TimeMonitor Software

TIMEMONITOR ANALYZER SOFTWARE

· Multiple Vendor Support
  – Counter and Time Interval Analyzer Data
  – GPS/SSU/BITS Data
  – Jitter/Wander Testset Data

· Multiple Signal Capability

· Extensive and Flexible Analysis

· Test to ITU-T, ETSI, ANSI and Telcordia Requirements

· Works with TimePictra, TimeScan, and TimeMonitor Measurement Software

· Runs on Windows® 95, 98, Me, NT, 2000, XP

TIMEMONITOR MEASUREMENT SOFTWARE

· Make Jitter and Wander Measure-ments 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

· Perform Extensive Analysis on Collected Data with the Companion Software TimeMonitor Analyzer

· Measure with GPIB, RS-232, or TCP/IP Interfaces

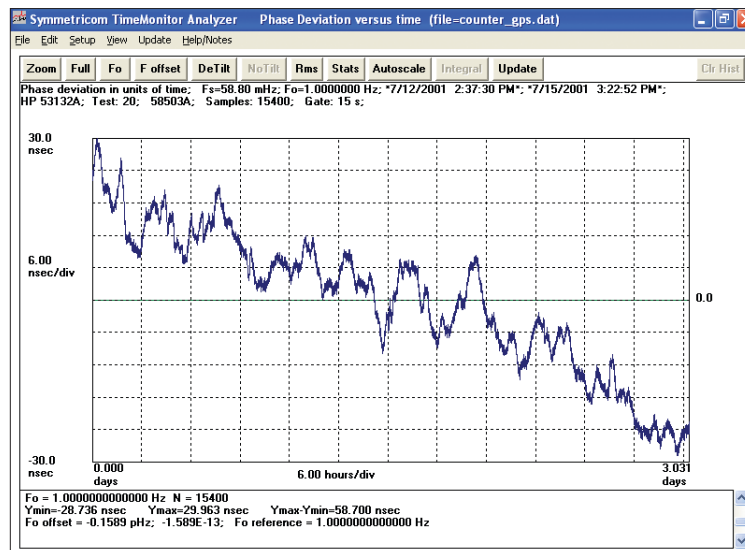· Runs on Windows® 95, 98, Me, NT, 2000, XP

FIG.1 Phase deviation plot vs. time

TimeMonitor Analyzer Software: Analyzing Network Sync Measurements

The TimeMonitor™ Analyzer Software 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 testsets used in networks and labs throughout the world, GPS/SSU/BITS equipment capable of making measurements, and counters using the companion software, the TimeMonitor Measurement Software.

The Three Principal Applications for the TimeMonitor Analyzer Software are:

1. As a tool for bringing together synchroniza-tion measurement data from a variety of sources and performing a wider range of analysis functions

2. As a companion to the TimeMonitor Measurement Software 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
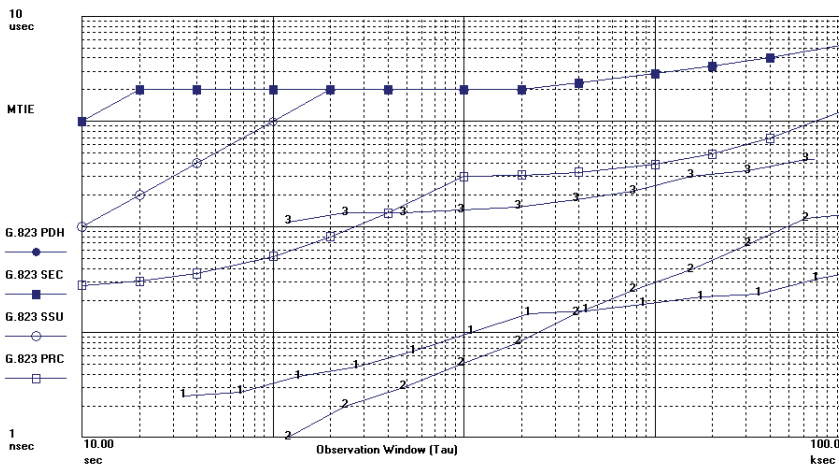
FIG.2 Four MTIE measurements compared
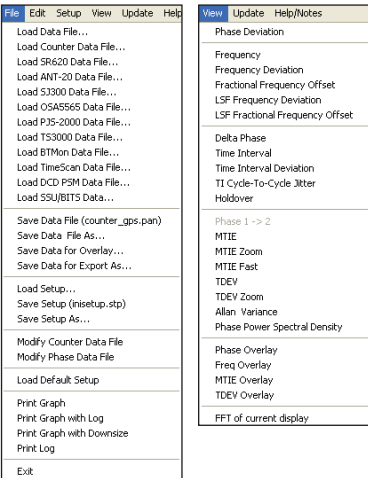
FIG.3 Examples of data formats and analysis types

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 Variance, 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.

