

FEATURES

- Direct Time Measurement of Pulse Trains
- Measure Jitter, Frequency, Time Interval (Skew), Pulse Width, Risetime, Event Timing, Time Interval Error (TIE), and More
- 3ps Single-Shot Resolution (12 Digits/s Frequency)
- DC to 2GHz / 4Gb/s Frequency Range. All functions Including Pulsethrough Work Over the Entire Frequency Range
- Up to 4 Million Continuous Zero Dead Time Measurements Per Second
- 200ps Minimum Pulse Width
- Highly Sophisticated and Flexible Arming (Triggering)
- PCI Express Interface for Super High Throughput
- On-board Memory for 4 Million Measurement Points – Can Be Read While Measurements are Taking Place

More Tests in Less Time

The BI200 is an ultra high performance time and frequency measurement instrument. Its high resolution and throughput, combined with continuous measurement capability, allow you to make measurements that are not possible with traditional time-interval counters. For example, it can timetag events (edges of an input pulse train) at a rate of 4 million per second continuously to on-board memory, while each of the edges is measured with 3ps resolution. This provides it with the capability to analyze the dynamic variations in pulse timing, pulsewidth, or frequency. In other words, the difference between the BI200 and a traditional counter/timer is analogous to the difference between a voltmeter and a scope. Measurements can also be streamed continuously over the PCI Express interface allowing unlimited acquisition at high rates.

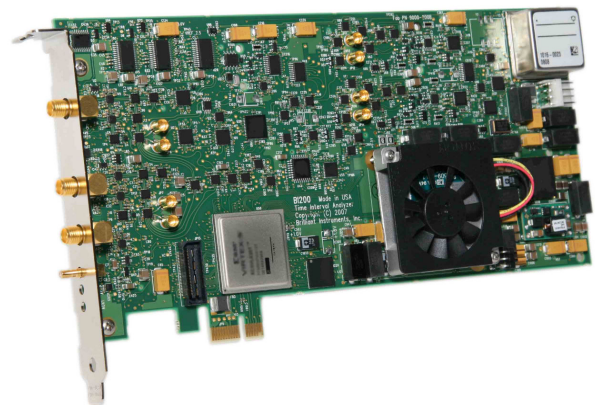
Full-Featured Instrument

The BI200 is a full instrument-on-a-card with all the features and capabilities you would expect in a bench-top instrument including high quality inputs, built-in NIST traceable calibration, and software and hardware that deliver fully computed results. The instrument has 10 measurement functions such as Frequency, Time Interval and Pulsewidth. All functions work directly on the input signal at frequencies up to 2GHz (4 Gb/s) without any prescaling. This means that you can measure pulses as narrow as 200ps, occurring at frequencies up to 2GHz, or the skew between two signals at 4Gb/s.

The inputs of the instrument include programmable termination voltage and hysteresis. These are features that are seldom found even in the best of the bench-top instruments. When you connect your signal source to the BI200 it sees a 50 ohm load which is terminated to an accurately programmable voltage between -2V and +3V. This allows you to connect ECL, PECL, or CML sources directly to the instrument with the proper loading. It even allows you to terminate the signal from CMOS sources to a center voltage which provides a symmetrical load for superior performance. The programmable hysteresis is an important feature for signals with slow risetime or high noise levels. It sets different threshold levels for the rising edge and the falling edge which prevents false triggering.

APPLICATIONS

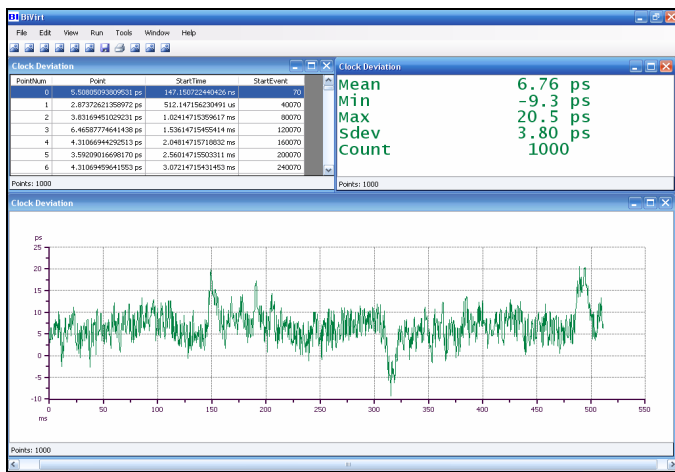
- PLLs and frequency modulation – measure jitter, time interval error and settling time
- Ultrasonic and radar pulse timing
- Optical and magnetic disk drive – measure jitter, risetime, and bit timing directly
- PCI Express and other high speed serial interfaces – measure jitter and skew
- Oscillators and crystals – measure frequency, start-up time and time interval error
- Pulse width modulated signals – measure variations over time
- Nuclear physics
- Time stamping of events in real time



