Jitter Measurement

Jitter Measurement for T1 E1 Signals

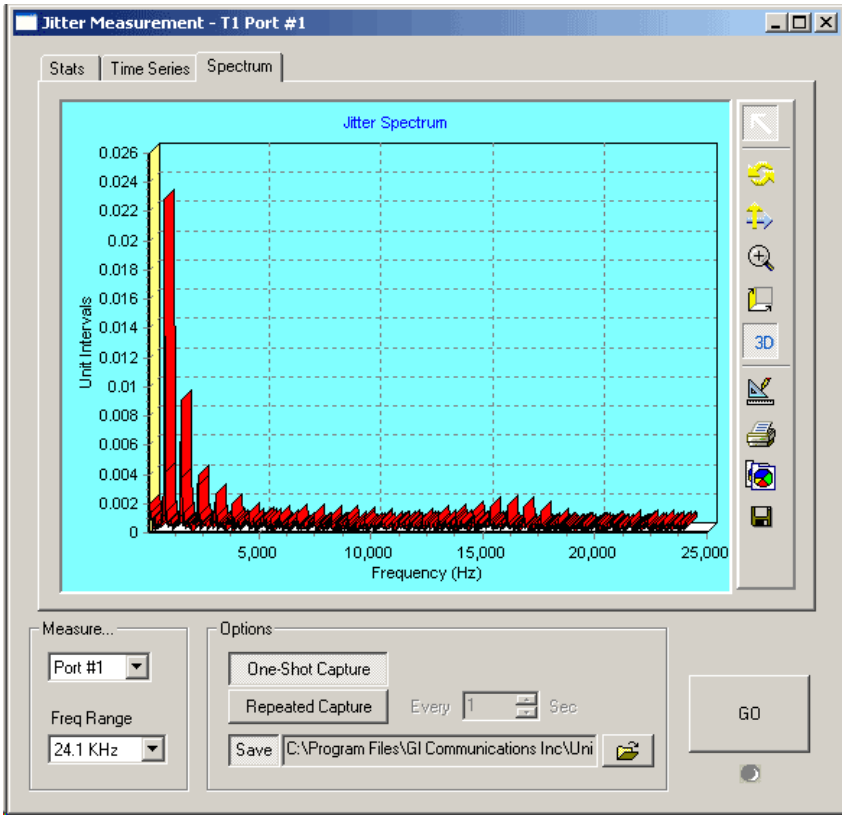
One Shot Capture, Repeated Capture

Statistics Results in UI units

Save Results in *.CSV Format

Time Series & Spectrum Graphs

View, Edit, and Print Customized Graphs



GL's jitter measurement software allows one to accurately measure jitter associated with T1 or E1 signals.

Jitter is the time discrepancy between the time of arrival of a clock pulse and its theoretical arrival time. Jitter arises from a number of sources, including aging of clock circuits, thermal and loading effects, Doppler shifts, and de-multiplexing from higher bit rate data streams. Since no clock is perfect, all clocks exhibit some degree of jitter. Jitter is always computed by comparing a clock signal (called the "nominal clock" or the "clock under test") with a clock having superior accuracy (called the "reference clock").

GL's Jitter Measurement module allows evaluation of jitter on either a tick-by-tick or a cumulative basis. Technically, cumulative jitter is of primary importance as network equipment must cope with the cumulative jitter. However, tick-by-tick measurements are also presented in this module.

Jitter can be measured in terms of the time duration of a single clock pulse. This time interval is referred to as a "Unit Interval" or UI. For T1 systems operating at 1.544 Mbps, 1 UI equals 647 nanoseconds. For E1 systems operating at 2.048 Mbps, 1 UI equals 488 nanoseconds. UI durations for higher rate bit streams are proportionately smaller.

Main Features

- Easy, accurate, visual pulse shape and jitter measurement for T1/E1 signals (only available with Universal T1/E1 cards).
- Provides an option to select T1 or E1 port for monitoring and the frequency range of interest.
- Supports One-Shot capture, Repeated Capture, and Save Capture options for jitter measurement.
- Results of the measurements can be saved in a *.CSV file.
- Jitter generation (coming soon).

For more details, please visit our web page http://www.gl.com/jitter-measurement.html.

