TX specification

Type	Item	Description
Pattern Generator Specification	Output	Differential PAM4/NRZ
	Terminal	AC Coupling, 2.92 mm female connector
	output Impedance	100 Ω ± 10%
	Pattern	PRBS 7/9/11/13/15/23/31, PRBS7~31Q; SSPRQ, JP03A, JP03B, LIN, Square Wave, Custom Defined Pattern, etc.;
	Symbol Data Rate [1] (Gbaud)	20.625/24.33/25/25.78125/26.5625/27.89/27.95/28.05/28.125/28.2/28.9/30;
	Frequence Accuracy	*±50 ppm (typical)*
	Output Amplitude [2] (Differential)	800 mVp-p / 1200 mVp-p [3]
	Rise Time (20–80%) [4]	<15 ps
	Fall Time (20–80%) [4]	<15 ps
	Random Jitter [5]	*<350 fs (typical)*
Trigger and Clock Specification	Clock Output Amplitude	>300 mVp-p
	Terminal (Single-end)	AC Coupled, 2.92 mm female connector
	Div Ratio (Adjustable)	4/8/16/32/64/128

Type	Item	Description
	Trigger Output	Built-in RF Switch to switch clock output

[1] Option EDR can be added to support more data rates.

[2] Net measurement value at the transmitter's end, default pre-emphasis/de-emphasis parameters.

[3] Measured on high power output mode which needs option HPO activated.

[4] Tested with 53.125 Gbps NRZ signal.

[5] Tested after Jitter separation.

RX specification

Type	Item	Description
Error Detector Specification	Input	Differential PAM4/NRZ
	Terminal	AC Coupled，2.92 mm female connector
	Input Impedance	100 Ω ±10%
	Input Range (Differential) [1]	100 ~ 1200 mVp-p
	Sensitivity (Differential) [2]	100 mVp-p
	Pattern	PRBS 7/9/11/13/15/16/23/31，PRBS7~31Q;
	Symbol Rate (Gbaud) [3]	20.625/24.33/25/25.78125/26.5625/27.89/27.95/28.05/28.125/28.2/28.9/30;
	Clock Mode	Built-in Clock Recovery
	Sync	Auto Sync (Level/Phase)

[1] High voltage signal may damage the receiver.

[2] BER might reach to E-3 level or even LOS while input signal <100 mVp-p.

[3] Option EDR can be added to support more data rates.

Environment Specification

Item	Description
Environment	Indoor
Operating	Temperature：0℃ to +55℃，Humidity：30% to 80% @non-condensing
Storage	Temperature：-30℃ to 60℃，Humidity：10% to 90%@non-condensing
Power Supply	Voltage Range：100-240 VAC，Frequency Range：50/60 Hz, Maximum Power：250W
Warm-up	30-minutes of warm-up and automatic calibration, with the ambient temperature variation remaining within ±3℃
Dimensions (mm)	412x441x112
Weight	6.5 Kg

* Dimensions and weight may vary depending on the configuration of different options.

4 Ordering Information

Option Type	Option ID	Remarks
FEC	FEC	Integrated FEC analyzer, offering a graphical analysis interface as well as data management capabilities
High Amplitude	HPO	High power mode which outputs up to 1,200 mVp-p of TX signal
Ext Data Rate	EDR	Extended protocol rates, refer to the specifications for details
Service (Choose one)	R3C	Extended warranty and service plan - 36 months
	R5C	Extended warranty and service plan - 60 months

5 Warranty Terms

Number	Item	Description	Period
1	Mainframe Warranty Period	Free of Charge during the warranty period (excluding static electricity or human damage)	12 months
2	Calibration Period	Return to the factory for calibration or bring the calibration system for on-site calibration	24 months

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