Easy to Use Software

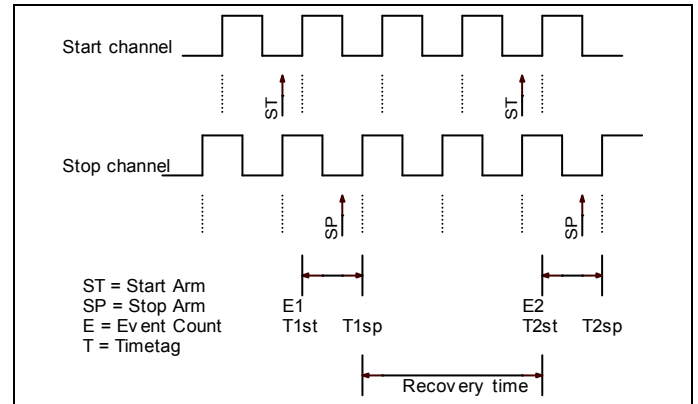
The software for the BI200 is designed for ease of use and extremely high performance. The driver software automatically manages the streaming of measurements at the super high rates which are possible with the PCI Express interface. The front panel software for Windows® allows you to easily set up multiple simultaneous displays of the measurements. This gives multiple views of the same data, or different functions from the same data. For example, you can set up the display to show a graph of the frequency of the signal vs. time, plus a tabular display of the same results, plus a graph of the time deviation of the signal vs. time, all from the same measurement acquisition run. The front panel can also run multiple instruments simultaneously.

The actual screen shot in the following page shows three views of the same Time Interval Error (TIE) measurement on a clock signal. Notice how the graph clearly shows a repetitive deviation in the clock edge timing of about 8ps which occurs about every 170ms. Also, note the rms jitter of 3.8ps which is shown in the digital display. This is the jitter of the signal plus the instrument measurement noise. The table display provides additional information about each of the measurement points.



Screen shot of the measurement of an actual clock signal with crosstalk disturbance

Two-Channel-Two-Edge Functions:



2-Ch Time Interval (TI2)

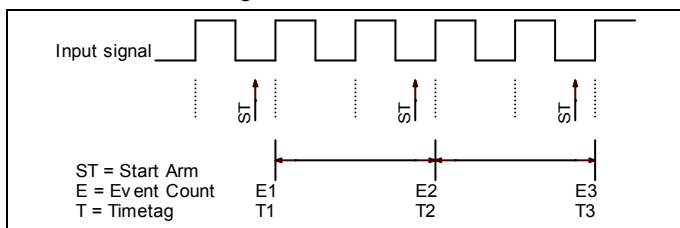
SPECIFICATIONS

General

- Frequency range: 0.15Hz to 2GHz (4Gb/s)
- Measurement repetition rate: 250ns to 6.8s
- Time Resolution: 3ps(rms) single shot
- In Frequency Avg and Period Avg functions:
 - Number of significant digits: 12 digits/s (9 digits in 1ms, or 6 digits in 1μs) regardless of input frequency
 - Resolution (in Hz rms): $\frac{Freq \times (3ps(rms))}{Measime}$

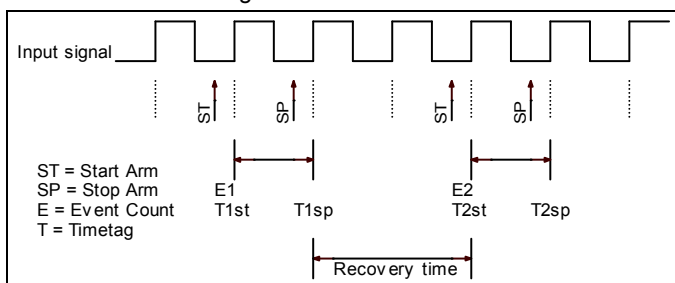
Measurement Functions

One-Channel-One-Edge Functions:



Frequency Average, Period Average, Continuous Time Interval (CTI), Time Interval Error (TIE)

One-Channel-Two-Edge Functions:



Period (Per), Pulsewidth (PW), 1-Ch Time Interval (TI1), Risetime, Falltime

Arming

Each measurement run is composed of multiple blocks with multiple "points" in each block. For example, 1000 blocks of 1000 pulsewidth points can be taken, for a total of 1 million points. Statistical results are provided for each block, and for the whole set of blocks.

Arming is the enabling of measurement points or blocks. There is separate arming for blocks and for points.

Timebase

- Internal NIST traceable 10MHz oven oscillator
 - Over full temperature range: ±0.02 ppm
 - Aging: ±0.001 ppm/day, ±0.3 ppm/year
 - Warm-up time: 5 minutes
- External 10MHz reference input
 - Frequency: 10MHz ±50ppm (±500Hz)

Software

- Windows® driver
 - Provides an extremely powerful set of functions for controlling the instrument and for data analysis
 - Includes tools for high speed reading of the instrument which take advantage of the PCI Express interface without burdening the user with the details
 - Compatible with Visual Basic, Visual Basic for Applications (VBA), C, C++ and C#
- Virtual Front Panel (Windows® based)
 - Provides multiple simultaneous displays for the same measurement. The displays can even be different functions, as long as they are from the same group
 - Can run multiple instruments simultaneously
- Warranty: 1 year

Request the complete datasheet at www.b-i-inc.com

*Specifications are subject to change without notice
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