



# SmartBits® 10 GIGABIT ETHERNET XFP MSA MODULES

10-Gigabit Ethernet (10GbE) has become the preferred network interface for linking workgroup switches, data center backbones in campus networks, managing large 1GbE link aggregation and interconnecting large enterprise networks. The SmartBits 10GbE XFP test modules provide highly scalable line-rate testing of switches, switch routers and routers.

## APPLICATIONS AND BENEFITS

- Accelerates the development and deployment of 10GbE networking equipment through automated performance and functional testing
- Both 10GbE LAN and WAN Layer-2 protocols are supported on the SmartMetrics and TeraMetrics test modules
- SmartBits correlates multiple key measurements like packet loss, latency, frame sequencing, stream identification and load from one test iteration. This gives test engineers unique insight into how buffering and queuing mechanisms affect packet IP QoS, while other test tools require executing multiple tests to provide the same information
- Tests core router performance by simultaneously creating routing events and tracking the effect on data plane traffic. Run an RFC-2544 data plane test while testing the BGP protocol
- Stresses a router by having it perform a different routing decision for each and every frame
- Tests the aggregated performance of switches when many 10/100 Mbps or Gigabit Ethernet ports are sending traffic to one or more 10GbE
- Tests the performance of switches and routers using RFC-2544 and RFC-2889 test methodologies. (Transmit round robin traffic pattern at wire rate with one packet per burst)
- Performs negative testing by injecting errors in transmitted traffic
- Tests IP multicast performance, as well as Diffserv and VLAN-enabled devices. Tests the forwarding performance of devices with a mix of IPv6 and IPv4 streams on the same port

The SmartBits 10GbE XFP modules generate realistic traffic at different OSI layers and analyze data frame, packet and stream metrics for each layer. The test modules, which can simultaneously manage data plane tests with control plane traffic required for metropolitan and enterprise routing, provide the most realistic performance measurements available in the industry.

Two high performance 10GbE test modules are offered for the SmartBits product line:

### XFP-3730A

The SmartBits XFP-3730A SmartMetrics™ module provides Layer-2 and Layer-3 switch and switch router benchmark and performance testing at a low cost. The SmartMetrics version is an excellent functional test platform for 10GbE firmware development, manufacturing and quality assurance applications.

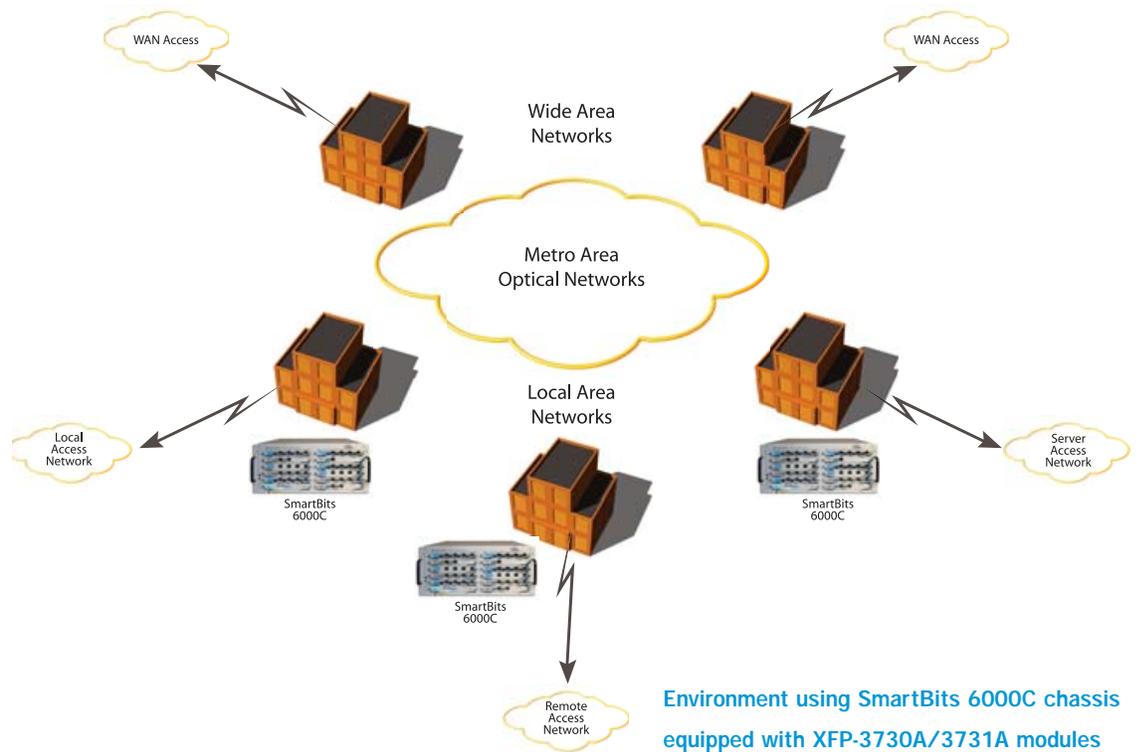
### XFP-3731A

The SmartBits XFP-3731A TeraMetrics™ module provides Layer-2 through Layer-7 testing, and is superior for switch routers and routing protocol benchmark and performance testing. It features a dedicated Pentium® processor that provides integrated and highly scalable control and data plane testing. The TeraMetrics version is an excellent platform for 10GbE firmware development, routing protocol performance tests, quality assurance and system test applications.

