



SANbox 9000 Series Stackable Chassis Switch

Modular Blades at an Edge Switch Price

Changing business requirements at many of today's best companies are driving the need for the *scalability, resiliency, and manageability* provided by modular chassis-based SAN switches. As new and unpredictable demands spring up every quarter, these companies require the flexibility to modify and expand their server/storage infrastructure frequently without impacting production environments. In addition, as the mission-critical role of data continues to grow, more businesses than ever must guarantee iron-clad security while providing a high degree of control and monitoring.

Until now, the robust performance, rapid deployment potential, and "pay as you grow" budgeting advantages of Fibre Channel chassis switches have been available only in the form of expensive Director appliances targeted primarily at mainframe customers. IT managers with high-port-count *open systems* SANs who are unwilling to pay a premium for unused Director features (such as FICON support) have been forced to purchase complicated meshes of smaller switches, or very large fixed-port units – both of which offer high port counts, but much less flexibility, fault tolerance, and overall system control.

QLogic now provides a new class of core switch, representing a sane alternative to quarter-million dollar Directors and large, less resilient fixed-port switches. The SANbox 9000 is *Designed to the Core* for cost-sensitive, business-critical, open-system environments that require high port and performance, with support for 99.999% available solutions.



Key Features and Benefits

Scalability

- 16 to 128 ports in a single 4U chassis
- 256 ports in a dual-chassis 8U HyperStack™
- Mix and match Fibre Channel I/O blades
 - 8Gb or 4Gb blades for server/storage connections (*16 ports each*)
 - 10Gb blades for auto-trunking links to other switches (*4 ports each*)
- Intelligent Storage Router Modules: iSCSI for connecting low-cost servers and FCIP for replicating data across a WAN.

Fault-Tolerance

- Dual CPU option – True director-class redundancy with failover is now affordable for open system SANs. No large edge switch can compare!
- Hot-swappable I/O blades – Easy, non-disruptive expansion and maintenance
- Redundant, hot-swappable power supplies and fans

Low Cost of Ownership

- Pricing begins well under \$100K
- 16-port entry point
- More standard features at no charge, fewer software licenses
- Customer Replaceable Units (CRUs) ensure simplicity, economy
- Lower power consumption, smaller rack space footprint, lower weight

Powerful Included Software

- QuickTools™ gets you up and running in minutes.
- Enterprise Fabric Suite™ 2007 helps you set up, monitor, tune, troubleshoot and service an unlimited number of large fabrics.
- Adaptive Trunking, RSCN suppression, Drag-and-drop Zoning Wizard, Extended Distance and more at no extra charge
- Advanced Fabric Security – Protect your data with the right mix of easy-to-implement features:
 - User security
 - Connection security
 - Device security

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Blazing Performance

- 800-Gbps backplane capacity in a single chassis module or 1.6 Tbps for a dual-module HyperStack.
- Over 2.17 Tbps total system bandwidth with 4Gb blades or 4.35 Tbps with 8Gb blades.
- Industry's lowest latency plus "No-Wait" routing for maximum transaction performance. Powerful embedded CPU and I/O blade ASICs.
- Enables high performance computing, video, and satellite capture data streaming applications

Customer Replaceable Units

- The industry's first stackable chassis switch designed for the convenience, simplicity, and economies of CRUs for key components.
- Redundant, hot-pluggable CPU, power supply, fan, and I/O Blades; Non-Disruptive Code Load and Activation (NDCLA) in support of 24x7 high availability operations.

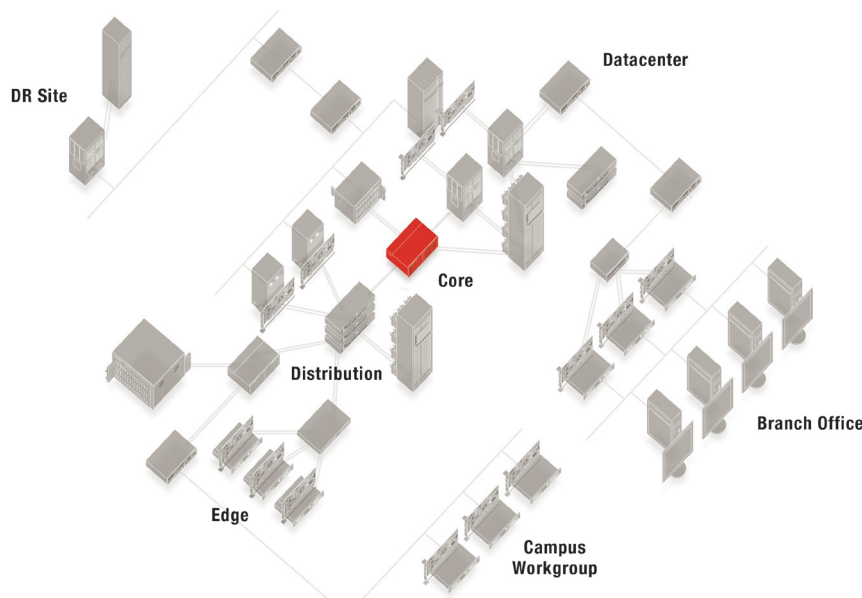
Ultra-High Availability

- Ensure ultra-high 99.999 percent availability for your mission-critical applications with the optional Fault Tolerant (FT) transparent CPU failover feature for the SB9200 dual-CPU models.

