

# Xgig® 10GE and 10GFC Protocol Analyzers

- Key Features**
- Multi-protocol analysis for 10GE, FCoE, FIP, 10G Fibre Channel, FCIP, iFCP, iSCSI, and all IP-related protocols
  - Complete support for emerging FCoE draft standards
  - 2-port XFP or SFP+ configuration connecting to both optical and electrical interfaces
  - Multi-function blade capable of Analyzer, Jammer and Load Tester
  - Full network visibility with 100% capture at line rate

**Benefits**

- Deep 4GB trace memory buffer per blade
- Industry’s most powerful trace capabilities
- Real-time dual CRC error monitoring and flagging in FCoE frames
- Patented search and filtering capabilities to accelerate development
- Time-syncs up to 32 channels
- Support for automation

The JDSU Xgig® 10GE and 10GFC Analyzer is a versatile, state-of-the-art solution for monitoring and analyzing live traffic of different storage protocols, including 10GE, 10GFC, FCoE, FIP, IEEE802.1Qx, TCP/IP, iSCSI, FCIP, iFCP, AoE, iWARP, etc. The Xgig chassis hosts up to four blades coupled with a comprehensive suite of analysis software applications to provide a unique platform offering the advanced multi-protocol, multi-application, and multi-channel capabilities users need to troubleshoot high-speed storage and networking applications.

Xgig provides accelerated resolution of network impairments as well as an extensive range of capabilities to proactively prevent performance impairments before they escalate to loss of access to mission-critical applications and data. With the ability to capture 100% of traffic at full line rate, triggering enabled across all protocol layers and anywhere within the layered frames, and extensive automated post-capture Expert analysis, Xgig gives users the deep visibility they need to design and test applications, monitor network performance, and ensure system reliability.

The JDSU Xgig 10GE and 10GFC Analyzer is specifically designed to provide distributed protocol monitoring, analysis, and testing of 10GE and 10GFC based protocols. It is the ideal tool for simplifying the identification, location, and resolution of difficult network impairments on FCoE protocol which is targeted to simplify the network structure for short distance links and has captured much attention in both the SAN and LAN industries.



Figure 1: Xgig 10GE and 10GFC Multi-Function Blades



CX4-XFP adapter



SFP+ Twinax cable



XFP cable



10GE SFP+



10GE XFP

### FCoE Support

The powerful capabilities of the Xgig Analyzer are available for the most recent standard proposals for FCoE. Xgig's multi-protocol platform provides a unique mechanism to monitor and analyze the same traffic passing through different transportation protocols by uniting the different analyzer port identities under the same time sync domain. For FCoE networks where the Fibre Channel network connects to the Ethernet network and merges with other types of traffic, Xgig is the ideal tool for analyzing the migration process from FC to Ethernet.

Xgig enables users to measure the impact on performance of native FC networks in a converged environment and is the unique tool able to address FCoE protocol issues such as real-time monitoring and flagging CRC errors on both the Ethernet packet and embedded Fibre Channel frame. In addition, Xgig Expert provides extensive network architecture and performance information about the converged network environment, as well as abundant expert metrics that allow developers to more quickly troubleshoot FCoE networks. Expert also offers a new report comparison feature enabling performance comparisons between native FC and converged FCoE networks to assist users in verifying and validating the effectiveness and efficiency of FCoE technology (to be released shortly).

### Hardware Features:

- **Industry's Most Powerful Trace Capture:** Experience complete visibility into network behaviors with 100% capture at full line rate of 10 Gb/s backed by the largest trace buffer (4 GB per blade) available from any vendor.
- **Multiple Protocols Supported on a Single Blade:** Monitor and analyze both 10GE and 10GFC protocols, as well as the emerging FCoE/FIP protocol, all with a single blade.
- **Multiple Data Tapping Methods:** Different data tapping methods trade off between nominal signal quality impact and data stream clean-up.
- **Universal 10Gb/s Interface Connection:** Support includes both optical and copper connections; XFP and SFP+ interfaces; and single mode and multimode fiber.
- **Maximum Time-Sync Grouping:** Time synchronize up to 32 ports under one domain.
- Industry's highest time stamp resolution for unparalleled accuracy
- **Reference Clock Out Connection:** Synchronize with other testing systems such as oscilloscopes for analog tests including eye diagrams and jitter measurements.

The Xgig Analyzer Platform streamlines resolution of events that impair network performance, thus enabling users to design, implement, test, and evaluate 10GE and 10GFC components and subsystems with a high degree of visibility and control. Xgig's integrated suite of software includes four key tools: TraceControl, Performance Monitor, TraceView, and Expert.

