Symmetricom®

TimeAnalyzer 7500

IEEE 1588 (PTP) Measurement and Analysis Test System

Release 1.0

KEY FEATURES

- Packet Jitter (Packet Delay Variation) measurement and analysis
- Traditional synchronization signals measurement and analysis
- Packet synchronization masks for intuitive PASS/FAIL result
- Raw PDV/TIE display, histogram/PDF/ statistics, MinTDEV, and MATIE/MAFE
- Easy-to-use GUI with real-time display and file export
- Precise timing measurement at physical layer with nanosecond accuracy
- PDV and traditional synchronization analysis with Telecom standard masks

KEY BENEFITS

- All-in-one packet timing and traditional synchronization test set
- Active IEEE 1588 client capability
- Portable IEEE 1588 (PTP) field and lab test system
- Comprehensive IEEE 1588 synchronization performance measurement and analysis for Packet and TDM networks
- Network suitability measurement and qualification system

Symmetricom's TimeAnalyzer 7500 is an all-in-one test and measurement instrument for collecting and analyzing IEEE 1588 packet-timing data, as well as analyzing traditional synchronization signals. This comprehensive, powerful test tool can help you meet the PTP packet sync performance requirements in every stage of your project: engineering, network planning, packet-timing deployment and troubleshooting. With its easy-to-carry portable enclosure, TimeAnalyzer 7500 is designed for use in the field as well as in the lab.
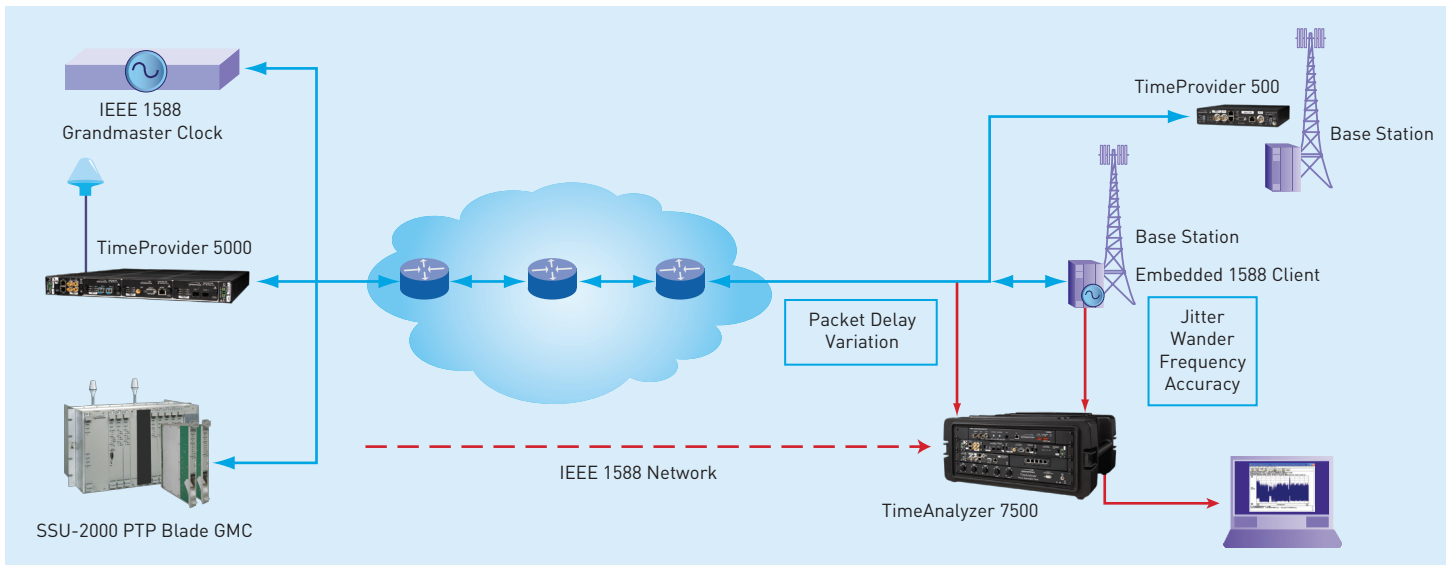
IEEE 1588 packets may traverse a broad range of networks – such as Ethernet, Digital Subscriber Line (xDSL), Gigabit Passive Optical Network (GPON), and Microwave – under a variety of traffic conditions. By measuring Packet Delay Variation (PDV), users can characterize a network and determine its suitability for delivering sync packets. TimeAnalyzer 7500 can also measure and analyze traditional synchronization signals, allowing users to validate the synchronization outputs of independent PTP clients. Both types of measurements are essential to ensure reliable synchronization.

