XtremeScale™ X2541

100GbE Ultra-Low Latency Network Adapters

SOLARFLARE®

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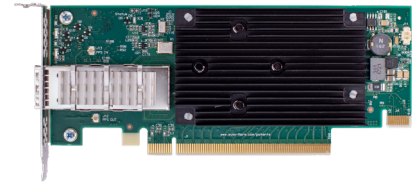
OVERVIEW

Solarflare's XtremeScale™ X2541 single-port 10/25/40/50/100G Ethernet network adapters are designed for high-performance electronic trading environments and enterprise data centers; including artificial intelligence, big data, analytics, hyperscale, machine learning, storage, and telco applications.

NETWORKING

Solarflare's record-breaking low latency and high throughput network adapters provide real-time packet and flow information to thousands of virtual NICs. This combination of ultra-high bandwidth, ultra-low latency, ultra-scale connectivity, and packet telemetry allows X2 series adapters to scale with each server, virtual machine or container.

ACCELERATION

For cloud data centers, Solarflare's Onload® application acceleration software dramatically accelerates and scales network-intensive workloads such as in-memory databases, software load balancers, and web servers. With Onload, data centers can support 4X or more users on their cloud network while delivering improved reliability, enhanced quality of service (QoS), and a higher return on investment, without modification to existing applications.

For electronic trading environments, Onload kernel bypass application acceleration and DPDK services deliver superior small packet performance with sub-microsecond hardware latency.

In addition, X2541 adapters support the precision time protocol (PTP) fabric service for apps that require synchronized time stamping of packets down to single-digit nanosecond resolution.

STORAGE

Solarflare provides an efficient link between fast NVMe storage and the network. X2 series adapters configured for NVMe™/TCP with Onload provide similar performance as NVMe fabrics based on special-purpose RDMA, further reducing host processing overhead and accelerating web and cloud traffic.

TARGET APPLICATIONS

- Electronic trading platforms
- Enterprise data centers
- Bare metal, containers and virtualized environments
- Content delivery networks

HIGHLIGHTS

- Sub-microsecond latency
- Near-zero jitter
- Highly scalable
- Predictable, deterministic system performance
- Industry's highest message rates
- Precision Time Stamping for accurate synchronization
- NVMe™/TCP storage ready
- SolarCapture® Pro network performance monitoring

TELEMETRY

Solarflare's SolarCapture® Pro packet capture software enables X2541 adapters to capture and time stamp packets in hardware, persist packet to disk, and replay packets streams. This feature provides the essential ingredient for corporate data centers to run applications such as high-precision network performance monitoring, analysis, and regulatory compliance.

WORKLOADS

The X2541 adapters are ideal for scale-out cloud, web, and CDN application environments. Solarflare adapters are used in a wide range of use cases, including software-defined networking (SDN), network functions virtualization (NFV), web content optimization, DNS acceleration, web firewalls, load balancing, NoSQL databases, caching tiers (Memcached), web proxies, video streaming, and storage networks.

Solarflare's X2541 adapters speed up TCP, unicast, multicast and UDP traffic for a wide variety of trading applications. From mission-critical exchange gateways and matching engines on the financial exchange side, to feed handlers, order routing, algorithmic trading engines, messaging applications, order execution, data distribution and client communications on the trading side, Solarflare's XtremeScale network adapters are considered the de facto standard in electronic trading environments.

SPECIFICATIONS

NIC Capabilities
- MSI-X support
- Interrupt coalescing
- 2x10/25G 64-byte line rate

Virtualization
- Linux Multi-queue
- VMware NetQueue
- Microsoft Hyper-V Virtual Machine Queue (VMQ)
- SR-IOV: 16 physical functions, 240 virtual functions; 2,048 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

Manageability and Remote Boot
- PXE and UEFI
- NC-SI over MCTP SMBus
- PLDM over MCTP SMBus
- MCTP PCIe VDM

Management and Utilities
- Ethtool support
- vCenter plug-in
- Solarflare boot manager

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

Network Acceleration
- Data Plane Development Kit (DPDK) Poll Mode Driver - packet
- Onload®* - TCP/UDP
- TCPDirect* - TCP/UDP

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

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

Ethernet Standards
- IEEE 802.3-2012 Ethernet base standard, including 802.3bx
- 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 a complete list of supported OS versions visit: 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)

Adapter Hardware
- PCIe Gen 3.1 x16
- 100G QSFP28 direct attach copper, optical transceiver or AOC

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

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

X2541	100Gb PCIe adapter. Note: *features can be acquired by purchasing separate software licenses.
X2541-PLUS	100Gb PCIe adapter. Note: hardware pre-configured for all * features; some features may require separate software licenses.

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

For more information please visit: solarflare.com
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