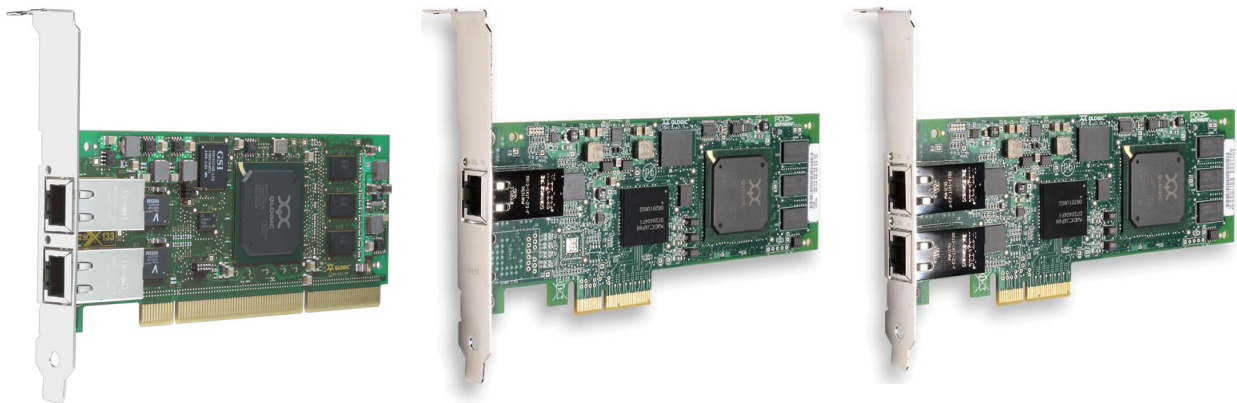


# 4000 Series

## PCI-X and PCIe to 1GbE iSCSI Adapters

### Overview

The QLogic 4000 Series one-gigabit Ethernet (1GbE) iSCSI Adapters provide SAN connectivity over Ethernet and TCP/IP network infrastructures. Both the iSCSI and TCP/IP processing functions are performed on the adapters and not on the host server CPU. By offloading these functions to the adapters, more host server CPU processing power is available to server applications, thus increasing the overall iSCSI SAN performance. The 4000 Series supports the latest version of IP addressing (IPv6), which is a requirement for next-generation government installations, and enables all IT administrators to begin building tomorrow's iSCSI SANs today.



## Highlights

- Networking and storage functionality for iSCSI, network attached storage (NAS), clustering, multimedia, distributed network applications, and Web serving
- Jumbo frames, 802.3x flow control, 802.1p priority service, and 802.1Q virtual LAN (VLAN) Ethernet networking
- Auto-negotiated 100Mbps and 1000Mbps line rate data transfer
- Low-profile PCI Express® form factor
- Universal iSCSI SAN boot for true remote storage boot implementations
- Storage reliability with iSCSI digests, ECC memory, and overlapping data path parity
- JTAG boundary scan, full scan, and memory (BIST)
- Highly integrated, low-power design

## Block Storage over Ethernet with iSCSI

The 4000 Series includes the QLA4050, QLA4050C, and QLA4052C (collectively referred to as QLA405x) and the QLE4060C and QLE4062C (collectively referred to as QLE406xC). The 4000 Series provides connectivity to SANs over Ethernet and TCP/IP network infrastructures for PCI-X™ and PCI Express bus-based servers. Using a widely deployed and familiar networking technology, iSCSI can lower the total cost of ownership to better manage and support storage networking.

## Superior Application Performance with FlexOffload®

By offloading the iSCSI and TCP/IP protocols to the adapter, the 4000 Series eliminates the processing, interrupts, and bus accesses required to support protocols in host software. The 4000 Series virtually eliminates the host CPU system processing required for iSCSI and TCP/IP, delivering superior application performance to software iSCSI alternatives.

## IPv6 Support

QLogic is the first to offer IPv6 support in an iSCSI TCP/IP offload engine (TOE) adapter. IPv6 is the next generation of IP addressing, which quadruples the number of network address bits from 32 bits (in IPv4) to 128 bits (in IPv6). As networks migrate to the updated IP protocol, IT managers can be assured that the QLE406xC will interoperate in emerging network environments.

## Simplified SAN Management

The 4000 Series utilizes the existing storage interface of the OS. Using a familiar storage interface allows the 4000 Series to support proven LUN and target-level failover functionality, storage SAN boot, and existing SAN management and application software.

## Comprehensive Operating System Support

QLogic offers the broadest range of support for all major OSs to ensure OS and hardware server compatibility. Drivers are fully tested with industry-recognized certifications from all of the major OSs, including Windows®, Linux®, Solaris®, Citrix®, Oracle®, and VMware®.

