T72200-FH

High Performance, Dual Port, Programmable 1/10/25/40/50/100/200GbE Storage Adapter

Enables several network and storage offloads, programmable compute, security, virtualization over a single wire.

Highlights

- Full suite of Storge features
- Full suite of Cloud features
- Full suite of data center networking features
- Full suite of data streaming features
- Full suite of encryption functions
- Integrated Ethernet switch
- Software Compatible with T4, T5, and T6

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
- Secure Sockets offload
- Full support for overlay products

Networked Storage

- Develop high-performance shared-storage systems providing both file and block level services
- Computational Storage
- Ethernet to the Drive
- Integrated encryption support
- NVMe Fabrics (iWARP and RoCEv2)
- NVMe/TCP (including NVMe offload)
- Very high data-integrity

High Performance Computing

- Very low latency Ethernet
- High performance RDMA support
- Increase cluster fabric bandwidth

Streaming Applications

- Internet attack protection
- QoS and Traffic Management
- Video streaming

Edge Products

- Micro Servers
- Gateways
- 5G Appliances
- Firewalls

Overview

Chelsio's T72200-FH is a dual port 40/50/100/200GbE Storage Adapter with a PCI Express 5.0 host bus interface, optimized for storage, cloud computing, HPC, virtualization, security, and other datacenter networking applications.

The seventh generation T7 ASIC technology from Chelsio provides the highest performance and efficiency, with dramatically lower host-system CPU communications overhead thanks to on-board hardware that offloads TCP/IP, UDP/IP, Unified RDMA (RoCEv2 and iWARP), iSCSI, NVMe-oF, NVMe/TCP, NVGRE, VXLAN and TLS/IPsec processing from its host system and frees up the host CPU cycles for the user applications. As a result, the system benefits from higher bandwidth, lower latency, and reduced power consumption.

T72200-FH supports IEEE standards-based link aggregation, failover features, and inter-adapter failover techniques that make it ideal for critical network applications requiring redundancy and high-availability capabilities. It also includes an integrated Traffic Manager for robust and flexible flow control, traffic management, and QoS.

T72200-FH runs the predecessor T4, T5, and T6 silicon software without modification to enable leveraging of the user's existing software investment. T72200-FH's architecture is Chelsio's seventh-generation DPU technology road-tested across several tier-1 OEMs over the years.

Programmable Transport Engine

The T72200-FH transport engine is highly programmable that can offload protocol processing per-connection, per-server, per-interface, while simultaneously providing complete stateless offload to traffic for non-offloaded connections (processed by the operating systems stack running on the host CPU). The T72200-FH also provides a flexible direct data placement capability for regular TCP sockets, with all the benefits of zero-copy and kernel bypass without rewriting the applications.

SmartNIC Solution

T72200-FH is built upon a high bandwidth and low latency architecture that offers offload support for a wide range of network, storage, virtualization, security, and cluster protocols operating over the same Ethernet link, using the exact same firmware, host software, and adapter. Thus, a given system using T72200-FH can be easily targeted at different vertical markets and a variety of useful functions enabled that is, dial the bandwidth to a given application and assign access control, while offloading only part of the traffic. Ethernet-only networking reduces the infrastructure costs in network adapters, cables, switches, rack space, power, equipment spares, management tools, planning, networking staff, and installation.

Features

Host Interface
- PCI Express Gen5 x16
- End Point (EP) operation
- MSI-X, MSI, legacy pin interrupts

Wire Interface
- NRZ or PAM4
- 2x1/10/25/40/50/100/200G (or 4x100) QSFP56
- IEEE 802.3cd (50/100/200GbE)
- IEEE 802.3by 25GbE
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3ap Backplane Ethernet
- IEEE 802.3ae (10 GbE)
- 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 802.1Qbb PFC
- IEEE 802.1Qaz (ETS)
- IEEE 802.3x Flow Control
- IEEE 802.3ad Load-balancing and Failover
- Ethernet II and 802.3 encapsulated frames
- Multiple MAC addresses per interface
- Jumbo Frames up to 9.6 Kbytes
- ITU-T G.8262, Sync-E
- IEEE 802.1AS Timing and Synchronization
- IEEE 1588 PTP

Stateless Offloads
- TCP/UDP checksum offload for IPv4, IPv6
- TSO, LSO, and GSO for IPv4 and IPv6
- VLAN filtering, insertion, and extraction
- Packet filtering and attack protection
- Nanosecond granularity 64b timestamping
- Ethernet Routing (packet header re-write)
- Packet Tracing and Packet Sniffing
- Adaptive interrupt coalescing
- Receive side scaling (RSS)

Storage Offloads
- iSCSI initiator and target mode stack
- T10 DIF/DIX support for iSCSI
- NVMe-oF Offload (iWARP)
- NVMe-oF Offload (RoCEv2)
- NVMe/TCP Offload
- QUIC Offload
- iSER Offload
- Data-at-rest encryption

Security
- AES 128/256 and SHA1/SHA2 offload
- TLS and IPsec co-processor mode
- TLS and IPSec inline mode
- QUIC co-processor mode
- QUIC inline mode
- Inline IPsec and TLS for all Offload Traffic
- Secure firmware update
- Hardware Root of Trust support

Cloud and Virtualization
- Inband Telemetry
- NVGRE, VXLAN and GENEVE support
- PCI-SIG SR-IOV, 256 VF, 8 PF
- 264 port virtual switch
- EVB, VEPA, Flex10, and VNTag
- 512 MAC addresses
- NAT Offload

Streaming
- Integrated Traffic Management
- Advanced QoS support
- Hierarchical QoS

High Performance RDMA
- Native RoCEv2 support
- Native iWARP support
- All to All support

Boot Facilities
- iSCSI, PXE, UEFI
- Secure Boot

TCP and UDP Offload
- Full TCP stack including IPv4 and IPv6
- Extensive RFC compliance, fully featured
- VLAN support up to 4096 VLAN IDs
- Load balancing and failover capabilities
- UDP Sockets API
- Low user-to-user latency
- Multicast replication on ingress or egress
- Patented Seamless Failover
- Proxy Switching

Data Center Features
- Internet Attack Protection
- PFC, DCB, and CEE
- Time stamping support
- Flow mirroring, sampling, and statistics
- GPUDirect

Embedded Processors
- 8 x RISC processors at 1.2GHz
- 1 x DFP processor at 400Gb

System Memory
- 16 GB DDR5 RDIMM
- 4 x 32-bit channels at 4800MT/s

Management and Other Interfaces
- UART
- NC-SI
- SPI Flash
- I2C, MDIO, GPIO, JTAG
- PLDM, MCTP (SMBus or PCIe), RBT
- SGMII for 1Gb BMC interconnect
- JTAG IEEE 1149.1 and IEEE 1149.6
- SyncE

Physical and Environmental
- Fully RoHS Compliant
- Operating Temp: -40° C to 85° C or -40° F to 185° F
- Operating Humidity: 5 to 95%
- Airflow: 200 lf/m
- Power: 39W

Ordering Information

Model:	T72200-FH
Physical Interface:	200GBASE-SR4/LR4
Connector:	QSFP56
Media:	MMF, SMF, or Twinax