High Performance
10GbE Storage Accelerator
NIC • TOE • iSCSI • RDMA • Unified Wire

CHELSIO'S S310E 10GbE Storage Accelerator is a 10 Gigabit Ethernet adapter with PCI Express host bus interface optimized for storage systems. The third-generation technology from Chelsio provides the highest 10GbE performance available and dramatically lowers host-system CPU communications overhead.

With on-board hardware that offloads TCP/IP, iSCSI, and iWARP RDMA processing from its host system, the S310E frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and lower power.
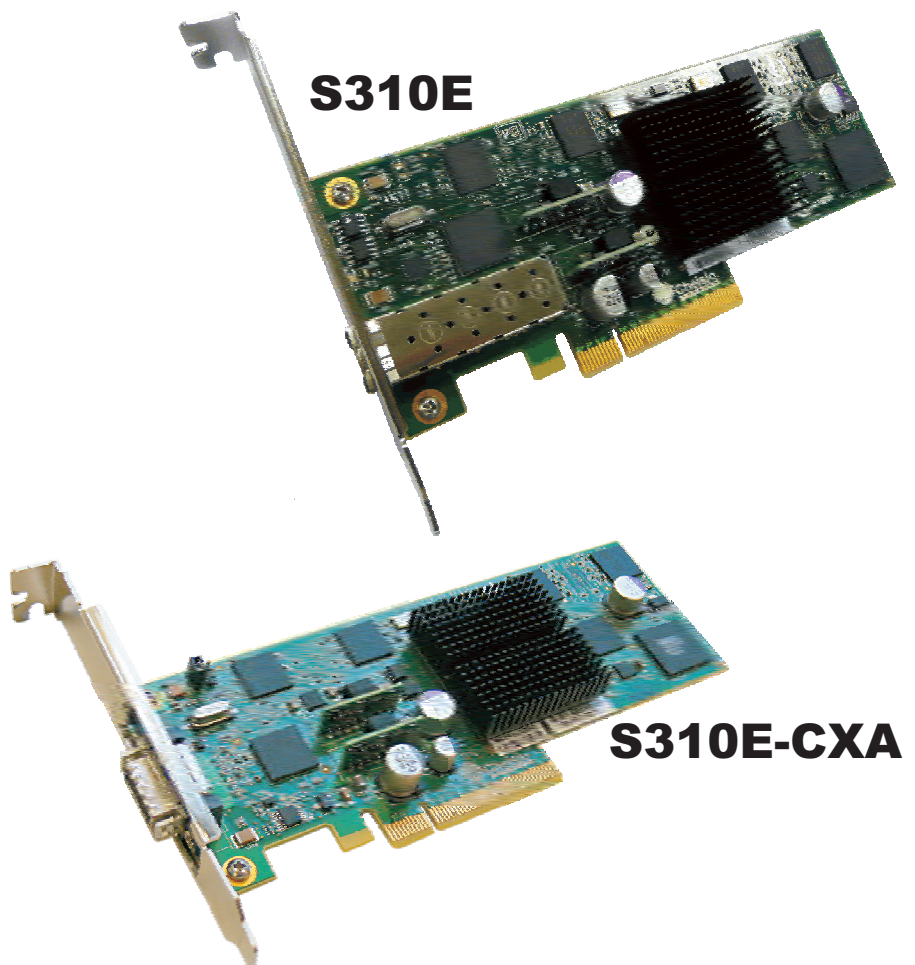
The 'Unified Wire' Solution

With the S310E, Chelsio is delivering on the promise of the 'unified wire,' enabling the convergence of server networking, storage networking, and cluster computing interconnects onto a single platform and a single fabric.

10Gb Ethernet-only networking reduces the data center's costs in network adapters, cables, switches, rack space, power, equipment spares, management tools, planning, networking skills, and installation.

You can get a white paper on Chelsio's Unified Wire solution at our website, www.chelsio.com.

TECHNICAL SPECIFICATIONS

S310E

S310E-CXA

TECHNICAL SPECIFICATIONS

Introduction

This document covers Chelsio's S310E (short-reach or long-reach fiber) and the S310E-CXA (CX4 copper).

General

- Physical Link Speed: 10Gbps
- Full Duplex
- Network Interface
  - S310E: fiber, short-reach multi-mode (850nm) or long-reach single-mode (1310nm) (SFP+ optics sold separately)
  - S310E-CXA: CX4 copper
    - Support for active optical cables with distances up to 100 meters.

Host Interface

- PCI Express 1.1
  - Supports x1, x4, and x8 link widths
  - Supports polarity and lane reversal
  - Supports Max Payload Size and Max Read Request Size of 128B to 4KB
  - Up to 80 split DMA read transactions
  - Traditional PCI INTA
- Message Signaled Interrupts (MSI)
- Message Signaled Interrupt Extension (MSI-X)
- Vital Product Data (VPD)

Ethernet NIC and Stateless Offload

- IEEE 802.3ae 10GBASE-SR compliant
- Priority (QoS) and VLAN – IEEE 802.1 p/q
- Flow Control – IEEE 802.3x
- Auto negotiation – IEEE 802.3ab
- Jumbo Frame support up to 9.6KB
- IPv4 and IPv6 TCP checksum offload
- IPv4 and IPv6 UDP checksum offload
- IPv4 and IPv6 IP checksum offload
- IPv4 and IPv6 Large Send offload
- IPv4 and IPv6 Large Receive offload
- Receive Side Scaling
- Transmit traffic management
- Wire rate rule-based packet filtering
- Wire rate bad packet filtering
- Multiple unicast MAC addresses
- Multicast MAC address filtering
- VLAN insertion and extraction
- Ethernet II and IEEE 802.3 encapsulated frames
- Interrupt coalescing