Using a hardware time-stamp processor that delivers nanosecond caliber-timing accuracy, and a comprehensive computation engine, TimeAnalyzer 7500 collects and analyzes PTP data in real-time and provides graphical displays off-line. Measurements include Packet Delay Variation (PDV), Minimum Time Deviation (MinTDEV), band TDEV, percentile TDEV, MATIE, MAFE, and Min Time Dispersion. TimeAnalyzer 7500 also features a set of masks in the packet domain that correspond to the masks in the synchronization domain, as defined by Telecommunication standards. These masks help determine if the PTP packet flow delivered over the network meets the synchronization criteria for the application and allows TimeAnalyzer 7500 to present a very intuitive and user-friendly PASS/FAIL result. The packet synchronization masks include:

- packetTDEV sync mask
- packet TDEV traffic mask
- packetZTIE sync mask
- packetZTIE traffic mask
- packetZTIE_wireless_1ppb mask
- packetZTIE_wireless_15ppb mask

TimeAnalyzer 7500
Measurement and Analysis Test System

Diagram labels:
- IEEE 1588 Grandmaster Clock
- TimeProvider 5000
- SSU-2000 PTP Blade GMC
- TimeProvider 500
- Base Station
- Base Station
- Embedded 1588 Client
- Packet Delay Variation
- Jitter Wander Frequency Accuracy
- IEEE 1588 Network
- TimeAnalyzer 7500

TimeAnalyzer 7500 can also perform physical-level frequency and phase measurements using frequency signals delivered through E1. TimeAnalyzer 7500 generates various performance data, including MTIE, TDEV, frequency deviation, and fractional frequency offset, which can be compared against Telcordia, ANSI, ETSI, or ITU-T requirement masks.

With an easy-to-use GUI for initiating measurements and analyses, TimeAnalyzer 7500's software enables users to quickly configure a test system and collect PTP timestamp data for PDV analysis. Users can collect data using a wide range of sampling rates (1Hz to 64Hz) to allow for pattern and trending analysis. The timestamp data can also be saved into a file and exported to a network emulator system for traffic simulation and playback. This export function provides a complete integration path to test the PTP network using traffic simulation and verification for R&D development, network planning, and network troubleshooting.

APPLICATIONS

With a combination of various components in the TimeAnalyzer 7500 platform, it supports applications for synchronization measurement such as:

• R&D engineering lab for development test and verification

• Network characterization, qualification, and planning

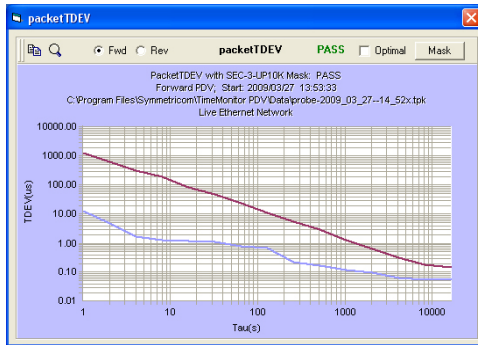• Packet synchronization deployment and verification

