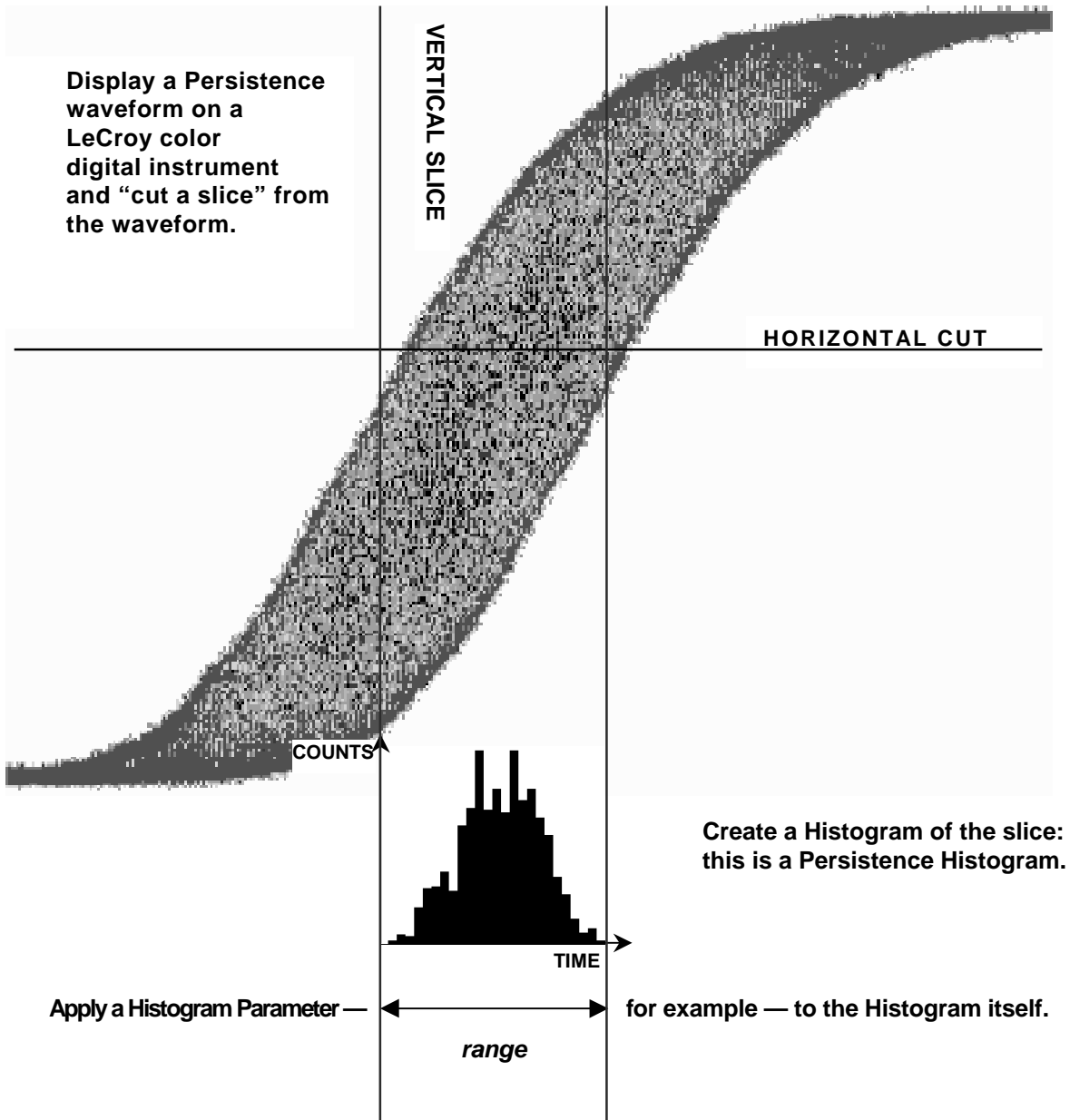


How “Per. Hist” Reveals Hidden Features





Why *Persistence* Histograms and When

The Persistence Histogram Function, **Per.Hist**, builds the histogram from a persistence map* to reveal the features that only exist when several acquisitions have been superimposed on one another. In contrast to this, the Histogram as Statistical Tool (see *Chapter 6*) simply graphs waveform parameters such as amplitude, frequency or pulse width on an acquisition or series of acquisitions.

