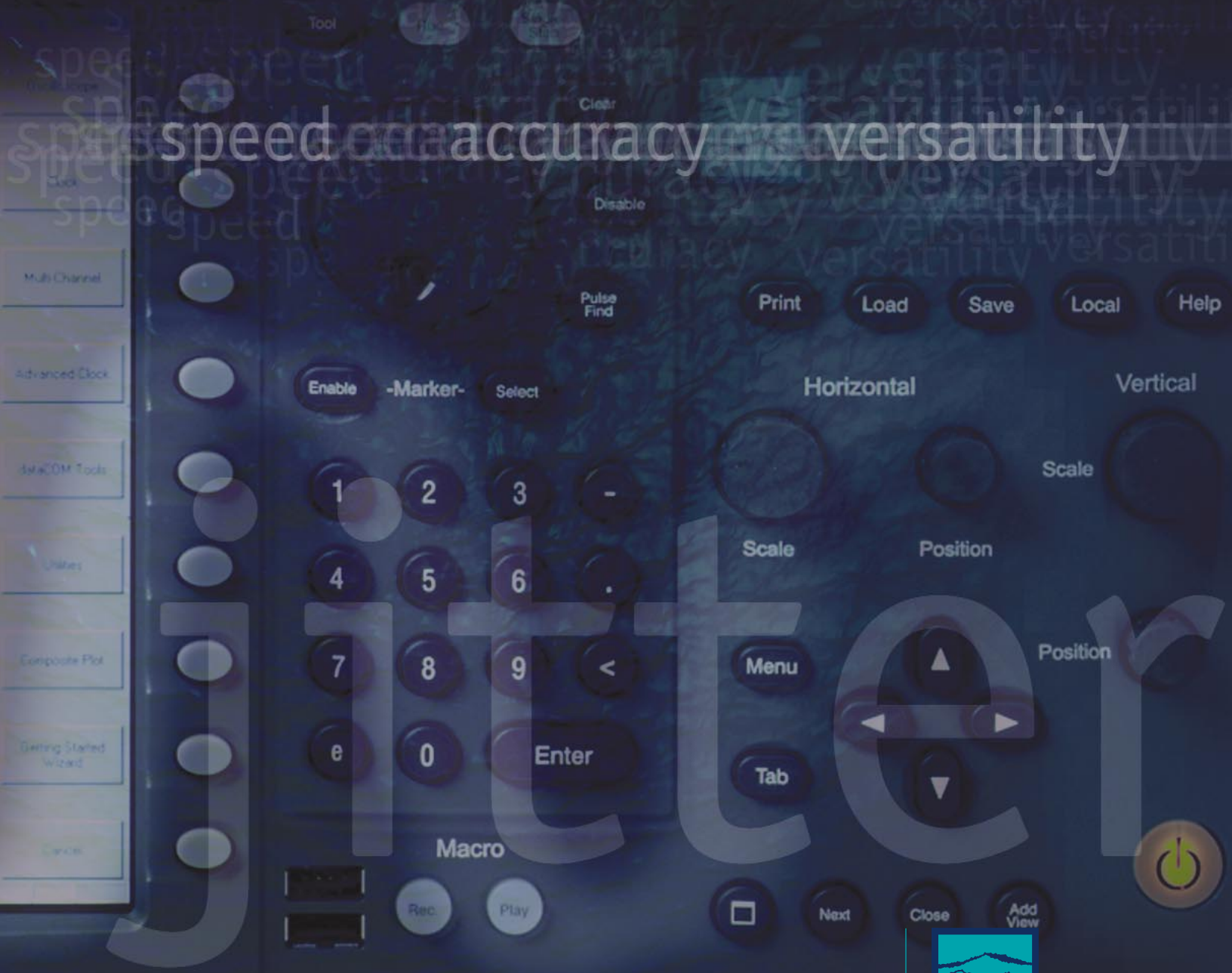


# WAVECREST SIA-3000

THE  
REFERENCE  
STANDARD  
FOR  
SIGNAL  
INTEGRITY  
ANALYSIS

speed of accuracy and versatility



**WAVECREST**  
A TECHNOLOGIES COMPANY

IN 6 DC to 3 GHz IN 7 DC to 3 GHz IN 8 DC to 3 GHz IN 9 DC to 3 GHz IN 10 DC to 3 GHz  
IN 6 IN 7 IN 8 IN 9 IN 10

Large, high-resolution color display makes it easy to see multiple analysis tools.

