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TimeMonitor Suite

Advanced Synchronization Measurement Analysis Suite

Key Features

TimeMonitor Analyzer Application

- Multiple vendor support: counters, jitter/wander test sets, GPS/SSU/BITS
- Multiple signal capability
- Extensive & flexible analysis
- Packet timing analysis (NTP, IEEE 1588 PTP, QoE)
- Test to ITU-T, ETSI, ANSI and Telcordia requirements
- Works with TimePictra and all TimeMonitor Applications

TimeMonitor Measurement Application

- Make jitter and wander measurements with portable, off-the-shelf counters
- Up to eight signals measured simultaneously with one computer
- Connect telecom traffic signals such as DS1 and E1 signals directly to the counters

TimeMonitor Retrieve Application

- Collect data or make live measurements using Microsemi network elements

TimeMonitor XLi Application

- Make XLi 1 PPS or 1/5/10 MHz measurements

TimeMonitor PDV Application

- Make IEEE 1588 or NTP PDV measurements

TimeMonitor TSC Application

- Make remote TSC 5120/15A live phase, phase noise, ADEV measurements

TimeMonitor Analyzer Application: Analyzing Network Sync Measurements

The Microsemi® TimeMonitor Analyzer Application is an advanced synchronization measurement analysis tool with the ability to import and analyze data from a number of sources. These include dedicated jitter/wander test sets used in networks and labs throughout the world, GPS/SSU/BITS equipment capable of making measurements, packet timing data using timestamped NTP or IEEE 1588 packets, and counters using the companion TimeMonitor Measurement application.

Three Principal Use Cases for the TimeMonitor Analyzer Application

1. As a tool for bringing together synchronization measurement data from a variety of sources and performing a wider range of analysis functions.
2. As a companion to the TimeMonitor Measurement/Retrieve/XLi /packet delay variation (PDV)/time stamp counter (TSC) applications for making and analyzing measurements.
3. As an analysis option for measurement-capable, GPS/SSU/BITS network synchronization equipment, particularly in conjunction with the TimePictra® element management system.

