



SolarflareSFN6322F

Dual-Port 10GbE SFP+ Onload Precision Time Synchronization Server Adapter

Solarflare® SFN6322F dual-port 10G Ethernet SFP+ Onload server adapter combines precision time synchronization with unmatched message rates and 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 SFN6322F delivers unmatched scalable performance for financial services and other enterprise data centers with the industry's lowest power consumption for additional cost savings.

The SFN6322F 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 SFN6322F 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 the industry's lowest latency at high message rates with clock synchronization on a single network simplifies latency-sensitive applications where clock synchronization is critical, such as financial services, industrial automation, geological sciences, and telecom synchronization.

The SFN6322F driver is compatible with the SFN6122F and SFN5122F products, and seamlessly interfaces to host software time synchronization solutions that utilize the standard Linux socket option `SO_TIMESTAMPING`, such as the PTPv2 daemon, which implements the IEEE1588 time synchronization protocol. Driver interfaces to kernels that pre-date `SO_TIMESTAMPING` are also available.

SFN6322F High-Precision Time Synchronization

Solarflare's SFN6322F utilizes a high-precision clock source, which meets the rigorous requirements for use in a Stratum 3 clock system for network synchronization. SFN6322F'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 SFN6322's 0.37 PPM Stratum 3 clock source, significantly impacting time stamp precision. Consequently, in PTP applications the SFN6322F limits drift and increases precision, which are key factors for high-precision PTP clock synchronization. SFN6322F features a Pulse Per Second (1PPS) input that can be utilized to calibrate the PTP offset. SFN6322F also features an extremely accurate 1PPS output timing signal aligned to the SFN6322F's Stratum 3 clock.

Lowest Latency at Highest Message Rates

SFN6322F delivers the industry's lowest latency at highest message rates to customers with leading edge financial services and enterprise data center deployments. SFN6322F also delivers the industry's 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.

SFN6322F supports Solarflare's OpenOnload® application accelerator, a full-featured, high-performance user-level network stack for Linux. OpenOnload provides unprecedented low latency performance with application compatibility and protocol compliance, bypassing kernel and networking overheads, while featuring binary compatibility with standard APIs and applications.

Lowest Power

At 3.1 watts per port, the SFN6322F 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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SFN6322F

Specifications

Product Number

SFN6322F

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)

SFN6322F: 6.2W

Operating Range

0° to 55° C

0 LFM, Min.

Physical Dimensions

L: 13.4 cm (5.3 in)

W: 6.9 cm (2.7 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

1PPS-input: SMA

Rising edge active, TTL into 50Ω

1PPS-output: SMA

Rising edge on-time, TTL into 50Ω

PCI Express

PCIe x8 Gen 2.0 compliant @ 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

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