Low Total Cost Of Ownership (TCO)

- All the enterprise-class benefits of a modular chassis switch with revolutionary pricing that starts under \$100K.
- Architected for long-term investment flexibility and protection to deliver a previously unachievable reduction in TCO.
- High density FC I/O Blade slots are not sacrificed for IP support. Rather, half-wide 1U SANbox 6000 series intelligent Storage Router (iSR) "modules" are utilized for low density/low cost iSCSI and FCIP ports (see the Storage Routers section at http://www.qlogic.com/Products/SAN_products_storagerouters.aspx).
- For SAN administrators who have invested in multi-vendor fabrics, the SANbox 9000 is interoperable with all FC-SW-2 compliant Fibre Channel Director, Distribution, and Edge Class switches as well as with popular servers, storage, and networking products from major manufacturers.
- Minimize management costs with easy-to-use and comprehensive Command Line Interface (CLI), QuickTools embedded web interface, and Enterprise Fabric Suite 2007 software tools included with every SANbox 9000 switch.
- Take a significant bite out of your operating costs as a result of the SANbox 9000's low power and cooling requirements, minimal footprint, and all-encompassing service plans.

Open Systems Enterprise



With hundreds of ports, support for solutions that require 99.999 percent availability and 1.6 terabits of bandwidth, the QLogic SANbox 9000 is *Designed to the Core* for the open systems enterprise.

SANbox 9000 Series Stackable Chassis Switch Modular Blades at an Edge Switch Price

Designed to the Core for Open Systems

Data center managers in *mainframe* environments are responsible for connecting large numbers of servers and storage systems. They pay a premium for servers, storage, and Director switches that support proprietary mainframe protocols.

Data center managers in *open systems* environments also want high availability, high performance, and scalability. However, they expect products built on open standards to be substantially more cost effective: less complex, more flexible, and easier to use.

Reliable, fast, modular, and incredibly cost effective, the QLogic SANbox line of Core-to-Edge fabric switch modules and intelligent storage router modules are *Designed to the Core* for the open enterprise.

SANbox Product Family

The new look for powerful, easy to manage fabrics

The SANbox 9000 is the flagship in the SANbox line of fabric switches and intelligent storage router platforms. As individual components, every QLogic SANbox part delivers the advantages of a best-in-class, standalone product solution. Working together as an intelligent, integrated network solution under the Enterprise Fabric Suite (EFS) software umbrella, they are easy to deploy and administrator. EFS makes your SAN perform better, too. That's why the entire QLogic SANbox line won the Windows® IT Pro "Readers Choice" award. For your switched Fibre Channel fabric, you can count on QLogic for exactly the right switch...from the core, to the distribution layer, to the edge. For low-cost local and remote server IP network connectivity, QLogic iSRs boost utilization while driving down cost and complexity. Most importantly, you ensure an open environment that can transparently accommodate multiple vendors, new solutions, and future flexibility.



SANbox

The new look for powerful, easy to manage fabrics

- SANbox 9000 Stackable Chassis Switch
- SANbox 6000 Intelligent Storage Router
- SANbox 5000 Stackable Switch
- SANbox 1000 Fixed Port Switch

SANbox 9000 Series Stackable Chassis Switch Modular Blades at an Edge Switch Price

SANbox 9000 Product Overview

HyperStack Architecture

The SANbox 9000 Series stackable chassis switch is a new class of core switch that enables solutions with the 99.999 percent availability, blazing performance, and easy scalability of a Director — but without the large footprint and high TCO.

