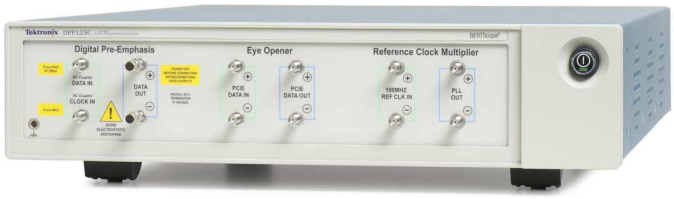
Digital Pre-emphasis Processor

BERTScope® DPP Series Datasheet



BERTScope DPP125C Option ECM

Features & benefits

- 1 to 12.5 Gb/s for Support of Hardware-based Equalization of 2nd- and 3rd-generation Serial Standards
- 3- or 4-tap for Full Support of Compliance Testing for 802.3ap, Serial Attached SCSI, 10GBASE-KR Backplanes, DisplayPort™, USB 3.0 PCI Express® Gen3
- Pre-cursor or Post-cursor Adjustment for Optimizing Compensation for ISI and Loss
- Exceptionally Easy Setup with Concurrent Multiple Domain Views Ideal for Operation as a Stand-alone Instrument Controlled by a Remote PC, or with a BERTScope for Complete Software Integration
- Precise Control to Correct for Effects such as Backplane ISI or Optical Effects with Adjustability through Tap Weights or Step Response provides the Flexibility Needed for Complete Design Characterization
- Optional integrated reference clock multiplication to PCIe compliant 2.5 GHz, 5 GHz, and 8 GHz
- Optional integrated eye opener functionality for testing DUTs with long channels
- Optional integrated clock doubler that enables full rate stress for 12 Gb/s SAS
- BERTScope Clock/Data delay compensated internally to allow length-matched matched cables
- Enclosure with the BERTScope footprint to allow equipment stacking
- New microcontroller to provide more processing power
- RS-232 interface enhancement to speed up PCIe receiver equalization link training
- Software to accommodate channel de-embedding and ISI fine adjustments

Applications

- Design Characterization for High-speed, Sophisticated Designs
- Certification Testing of Serial Data Streams for Industry Standards
- Design/Verification of High-speed I/O Components and Systems

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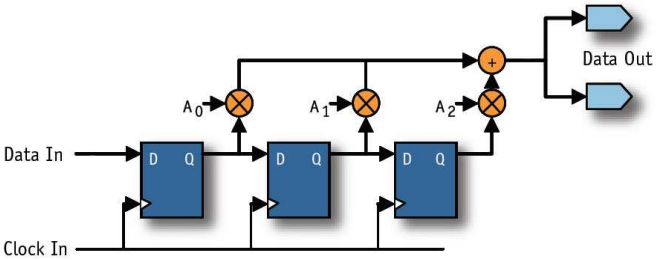


Example functional block diagram (3-Tap shown).

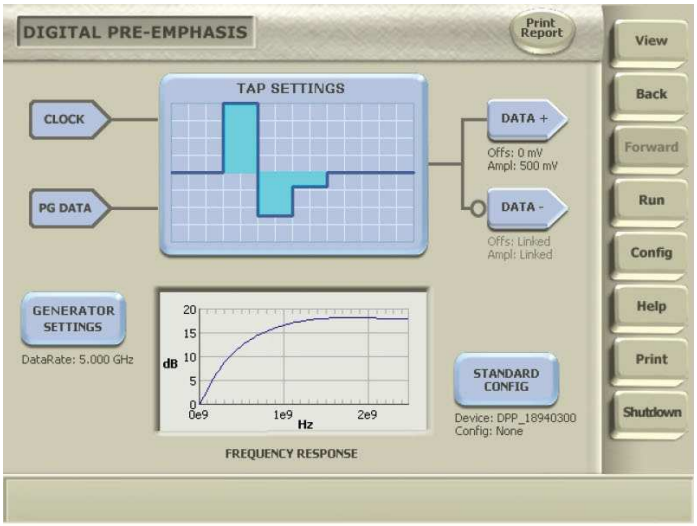
The DPP125C is a nonlinear signal conditioner capable of adding controllable amounts of pre-emphasis to a signal. It takes in single-ended inputs of data and clock.