Both Histogram and Persistence Histogram bar charts are divided into intervals, or bins. But whereas each bin in the Histogram bar chart contains a class of similar parameter values, **Per.Hist** analyzes both vertical and horizontal “slices” of the persistence map. Vertically, each bin contains a class of similar *amplitude* levels; horizontally, a class of similar *time* values.

For a Histogram of...	Use...
A crossover point in time or in amplitude on an eye diagram...	Per.Hist. (Vert. and Horiz. Slices)
Cumulative jitter on an eye diagram...	Per.Hist (Horiz. Slice)
Signal-to-noise ratio on an eye diagram...	Per.Hist. (Vert. Slice)
The different interval widths present in a long data stream...	Histogram (of Timing Parameter <i>p@lv</i>)
Cumulative jitter on a long record of a clock signal...	Histogram (of Timing Parameter <i>tie@lv</i>)
Cycle-to-cycle jitter...	Histogram (of <i>Delta p@lv</i>)

* Persistence maps are generated using the Persistence function on LeCroy color digital instruments.

Set Up and Configure for Per.Hist

There are two methods to create a Persistence Trace on the Jitter and Timing Analyzer. The easiest method is to use the Jitter Views toolbar's **ANALYSIS** button to access the **Analysis** menu. When this method is used, the Persistence Trace will be displayed on Trace C. To configure and display Persistence traces on any trace, use the method below:

1. **Acquire a trace in Persistence mode, using LeCroy Analog Persistence.**

SETUP OF A

use Math?
No Yes



Math Type
Jitter
Histogram
Per.Hist
Per.Trace
Rescale

pers of
1 2 3 4
B C D

cut
horizontal
vertical

center
-0.16 div
(45.2mV)

width
1 bins
(0.0mV)

2. Press  to display the ZOOM + MATH menus. They allow redefinition of any of the four traces, A, B, C and D and access their "SETUP" menus.
3. Press the  for "REDEFINE A", to configure the function — on Trace A for this example. Then select "Per.Hist" from the "Math Type" menu and use the menus shown here to create a Persistence Histogram.

use Math?

To choose a math function.

Math Type

For selecting "Per.Hist".

pers of

For selecting the source trace to be histogrammed.

cut

To select to cut a horizontal or vertical slice of the persistence waveform for histogramming. Here, "horizontal" has been selected, which means that the parenthesized values set in the "center" and "Width" menus, *below*, will be expressed in units of amplitude. When "vertical" is highlighted, the same values will be expressed in units of time, and in pixels.)