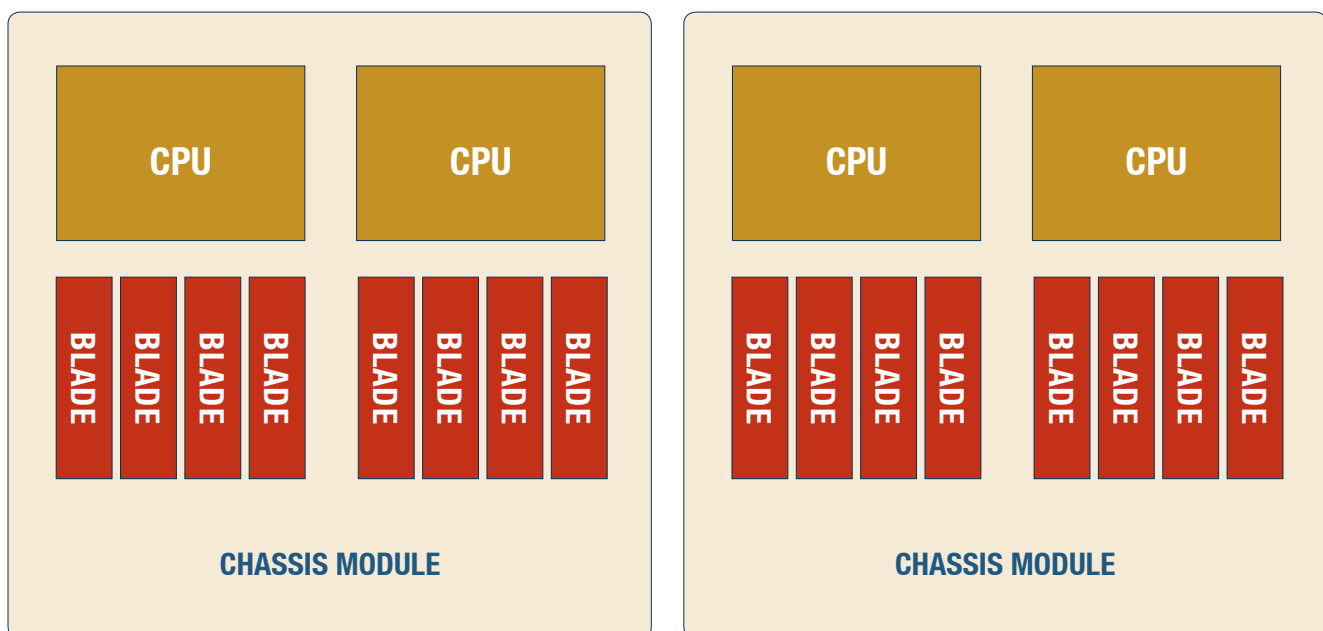
What makes it all possible is the SANbox 9000 architecture that features:

- **HyperStack:** Four 200Gb dedicated backplane-to-backplane interconnects between chassis modules
- **High Bandwidth Chassis:** 1.6Tb of backplane bandwidth for a dual chassis HyperStack configuration
- **Redundancy:** Redundant CPU, power supply, and fan blades, including the ability to hot-swap replace by a customer
- **Compact:** Up to 128 ports in only 4U of rack space, 256 ports in 8U-HyperStack

- **Ultra-High Availability:** Optional fault tolerant transparent CPU failover feature for any SB9200 module



HyperStack™



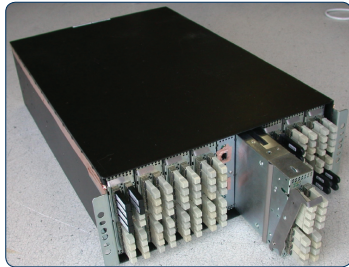
The SANbox 9000 architecture is redundant for high availability, delivers 1.6 terabits of total system bandwidth, and allows chassis modules to scale via innovative HyperStack technology.

SANbox 9000 Series Stackable Chassis Switch Modular Blades at an Edge Switch Price

Stackable Chassis Switch

For unprecedented scalability, the eight-slot SANbox 9000 chassis is uniquely modular in two dimensions. Like a Director switch, I/O Blades can be added as needed. Unlike a Director, the SANbox 9000 chassis is itself a module. Using HyperStack technology pioneered by QLogic, a second chassis can be inter-connected when needed and managed as a single switch.

For high availability, the SANbox 9000 features redundant, hot swap CRUs, including CPU, power supply, and fan blades. For ultra-high availability, any SANbox 9200 dual-CPU module can optionally include the fault tolerant transparent CPU failover feature.



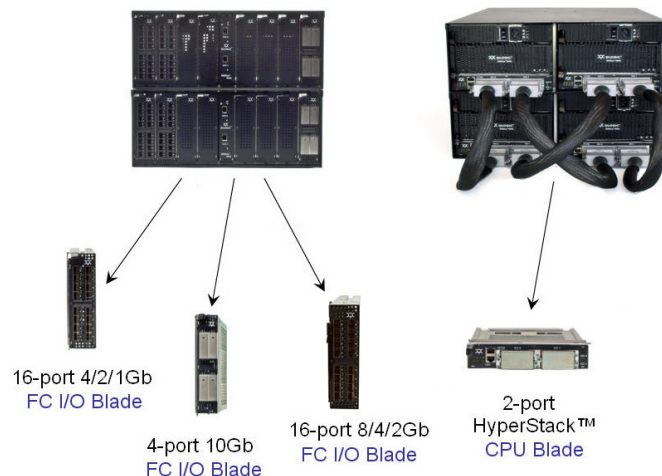
From the front of the SANbox 9000 chassis module, up to eight customer serviceable I/O Blades can be added or replaced non-disruptively without tools.