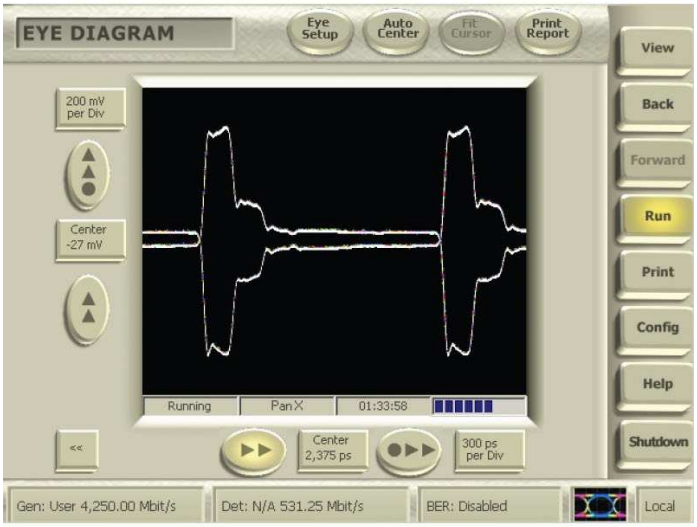
Intuitive control with many views

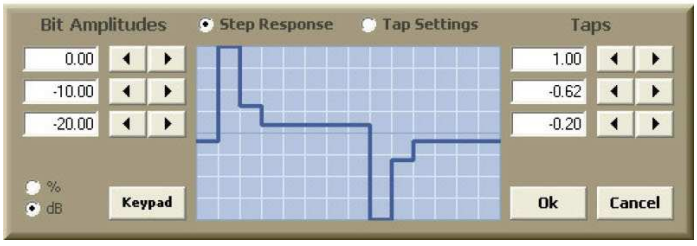
The wave shape can be adjusted in the user interface by either directly entering tap weights, or through an amplitude-weighted time domain bitmap showing the step response. In addition to these two views, a frequency-domain Bode plot is calculated and displayed to show the effect being implemented. This is particularly helpful when counteracting the effects of circuit board ISI with a measured frequency response.

Adjustable output

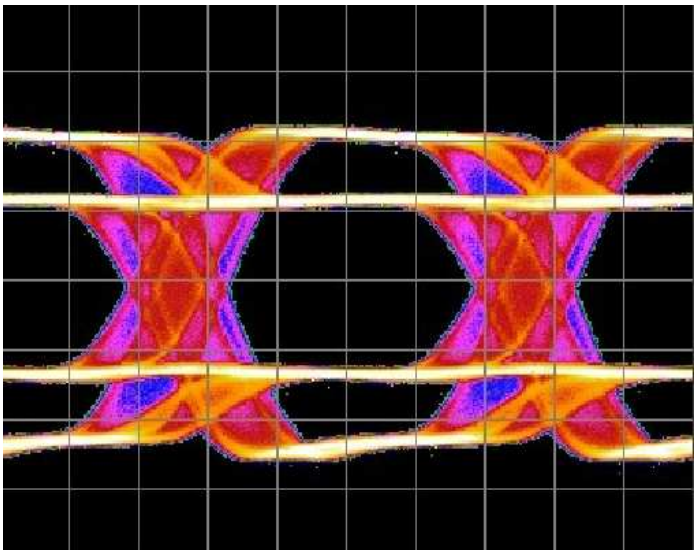
Output amplitude is user adjustable in amplitude and offset, and is offered differentially.



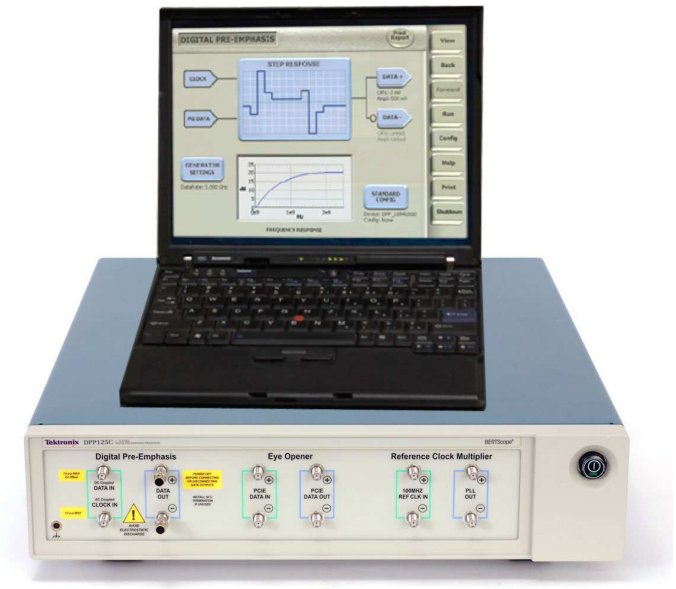




Intuitive user interface gives multiple views of the output waveform.



