Jitter Measurement Tools

New And Traditional Tools Make Jitter Measurements Easy

As clock speeds in computers and data rates in communications systems increase timing budgets become tighter and the need to measure and characterize timing jitter becomes more critical. LeCroy oscilloscopes offer a host of powerful timing measurement tools ranging from traditional eye diagrams using a new analog persistence display, application specific timing parameters, and statistical analysis utilizing histograms.

Analog persistence is a new feature included in the LC series of digital oscilloscopes. It offers variable intensity or color graded persistence to provide an analog scope-like display of statistically varying data as shown in figures 1 and 2. The analog persistence displays allow users of the traditional eye diagram to use digital scope with the same effectiveness that they enjoyed with older analog scopes. At the same time they reap all the benefits of the digital oscilloscope such as full color hard copy.

Accurate measurements of jitter are available in the form of direct parameter readouts using 40 basic parameters and over 100 optional, application specific parameters. An ex-

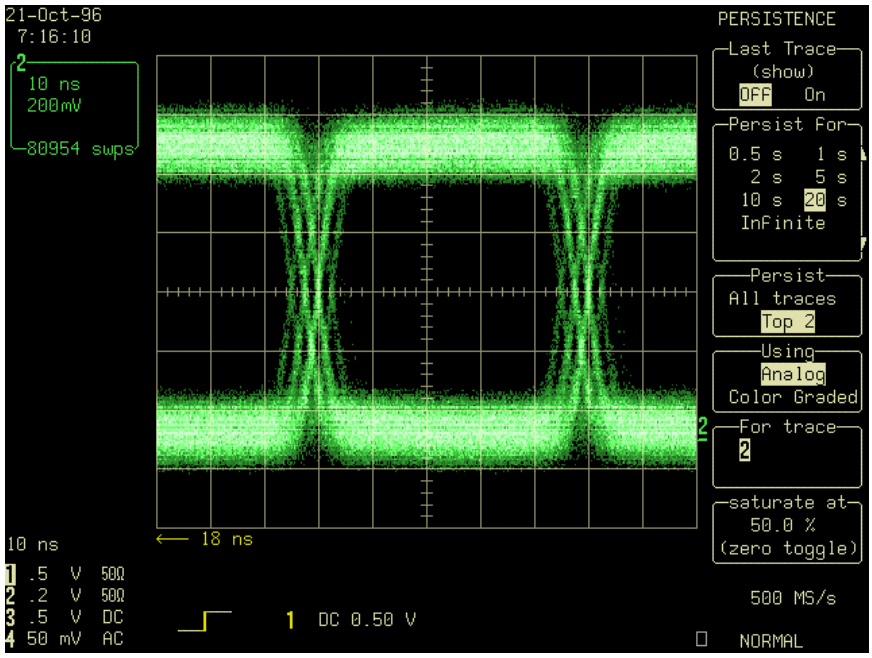

Figure 1- An analog persistence display of a traditional eye diagram shows linear variation of intensity with repetition rate

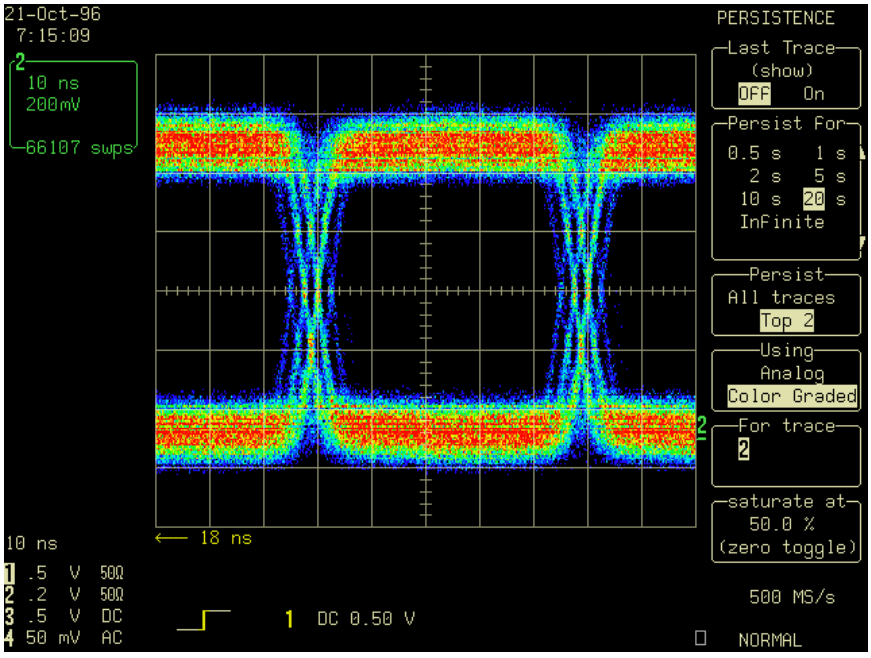

Figure 2 - A color graded persistence eye diagram display

ample of these parameters is shown in figure 3. Parameter measurements include both instantaneous readouts or statistical display of average, maximum and minimum values, as well as standard deviation. Parametric measurements can be made over the entire display or over any user selected region.