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.
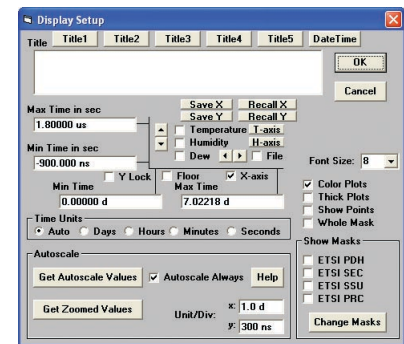
Analyze and Compare Multiple Signals

Phase, frequency, MTIE, and TDEV 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 software, 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 Symmetricom's BTMon, and the TimePictra network management software.

FIG.4 Setting up view details

Customizable Display

The display is customizable through either the Display Setup or by using the mouse. (See Fig.4) 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.

Built-In Telecom Masks

The software 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 Software

The TimeMonitor Analyzer and the TimeMonitor Measurement have been designed to work together. While the Measurement Software 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 Software without any interruption to the measurements. (See Fig.5)

FIG.5 TimeMonitor analysis and measurement work together

To enhance the postprocessing of these measurement files, sections of data can be extracted into new files, several files combined into one, measurement glitches fixed, or data file size reduced by decimation. This is accomplished using a set of functions called "Modify Counter Data File." (See Fig.6)

Many of these same functions such as extracting a section of data or removing measurement glitches can in fact be applied to any data imported into the Analyzer using another set of functions called "Modify Phase Data File."

Exporting Data and Graphs

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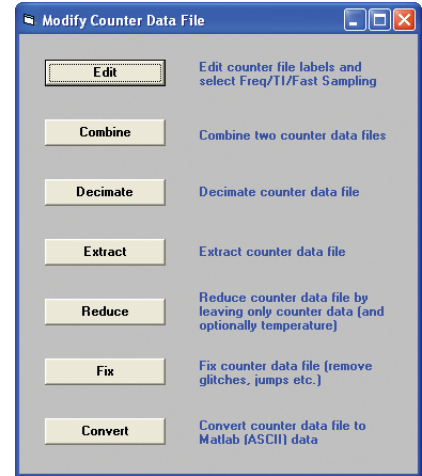

FIG.6

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.
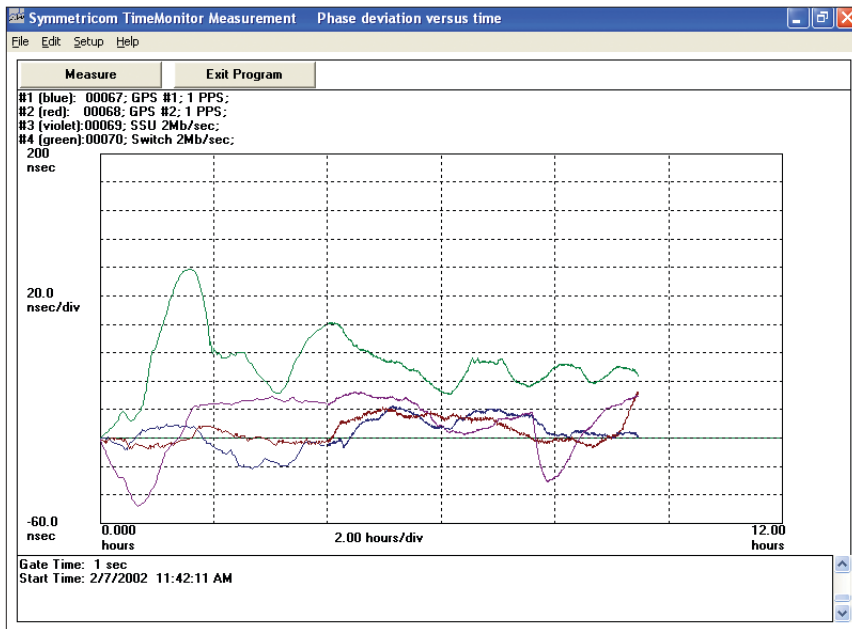
FIG.7 TimeMonitor measurement plot

TimeMonitor Measurement Software: Measuring the Synchronization Network

The TimeMonitor Measurement Software provides a portable, inexpensive means of evaluating network jitter and wander. Together with its companion TimeMonitor Analyzer Software, it enables a synchronization engineer to ensure network and equipment compliance with ITU-T, ETSI, ANSI, and Telcordia requirements. (See Fig.7)

The TimeMonitor Measurement Software 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.

Multi-Vendor Support

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

Multiple Interface Support

The TimeMonitor Measurement Software supports GPIB, RS-232, and TCP/IP connections. In the case of GPIB connections, National Instruments and Agilent cards are supported. TCP/IP connectivity is possible with a terminal server, which makes measurements over long distances possible.

Flexible Sample and Signal Rates

Signal rates from 1 PPS (1 Hz) to DS1 (1.544 Mbps) to E1 (2.048 Mbps) 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 Software. The Analyzer Software is also used to perform analysis on completed measurements.

Multiple Signal Measurements

The TimeMonitor Measurement Software 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.

The signals need not be at the same rate. It is possible, for example, to measure 1 PPS, 1.544 Mbps, 2.048 Mbps and 10 MHz signals simultaneously.