

PicoTime™

Pico Second Resolution Test Set

- Clock characterization such as quartz crystal oscillator, Rubidium atomic clocks and cesium clocks
- Calibration of quartz crystal oscillator, and atomic clocks
- ADEV, Phase and Frequency
- DUT Frequency Range: 1MHz to 30 MHz
- Phase time resolution and frequency
- System noise: <2ps rms
- Automatic operation



The PicoTime™ is a low-cost, high-performance measurement test set. It features a cutting-edge 1ps resolution and an easy-to-use software application for performance analysis. Combined with the CNT-91 Frequency Counter/Analyzer, it enables very high resolution measurements of ADEV from 1ms and up, TIE, plus frequency

System Description

The system is designed to make a direct frequency measurement in comparison with an external 10 MHz frequency reference. PicoTime is based on a heterodyne system using direct digital synthesizer (DDS) technology to allow measurements in the range of up to 30 MHz. The external 10 MHz reference divided by 2×10^7 is used to make time interval measurement each second.

Direct frequency measurement is used for programming DDS. The DDS divides the device frequency around 1kHz by using two mixers. As indicated in the block-diagram, the whole system is based on a heterodyne architecture with a double frequency conversion.

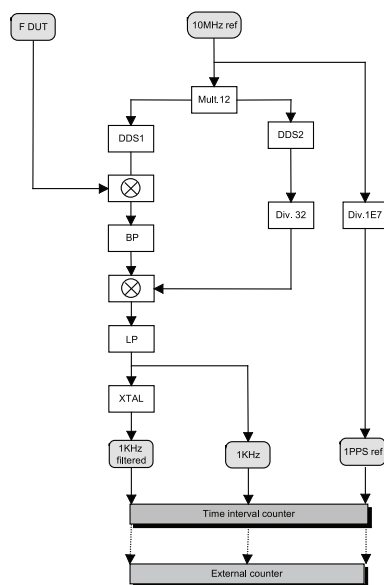


Figure 1: Block diagram

Three outputs are available:

- 1kHz where a crystal filter based PLL is used to restrict the bandwidth to only 1Hz
- 1kHz with about several 100 kHz bandwidth
- 1pps reference

The system is controlled with the PC COM interface. When connecting an external CNT-91 Frequency Counter/Analyzer, other types of measurements can be performed. For example TIE and ADEV from 1 ms and up, plus frequency measurements with a resolution of $2E-13$ (1s meas time).

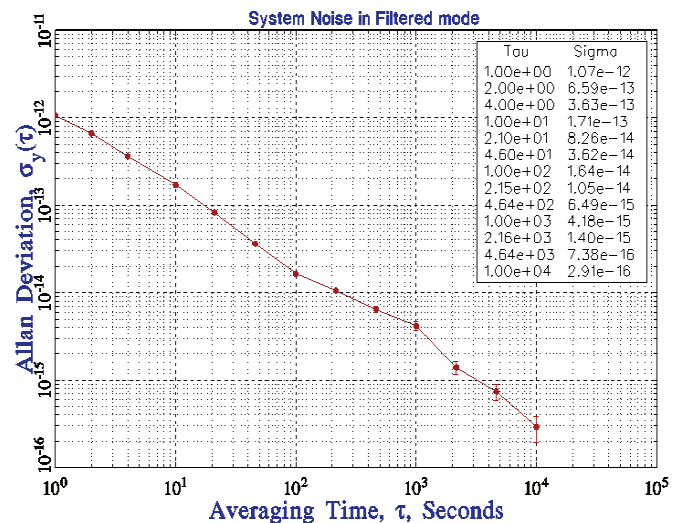


Figure 2: System Noise in ideal conditions



Electrical

	Standard version
DUT Center Frequency Range	1MHz to 30 MHz
Measurement Noise in filtered mode (1Hz bandwidth) @10 MHz (Maximum Relative Frequency Deviation During Measurements $<1 \times 10^{-9}$)	<2 ps
Measurement Noise in unfiltered mode (>3 kHz bandwidth) @10 MHz (Maximum Relative Frequency Deviation During Measurements $<1 \times 10^{-7}$)	<10 ps
Reference Frequency	10 MHz
Phase time sensitivity versus temperature	<20 ps / $^{\circ}$ C
Input Signal Level	+3dBm to 17 dBm
Input Impedance	50 Ω
Connector Type	BNC
PC Port	Standard – Serial (COM1 or COM2 or COM3 or COM4)

