Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra
Product Guide (withdrawn product)

The Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra is a high-performance dual-port 10 GbE adapter that enables the lowest latency networking solutions for electronic/high frequency trading and other latency-sensitive applications.

The adapter accelerates HPC and Hadoop by providing high message rate and low latency interconnects for compute clusters. The adapter's CPU offload along with high performance enables servers to provide more services to more users in cloud and grid environments.

The following figure shows the adapter.

Figure 1. Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra

Did you know?

With a latency of less than 2 microseconds, the SFN7122F adapter, when combined with OpenOnload application acceleration middleware, offers upwards of 25% lower latency than the SFN6122F adapter. This extremely low latency is ideal for the financial services industry, where low latency and high performance TCP and UDP processing are important attributes for a network interface.

Part number information

The following table provides the ordering part number and feature code for the SFN7122F adapter.

Table 1. Ordering part number and feature code

Part number	Feature code	Description
47C9977	A522	Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra

The adapter option part number includes the following items:

- One adapter with a full height PCIe bracket attached
- One low profile PCIe bracket (included in the box)
- Support CD
- Important Notices Flyer

Note: The adapter ships without any SFP+ transceivers or direct attach cables. These items must be ordered separately (for details, see Table 2 and Table 3).

Supported transceivers and direct-attach cables

The SFN7122F adapter has two empty SFP+ cages that support SFP+ SR transceivers and Twinax direct attached copper cables, as shown in Table 2 and Table 3.

Table 2. Supported SFP+ transceivers

Part number	Feature code	Description
Optical Transceivers		
49Y4216	0069	Brocade 10Gb SFP+ SR Optical Transceiver
46C3447	5053	SFP+ SR Transceiver (10Gb)
49Y4218	0064	QLogic 10Gb SFP+ SR Optical Transceiver

The maximum cable distance is 300 m using OM3 multimode fiber optic cable.

Table 3 lists the supported direct attach copper (DAC) cables.

Table 3. Supported direct attach copper cables

Part number	Feature code	Description
Active DAC/Twinax cables		
95Y0323	A25A	1m Active DAC SFP+ Cable
95Y0326	A25B	3m Active DAC SFP+ Cable
95Y0329	A25C	5m Active DAC SFP+ Cable
Passive DAC/Twinax cables		
00D6288	A3RG	.5m Passive DAC SFP+ Cable
90Y9427	A1PH	1m Passive DAC SFP+ Cable
00AY764	A51N	1.5m Passive DAC SFP+ Cable
00AY765	A51P	2m Passive DAC SFP+ Cable
90Y9430	A1PJ	3m Passive DAC SFP+ Cable
90Y9433	A1PK	5m Passive DAC SFP+ Cable

Features

Based on Solarflare's fourth-generation SFC9120 Ethernet controller, the SFN7122F adapter delivers dual-port, line-rate 10 Gbps throughput for moving large amounts of data and eliminating server I/O bottlenecks. The adapter delivers industry-leading network performance with ultra-low latency at the highest message rates.

The adapter has the following features:

- Delivers industry-leading performance, providing high throughput, low latency, and high processor efficiency, which improves the performance of network communications, network-attached storage, and remote file system access.
- Suitable for applications such as email, database, OLTP, data mining, web serving, and big data.
- Includes Solarflare's unique hardware-accelerated virtual channel architecture. Each virtual channel provides an independent channel between the network adapter and host software, allowing network I/O processing to be distributed efficiently over multiple processor cores. With 1024 virtual channels per port (2048 per adapter), I/O performance scales as the number of processor cores and virtual machines increase.
  Note: In the Solarflare documentation, the virtual channel feature is referred to as vNIC. This feature is different from the Virtual Fabric vNIC capability.
- Supports PCIe 3.0 with ultra-low latency features, such as direct packet transfer (Tx PIO) mode and the templated send API.
- Features hardware acceleration to optimize packet delivery, such as UDP multicast replication, integrated Layer 2 switching capability and VLAN insertion/removal, along with TCP segmentation offload (TSO) to reduce processor load.
- Supports Receive Flow Steering (RFS) acceleration, which improves processing efficiency by steering received packets to the processor core that is running the application that consumes those packets.
- Accelerates guest applications in leading hypervisors by efficiently distributing virtual machine network I/O traffic across multiple processor cores while supporting NetQueue and VMQ in VMware, and Microsoft VMQ in Hyper-V.
- At fewer than 6 watts, the adapter consumes less than half the power of the leading competitor's products, and can deliver 5x - 10x the efficiency of 1G Ethernet (Gbps per watt). This results in a power-efficient 10G network that can save thousands of dollars of operating costs for a typical data center
- Graphical user interface and scriptable command-line interface for ease of management.

