T580-CR

Ultra High Performance, Dual Port 40 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
- Ultra 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 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 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 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 T580-CR is a dual port 40 Gigabit Ethernet Unified Wire adapter with PCI Express 3 host bus interface, optimized for cloud computing, HPC, virtualization, storage, and other data center applications.

The fifth-generation (T5) technology from Chelsio provides the highest 40GbE performance available and dramatically lowers host-system CPU communications overhead with on-board hardware that off-loads TCP/IP, iSCSI, FCoE and iWARP RDMA processing from its host system. T580-CR frees up host CPU cycles for useful applications. The system achieves increased bandwidth, lower latency, and uses less power.

The T580-CR sets itself apart from other other 40Gb offerings from Chelsio in that it provides dual-paths to the external memory on the adapter thereby allowing offloaded connections, such as TOE and iSCSI, to achieve the maximum bandwidth provided by the card.

The Unified Wire Solution

With the T580-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 40GbE combined with storage and cluster protocols operating over TCP/IP (iSCSI, FCoE, and iWARP respectively). 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.

T580-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.

T580-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. 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 T580-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 T580-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

T580-CR integrates a high performance packet switch, which allows switching traffic from any of the input ports to any if 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 T580-CR is generations ahead of competing products.

Software Drivers

Chelsio offers a full suite of protocol software drivers with the T580-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: T580-CR
Physical Interface: 40GBASE-SR4*
Connector: QSFP+

Accessories

SM40G-SR: 40G short-reach QSFP+ optical module
OCTTAPCABLE3M: QSFP+-to-4xSRFP+ Twinax Passive Cable
QSRCABLE10M: 10m QSFP+-to-QSFP+ SR Optical Cable
QTAPCABLE1M: 1m QSFP+-to-QSFP+ Twinax Passive Cable
QTAPCABLE3M: 3m QSFP+-to-QSFP+ Twinax Passive Cable
QTAPCABLE5M: 5m QSFP+-to-QSFP+ Twinax Passive Cable

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

Specifications

Host Interface
- PCI-E Gen 3 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
- 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
- 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 802.3ba (40 GbE)
- IEEE 802.3az (Energy Efficient Ethernet)
- 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

Physical and Environmental
- Dimensions without bracket:
  6.6 in. x 3.95 in. or 16.76 cm x 10.03 cm
- Operating Temp: 0 to 55°C to 32 to 131°F
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Typical power consumption: 21 W

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