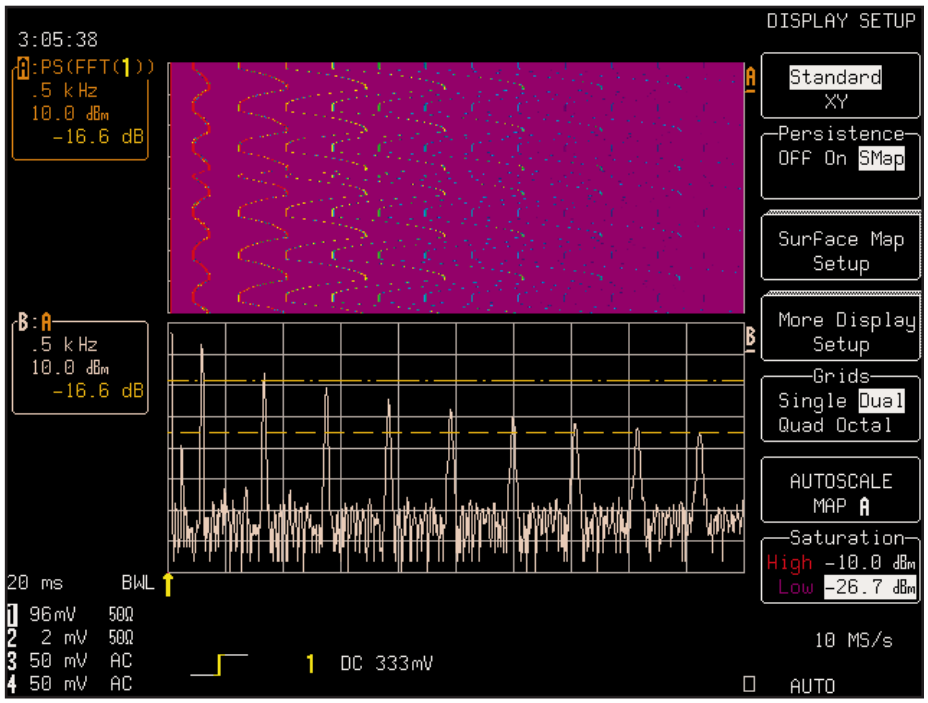
Analysis Packages

Surface Map Software

Leading Features

- ***Three dimensional analysis package allows simple examination of time-varying data***
- ***Offers continuous display of dynamic variations such as data patterns, reflective ranging, load variations, and imaging***
- ***Customizable features allow users to set analysis tools to meet specific measurement needs***
- ***Simplifies the study of time, frequency, and jitter phenomena***
- ***Saves time between measurements with choice of segmented and non-segmented modes***



The surface map display (upper) reveals instability in the position of peaks in the FFT Frequency Spectrum (lower trace).

Unique software package

LeCroy's Surface Map software allows users to see the evolution of waveform variations over time. Surface maps use each horizontal line of pixels on the DSO screen to depict separately captured waveforms. The amplitude of the waveform is denoted by color. Highest peaks are represented in red and lowest signal levels are seen in violet. If a peak is moving, the red pixel changes position from one line to the next, making it easier to locate faults.

The "surface" of this three dimensional map shows signal modulation, jitter and other effects in a single view. Surface map images can be made from voltage vs time waveforms, from FFT's or other types of data.

Figure 1 shows an example of a surface map display of an FFT. The lower trace shows the latest FFT, which corresponds to the bottom line of the surface map in the upper trace. It is easy to see the variation in signal frequency and determine, by observation, that the variation is sinusoidal in nature.

The SMAP feature is an ideal way to view signal variations in applications such as echo ranging (radar, sonar, lidar, ultrasound), packetized serial data streams (magnetic storage and network communications), and control system dynamics (power supplies, automatic gain and frequency controls, phase locked loops). It can be used with time domain, frequency domain, or jitter functions.

