



# SANbox™

1Gb 8,16 and 16HA  
Fibre Channel Switches

# Switch SERIES

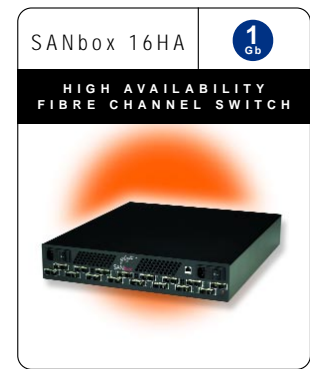
QLogic's SANbox switches provide the essential foundation for entry-level to mid-range Storage Area Networks (SAN). Linking multiple hosts and storage resources, SANbox fibre channel switches create the connectivity framework to help users share and efficiently access stored data.



- Ideal for entry level SANs
- SANbox Full Loop Support, plus F\_port and E\_port capability
- Substantial performance boost over hub based SANs



- Great for typical SANs
- 16 ports for easy SAN scalability
- Fully interoperable with all QLogic SANbox and other FC-SW-2 compliant switches



- Perfect for high availability SAN implementations
- All the features of the SANbox-8 and SANbox-16 plus optional dual hot-swappable power supplies/fans

- Gigabit speed (full duplex) at all 16 ports
- Full fabric, loop (public and/or private) or switch-to-switch connectivity at every port

- Auto-sensing, self-configuring ports
- Cascade/Mesh for entry-level, Multistage™ for large fabric configurations

- ASIC-embedded memory - faster, cooler, more scalable and reliable than shared memory architecture
- Lowest 1Gb switch latency in the industry (580 nanoseconds)

- Full E\_Port switch support for heterogeneous SANs
- High Availability: Dual redundant power supply option (SANbox-16HA)

Supplying eight and sixteen port models, the QLogic SANbox family of switches enables your business flexibility in building your SAN infrastructure. The SANbox-16HA switch adds high-availability to the extensive list of features, maximizing your access to mission-critical data. Regardless which of the three models you choose, the SANbox-8, SANbox-16 and SANbox-16HA deliver industry-leading 1Gb Fibre Channel performance.

Comprehensive SAN services, including those listed below, are automatically distributed across multi-switch fabrics. Powerful ease-of-use and management features, fifth-generation engineering quality and a commitment to ANSI-standard interoperability make QLogic's SANbox Switch Series a value-packed component of today's best SANs.

**SANbox FLS™ (FULL LOOP SUPPORT).** SANbox switches work seamlessly with the Fibre Channel devices you already have in place. *Translative Mode* brings legacy private loops forward into a public environment, by dynamically handling address translation issues transparently to the users.

**REAL-WORLD SCALABILITY.** QLogic SANbox products expand to support high-performance fabrics of virtually unlimited size. In Cascade, Mesh, Multistage, or combination of configurations, QLogic's innovative architecture lets you implement the topologies that make sense for your environment.

**SANsurfer™ Tool Kit.** Manage all aspects of your SAN using QLogic's embedded Web-based browser interface – or integrate with your GUI of choice. Either way, QLogic's flexible OSI-based management architecture lets you access powerful features including SANguard™ zoning for the ultimate in data security.

**SANbox Fibre Channel Switches****Fibre Channel Standards Compliance**

- FC-PH Rev 4.3
- FC-PH-2
- FC-PH-3
- FC-AL Rev 4.5
- FC-AL-2 Rev.7.0
- FC-FLA
- FC-GS-2
- FC-GS-3
- FC-FG
- FC-PLDA
- FC-Tape
- FC-VI
- FC-SW-2
- Fibre Channel Element MIB

**Fibre Channel Classes of Service**

- Classes 2,3 connectionless

**Modes of Operation**

- Fabric
- SANbox FLS
  - Public loop
  - Private loop
  - Segmented private loop
  - Private-to-public (fabric) bridging
  - Public (fabric)-to private bridging
- Broadcast

**Performance Feature****Fabric Port Speed**

- 1.0625 Gb/s, full-duplex

**Fabric Latency**

- Less than 0.6µs (best case, no contention)
- Cut-through routing

**Fabric Point-to-Point Bandwidth**

- 103 MB/s

**Fabric Aggregate Bandwidth**

- Single chassis
- SANbox-8: Up to 16 Gb/s (full duplex) end-to-end
- SANbox-16 and 16HA: Up to 32 Gb/s (full duplex) end-to-end
- Non-blocking architecture

**Maximum Frame Sizes**

- 2148 bytes (2112 byte payload)

**Per-Port Buffering**

- ASIC-embedded memory (non-shared)
- Each port has a guaranteed 8-credit buffer for full performance well over the 10km spec of longwave optics

