

# Digital Pre-emphasis Processor

## BERTScope® DPP Series Datasheet



BERTScope DPP125C Option ECM

### Notice to EU customers

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### 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 3.0/3.1 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 enables full rate stress for 12 Gb/s SAS
- BERTScope Clock/Data delay compensated internally to allow length-matched cables
- Enclosure with the BERTScope footprint to allow equipment stacking

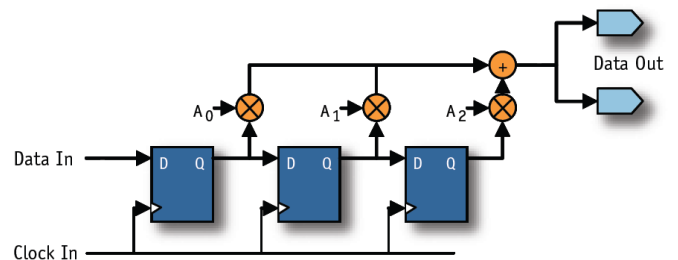
- New microcontroller to provide more processing power
- RS-232 interface enhancement to speed up PCIe receiver equalization link training

### 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

### Overview

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.



Example functional block diagram (3-Tap shown).

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.



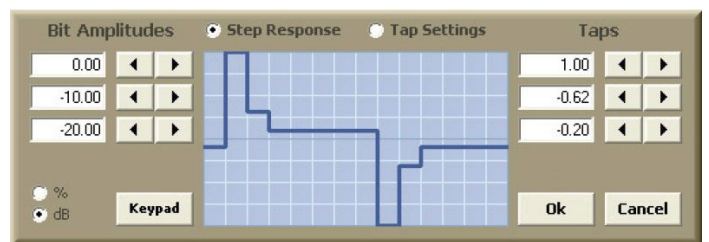
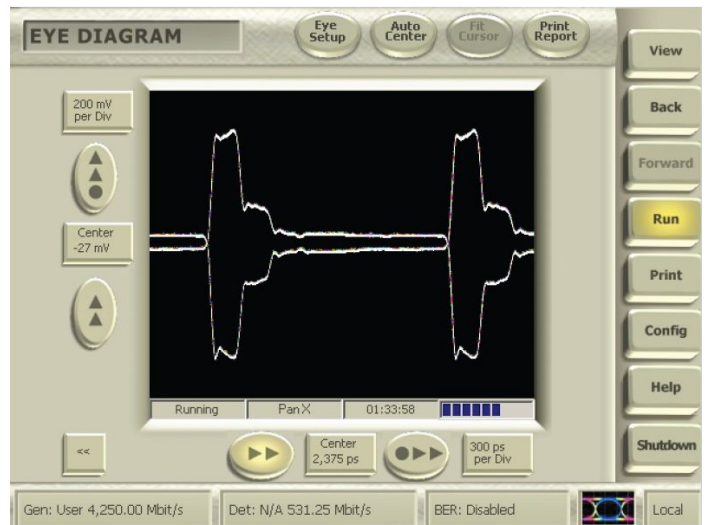
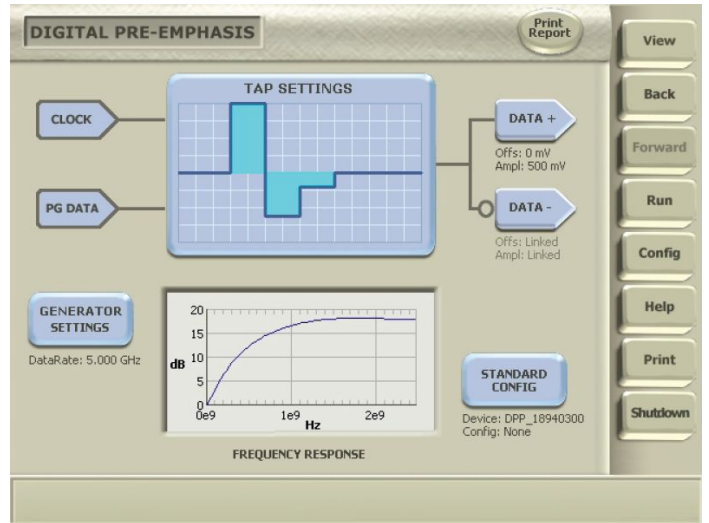
BERTScope DPP125C connected to a laptop



