

XtremeScale™ X2522

The World's Lowest Latency 10/25G Ethernet NIC The Industry's 1st Standard NIC with HW Security

The X2522 dual-port 10/25G Ethernet NIC is a member of the X2 family of XtremeScale products that redefine the price/performance of standard NICs for modern data centers.

Designed from the ground up for virtualized dense server environments, Solarflare XtremeScale X2 adapters are the most cost-effective NICs in the industry for Ethernet connectivity. At the same time, XtremeScale acceleration provides record-breaking low latency and throughput needed for today's modern class of applications. X2 is the most secure standard NIC with integrated hardware firewalls. XtremeScale X2 is the only general-purpose NIC with 2,048 Virtual NICs, programmable packet processing engine for network off-load and real-time packet/flow capture required by your network performance management and analytics platforms.

Summary of Features and Benefits

Acceleration Services Allow Distributed Apps to Scale-Out – The challenge with distributed apps is keeping hardware and system latency low, while scaling to thousands of tasks running across thousands of cores. The X2522 harnesses kernel bypass acceleration technology to deliver superior small packet performance with latency as low as one-half microsecond. Solarflare kernel bypass technologies include Onload™, ScaleOut Onload and DPDK acceleration services provide servers the headroom needed to handle more processes in the same amount of time and/or with less servers.

Solarflare acceleration technology can also be used in to build ultra-low latency NVMe all-flash storage fabrics. X2522 NICs configured for NVMe over standard TCP--and with kernel bypass acceleration--provide the same performance as NVMe fabrics based on special-purpose RDMA fabrics.

Precision Time Stamping for Accurate Synchronization - The X2522 supports the precision timing protocol (PTP) fabric service for apps that require synchronized time stamping of packets down to the single-digit nanosecond.

Protect Traffic “Inside” the Data Center by Deploying the Industry’s 1st Standard NICs with HW Security On-Board – ServerLock™ technology inside every standard X2522 NIC complements firewall perimeter security. It is now possible to scale security inside your data center by using micro-segmentation to scale packet surveillance, filtering, cloaking and firewalling with every server.

Real-Time Telemetry Feeds NPM & Analytics - The X2522 provides real-time monitoring, inspection and capture of packets needed for network performance management, security analytics, or compliance. Packet data can be forwarded to a libpcap API or saved to a file with hardware timestamps.

A Platform for Micro-Segmented NIC Fabric Services - For modern data centers, X2522 lays a new foundation for NIC-based network virtualization needed for their highly distributed applications with thousands of inter-connected web server, machine learning and big data workloads. X2522 is the first and only standard NIC platform that can establish ultra-scale connectivity to thousands of virtual NICs, while at the same time providing real-time packet and flow information. The combination of ultra-high bandwidth, ultra-low latency, ultra-scale connectivity and packet telemetry, allows X2522 NICs to serve as the Industry’s first commercial platform for micro-segmented NIC fabric services that scale with each server, VM or container.

The Most Cost Effective NICs in the Industry – Solarflare makes data center-wide deployment of these capabilities cost-effective. Although X2522 NICs provide superior performance and the SmartNIC-like ability to enable network services, a 25GbE X2 NIC from Solarflare offers a cost advantage over comparably configured NICs from market share leaders Broadcom, Intel and Mellanox.



The Solarflare Advantage

- **Lower Cost** – We invite you to compare. The X2522 is flat-out the most cost-effective 10/25G NIC.
- **Scale Higher** - The only standard 10/25G NIC with half-microsecond latency, and the ability to segment a single NIC into thousands of vNICs or 8x competitive NICs.
- Together, ultra-low latency and ultra-scale connectivity power a more efficient data center that scales higher with more workloads per server and/or less servers.
- See how the X2522 accelerates [NGINX load balancing](#) by 400%, [Redis database caching](#) by 400%, and [NGINX web servers](#) by 40%.
- **Secure Every Server** - The first and only solution allowing IT organizations to deploy a layer of security on every server using a general-purpose NIC.
- **Network Visibility** - Only standard NICs from Solarflare provide valuable real-time packet and flow data for you to monitor, capture and analyze.

