BERTScope™ CRJ

BERTScope CRJ 12500A
Variable Clock Recovery
Jitter Analyzer
150 Mb/s - 12.5 Gb/s

- Full BERTScope CR functionality including compliant clock recovery to 12.5 Gb/s, adjustable, self-measuring loop BW and peaking, plus powerful jitter measurement capability
- Direct spectral analysis of jitter components
- “Spectrum analyzer” display with cursor measurements of jitter and frequency
- User-settable frequency gated measurements for band-limited integrated jitter
  - Preset band limits for PCI-Express Gen2 jitter spectrum
- Direct measure of Duty Cycle Dependent (DCD) jitter
- Passive “Pass through” signal path - neither timing nor amplitude on input signal are regenerated

SYNTHESYS
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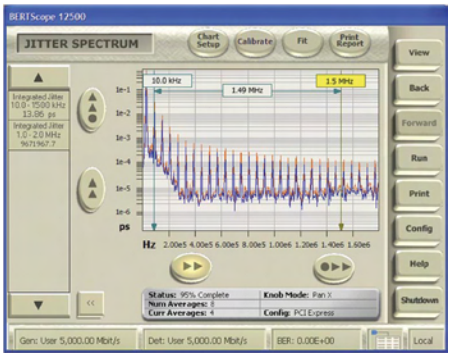
The Vision of a Scope,
the Confidence of a BERT,
and Clock Recovery you can Count on.

Powerful Tools to Analyze Jitter

Measurement of the total jitter in a serial data signal provides useful information to predict the accuracy of the system. However a total jitter number does not provide very much information on the nature of the jitter. This information is necessary to determine the susceptibility of the receiver to various jitter components, and is useful to identify the source. The new BERTScope CRJ clock recovery instrument provides powerful jitter analysis capability.

Jitter Spectrum Display

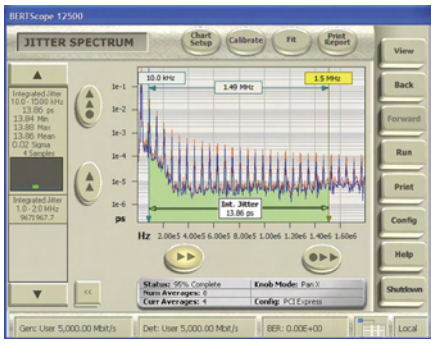
The BERTScope CRJ model features all of the clock recovery capability and performance of the BERTScope CR, with the addition of a powerful jitter measurement and analysis tool – Jitter Spectrum. This view is available on any BERTScope operating with a BERTScope CRJ. The Jitter Spectrum view is a plot of jitter magnitude versus frequency.



The Jitter Spectrum is a powerful tool for quantifying and isolating the source of jitter components in the device under test. Frequency peaks from non related clocks, switching power supplies, and other periodic jitter that is uncorrelated with the data clearly show up in the 'spectrum analyzer' type display. The vertical axis is scaled in either % of UI or Time. Either linear or log scaling can be selected.

Frequency Gated Measurement

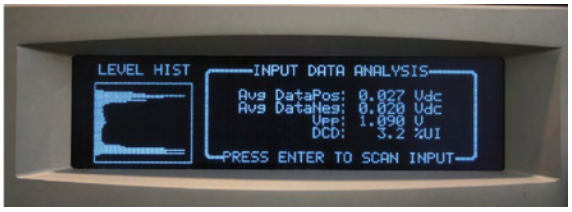
Because the clock recovery process tracks the lower frequency components in a serial data receiver, the system is generally less sensitive to low frequency jitter components than to the higher frequency ones. This varying sensitivity to different frequency components is factored into the compliance tests of various serial data standards, such as second generation PCI-Express. Thus, the ability to measure the magnitude of the jitter components emitted from a transmitter in various frequency bands is important for system validation. The BERTScope CRJ features a band selected integrated jitter measurement. The user enters the lower and upper limits of the frequency band which the jitter measurement is to be integrated over. A real time display provides the total integrated jitter within this band. Up to three different simultaneous frequency bands can be entered in the instrument.



Help isolating jitter sources

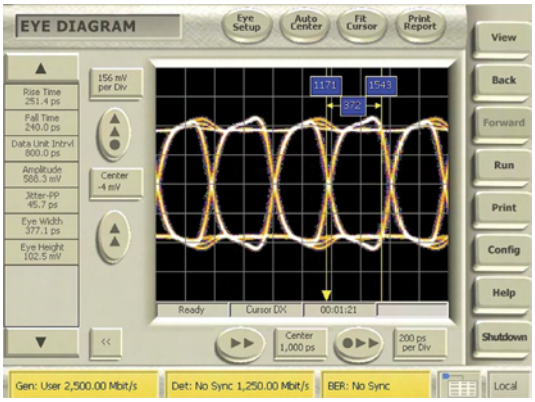
Periodic jitter components uncorrelated to the data are often caused by coupling of system clocks, cross talk from uncorrelated data lines, power supply ripple pattern dependent jitter, etc. These show up as sharp frequency peaks in the jitter display. Cursor measurements allow the user to quickly find the frequency associated with the suspect peak.

Duty Cycle Dependent Jitter



Measurement

Jitter components can often be related to the data pattern. Duty Cycle Dependent Jitter (DCD) occurs when consecutive bits in the data pattern have unequal lengths. The unequal lengths can be either due to 1's and 0's having different durations or due to the use of sub-rate clocks. For example, a half rate clock would use a delayed version of its rising edge to clock the second of two consecutive bits. If the delay is different from the nominal unit interval (bit length) then every two bits become a sequence of a long bit followed by a short bit.



The BERTScope CRJ can directly measure the DCD in the incoming data stream and report the result in percentage of the unit interval (UI) on the front panel display.

Specifications

The performance of the BERTScope CRJ Jitter Spectrum and DCD measurements are listed in the specifications below. The performance of the clock recovery functionality remains identical as listed in the BERTScope CR specifications.

Jitter Spectrum:

Minimum Frequency	200 Hz
Maximum Frequency	90 MHz
Minimum Frequency Resolution	200 Hz
Maximum Jitter	Limited only by the ability of the clock recovery to lock with PLL BW at 0.5 MHz and 0.5 dB peaking.
Vertical units	% UI or ps
Vertical scale	Log or linear
Frequency scale	Linear or log
Max. number of integrated measurement frequency bands	3

Duty Cycle Dependent jitter:

Units	% UI or ps
Maximum range	50 % UI

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