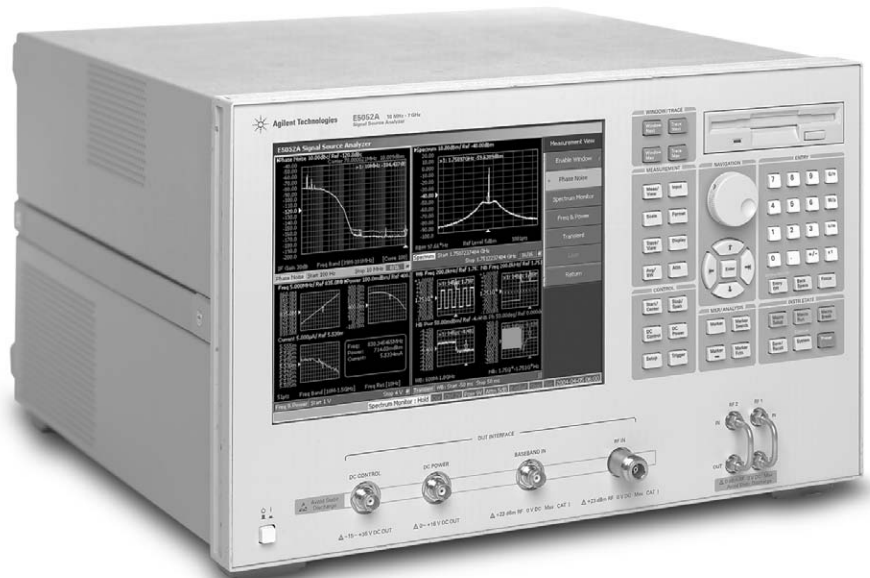


**Agilent E5052A Signal Source Analyzer
with E5001A SSA-J Software provides
Precision Clock Jitter Analysis with
femto-second resolution.**

Technical Overview



Agilent Technologies

Introduction

In order to meet the demanding needs for more precise and accurate characterization and evaluation of clock-signal jitter in advanced digital communication systems today, Agilent offers a new tool that delivers remarkable, ultra-low jitter measurement capabilities on both random jitter (RJ) and periodic jitter (PJ).

The E5001A SSA-J Precision Clock Jitter Analysis software along with the E5052A Signal Source Analyzer enhances your ability to separate RJ and PJ from total jitter (TJ) by combining time-domain waveform measurement techniques and frequency-domain phase-noise measurement techniques.

Ultra-low RJ measurement with femto-second resolution

E5052A jitter-measurement resolution and noise floor are exceptionally low, typically on the order of a few femto-seconds of random jitter noise-floor at a 10Gbps rate. The typical high-performance (real-time or sampling) oscilloscope has a jitter noise-floor above one hundred femto-seconds due to the limited dynamic-range of the ADC and relatively large residual jitter of its internal reference time base. The E5052A has a very quiet internal time base and maintains wide dynamic-range by detecting phase-noise at baseband where a large carrier signal is cancelled out. Besides the very quiet internal time base, the E5052A can extend the jitter measurement limit even below the residual jitter of its internal time base by using a unique cross-correlation technique between two independent internal measurement channels. Using this cross-correlation technique, the E5052A achieves the highest performance of any signal source analyzer. It may have 100 times to 1,000 times lower jitter noise floor when compared to an oscilloscope.

