

PBT8856

8×56G Bit Error Ratio Tester

Version 1.3





Product Description

Semight Instruments PBT8856 is a high-performance bit error ratio tester (BERT) applied to high-speed serial signal error rate test, which can be used for physical layer characterization and consistency test. It covers all emerging 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 30GBaud symbol rate (equivalent to 60Gbit/s). It provides strong performance and flexibility guarantee for pre-research, design and production test of high-speed serial circuit product based on its excellent signal quality (fast rise/fall time, low jitter), rich functions (supporting FEC simulation analysis), flexible feature options and ultra-high overall integration. Moreover, the programmable pattern generator (PPG) can provide 3-Tap/7-Tap pre-emphasis tuner to compensate the loss of the signal in the transmission process and improve the signal quality. The bit error detector (ED) is equipped with built-in equalizer to ensure the signal integrity of the link. Moreover, the built-in fast locked clock recovery module ensures the stability of the link during the bit error test and the accuracy of the bit error test in the harsh and complex test environment.

Key Features

- High performance 8 × 56Gbps bit error ratio tester, supporting up to 8 groups of service channels
 - Fast rising edge, low jitter;
- Support FEC simulation test analysis;
- Built-in RF switch to achieve host remote-switching trigger clock port;
- Support high power mode of PPG port output;
- Each channel can be independently configured as NRZ or PAM4;
- Support PRBS 7/9/11/13/15/16/23/31, PRBS7~31Q;
- Support rich test patterns, such as SSPRQ/JP03A/JP03B/LIN/square wave/CJT/user-defined patterns, etc;
- Support CTLE equalization on receiving end;
- 3-Tap and 7-Tap emphasis tuner with pre/main/post tap adjust.
- Support random/burst bit error injection and input/output polarity switching;
- Clock out supports frequency division (4-128 frequency division);
- Powerful and flexible database management function, giving assistance to research and development of in-depth analysis of data;
- The product can be flexibly programmed by calling external API (LabView, C #) through Ethernet port or USB control interface;
- Supported test patterns:
 - PRBS 7/9/11/13/15/16/23/31;
 - PRBS 7~31Q;
 - SSPRQ test patter;
 - Square Wave, JP03A, JP03B, CJT, LIN;
 - User-defined test pattern (64 bits length);



Software function

Semight Instruments PBT8856 has very intuitive and simple interface GUI in which the system can be easily configured and all channel results can be displayed. It provides FEC simulator with pre/post BER analysis and the built-in SNR indicator.

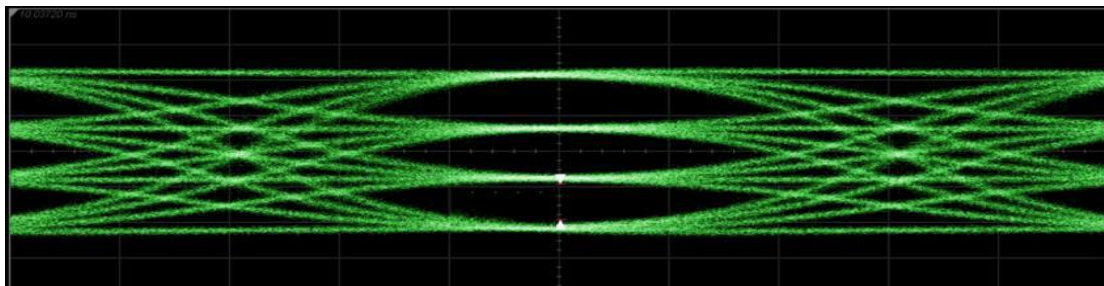
The screenshot displays the main configuration and monitoring interface of the PBT8856. Key features include:

- Channel Configuration:** Four channels (CH1-CH4) are shown, each with settings for PPG Pattern (PRBS16Q), ED Gating Times (10000000), and PPG Amplitude (90 mVpp).
- Modular Type:** A dropdown menu is set to 'QSFP_DD', with options for QSFP28 and SFP28.
- Monitoring:** Each channel has a 'Process bar of Ber test' and an 'Error Ratio MSB' display. CH1 shows an error ratio of 0.00E+000, CH2 shows 0.00E+000, CH3 shows 0.00E+000, and CH4 shows 28.974E.
- SNR Bar:** A signal-to-noise ratio indicator is present for CH3.
- Alarms:** 'Alarm: Los of Signal' is shown for CH2, and 'Warning: Un-Locked Signal' is shown for CH4.
- Buttons:** 'High Power PG', 'FEC simulator', and 'Polarity Indicator' are visible.