From the rear of the SANbox 9000 chassis module, customer replaceable CPU, power supply, and fan blades are hot-swappable.

I/O Blades

Each modular SANbox 9000 chassis features eight slots for any mix of 4Gb, 8Gb, or 10Gb Fibre Channel I/O Blades.



Multiple Technologies — One Modular Architecture

The SANbox 9000 stackable chassis switch gives customers ultimate flexibility to deploy the bandwidth and connectivity configurations that make sense for their environments..

Fibre Channel (FC) I/O Blades



4Gb FC I/O Blade — 16 Ports x 4Gb Fibre Channel

The 4Gb FC Blade includes sixteen 4Gb/2Gb/1Gb auto-sensing Fibre Channel ports. Mix and match any combination of blades for up to 128 ports per chassis module – or 256 ports in a dual-chassis HyperStack.



8Gb FC I/O Blade — 16 Ports x 8Gb Fibre Channel

The 8Gb FC Blade includes sixteen 8Gb/4Gb/2Gb auto-sensing Fibre Channel ports. Mix and match any combination of blades for up to 128 ports per chassis module – or 256 ports in a dual-chassis HyperStack.



10Gb FC I/O Blade — 4 Ports x 10Gb Fibre Channel

The 10Gb FC Blade includes four 10Gb Fibre Channel ports. Configure SANbox 9000 slots with 10Gb FC Blades for high-speed ISL connectivity from the core to the distribution, or edge tiers with SANbox 5000 stackable switches.

iSCSI and FCIP I/O Modules



iSCSI and FCIP I/O Modules — 2 Ports x 1Gb Ethernet + 2 Ports x 2Gb Fibre Channel

QLogic has chosen not to sacrifice valuable high-density FC I/O Blade slots for IP support. Instead, external half-wide 1U SANbox 6000 series iSR “modules” are utilized for low-density/low-cost iSCSI and FCIP ports (see http://www.qlogic.com/Products/SAN_products_storagerouters.aspx). Even at 4 + 1 = 5U, the SANbox 9000 Director switch is still the most rack efficient and rack-mount flexible multi-protocol solution in the industry

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Fabric Management Software

With wizard-based installation and configuration tools, the SANbox 9000 stackable chassis switch is the easiest to install and easiest to manage core switch on the planet. But for large fabrics where management becomes complicated, the SANbox 9000 series includes a comprehensive and powerful suite of management tools.

For point-and-click management, the tools are accessible from a user-friendly Graphical User Interface (GUI). And for the SAN experts, a comprehensive Command Line Interface (CLI) is available. Plus, integration with your favorite third-party applications is made easy with QLogic SANbox APIs, or the industry-compliant SMI-S agent.



QuickTools is an embedded Java® web applet for device discovery, device management, zoning, and fabric management. A configuration wizard walks users through switch setup and configuration. A zoning wizard provides simple drag-and-drop zoning with fast activation to get the switch ready for immediate use.



Enterprise Fabric Suite 2007 is a suite of tools for setup, configuration, zoning, fabric management, fabric monitoring, performance monitoring, and configuring extended distance capability. Enterprise Fabric Suite 2007 can manage an unlimited number of switches and fabrics from a single console.

SANbox 9000 Series Stackable Chassis Switch Modular Blades at an Edge Switch Price

Performance Monitoring	Fabric Management	Installation
Distance	SANbox 9000 Management Tools	Throughput
Fabric Monitoring	Security	Diagnostics

Adaptive Trunking guarantees extremely high performance while eliminating the need to manually configure and maintain ISL aggregation groups. Effective ISL routing and utilization is essential to achieving Return on Investment (ROI) in mid- to large-scale SANs. QLogic's Adaptive Trunking comes standard with all SANbox 9000 series switches.

Performance Monitoring	Fabric Management	Installation
Distance	SANbox 9000 Management Tools	Throughput
Fabric Monitoring	Security	Diagnostics

Fabric Security offers the right mix of protection features for user security, connection security, and device security. RADIUS authentication is supported so that separate user names and passwords don't have to be managed. The data path for switch management communication is encrypted using Secure SHell (SSH) for CLI and Secure Socket Layer (SSL) for Enterprise Fabric Suite 2007, QuickTools, and SMI-S. Users can setup device connection security to control what devices have access to the switch. ISL and port authentication is achieved using Fibre Channel-Security Protocol (FC-SP) and DH-CHAP. Additional device authentication is performed using FC-GS-4 CT.

Performance Monitoring	Fabric Management	Installation
Distance	SANbox 9000 Management Tools	Throughput
Fabric Monitoring	Security	Diagnostics

SANdoctor™ provides a comprehensive set of diagnostic tools for troubleshooting fabric problems. FC Ping verifies that a functional path exists between two ports. FC Trace Route displays path information between a source and a destination. Digital Diagnostics Monitoring displays SFP, X2, and XPAK transceiver data to determine if variables are within operational limits.

