VIAVI

Xgig® Protocol Analysis and Test Platform

Comprehensive Multi-Protocol Analysis and Testing for Fibre Channel, SAS/SATA, Ethernet (including FCoE, iSCSI, RoCE, and iWARP) and PCIe/NVMe

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The Viavi Solutions Xgig Protocol Analysis and Test Platform:

- Accelerates new product development reducing development costs
- Improves product quality and reliability
- Helps to ensure product interoperability and performance
- Facilitates field installation and maintenance by debugging field issues

The Xgig's unified platform supports simultaneous analysing and testing of multiple protocols based on the most comprehensive range of industry analysis and test functions in a single chassis.

Protocols

- Up to 128G Fibre Channel
- Up to 24G SAS/SATA
- Up to 100G Ethernet, including FCoE, iSCSI, RoCE, and iWARP
- Up to Gen4 PCIe/NVMe

Functions

- Analysis
- Error injection (jamming)
- Fibre Channel and SAS/SATA traffic generation
- Fibre Channel load testing
- 10 G Ethernet delay emulation
- Bit error rate testing

Xgig provides unmatched visibility into network interactions for streamlined identification and resolution of even the most difficult network, server, and storage issues. Advanced features, such as in-line bidirectional cross-protocol Expert analysis, makes Xgig ideal for solving today's high-speed serial bus challenges.

The Viavi Xgig Platform

Xgig is a unified, integrated platform employing a unique chassis and blade architecture for maximum scalability and flexibility and fixed portable solutions. Various blades support a wide range of protocols and test functions.

Users can place an Xgig directly in line on a link, connect it using the Viavi TAP family, or cascade several Xgig chassis together for up to 64 time-synchronised analysis/test ports across multiple protocols for traffic correlation across several devices and network domains. Xgig is the only protocol analyser supporting multiple protocols in a multi-functionality environment, all in one chassis or chassis combination.

Xgig's ease-of-use and flexibility accelerate product development and testing. Users can access all protocols and analyser functions through an intuitive, unified GUI-based suite of applications—TraceControl, TraceView, and Expert—running on a Windows management PC connected through a GE LAN. The Xgig 1000 chassis also provides USB interface access.

Multi-User Feature

Xgig's unique multi-user capability offers maximum flexibility and efficient use of equipment. Multiple users can control different port pairs on one hardware blade to simultaneously conduct separate tests. Meanwhile, up to 32 concurrent users can access locked ports to view test status or data at any time.

Advanced Analysis

Xgig Analyser's three test applications, TraceControl, TraceView, and Expert, offer *extensive visibility* into networks to resolve even the most elusive errors and impairments. Xgig can *record all traffic (frames and order sets) or specific event* by setting the smart trigger condition in Trace-Control between any two end points. TraceView reveals the captured traces, the industry-standard trace-viewer format, with various navigation tools for deep packet investigation. Expert's unique automatic trace analysis accelerates debugging by displaying an issue summary of the network topology and reporting network performance statistics. TraceControl monitors link performance in real time with critical statistics to determine network health.
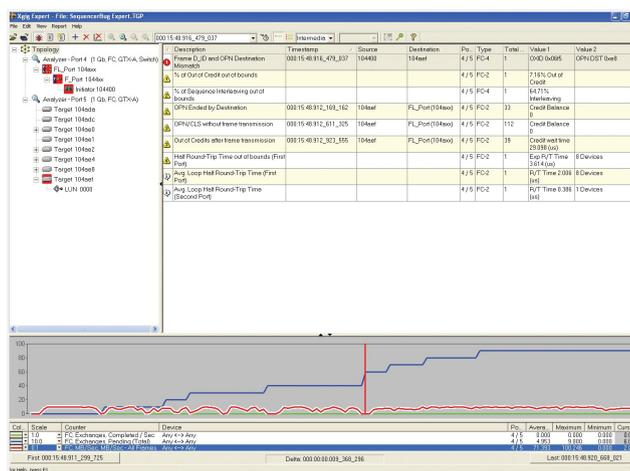

Figure 1. Xgig Expert

Unique Multifunction Offering

In addition to protocol analysis, the same hardware also provides functions such as error jamming, generation, load testing, and delay emulation for a complete test solution that saves on your capital investment. The Maestro application suite manages the multifunctional capabilities through a common interface, driving multiple tests concurrently.

