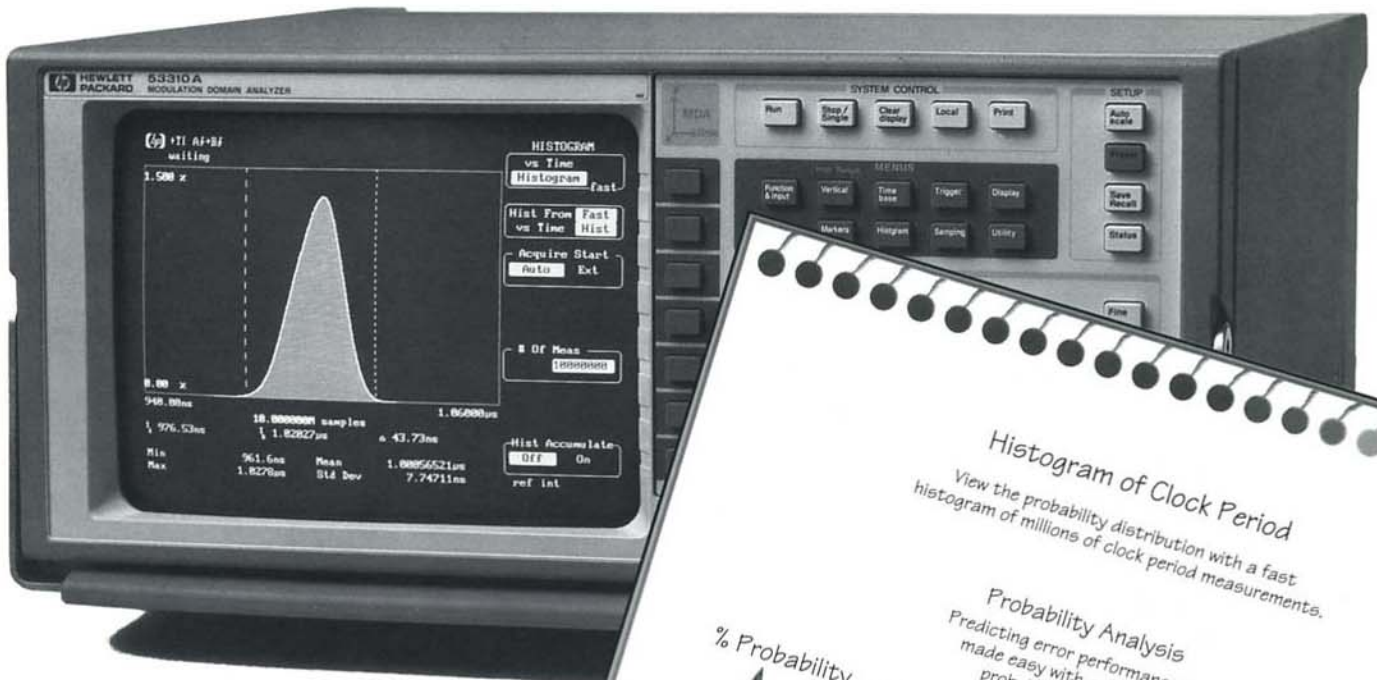


Histograms Simplify Analysis of Random Jitter

Application Brief AN 1200-9

HP 53310A Modulation Domain Analyzer



Histogram of Clock Period
View the probability distribution with a fast histogram of millions of clock period measurements.

Probability Analysis
Predicting error performance is made easy with automatic probability analysis.

Jitter Distribution
The shape of the distribution gives a quick determination of the mode of jitter. Random jitter produces a Gaussian shaped distribution.

Automatic Calculations
A complete statistical analysis of jitter distribution is available at the press of a button.

Better Characterization of Random Jitter

Situation

Digital circuits are virtually everywhere. The trend is towards more capable microprocessor-controlled systems that will run at faster and faster clock rates. As clock rates increase, characterization of timing accuracy and jitter becomes more important. Designers are finding an increased need to characterize jitter in order to achieve error-free design goals.

Problem

Excessive clock jitter can limit performance in digital systems. Jitter is an unintentional form of modulation that can have a wide variety of sources. Timing-related data errors will occur if jitter is beyond acceptable limits. Designers need a fast and easy way to obtain a complete characterization of clock jitter in microprocessor controlled circuits.

Solution

The HP 53310A Modulation Domain Analyzer's fast histograms make it easy to get a complete view of clock jitter. The shape of the histogram indicates the nature of the jitter. For example, a Gaussian-shaped distribution would suggest the jitter is random. Statistics are calculated automatically to provide the mean, minimum, maximum, standard deviation and peak to peak values based upon millions of timing measurements. Error probabilities can be easily determined by setting high and low limits with the measurement markers.

The Modulation Domain Gives You a New Way to View Your Complex Signals

Better ways to analyze your complex signals don't come along often. Now Hewlett-Packard brings you the Modulation Domain - a way of looking at frequency or time interval measurements that directly and clearly reveals both intentional and unintentional modulation.

For frequency analysis, it's the missing piece of the puzzle. The Time Domain shows you amplitude (voltage) vs. time. The Frequency Domain gives you amplitude vs. frequency. The Modulation Domain plots frequency vs. time - an intuitive and insightful way of examining your signal's dynamic frequency modulation.



For timing measurements, the Modulation Domain's view of time interval vs. time allows you to both see and quantify timing jitter directly - taking you one step beyond the Time Domain's qualitative view.

Related Applications

- Microprocessor clock jitter
- Clock jitter in telecommunications systems
- Timing jitter in digital storage devices
- Timing jitter in integrated circuits
- Identification of periodic jitter sources
- Pulse repetition interval jitter in radar systems
- Timing jitter in electromechanical systems
- Data-to-clock jitter

For more information, call your local Hewlett-Packard Test and Measurement Sales Office listed in your telephone directory.

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