

# National Metrology Labs

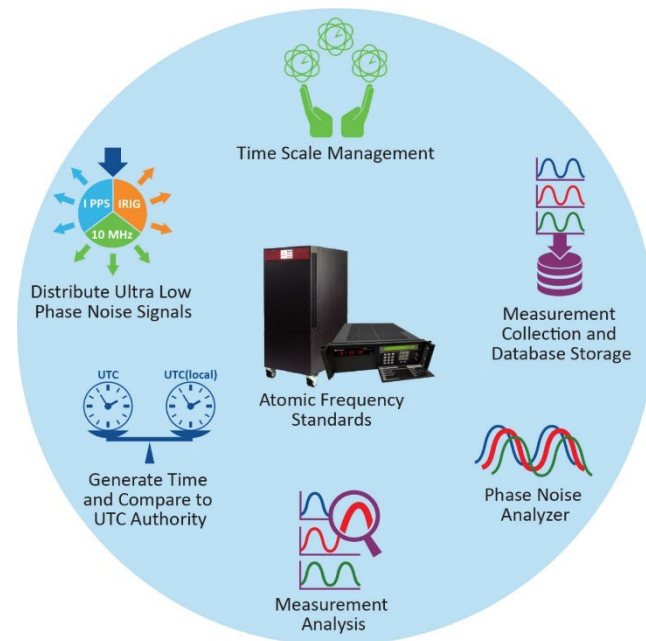
## Add More Capability to Your Atomic Clocks to Create UTC-Traceable Time

We are the market leader in providing atomic frequency standards to metrology laboratories across the globe. Our state-of-the-art facilities manufacture the 5071A and 5071B cesium references with accuracies as low as  $5E-13$ , with no systemic frequency drift during the operational life of the unit and no need for calibration. The MHM-2020 active hydrogen maser uses stimulated emissions to generate the hyperfine transition frequency of ground-state hydrogen atoms. The resulting stabilities, when measured over intervals of 1 second to 1,000 seconds, are the highest for any commercially available clock.

### Time and Frequency Development Tools

Metrology labs, academic research institutions and commercial laboratories require a powerful set of time and frequency tools to optimize the use of their atomic clocks as part of their research projects. These tools need to be capable of capturing, storing, managing and analyzing a variety of clock properties.

As the market leader in the development and production of atomic clocks, we offer a variety of time and frequency tools to measure short-term phase noise, long-term wander or more often a combination of clock characteristics. Our time and frequency measurement instruments and supporting software suites can help you achieve the highest level of precision, efficiency and reliability in your time and frequency project.



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## Time and Frequency Hardware Products



### Phase Noise Analyzer

#### 53100A

- Internal Reference (IR) options for OCXOs and atomic clocks
- ADEV typically less than  $5E-15$  at  $t = 1s$ ;  $1E-16$  at  $t = 1000s$
- Close-to-carrier phase noise and AM noise at offsets from 0.001 Hz
- Single- or dual-reference oscillator inputs allow cross-correlation measurements with noise floor approaching  $-175$  dBc/Hz
- Modified Allan Deviation (MDEV), Hadamard Deviation (HDEV) and Time Deviation (TDEV)
- Jitter, residual FM and SSB carrier/noise ratio



### Generate Time and Compare UTC Authority

#### SyncSystem 4380A Time Scale Edition

- Functions as the centerpiece of a time scale system
- Multi-channel measurement system to measure member clocks
- Ensemble and time scale algorithms to combine clocks into one output
- Delivers local realization of UTC and contribution to worldwide UTC time scale
- Includes GNSS common view and related reports for interfacing with BIPM



### Distribute Low-Phase-Noise Signals

#### 6300 Series

- Modular and intelligent switching and distribution system providing ultra-low-noise phase performance
- Support for a wide range of signal formats including low-noise sine waves, IRIG timecodes and pulse formats
- Available in both a 1U and 4U rack-mount chassis with plug-in modules that are hot swappable and interoperate in both chassis types
- Redundant and hot-swappable power supplies configurable for AC/AC, DC/DC or AC/DC

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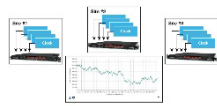
## Time and Frequency Software Products



### Time Scale Management

#### Time Scale Orchestrator

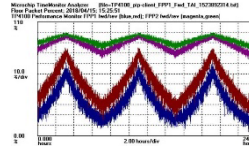
- Integrated management, monitoring, alarming and reporting of a time scale system
- Dashboard that provides a complete view of the system operation
- Real-time and historical plotting of the time scale performance relative to the selected truth source
- Database for long-term storage of common view reports, clock reports and TAIPPP reports



### Measurement Collection and Database Storage

#### MeasDB Software

- Flexibly configured with plug-in cards for phase and time interval measurements
- Measurement reference can be configured with an internal clock, GNSS or external source
- MeasDB software enables measurements to be made across multi-lab (campus) type environments



### Measurement Analysis

#### TimeMonitor Software

- Analysis for both one-way and two-way time and frequency packet measurements
- Advanced synchronization performance analysis tool
- Extensive and flexible analysis capability
- Multiple test set vendor support
- Test to ITU-T, ETSI, ANSI and Telcordia requirements



### Atomic Clock Analysis

#### Clockstudio Software Tool

- Monitor and control multiple clock devices with one intuitive GUI
- View device status, information, documentation and web pages
- Adjust frequency, time of day, 1 Pulse Per Second (1 PPS) disciplining, pulse width and more
- Upload latest firmware to device
- Import data with our TimeMonitor analysis software for additional processing
- Support for the 5071B cesium clock added to version 1.1