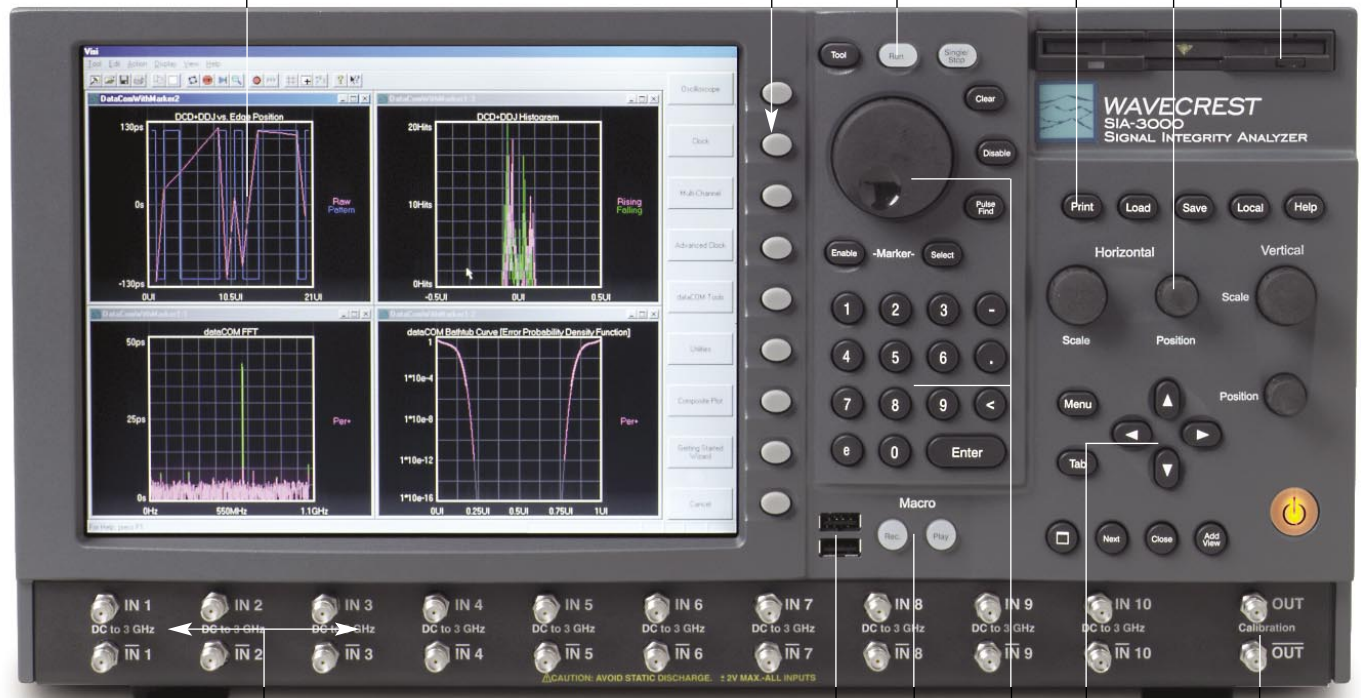
File input/output function buttons load and store measurement data, tool configurations and data patterns.

Tool function buttons display tool selections, start/stop measurements, continuous run or clear current display measurements.

Tool/field selection and input buttons.

Horizontal and vertical controls adjust scale and position viewing characteristics.

120 MB Superdisk drive provides PC compatibility, data loading and archiving.



Measurement channels configurable with up to 10 channel cards.

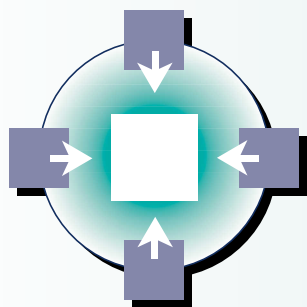
USB connectors for auxiliary devices, such as keyboard and pointing devices.

