



T&F Metrology Measurement System for Precise Time and Frequency Metrology

Measurement System for Precise Time and Frequency Metrology is

first such unique, multifunctional and technologically advanced system for precise metrology of time and frequency.

This system allows for:

- simultaneous high-resolution measurements of time intervals between signals from several sources,
- precise frequency measurements,
- generation of reference time intervals in wide range of parameters,
- evaluating the stability of frequency sources, especially reference atomic clocks,
- distribution of reference time and frequency signals, electrical and optical, to many receivers.

The system comprises visually and functionally unified devices:

- MTC 108 - 8-Channel Time/Frequency Counter,

- TIG 101 - Delay/Frequency Generator,
- PDA 0816 - Programmable Electrical and Optical Signals Distribution Amplifier

It's the only one complete and unified time and frequency metrology set offering such wide range of parameters and functionality in the world.

The main application areas of the system are military and civil laboratories specializing in generation and distribution of high-precision reference time and frequency signals.

Any of the devices can operate autonomously, what makes the potential application area even wider, which includes sciences such as nuclear physics, astronomy, geodesy or technical branches like satellite navigation, telecommunications, optoelectronics, semiconductor and computer industries.

FEATURES

- Wide range of time interval measurements (> 1h), very high precision (< 8 ps) and high measurement rate (up to 10×10^6 meas./s/channel).
- Picosecond-based precision of measurement.
- Frequency measurement up to 3.5 GHz with 12 significant digits resolution.
- Ultra-low jitter (<5 ps) source of reference time intervals.
- Optical or electrical distribution of the signals to 16 receivers.
- Local or remote system control via USB and Ethernet.

MTC 108



Multichannel Time/Frequency Counter MTC 108 measures time intervals in a wide measurement range ($> 1h$) with very high precision ($< 4.5 ps$) and high measurement rate (up to 91×10^6 meas./s) in eight independent measurement channels. Frequency measurements are also performed in very wide range (up to 3.5 GHz) and with high resolution (12 significant digits). The functionality of MTC 108 is further improved by clock signal sources short-term stability measurement modes (Allan deviation) and quality estimation of these signals (time interval error, time deviation).

PDA 0816



Programmable Distribution Amplifier PDA 0816 enables both optical and electrical distribution of signals generated in the system or derived from other sources to up to 16 external receivers simultaneously.

TIG 101



Delay (Time Interval)/Frequency Generator TIG 101 is a source of reference time intervals that are generated with ultra-low jitter ($< 5 ps$), based on a dedicated method of counting signal time periods with dynamic phase shifting. The generator can be a source of a rectangular waveform with precisely controlled frequency (1 MHz resolution).

Characteristic

- Time interval measurements are performed in a wide measurement range ($> 1h$) with very high precision ($< 8 ps$) and unparalleled measurement rate (up to 10×10^6 meas./s/channel).
- Picosecond-based precision of measurement through use of time-digital encoding, built-in atomic frequency generator and embedded automatic calibration procedure.
- Performing measurements in very wide range (up to 3.5 GHz) and with high resolution (12 significant digits).
- The system is a source of reference time intervals with ultra-low jitter ($< 5 ps$), based on a dedicated generation method.

- Ability to distribute optical or electrical signals to up to 16 receivers simultaneously.
- Can be controlled locally through the user-friendly built-in keyboard and/or touch panel, as well as remotely via USB or Ethernet interfaces.

The system was presented at 8 exhibitions and at 6 International Invention Shows, where it has earned 6 medals, a special prize and a distinction.

The operation of the system has been experimentally verified rendering it ready for implementation. The whole system, as well as its single instruments, are the subjects of protection by the means of Industrial Property Law.

The prototype of MTC 108 has already found its field of use in Poznań Supercomputing and Networking Center affiliated to the Institute of Bioorganic Chemistry of the Polish Academy of Sciences.



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