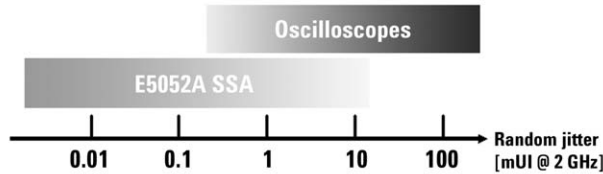


Figure 1. SSA versus oscilloscope

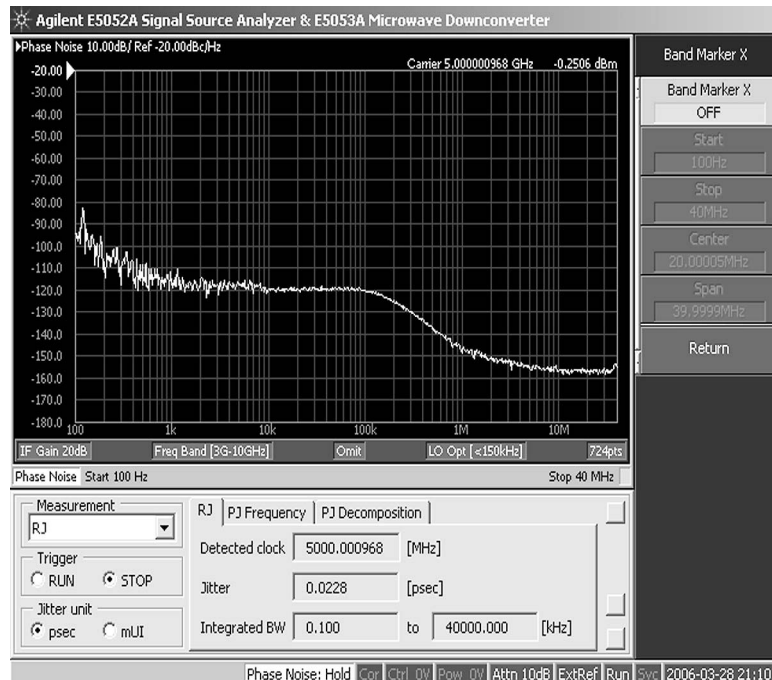


Figure 1a. RJ spectrum view

Real-time jitter spectrum analysis on both RJ and PJ

The jitter frequency analysis range is from 1 Hz to 40 MHz. The E5001A's PJ extracting function can identify periodic jitter frequency components out of random jitter components within the user-definable boundary. It is very fast and easy to change integration boundaries of analysis frequency range in order to get total jitter in a specific bandwidth. Unlike the traditional jitter measurement paradigm, the E5052A and the E5001A software offer speedy and easy real-time jitter spectrum measurements for both RJ and PJ so that the user can save evaluation time and gain more insight into new investigations. Periodic jitter components are displayed in the PJ Spectrum view. The periodic jitter frequencies help you to understand clock signal quality and contamination sources of signal integrity.

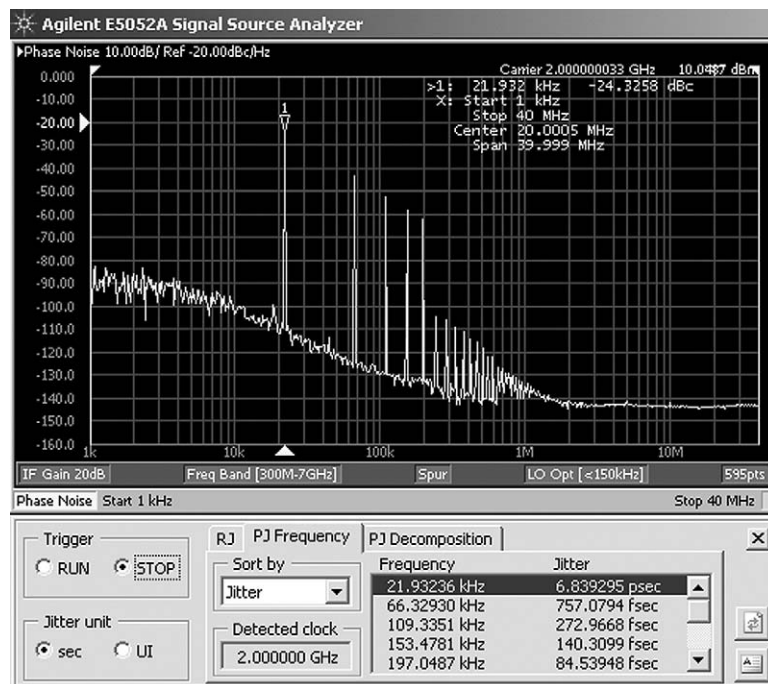


Figure 2. PJ spectrum view

The E5001A works not only in frequency-domain but also in time-domain

The E5001A determines precise RJ and PJ separation through the use of an algorithm based on power integration. You get clear and detailed information about jitter characteristics of the clock signal, such as jitter trend, jitter histogram, RJ_{rms} , PJ_{rms} , TJ_{p-p} , PJ_{p-p} , $PJ_{\delta-\delta}$, so that you can estimate the system's data-independent bit-error-rate (BER) during a specific period of time.

