SyncSystem 4380A with Multi-Channel Measurement Modules

Overview

Microchip's SyncSystem 4380A can now be equipped with the 4382A Phase Measurement and 4393A Time Interval Counter modules to deliver a flexible, multi-channel measurement system that is ideal for high-resolution applications. This advanced instrument offers customers a cost effective way to measure the phase difference between multiple signals, ranging from a base configuration of 4-signal inputs on a single module to larger quantities in a single and multi-chassis configuration.

SyncSystem 4380A

4382A Phase Measurement Module

4393A Time Interval Counter Module

Key Benefits

- SyncSystem 4380A Multi-channel Measurement System can be flexibly configured with plug-in cards for phase and time interval measurements
- Measurement reference can be configured with either an internal clock, GNSS or external frequency reference
- Low-noise performance enables accurate measurement of atomic clocks
- Standard 19-inch rack mount chassis with hot-swappable AC or DC power supplies
- Mult-channel measurement software (MeasDB) provides centralized database of measurement data accessible using a web browser
- Measurement data from MeasDB can be easily imported into TimeMonitor software for signal analysis
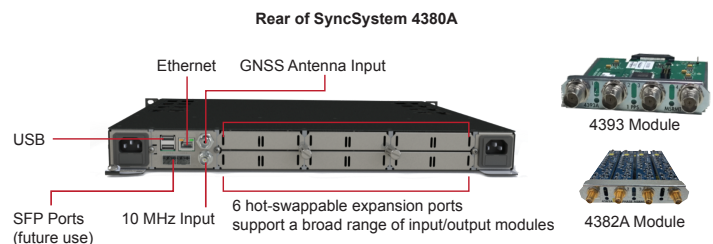
Summary

Known for its high-performance signal distribution, the SyncSystem 4380A can now be configured for high-resolution signal measurements. Using either the internal atomic clock, external reference, or GNSS, high-resolution phase and time measurements can be stored and managed. Complimented with a suite of analysis software, metrology labs, ground stations, aerospace and defense applications can benefit from this scalable phase and time acquisition solution.

Operation

The 4382A is a four-channel phase measurement card capable of measuring the phase of 5MHz or 10MHz signals to high precision. The 4382A includes a multiple mixer measurement system all contained on a single plug-in card. The 4382A module measures the phase difference between an RF signal from the clock under test and a reference RF signal. The 4382A card can be configured to use the internal timebase of the SyncSystem 4380A or one of the four ports of the card can be configured as the reference RF signal. The SyncSystem 4380A uses measured IF phase differences to compute input phase at a resolution of better than 100 femtoseconds.

The 4393A Time Interval Module can measure the 1PPS of up to four different devices relative to the internal clock of the SyncSystem 4380A. Measurements are real-time with user programmable averaging periods ranging from 1 to 300 seconds.

Rear of SyncSystem 4380A

Ethernet

GNSS Antenna Input

USB

SFP Ports (future use)