Fabric Specifications

Fibre Channel protocols

- Physical Interface (FC-PI-3)
- Line Services (FC-LS)
- Framing & Signaling (FC-FS-2)
- Generic Services (FC-GS/FC-GS-2/FC-GS-3/FC-GS-4/FC-GS-5)
- Switch Fabric (FC-SW-2/FC-SW-3/FC-SW-4), except for enhanced zoning
- Arbitrated Loop Rev. 4.6 (FC-AL)
- Arbitrated Loop-2 Rev. 7.0 (FC-AL-2)
- Fibre Loop Attachment (FC-FLA)
- Tape Technical Report (FC-Tape)
- Virtual Interface Architecture Mapping (FC-VI)
- Fabric Element MIB Specification (RFC 2837)
- Fibre Alliance MIB Specification (Version 4.0)
- Methodologies for Interconnects (FC-MI-2)
- Device Attach (FC-DA)
- Security Protocols (FC-SP)

Fibre Channel classes of service

- Class 2, Class 3, and Class F (inter-switch frames) connectionless Fibre Channel protocol support

Modes of Operation

- Fabric
- Public loop
- Broadcast

Performance Features

Fabric port speed

- 4Gb I/O Blade (SB9004-4G) @ 1.0625, 2.125, and 4.250 Gbps
 - Auto sensing of 1, 2, and 4 Gbps port speeds
 - Optionally programmable to fixed port speed
- 8Gb I/O Blade (SB9004-8G) @ 1.0625, 2.125, 4.250, and 8.50 Gbps
 - Auto sensing of 1, 2, 4 and 8 Gbps port speeds
 - Optionally programmable to fixed port speed
- FC10G4 I/O Blades @ 12.75 Gbps

FC fabric latency (best case)

- 4Gb I/O blade (SB9004-4G): <0.3µsec @ 4 Gbps
- 8Gb I/O blade (SB9008-8G): <0.2µsec @ 8 Gbps
- 10Gb I/O blade (SB9010-10G): <0.2µsec @ 10 Gbps

FC fabric point-to-point bandwidth

- 212MB/s Full-Duplex on 1Gb ports
- 424MB/s Full-Duplex on 2Gb ports
- 850MB/s Full-Duplex on 4Gb ports
- 1700MB/s Full-Duplex on 8Gb ports
- 2550MB/s Full-Duplex on 10Gb ports

System bandwidth

- Backplane switching capacity
 - SB9100 Model – 408 Gbps, full-duplex
 - SB9200 Model – 816 Gbps, full-duplex
 - 2X SB9200 HyperStack – 1632 Gbps, full-duplex
 - Non-blocking HyperStack architecture
- Local switching capacity
 - SB9100, 4Gb blades – 1088 Gbps
 - SB9100, 8Gb blades – 2176 Gbps
 - SB9200, 4Gb blades – 2176 Gbps
 - SB9200, 8Gb blades – 4352 Gbps

Maximum frame sizes

- 2148 bytes (2112 byte payload)
- In-order delivery assured within OX-ID

Per-port buffering

- ASIC-embedded memory (non-shared)
- Each port has a guaranteed 16-credit zero wait state buffer for full performance up to 13km @ 2Gb and 2Km @ 10Gb
- Buffer credit donor support via software GUI wizard to extend distance with full performance as shown in the Extended Distance Donor Buffer Credit Allocation table on page 12

ISL trunking

- Supports aggregation of up to 128 ISLs in one or more trunks between multiple switches in any port speed combination and across multiple I/O Blades
 - 10Gb recommended to maximize number of usable 8/4/2/1Gb server/storage ports on both SANbox 5000 series and 9000 series switches
- Switch-On-Exchange (SOE) mode for dynamic ISL trunk load balancing to maximize throughput
 - Assured in-order delivery of frames in all multi-switch and multi-ISL trunked configurations
 - Adaptive Trunking to improve efficiency via optimal routing across multiple trunk groups
 - Intelligent Path Selection (IPS) on all 10Gbps and 8/4/2/1Gbps ISL trunk ports
- Automatic configuration of ISL trunks including multi-hop paths between multiple switches
 - Supports all multi-switch fabric topologies including stack, cascade, cascaded loop, and mesh
 - Adaptive Trunking to improve efficiency via optimal routing across multiple trunk groups
 - Up to 239 switches depending on configuration
- Non-disruptive dynamic addition of ISLs to an existing trunk
- High availability with automatic path failover