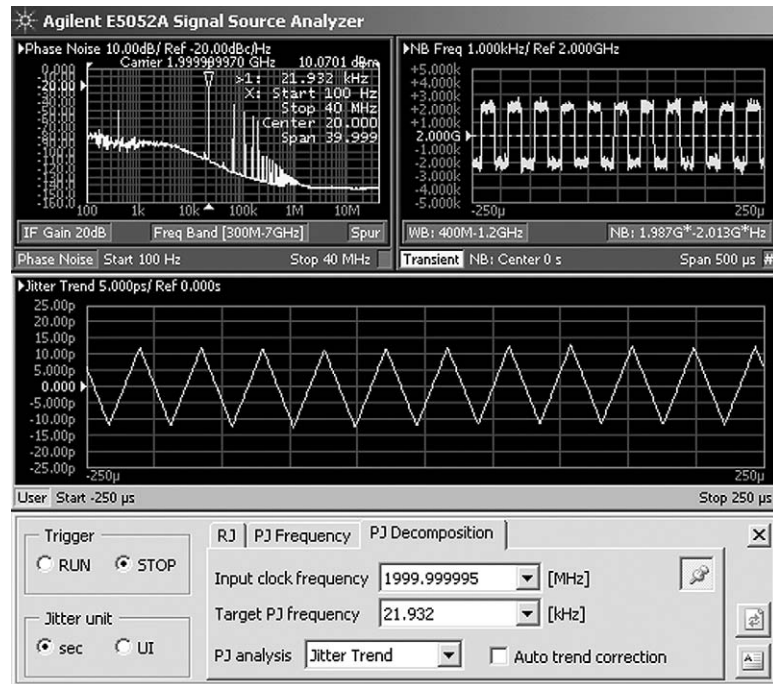


Figure 3. Jitter trend view

Consider taking advantage of the E5001A SSA-J software with your E5052A if you want to:

- make accurate characterization or evaluation of your data-independent clock jitter below a few pico-seconds.
- identify periodic noise sources (that may cause clock jitter) through PJ extraction.
- separate RJ from the total jitter you are observing, and estimate system performance in BER.
- have clearer design insight into signal integrity by combining both analysis methods in time domain and frequency-domain.
- observe an exceptionally low jitter world that has never been seen by usual high-performance oscilloscopes

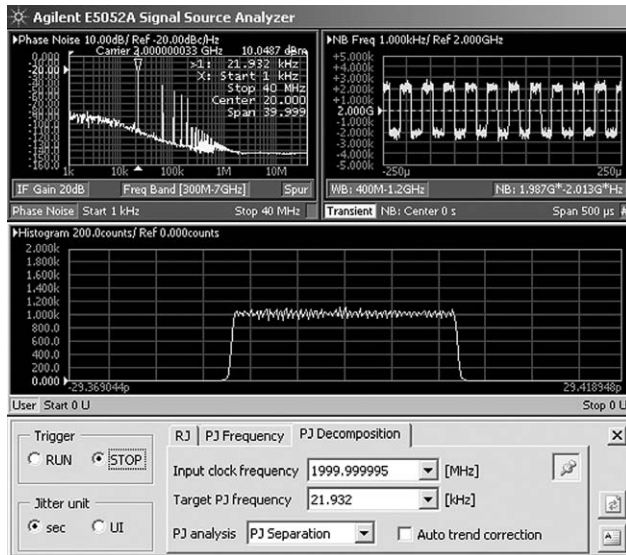


Figure 4. PJ separation view. Histogram 200 counts.

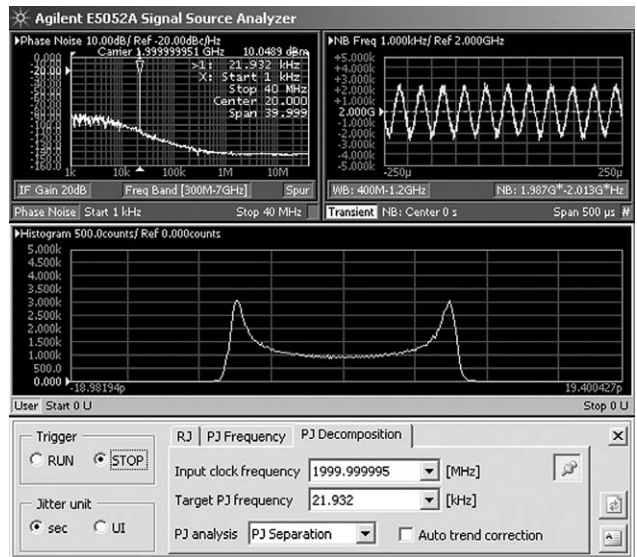


Figure 5. PJ separation view. Histogram 500 counts.

Ordering Information:

E5001A SSA-J Precision Clock
Jitter Analysis software

Note: The E5001A software works with the E5052A firmware Rev. 2.50 or later. To update your E5052A firmware, access www.agilent.com/find/ssa and follow the instructions to download the latest firmware version.

Web Resources

For additional product information and literature visit:

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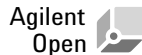
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