



# SANbox<sup>®</sup> 5600Q/5602Q

## Fibre Channel Stackable Switch

### Affordable Now—Big Savings Later

- Low initial cost
- Reduced expansion costs
- Longer product and topology lifespan

### Powerful, Intuitive Software

- QuickTools™
- Enterprise Fabric Suite 2007™
- SANdoctor™
- Fabric Security

### More Ways to Grow

- Flexible port licensing on a single switch
- Stack switches for quick, easy expansion
- High-speed modular backbone

### Easy to Install and Manage

- Installation and configuration wizards
- On-board Graphical User Interface (GUI)
- Manage stacks as a single device

### Fast, Reliable 4Gb/10Gb Performance

- Non-blocking, full bandwidth architecture
- Adaptive Inter-Switch Link (ISL) trunking
- I/O StreamGuard for RSCN suppression
- Hardware-enforced zoning by worldwide name
- Hot-swappable dual power supply option
- Non-Disruptive Code Load and Activation (NDCLA)



### Start or Expand Your 10Gb Backbone Today!

Now the benefits of stackable IP switches are available for high-performance 4Gb Fibre Channel SANs. SANbox 5600Q Series stackable switches deliver the performance and seamless scalability of a modular chassis switch in an easy-to-manage, pay-as-you-grow solution.

- Entry as low as eight 4Gb device ports
- Single-switch expansion to sixteen 4Gb device ports – *plus four 10Gb stacking ports (20 ports total)*
- Multi-switch expansion to 96 device ports per stack
- Single (SB5600Q) and dual-power supply (SB5602Q) options

### The Most Cost-Effective Way to Build a SAN

SANbox 5600Q lets you start small, then scale with your company's needs using state-of-the-art 10Gb Fibre Channel "stacking" technology typically found only in high-end director products. As proven in the Ethernet world, stackable architectures cut costs and increase stability by providing a dedicated, highly-expandable transport for aggregate ISL traffic – eliminating the disruption, port waste, and management hassles associated with using regular device ports for inter-switch links. It's like having the performance and hands-off convenience of an expensive chassis switch – without the cost overhead of a chassis!



Easy SAN Expansion - No Device Disruption

***Need more server or storage ports? Simply add another 5000 Series switch to the stack. There's no need to move existing cables or disrupt devices – your ISL bandwidth expands automatically with each switch!***

## Affordable Now – Big Savings Later

- **Low initial cost** – Out of the box, dual-speed SANbox 5600Q Series products provide superior performance at a price-per-port competitive with single-speed, non-stacking edge switches.
- **Reduced expansion costs** – With no device ports wasted for ISLs, multi-switch SANbox 5600Q networks require up to 50% fewer switches. As growth occurs, cables and transceivers for SANbox 5600Q 10Gb ports actually cost *less* than equivalent 4Gb ISLs on a per-bandwidth basis.
- **Longer product and topology lifespan** – Other vendors force customers to take a non-linear “rip and replace” approach to SAN growth, offering a limited solution at the low end, followed by a radically different (and much more expensive) architecture as the installation matures. QLogic’s modular ISL backbone helps customers pace investments and deployment activities predictably over time, with fewer wrong turns and reversals – even when corporate strategies and directions change. The SANbox 5600Q ensures *every* SAN purchase will remain a viable part of the infrastructure far into the future.

## More Ways to Grow

- **Flexible port licensing on a single switch** – SANbox 5600Q products are available in a range of port count configurations. As requirements change, it’s easy to activate additional ports in four-port increments via the embedded QuickTools GUI or the command line interface.
- **High-speed backbone for multiple switches** – When you’re ready, simply turn on the plug-and-play stacking ports for the quickest, most cost-effective way to set up a multi-switch SAN. Only QLogic offers industry-standard 10Gb Fibre Channel ISLs on both core and edge switches – you’ll never need to unplug a device cable or disrupt a device, no matter how large your fabric grows. Scalability “best practices” are *built into* the SANbox 5600Q architecture!

## Easy to Install and Manage

- **Installation and configuration wizards** – From basic switch setup to advanced zoning and extended distance configuration, the SANbox 5600Q has automated routines to make deployment a snap. Installation is a three-step, point-and-click process. Self-configuring switch ports automatically adjust to 4Gb or 2Gb device speeds.
- **On-board GUI** – No software to load. Just point a web browser at any switch and manage the entire fabric from that location. No matter what your level of expertise, the web-based QuickTools interface has everything you need for basic fabric management.

For advanced administration of larger SANs, the optional *Enterprise Fabric Suite* application provides an unprecedented level of intuitive control.

- **Stack Management** – With *Enterprise Fabric Suite*, users can manage stacks of 5000 Series products as a single device, loading firmware, applying security changes, or handling user and SNMP administration for up to six switches simultaneously.

## Fast, Reliable 4 Gbps/10 Gbps Performance

QLogic SANbox 5600Q products provide uncontested full-duplex bandwidth at every port. That’s 136 Gbps for device ports, plus 102 Gbps on the ISL ports – a total of 238Gb of bandwidth per switch! Plus, thanks to the QLogic 10Gb backbone, ISL bandwidth expands automatically as network capacity grows, ensuring a consistent user experience over time.