Error Injection/Jamming

Used in conjunction with one or more Xgig Analysers, Xgig Jammer manipulates network traffic to *simulate errors in real time* so users can verify the responsiveness and robustness of the error-recovery processes. Errors can be precisely defined and timed to thoroughly test networks and *to automate most of the testing process.*

Traffic Generation

Xgig Generator enables developers to comprehensively test FC and SAS/SATA devices from a *protocol perspective.* Designed for maximum flexibility, Xgig Generator creates *arbitrary traffic* giving developers confidence that their networks and devices can handle traffic reliably under normal operating conditions.

FC/FCoE Load Testing

Fibre Channel and FCoE switches and networks must withstand *sustained bursts of traffic* without losing data. Xgig Load Tester loads Fibre Channel and FCoE links to capacity to verify that they can adequately manage high-traffic loads, maintaining network performance and reliability.

10 GE Delay Emulator

When testing datacenter interconnect functionality and performance, the 10 GE Delay Emulator can replace cumbersome fiber spools for flexible delay simulation due to distance and logic multi-path variation. Also, the Xgig Delay Emulator can simulate network impairments, such as packet drops during congestion or frame reordering from switch errors.

Bit Error Rate Testing (BERT)

Xgig BERT provides the tools to confirm that networks meet minimum data integrity standards. It also presents the results in *industry-accepted report formats* to facilitate certification. Xgig BERT simplifies data integrity testing letting users inject data patterns into the traffic stream that create *worst-case data loading* conditions to *stress a network's physical layer* to its limits. It can also significantly *reduce manufacturing test times* for hubs, host bus adapters, FC RAIDs, and other active or passive devices by stressing all of the components in the data path.

Xgig BERT is a *protocol-aware* tool that accounts for traffic modifications made by devices in the transmission path.

Automation

For ultimate flexibility and control, users can access several GUI functions and configurations through the Application Program Interfaces (API) to customise and automate tests via scripts. Scripts based on C/C++ or TCL/TK let users design trigger and control combinations to accelerate development by automating and managing regression testing for debugging and manufacturing that would otherwise be time-consuming to configure and manage through the GUI.

Accessing Xgig

Xgig can be managed and configured remotely through a GE LAN connection. Client software (Xgig and Maestro) and a web utility can be used to access blade licenses and software version statuses, to push firmware and system upgrades, and to reboot/shutdown the chassis. A terminal console is sometimes needed to manage system configuration, such as naming a chassis and configuring an IP address before a client can connect to the Xgig.

The Xgig 1000 USB interface offers more direct chassis configuration capability that lets users:

- view and modify the chassis system configuration, including chassis name and static and dynamic IP addresses

- view software version information and system logs

- monitor system FPGA upgrade status

- reboot or shutdown the chassis

- run a set of diagnostics to verify network connectivity.

Xgig Package Options

The Xgig Chassis in Figure 2 is available as a four-slot chassis for four blades. The chassis are rack-mountable.

The chassis in Figure 3 is available in multiple protocol configurations.

Key Features:-

1 Console port for local configuration

2 Tap control via software (reserved for future use)

3 Cascade ports

4 TTL input/output for external triggering and control

5 10/100/1000 LAN connection for software control and configuration

R Reserved

6 System status LEDs: Ready, power, and temperature

7 Power on/off switch AC power connector (rear—not shown)

8 USB Ports
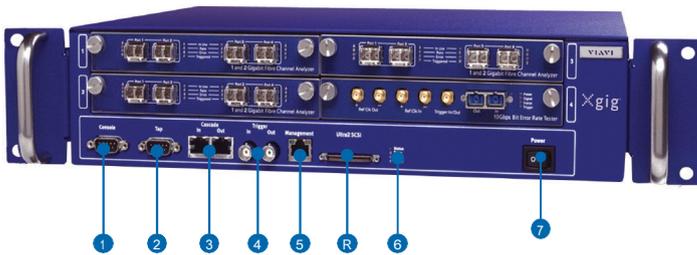
Figure 2. Xgig 4-slot chassis and blade options

Figure 3. Xgig 1000 chassis

Xgig Features

Unique Unified Multi-Protocol, Multifunctional, Multi-User Platform

Xgig is recognised as the industry's best storage network and device development tool that can uniquely analyse across multiple protocols at this level of functionality in one platform.