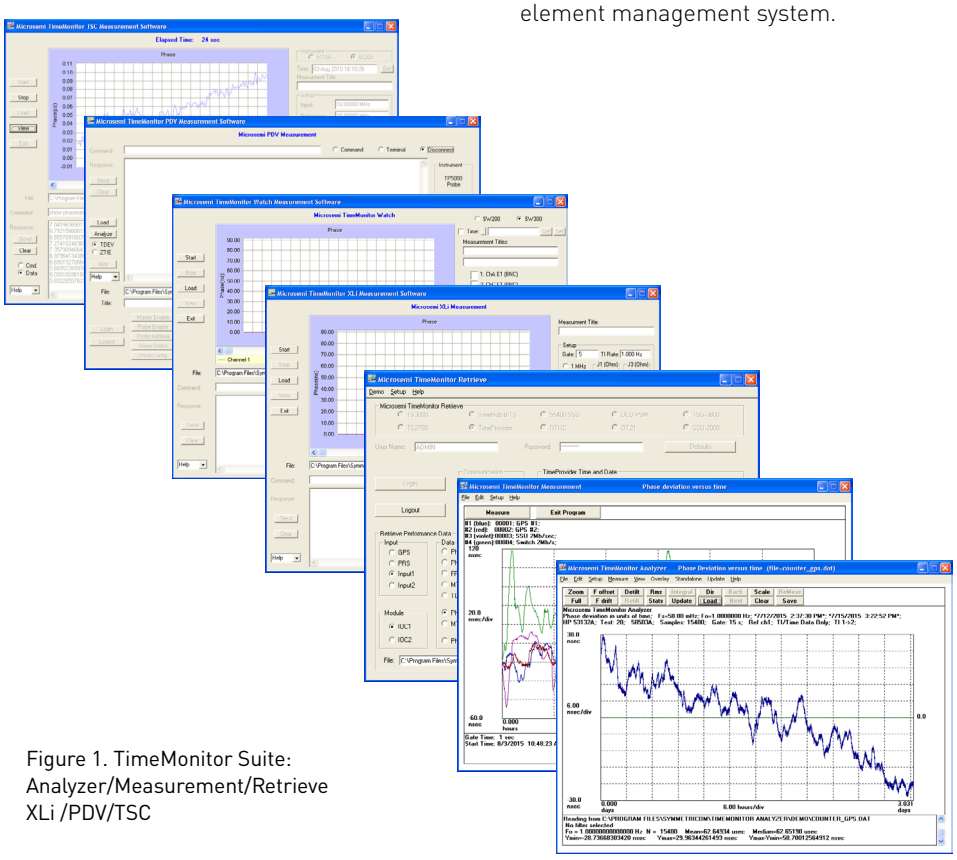


Figure 1. TimeMonitor Suite: Analyzer/Measurement/Retrieve XLi /PDV/TSC

TimeMonitor Suite

Analyze and Compare Multiple Signals

Phase, frequency, MTIE, TDEV, ADEV, and MDEV results from multiple measurements can be overlaid on the same graph. This allows, for example, comparison of equipment inputs and outputs or comparison of a number of signals measured at a particular site. Up to eight measurements can be placed on a single graph. Graphical subtractions can be performed on phase and frequency results.

Multiple Vendor Support

Data from a variety of industry-standard jitter/wander test equipment from a number of vendors can be imported into the application. Also, data from the companion application, TimeMonitor Measurement, which is itself multi-vendor, can be analyzed. Finally GPS, SSU, and BITS network equipment measurement data can be imported and analyzed, including data collected by Microsemi's TimeScan, BTMon, and the TimePictra network management system.

Extensive and Flexible Analysis Capability

In addition to the standard phase deviation (TIE), MTIE, and TDEV displays, a host of other analysis functions are available. Frequency can be computed in seven different ways, including five types of plots and two ways of computing frequency offset or accuracy. Other analysis includes Allan Deviation (ADEV), Modified Allan Deviation (MDEV), FFT's, histograms, and statistics. It is possible to zoom in on a section of data and then compute MTIE or TDEV on that section. In addition, a portion of a data set can be extracted to produce a new data file which can itself be analyzed separately.

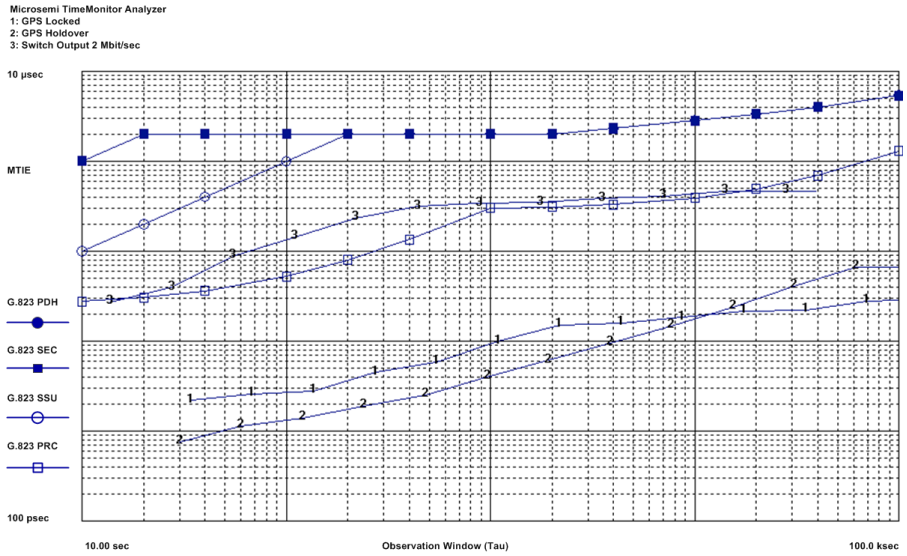


Figure 2. Three MTIE Measurements Compared to Four Telecom Masks

Remove Frequency Offset/Drift and Apply Filters

Using a least square fit calculation to a line or curve, the effects of oscillator frequency offset or drift can be removed. The adjusted data is then used for all calculations. Digital low-pass, high-pass, and band-pass filters can also be applied, with user-selectable cut-off frequencies. Thus wander can be analyzed with jitter removed and vice versa. Non-uniformly sampled data can be resampled to produce a uniformly sampled set of data prior to the application of filtering. Time and phase units are also user-settable. Clicking on a plot or applying a cursor shows the instantaneous time and date.

Customizable Display

The display is customizable through either the Display Setup or by using the mouse. Zooming is a simple, mouse-driven operation. The Display Setup provides complete control over the graph allowing the user to set minimum and maximum x and y axis values as well as x and y grid values. There are five lines of text available for graph titles.