**Scalability****Ports Per Chassis (populated in 1-port increments)**

- SANbox-8: 8 Universal Ports
- SANbox-16 and 16HA: 16 Universal Ports

**Multi-Switch Fabrics**

- Supports all topologies, including: Cascade, Cascaded loop, Mesh, and Multistage
- Supports multiple links between switches
- In-order delivery of frames in all multi-switch and multi-link configurations

**Fabric Port Types**

- All ports can assume the following states:
  - F\_port: Fabric
  - FL\_port: Fabric Loop (public loop)
  - E\_port: Switch-to-switch
  - TL\_port: Translative mode – private-to-public/public-to-private bridging
  - SL\_port: Segmented mode – Segment private loops for reduced arbitration. Allows switch to replace and improve on the performance of a hub
- All ports are auto-discovering, self-configuring

**Media Type**

- Hot-Pluggable, industry-standard Gigabit Interface Converters (GBICs)

**Supported GBIC Types**

- Shortwave 100-M5-SN-I
- Longwave 100-SM-LL-L
- Copper HSSDC 100-TW-EL-S
- Copper DB9 100-TW-EL-S
- Any GBIC type can be used in any fabric port

**Media Transmission Ranges**

- Optical
  - Shortwave: 500m (1,640ft)
  - Longwave: 10km (6.2mi.)
  - With repeaters: 20-30km (12-18mi.)
- Copper: 13m (43ft.) uncompensated, or 30m (129ft) compensated

**Cable Types**

- 50/62.5 micron multi-mode fiber optic
- 9 micron single-mode fiber optic
- Copper

**Interoperability**

- Fully interoperable with all SANbox products
- Backwards compatible with most GigWorks MKII configurations
- Compatible with FC-SW-2-compliant devices

**Fabric Management****Management Processor**

- Superscalar Intel i960HA

**Management Methods**

- SANsurfer embedded web-based management tools (standard and private brand versions)
- SNMP, TFTP, TELNET, SES, GS3

**Access Methods**

- In-band
- Ethernet 10/100 with RJ45

**Diagnostics**

- Power-up self-test of all functionality except media modules
- Field-selectable full self-test including media modules

**Fabric Services**

- Simple Name Server
- SANGuard Zoning
  - Hardware-based
  - Broadcast
  - Name Server
  - All zoning assigned on per node basis, even across Multi-stage fabrics
- I/O Streaming Guard (RSCN suppression)
- Alias-Server (Multicast)
- Multi-chassis in-order delivery
- Automatic Path Selection (APS) in Multistage configurations

**User Interface**

- LED indicators, command console, and web-based utilities

**Mechanical**

- Enclosure Types and Options
- Secure stacking with optional feet
- Efficient rack mounting with Optional ears (Ears can be mounted front or back.)

**Dimensions****SANbox-8**

- Width: 17.4" (19" rack mountable)
- Height: 1.72"
- Depth: 13.6"

**SANbox-16 and SANbox-16HA**

- Width: 17.6"(19" rack mountable)
- Height: 3.36"
- Depth: 21.813"

**Weight****SANbox-8**

- With 8 GBICs: 15.5lbs

**SANbox-16**

- With 16 GBICs: 22lbs

**SANbox-16HA**

- With 16 GBICs: 28lbs (single power supply), 32lbs (dual power supplies)

**Power Supply/Cooling**

- SANbox-8 and SANbox-16 Front-to-back or optional back-to-front airflow
- SANbox-16HA Optional redundant hot-swappable power supplies/fans Front-to back airflow

**Environmental****Operating**

- Temperature: +5°C to +40°C
- Humidity: 15% to 80% non-condensing
- Altitude: 0 to + 10,000 feet
- Vibration: IEC 68-2-34 5-500Hz, random, 2.09 G rms, 10 minutes
- Shock: IEC 68-2-27 4g, 11ms, 20 repetitions

**Non-Operating**

- Temperature: -40°C to +70°C
- Humidity: 5% to 90% non-condensing
- Altitude: 0 to + 50,000ft
- Vibration: IEC 68-2-34 5 to 500Hz, random, 2.09 G rms, 10 minutes
- Shock: IEC 68-2-27 30g, 292 ips, 13ms, 3 repetitions, 3 axis

**Electrical****Operating Voltage**

- 90-137 Vac, 47-63 Hz
- 180-265 Vac, 47-63 Hz

**Power Source Loading**

- 1.6 Amps maximum at 90-137 Vac
- 0.9 Amps maximum at 180-265 Vac

**Heat Output**

- 150 watts fully populated

**Regulatory**

Country	Safety	EMC
Canada	ULC 1950	ICES-003 Issue 3
United States	UL 1950n	FCC Part 15 Class A
Japan		VCCI Class A
European Community	EN60950 A4 CB-Scheme	EN55022 Level A EN55082-1 (immunity)



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