System processor

- 800 MHz Power PC® processor

I/O Blade processor

- 400 MHz Power PC processor

Modular Scalability

Ports per chassis module

- 16 to 128 FC 8/4/2/1 Gbps ports
- 4 to 32 FC 10 Gbps ports
- Full Blade intermix support, maximum eight Blades, all Blades hot-pluggable
- >475,000 user ports depending on configuration

Ports per rack

- Up to 1,280 ports per 42U rack

Chassis module HyperStack

- Two BASE Model SB9200 chassis modules via four proprietary HyperStack cables
 - Two domains
 - Up to 256 Fibre Channel 8/4/2/1 Gbps ports

Multi-switch fabrics

- Supports all topologies, including: stack, cascade, cascaded loop, and mesh
- Maximum 239 switches (domain IDs) depending on configuration

Fabric port types

- All ports are universal, auto-discovering, self-configuring and can assume the following states:
 - F_Port: Fabric (N_Port ID Virtualization [NPV] support automatically enabled) with up to 255 NPVs per port
 - FL_Port: Fabric loop (public loop)
 - E_Port: Switch-to-switch

Administrative port types

- G_Port: Generic
- GL_Port: Generic loop

Port security

- Port binding via list of WWNs (up to 32) allowed access to a port
- ISL and port authentication via FC-SP and DH-CHAP

Port statistics

- Configuration and operational data
- Transmitted and received frame counts
- Transmitted and received error counts

Media type (ordered separately)

- 8Gb I/O blade (SB9008-8G) – Hot-pluggable, industry standard 3.3 volt SFP+ transceivers (for 8 Gbps speed) or SFP transceivers (for 4 and 2 Gbps speed)

SANbox 9000 Series Stackable Chassis Switch Designed to the Core™ for Open Systems

- 4Gb I/O blade (SB9004-4G) – Hot-pluggable, industry standard 3.3 volt SFPs for 4/2/1 Gbps speeds
- 10Gb I/O blade (SB9010-10G) – Hot-pluggable, industry-standard X2 optical transceivers or X2 copper ISL cables for 10 Gbps speed

Supported SFP transceiver types

- Short Wave (optical)
- Long Wave (optical)
- Active/Passive Copper (8/4/2Gb)
- **Supported X2 transceiver types**
- Short Wave (optical)
- Long Wave (optical)

Media transmission ranges (@ 10Gbps speeds)

- Optical Media
 - Short Wave: 300 m (984 ft.)
 - Long Wave: 8.34 km (5.18 miles)

Optical cable types (4Gb, 8Gb, and 10Gb)

- 50/62.5 micron multimode fiber optic
- 9 micron single-mode fiber optic

Interoperability/Certifications

- Fully interoperable with all QLogic SANbox switch products
- Compatible with FC-SW-2 compliant switches, including Brocade, Cisco and McDATA
- Management interoperability with leading SAN management applications
- FCIA SANmark and SNIA SMI-S certified
 - SCD-3001v2a1 (E_Port)
 - SCD-3002v2 (FL_Port)
 - SCD-3010v1 (RSCN)
 - SCD-3020v1 (Zoning)
- Certified with leading SAN hardware and software vendors. Visit www.qlogic.com/interoperability/interoperability.aspx for a comprehensive listing

Fabric Services**Software releases**

- QuickTools version 7.08.XX or later
- Enterprise Fabric Suite 2007 version 7.08.XX or later
- Switch Firmware version 7.8.XX or later

Ethernet connections

- CPU Blade: RJ-45 Ethernet connector on each CPU Blade on back of chassis module
- Maintenance Panel: Two alternate RJ-45 Ethernet connectors on Maintenance Panel on front of chassis module
- IPv6 support

Management methods

- Enterprise Fabric Suite 2007 GUI
- QuickTools web applet
- Application Programming Interface (API)
- CLI
- GS-4 Management Server (including FDMI)
- Simple Network Management Protocol (SNMP)
- RADIUS
- File Transfer Protocol (FTP)
- Trivial File Transfer Protocol (TFTP)
- Storage Management Initiative Specification (SMI-S)

Fabric security

- Fabric binding via list of allowed domain IDs and switch WWNs
- Inter-switch management communication data path encryption
 - SSH for CLI
 - SSL for QuickTools, EFS 2007, and SMI-S
- Device, Host, and Switch Authentication
 - Local security database configuration, or
 - Remote authentication via a RADIUS Server
 - Additional MS request authentication via FC-GS4 CT authentication
 - Enable/Disable in-band management of switch

Registered State Change Notification (RSCN)

- RSCNs are generated per standard (FC-GS, FC-FS, FC-SW, etc.)
- Delayed to allow consolidation into single RSCN
- QLogic I/O StreamGuard™ suppresses RSCNs between initiators