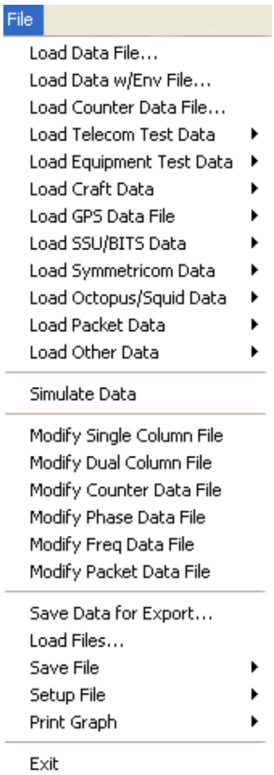


Figure 3. Examples of Data Formats and Analysis Types

TimeMonitor Suite

Built-in Telecom Masks

The application includes numerous telecom masks supplied from ITU-T, ANSI, ETSI, and Telcordia. Updating these masks or adding new ones is as simple as typing values in a text editor.

Integration with the TimeMonitor Measurement/Retrieve/XLi /PDV/ TSC Applications

The TimeMonitor Analyzer and the TimeMonitor Measurement have been designed to work together. While the Measurement application is in the process of making live measurements, a click of the copy button makes a snapshot of all the measurements available to the Analyzer application without any interruption to the measurements (see Figure 5). Likewise, TimeMonitor Analyzer imports all files produced by TimeMonitor Retrieve XLi, PDV, and TSC applications.

To enhance the postprocessing of these measurement files, sections of data can be extracted into new files, measurement glitches fixed, phase gaps filled, or data file size reduced by decimation. These and many of the other available functions are shown in Figure 6. These functions are available not only to measurement files produced by TimeMonitor Measurement, Retrieve, XLI, PDV, and TSC, but can also be applied to any of the data imported into TimeMonitor Analyzer. In addition, a number of functions such as file delimiting are available at the time of data import.

Exporting Data and Graphs

Graphs can be easily exported to slideshows or word-processing applications, enabling rapid preparation of documents or reports on network synchronization performance. Graphs can also be printed directly from the Analyzer application. In addition, data can be exported to spreadsheets or math applications for customized analysis.

Online Help

There is an interactive on-line help system that guides the user through options, as well as describing some of the analysis algorithms. The online help documentation is supplemented with a readme file, also accessible directly as a TimeMonitor Analyzer menu command. Also, a manual is supplied in electronic form as a PDF document.

TimeMonitor Measurement Application: Measuring the Synchronization Network

The TimeMonitor Measurement application provides a portable, inexpensive means of evaluating network jitter and wander. Together with its companion TimeMonitor Analyzer application, it enables a synchronization engineer to ensure network and equipment compliance with ITU-T, ETSI, ANSI, and Telcordia requirements (see Figure 8).

The TimeMonitor Measurement application provides an inexpensive solution in two ways. First, it allows the use of inexpensive, off-the-shelf, counters for synchronization measurements. Second, its expansion capabilities allow a single computer to control up to eight counters simultaneously.

Multiple Vendor Support

Counters from Agilent®/HP®, Stanford Research Systems®, Fluke®, Pendulum®, and Racal® are supported by the applications.

Multiple Interface Support

The TimeMonitor Measurement application supports LAN, USB, GPIB, RS-232, and TCP/IP connections. In the case of GPIB connections, National Instruments and Agilent interfaces are supported. LAN connectivity makes measurements over long distances possible.

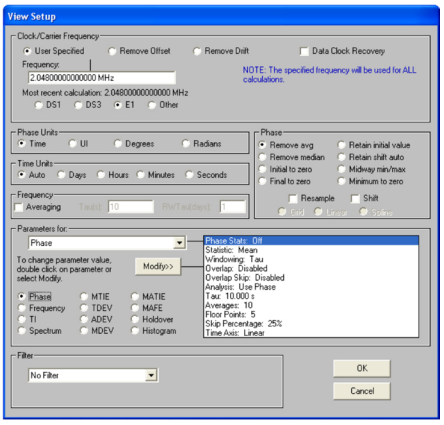


Figure 4. Setting Up View Details



Figure 5. TimeMonitor Analyzer and Measurement work together



Figure 6. Phase File Data Processing and Analysis

TimeMonitor Suite

Flexible Sample and Signal Rates

Signal rates from 1PPS (1 Hz) to DS1 (1.544 Mb/s) to E1 (2.048 Mb/s) to 10 MHz and above can be measured with this system. Sample rate is also selectable with possible measurement durations ranging from seconds to weeks or months.