### TraceView

In the TraceView (see Figure 2), protocol decoding is based upon the most recent standard proposals that support the FCoE and DCE/CEE technologies, as well as the pre-T11 FCoE proposals, to support users in all stages of development:

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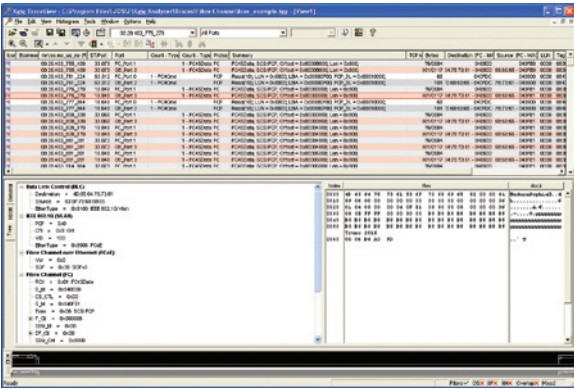


Figure 2: Xgig TraceView

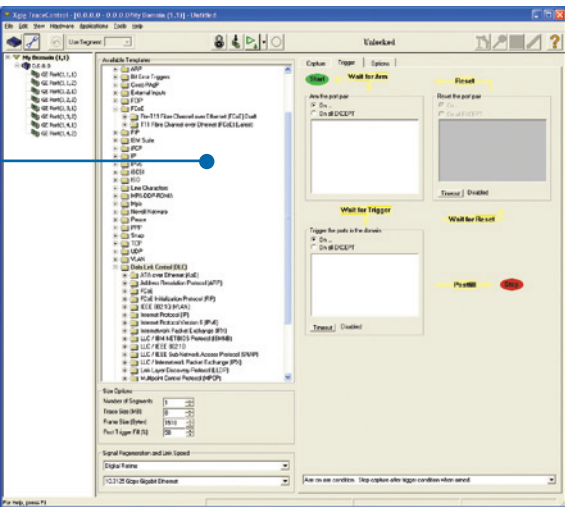


Figure 3: Xgig TraceControl

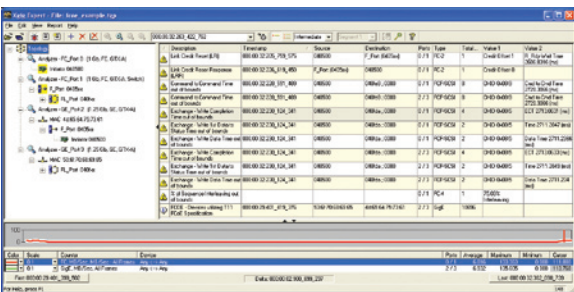


Figure 4: Expert View

- T11 FCoE pre-T11 proposal T11/07-303v0
- T11 FCoE most recent proposal T11/07-479v0
- T11 FIP most recent proposal T11/08-263v1
- IEEE802.1Qbb Priority Flow Control (PFC)
- IEEE802.1Q Data Center Bridging eXchange (DCBX) protocol
- IEEE802.1Qaz Enhanced Transmission Selection (ETS) protocol
- IEEE802.1AB-2005 Link Layer Discovery Protocol (LLDP)

**In addition, Traceview also supports**

- Extensive Ethernet-based Upper Layer Protocol (ULP)
- Support for FCIP, iFCP, IP, and RDMA
- Support for iSCSI
- Powerful trace filtering and searching to accelerate troubleshooting

**TraceControl**

TraceControl offers Comprehensive traffic library 1 of pre-defined and user-defined protocol templates for frames, ordered sets, and errors simplify defining the specific conditions and sequences under which trace capture occurs. The library includes patterns for a wide range of protocols including FCoE, FIP, PFC, ETS, LLDP, DCBX, ARP, iFCP, FCIP, IP, IPv6, VLAN, iSCSI, TCP, UDP, and RDMA, among others.

**TraceControl also offers**

- Internal and external cross triggering for complete trace capture flexibility
- Arm-sharing across all ports in a link to simplify test set up and configuration
- Optical Tx/Rx optical power reading for ensuring signal integrity

**Expert**

Expert (see Figure 4) provides a unique and robust set of debugging and analysis capabilities, including automatic sorting through millions of events to identify performance, upper layer protocol, and logical and physical layer issues. In addition, 10GbE/FC protocol violations, interoperability problems, performance issues, and errant behaviors are flagged and reported.

The JDSU Expert Analysis supports more than 1800 metrics and 1200 analysis functions across protocols. Protocols supported include FC-2/4, FCP, SCSI, iSCSI, FCIP, iFCP, FCoE, GigE, IP, IPv6, UDP, and TCP. Expert also provides extensive network architecture and performance information for new FCoE network environments. Abundant expert metrics help developers test and debug new FCoE networks faster and more efficiently. For FCoE network analysis, Expert's new report comparison feature provides a distinctive method for comparing the performance between native FC networks and FCoE networks to enable developers to verify and validate the effectiveness and performance of FCoE technology.

