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.

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
- Easily expandable by incorporating up to six modules which are hot-swappable
- Graphical interface available using MeasDB application
- Measurement data can be easily imported into TimeMonitor software for further analysis

Operation
The 4382A is a phase measurement module using a multiple mixer measurement system all contained on a single plug-in card. When installed in the SyncSystem 4380A, the module measures the phase difference between an RF signal from the clock under test and a reference RF signal that is common to all measurement channels on the four-channel measurement module. An internal numerically controlled oscillator within the SyncSystem 4380A provides the reference RF signal. Phase differences are measured directly rather than by using time differences because the phase measurements do not require knowledge of absolute frequency. The measured phase differences are then converted to nominal time differences with measurement 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.

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. Complemented with a suite of analysis software, metrology labs, ground stations, aerospace and defense applications can benefit from this scalable phase and time acquisition solution.

www.microchip.com
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 any standard Virtual Machine environment to provide multiple users with access to multiple 4380A systems. Using a standard browser, an easy to use interface allows you to select any 4380A system and any port on a 4382A or 4393A card for quick configuration and measurement set-up. You can connect locally to the 4380A or remotely. Further, a single user can connect to multiple 4380A systems that are deployed in different locations throughout a multi-lab (campus) type environment.

Measurement data that is 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.

Specifications
4382A Phase Measurement Module
Performance
- Allan Deviation: $< 1.0 \times 10^{-12}$ at 5 MHz
- Allan Deviation: $< 5.0 \times 10^{-13}$ at 10 MHz
- 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: $< \pm 500$ ps to internal 1 PPS
- Resolution: $< \pm 50$ 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

www.microchip.com