



## VScope™ Embedded Waveform Viewing Technology

Vitesse's revolutionary technology enables direct signal scans from inside ICs

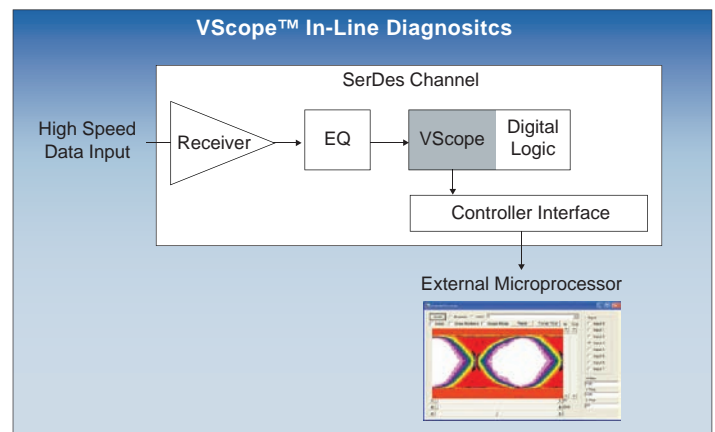
With VScope™, engineers and even system operators can scan received data from within the IC itself in a manner similar to oscilloscopes and bit error rate detectors. Offered in clock and data recovery products from Vitesse, VScope can operate on any channel of live data, enabling unique capabilities for testing and system monitoring.

### Direct Signal Integrity Analysis

VScope makes accurate monitoring possible that was formerly out of reach. By scanning a signal after the IC equalization but before conversion to a digital stream, a true picture can be obtained of the input signal and the equalization performance.

This in-line diagnostic not only takes advantage of equalization, but also avoids inherent inaccuracies with measurements taken at the input to the IC. Outside probing can only approximate the actual signal and can introduce capacitive loading and other inaccuracies.

The veracity of the scan data is further enhanced by the fact that the same circuits handle both waveform scanning and data acquisition, ensuring an exact correlation between data and measurement.



### Unlimited System Diagnostics

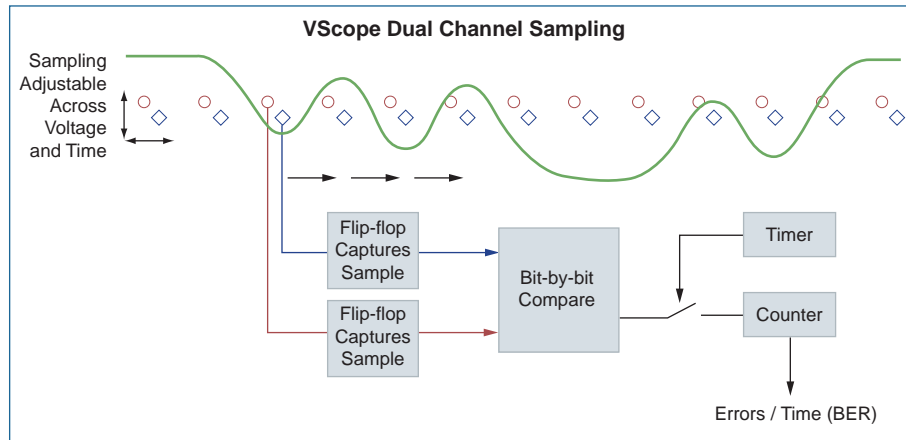
VScope diagnostics go beyond standard capabilities and enable revolutionary new applications. The technology not only augments design testing, but also creates opportunities for remote diagnostics and monitoring of ongoing system health.

Using VScope, design testing becomes more cost effective and streamlined. For multi-board systems such as backplanes, engineers can test in a fully assembled system, eliminating special test cards and awkward cabling arrangements. Signal integrity (SI) margins across voltage and temperature can also be tested far more easily, since the only interface required when testing a board in an environmental chamber is the lower frequency control bus to the PCB.

Remote monitoring is another VScope advantage. By transporting the scan data in the packet overhead, this diagnostic information can be accessed in real time from anywhere in the network. Data service providers can make detailed remote measurements of signal integrity from the central office, eliminating on-site service to perform the same test using conventional instruments. Furthermore, by monitoring the health of a given link, signal degradation can be identified and solved before it becomes a problem. The results for service providers are reduced field labor, reduced operational expenses, and rapid, pre-emptive customer service.

## Scanning Architecture

The scanning architecture is based on gathering two samples of the input data stream, with each sample point independently adjustable in voltage and time within each bit period.



Comparing the samples on a bit-by-bit basis and accumulating comparisons over a fixed time period produce a result similar to a bit error rate (BER) detector.

By plotting the BER across voltage and phase, a picture emerges that, with further processing, yields a map of the waveform edges similar a clock-triggered oscilloscope. The resolution of the waveform can approach that of outside test equipment. Because increased resolution implies greater overhead processing, VScope optimizes this trade-off between the amount of detail and performance.

VScope Example Waveform



## Applications

- **Signal Integrity Analysis** – In-line diagnostics provide more accurate, cost-effective, and accessible SI analysis
- **Backplane Design** – Directly accessing and sharing waveform scan data enables SI testing in a fully assembled system
- **Remote SI Monitoring in Communication Systems** – Centralized diagnostics eliminate on-site measurements and enable preventive monitoring of the system health
- **Test and Measurement Equipment** – New technology enables probe-free signal measurements

## More Information

For more details about VScope, visit [www.vitesse.com/vscope](http://www.vitesse.com/vscope).

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