NEW! Time/Frequency Counter Model T4100U(e)

High Performance Miniature Instrument with USB Interface

- Precise and versatile counter powered and controlled via USB port
- Time interval measurement range: 0 – 1000 seconds
- Precision (standard deviation) < 10 ps at time interval measured from 0 to 50 ms
- Frequency range up to 3.5 GHz
- Measurement rate up to $5 \times 10^6$ meas./s
- Measurement of Allan Deviation (ADEV)
- Totalize mode
- Selectable pulse edge and polarity
- Selectable input threshold level or automatic threshold search
- Comprehensive statistical data processing
- User-friendly software for Windows and drivers for user’s applications
- Easy export of data files for processing in other programs (Stable32, MS Excel)
- Built-in automatic calibrator

TIME INTERVAL COUNTER WITH PICOSECOND PRECISION IN A SMALL, LIGHT, AND HANDY CASE WITH USB INTERFACE

The advanced Time/Frequency Counter T4100U is contained in a small, light, and handy case connected by two USB 2.0 ports to computer (notebook, netbook, or PC). It combines a 10 ps precision (RMS) of single-shot time-interval measurement with affordable cost and reliability for thorough industrial and scientific applications. The supplied software creates a user-friendly graphic interface and provides many useful functions for accurate control, diagnostics and statistical processing of the measurement data. Extended built-in memory of measurement results (model with external power supplier) helps designing complex measurement sessions.

The heart of the instrument is a newly developed counter chip, which contains an interpolation time counter with two precise two-stage Time-to-Digital Converters and a built-in microcontroller. The on-board data memory allows for a high measurement rate. The counter T4100U contains a Temperature-Compensated Crystal Oscillator (TCXO) which provides high accuracy at reasonable cost. An external reference clock, e.g. atomic standard, can also be used.

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Display in Time Interval mode

**Specifications**

**Functions**
- Time Interval: between two pulses at two inputs or pulses appearing consecutively at a single, common input
- Period, Pulse Width, Frequency, Allan Deviation, Totalize

**Statistics**
- Mean, Min and Max Values, Standard Deviation

**Graphics**
- Tables and plots of statistical distributions and frequency stability

**Time Interval**
- **Range**: 0 – 1000 seconds (Inputs A and B)
- **Resolution (LSB)**: 1.8 ps in single-shot measurements, may be reduced with averaging
- **Precision (Standard Deviation)**: < 10 ps at time interval measured from 0 to 50 ms
  - < 10/√Sample_Size ps with averaging
- **Systematic Error**: < ± (1 ns max + (Timebase Error x Interval) + Trigger Level Timing Error)
- **Range Limit (Overflow)**: presettable: 1 s, 10 s, 100 s, 1000 s
- **Start Enable**: internal (controlled by software)
- **Stop Disable**: referred to Start, internally programmable over the range (1…999)·20 units, where the unit is selected as ns, µs, and ms
- **Dead Time**: < 200 ns
- **Measurement Rate**: up to 5·10^6 measurements per second (when measuring zero time interval and storing data in on-board RAM),
  - up to 4·10^7 measurements per second stored to memory in PC

**Frequency & Period**
- **Range**: Inputs A and B: 1 mHz to 200 MHz
  - Sensitivity < 75 mV RMS typ. (0.01 to 200 MHz)
  - Minimum slew rate: 10 V/µs
- **Input F**: 100 MHz to 3.5 GHz
  - Sensitivity < -12 dBm (< 55 mV RMS) from 400 MHz to 3 GHz
  - Sensitivity < -3 dBm (< 160 mV RMS) from 100 MHz to 3.5 GHz
- **Gate Time**: selected from 1 µs to 10 s (reciprocal method)
- **Dead Time**: 200 ns + 2 periods of tested signal
- **Measurement Rate**: up to 8·10^5 measurements/sec (when measuring frequency in 1)

**Totalize**
- **Range**: 0 to 5·10^11 counts
- **Input frequency**: max. 200 MHz
- **Gate Time**: Internal: from 1 µs to 10 s, Manual Start-Stop, External Gate (Input B)

**Inputs A and B**
- Impedance: 50 Ω, DC coupled; SMA sockets
- Amplitude: within ± 4 V
- Pulse edge: selectable, rising or falling
- Threshold: manually adjustable from -4 V to +4 V with 8 mV resolution, or set automatically

**Internal Clock Generator**
- 10 MHz TCXO, stability 5·10^-7 (- 40 to +85 °C), ageing 1·10^-6/year

**External Clock Generator**
- 10 MHz, min. 100 mV on 50 Ω input impedance, DC coupled; SMA socket

**Capacity of on-board memory**
- 4 M meas. (version e – external supplier) or 16 K meas. (USB supplied)

**USB receptacle**
- Type B, USB 2.0 Hi-Speed

**Power Supply**
- provided by two USB 2.0 ports (typical) or external supplier (version e)

**Supplied Software**
- for Windows® XP/Vista/7/8, Royalty free USB drivers

**Size**
- 135 (L) x 70 (W) x 17 (H) mm

**Weight**
- 160 g