Macro buttons simplify frequent keystroke sequences with one-button acquisition.

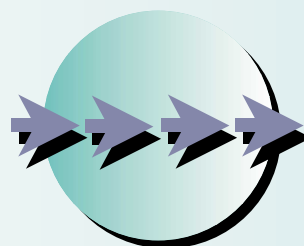
Keypad for active field data entry. Dial varies values or scrolls through choices.

Calibration source.

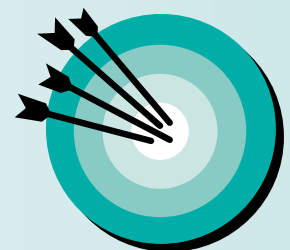
Menu selection activates pull-down menus, allows navigation of choices and online help. Display controls scroll through open/close tools, add views and maximize window.



**Versatility**



**Speed**



**Accuracy**

**Simple operation**

With the rapid increase of clock speeds and data rates due to the exponential growth in data transmission, test engineers and production managers are coming to grips with a new market reality: If you want to ensure signal integrity, you have to control jitter. That’s exactly why you need the **WAVECREST** SIA-3000™ family of instruments. These powerful new test and measurement solutions simplify jitter analysis and deliver accurate results faster than any other instrument.

The SIA-3000 makes first-time users look like seasoned jitter experts. With its integrated display, and intuitive, pushbutton controls, you can launch multiple views of data, switch tools or scroll through windows. Plus, a setup wizard guides you through instrument configuration step-by-step for every test.

**Superior versatility**

The SIA-3000 has up to 10 fully parallel channels, and it can test multiple channels for jitter and accuracy at the same time. It provides measurement capabilities you would normally get from an oscilloscope, a bit error rate (BER) tester, a time interval analyzer and a spectrum analyzer. Plus, it has advanced jitter separation capabilities these instruments can’t offer.

**Unmatched speed-of-test**

Whether you are analyzing one signal in depth or comparing results across multiple channels, the SIA-3000 helps you perform jitter analysis significantly faster than conventional instruments. For example, it performs a thousand-sample period measurement in less than nine milliseconds. Quicker testing means higher throughput, which accelerates time-to-market, improves ROI and gives your company a solid competitive advantage.

**Unprecedented accuracy**

The SIA-3000 measures data rates up to 4.5 Gb/s with 200 femtosecond resolution and unprecedented accuracy. With this level of precision, the SIA-3000 allows you to reduce guard bands and improve yields.

**Trust the experts in jitter analysis**

Around the world, market leaders in datacom, telecom and semiconductors trust **WAVECREST** solutions to guarantee signal integrity and meet compliance standards, such as JEDEC, ANSI, IEEE and ITU. We are the leader in jitter analysis, a position we have held since 1987. And we take an active role in the education of engineers and technicians. To learn more about the SIA-3000, or to obtain a copy of “Jitter Fundamentals,” our 20-page guide to the science behind jitter analysis, please contact **WAVECREST** at 1-800-733-7128 or visit [www.wavecrest.com](http://www.wavecrest.com).

**SIA-3000 Family**

	<b>SIA-3000</b>	<b>SIA-3000P</b>	<b>SIA-3000S</b>
Maximum Frequency and Data Rate	3 GHz, 4.5 Gb/s*	3 GHz, 4.5 Gb/s*	800 MHz, 800 Mb/s*
Channel Card Upgrade Support	Standard	Standard	No
Parallel Channel Options	2, 5 or 10	2, 5, or 10	2
Integrated Color LCD Display	Standard	No	Standard
Integrated User Controls	Standard	No	Standard
Throughput Enhancement Kit Support	Optional	Optional	No
Single-ended Input Capability	Standard	Standard	Standard
Differential Input Capability	Standard	Standard	Optional