Environment

	Temperature	Relative Humidity
Operating	15 $^{\circ}$ C to 30 $^{\circ}$ C	10% - 85%
Storage	-25 $^{\circ}$ C to 55 $^{\circ}$ C	
Transportation	-25 $^{\circ}$ C to 70 $^{\circ}$ C	

Power Requirements

	Standard version
Power Supply	AC input 85-264V
Power Input Fluctuation	$\pm 10\%$ of nominal supply voltage (230 V~)
Input Frequency	47 – 63 Hz
Power Consumption @25 $^{\circ}$ C	<10 W after warm-up
Connector Type	IEC plug

General Specifications

Dimensions and Weight

Width x Height x Depth:
445 x 300 x 44 mm (1U)
(17.52 x 11.81 x 1.73 in)

Weight:
Net 3.5 kg (7.7 lb)

Software Upgrades

The latest software upgrades can be downloaded – free of charge from www.pendulum-instruments.com

Ordering Information

Basic Model

PicoTime:

Picosecond resolution test set

Included with shipment:

Power cable (EU type is standard)
Users manual on CD
RS232 communication cable to PC
PicoTime installation SW on CD

Options and accessories

- Option US:* US Power cable
- Option CN:* Chinese Power cable
- Option CH:* Swiss Power cable
- Option E:* 19" Rack mount ears
- Option ExtW-3:* Extended warranty to 3 years
- Option ExtW-5:* Extended warranty to 5 years

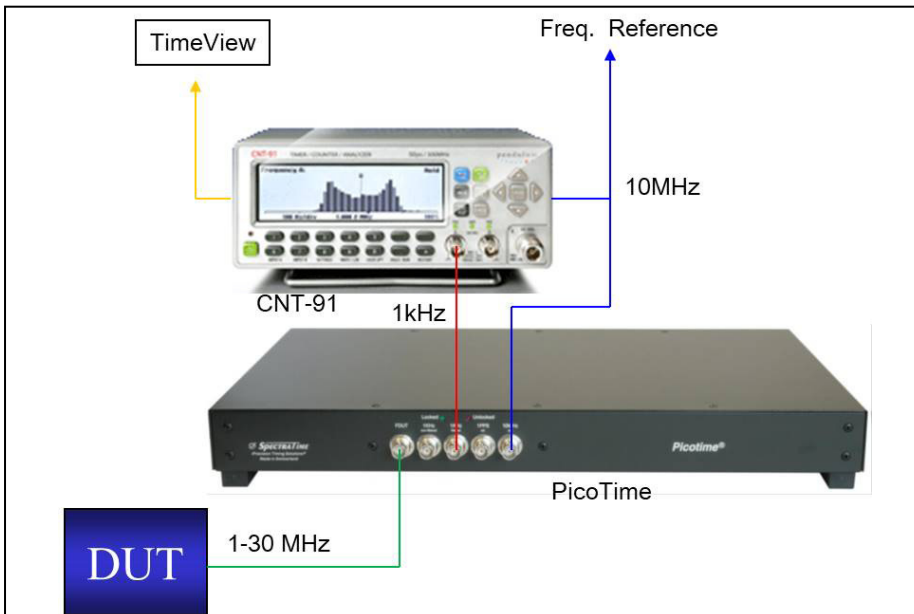


Figure 3: CNT-91 + PicoTime. A high resolution Frequency Comparator and ADEV test set