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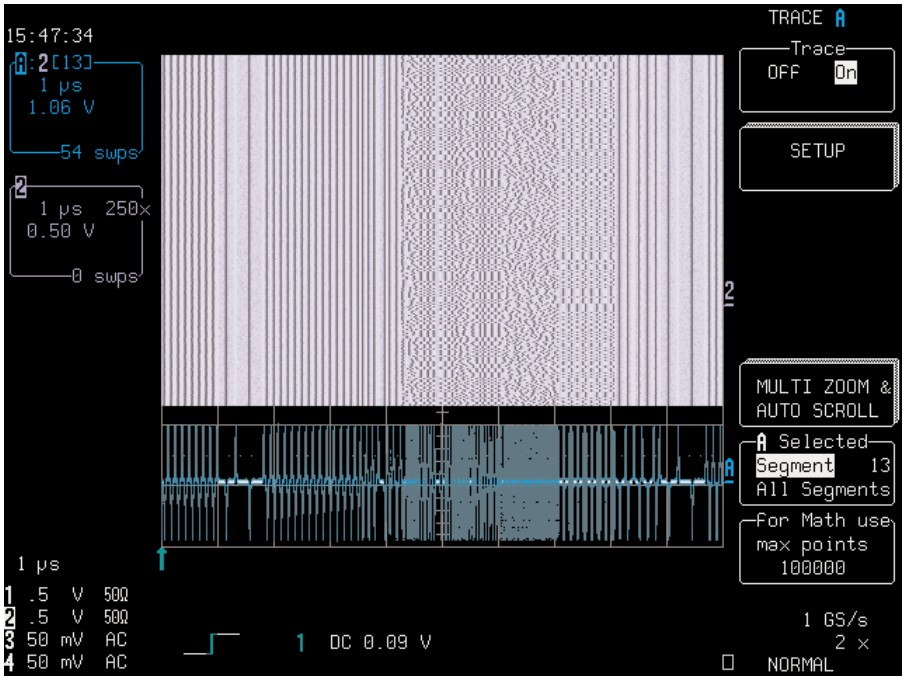

A surface map of digital data from a disk drive. Some bits are held constant (straight lines) while others toggle.

Tools for viewing

The saturation feature allows control of the color-to-amplitude mapping. The "High Saturation"level identifies the threshold above which all amplitudes will be plotted as red. Conversely, the "Low Saturation" level identifies the threshold under which all amplitudes will be plotted violet. This saturation control allows the allocation of colors to a segment of the amplitude range in which desired events can be found.

The same data viewed at different saturation levels, can yield different clues. This flexibility allows users to see the three dimensional view of the display traces over time. Engineers benefit from viewing a continuous display of dynamic variations like data patterns, reflective ranging, load variations, and imaging. An AUTOSCALE button sets the saturation levels for the data set observed within the grid.

Segmented and non-segmented traces

In segmented mode, each segment of the acquired waveform is presented on one line, up to the maximum number of segments acquired. As many segments as there are lines in the grid can be plotted, and a scroll mechanism is provided to allow comfortable viewing of chunks of segments within the entire waveform acquisition memory. Waveforms can be analyzed, computed upon, stored and recalled.

In non-segmented mode, each trace is plotted on one line within the grid. Each subsequent acquisition causes the next line to be painted, with no memory of the past traces other then colored pixels in the grid. When the filling process reaches the bottom of the grid, the surface map starts to scroll upwards. The earliest lines go away at the top of the grid. Only the number of waveforms corresponding to the number of lines in the grid are plotted.

In the figure above we see the surface map of a series of 250 acquisitions of disk drive sector data. The data has been acquired in sequence mode for minimum dead time between acquisitions. Note that all fields of the sector data are being held constant except for the data field. Vertical lines in the surface map indicate no change in data. Changes appear as broken vertical lines. Since this data is digital, the color variation is limited to two basic colors.

The Surface Map feature is available for use on the complete line of LeCroy color digital oscilloscopes and can be retrofitted into previously-delivered WavePro™, Waverunner™ and LC series scopes.

Ordering Information	Product Code
Surface Map Analysis Package	SMAP
Retrofit Surface Map Analysis Package	RK-SMAP

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