GL Communications Inc.

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Theory of Operation

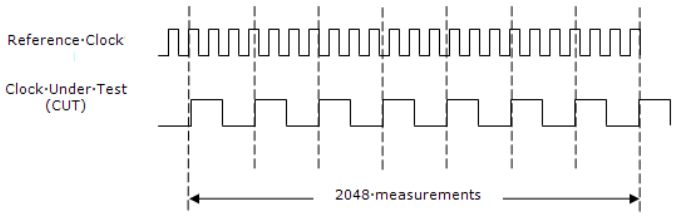
GL's Jitter Measurement module computes jitter by comparing the incoming signal against a much higher rate reference clock. The nominal clock signal (the "Clock Under Test" or "CUT") is recovered from the incoming data stream. The number of reference clock ticks for each incoming nominal clock tick thus extracted is captured for analysis. Reference clock values are captured in blocks of 2048 consecutive measurements. The strategy is illustrated in the following figure.

When computing the jitter frequency spectrum, the frequency resolution is dependent on the nominal clock rate and the number of nominal clock tick values. Frequency precision is given by the following formula:

$$precision = \frac{Nc}{2048} \quad Hz = \frac{Nyq}{1024} Hz$$

Where,

- Nc is the nominal clock rate in bits per second
- Nyq is the Nyquist frequency corresponding to that nominal clock rate
- 1024 is the number of frequency "bins" in the computed frequency spectrum.



Buyer's Guide

XX012 - Pulse Shape and Jitter Measurement - Easy, accurate, visual pulse shape and jitter measurement for T1 E1 signals

Related Hardware

HTE001 - Universal HD T1 or E1 PCI Cards
HUT001/HUE001 – Basic Universal HD T1/E1 Software

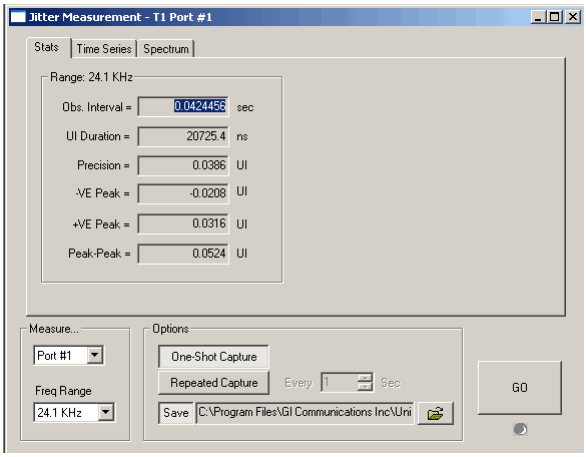
* Specifications and features subject to change without notice.

User Interface

The user interface provides various pages that display the jitter measurement results in decimal and graphical formats.

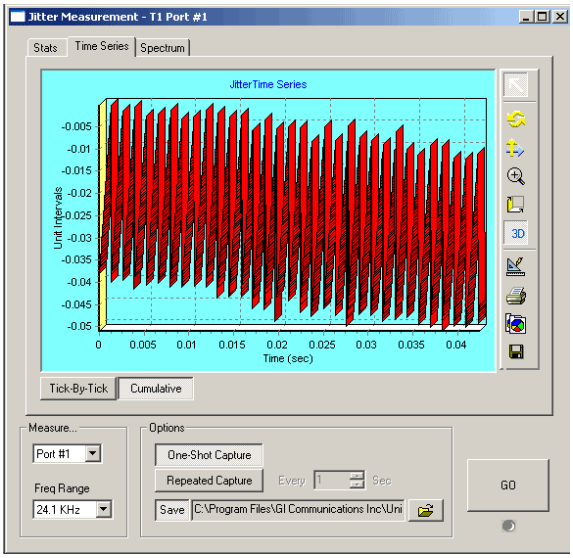
Statistics (Stats) Page

This page constitutes the observation interval, T1/E1 Precision value, +/- VE Peak value, and peak-to-peak value for measurement purposes.



Time Series and Spectrum Page

The time series displays the captured jitter values on either a cumulative or tick-by-tick basis. The frequency spectrum of the captured jitter values will be displayed in the spectrum page. The Peak-to-peak jitter is displayed as a function of jitter frequency.



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