In addition, the adapter supports the Solarflare OpenOnload application acceleration middleware on Linux operating systems. OpenOnload bypasses the network stack in the Linux kernel by dedicating a virtual channel to each accelerated application.

OpenOnload enables the following capabilities:

- Suitable for the most demanding, latency-sensitive applications in environments requiring the highest message rates.
- Delivers ultra-low latency and high throughput even as message rates increase.
- Enables accelerated application performance through TCP/IP, UDP, and multicast acceleration.
- Streamlines and reduces interrupts, context switches, and data copies.
- Reduces the processing that is associated with networking and improves processor core scaling.
- Increases message rates by 300% or more.
- Binary compatibility with industry standard APIs, so no software modifications are needed, and OpenOnload seamlessly integrates in to the existing infrastructure.

- A standards-based solution using TCP/IP and UDP, so no specialized protocols are needed.

Note: Solarflare OpenOnload runs only on non-Xen Linux distributions. Windows and VMware are not supported.

Technical specifications

The SFN7122F adapter has the following specifications:

- Based on the Solarflare Solarstorm SFC9120 controller.
- Two 10GbE SFP+ ports with support for optical SFP+ modules and Direct Attach Copper (DAC) cables.
- Full line-rate performance across all ports.
- Very low latency:
  - SFN7122F without OpenOnload: 6.3 µs (TCP) and 5.4 µs (UDP)
  - SFN7122F with OpenOnload: 1.8 µs (TCP) and 1.7 µs (UDP)
- Low-profile form factor.
- PCI Express 3.0 x8 host interface for full, 40 Gbps bidirectional bandwidth.
- Jumbo Frames support (9216 byte frames).
- IEEE 802.1q VLAN support provides enhanced network management and efficiency.
- Support for VMware NetQueue and Microsoft VMQ improves network performance in virtualized environments.
- Support for NIC teaming.
- IEEE 802.3x flow control support.
- Receive Side Scaling (RSS) with 2048 virtual channels (1024 per port) distributes IPv4/IPv6 loads across processor cores.
- Accelerated Receive Flow Steering (RFS) intelligently aligns I/O processing with application processing to a single processor core by using on-chip advanced packet filtering.
- TCP, IP, and UDP checksum offload.
- IP flow filtering enables the hardware to steer packets that are based on IP, TCP, and UDP header contents to a virtual channel.
- MAC address filtering enables the hardware to steer packets that are based on the MAC address to a virtual channel.
- Advanced Packet Filtering: 4096 multicast filters, 4096 VLANs/port, adaptive TCP/UDP/IP, MAC, VLAN, RSS, and RFS filtering, and Accelerated Receive Flow Steering (RFS).
- Message Signaled Interrupts (MSI) and MSI-X support maximizes server processing performance by reducing processing impact and lowering interrupt latency.
- Supports Large Send Offload (LSO), Giant Send offload (GSO) TCP Segmentation Offload (TSO), and Large Receive Offload (LRO) for improved adapter performance and reduced processor utilization.
- Supports Intel QuickData, which uses host DMA engines to accelerate I/O.
- Supports iSCSI boot and PXE boot.
- Supports SNMP and ACPI 3.0.
- Power consumption (typical): 5.9 W.

