Xgig® 6 Gb/s SAS Target Emulator

Key Features

- Part of the best-of-breed Xgig platform of design and test tools

- Supports bidirectional SAS target emulation up to level-4 functionality

- Operates at 1.5, 3.0, and 6.0 Gb/s

- Blade supports 4 SAS Target Emulators per blade and up to 8 Target Emulators per chassis

- Runs on Windows 2003 (Server: Service Pack 2), XP (Professional: Service Pack 3) and Vista (Business and Ultimate versions)

The new JDSU Xgig® Target Emulator offers advanced testing and troubleshooting capabilities to storage equipment designers, testers, and manufacturers. Extending the capabilities of the Xgig platform of design and test tools, the Target Emulator connects to users' systems and supports SAS protocol-level testing at 1.5, 3.0, and 6.0 Gb/s. With full configurability, flexible responsiveness, and automated operation, the Target Emulator is the ideal tool for accelerating the bring-up, regression, and manufacturing testing of SAS equipment.

Advanced Emulation Capabilities for Complete Target Visibility and Control

The Target Emulator builds upon the proven Xgig platform, a flexible chassis-and-blade hardware architecture supporting multiple protocols. Utilizing this architecture and the JDSU 6 Gb/s 4-wide-link blades with dual mini-SAS/I-Pass connectors[1], the Target Emulator allows bidirectional SAS target emulation up to level-4 functionality (e.g. SCSI and ATA commands) across up to 4 ports per blade or 8 ports per chassis.

The Target Emulator introduces powerful testing capabilities to the proven multi-functional Xgig platform. While users can already capture and analyze traffic (Xgig Analyzer), create arbitrary traffic (Xgig Generator), and modify live traffic (Xgig Jammer), the Target Emulator completes testing coverage by providing users with a simple-to-configure target for comprehensive testing of SAS hosts or expanders.

Flexible Target Control for Accelerated Development

By allowing users to specifically define a wide range of target parameters, including timing and responsiveness, the Target Emulator gives users comprehensive control of target behavior. Rather than only monitoring how hosts and expanders operate with a particular target, users can vary target behavior to emulate operation across an extensive range of characteristics, all during a single test session. In addition, the Target Emulator can be configured to customize SCSI commands, inject or reject errors, perform illegal actions, and change timing, among other capabilities:

Programmable Attenuation: Users can adjust target characteristics through programmable control of transmit amplitude attenuation.

User-modified EOF: Control of frame EOF enables users to send invalid frames containing a user-modified EOF with the option of removing the EOF completely (i.e., the EOF is replaced by an ALIGN character.)

Benefits

- Complete target emulation enables comprehensive testing of SAS hosts and expanders

- Comprehensive control of target behavior emulates operation across an extensive range of target characteristics

- Three testing modes allow users of various programming skill levels to create useful testing scripts.

- Support for simultaneous users leverages test tool investment across an entire development team

- Licensing of one, two, or four Target Emulators per dual Wide-Link blade allows users to purchase only the functionality they need, when they need it
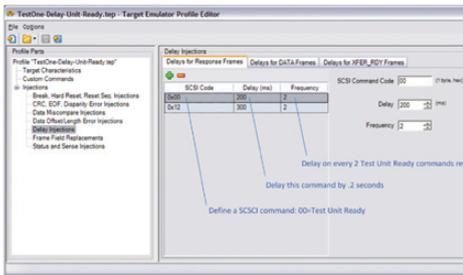
Figure 1: Target Emulator GUI

Spread-Spectrum Clocking Support: The Target Emulator can support spread-spectrum clocking reception as per the 6 Gb/s SAS specification.

Speed Negotiation Control: Users can select link speeds using the specified SAS speed negotiation protocols.

"Loss of Sync" Insertion: Users can test system error recovery mechanisms by forcing a "Loss of Sync" either by temporarily changing the clock rate or by sending constant disparity and/or code violation errors. The Target Emulator can be configured to continue with no OOB re-initialization, initiate an OOB re-initialization, or to respond to an OOB from the host.

Simplified Test Setup and Operation through Advanced Automation

Core to the flexibility and ease-of-use of the Target Emulator is its Application Programming Interface (API). The API is a superset of the JDSU legacy Monarch (SAS) product and extends full control of all Target Emulator functionality to C/C++ scripts. Use of the API enables users to bypass GUI-based control and completely automate operation to quickly and reliably exercise comprehensive test suites that provide complete regression testing and full test coverage across all known corner cases and potential issues. In addition, with only slight modifications, the Target Emulator can utilize legacy scripts and provide equivalent functionality.

For maximum usability, the Target Emulator also provides a manual user interface consistent with the Xgig Generator.

The Xgig Target Emulator offers three testing modes of increasing sophistication and automation:

Interactive Mode enables users to select and execute commands with point-and-click ease and is ideal for those with simple testing needs or who want to quickly start using the Target Emulator. Users can do speed testing by creating a table of frequently-used commands to further simplify selection.

Macro Mode allows users to create multi-step command scripts without the complexity of a compiled environment. Simple branching capabilities support multi-step or repeated command sequences. Individual test scripts can be saved to build test libraries suited to particular products or developments.

Compiled Test Mode unleashes the full power of the Xgig Target Emulator. Using the compiled C/C++ API, users can create and access extensive test scenarios capable of executing time-sensitive tests across multiple Xgig Target Emulators.

Comprehensive Testing Through Advanced Multi-functional Capabilities

The Target Emulator is part of the JDSU Xgig Monitoring and Analysis platform, the most comprehensive testing solution on the market today. Xgig's multi-functional capabilities enable users to easily reconfigure the Target Emulator function to any other supported Xgig SAS function simply by toggling software switches[2]. Flexible licensing allows users to purchase only those additional capabilities they require, when they require them. Complementary functionality includes the Xgig Analyzer for 100% capture of traffic at full line rates, the Xgig Generator for creating arbitrary protocol traffic, and the Xgig Jammer for modifying live traffic in real-time. Together, these tools gives users complete visibility with full control of network traffic to enable fast problem identification and resolution across even the most complex topologies.

1 Wide-blades are compatible only with the 4-blade Xgig chassis.
2 Additional multi-functional capabilities are available through the purchase of a function key.

Part Numbers

Blade: Xgig-B860SA	(2x Wide-Port (8-port) SAS/SATA Blade)

Software Options (Licensable per port pair)

Xgig-S16TS	Target Emulator Key, 6 Gb/s SAS (1 port pair/1 function, ¼ blade)
Xgig-S26TS	Target Emulator Key, 6 Gb/s SAS (2 port pairs/2 functions, ½ blade)
Xgig-S46TS	Target Emulator Key, 6 Gb/s SAS (4 port pairs/4 functions, 1 blade)

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