S7250

High Performance, Dual Port, Programmable 1/10/25/50GbE Smart NIC

Enables several offloads, security, and virtualization over a single wire

Applications

Datacenter Networking
- Scale out servers and NAS systems
- Consolidate LAN, SAN, and cluster networks
- Link servers in multiple facilities to synchronize data centers
- 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
- Enable high performance NAS systems and Ethernet-based IP SANs
- Develop high-performance shared-storage systems providing both file and block level services
- Integrated encryption support
- NVMe Fabrics (iWARP and RoCEv2)
- NVMe/TCP
- 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 S7250 is a dual port 1/10/25/50GbE Smart NIC with a PCI Express 5.0 host bus interface, optimized for storage, cloud computing, HPC, embedded, virtualization, security, AI, and other datacenter networking applications.

The seventh generation S7 ASIC technology from Chelsio provides the highest performance and efficiency, with dramatically lower host-system CPU communications. Thanks to an 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 host CPU cycles for the user applications. As a result, the system has the benefits of higher bandwidth, lower latency, and reduced power consumption.

The S7250's architecture utilizes Chelsio's seventh generation DPU technology that is road-tested across several tier-1 OEMs over the years and has evolved to support all offloads using host memory. As a result, S7250 can now enable a full featured offload technology in a small memory-free package to address the server and cloud applications at an aggressive price point and with a high connection capacity.

S7250 runs the predecessor T4, T5, and T6 silicon software to enable leveraging the user's existing software investment without any modification.

S7250 supports IEEE standard-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.

The Memory-free Operation

The S7250's architecture allows using the host memory to perform the various offload functions, removing the need for card memories. The system has the benefits of host CPU savings with no additional cost compared to a regular stateless offload NIC, resulting in an extremely lower cost in the bill of material. It uses the exact same firmware and software that runs on the T7 series of adapters (with the card memory).

Features

Host Interface
- PCI Express Gen5 x8
- MSI-X, MSI, legacy pin interrupts

Wire Interface
- NRZ or PAM4
- 2x1/10/25/50G SFP56
- 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 and 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 rewrite)
- 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
- 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
- Inline IPsec and TLS for all Offload Traffics
- Secure the firmware update
- Hardware Root of Trust support

Cloud and Virtualization
- Inband Telemetry
- NVGRE, VXLAN and GENEVE support
- PCI-SIG SR-IOV, 256 VF, and 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
- High-capacity offload without the card memory

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

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

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: 11W

Ordering Information

Model:	S7250
Physical Interface:	50GBASE-SR/LR
Connector:	SFP56/SFP28/SFP+
Media:	MMF, SMF, or Twinax

Accessories

TAPCABLE-3M (3M 10G SFP+):	10G short/long passive twin axial cable
TAPCABLE28-3M (3M 25G SFP28):	25G short/long passive twin axial cable
TAPCABLE56-3M (3M 50G SFP56):	50G short/long passive twin axial cable
SM10G-SR (10G Short Reach SFP+):	10G short optical transceivers and cable
SM10G-LR (10G Long Reach SFP+):	10G long optical transceivers and cable
SM25G-SR (25G Short Reach SFP28):	25G short optical transceivers and cable
SM25G-LR (25G Long Reach SFP28):	25G long optical transceivers and cable
SM50G-SR (50G Short Reach SFP56):	50G short optical transceivers and cable
SM50G-LR (50G Long Reach SFP56):	50G long optical transceivers and cable