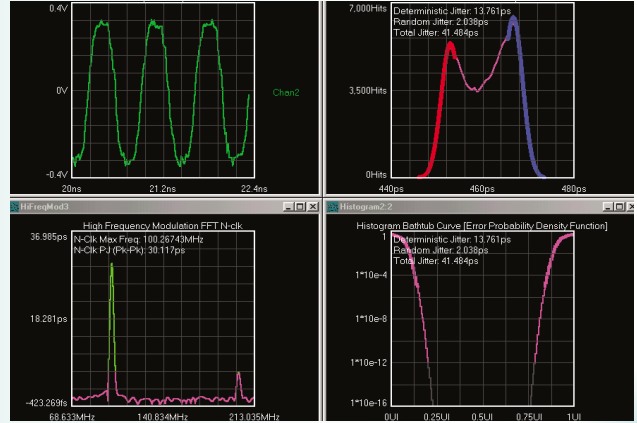
\*Based on current channel card options

The SIA-3000 achieves its analysis power through Virtual Instruments™ Signal Integrity (VISI) Software — the platform for all of your application needs. These software modules enable you to analyze jitter in a wide variety of applications. What's more, **WAVECREST** is constantly developing new modules for emerging applications in high-speed systems and components.

Identify spectral content of jitter

### Clock Analysis Module

VISI Clock Analysis Software provides the tools you need to quantify and isolate timing anomalies on clock signals. It separates random and deterministic jitter components, quantifies the frequency and magnitude of periodic jitter, and analyzes adjacent cycles of a clock signal with unprecedented speed and accuracy. Wavecrest Clock Software is ideally suited to meet the needs of oscillator, PLL, clock and clock fanout applications. With this software, even inexperienced users will be able to measure accumulated jitter, low- and high-frequency modulation, adjacent cycle jitter and lock time — quickly and easily.

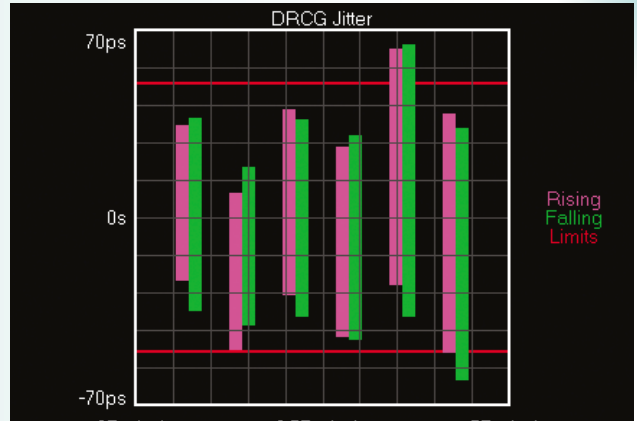


Clockwise from top left: Waveform view of clock signal. Histogram of period measurements with Gaussian tails fit to left and right sides to determine RJ and DJ. Bathtub curve used for estimating long-term reliability. High frequency modulation tool showing magnitude and frequency of a spectral component.

Complete jitter validation in seconds

### DRCG Module

VISI Direct Rambus® Clock Generator (DRCG) Validation Software enables fast, accurate verification of Rambus® licensed DRCG modules. It measures timing characteristics for adjacent clock cycles of DRCG modules, as specified in the Rambus® DRCG Validation specification. In fact, it performs all the DRCG verification tests in less than five seconds, allowing you to test more samples in less time. If the DRCG modules are out of spec, use the comprehensive analysis capabilities of the clock module to further diagnose and debug the problem.



DRCG validation tool showing adjacent cycle measurements for 1-6 cycle-to-cycle measurement for rising and falling edges. A summary table (not shown) is also generated, enabling you to "cut and paste" data into the Rambus DRCG template.

## SIA-3000

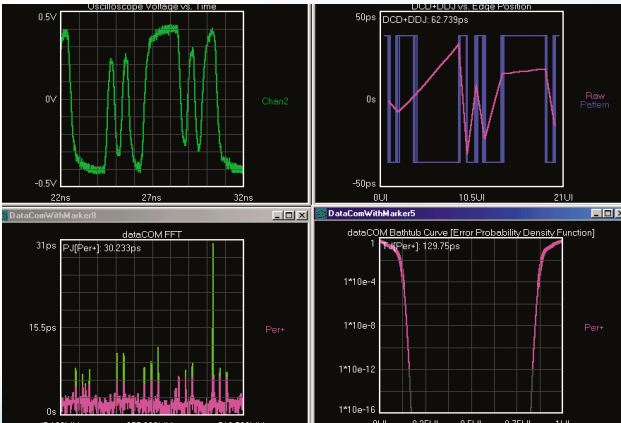
The SIA-3000 is the reference standard for signal integrity analysis. It is the only testing solution that can measure jitter in seconds, separate jitter into its random and deterministic components, and analyze jitter in a wide range of applications. All of which makes it the ideal jitter analysis solution for high-performance lab work.