- **Non-blocking, full bandwidth architecture** – 238 Gb of bandwidth per switch. Dedicated 10Gb ISL transport makes it easier to create non-blocking multi-switch configurations.
- **Adaptive Trunking** – No extra cost or complicated license schemes. Built-in QLogic-exclusive trunking feature optimizes ISL utilization and performance by pooling the capacity of multiple 10Gb or 4Gb links in a single high-bandwidth pipeline. Trunks are automatically invoked as needed, eliminating the need for manual configuration. Unlike other trunking implementations, trunked ports do not need to be sequential, and may even be spread across multiple switches. The industry-standard switch-on-exchange method supports Intelligent Path Selection, Fabric Shortest Path First, and Virtual Trunking.

A variety of reliability features make the SANbox 5600Q capable of delivering overall system availability greater than 99.999%.

- **I/O StreamGuard for RSCN suppression** – Guaranteed uninterrupted bandwidth for time-sensitive applications such as video streaming and tape backups.
- **Hardware-enforced zoning by Worldwide Name**
- **Hot-swappable dual power supply option**
- **Non-Disruptive Code Load and Activation (NDCLA)**

## Powerful, Intuitive Software

QLogic implements the same code base for the entire SANbox product line, including the popular SANbox 9000 Series switch. Not only are SANbox products backward and forward compatible, you’ll only need to learn one set of management tools.

- **QuickTools** – Embedded Java® web applet for device discovery, device management, zoning, and fabric management. QuickTools

## SANbox 5600Q/5602Q Fibre Channel Stackable Switch

includes the Configuration Wizard and QLogic's exclusive Drag-and-Drop Zoning – the industry's most intuitive zoning method.

- **Enterprise Fabric Suite** – Control software costs while managing the SAN *your way* with unprecedented granularity. Enterprise Fabric Suite bundles high-value enterprise features such as Fabric Tracker, Performance View, Port Threshold Alarms, Stack Management, and mPort Technology™ movable port activation into a single site-licensed package. You'll spend less time and money licensing individual features or worrying about "balloon payment" per-switch fees as your SAN grows.
- **SANdoctor** – Comprehensive set of diagnostic tools for troubleshooting problems in your fabric. Includes SFP digital diagnostics, fabric traceroute, and fabric ping.
- **Fabric Security** – Provides the right mix of protection features for user, connection, and device security. Supports RADIUS authentication, Secure Shell (SSH), and Secure Socket Layer (SSL) encryption. Device connection security support using Fibre Channel Security Protocol (FC-SP), DH-CHAP, and FC-GS-4 CT.

### Interoperability

- **Fully compatible with other SANbox switches** – Mix and match in stacks with all 5000 Series products (2Gb or 4Gb). As always, QLogic's management tools are 100% backward compatible with full support for previous-generation switches.
- **Interoperable with all major storage, server, application, and infrastructure vendors** – SANbox products are designed for heterogeneous OS environments including Windows®, UNIX®, Linux®, AIX®, MacOS®, Solaris® and others. SNMP support, available API, and SMI-S agent for integration into popular third-party management applications.
- **Virtualization Support** – N\_Port ID Virtualization (NPIV) support comes standard with the SANbox 5600Q, allowing full integration and interoperability with applications such as VMWare® and hardware such as the IBM® Intelligent Pass-thru Module and HP® VC-FC blade switch modules. Only QLogic delivers end-to-end NPIV support on Host Bus Adapters (HBAs) and switches.
- **Interoperable with all FC-SW-2 compliant switches** – No need for proprietary interoperability to achieve full functionality.

### Investment Protection

Planning to expand to a core-edge topology in the future? Need to add edge connectivity to an existing core infrastructure? No matter where you begin, SANbox 5600Q and QLogic's 10Gb ISL backbone provide the most efficient, cost-effective expansion method. Competing solutions rob increasing numbers of device ports to support growing ISL requirements. With the SANbox 5600Q,

there is no "point of diminishing returns" for switch investments and no performance penalty for growth. *Every switch you purchase continues to add the same user value.*

The modular backbone helps you avoid disruptive topology reversals and react faster to changing requirements, including the adoption of new technologies. With the SANbox 5600Q, IT managers can realize a cost-optimized path from the initial-to-ultimate solution without knowing the intervening requirements ahead of time.

*Spend your IT dollar on user applications, not infrastructure.* SANs exist to support users. Don't let cost and complicated infrastructure turn this equation upside down. SANbox 5600Q low-TCO products will enhance any company's long-term growth strategy, improving operational efficiency, increasing storage utilization – and ultimately making business-critical applications and personnel more productive.