BERTScope DPP125C rear view

### Intuitive control with many views

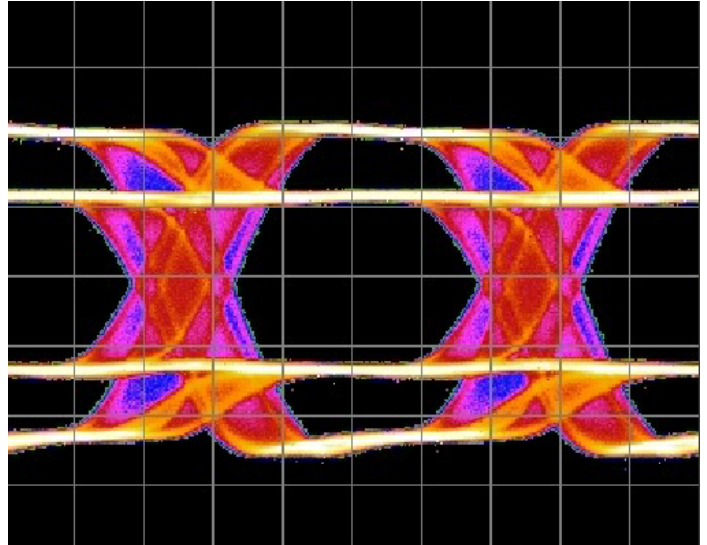
The wave shape can be adjusted in the user interface by either directly entering tap weights, or through an amplitude-weighted time domain bitmap showing the step response. In addition to these two views, a frequency-domain Bode plot is calculated and displayed to show the effect being implemented. This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



Intuitive user interface gives multiple views of the output waveform

## Adjustable output

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



De-emphasized signal with sinusoidal jitter from a BERTScope

## Specifications

All specifications are guaranteed unless noted otherwise. All specifications apply to all models unless noted otherwise.

<b>Data rate range</b>	1-12.5 Gb/s
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### Inputs

<b>Clock</b>	Single-ended, SMA connector
<b>Sensitivity (Typical)</b>	250 mV
<b>Termination</b>	50 $\Omega$ , AC coupled
<b>Maximum jitter transfer</b>	1:1, Input clock to Output data

<b>Data</b>	Single-ended, SMA connector
<b>Sensitivity (Typical)</b>	250 mV, PN31 pattern
<b>Termination</b>	50 $\Omega$ , AC coupled

### Outputs

<b>Data</b>	Differential, SMA connector
<b>Maximum amplitude (Typical)</b>	1.8 V, differential, adjustable
<b>Differential skew (Typical)</b>	<2 ps
<b>Maximum DC offset (Typical)</b>	$\pm$ 500 mV
<b>Coupling</b>	AC, AC-coupled data with DC-coupled output offset
<b>Function</b>	3- or 4-tap, clocked FIR
<b>Random jitter (Typical)</b>	<350 fs <sup>RMS</sup> , additive, 1010 pattern
<b>Tap range</b>	-100 to +100 (including 0) in 1% steps
<b>Tap resolution</b>	1% or 0.1 dB, any tap
<b>Transition time</b>	<40 ps, all taps, 1010 pattern

## General specifications

<b>Control interface</b>	USB 2.0
<b>Dimensions</b>	
<b>Width</b>	39.4 cm (15.5 in)
<b>Height</b>	9.5 cm (3.75 in)
<b>Depth</b>	33.6 cm (13.25 in)
<b>Weight</b>	4 kg (9 lb)
<b>Power consumption</b>	<150 W
<b>Voltage</b>	100-240 V AC, 45-63 Hz; Auto-range, IEC power plug

## 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
Display Port 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 $\pm 0.5$ dB on transmitters

## Ordering information

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

### DPP125C

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

### Instrument options

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

### Accessories

All models include: Power cable (US), USB cable, 2 SMA input cables, CD-ROM with software



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Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

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