

## High Performance, Dual Port 10 GbE Unified Wire Adapter

Enables TCP, UDP, iSCSI, iWARP and FCoE Offload over Single Unified Wire with SR-IOV, EVB/VNTag, DCB

### Highlights

- PCI Express Gen3 x8
- Low Latency
- Supports up to 1M Connections
- Full TCP and UDP offload
- Full iSCSI, FCoE offload
- Full iWARP RDMA offload
- Full NAT offload
- EVB, Flex10, VNTag
- PCI-SIG SR-IOV
- Integrated media streaming offload
- HW based firewall
- Traffic filtering & management
- Software Compatible with T4
- IEEE 1588v2 Precision Time Protocol

### Applications

#### Datcenter 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 InfiniBand, 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 SANs
- Develop shared-storage systems providing both file and block level services
- Build high performance storage backend fabrics using Ethernet

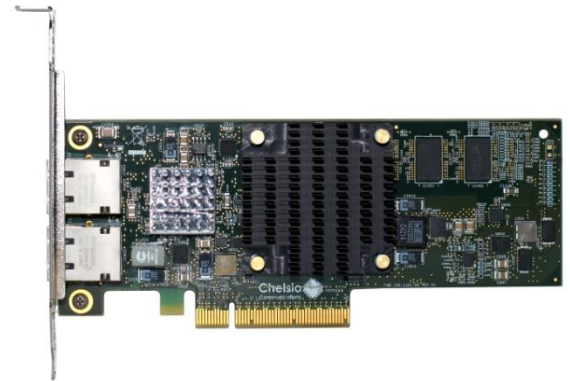
#### High Performance Computing

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

### Overview

Chelsio's T520-BT is a dual port 10GBase-T 10 Gigabit Ethernet Unified Wire adapter with PCI Express 3.0 host bus interface, optimized for storage, cloud computing, HPC, virtualization and other data center applications.

The fifth-generation T5 ASIC technology from Chelsio provides the highest performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that offloads TCP/IP, iSCSI, FCoE and iWARP RDMA processing from its host system and frees up host CPU cycles for other applications. As a result, the system benefits from higher bandwidth, lower latency and reduced power consumption.



### The Unified Wire Solution

The T5 ASIC enables a unified wire for LAN, SAN, and cluster traffic, built upon a combination of high bandwidth and low latency architecture along with a complete set of storage and cluster protocols operating over Ethernet (iSCSI, FCoE, and iWARP). In parallel, operating systems and hypervisors that have incorporated native support for iSCSI and database applications are now supporting file-based storage protocols such as NFS as an alternative to SANs.

FCoE and iSCSI support in the T520-BT benefits from high reliability features that include memory ECC, data path CRC and T10-DIX in addition to the checksums and CRC available at different protocols layers. iSCSI and FCoE provide a transition path from legacy SANs to converged networks.

The adapter supports IEEE 802.3ad link aggregation/failover features, as well as patented inter-adapter failover techniques that make it ideal for critical network applications requiring redundancy and high-availability capabilities.

T520-BT also includes an integrated Traffic Manager for robust flow control, traffic management, and QoS.

T520-BT 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.

## 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. With support for the 8 Gbps Gen 3 data rate, the T5 ASIC PCIe interface provides 64 Gbps of raw bandwidth to the server. T5 also provides support for PCIe SR-IOV virtualization with embedded virtual switch.

## Complete and Flexible TCP Offload

The T5 has hundreds of programmable registers for protocol configurations, RFCs, and offload control. The T520-BT 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-BT provides a flexible zero-copy capability for regular TCP connections, requiring no changes to the sender.

## Packet Switching and Routing

T520-BT 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 a decade 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.

## Software Drivers

Chelsio offers a full suite of protocol software drivers with the T520-BT adapters. See [www.chelsio.com/support](http://www.chelsio.com/support) for the latest information. The software supports operation in both protocol-offload and non-offload modes.

## Ordering Information

Model:	T520-BT
Physical Interface:	Dual port RJ-45 / 10GBase-T
Connector:	RJ-45 / Cat-6a
Media:	Twisted pair

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## Specifications

### Host Interface

- PCI-E Gen3 x8
- MSI-X, MSI and support for legacy pin interrupts

### High Performance RDMA

- Low latency and line rate bandwidth
- Enhanced RDMA primitives
- iWARP support on Linux OFED
- Support for Atomics and Immediate Data
- Microsoft Network Direct support
- Supported Transport for SMB-Direct in Microsoft Windows Server 2012

### 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
- 140 port virtual switch
- EVB, VEPA, Flex10, VNTag
- 512 virtual MAC addresses
- Offload 802.1 Qbg/h
- NVGRE & VxLAN

### TCP/IP Full Offload

- Full TCP 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
- Full HBA offload
- T10 DIF/DIX support

### FCoE

- Full HBA FCoE (Initiator or Target)
- Open FCoE Offload (Initiator)
- 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 802.1Q VLAN Tagging
- IEEE 802.1Qbg EVB/VEPA
- IEEE 802.1BR Bridge Port Extension
- IEEE 802.1Qau Congestion Notification
- IEEE 802.3x Flow Control
- IEEE 802.3ad Load-balancing and Failover
- Ethernet II and 802.e encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6 Kbytes

### Physical and Environmental

- Dimensions without bracket:  
6.6 in x 2.71 in or 16.76 cm x 6.88 cm
- Fully RoHS Compliant
- Operating Temp: 0° to 55° C or 32° to 131° F
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Typical power consumption: 20 W