## SIA-3000P

The SIA-3000P is optimized for production testing and has been successfully integrated with multiple ATE platforms. It combines the capabilities of the SIA-3000 with high-throughput production software, enabling comprehensive testing at production-level speeds. The extremely stable time base and patented algorithms ensure repeatability and reproducibility, which eliminate correlation issues back to the lab.

## SIA-3000S

The SIA-3000S is the value-priced member of the SIA-3000 family. It is ideal for test engineers who need to perform advanced jitter analysis — but have lower requirements for data rate and frequency, and do not need to test more than two channels in parallel. This affordable solution is ideal for clock applications such as oscillators, Rambus DRCG modules, USB 2.0 and Firewire applications.



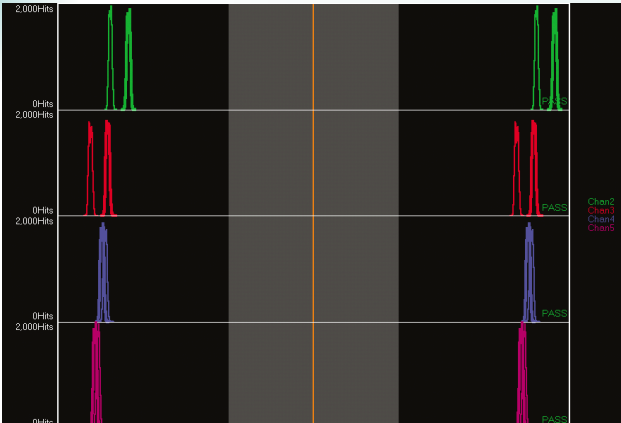
Clockwise from top left: Waveform view of data signal. DCD and ISI plot as a function of edge position in the pattern. Bathtub curve used for determining eye closure at a BER. Spectral view of the PJ components.

*Separate DJ and RJ for compliance testing*

### Datacom Module

VISI dataCOM Software performs advanced jitter analysis for Fibre Channel, InfiniBand, DVI, LVDS, Gigabit Ethernet, Serial ATA, XAUI, 3GIO and SONET applications. Patented software algorithms allow you to separate Total Jitter into its Deterministic and Random components. These analysis tools enable you to measure Total Jitter to  $10^{-16}$  BER in seconds, quantify periodic modulations due to crosstalk or EMI, measure bandwidth limitations and Gaussian noise. Data analysis can be performed with a repeating pattern and pattern marker, random data with a bitclock, or on the data alone. Multichannel measurements can be performed in parallel on up to 10 channels, ideal for multi-lane serial applications.

SI



Histograms of data edge transitions before and after the clock edge for four data channels. The gray band represents user-defined pass/fail setup-and-hold times.

*Execute multichannel timing analysis*

### Databus Module

VISI Databus Software allows you to fully characterize single-ended and differential clock and data signals for timing, clock and data jitter, clock-to-data skew, channel-to-channel skew and BER. Setup-and-hold violations can be measured based on the actual mean of the data histogram referenced to the clock edge. Setup-and-hold parameters can also be measured using a worst-case data edge location. This method — which uses the patented TailFit™ algorithm from **WAVECREST** — allows you to quickly predict long-term system reliability. VISI Databus Software is ideally suited for LVDS, Source Synchronous, Rapid IO and other databus applications.

## Optical Signal Integrity OE-2

The **WAVECREST** OE-2 optical-to-electrical converter (pictured at right with the SIA-3000) connects seamlessly with the entire family of **WAVECREST** SIA-3000 solutions. It enables high-speed design, debug, characterization and production testing of optical signals in Gigabit Ethernet, Fibre Channel, Very Short Reach (VSR), SONET, parallel 10 Gigabit Ethernet (LX4 and SX4) and InfiniBand applications. This fully integrated and calibrated instrument features four low-pass filters, four switchable amplifiers and an optical power meter.