Fabric diagnostics

- Optional SANdoctor™ software package

Call Home

- Switch initiated problem message notification to multiple end-user e-mail boxes
- Message content criteria selectable by log event level (fault, alarm, critical, warning)
- Up to 25 profiles; up to 10 e-mail recipients per profile
- Message queue, status, and history statistics can be queried
- Ability to test a new/changed Call Home profile and view log failures
- Operates an SMTP client to transfer e-mail messages to designated SMTP servers via TCP/IP interconnect
- Call Home directly to QLogic worldwide Technical Support Center coming in mid-CY2008

Maintainability**Maintenance strategy**

- Hot-pluggable CRUs per chassis module
 - SFP & X2 transceivers
 - I/O Blades (eight maximum, three types w/ Intermix)
 - CPU Blades (two w/Model SB9200, one w/ Model SB9100)
 - Power supply blades (two)
 - Fan blades (two)
- Enhanced data integrity on all data paths
- Fabric Shortest Path First (FSPF) rerouting around failed links
- Integration with SNMP managers
- Non-disruptive “hot” firmware code load and activation (NDCLA)
- Easy configuration, save, and restore
- E-mail Call Home system initiated alarm/fault notification

Maintenance access methods

- Single point in-band management with auto-discovery across multiple switches via software GUI
- One out-of-band Ethernet 10/100Mb BaseT RJ-45 management port per CPU Blade, each replicated on Maintenance Panel
- One RJ-45 serial port per CPU Blade (RJ-45 to DB-9 conversion dongle included)
- FC-GS4 Management Server

Diagnostics

- Power-On Self-Test (POST) tests all functional components except SFP and X2 transceivers
- Optional SANdoctor fabric diagnostics software
 - FC Ping: verifies functional path existence between two ports
 - FC Trace Route: displays path information between a source and destination
 - Digital Diagnostics Monitoring: displays real-time SFP, X2, and XPAK transceiver data

Visual user interface

- LED indicators on the Maintenance Panel, I/O Blades, CPU blade(s), power supply blades, and fan blades

Maintenance Panel (MP)

- Dual redundant Maintenance Panel EPROMs maintain chassis-specific information (such as WWN, SNMP system object ID, serial number, part number, etc.), alternate Ethernet management interface ports, and LED summary status information for the switch

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Global services¹

- Standard one year hardware/firmware warranty
- SAN Pro Service and Support Programs
 - SAN Pro Preferred standard on BASE Model SB9200 & ENTRY Model SB9100: Next Business Day (NBD) Advanced Delivery spares, 24x7 technical phone support
 - Optional: upgrades to SAN Pro Choice (NBD Onsite Replacement) and SAN Pro Prime (4-hour Onsite Replacement) available for a fee

Physical Characteristics

Enclosure chassis module/blade packaging

- Standard Rack Mountable Chassis Module
 - Includes adjustable forward/reverse Mounting Rail/Racking kit and dual power cords
- I/O Blades
 - Standard and optional I/O Blades do NOT include SFPs, X2 transceivers, or copper/optical cables (orderable separately)
- Hardware and Software License Field Upgradeability:
 - SB9100 ENTRY Model to SB9200 BASE Model
 - SB9200 Model to SB9200 Fault Tolerant Model
 - One SB9200 BASE Model to Dual HyperStack Model
 - Two SB9200 BASE Models to Dual HyperStack Model

Dimensions (chassis module)

- Width: 431 mm (17.0") 19" rack mountable
- Height: 179 mm (7.0") (4U)
- Depth: 673 mm (26.5")

Weight (SB9200 chassis module maximum)

- 40.82 kg (90 lbs)

Power supply/cooling (both SB9100 and SB9200)

- Hot-Pluggable/Dual-Redundant power supply blades with integrated cooling fans
 - Dual 7'6" long 3-wire 16AWG power cables with IEC320 input connector
 - Popular international country dual power cable/connector kit options available
- Hot-Pluggable/Dual-Redundant fan blades
- Back-to-Front and Front-to-Back Airflow Direction Models available
- 150-cfm airflow
- 1,000 watts or 3,414 BTU/hour rating per power supply

Heat output (SB9200 full data traffic maximum)

- 2,046 BTU/hour at 128-ports 4Gb Fibre Channel

(incl. SFPs and "local switching")

- 4,228 BTU/hour at 256-ports 4Gb Fibre Channel HyperStack (incl. SFPs and "local switching")

Electrical Requirements

Operating voltage/frequency

- 100 to 240 VAC auto-sensing, single phase
- 47 to 63Hz

Power source loading (SB9200 chassis module maximum power supply rating)

- 10 Amps at 100 VAC
- 4.2 Amps at 240 VAC

Operating load (SB9200 with no data traffic)

- 550 Watts at 128-ports 4Gb Fibre Channel (including SFPs)
- 1,120 watts at 256-ports 4-Gb Fibre Channel HyperStack (including SFPs)

Operating load (SB9200 with full data traffic)