## Appendix A: Xgig Decoding Protocol List

Following list of protocols is not exhaustive

### Fibre Channel

C-AL-2, FC-FS-2, FC-LS, FC-GS-6, FC-SW-5, FC-VI, FCP-4, FICON, VSAN, FC-AE, FC-AE-ASM, FC-AE-FCLP, FC-AE-RDMA, FC-AE-1553, FC-AE-VI, FC-SATA, FC-AV

### Ethernet

FCoE/FC-BB-5/FC-BB\_E, FIP, IEEE 802.1AB: LLDP, IEEE 802.1Q: GVRP, MSTP, VLAN, PFC, ETS, DCBX, DLC, ISL, LLC, SNAP, ARP, IPX, NCP, SAP, IPXRIP, NETBIOS, IBMNB, MPLS Label, PPPoE Discovery, PPPoE Session, LCP, CHAP, MPCP, IP, IPv6, Cisco PAA, PAGP, MPCP, AoE, IEEE 802.1D: BPDU, GARP, GMRP, RSTP, IEEE 802.2, IEEE 802.3, IEEE 802.3x, IEEE 802.5, IEEE SNAP, Loopback, SNAP & LACP, IEEE 802.1D, IEEE 802.11

### IP

ICMP, ICMPv6, IGMP, ESP, TCP, UDP, AH, OSPF, DVMRP, MOSPF, PIM-DM, PIM-SM, RSVP

### TCP/UDP

iSCSI, FCIP, iFCP, iSNS, LDP, HTTP, SSH, NFS, RPC, RPCBIND, NBSS, Mount, DHCP, PORTMAP, MPA, DDP, RDMAP, iSER, SMB2

### TCP/IP Suite

ARP, BGP (Version 4), BOOTP, CharGen, Discard, DNS, Echo, EGP, Finger, FTP, GGP, Gopher, HTTPS, ICMP, Ident, IMAP, LDAP, MIME, Mobile IP (A11), MOUNT, MPLS (v1), NetBIOS, NETCP, NIS, NNTP, NTP, OSPF, PH, POP3, RARP, RIP (Version 2), RMCP, SLP (v2), SMTP, SNMP (v1, v2, v3), TELNET, TFTP, Unix Remote Services, VRRP, WebNFS, Whols, XDMCP, XDR, Xwindows

### SCSI

SPC-4, SPC-2, SAM-4, SSC-3, SBC-3, SMC-3, SCC-2, ADC-2, SES-2, TCG

### IPv6

DHCPng, ICMPng, IDNg, IPng, OSPFng, RIPng, RSVPng

## Specifications

### Mechanical

#### Dimensions

Width: 6.125 inches (156 mm)  
Length: 11.5 inches (292 mm)  
Weight: 0.9 lbs (0.5 kg)

#### Indicators (Green, Yellow, Off)

In Use, Link, LED x (application-specific), LED y (application-specific)

#### Connectors

2 XFP or 2 SFP+ connectors (optics or copper)

#### SMA

Reference Clock Out

### Accessories

10GE/FC XFP transceivers (SR and LR)  
10GE/FC SFP+ transceivers (SR and LR)  
10G XFP direct attach cable assemblies  
10G SFP+ direct attach cable assemblies  
10G CX4 copper transceivers XFP format for electrical InfiniBand 4x3.125 GigaBaud links

### Minimum System Requirements

- Windows 2000, Windows 2003, Windows XP, or Windows Vista operating systems
- **Small Configuration** (sync group of up to 16 ports): Pentium III 800 MHz, 512 MB RAM min/1 GB preferred, 40 GB disk space, 100/1000 Mb/s Ethernet
- **Large Configuration** (sync group of over 16 ports): Pentium 4 with 2 GHz or faster processor, 1 GB RAM min/2GB RAM supported, 80 GB disk space, 1000 Mb/s Ethernet

### Trace Buffer Size

#### Maximum

4 GB per blade

### Protocol Support

10GE and 10G Fibre Channel

### Software Features

#### TraceControl

- Most complete trigger library
- Multi-level triggering
- Arm/Trigger from any layer of data
- Trigger on either CRC in FCoE frames
- Optical Tx/Rx optical power reading
- Automation support

#### TraceView

- 100% configurable spreadsheet
- Powerful trace filter/search schemes
- Customizable graphic decode support
- Hundreds of decodes, including FCoE, FIP, IEEE802.1Qx, FCIP, iFCP, iSCSI, IP, UDP, TCP/IP, AoE and iWARP

#### PerformanceMonitor

- Live traffic monitoring and statistics
- Extensive views
- Real-time monitoring dual CRCs in FCoE frames

#### Expert

- >1800 metrics library and error conditions
- Specialized functionality for FCP-SCSI, FCIP, iFCP, FCoE, FIP, IP, IPv6, TCP, UDP, iSCSI
- Comparison reports

## Test & Measurement Regional Sales

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