Full TCP Offload Engine (TOE)

- Up to 64k concurrent connections
- VLAN support up to 2047 different VLANs (IEEE 802.1Q)
- Multiple IP addresses per interface
- Multiple unicast MAC addresses
- Extensive RFC compliance
- Very low latency cut-through processing
- Zero copy on transmit and receive
- Programmable high speed congestion control
- Rate based congestion control
- TCP pacing
- TCP Direct Data Placement (DDP)
  - No application changes
  - No interoperability with peer required

iSCSI

- OS Support
  - Kernel-mode support Linux 2.6.x, Red Hat, SuSE
- Configuration
  - Command Line Interface (CLI)
  - Web-based GUI
- RFC 3720 "must"-level feature compliance
  - Multiple connections per session
  - Header and/or data digest offload
- Discovery
  - iSNS Client with manual discovery of iSNS server
- Security
  - One-way and mutual CHAP
  - Access Controls Lists (ACL)
- Block Device
  - Seamless support for volume management services (LVM & EVMS)
  - Dynamic LUN resizing

High Performance
10GbE Storage Accelerator

- Availability
  - Error Recovery Level 0 (ERL0)
  - Multi-path IO (MPIO)
- Target Performance
  - 2.1 GBps full-duplex throughput
  - 240K IOps (512B I/Os)
- Available as licensable binary
- Loadable module support

RDMA

- Ultra-low latency, line-rate bandwidth
- IETF RDDP and RDMAC iWARP compliance
- APIs: RNIC-PI, kDAPL and OpenFabrics 1.3

Integrated Traffic Manager, QoS and Virtualization

- Multiple queues with configurable service rates
- Per-connection traffic steering
- Per-connection and/or per-class traffic management

Management Interfaces

- MDIO Master for PHY management
- I^2C-Bus Master for PHY management and I/O expansion
- SMBus Master/Slave for system management
- GPIO for general system management
- IPMI

Statistics

- SNMPv2
- TCP MIBs (RFC 2012)
- IP MIBs (RFC 2011)

Physical and Environmental Condition

- Dimensions without bracket: 6.6 in. x 2.5 in. or 16.8cm x 6.4cm
- Operating Temperature: 0 to 55ºC or 32 to 131ºF
- Storage Temperature: -40 to 70ºC or -40 to 158ºF
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m

- Typical Power Consumption:
  - S310E: 16.7W
  - S310E-CXA: 16W

LED Programming

- Red LED comes on after power up, then turns off when ready.
- Red LED turns on when in error condition.
- Activity LED blinks when packets are sent/received.
- Link LED lights up when link is established with peer.

Diagnostics and Utilities

- Chelsio provides diagnostic and utility programs.

Cable Distance (Optical)

- FDDI: 26 meters on 62.5µm MMF with modal bandwidth of 160MHz-km
- Optical mode 1 (OM1): 33 meters on 62.5µm MMF with modal bandwidth of 200/500MHz-km
- Optical mode 2 (OM2): 82 meters on 50µm MMF with modal bandwidth of 500MHz-km
- Optical mode 3 (OM3): 300 meters on laser optimized 50µm MMF with modal bandwidth of 2000MHz-km

Operating System Support

- 32-bit and 64-bit Linux
  - RedHat Enterprise Linux 5
  - SuSE Linux Enterprise Server 10
- FBSD: NIC mode available, TOE in progress TBA
- Solaris 10
- VMware ESX 3.5
- Xen 4.1

Kit Contents

- PCIe 10 Gigabit Ethernet adapter
- Quick install guide
- User documentation and driver download information
- Product warranty statement

S310E
S310E-CXA

High Performance
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Compliance

IEEE
- 802.1p (QoS)
- 801.1Q (VLANs)
- 802.3-2005
- 802.3x (flow control)

Safety
- UL
- Canada UL
- EN 60950

Emissions
- FCC Class B (USA)
- VCCI Class B (Japan)
- EN55022 Class B
- EN55024-1
- ICES-003 Class B (Canada)
- CE (European Union)
- VCCI Class 1 (Japan)
- C-Tick (Australia)

Environmental
- RoHS

UNH-IOL
- RDMA/iSCSI
- Ethernet
- XAUI

Laser
- IEC/EN 60825-1 Class 1

Other
- PCIe v1.1
- IPv4, IPv6
- ACPI 1.1a
- Microsoft WHQL
- Server Design Guide version 3.0
- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

Ordering Info

S310E   1-port 10GbE Storage Accelerator with PCI-E 8x (SFP+ optics sold separately*)

S310E-CXA   1-port 10GbE Storage Accelerator with PCI-E 8x & CX4 copper

*SFP+ optics sold separately. Only Chelsio-supplied modules may be used.

SM10G-SR   10G short-reach SFP+ optic module
SM10G-LR   10G long-reach SFP+ optic module
TAPCABLE3M   Twinax passive cable, 3-meter
TAACABLE5M   Twinax active cable, 5-meter
TAACABLE10M   Twinax active cable, 10-meter