Specifications

Acceleration

Universal Kernel Bypass
 DPDK Poll Mode Driver - Packet (Cloud, Telco)
 ScaleOut Onload - TCP (Cloud, Telco, Enterprise)
 Onload - TCP/UDP (Fintech)
 TCP Direct - TCP/UDP
 (Fintech) MSI-X Support
 2x25G 64-byte line rate
 Interrupt Coalescing

Security

ServerLock™ Local Hardware Filtering - Monitor, report, analyze, filter and enforce policies
 Tamper resistant adapter – Digitally signed firmware and secured private keys

Time Synchronization and Hardware Timestamping

Hardware timestamping for all packets, sent and received including PTP.
 On-board Stratum 3 compliant oscillator
 Solarflare Software PTP Daemon delivers enhanced stability and clock synchronization accuracy and can be used to synchronize the adapter clock to external time source

Stateless Offloads

TCP/UDP Checksum Offload (CSO) TCP Segmentation Offload (TSO) Giant Send Offload (GSO)
 Large Send Offload (LSO) Large Receive Offload (LRO)
 Receive Side Scaling (RSS)
 Receive Segment Coalescing (RSC)

Manageability and Remote Boot

PXE and UEFI
 Solarflare Secure Boot
 Tamper resistant Secure Firmware
 Upgrade MCTP SMBus
 MCTP PCIe VDM

Management and Utilities

Ethtool Support vCenter Plug-in
 Solarflare Boot Manager

Adapter Hardware

PCIe Gen 3.1 x8
 25G SFP28 or 10G SFP+ direct attach copper or optical transceiver; SFP28 cages.
 XtremeScale™ SFC9250 Ethernet Controller

Hardware Certifications

FCC, UL, CE
 RoHS - Complies with EU directive 2011/65/EU

Traffic Engineering

XtremePacket™ Engine for dedicated parsing, filtering, and flow steering
 TCP/UDP/IP, MAC, VLAN, RSS filtering Accelerated Receive Flow Steering (ARFS) Transmit Packet Steering

Storage

NVMe-TCP Plug-in for low latency, high performance storage networking on standard Ethernet fabric

Virtualization

Microsoft Hyper-V Virtual Machine Queue (VMQ) SR-IOV: 16 physical functions; 240 virtual functions 2048 Guest OS protected vNICs
 Full hardware switch fabric in silicon capable of steering any flow based on Layer 2 to Layer 4 protocols, between physical and virtual interfaces.
 VXLAN, NVGRE, and GENEVE tunneling offloads; adaptable to custom overlays.
 VLAN and VLAN Q-in-Q Insertion/Stripping

Ethernet Standards

IEEE802.3-2012 Ethernet Base Standard, including 802.3bx IEEE 802.3-2015 (10/25Gb) Ethernet Flow Control IEEE 802.3by Ethernet consortium 25 Gigabit Ethernet IEEE 802.3ad, 802.1AX Link Aggregation IEEE 802.1Q, 802.1P VLAN Tags and Priority IEEE 1588-2008 PTPv2
 Jumbo Frame support (9000 bytes)

OS Support

Red Hat RHEL, SUSE SLES, Debian, Ubuntu Windows Server
 VMware ESXi
 For complete list of supported OS versions visit: <http://support.solarflare.com>

Physical Dimensions

L: 16.75 cm (6.6 in)
 W: 6.9 cm (2.7 in)
 End bracket height: PCI Express standard, 12.0 cm (4.725 in) PCI Express low-profile: 7.92 cm (3.12 in)

Environmental Requirements

Temperature:
 Operating: 0°C to 55°C (32°F to 131°F) Storage: -40°C to 65°C (-40°F to 149°F) Humidity:
 Operating: 10% to 80%
 Storage: 5% to 90%

Ordering Information

X2522, X2522-PLUS

SF-119854-CD Issue 4
 X2522 Product Brief 041618

Note: Feature availability is dependent on software release support. Please contact Solarflare support for details.