Analyze Live Measurements or Completed Measurements

With the press of a button, snap-shot copies of ongoing measurements are made allowing extensive analysis such as zooming, MTIE, TDEV, frequency calculations, statistics, and fast Fourier transforms using the companion TimeMonitor Analyzer application. The Analyzer application is also used to perform analysis on completed measurements.

Multiple Signal Measurements

The TimeMonitor Measurement application supports up to eight simultaneous measurements with the GPIB and TCP/IP interfaces and up to 4 signals simultaneously with RS-232 interfaces. This can save considerable time when a number of signals at a site must be tested for long-term wander versus measuring them one at a time. It is also useful for testing the input to and output from a particular device in order to assess its transfer characteristics.

TimeMonitor Suite Specifications

- Runs on Windows® XP, Vista, 7
- Processor Pentium IV 2.0 GHz or higher
- RAM 2 GB or higher
- Hard disk space 25 GB or higher
- Display XGA (1024x768) minimum

TimeMonitor Suite Applications

- TimeMonitor Analyzer: imports and analyzes synchronization measurement data from a variety of sources and performs a wide range of analysis.
- TimeMonitor Measurement: performs inexpensive multiple channel synchronization measurements using off-the-shelf counters with live phase/frequency display.
- TimeMonitor Retrieve: collects live or archived measurement data from Microsemi synchronization equipment.
- TimeMonitor XLi: performs XLi PPS or 1/5/10 MHz measurements with live phase/frequency display.
- TimeMonitor PDV: performs PDV IEEE 1588 PTP probe or NTP probe measurements using the TP5000.
- TimeMonitor TSC: performs live phase, phase noise, or ADEV measurements remotely using the TSC 5115A/5120A test set.

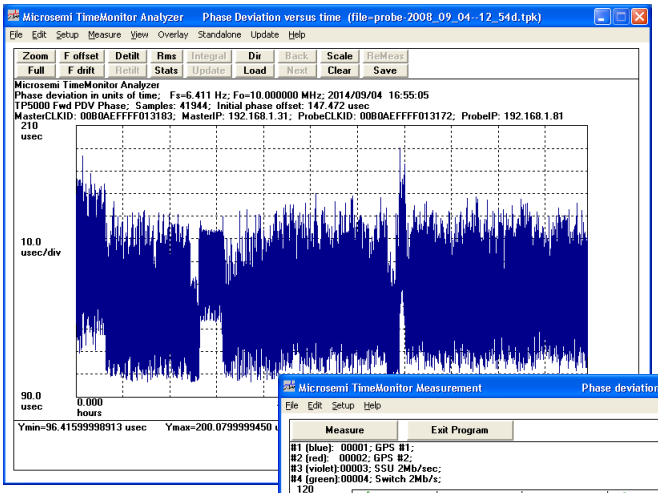


Figure 7. Plot with PDV Analysis

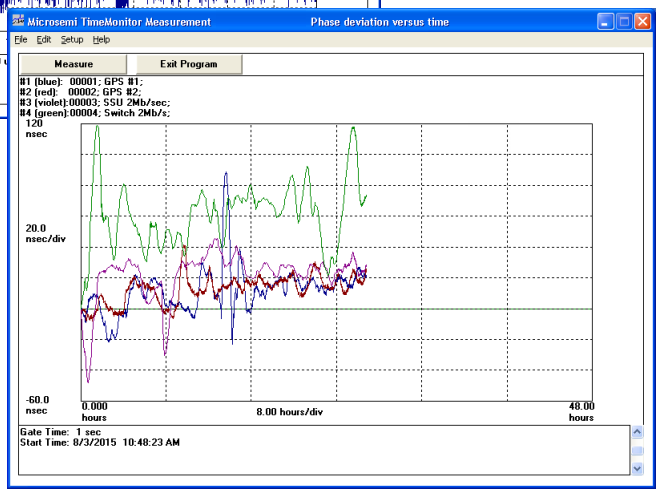


Figure 8. TimeMonitor Measurement Plot



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