S302E

High Performance, Multi-Port
1GbE Storage Accelerator
Unified Wire • TCP/IP • Storage

Highlights

- 'Unified Wire' interconnect solution for server networking, storage networking, and clustering on a single platform
- Full TCP offload, iSCSI, and iWARP RDMA plus direct data placement (DDP)
- Reduces host CPU utilization by up to 90% compared to NICs without full offload capabilities
- PCI-X or PCI Express 8x host bus interface
- Line-rate 1Gbps full-duplex performance
- Integrated traffic manager, QoS, and virtualization capabilities
- TCP sockets, SCSI, RNIC-PI, kDAPL, and OpenFabrics 1.3 software interfaces
- Powerful per-connection, per-server, and per-interface configuration and control

Applications

Data-Center Networking

- Scale up servers and NAS systems
- Link servers in multiple facilities to synchronize data centers
- Consolidate LAN, SAN, and cluster networks

Networked Storage

- Enable high performance NAS systems and Ethernet-based IP SANs
- Deploy Ethernet-only IP SANs throughout the enterprise beyond the data center
- Develop shared-storage systems providing both file- and block-level services

High Performance Computing

- Very low latency Ethernet
- Increase cluster fabric bandwidth
- Deploy Ethernet-only networking for cluster fabric, LAN, and SAN
- Routable infrastructure

CHELSIO'S multi-port 1 Gigabit Ethernet adapters are optimized for storage applications. The third-generation technology from Chelsio provides the highest 1GbE performance available and dramatically lowers host-system CPU communications overhead.
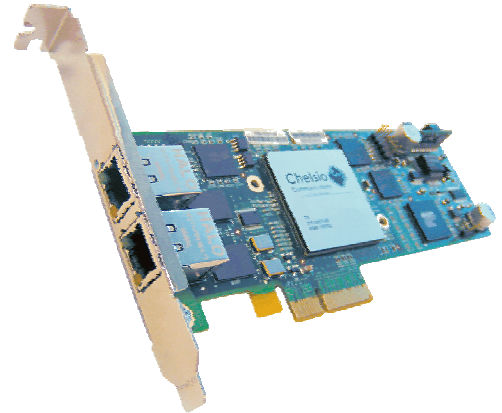
With on-board hardware that offloads TCP/IP, iSCSI, and iWARP RDMA processing from its host system, the adapters free up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and lower power.

The adapters accelerate the iSCSI protocol for block-level storage traffic between servers and storage systems. For more info on Chelsio's iSCSI solution, please go to our website at www.chelsio.com.

The adapters' multiple ports and IEEE 802.3ad link aggregation/ failover features are ideal for critical network applications that require redundancy and high-availability capabilities.

The 'Unified Wire' Solution

With these adapters, 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.

1Gb Ethernet-only networking reduces the data center's cost 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.

Fully Featured Server Adapter

Chelsio's multi-port 1GbE adapters offer best-of-class performance and features, including IP/UDP/TCP checksum and large send offload, rate control and QoS, virtualization, and rule-based traffic steering and filtering.

Third-Generation Protocol Offload Engine

These adapters employ Chelsio's unique third-generation Terminator 3 ASIC, a high-performance, programmable protocol processor. Terminator 3 processes all connections in a single datapath to deliver line-rate 1Gbps or 10Gbps performance with one connection, up to thousands of connections. In contrast, competitive multi-RISC offload engines, which rely on having enough connections to distribute their processing among parallel processors to achieve full performance, are ultimately limited by the performance of each processor.

Complete and Flexible TCP Offload

The Terminator 3 ASIC has hundreds of programmable registers for protocol configuration, RFCs, and offload control. Chelsio's multi-port 1GbE adapters can offload TCP processing per-connection, per-server, per-interface, and globally and simultaneously tunnel traffic from non-offloaded connections to the host processor for the native TCP/IP stack to process. These adapters provide a flexible zero copy capability for regular TCP connections, requiring no changes to the sender, to deliver line rate performance at minimal CPU utilization.

Upper Layer Protocols

Chelsio's multi-port adapters offload the expensive byte touching iSCSI operations and payload placement to greatly accelerate iSCSI performance for IP SAN applications while maintaining flexibility. The iSCSI protocol itself can be implemented by vendors to provide product differentiation. These adapters also implement a high-capacity, low-latency, high-bandwidth iWARP RDMA/RDDP, which adheres to the IETF standards.

Robust, Proven Solution

Subjected to thousands of hours of compatibility testing, over three years of stress testing by several OEM test suites and production deployments in servers, storage systems and cluster computing, Chelsio's robust, stable protocol offload technology delivers proven performance in a wide range of environments. Chelsio's adapters are generations ahead of competing products.

Software Drivers

Chelsio offers a full suite of protocol software and drivers for the S302E adapters. See www.chelsio.com/support for latest info. The software supports operation in both protocol-offload and non-offload modes.

Product Models

Model:	**S302E**
Host interface:	PCI Express
Physical interface:	Two RJ-45
Distance:	100m
Connector:	Cat-5
Media:	Twisted pair

Specifications

Host Interface
- PCI Express 1.1 x4, x2, x1
- MSI-X, MSI and support for legacy pin interrupts

Network Interface
- 1000BASE-T

Ethernet
- IEEE 802.1p Priority and 802.1Q VLAN tagging
- IEEE 802.3x flow control
- IEEE 802.3ad link aggregation
- Ether II and 802.3 encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6Kbytes

Stateless Offloads
- TCP checksum offload for IPv4 & IPv6
- TCP Segmentation Offload (TSO) for IPv4 & IPv6
- Large Receive Offload (LRO) for IPv4 & IPv6
- Large Send Offload (LSO) for IPv4 & IPv6
- UDP checksum offload for IPv4 & IPv6
- Receive Side Scaling and packet steering
- Line rate packet filtering and attack protection

TCP/IP Full Offload
- Full TCP implementation including exceptions
- High performance even in presence of packet loss
- Extensive RFC compliance, fully featured stack
- Zero copy on Tx and Rx
- Direct Data Placement (DDP)
- Up to 64K simultaneous connections capacity

Integrated Traffic Manager
- Multiple Tx & Rx queues with QoS
- Two separate channels for simultaneous low latency & high bandwidth
- Per-connection and per-class rate control
- Packet loss avoidance

Virtualization and Firewall
- Rule-based packet steering and filtering capability

iSCSI Acceleration
- Full iSCSI initiator and target mode stack
- Header & Data Digest (CRC) generation & checking
- PDU recovery
- Direct Data Placement (DDP)

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

Physical and Environmental
- Dimensions without bracket: 6.6 in. x 2.5 in. or 16.8 cm x 6.4 cm
- Operating Temp: 0 to 55ºC or 32 to 131ºF
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Typical power consumption 11W