

A Technologies Company

### Who is Wavecrest?

Wavecrest provides leading-edge test and measurement products for the design, characterization, and production of electronic and photonic components and systems. Founded in 1985, Wavecrest is the industry leader for time interval measurement and jitter analysis in development labs and production floors for semi-conductor manufacturers around the world. Wavecrest is the only test and measurement manufacturer that provides a complete solution from design to production.

## What is Wavecrest's core competency?

Wavecrest's core competence is based on the following pioneering efforts:

- Patented design & manufacture of extremely accurate time measurement hardware
- Patented algorithms for separating all known components of jitter
- Invented algorithms for jitter modulation measurement in clock or data signals
- · Invented "Tail-Fit" algorithm to predict long-term timing performance and compliance to ANSI and Fibre Channel specifications
- Invention of algorithms to measure Bit Error Rate (BER) using time interval analysis

#### Why is Wavecrest the reference standard in the industry?

Wavecrest is the reference standard for timing and jitter measurements as evidenced by:

- Legacy installation of over 800 DTS Time Interval Analyzers in the field over a 17 year span
- Fibre Channel standards (MJS and MJSQ) have Wavecrest products represented in them
- IEEE 802.3 participation as voting member and working group participant (10 GbE)
- Portfolio of implemented patents for analyzing jitter and its effects in signals
- InfiniBand trade association member, FCIA
- NIST traceability

What are the capabilities of Wavecrest's precision instruments and software tools? Wavecrest's award-winning Virtual Instruments<sup>TM</sup> Signal Integrity (VISI) software provides the most complete jitter and signal integrity analysis software package on the market. Production test applications can make use of Wavecrest's Production Application Programming Interface (API) to access all the same statistics and plot data provided by capability of VISI software as shown here:

| Technology   | Standard   | VISI Tool                               | Analysis Capabilities  |
|--|--|---|--|
| Fibre Channel  | FC-PI, FC-MJS<br>T11.2/1316-DT                               | DataCOM<br>Tool<br>Oscilloscope<br>Tool | <ul> <li>Separate jitter components for compliance testing         <ul> <li>measure TJ, RJ, DJ, PJ, DCD&amp;DDJ</li> <li>perform on repeating pattern or random data</li> <li>display eye histograms (clock-to-data jitter histograms)</li> <li>separate histograms of rising from falling edges</li> <li>BER bathtub curves</li> <li>measure duty cycle distortion</li> </ul> </li> <li>Measure BER to 10<sup>-16</sup> as a function of eye opening</li> <li>View spectra of datarministic components</li> </ul> |
| Gigabit Ethernet   | IEEE 802.3   |   |  |
| InfiniBand <sup>™</sup>  | Release 1.0.a  |   |  |
| XAUI   | IEEE P802.3ae  |   |  |
| FireWire   | IEEE 1394B   |   |  |
| Serial ATA   | rev 2.0  |   | <ul> <li>View spectra of deterministic components</li> <li>Quantify periodic modulations due to crosstalk, EMI, etc.</li> </ul>  |
| USB  | 1.0 Gold   |   | <ul> <li>Use integrated oscilloscope to measure VOH, VOL, rise time, fall<br/>time, etc.</li> </ul>  |
| LVDS   | IEEE 1596.3  |   | Measure complex timing & jitter issues across entire databus   |
| Rapid IO   | rev 1 1  |   | Fully characterize single-ended and differential clock and data  |
|  |  | _                                       | Clock and data timing and jitter, clock-to- data skew, and BER   |
| HyperTransport   | rev 1.03   | Databus Tool                            | <ul> <li>based on actual data histogram mean referenced to clock</li> </ul>  |
| DVI  | rev 1.0  |   | - or based against worst-case data edge location   |
| 3610   |  |   | <ul> <li>Predict long-term setup/hold violation with patented TailFit<br/>algorithms</li> </ul>  |
| 3010   |  |   | <ul> <li>Perform timing analysis on PanelLink<sup>™</sup>, TMDS devices</li> </ul>   |
| PLL Devices  | Devices<br>ngle channel JEDEC<br>channel JESD65-A<br>channel | Clock Tool                              | <ul> <li>Dynamic settling/recovery and lock time, loop response</li> </ul>   |
| <ul> <li>single channel</li> <li>2 channel</li> <li>4 channel</li> </ul> |  |   | Cycle-cycle jitter, I/O jitter, periodic jitter, accumulated jitter  |
|  |  |   | <ul> <li>Measure switching power supply noise, phase noise</li> </ul>  |
|  |  |   | <ul> <li>High and low frequency modulation, bandwidth extraction</li> </ul>  |
| Direct Rambus <sup>™</sup><br>Clock Generator                            | DRCG Validation<br>Template                                  | DRCG Tool                               | Fast, accurate jitter verification of DRCG clock   |



#### How can a contract test house benefit from Wavecrest products?

Integrating production-proven Wavecrest signal integrity analyzers in your existing ATE will expand the ATE's capability and the markets you serve, enabling you to get more business. By also extending the ATE's useful life, you will realize a greater return on your ATE investment. With the ability to conduct fast compliance testing to standards, you can consistently ensure high quality product shipping to your customers at the lowest possible test cost per device.

#### What ATE manufacturers have integrated Wavecrest products?

The following ATE vendors have integrated Wavecrest DTS series products:

| ATE Vendor     | ATE System            |
|----------------|-----------------------|
| Agilent        | 93000<br>94000, 83000 |
| Advantest      | T6672                 |
| Credence       | Duo, Quartet          |
| LTX            | Fusion, Synchro       |
| SZ Test System | (all models)          |

Wavecrest is working with the same manufacturers to integrate the Wavecrest's newly released SIA-3000<sup>™</sup> into their ATE platforms. The SIA-3000 provides unmatched capability with high-speed parallel measurement capability on up to 10 differential channels.

# What if I have an ATE system that is not in the table above, or I have an existing tester without a Wavecrest product integrated into it?

Wavecrest's Customer Solutions team offers production-ready interface kits for the following platforms:

- Agilent 83000/93000
- Credence SC 312
- Teradyne Catalyst & Tiger

Other interface kits are becoming available as they are developed. Wavecrest application engineers will work with your engineers to quote a complete, custom solution to meet your needs. Options include a portable system on a roll around cart (known as the <u>Test Enhancement Module</u>, or TEM) with a quick connect interface to your ATE or undergoing a full integration into your ATE mainframe. Also, some of our ATE partners offer their own interface kits to our signal integrity analyzers as well.

#### What Application Packages are available from the Customer Solutions Team ?

Wavecrest's Customer Solutions team offers production-ready application packages for several technologies that require accurate and precise jitter and signal integrity test capability. Contact Wavecrest for more information on the latest application packages that are continually being developed.

#### Where can I learn more about Wavecrest?

Visit our website at <u>www.wavecrest.com</u>, or call our San Jose office at (408)436-9000 or toll-free at (800)821-2272.