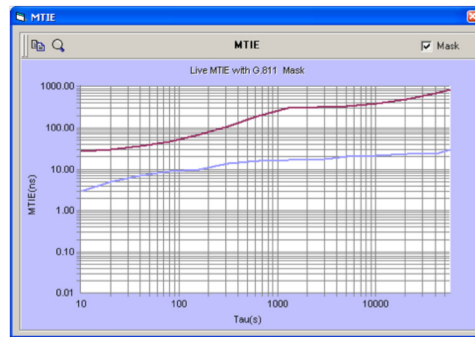# GRAPHICAL USER INTERFACE DISPLAYS OF MEASUREMENTS AND ANALYSES
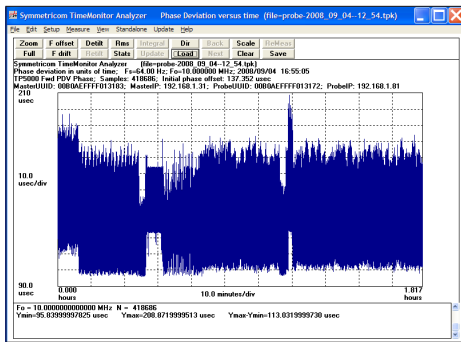
PDV measurement
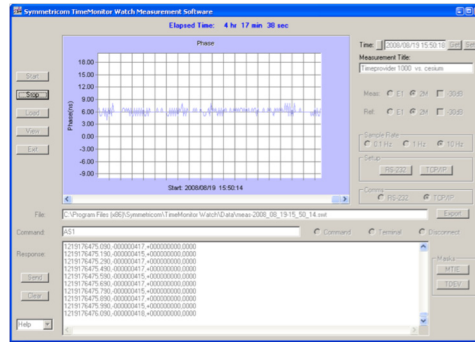
Frequency Measurement

PacketTDEV Measurement with Pass Indication

MTIE measurement with G.811 mask

SPECIFICATIONS

MEASUREMENT INTERFACES
- Packet Timing
  - o 2 x 100/1000 Ethernet (IEEE 1588) on Electrical or Optical
- Traditional Synchronization
  - o 1 x E1 (2.048 MHz – G.703-13 or 2.048Mbps - G.703-9) on BNC

REFERENCE CLOCK INPUT
- GPS
- E1

OUTPUT
- 1 x 10MHz
- 1 x 1PPS
- 2 x E1 (2.048 MHz) mini BNC - G.703-13

AUX OUTPUT
- 1 x E1 (2.048 MHz) BNC – G.703-13

LEDs
- GPS
- Power
- Alarms
- SYS

MEASUREMENT ACCURACY
- Packet timing measurement
  - o 10 ns
  - o Internal sampling rate: ranges from 1 packet per second to 64 packets per second
- Traditional synchronization measurement
  - o Meets PRC/Stratum One MTIE masks, dependent on the stability and accuracy of the customer supplied reference
  - o MRTIE resolution 1 ns
  - o Internal sampling rates: 80 samples per second
  - o Samples averaged to 10, 1, or 0.1 samples per second

HARDWARE MODULE
- TP5000 – IMC, IOC (Rubidium Clock), I/O cards
- TP500
- TimeWatch
- 4-port Ethernet Switch

SOFTWARE AND SPECIFICATION
- TimeMonitor Measurement & Analysis Software
- Runs on Microsoft Windows 95, 98, Me, NT, 2000, XP, and Vista
- Processor Pentium IV2.0 GHz or higher
- RAM 512 MB or higher
- Hard disk space 6GB or higher
- Display XGA (1024x768) minimum

MANAGEMENT INTERFACE
- RS232
- RJ45 Ethernet

POWER SUPPLY
- 110/220 VAC, 50/60 Hz

ENVIRONMENTAL
- Operating temperature: -5°C to +45°C
- Storage temperature: -25°C to +60°C
- Operating humidity: 5% to 95% RH

PHYSICAL SPECIFICATION
- Weight: 48 lbs
- 609 mm W x 609 mm D x 279 mm H (24 in W x 24 in D x 11 in H)

SAFETY
- CE Mark
- RoHS
- EN61010
- EN61326
- CB Scheme