

High Performance, Dual Port 10 GbE Unified Wire Adapter

**Enables TCP Offload over Single Unified Wire with SR-IOV,
 EVB/VNTag, DCB**

Highlights

- PCI Express Gen3 x8
- Low Latency
- Memory free & up to 32 connections for offload functionalities
- Full TCP offload
- EVB, Flex10, VNTag
- PCI-SIG SR-IOV
- Integrated media streaming offload
- HW based firewall in the cloud
- Traffic filtering & management
- Software Compatible with T4

Applications

Datacenter Networking

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

Cloud Computing

- Virtualization features to maximize cloud scaling and utilization
- Runs Fibre Channel apps unmodified over Ethernet
- Cloud-ready functional and management features
- QoS and Traffic Management

Networked Storage

- Enable high performance NAS systems and Ethernet-based IP SANs
- 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

Overview

Chelsio's T520-SO-CR is a memory free dual-port 10 Gigabit Ethernet Unified Wire adapter with a PCI Express 3.0 host bus interface, optimized for cloud computing, virtualization, storage, and other data center applications.



This adapter, based on the fifth-generation (T5) technology from Chelsio provides the highest 10GbE performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that off-loads TCP/IP processing from its host system. T520-SO-CR frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and uses less power.

The Unified Wire Solution

With the T520-SO-CR, Chelsio is enabling a unified wire for LAN, SAN, and cluster traffic. This unified wire was made possible by the high bandwidth and low latency of 10GbE combined with storage and cluster protocols operating over TCP/IP. In parallel, operating systems and hypervisors have incorporated native support for iSCSI and database applications are now supporting file-based storage protocols such as NFS as an alternative to SANs.

T520-SO-CR includes a full-fledged integrated Traffic Manager for robust flow control, traffic management, and QoS.

Fibre Channel over Ethernet (FCoE) provides a transition path from legacy SANs to converged networks. Expanding its unified wire approach, Chelsio has added FCoE hardware support for the adapter.

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

T520-SO-CR 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.

T5 - Fifth-Generation Protocol Offload Engine

The T5 is Chelsio's fifth-generation TCP offload (TOE) design, fourth-generation iSCSI design, and third-generation iWARP (RDMA) implementation. For the server connection, the T5 chip included a PCI Express v3.0 x8 host bus interface. With support for the 8 Gbps Gen 3 data rate, the PCIe interface provides up to 64 Gbps for bandwidth to the server. T5 also provides support for PCIe I/O virtualization. On this External Memory Free version of the adapter, a maximum of 32 offloaded TCP/IP connections is supported that are meant to be used in a low Round-Trip-Time (RTT) environment. Most of the T5 features are carried over from those found on T4.

Complete and Flexible TCP Offload

The T5 has hundreds of programmable registers for protocol configurations, RFCs, and offload control. The T520-SO-CR can offload 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. The T520-SO-CR provides a flexible zero-copy capability for regular TCP connections, requiring no changes to the sender, to deliver line rate performance at minimal CPU utilization.

Packet Switching and Routing

T520-SO-CR integrates a high performance packet switch, which allows switching traffic from any of the input ports to any of the output ports (wire-to-wire) and from any of the output ports to any of the input ports (host-to-host).

Robust, Proven Solution

Subjected to thousands of hours of compatibility testing, over multiple years of stress testing by several OEM test suites and production deployment in servers, storage systems, and cluster computing, Chelsio's robust, stable protocol offload technology delivers proven performance in a wide range of environments. The T520-SO-CR is generations ahead of competing products.

Software Drivers

Chelsio offers a full suite of protocol software drivers with the T520-SO-CR adapters. See www.chelsio.com/support for the latest information. The software supports operation in both protocol-offload and non-offload modes.

Ordering Information

Model:	T520-SO-CR
Physical Interface:	10GBASE-SR or LR*
Connector:	LC Duplex
Media:	MMF or SMF

Accessories

SM10G-SR: 10G short-reach SFP+ optic module **TAPCABLE1M:** Twinax passive cable, 1M

SM10G-LR: 10G long-reach SFP+ optic module **TAPCABLE3M:** Twinax passive cable, 3M

SRCABLE3M: Fibre optic cable, 10GBASE-SR, 3M **TAPCABLE5M:** Twinax passive cable 5M

LRCABLE3M: Fibre optic cable, 10GBASE-LR, 3M

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

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Specifications

Host Interface

- PCI-E Gen 3 x8
- MSI-X, MSI, and support for legacy pin interrupts

UDP & Multicast Offload

- UDP Sockets API
- Low user-to-user latency
- Multicast replication on ingress or egress

Virtualization

- PCI-SIG SR-IOV
- 128 Virtual and 8 Physical functions
- 144 port virtual switch
- EVB, VEPA, Flex10, VNTag
- 512 virtual MAC addresses
- Offload 802.1 Qbg/h
- NVGRE & VxLAN

TCP/IP Full Offload

- FullTCP implementation including IPv4 & IPv6
- Extensive RFC compliance, fully features stack
- Full TCP Proxy between any set of connections
- VLAN support up to 4096 VLAN IDs
- Load balancing and Fail-over capabilities

iSCSI

- Full iSCSI initiator and target mode stack
- CRC32 offload generation verification
- iSCSI proxy switching based on SCSI CDB
- T10 DIF/DIX support

FCoE

- Full HBA FCoE (Initiator or Target)
- CRC32 offload generation & verification
- Ingress & Egress ACL (Access Control List)
- T10 DIF/DIX support

Stateless Offloads

- TCP/UDP checksum offload for IPv4 & IPv6
- TSO, LSO, and GSO for IPv4 & IPv6
- VLAN filtering, insertion, & extraction
- Line rate packet filtering and attack protection
- Fine granularity time stamping (down to 2ns)
- Ethernet Routing (packet header rewrite)
- Packet Tracing and Packet Sniffing

Ethernet

- IEEE 802.3ae (10 GbE)
- IEEE 802.3az (Energy Efficient Ethernet)
- IEEE 802.3z (1GbE)
- IEEE 802.1p priority
- IEEE 8021Q VLAN tagging
- IEEE 802.1Qbg EVB/VEPA
- IEEE 802.Qhn VNTag
- IEEE 9-2/1Qg/h Congestion Notification
- IEEE 802.3x flow control
- IEEE 802.3ad load-balancing and failover
- Ether II and 802.e encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6 Kbytes

Operating System Support

- Linux
- Windows
- FreeBSD
- MacOS (NIC only)
- Illumos
- Xen
- ESX

Physical and Environmental

- Dimensions without bracket:
6.6 in. x 2.71 in. or 16.76cm x 6.88cm
- RoHS Compliant
- Operating Temp: 0 to 55°C to 32 to 131 °F
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Typical power consumption: 9 W