Statistical analysis of any of the measurement parameters using histograms provides the most detailed quantitative description of the process being measured. In addition to the basic measurement parameters 18 statistical parameters are included in the optional statistical analysis package for completely characterizing histograms as shown in figure 4.

Once the nature of timing jitter has been characterized this information can be used to establish automated tests to maintain consistent product quality. In figure 5 a pass/fail test utilizing multiple masks and parameter limits to verify a waveform. LeCroy maintains compatible setup and waveform files across product lines so that tests developed on high end oscilloscopes will also operate on lower cost oscilloscopes with minimum restrictions. This allows the use of lower cost scopes for production testing and service operations.

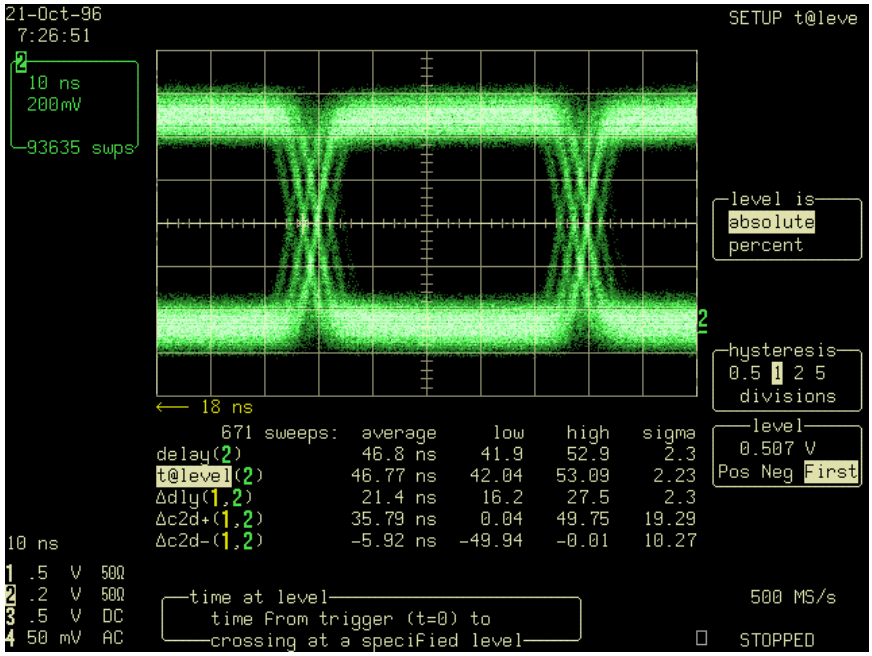

Figure 3 - A display of 5 of the over 100 parameters available. These are all examples of various timing parameters using the statistical readout format.

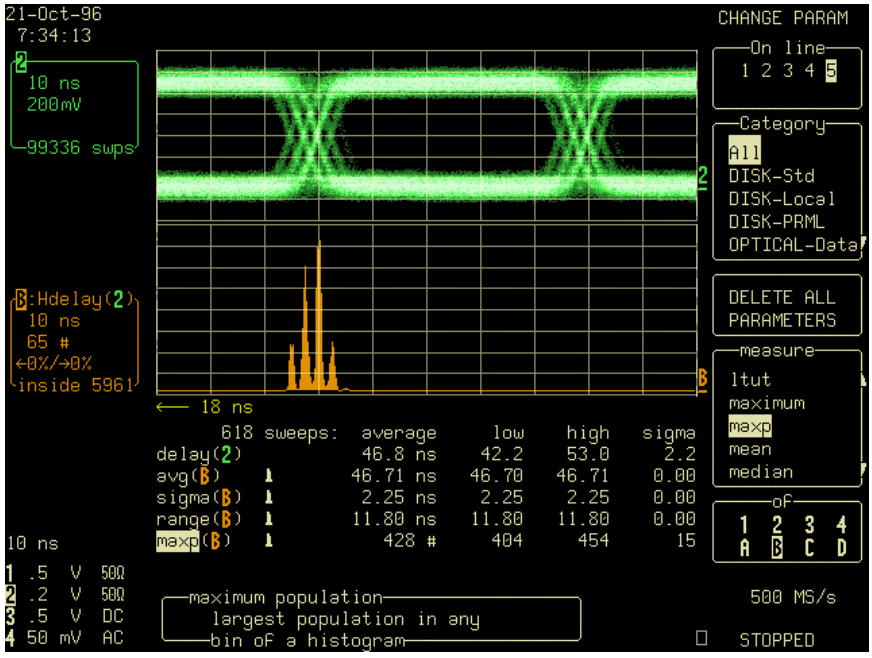

Figure 4 - The histogram of the delay parameter including average (mean), sigma (standard deviation), range, and maximum population readout for the distribution.

