GIGANET SYSTEMS
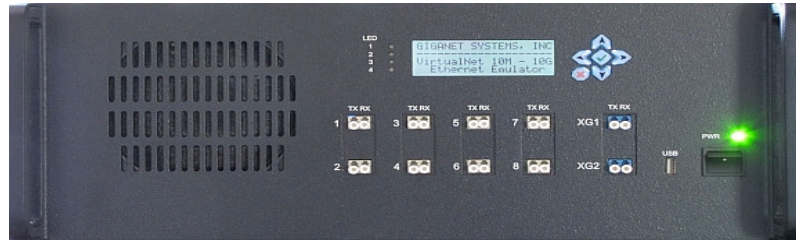
VirtualSAN™ FC 4/8G System Validation

Applications
• Firmware Testing
• SAN Equipment Validation, and Performance Optimization
• Disaster Recovery Testing
• Remote Backup Testing
• Storage Extension (symmetric data replication) Validation
• FCoE System/SAN testing

Benefits
• Increased system robustness with complete testing of error scenarios
• Reduced time to market with faster corner case testing
• Increased productivity with automated generation of specific error scenarios
• Eliminate costly post deployment operational and performance issues
• Faster root cause analysis of problems in deployed systems through repeatable test cases

Overview

VirtualSAN™ is a high-performance in-line (pass-thru) 4G/8G Fibre Channel test equipment that enables development and verification engineers to validate proper system response to error conditions that can occur in deployed systems. VirtualSAN can modify/impair live bi-directional traffic according to user specified parameters and duration as the data passes through it.

By incorporating VirtualSAN into their test and verification setup, engineers can introduce bit-errors, corrupt frame data, modify specific protocol fields in selected frames and observe the resulting system response and recovery. This testing enables validation of system performance and robustness under each specific error scenario. Thorough testing for these corner cases is essential for preventing costly post-deployment operational/performance issues for mission critical systems.

VirtualSAN utilizes customized Integrated Circuits (ICs) to process the FC traffic and apply specified impairments to each frame at full line rate. Impairments are applied in a highly precise and repeatable manner which is essential for reproducing issues, performance optimization as well as root-cause analysis.

Features
• **Performance:** Full line rate regardless of the incoming frame sizes, number of impairments, or the specified parameters for impairments.
• **Frame Impairments:** Drop, Corrupt, Modify, Checksum errors, and Delay. Layer2 FCS can be optionally corrected for modified frames. Delay changes are smooth and introduced in a hit-less manner.
• **Phy Layer Impairments:** Bit-Errors, Bit-rotation, Advanced LOS.
• **Targeted Impairments:** Unique ability to select a particular frame for specific impairments based on user specified frame protocol field values.
• **Protocol Field Parsing:** Emulator parses frames in hardware to recognize specific protocol fields within frame data. Protocol fields can be used as part of impairment parameter settings.
• **Impairment durations:** Impairments can be specified as having infinite as well as finite duration in units of Time, Frames, and Bytes.
• **Impairment rates:** Impairments can be specified with distinct probabilities for each impairment to create realistic test scenarios.
• **Dynamic impairment parameters**: Impairment parameters can be changed during testing without disrupting traffic stream. VirtualSAN switches from one set of conditions to another on a single frame boundary without creating unintended intermediate impairment conditions.
• **Analysis:** Detailed real-time statistics for bi-directional Ingress/Egress traffic as well as statistics related to impairments created by the VirtualSAN. All statistics may be recorded to a CSV for post analysis.
• **Multiple ports:** Up to Four FC1x/2x/4x ports and Two FC8x ports with simultaneous operation on all ports.
• **Usability:** Intuitive GUI and a powerful TCL based CLI.

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Typical In-Line Test Setup

Features	VirtualSAN – FC 1x/2x/4x/8x
Throughput	Full line rate, At all frame sizes, All impairment settings
Targeted Impairments	Field comparisons =, ≠, ≥, ≤, In Range, Out of Range Multiple comparisons can be combined with AND / OR conditions
Frame Drop	Rate – 1E-7% (1E-9) to 100%, Distributions – Uniform, Periodic, Bursty
Data Corruption	Rate – 1E-2 to 1E-12, Full or partial frame corruption Optional FC-2 Checksum Correction for corrupted frames Ability to limit data corruption to either Targeted Frames or Non-Targeted frames or All incoming frames.
Data Modification	2 Engines – Each capable of modify up to 128 frame bytes Modification with bit-mask ability to modify specific bits Data modification modes – Random, Invert, User Specified Data Insertion Optional FC-2 Checksum Correction Separate rates Frame Drop rates for Non-Targeted and Targeted Frames
CRC Errors	FC-2 Checksum errors Separate rates CRC Error rates for Non-Targeted and Targeted Frames
Delay	FC8x – 10µs to 275ms, ± 4.7 ns, FC4x – 20µs to 275ms, ± 9.4 ns FC2x – 40µs to 550ms, ± 18.8 ns, FC1x – 80µs to 550ms, ± 37.6 ns Fixed/Variable Delay Distributions
Layer 1 Bit Errors	Rate – 1E-2 to 1E-12, Burst Length – 1 to 32767 bits
Layer 1 Output Bit Rotation	40 output bit-rotation options to exercise all possible Comma alignment taps
Output (Laser) Disable	25ms minimum, Fixed/Random Cycle Times (±200us)
Real Time Statistics	FC-1, FC-2 Errors, Interface Traffic, Impairments, Logging for all stats

Physical Specifications:

Data Interface: Optical LC Connectors
                          FC 1x/2x/4x – Up 4 ports – 850nm and 1310nm
                          FC 8x – 2 Ports – 850nm, 1310nm, and 1550nm
Management Interface: 1xGigabit Ethernet, GUI and TCL based CLI
Hardware Warranty: 1year included
Input Power: 100VAC to 240VAC, 50-60Hz, 225 Watts (Max)
Dimensions: 19" Rack-mountable, 4U, 7"(H) x 16 7/8"(W) x 17.7"(D)
Net Weight: 45 lbs

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