Multi-Protocol Support	Xgig simultaneously supports Fibre Channel, Ethernet and its upper protocols (FCoE, iSCSI, NFS, IP, TCP, and others), SAS/SATA and PCIe/NVMe
Multi-User Support	Xgig's unique multi-user capability lets multiple users independently control different port pairs on the same hardware chassis/blade. Up to 32 users can concurrently access the same ports to view test status and data.
Comprehensive Functionality	Each blade supports extensive test functions, such as analyser, jammer, load tester, generator, delay emulator, and BERT*. (Contact local support centre for more information.)

Accelerated Debugging and Simplified Development

Viavi leads the industry in FC, SAS/SATA, FCoE, Ethernet and PCIe development tools and continues to invest in developing tools that make their extensive expertise readily available to all of their customers.

Expert Analysis Software	Viavi uniquely provides Expert Analysis on monitored links to automatically identify and locate network impairments. Expert checks on more than 1200 symptoms and applies more than 1800 metrics so developers can resolve issues before they result in network shutdowns or application slowdowns.

Unparalleled Ease-of-Use

The Xgig's unified platform offers maximum functionality with extreme ease-of-use making it easy for engineers to learn and use.

Intuitive GUI	Spend more time analysing and less time learning the software interface
Automated Analysis/Testing	API scripting tools automate analysis and testing functions
Drag-and-Drop Triggers	Simplify trigger setup with pre-defined protocol-specific templates
Customized Triggers	Template editor lets users create their own protocol templates for triggering
Protocol Development Kit	Develop custom protocol decodes
Calculate Delta Times	Delta calculator determines time deltas between any two events, timing properties of user applications, and general performance information

Complete Network Visibility and Access to Data

Xgig's extensive capabilities and flexibility provide unmatched visibility into networks to simplify problem identification and resolution, accelerate new product design, and speed time-to-market.

Largest Trace Capture Buffers	Captures up to 4 GB of traffic per port—up to 32 GB per blade (64GB for Gen 4 PCIe) giving developers enough trace data to resolve even the most elusive problems
Performance Measurements	Graphically displays useful performance statistics for every active link
Hide Non-Relevant Data	Preset filter order hides traffic-control primitives to only display data so developers can focus on specific frames or packets
Adjustable Payload Size	Reduces trace size to capture extra frame-header information by truncating payloads/frames
Drag-and-Drop Filters	Simplifies filter setup with pre-defined protocol templates
Exchange View	Summarises trace by exchanges
Traffic Summary View	Provides top-level event information in the trace buffer within seconds
Protocol View	Lets users focus on a specific protocol layer
Customized Filters	Template editor lets users create user-defined protocol templates for advanced filtering
SCSI Expert View	Simplifies trace analysis by collapsing exchanges and associated behavioral information into a single event in the Data Inspector pane
Protocol Tree View	Displays the tree structure of data when it is mapped to the current protocol
Histogram View	Lets users focus on small areas of a trace, change the appearance and scale of graphs, and show/hide traces
DWORD View	Provides a detailed view for each line of TraceView's Summary View
Filter/Search/Hide Tool	Simplifies the display and lets users access specific events quicker than any tool available

Flexible Development Platform

With its blade architecture and configurable multifunctional capabilities, Xgig is the most flexible development platform for network tools available today.

Multiple Probing Methods	Xgig supports two flexible probing modes: Digital retiming and analog pass-through.
Flexible Internal Trigger	Multiple trigger modes help users capture trace data intelligently: 1) Stop capture with the stop button — no trigger 2) Stop capture after trigger 3) Arm-on-arm condition, stops capture after trigger condition when armed 4) Arm then stop after trigger, rollback on reset condition 5) Stop when memory full 6) Advance mode for SAS and PCIe protocols
External Trigger Support	Xgig platform can trigger or be triggered by an external device through BNC TTL or SMA ports.
Trace File Support	Correlate traffic within devices using traces captured by Wireshark, Bus Doctor Analyser, and I-Tech PowerFrames and analysed using TraceView and Expert.
Choice of Decode Engine	Choose between the Viavi-optimised Xgig proprietary decode engine or the Surveyor decode engine.

Leverage Test Equipment Investment

Test equipment is a significant investment for network companies, and Xgig's unified platform helps them get the most capabilities and performance for their money.

Scalable Configuration	Connect up to 4 chassis for unified triggering, capturing, and analysis for more comprehensive analysis and visibility across even the most complex networks. Chassis support up to 16 lanes for coordinated monitoring and time-synchronisation of up to 4 chassis of mixed protocol traffic.
Scalable Licensing	Add new tools on demand through software upgrades.

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