The screenshot shows the 'FEC Plot' window, which includes a graph and a data table:

- Graph:** The y-axis is 'CodeWord Count' (log scale from 1.0e+00 to 1.0e+04) and the x-axis is 'Symbol Error' (0 to 30). The plot shows a decreasing trend in codeword count as symbol errors increase.
- Table:** A table below the graph shows error statistics for 16 symbols. The first row (Symbol 1) shows 0 errors. The second row (Symbol 2) shows 5748 errors.
- Controls:** The interface includes 'LOG On/Off', 'History Data', 'Record Timer', 'Margin Alarm' (Threshold: 15), and 'Symbol Err Statistic'.

Technical Specification



*SSPRQ Pattern@26.5625GBaud, differential eye diagram @Keysight DCA 1092C



Pattern Generator Indicators	Output type	PAM4/NRZ
	Termination	Differential 100Ω, Single-ended 50Ω; AC-coupled
	Data patterns	PRBS7/9/11/13/15/16/23/31, PRBS7~31Q
		SSPRQ,JP03A/03B, LIN, CJT, Square Wave User Defined Pattern (64bits length)
	Data symbol rate (GBaud)	20.625/24.33/25/25.78125/26.5625/27.89/27.95/28.05/28.125/28.2/28.9/30;
	Frequency accuracy (Typ)	±50ppm
	Maximum output amplitude (differential)	>800mVpp ①
		>1200mVpp ②
	Rise time (20–80%) ③	<15ps
	Fall time (20–80%) ③	<15ps
	Random jitter ④	<350fs
Connector	2.92mm Female, 50Ω	

① Net value of measurement on TX output, with default pre-emphasis/de-emphasis

② 30cm RF test cable, output measured value in "high power output" mode

③ Measured with 26.5625 Gbps NRZ signal

④ Measured after jitter separation

Trigger Output Indicators	Output amplitude	>300mVp-p
	Output type	AC-coupled, Single ended
	Frequency division ratio (settable)	4/8/16/32/64/128
	Connector	2.92mm female; 50Ω
	Trigger output	Support RF Switch for A/B 4-Channels
Error Detector Indicators	Input type	Differential PAM4/NRZ
	Termination type	Differential 100Ω, Single ended 50Ω; AC-coupled
	Receiving amplitude (differential) ①	100mVpp~1200mVpp
	Receiving sensitivity (differential)②	100mVpp
	Data patterns PRBS	PRBS 7/9/11/13/15/16/23/31, PRBS7~31Q;
	Data symbol rate (GBaud)	20.625/24.33/25/25.78125/26.5625/27.89/27.95/28.05/28.125/28.2/28.9/30;
	SNR indicator	Support
	Clock mode	Built-in clock recovery
Synchronization type	Auto Synchronization (level/phase)	
Connector	2.92mm female, 50Ω	

① Net value measurement on RX port

② BER might reach to E-3 level or even LOS while input signal <100 mVpp



General Indicators	Environment	Indoor
	Work	0 °C ~ +55 °C, 30 % ~ 80 % Relative Humidity with no condensation
	Storage	-30 °C~70 °C , 10%~90% Relative Humidity with no condensation
	Altitude	Operation : 0m to 2000m, Storage: 0m to 4600m
	Power	LINE: 100-240VAC, 50/60Hz, 250W
	Warm-up time	10 minutes
	Dimensions (mm)	412*441*112(with foot pad/handle)
	Weight	Net weight 6.5kg

Ordering Information

PBT8856	8×56G PAM4/NRZ Bit Error Ratio Tester
Standard Accessories	USB control cable, Power cord, Software Package in U-Disk
Options	
-RFSW	Built-in RF switch which allows host remote-switching trigger clock port
-HPO	Built-in high power output mode>1,200mVpp pattern generator output
-FEC	FEC simulation analysis (KP4/KR4 protocol)
-EDR	Extendable Data Rate for more applications.



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About Semight Instruments

Semight Instruments is a leading provider of global high-end test instrument and equipment. The company provides products and service to the development, fabrication and service of high-speed communication, optical chip and semiconductor testing fields. Semight's flagship testing instrument includes high-speed bit error ratio tester, network analyzer, broadband sampling oscilloscope, high-precision wavelength meter, optical spectrum analyzer, and digital Source Measure Unit. In addition, the company delivers optoelectronic hybrid ATE, laser chip burn-in system, laser chip tester, silicon photonics wafer tester, power chip tester, wafer level burn-in system, semiconductor parametric test system to domestic and international customers.

Semight Instruments adheres to the customer-centric, employee-based, innovation-driven, and subtle and broad corporate culture, and continues to provide customer trusted, cost-effective and high-performance products and service.

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*Product specifications and descriptions in this article can be changed without notice