- 600 Watts at 128-ports 4Gb Fibre Channel (including SFPs and "local switching")
- 1,240 watts at 256-ports 4-Gb Fibre Channel HyperStack (including SFPs and "local switching")

Circuit protection

- Internally fused

Environmental Factors

Operating

- Temperature: 0°C to 40°C (32° to 104°F)
- Humidity: 15% to 80% non-condensing
- Altitude: 0 to 3048m (0 to 10,000 feet)
- Vibration: IEC 68-2, 5-500 Hz, random, 0.21g RMS, 10 minutes
- Shock: IEC 68-2: 4g, 11ms, 20 repetitions

Non-operating

- Temperature: -40°C to 70°C (-40° to 158 °F)
- Humidity: 5% to 90% non-condensing
- Altitude: 0 to 15,240m (0 to 50,000 feet)
- Vibration: IEC 68-2: 5-500 Hz, random, 2.1g RMS, 10 minutes
- Shock: IEC 68-2: 30g, 13 msec, trapezoidal pulse

Regulatory Certifications

Safety standards

- UL 60950-1 – UL Listed (United States)
- CAN/CSA C22.2 No. 60950-1 – cUL Listed (Canada)
- EN60950-1 (EC)
- CB Scheme-IEC 60950-1 (International)
- GOST R (Russia)

Emissions standards

- FCC Part 15B Class A (USA)
- VCCI Class A ITE (Japan)
- ICES-003 Class A ITE (Canada)
- EN 55022 Level A (EC)
- CISPR 22, Class A (International)
- AS/NZS CISPR 22:2002 Class A (AUS/NZ)
- GOST R (Russia)
- KN22 – Class A (Korea)

Environmental standards

- RoHS-5/WEEE (EU & Japan)

Voltage fluctuations

- EN 61000-3-3

Harmonics

- EN 61000-3-2

Immunity

- EN 55024

Marking

- FCC Part 15, UL (United States)
- cUL, CUE, TUV (Canada)
- TUV , CUE, CE (EC)
- VCCI-A (Japan)
- C-Tick (AUS/NZ)
- GOST R (Russia)
- MIC (Korea)
- Exempt (Taiwan)
- UL AR/S-Mark (Argentina)
- CCC – Field Replaceable Unit (FRU) power supply modules (China)

¹ For additional information on SANbox 9000 service options, visit <http://www.qlogic.com/Support/ServicePrograms.aspx?id=m11>.

Extended Distance Donor Buffer Credit Allocation

Donor Ports	Buffer Credit Allocation Per I/O Blade		Distance @ 1 Gbps	Distance @ 2 Gpbs	Distance @ 4 Gpbs	Distance @ 8 Gpbs	Distance @ 10 Gb
	1/2/4 Gb/sec	10 Gb/sec					
0	16	16	26km	13km	6km	3km	2km
1	30	30	50km	25km	12.5km	6.25km	4.17km
2	45	45	75km	37.5km	18.75km	9.375km	6.25km
3	60	60	100km	50km	25km	12.5km	8.34km
4	75	—	125km	62.5km	31.25km	15.625km	—
5	90	—	150km	75km	37.5km	18.75km	—
6	105	—	175km	87.5km	43.75km	21.875km	—
7	120	—	200km	100km	50km	25km	—
8	135	—	225km	112.5km	56.35km	28.175km	—
9	150	—	250km	125km	62.5km	31.25km	—
10	165	—	275km	137.5km	68.75km	34.375km	—
11	180	—	300km	150km	75km	37.5km	—
12	195	—	325km	162.5km	81.25km	40.625km	—
13	210	—	350km	175km	87.5km	43.75km	—
14	225	—	375km	187.5km	93.75km	46.875km	—
15	240	—	400km	200km	100km	50km	—

- Each 4Gb, 8Gb, or 10Gb port is supported by a data buffer with a 16 credit base capacity (that is, 16 maximum sized frames).
- Longer distances can be spanned at full bandwidth on 1/2/4/8Gb or 10Gb ports by extending buffer credits to G_Ports, F_Ports and E_Ports (per table above).
- Each 1/2/4/8Gb or 10Gb port on an I/O Blade can donate up to 15 of their 16 base buffer credits which a recipient port on the same I/O Blade can borrow.
- The recipient port also loses a single base buffer credit in the process.
- Prerequisite minimum cable lengths apply as well.

SB9000 Series Minimum Configuration

	CPU Blades	16-Port 4/2/1Gb FC I/O Blades	4-Port 10Gb FC I/O Blades	Power Supply Blades	Fan Blades	HyperStack Cables
SB9100 ENTRY Model	1	1	0	2	2	0
SB9200 BASE Model	2	2	0	2	2	0

16-port 8Gb blades may be ordered separately to supplement the above minimum configurations.

For a list of authorized resellers, visit <http://www.qlogic.com/WhereToBuy/WheretobuyHomePage.aspx>



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