

TDSJIT3 Advanced and TDSJIT3 Essentials

Jitter and Timing Analysis Software Data Sheet



Features & Benefits

- Use the Jitter Wizard to Easily Make Accurate Jitter Measurements
- Analyze Random and Deterministic Jitter (Rj/Dj) and Estimate Total Jitter at BER
- Analyze Deterministic and Total Jitter on Repeating or Arbitrary Random Data Patterns
- Analyze Frequency-bounded Jitter and Timing Measurements using Timing Measurement Filters (First, Second, and Third-order High-pass and Low-pass Butterworth)
- Acquire, Capture, Store, and Analyze Worst-case Offenders
- View Simultaneous Results from Alternate Measurement Configurations Designated on a Single Channel or Source
- Qualify Jitter Measurements Using Channel Inputs, Cursors or Timing Details, Population Size, and Amplitude Range
- View and Analyze Jitter Spectrums, Histograms, and Trends with One Click
- 400 fs Typical Jitter Noise Floor with DSA72004
- 800 fs_{RMS} Typical Jitter Accuracy with DSA72004
- Utilize a Configurable Golden PLL (TDSJIT3 Advanced only)
- Differential Crossover Voltage Measurements (TDSJIT3 Advanced only)

Applications

- Characterize Timing and AC Performance of High-speed Parallel and Serial Designs and Systems to 10.25 Gb/s and Beyond
- Characterize Data-to-Data and Clock-to-Data Jitter
- Characterize PLL Dynamic Performance and Transfer Functions
- Characterize Modulation of Spread Spectrum Clock Circuits
- Characterize Jitter Generation, Transfer, and Tolerance
- Characterize Clock and Data Jitter in HyperTransport, PCI Express, Fibre Channel, SONET, Serial ATA, and other Electrical or Optical Physical Layer Circuits

User-installed, Oscilloscope-resident Timing Analysis Package

TDSJIT3 is the premiere jitter and timing analysis software package available for real-time oscilloscopes. Running externally or within the Tektronix DPO7000, DPO/DSA70000, TDS5000B, TDS6000B/C, and TDS/CSA7000B Series oscilloscopes, TDSJIT3 provides the highest accuracy and lowest noise jitter measurements available in any real-time instrument. With comprehensive jitter analysis algorithms TDSJIT3 simplifies discovering jitter and its related sources in today's high-speed digital, communication, and system designs.

Digital designers, analog designers, communication and systems engineers in the computer, semiconductor, and communications industries are facing new challenges as processor clock speeds race beyond 3 GHz and backplane electrical data rates greater than 6 Gb/s become commonplace. These increasing clock and data speeds mean reduced circuit tolerance, or margin, for noise and jitter. By using tools to rapidly characterize and discover sources of jitter, designs can be made more robust, brought to market faster, and ultimately operate better in today's ultra high-speed environment.

Measurements

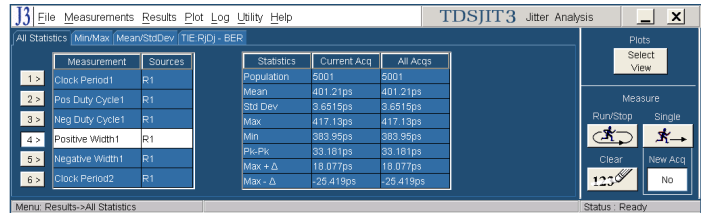
Measurement	Description
General Measurements	Rise Time, Fall Time, Positive Width, Negative Width, High Time, Low Time, Skew, Differential Crossover Voltage*1
Clock Measurements	Frequency, Period, Cycle-Cycle, N-Cycle, Positive Cy-Cy Duty, Negative Cy-Cy Duty, Positive Duty Cycle, Negative Duty Cycle, Clock TIE, Clock PLL TIE*1
Data Measurements	Data Frequency, Data Period, Data TIE, Data PLL TIE*1
Clock to Data	Setup, Hold, Clock-out
Advanced Analysis*1	Rj, Dj, Pj, DCD, DDj, Tj, BER
Plots	Histogram, Time Trend, Cycle Trend, Spectrum, Eye Diagram Statistics*1 (BER CDF Curve), Phase Noise, Transfer Function
Data Logging	Statistics, Min/Max Wfm, Snapshot, Worst-case

*1 Features are only available with TDSJIT3 Advanced.