Both SmartBits 10GbE XFP-MSA-based test modules are used to measure the performance and test the interoperability of IPv4 and IPv6 networking devices. All SmartBits 10-Gigabit Ethernet test modules are compliant with the IEEE 802.3ae standard.



SmartBits XFP-3731A module



## KEY FEATURES

### Transmit Side

- Stream-based, wire-rate traffic generation at all frame sizes
- Supports frame sizes of 48 to 16,384 bytes without CRC
- Supports up to 2048 independent IPv4 or IPv6 streams
- Varies multiple address fields per stream to create millions of unique address flows
- Supports random IFG generation
- Arbitrary stream sequencing enables the mixing of various frame rates
- Supports 802.1p, 802.1q and 802.3ac VLAN tagged frames
- Supports 802.3x flow control commands and PAUSE frames
- Transmission modes: continuous, single-burst, multiburst, continuous multi-burst
- Allows mask-based address skipping for easy test setup

### Receive Side

- Tracks and analyzes up to 64,000 unique streams in histograms
- Real-time analysis of TOS, Diffserv and traffic class values, giving rates and events per traffic classification
- Simultaneously measures packet loss, latency, and frame sequencing (that is the jumbo test) for each stream and correlates it to traffic load
- Link fault signaling tests provide the ability to set and test remote and local link faults
- Unicast, broadcast, and multicast traffic effects can be analyzed
- 64Mb capture buffer enables the logging and exporting of filtered events to external protocol analysis equipment
- Per-port statistics include real-time latency, VLAN priority, transmitted/received frames for MPLS, IPv4, IPv6, ARP, PING, IGMP, QoS (Diffserv, DSCP, ToS/CoS), total bytes, CRC errors, and over- and under-sized frames
- Data integrity checking of the data payload portion of the IP packet
- IP header checksum verification

## Protocol Support

IPv4, IPv6, UDP, TCP, ARP, ICMP, IGMPv1/2/3, RIP, BGP-4, OSPF, and MPLS

## Internetworking Tests

The XFP-3730/3731A module, in combination with other SmartBits modules, can perform internetworking tests with 10/100/1000 Mbps Ethernet, ATM or Packet over SONET devices.

## SPECIFICATIONS

Both the XFP-3730A and the XFP-3731A support the XFP MSA standard specifications. The XFP MSA interface allows users to change the XFP optical transceiver to support different 10GbE laser wavelengths, reach ranges and 10GbE serial data link layer protocols. The XFP optical transceiver is hot-pluggable to the XFP-3730A/3731A test modules. The XFP-3730A/3731A automatically reconfigures itself to adapt to the different optical transceiver types. The XFP transceivers support the changeover between 10GbE LAN and WAN Layer-2 protocols by the SmartBits software applications and test automation APIs. The XFP MSA transceivers can be ordered from Spirent Communications.

## SUPPORTED APPLICATIONS

- AST II™
- Automated RFC 2544 and 2889 test scripts
- SmartBits Avalanche
- SmartBits Automation™
- SmartFlow™
- SmartLibrary™
- SmartmulticastIP™
- SmartWindow™
- TeraRouting Tester™ (XFP-3731A only)
- TeraDot1x Tester™

## REQUIREMENTS

- The XFP-3730A and XFP-3731A test modules require one slot in a SmartBits 600B or 6000C chassis
- An IBM or compatible Pentium® PC running Windows® 98/2000/NT/XP, with mouse and color monitor
- For chassis and module control: one Ethernet cable with RJ-45 connectors (use a crossover cable if directly connected from a PC to the SmartBits chassis or module), and a 10/100 Mbps half-duplex Ethernet controller card (in the PC/workstation)

10 Gigabit Ethernet Test Module Specifications		
Feature	XFP-3730A SmartMetrics 1-slot Module	XFP-3731A TeraMetrics 1-slot Module
Optical transceiver types	XFP MSA	
Laser wavelengths	850nm, 1310nm, 1550nm	
10GbE IEEE 802.3ae protocol modes	Serial LAN, WAN	
Optical cabling	Multi-mode, single mode fiber	
Signal rate	10.3125Gbps LAN, 9.58464Gbps WAN	
Maximum receive streams	64,000	
Minimum / maximum frame size without CRC	48 – 16,384 bytes	
Deficit Idle Count support (DIC)	LAN and WAN modes / ON or OFF selectable	
Link Fault Signaling (LFS)	LAN and WAN modes / ON or OFF selectable	

## ORDERING INFORMATION

### XFP MSA Modules

SmartMetrics 10 Gbps Ethernet XFP, 1 Port Module, W/O Transceiver (P/N XFP-3730A)

TeraMetrics 10 Gbps Ethernet XFP, 1 Port Module, W/O Transceiver (P/N XFP-3731A)

### XFP Optical Transceivers

Optical Transceiver, XFP MSA, 10GbE, 850nm, MM (P/N ACC-6030A)

Optical Transceiver, XFP MSA, 10GbE, 1310nm, SM (P/N ACC-6031A)

Optical Transceiver, XFP MSA, 10GbE, 1550nm, SM (P/N ACC-6032A)

## SPIRENT GLOBAL SERVICES

Spirent Global Services provides a variety of professional services, support services and education services — all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at [www.spirentcom.com/gs](http://www.spirentcom.com/gs) or contact your Spirent sales representative.



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