



# T540-SO-CR

## High Performance, Quad Port 10GbE Server Offload Adapter

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

### Highlights

- PCI Express Gen3 x8
- Low latency user-space I/O
- OVS Offload with OpenFlow support
- DPDK (Data Plane Development Kit)
- EVB, Flex10, VNTag
- PCI-SIG SR-IOV
- HW based firewall and NAT offload
- Traffic filtering & management
- IEEE 1588v2 Precision Time Protocol
- Supports x86, Armv8 (Aarch64), IBM Power and OpenPOWER Servers

### Applications

#### Datacenter Networking

- Scale out servers and NAS systems
- Consolidate LAN, SAN and cluster networks
- Enhanced network and server security

#### Cloud Computing

- Virtualization features to maximize cloud scaling and utilization
- 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

### Overview

Chelsio's T540-SO-CR is a quad port low profile, memory free, 10 Gigabit Ethernet Server Offload adapter with a PCI Express 3.0 host bus interface. The adapter is optimized for networking, cloud computing, virtualization and other datacenter applications.

This adapter, based on the fifth generation (T5) technology from Chelsio provides the highest performance available and dramatically lowers host system CPU communications overhead. As a result, the system benefits from higher bandwidth, lower latency and reduced power consumption.

This memory free variant of the adapter doesn't have any external memory on adapter and is best suited for L2 NIC, Traffic management, Filtering and Virtual environments. All variants of Chelsio adapters leverage a single software stack (drivers/firmware/management tools) and support all protocols concurrently. It will work with any legacy switch infrastructure and does not rely on new features such as DCB, PFC, ETS, etc.

### The Unified Wire Solution

The T540-SO-CR shares the high bandwidth and low latency architecture of other T5 products. It forms the basis of high performance server adapter designs with a full suite of stateless offloads, including LRO, LSO, RSS, virtualization and traffic management.

The T540-SO-CR supports IEEE standards-based link aggregation/failover features, that makes it ideal for critical network applications requiring redundancy and high-availability capabilities.

The T540-SO-CR also includes an integrated Traffic Manager for robust and flexible flow control, traffic management, and QoS.

Chelsio's Unified Wire Ethernet-only networking solution reduces the infrastructure costs in network adapters, cables, switches, rack space, power, equipment spares, management tools, planning, networking staff 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 8GT/s PCIe Gen 3 data rate, it provides 64 Gbps of raw bandwidth to the server. It also provides support for PCIe SR-IOV virtualization with embedded virtual switch.

## Packet Switching and Routing

T540-SO-CR integrates a 140-port high performance L2-L3 packet switch with integrated access control and flow control support, which allows switching traffic from any of the ports or host queues or physical or virtual functions to each other. The switch can further provide multicast and replication functions in the ingress or egress direction. Typical use is for very high performance OVS offload.

## 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 T540-SO-CR adapters. See <https://www.chelsio.com/support/> for the latest information.

## Ordering Information

Model:	T540-SO-CR
Physical Interface:	10GBASE-SR/LR*
Connector:	SFP+
Media:	MMF/SMF fiber or twinax (up to 5m)

## Accessories

SM10G-SR/LR:	10G short/long reach SFP optical module
TAPCABLE-1M/3M/5M:	Twinax/DAC passive cable for 10Gb, 1M/3M/5M
SRCABLE3M/LRCABLE3M:	Short/Long reach fiber optics cable for 10Gb, 3M

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

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH CHELSIO PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN CHELSIO'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, CHELSIO ASSUMES NO LIABILITY WHATSOEVER, AND CHELSIO DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND OR USE OF CHELSIO PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. CHELSIO PRODUCTS ARE NOT INTENDED FOR USE IN MEDICAL, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS. CHELSIO MAY MAKE CHANGES TO SPECIFICATIONS AND PRODUCT DESCRIPTIONS AT ANY TIME WITHOUT NOTICE.

Copyright © 2018 - Chelsio Communications - All rights reserved.

## Specifications

### Host Interface

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

### Virtualization

- PCI-SIG SR-IOV
- 128 Virtual and 8 Physical functions
- 140 port virtual switch
- OVS Offload
- EVB, VEPA, Flex10, VNTag
- 512 MAC addresses
- NVGRE, VXLAN and GENEVE support

### Stateless Offloads

- TCP/UDP IPv4/6 checksum offload
- TSO, LSO and GSO for IPv4 & IPv6
- VLAN filtering, insertion & extraction
- Line rate packet filtering and attack protection
- Nanosecond granularity 64b timestamping
- Ethernet Routing (packet header rewrite)
- Packet Tracing and Packet Sniffing

### Unified Boot

- PXE support
- Legacy and uEFI environments

### 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 & Failover
- Ethernet II and 802.3 encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6 Kbytes

### Operating System Support

- Linux, Windows, FreeBSD, MacOS, Illumos, vSphere ESXi

### Physical and Environmental

- 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: 8 W
- Low Profile: H: 2.731" x L: 6.6"