10 MHz Input

6 hot-swappable expansion ports support a broad range of input/output modules

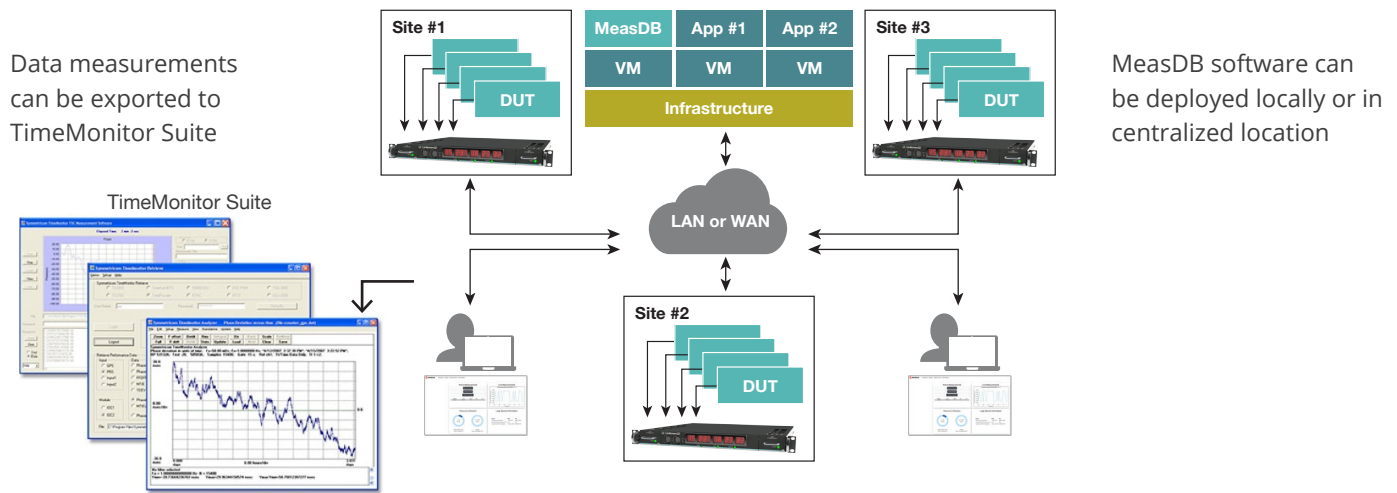4393 Module

4382A Module

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MeasDB Software

The SyncSystem 4380A equipped with 4382A and 4393A cards, can be connected to the MeasDB software to provide a powerful and versatile database measurement platform. The MeasDB software installs on a server or Virtual Machine environment to provide multiple users with access to multiple 4380A systems. Using a standard browser, an easy to use interface allows the user to select any 4380A system and any port on a 4382A or 4393A card for quick configuration and measurement set-up. The user can connect locally to the 4380A or remotely. Using MeasDB, a single user can connect to multiple 4380A systems that are deployed in different locations throughout a multi-lab (campus) type environment or in remote locations.

MeasDB Dashboard
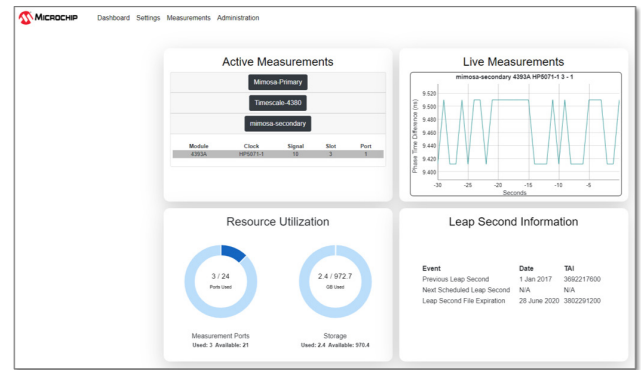
Measurement data stored in the MeasDB platform can be easily imported into Microchip's TimeMonitor Suite for detailed analysis. Performance metrics such as ADEV, TDEV, MTIE and many other calculations can be executed with a single push of a button by TimeMonitor and compared to a wide variety of industry performance masks.

Data measurements can be exported to TimeMonitor Suite

TimeMonitor Suite

MeasDB software can be deployed locally or in centralized location

Specifications

4382A Phase Measurement Module

Performance

- Allan Deviation (using one 10 MHz port as reference)
  - 1 sec   2E-13
  - 10 sec   2E-14
  - 100 sec   2E-15
  - 1000 sec 4E-16
- Resolution: Less than 100 femtoseconds

Electrical

- Number of Inputs: 4
- Input connectors: SMA
- Input Impedance: 50Ω
- Input Frequency: 5 MHz or 10 MHz (per card with automatic sensing)
- Input Signal Level: 3 dbm to 17 dbm

4393A Time Interval Counter Module

Performance

- Accuracy: < ±500 ps to internal 1 PPS
- Resolution: < ±50 ps

Electrical

- Number of Inputs: 4
- Input connectors: BNC (F)
- Input Impedance: 50Ω
- Input Voltage (50Ω): 5 Vpk
- Minimum Input Pulse Width: 10 μs
- Maximum Input Pulse Width: 500 ms

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