T61100-OCP

High Performance, Single Port 40/50/100GbE Server Offload Adapter for Open Compute Project (OCP)

Enables TCP, UDP, iSCSI, iWARP, FCoE, TLS/SSL, DTLS, IPsec, SMB 3.X crypto, and SDN Offload over Single Unified Wire with SR-IOV, EVB/VNTag and DCB

Highlights

- OCP Form Factor
- PCI Express Gen3 x16
- Ultra-low latency user-space I/O
- Full TCP and UDP offload
- Full iSCSI, FCoE offload
- Full NVMe over Fabrics (NVMe-oF) offload
- Full iWARP RDMA offload
- Full TLS/SSL, DTLS, IPsec and SMB 3.X crypto offload
- Advanced security protocol acceleration
- AES, SHA1 and SHA2 offload
- OVS Offload with openflow support
- DPDK (Data Plane Development Kit)
- VXLAN, GRE/NVGRE, Geneve
- EVB, Flex10, VNTags
- PCI-SIG SR-IOV
- Integrated media streaming offload
- HW based firewall and NAT offload
- Traffic filtering & management
- IEEE 1588v2 Precision Time Protocol
- Software Compatible with T4 and T5
- 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
- Runs InfiniBand, FibreChannel applications unmodified over Ethernet
- Cloud-ready functional and management features
- Secure Sockets offload
- 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
- Encrypt all communication and data at rest

High Performance Computing

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

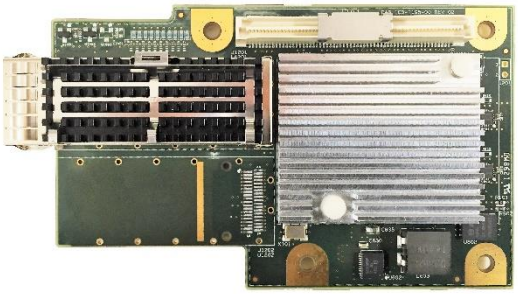
Specifications

Host Interface

- PCI-E Gen3 x16
- MSI-X, MSI and support for legacy pin interrupts

Overview

Chelsio's T61100-OCP for Open Compute Project (OCP) is a memory free single port 40/50/100 Gigabit Ethernet Server Offload adapter, with PCI Express 3.0 host bus interface, optimized for cloud computing, storage, HPC, virtualization and other datacenter applications in an Open Compute Network and Storage environment.



This adapter, based on the sixth-generation (T6), memory free technology from Chelsio, provides the highest performance and efficiency, dramatically lowers host-system CPU communications overhead and frees up host CPU cycles for useful applications. As a result, the system benefits from higher bandwidth, lower latency and reduced power consumption.

Chelsio memory free variant of the adapters doesn't have any external memory on adapter and can offload a limited number of TOE, iSCSI and iWARP connections. Once offloaded connections limit is reached, the adapter falls back to host compute cycles without disturbing the network traffic. All other features and functionalities are supported transparently by T61100-OCP, similar to adapters with external memory on them. All variants of Chelsio adapters leverage single software stack (drivers/firmware/management tools) and support all protocols concurrently.

T61100-OCP runs all the host software of its predecessor, T5, as-is, thus enabling leveraging of all the prior software investment. It offers all the features of T5, and in addition adds support for integrated offload of IPsec, TLS/SSL, DTLS and SMB 3.X crypto.

Open Compute Project is a rapidly growing community of engineers to design and enable the delivery of the most efficient server, storage and datacenter hardware designs for scalable computing.

The Unified Wire Solution

The T61100-OCP shares the high bandwidth and low latency architecture of other T6 products. It forms the basis of high performance server adapter designs with a full suite of stateless offloads, including LRO, LSO, RSS, virtualization, traffic management and security.

The T61100-OCP supports IEEE 802.3ad link aggregation/failover features that make it ideal for critical network applications requiring redundancy and high-availability capabilities.

T61100-OCP also includes an integrated Traffic Manager for robust flow control, traffic management, and QoS.

Chelsio 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.

Sixth-Generation Protocol Offload Engine

T6 is Chelsio's sixth-generation TCP offload (TOE) design, fifth-generation iSCSI design, and fourth-generation iWARP (RDMA) implementation. With support for the 8 Gbps PCIe Gen3 data rate, the T6 host interface provides 128Gbps of raw bandwidth. Also provides support for in-line TLS/SSL, PCIe SR-IOV virtualization with an embedded virtual switch.

High Performance Security Offload

T61100-OCP introduces ground breaking TLS/SSL performance with inline Cryptographic functions leveraging Chelsio's proprietary TCP/IP offload engine. Chelsio's full offload TLS/SSL is uniquely capable of 100Gb line rate performance. In addition, it can be used with inline mode for DTLS and in a traditional co-processor lookaside mode to accelerate IPsec, TLS/SSL with AES, SHA1 and SHA2 processing and SMB 3.X crypto.

Packet Switching and Routing

T61100-OCP 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 technology delivers proven performance in a wide range of environments.

Software Drivers

Chelsio offers a full suite of protocol software drivers with the T61100-OCP adapters. See www.chelsio.com/support for the latest information. The software suite supports operation in both stateful and stateless offload modes for all major operating systems.

Ordering Information

Model:	T61100-OCP
Physical Interface:	100GBASE-CR4/SR4*
Connector:	QSFP28
Media:	MMF or SMF or Twinax

Accessories

SM40G-SR/LR:	40G short/long reach QSFP optical module
SM100G-SR/LR:	100G short/long reach QSFP28 optical module
QTAPCABLE-1M/3M/5M:	Twinax/DAC passive cable for 40Gb, 1M/3M/5M
QTAPCABLE28-1M/2M/3M:	Twinax/DAC passive cable for 100Gb, 1M/2M/3M
QSRCABLE10M:	Fiber Optic cable for 40Gb and 100Gb, 10M

* QSFP28 optics sold separately. Only Chelsio-supplied modules may be used.

Cryptography Offloads

- AES 128/256 and SHA1/SHA2 offload
- TLS/SSL, DTLS, IPsec and SMB 3.X crypto support
- Full offload and lookaside co-processor modes

Virtualization

- PCI-SIG SR-IOV
- 256 Virtual and 8 Physical functions
- 264 port virtual switch
- OVS Offload
- EVB, VEPA, Flex10, VNTag
- 512 virtual MAC addresses
- NVGRE, VxLAN, and Geneve support

High Performance RDMA

- Ultra-low latency and line rate bandwidth
- iWARP support in standard OFED
- Support for Atomics and Immediate data
- Native support for Windows Server 2012-R2, 2016, Azure Stack, Storage Replica, Storage Spaces Direct, Client RDMA, SMB-Direct, Network Direct
- Support for iSER, NFS-RDMA, Lustre-RDMA, NVIDIA's GPUDirect, Hadoop-RDMA

UDP & Multicast Offload

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

TCP/IP Full Offload

- Full TCP stack including IPv4 & IPv6
- Extensive RFC compliance, fully featured
- VLAN support up to 4096 VLAN IDs
- Load balancing and failover capabilities

iSCSI Offload

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

Ethernet Standards

- IEEE 802.3bj (100 GbE over copper/backplane)
- IEEE 802.3ba (40/100 GbE)
- 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

Operating System Support

- Linux, Windows, FreeBSD, MacOS (NIC only), Illumos, XenServer, vSphere ESXi

Physical and Environmental

- Fully RoHS Compliant
- Operating Temp: 0° to 35° C or 32° to 95° F
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Typical power consumption: 18W
- Dimensions without bracket: 4.33 in. x 2.68 in. or 10.9 cm x 6.8 cm