center

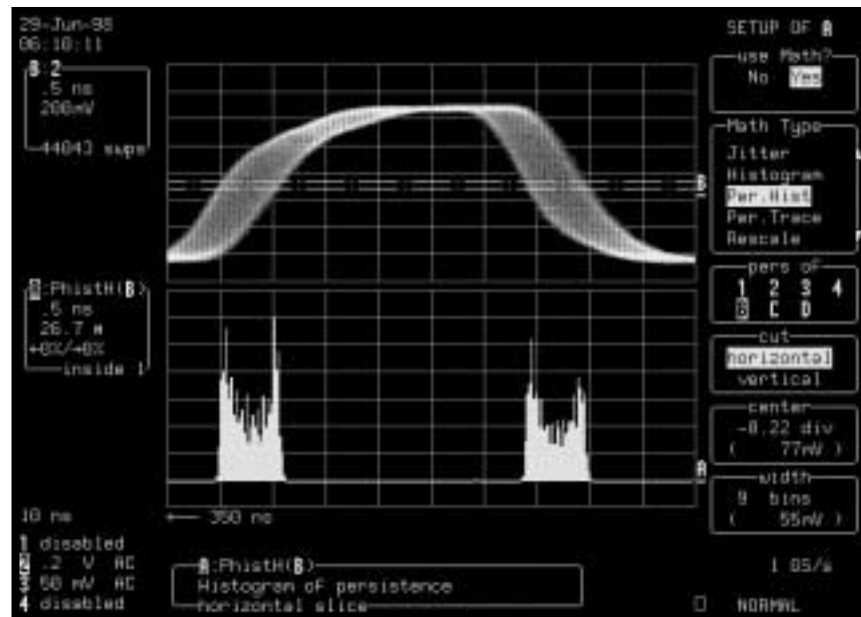
To position the cut on the persistence waveform: a pair of dedicated line cursors appear for visualizing and positioning the "slice", controlled with the corresponding menu knob. Pressing the menu button causes the cursor to revert to the middle of the grid.



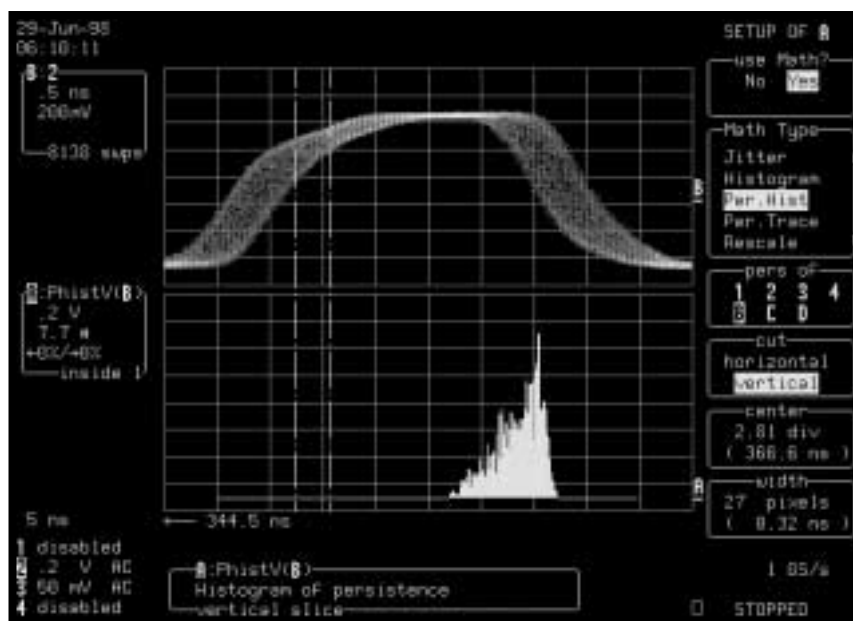
How To Use Persistence Histograms

width

To set the width of the “slice”: a pair of dedicated line cursors appear for visualizing and setting the width of the cut, controlled using the corresponding menu knob. The menu button causes the width to revert to zero. (The “bins” referred to in this menu when horizontal cuts are made are *not* histogram bins, but rather eight-bit ADC bins.)



Persistence Histogram, horizontal cut. The horizontal “slice” has been “cut” using the cursors set with the center and width menus. Note the exact alignment of the bar chart sections on Trace A with the sliced Persistence waveform region on each occasion that the cursors intersect the waveform. The Per.Hist Function may be further analyzed using either the instrument’s standard measurement cursors or Histogram Parameters.



Persistence Histogram, vertical cut. The “slice” has been “cut” using the cursors set with the center and width menus. With vertical cuts, the bar chart on Trace A is unaligned with the slice of the Persistence waveform (this is because low-amplitude bins are displayed at left, and high-voltage bins at right, of the grid). The Per.Hist Function may be further analyzed using either the instrument’s standard measurement cursors or Histogram Parameters.

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