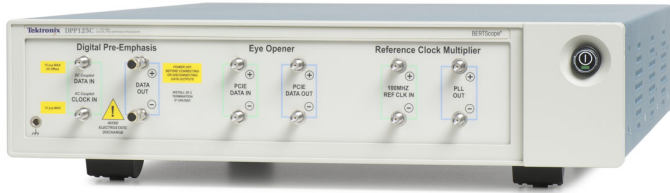


# Digital Pre-emphasis Processor

## BERTScope® DPP Series Datasheet



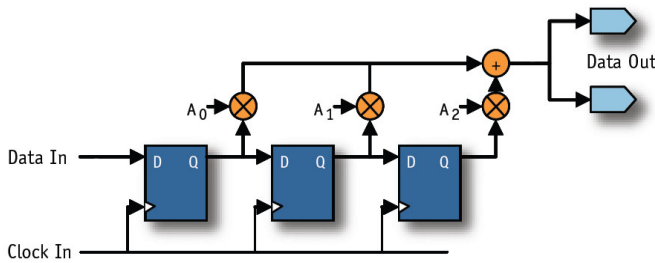
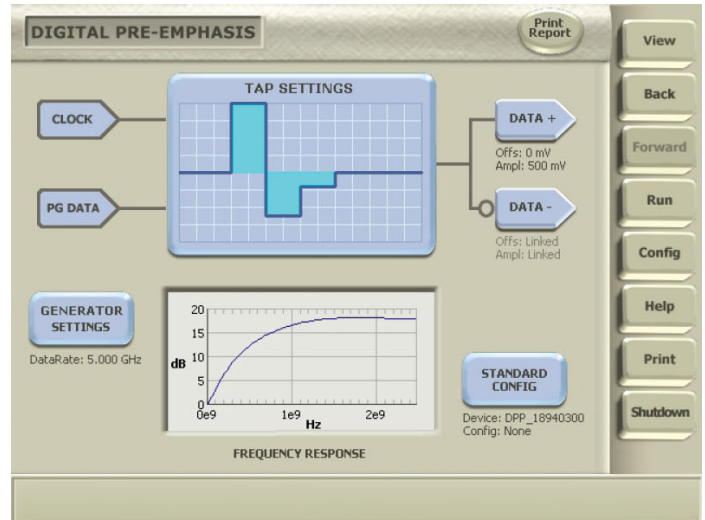
BERTScope DPP125C Option ECM

### 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



Example functional block diagram (3-Tap shown).

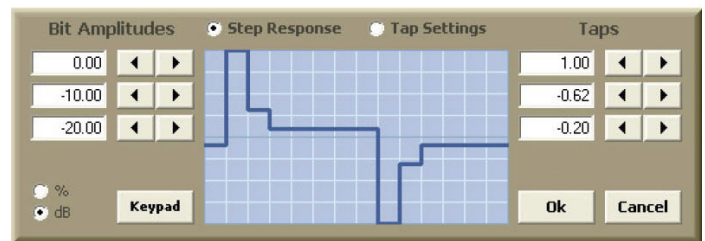
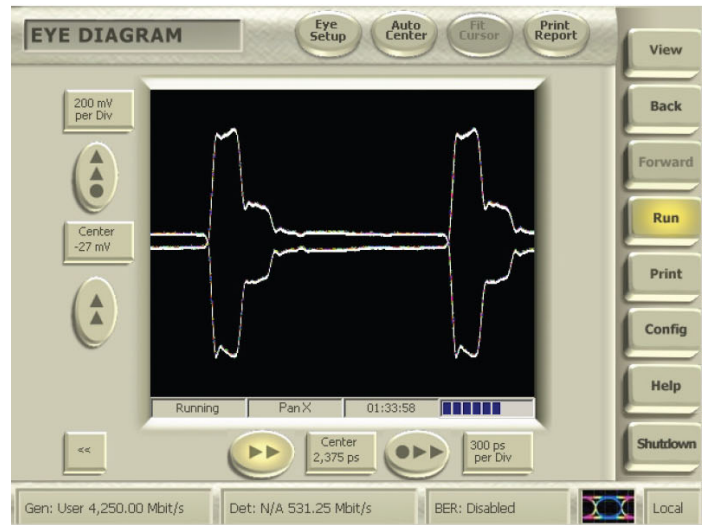
The DPP125C is a nonlinear signal conditioner capable of adding controllable amounts of pre-emphasis to a signal. It takes in single-ended inputs of data and clock.

### Intuitive control with many views

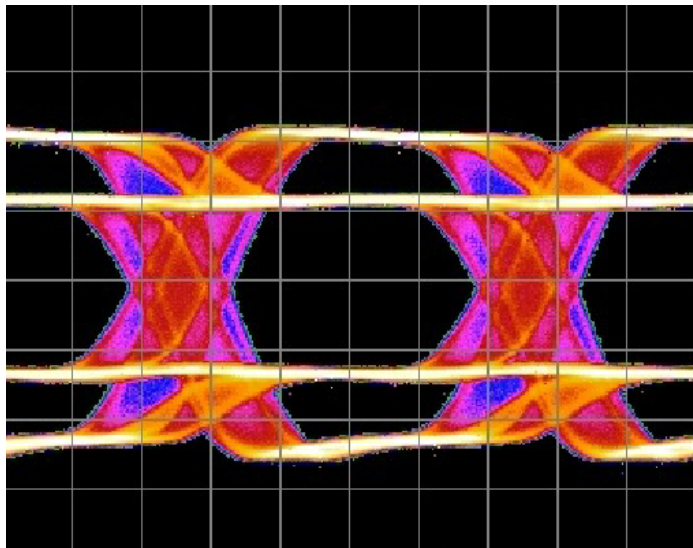
The wave shape can be adjusted in the user interface by either directly entering tap weights, or through an amplitude-weighted time domain bitmap showing the step response. In addition to these two views, a frequency-domain Bode plot is calculated and displayed to show the effect being implemented. This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

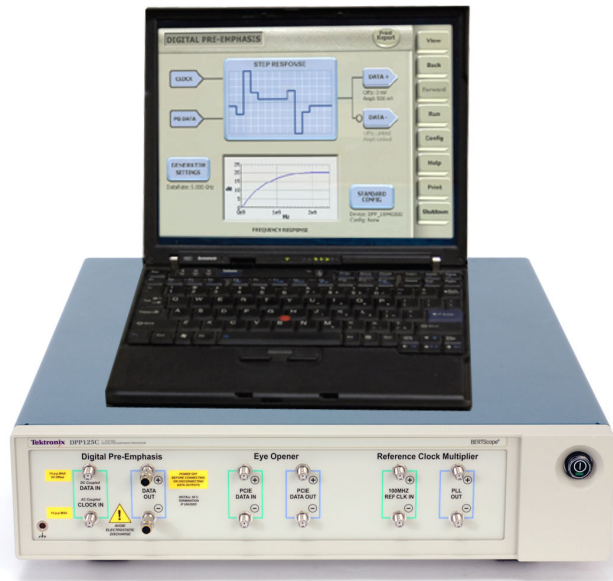


De-emphasized signal with sinusoidal jitter from a BERTScope.

## Characteristics

### Specifications

Characteristic	Specification	Notes
Data Rate Range	1-12.5 Gb/s	
<b>Inputs</b>		
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	
<b>Outputs</b>		
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 f <sub>RMS</sub> (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
<b>General</b>		
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



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.

### 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.

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**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tektronix.com](http://www.tektronix.com)



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