# WAVECREST SIA-3000 Specifications

## Mainframe

Channel card options	2, 5, 10																				
Maximum frequency and data rate options	Configurable up to 3 GHz / 4.5 Gb/s*																				
Hardware resolution	200 fs																				
Data storage	10 Gbyte (minimum) internal hard drive. 3.5" MS-DOS® compatible 120MB Superdisk floppy drive																				
Typical measurement rates**	<table border="0"> <tr> <td>Hits/measurement</td> <td>10</td> <td>100</td> <td>1000</td> <td>10,000</td> </tr> <tr> <td>Measurement overhead (ms)</td> <td>3.3</td> <td>3.38</td> <td>4.11</td> <td>11.15</td> </tr> <tr> <td>Measurement time (ms)</td> <td>0.05</td> <td>0.48</td> <td>4.8</td> <td>47.95</td> </tr> <tr> <td>Total Measurement time (ms)</td> <td>3.35</td> <td>3.86</td> <td>8.91</td> <td>59.1</td> </tr> </table>	Hits/measurement	10	100	1000	10,000	Measurement overhead (ms)	3.3	3.38	4.11	11.15	Measurement time (ms)	0.05	0.48	4.8	47.95	Total Measurement time (ms)	3.35	3.86	8.91	59.1
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Internal timebase reference	<table border="0"> <tr> <td>Frequency</td> <td>10 MHz</td> </tr> <tr> <td>Aging/year (after 24 hrs on)</td> <td><math>1.5 \times 10^{-7}</math></td> </tr> <tr> <td>Aging/day (after 24 hrs on)</td> <td><math>1 \times 10^{-9}</math></td> </tr> <tr> <td>Short term (1 sec) stability (after 1 hr on)</td> <td><math>5 \times 10^{-11}</math></td> </tr> </table>	Frequency	10 MHz	Aging/year (after 24 hrs on)	$1.5 \times 10^{-7}$	Aging/day (after 24 hrs on)	$1 \times 10^{-9}$	Short term (1 sec) stability (after 1 hr on)	$5 \times 10^{-11}$												
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Internal calibration source	Frequency 900.108 MHz																				
Flat panel display	Color TFT-LCD 10.4" diagonally, 1024 x 768 pixels																				
External inputs and outputs	3 USB ports (2 on front, 1 on rear) GPIB 10/100 BaseT Ethernet Parallel Port, 25 pin D-sub RS-232, 9 pin D-sub VGA, 15 pin D-sub 10 MHz external timebase input 10 MHz timebase output																				

## General

Power requirements	<table border="0"> <tr> <td>Voltage</td> <td>90-260 VAC</td> </tr> <tr> <td>Frequency</td> <td>47-63 Hz</td> </tr> <tr> <td>Power</td> <td>500 Watts for a five-channel system</td> </tr> </table>	Voltage	90-260 VAC	Frequency	47-63 Hz	Power	500 Watts for a five-channel system
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Frequency	47-63 Hz						
Power	500 Watts for a five-channel system						
Environmental requirements	<table border="0"> <tr> <td>Operating Temp. range</td> <td>15-35°C</td> </tr> <tr> <td>Temp range for calibration</td> <td>Cal temp <math>\pm 5^\circ\text{C}</math></td> </tr> <tr> <td>Humidity</td> <td>10-85% R.H. (noncondensing)</td> </tr> </table>	Operating Temp. range	15-35°C	Temp range for calibration	Cal temp $\pm 5^\circ\text{C}$	Humidity	10-85% R.H. (noncondensing)
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Temp range for calibration	Cal temp $\pm 5^\circ\text{C}$						
Humidity	10-85% R.H. (noncondensing)						
Instrument size	23.25"L x 17"W x 8.7"H 19" rack mountable						
Weight	42 lbs						

\*For more detailed performance information, please see individual channel card specifications.

\*\* Data provided for period measurements



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