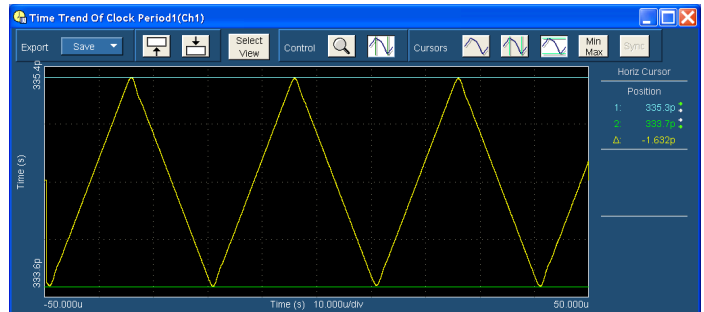
The TDSJIT3 Jitter Analysis Software extends Tektronix' real-time oscilloscopes capability, performing complex measurements on contiguous clock cycles or data edges single-shot acquisitions. Providing jitter measurements for most key timing parameters required by today's interface standards, TDSJIT3 Advanced and TDSJIT3 Essentials are specifically designed to meet the jitter measurement needs of today's high-speed digital designers in the computer and communications industries. Measurements can be made on differential signals, between two separate inputs, or on multiple inputs simultaneously. Multiple measurements and plots can be displayed on the internal and external monitor. Trend analysis plots quickly show how timing parameters can change over time, like frequency drift, PLL startup, or response to power supply changes. Spectrum analysis quickly shows the frequency of jitter and modulation sources for easier identification: adjacent oscillators and clocks, power supply noise, or signal crosstalk. Comprehensive statistics and histograms of timing parameters enhance the powerful analysis capabilities of TDSJIT3 Plot displays and data can be relocated to the second monitor, saved to disk, or exported for further analysis. Acquired waveforms and measurement data logs can be saved for later analysis. You can quickly make accurate total jitter (Tj) estimates at levels down to 1×10^{-18} BER on common data signals including those with random pattern content. Control population size across single

Jitter Components	Current Acq	All Acqs
Random (RMS)	11.472ps	11.472ps
Deterministic (Pk-Pk)	403.26ps	403.26ps
Periodic	402.20ps	402.20ps
Duty Cycle	131.28fs	131.28fs
Data Dependent (ISI)	928.25fs	928.25fs
Total @ BER (Pk-Pk)	548.65ps	548.65ps
Eye Opening @ BER	931.42mui	931.42mui

TDSJIT3 Jitter Measurements



TDSJIT3 Jitter Analysis screenshot



TDSJIT3 Trend Analysis plot

or multiple acquisitions; qualify what part of a signal is measured; correlate jitter trends and peaks to the original acquisition waveform; even share and analyze stored waveforms captured by colleagues.

Characteristics

DPO7000 Series (TDS5000/B, TDS6000/B, TDS7000/B, and CSA7000/B Series Provide Similar Capability)

Characteristic	Description
Jitter Noise Floor	0.6 pSRMS (DPO7354, typical over 10 μs acquisition).
Jitter Measurement Accuracy	1.5 pSRMS (DPO7354, typical over 10 μs acquisition).
Delta Time Accuracy	3.0 pSRMS (20 GS/s, ≤10 nS measurement period).
Delta Time Accuracy Specification	$\pm [0.06 / (\text{sample_rate}) + 1.5 \text{ ppm} \times \text{Measurement_period}]_{\text{RMS}}$ $\pm [0.30 / (\text{sample_rate}) + 1.5 \text{ ppm} \times \text{Measurement_period}]_{\text{pk}}$

DPO/DSA70000 Series (TDS6000C Series Provide Similar Capability)

Characteristic	Description
Jitter Noise Floor	400 fsRMS (DSA72004, typical over 10 μs acquisition)
Jitter Measurement Accuracy	800 fsRMS (DSA72004, typical)
Delta Time Accuracy	600 fsRMS (typical, see instrument manual for details)

Physical Characteristics

Software supplied on compact disk media.

Software application running on the DPO7000, DPO/DSA70000, TDS5000/B, TDS6000B/C, and TDS/CSA7000/B Series four-channel oscilloscopes.

Ordering Information

TDSJIT3 Advanced

Order Option	DPO7000, DPO70000, TDS5000B, TDS6000B/C, TDS/CSA7000B Series Oscilloscope
Opt. JA3	To Have Preinstalled On New Oscilloscope
Opt. JA3	To Upgrade Your Existing Oscilloscope

Note: TDSJIT3 Advanced is included with DSA70000 Series instruments.

TDSJIT3 Essentials

Order Option	DPO7000, DPO70000, TDS5000B, TDS6000B/C, TDS/CSA7000B Series Oscilloscope
Opt. JE3	To Have Preinstalled On New Oscilloscope
Opt. JE3	To Upgrade Your Existing Oscilloscope

To Upgrade Versions of TDSJIT3

Order Option	Upgrade Path
Opt. JTA	TDSJIT3 (JT3) v1 to TDSJIT3 v2 Advanced (JA3)
Opt. E3A	TDSJIT3 (JE3) v2 Essentials to TDSJIT3 v2 Advanced (JA3)
Opt. 3EA	TDSJIT3 (J3E) Essentials v1 to TDSJIT3 v2 Advanced (JA3)
Opt. 3EE	TDSJIT3 (J3E) Essentials v1 to TDSJIT3 v2 Essentials (JE3)

Includes: Software on CD, manual on CD.

Recommended Accessories

Accessory	Description
Arbitrary Waveform Generator	AWG7102
Active Probes	P7500 TriMode™ active probe with DPO/DSA70000 Series, and TAP1500 and TAP2500 with the DPO7000 Series
Differential Probe	P7500 TriMode™ active probe with DPO/DSA70000 Series
High-bandwidth Differential Acquisition System with SMA Inputs	P7313SMA differential probe adapter

Notes:

TDSJIT3 is not compatible with two-channel oscilloscopes. Installing TDSJIT3 replaces earlier versions such as TDSJIT2.

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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



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