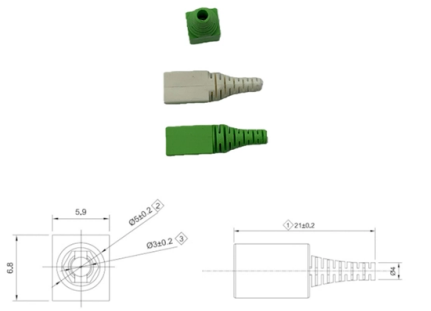
How to adjust the sampling waveform of an eye diagram analyzer



Overview

At the optimal sampling time, the bit error rate of the sample is the lowest, and the bit error rate increases as the sampling time moves to both sides of the time axis, as shown in Figure 6.

Key Takeaways

To adjust the sampling waveform of an eye diagram analyzer, you need to configure the trigger source, sampling delay, scale, and offset to optimize the display and measurement of the eye pattern.

Trigger Configuration

The first step is to select an appropriate trigger source. Eye diagram analyzers can use the data signal itself, a recovered clock, or a divided clock as the trigger. Using a clock trigger provides a classical eye diagram showing all possible bit transitions, while a divided clock trigger can help if the instrument's trigger bandwidth is narrower than the data rate, though care must be taken to avoid missing parts of the pattern.

For encoded or double data rate signals, triggering on the correct clock edge (rising or falling) ensures consistent waveform alignment.

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Sampling Delay and Equivalent Time

Sampling oscilloscopes use equivalent-time sampling to capture high-speed signals. The waveform is built sequentially by sampling the signal at slightly delayed intervals on successive trigger events. Adjusting the sweep time and the number of horizontal points determines the delay between samples, which affects the horizontal resolution of the eye diagram.

This allows the analyzer to reconstruct the waveform accurately even at very high data rates.

Scale and Offset Adjustment

Once the trigger and sampling are set, adjust the vertical scale and offset to clearly view the eye opening. Most analyzers default to auto-scale, but manual adjustment can improve visibility of signal details. Enter the desired Y-axis scale and offset values to center the eye diagram and optimize the amplitude representation.

This is particularly useful when analyzing overshoot, undershoot, or jitter.

Pattern and Rise Time Settings

If your analyzer supports a virtual bit pattern generator, define the bit pattern and set the rise time to match the device under test. After changing these settings, redraw the eye diagram to reflect the updated waveform. This ensures the displayed eye accurately represents the signal characteristics.

Practical Tips

Use persistence mode to layer multiple waveform captures, highlighting jitter and noise patterns. For detailed analysis, move the decision point in time or voltage to probe different parts of the eye and measure error rates. Save results for further analysis using export functions, typically in CSV format.

By carefully configuring the trigger, sampling delay, scale, offset, and pattern settings, you can optimize the eye diagram display for accurate measurement of signal integrity, jitter, and timing characteristics.

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Article Content

Eye Diagram and Digital Signal Testing

At the optimal sampling time, the bit error rate of the sample is the lowest, and the bit error rate increases as the sampling time moves to both sides of the time axis, as shown in Figure 6.

Performing Eye Diagram Measurements

In the oscilloscope, an eye diagram is often used to analyze signal quality. You can diagnose problems, such as attenuation, noise, jitter, and dispersion that arise or characterize specific parts of the system

Eye Diagram Support VI

The following block diagram illustrates a common workflow for the Eye Diagram Measurements VIs, including how to set the scale offset and multiplier of the eye diagram.

71501D Eye-Diagram Analysis System Users Guide | Keysight

You can configure the 71501D system as a high-speed eye-diagram analyzer using Option 005 eye-diagram analysis software.

Making Eye Diagram Measurements in PicoSample

A high-quality eye diagram on the PicoSample screen can be obtained in two ways. The first method is available when measuring data pattern is fed to the channel input, and it is also

Anatomy of an Eye Diagram

Learn how to construct an eye diagram via common methods of triggering used in electrical engineering to gain more insight to transmitters, channels and receivers.

Waveform/Eye Diagram Analysis Parameters

Arbitrary (Random) Bit Stream (ABS) is a popular random bit stream used to generate eye diagrams. The ABS pattern is designed to provide a large random pattern of bits that would quickly converge to

Analyzing Eye Diagrams for Signal Integrity | Sierra Circuits

In this article, you''ll learn how eye patterns are generated and how to analyze eye diagrams for signal integrity by evaluating the eye height, width, jitter, and amplitude.

Technical Note: Enabling Precision EYE Pattern Analysis

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Since receiver frequency response largely affects measured waveform, the EYE pattern analyzer should have optimized characteristics close to the ideal frequency response.

Eye Diagrams and Sampling Oscilloscopes

On the first trigger event the oscilloscope samples the waveform immediately and displays the value at the very left edge of the screen. On the next trigger event, it delays slightly before sampling the data.

How to Read and Interpret an Eye Diagram Signal for

Learn about eye diagram signals and how they are used to analyze and visualize the quality of digital communication signals.

Eye Diagrams and Sampling Oscilloscopes

Eye Diagrams and Sampling Oscilloscopes Most people are familiar with an oscilloscope display of repetitive waveforms such as sine, square, or triangle waves. These are known as single-value

Eye diagrams: The tool for serial data analysis

Eye diagrams can provide insight into the performance of a serial data link. While engineers have used eye diagrams for decades, oscilloscopes continually get new features that

Analyzing Data using Eye Diagrams

Overview PLTS constructs measurement-based eye diagrams (or patterns) by convolving the calculated time domain impulse response (generated from frequency domain measurement data) with a

Eye Diagram and Digital Signal Testing

The eye diagram reflects that the digital signal is affected by the physical device and the channel. Engineer can quickly obtain the measured parameters of the signal in the product to be

Construct eye diagram from stored signal samples

Eye diagram is a powerful tool to analyze the overall quality of a communication link. It reveals important characteristics of a communication link, that includes timing sensitivity, noise

How to Read an Eye Diagram

The eye mask is normally overlaid on top of the eye diagram between the main signal levels and the signal transitions. When we draw out an eye mask as a

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Analyzing Eye Diagrams for Signal Integrity | Sierra

An eye diagram is one of the most effective methods for analyzing the signal integrity of your PCB designs. It reveals the quality of high-speed

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This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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