### Typical Uses

Environments	Applications
Small stand-alone or departmental/workgroup SANs	Email LAN-free backup Disaster recovery Storage/server consolidation DAS-to-SAN migration Video
Edge switch in larger core-edge topologies	Email ERP/MRP Storage/Server consolidation Data warehousing Video

### Why 10Gb Stacking Ports Matter

- Predictable ROI – No point of diminishing returns
- No penalty for growth
- "Best practices" are built into the architecture
- Simple ISL administration
- ISLs protected from day-to-day changes
- Less business disruption during expansion
- Consistent user experience over time
- Future-ready architecture

## SANbox 5600Q/5602Q Fibre Channel Stackable Switch

## Scalability

## Ports per chassis

- Eight to sixteen 4-Gbps ports (upgradeable in 4-port increments)
- Four 10-Gbps XPAK MSA-compliant ports

## Multi-switch fabric support

- All topologies including: stack, cascade, cascaded loop, and mesh
- Multiple 10Gb or 4Gb links between switches
- Adaptive trunking, intelligent path selection

## Port types

- All ports are universal, auto-discovering, self-configuring, and assume the following states:
  - F\_Port, FL\_port, E\_port, G\_Port, GL\_Port

## Performance Features

## Fabric port speeds

- 4-Gbps, 10-Gbps full-duplex. 4Gb ports auto-negotiate with slower devices.
- Fabric latency less than 0.4  $\mu$ s
- Cut-through routing

## Fabric point-to-point bandwidth

- 850 MBps full-duplex on 4-Gbps ports
- 2550 MBps full-duplex on 10-Gbps ports

## Aggregate bandwidth

- 238-Gbps per chassis, end-to-end
- Non-blocking architecture

## Maximum frame sizes

- 2148 bytes (2112 byte payload)

## Per-port buffering

- ASIC-embedded memory (non-shared)
- Guaranteed 16 credit zero wait state buffer for full performance up to 13km @ 2-Gbps and 2km @ 10-Gbps
- Extended distance via credit donation

## Media

- Hot-pluggable, industry-standard 3.3 volt Small Form Pluggable (SFP) for 4-Gbps ports
- Hot-pluggable, industry-standard XPAK optics or copper stacking cables for 10-Gbps ports

## Supported SFP types

- Shortwave/longwave (optical), active copper

## Media transmission ranges (2-Gbps)

- Shortwave optical: 500 m (1,640 ft.)
- Longwave optical: 10 km (6.2 mi.)

## Cable types

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

## Interoperability

- Compatible with FC-SW-2 compliant switches including Brocade®, Cisco®, and McData®
- Management interoperability with leading SAN management applications

## Fabric Management

## Management methods

- QuickTools web applet
- Enterprise Fabric Suite 2007
- Command Line Interface
- API, GS-4 Management Server (including FDMI), SNMP, RADIUS, FTP, TFTP, SMI-S.

## Access methods

- 10/100 Ethernet BaseT (RJ45), serial port (RS-232 with DB9), in-band (Fibre Channel)

## Diagnostics

- Power-On Self Test (POST)
- Optional SANdoctor fabric diagnostics software

## Fabric services

- Simple name server, hardware based zoning, Registered State Change Notification (RSCN), I/O StreamGuard, multi-chassis in-order delivery, automatic path selection, FDMI support

## User interface

- LEDs, command-line console, and web utilities

## Mechanical/Power/Cooling

## Single integrated power supply model

- Rubber mounting feet, mounting brackets
- Optional rail mount kit

## Dual hot-swappable power supply model

- Hot-swap power supplies, integrated fans

- Optional rail mount kit
- Front-to-back air pattern (both models)
- RoHS compliant

## Dimensions

- H x W x D: 43.2 x 432 x 305 mm (1.7 x 17 x 12 in) – single power supply
- H x W x D: 43.2 x 432 x 508 mm (1.7 x 17 x 20 in) – dual power supply

## Weight

- 4.08 kg (9 lbs) – single power supply
- 6.80 kg (15 lbs) – dual power supply

## Environmental and Equipment Specifications

## Operating

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

## Non-operating

- Temperature: -40° to 70°C (-40 to 158 °F)
- Humidity: 5% to 90% non-condensing
- Altitude: 0 to 50,000 feet
- Vibration: 5 to 500 Hz, random, 2.09 Grms, 10 minutes
- Shock: 30g, 13 msec, trapezoidal

## Electrical

- Voltage: 100 to 240 VAC; 50 to 60Hz
- Power load: 120 VAC
- Heat output: 100W maximum

## Agency Approvals—Product Safety

- US/Canada: UL/cUL, 60950-1
- Europe: EN60950, CB Scheme-IEC 60950-1, CE, TUV, Low Voltage Directive
- Russia: GOST R
- Argentina: S Mark

## Agency Approvals—EMI/EMC

- Meets Class A emissions and immunity requirements for USA, Canada, Europe, Australia, New Zealand, Korea, Japan



Corporate Headquarters QLogic Corporation 26650 Aliso Viejo Parkway Aliso Viejo, CA 92656 949.389.6000 [www.qlogic.com](http://www.qlogic.com)

Europe Headquarters QLogic (UK) LTD. Surrey Technology Centre 40 Occam Road Guildford Surrey GU2 7YG UK +44 (0)1483 295825

For information about supported SAN standards and classes of service, visit [www.qlogic.com/sanstandards](http://www.qlogic.com/sanstandards).