De-emphasized signal with sinusoidal jitter from a BERTScope.



The BERTScope DPP Series can operate as a stand-alone instruments controlled by a PC, or with a BERTScope for complete software integration. It can be fully automated, and with its compact size, it will easily fit into a manufacturing environment.

Characteristics

Specifications

Characteristic	Specification	Notes
Data Rate Range	1-12.5 Gb/s	
Inputs		
Clock	Single Ended	SMA
Sensitivity	250 mV (typ.)	
Termination	50 Ω, AC coupled	
Maximum jitter transfer	1:1	Input Clock to Output Data
Data	Single Ended	SMA
Sensitivity	250 mV (typ.)	PN31 pattern
Termination	50 Ω, AC coupled	
Outputs		
Data	Differential	SMA
Max. Amplitude	1.8 V (typ.)	Differential, Adjustable
Diff. skew	<2 ps (typ.)	
Max. DC offset	±500 mV (typ.)	
Coupling	AC	AC-coupled data with DC-coupled output offset
Function	3- or 4-tap, clocked FIR	
Random jitter	<350 fs_{RMS} (typ.)	Additive, 1010 pattern
Tap range	–100 to +100 (including 0) in 1% steps	
Tap resolution	1% or 0.1 dB, any tap	
Transition time	<40 ps	All taps, 1010 pattern
General		
Control Interface	USB 2.0	
Dimensions (W × H × D)	39.4 × 9.5 × 33.6 cm (15.5 × 3.75 × 13.25 in.)	
Weight	9 lb. (4 kg)	
Power Consumption	<150 W	
Voltage	100-240 V AC, 45-63 Hz	Auto-range, IEC power plug

Emerging standards requirements

Standard	Required number of taps	Notes
802.3ap, 10GBASE-KR 10GbE Backplane	3	
PCI Express 2.5 GT/s Receiver	2	0.7 dB for receiver testing
PCI Express 5 GT/s Transmitter	2	Selectable 3.5 dB and 6.0 dB levels on transmitters
PCI Express 8 GT/s	3	All preshoot and deemphasis settings in TxEQ coefficient matrix
SAS 6 Gb/s	2	2 dB for reference transmitters 2-4 dB for device transmitters
DisplayPort Transmitter 1.62 Gb/s and 2.7 Gb/s	2	Selectable 3.5 dB, 6 dB, or 9.5 dB on transmitters
USB 3.0 Transmitter 5 GT/s	2	3.5 dB nominal ±0.5 dB on transmitters

BERTScope DPP125C rear view

Ordering information

DPP125C
1-12.5 Gb/s 3-Tap Digital Pre-emphasis Processor

Opt. 4T
Optional 4-Tap Digital Pre-emphasis Processor

Opt. ECM
Optional integrated PCIe compliant clock multiplication for 2.5/5/8 GHz, eye opener, and clock doubler for 12 Gb/s SAS

The BERTScope DPP Series can be operated stand-alone with a PC (not included) or with a suitable BERTScope model.

All Models Include: Power cable (US), USB cable, 2 SMA input cables, and CD-ROM with software.

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900

Austria 00800 2255 4835*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777

Belgium 00800 2255 4835*

Brazil +55 (11) 3759 7627

Canada 1 800 833 9200

Central East Europe and the Baltics +41 52 675 3777

Central Europe & Greece +41 52 675 3777

Denmark +45 80 88 1401

Finland +41 52 675 3777

France 00800 2255 4835*

Germany 00800 2255 4835*

Hong Kong 400 820 5835

India 000 800 650 1835

Italy 00800 2255 4835*

Japan 81 (3) 6714 3010

Luxembourg +41 52 675 3777

Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90

Middle East, Asia, and North Africa +41 52 675 3777

The Netherlands 00800 2255 4835*

Norway 800 16098

People's Republic of China 400 820 5835

Poland +41 52 675 3777

Portugal 80 08 12370

Republic of Korea 001 800 8255 2835

Russia & CIS +7 (495) 7484900

South Africa +41 52 675 3777

Spain 00800 2255 4835*

Sweden 00800 2255 4835*

Switzerland 00800 2255 4835*

Taiwan 886 (2) 2722 9622

United Kingdom & Ireland 00800 2255 4835*

USA 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

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