



Dual-Port 10GbE Precision Time Synchronization Server Adapter

Solarflare® SFN5322F dual-port enterprise SFP+ server adapter combines precision time synchronization with ultra-low latency 10G Ethernet, both accelerating time synchronization and providing the industry's best application performance on a single data network and in a single PCIe slot. The SFN5322F delivers unmatched scalable performance for data centers and the industry's lowest power consumption for additional cost savings.

The SFN5322F accelerates time synchronization by performing high-precision hardware time-stamping of IEEE 1588 Ethernet frames together with high-performance, ultra-low latency application acceleration.

The SFN5322F eliminates a secondary server adapter (freeing PCIe slots) and dedicated appliances, as well as additional physical networks, which would otherwise be required for clock distribution, while facilitating slave servers to precisely synchronize internal clocks to a network master clock. Combining ultra-low latency data transfers with clock synchronization on a single network simplifies latency-sensitive applications where clock synchronization is critical, such as financial services and distributed processing environments.

The SFN5322F driver is compatible with the SFN5122F product and seamlessly interfaces to host software time synchronization solutions that utilize the standard Linux socket option `SO_TIMESTAMPING`, such as PTPv1 or PTPv2 daemons, which implement the IEEE 1588 time synchronization protocols. Driver interfaces to kernels that predate `SO_TIMESTAMPING` are also available.

SFN5322F High-Precision Time Synchronization

Solarflare's SFN5322F utilizes a high-precision clock source, which meets the rigorous requirements for use in a Stratum 3 clock system for network synchronization. SFN5322F's high-precision clock stability enables servers to synchronize to a data network clock with greater precision, and serve as a highly stable and precise clock source. Alternative products utilizing crystals can drift significantly over time, temperature, and age, resulting in an inferior clock synchronization solution. For example, between synchronization cycles a typical 15 PPM crystal can drift 4000% more than the SFN5322's 0.37 PPM Stratum 3 clock source, significantly impacting time stamp precision. Consequently, in PTP applications the SFN5322F limits drift and increases precision, which are key factors for high-precision PTP clock synchronization.

Application Performance Leadership

SFN5322F delivers the industry's lowest latency at the highest message rates to customers with leading edge enterprise data center deployments. SFN5322F also delivers the industry's highest message rate and lowest latency jitter, with full 40 Gbps bidirectional line-rate performance. Featuring a rich set of stateless offloads, it provides efficient acceleration of the most demanding network protocol tasks.

SFN5322F supports Solarflare's OpenOnload® application accelerator, a full-featured, high-performance user-level network stack for Linux. OpenOnload provides unprecedented performance with application compatibility and protocol compliance, bypassing kernel and networking overheads, while featuring binary compatibility with standard APIs and applications.

Lowest Power

At 2.6 watts per port, the SFN5322F enables a uniquely low power budget increasing the efficiency of combining ultra-low latency 10G Ethernet with the additional precision time stamping capabilities.



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Specifications

Product Number

SFN5322F

Dual port SFP+

Standards and Compliance

IEEE1588

IEEE 802.3ae

IEEE 802.3ad

IEEE 802.1Q

IEEE 802.1p

IEEE 802.3x

RoHS Compliant

Power (typical)

SFN5322F: 5.2W

Operating Range

0° to 55° C

0 LFM, Min.

Physical Dimensions

L: 16.74 cm (6.59 in)

W: 6.89 cm (2.71 in)

End bracket height:

PCI Express standard

12 cm (4.725 in)

PCI Express low-profile

7.92 cm (3.12 in)

Advanced Features

Precision Time Stamping (port 0)

Facilitates accurate synchronization of network nodes

Stable Precision Oscillator

Stratum 3 compliant; short term drift < 3.7*10⁻⁷ in 24 hours

Server Clock Synchronization Precision

Sub 200ns

PCI Express

PCIe x8 Gen 2.0 compliant (PCIe Gen 3.0 compatible)

@ 5.0 GT/s for full, 40 Gbps bi-directional bandwidth

SFC9020 10G Ethernet Controller

Supports high-performance 10GbE

SFP+ Support

Supports optical & copper SFP/SFP+ modules: Direct-Attach,

Fiber (10G or 1G), 1G/10G combo

1000BASE-T SFP Support

Supports 1G 1000BASE-T SFP modules

Low Latency

Cut-through architecture/intelligent interrupt coalescing

Receive Side Scaling (RSS)

Distributes IPv4/IPv6 loads across all CPU cores; MSI-X

minimizes interrupt overhead

Hardware Offloads

LSO, LRO, GSO; IPv4/IPv6; TCP, UDP checksums

Adapter Teaming/Link Aggregation

LACP, MLAG for redundant links & increased bandwidth

Enhanced Tuning

Adaptive interrupt moderation

IP Flow Filtering

Hardware directs packets based on IP, TCP, UDP headers

Advanced Packet Filtering

256 multicast filters; 4096 VLANs/port; adaptive TCP/UDP/IP,

MAC, VLAN, RSS, RPS, RFS filtering; Accelerated Receive

Flow Steering (RFS)

Jumbo Frames

9000 byte MTU for performance

Intel QuickData™

Uses host DMA engines to accelerate I/O

Remote Boot

PXE, iSCSI boot; unattended installation

Management

ACPI v3.0, SNMP, SMBus, IPMI

Operating Systems

RHEL5, 6; MRG; SLES10/11; SLERT; other Linux