## Guaranteed Interoperability

Storage partner certifications, combined with agency and regulatory testing, ensure that all products meet worldwide compliance hardware and software specifications. All adapters are tested extensively with third-party hardware and multiple software applications to ensure best-in-class SAN interoperability and compatibility. You can be confident that purchasing QLogic adapters will meet your storage networking needs.

## Host Bus Interface Specifications

### Bus Interface

- 64-bit, 133/100/66MHz PCI-X and 32- and 64-bit, 33/66MHz PCI (QLA405x)
- 2.5GHz PCIe® x4 (QLE406xC)

### Signal Voltage

- 3.3V (QLA4050) or universal (3.3V or 5V) (QLA405xC)

### Hardware Platforms

- IA32 (x86), x64, Sun® SPARC®

### Compliance

- *PCI Express Base Specification* rev. 1.0a, *PCI Express Card Electromechanical Specification* rev. 1.0, *PCI Bus Power Management Interface Specification* rev. 1.1 (QLE406xC)
- Conforms to *PCI Local Bus Specification* rev. 2.3, *PCI-X Specification* rev. 1.0b, *PCI-X Electrical and Mechanical Addendum* rev. 2.0a, *PCI Local Bus Specification*, *PCI Bus Power Management Interface Specification* rev. 1.1, *PCI Hot Plug Specification* rev. 1.0 (QLA405x)

## iSCSI, TCP/IP, and Ethernet Specifications

### Data Rate

- 100/1000Mbps

### Throughput

- 1Gbps line rate per port

### Topology

- Any Ethernet network

### iSCSI

- RFC3347: *iSCSI Requirements and Design Considerations*, CHAP, Internet simple name service (iSNS), service location protocol (SLP)

### TCP/IP

- RFC791, *Complete state-based TCP/IP offload*; RFC793, *Internet Protocol Specification (IPv4)*; RFC1122, *Transmission Control Protocol (TCP) Specification; Requirements for Internet*
- RFC1323, *Hosts—Communication Layers*; RFC2581, *TCP Extensions for High Performance; TCP Congestion Control*

### Ethernet

- 1,500 bytes or 9,000 bytes (jumbo)

## Physical Specifications

### Ports

- QLE4060C: single; QLE4062C: dual
- QLA4050C and QLA4050: single; QLA4052C: dual

### Connections

- QLE406xC: RJ45 for copper connector
- QLA4050C and QLA4052C: RJ45 for copper connector
- QLA4050: Small form factor fixed (SFF) multimode optic with Lucent connector (LC)-style connector

### Form Factor

- Low profile: 16.93cm × 5.15cm (6.7in. × 2.5in.)

## Environment and Equipment Specifications

### Temperature

- Operating: 0°C to 55°C (32°F to 131°F)
- Storage: -20°C to 70°C (-4°F to 158°F)

### Airflow

- 100FPM (0.5m/S)

### Humidity

- Relative (non-condensing): 10% to 90%
- Storage: 5% to 95%

### Power Dissipation

- QLA4050C: 7.5W; QLA4052C: 8.5W; QLA4050: 7.0W
- QLE4060C: 9.6W (maximum); QLE4062C: 10.7W (maximum)

### RoHS Compliant

- RoHS 6

### Cable Distances

- 100 meters, category 5e/6 UTP

## Tools and Utilities

### Management Tools

- SANsurfer iSCSI Host Bus Adapter Manager and SANsurfer iSCSI Command Line Interface (iSCLI)

### Device Utilities

- Utilities for Flashing BIOS and firmware

### Boot Support

- BIOS, FCode

### Operating Systems

- For the latest applicable operating system information, see <http://driverdownloads.qlogic.com>

## Ordering Information

### PCI-X

- QLA4050C
  - Single-channel copper adapter with standard-size brackets
- QLA4052C
  - Dual-channel copper adapter with standard-size brackets
- QLA4050
  - Single-channel optical adapter with standard-size brackets

### PCIe

- QLE4060C
  - Single-channel copper adapter with standard-size brackets
- QLE4062C
  - Dual-channel copper adapter with standard-size brackets

## Agency Approvals

- FCC Part 15 Class B
- ICES-003 Class B
- EN55022:1998 (Amds A1:2000, A2:2003) Class B/CSISPR 22:2006
- EN61000-3-2:2000 (A2:2005)
- EN61000-3-3:1995 (A1:2001&A2:2005)
- EN55024:1998 (Amds A1:2001, A2:2003)
- VCCI Class B
- AS-NZS Class B
- Korea RRL Class B
- Taiwan BSMI CNS 13438:2006 Class B
- UL 60950-1 (Second Edition) 2007
- CSA C22.2 No. 60950-1-07 (Second Edition) 2007
- TUV EN60950-1:2006+A11+A1+A12 Second Edition
- TUV CB IEC 60950-1:2001



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