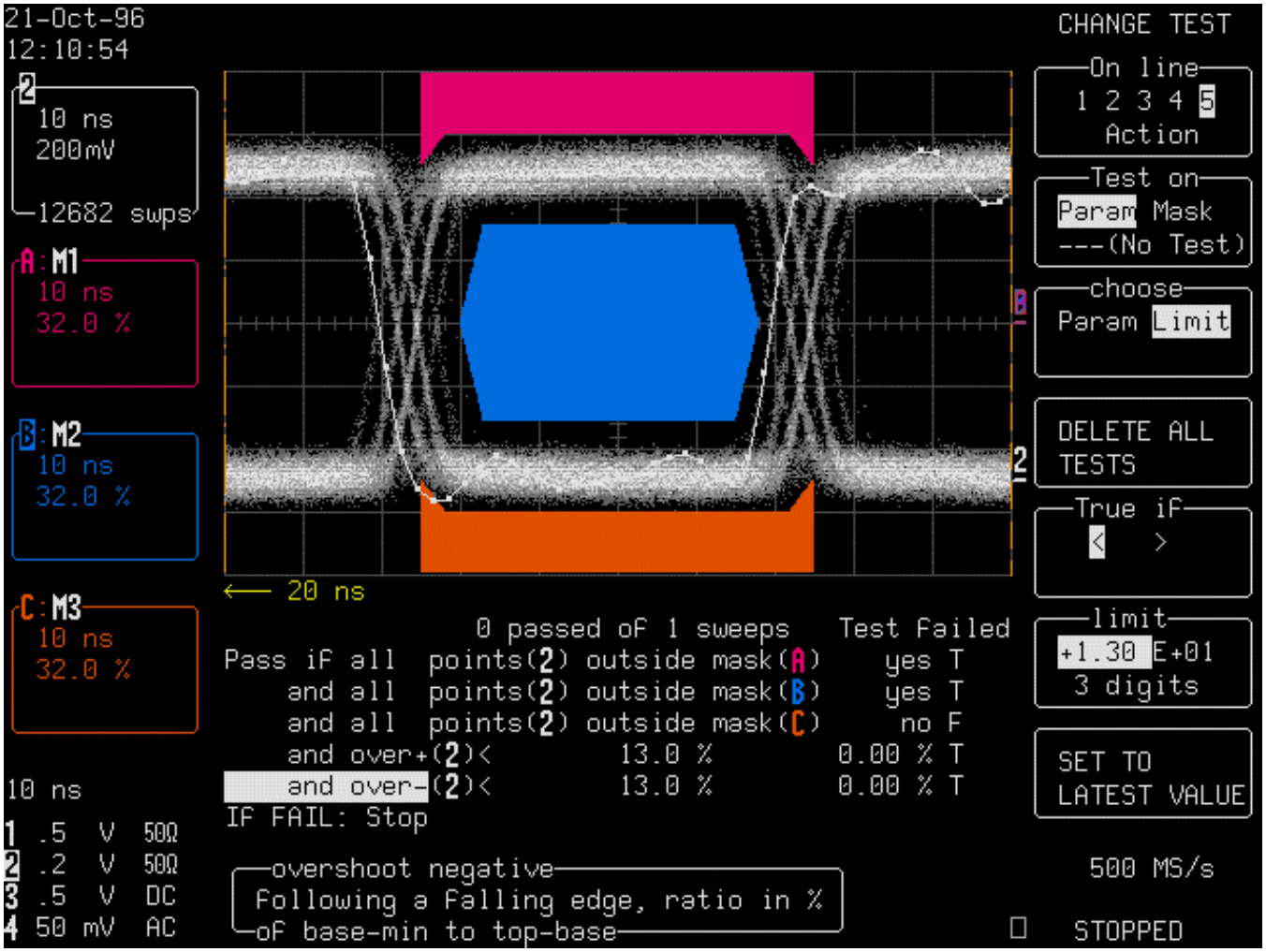

Figure 5 - A pass fail test setup using multiple masks and parameter limit testing. Highlighting the last waveform acquired makes it easy to see the failure point.

LeCroy oscilloscopes offer a complete solution for critical timing measurements. Wide bandwidth, high sample and long memory for high timing resolution, analog and color graded persistence for easy to interpret displays, and the most powerful measurement and analysis package available.