The adapter has the following restrictions:

- No UEFI support. Adapter boot by using legacy BIOS only.

- No support for Wake on LAN (WoL).
- No support for Virtual Fabric.
- No support for Energy Efficient Ethernet (EEE).
- No support for iSCSI offload.
- No support for Ethernet Virtual Bridge (EVB).
- No support for Converged Enhanced Ethernet (CEE).
- No support for TCP Offload Engine (TOE).

Standards supported

- PCI Express Base Specification, rev. 2.0
- PCI Express Card Electromechanical Specification, rev. 2.0
- PCI Bus Power Management Interface Specification, rev. 1.2
- IEEE 802.3ae (10 Gb Ethernet)
- IEEE 802.1Q (VLAN)
- IEEE 802.3ad (Link Aggregation)
- IEEE 802.1p (Priority Encoding)
- IEEE 802.3x (Flow Control)
- IPv4 (RFQ 791)
- IPv6 (RFC 2460)
- IEEE 802.3ae 10GBASE-SR short range fiber optics 10 Gb Ethernet
- 10GSFP+Cu SFP+ Direct Attach copper

Server support

The SFN7122F adapter is supported on the System x servers that are listed in the following tables.

The following tables list the System x servers that are compatible.

Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

The following tables list the System x servers that are compatible.

Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

Table 4. Support for System x and dense servers with Xeon E5/E7 v4 and E3 v5 processors

Part number	Description	x3250 M6 (3943)	x3250 M6 (3633)	x3550 M5 (8869)	x3650 M5 (8871)	x3850 X6/x3950 X6 (6241, E7 v4)	nx360 M5 (5465, E5-2600 v4)	sd350 (5493)
47C9977	Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra	N	N	Y	Y	N	Y	N

Support for servers with Intel Xeon v3 processors

Table 5. Support for servers with Intel Xeon v3 processors

Part number	Description	x3100 M5 (5457)	x3250 M5 (5458)	x3500 M5 (5464)	x3550 M5 (5463)	x3650 M5 (5462)	x3850 X6/x3950 X6 (6241, E7 v3)	nx360 M5 (5465)
47C9977	Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra	N	N	Y	Y	Y	N	Y

Support for servers with Intel Xeon v2 processors

Table 6. Support for servers with Intel Xeon v2 processors

Part number	Description	x3500 M4 (7383, E5-2600 v2)	x3530 M4 (7160, E5-2400 v2)	x3550 M4 (7914, E5-2600 v2)	x3630 M4 (7158, E5-2400 v2)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 BD (5466)	x3650 M4 HD (5460)	x3750 M4 (8752)	x3750 M4 (8753)	x3850 X6/x3950 X6 (3837)	x3850 X6/x3950 X6 (6241, E7 v2)	dx360 M4 (E5-2600 v2)	nx360 M4 (5455)
47C9977	Solarflare SFN7122F 2x10GbE SFP+ Flareon Ultra	N	N	Y	N	Y	N	N	N	N	N	N	N	Y

For the latest information about the System x servers that support each adapter, see the ServerProven® website at the following address:
http://www.lenovo.com/us/en/serverproven/

Operating system support

The SFN7122F adapter supports the following operating systems:

- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE Linux Enterprise Server 11 for AMD64/EM64T
- SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T
- SUSE Linux Enterprise Server 12

Solarflare OpenOnload is supported by the adapter only on non-Xen versions of Linux. Download the OpenOnload software from (no cost for registration is required) from the following website:
https://support.solarflare.com/index.php?option=com_cognidox&view=categories&Itemid=25

For the latest information about the specific versions and service packs that are supported, see the ServerProven website at the following address:
http://www.lenovo.com/us/en/serverproven/

Click **System x servers**, and then click **LAN** to see the support matrix. Select the check mark that is associated with the System x server in question to see the operating system support details.

Physical specifications

The SFN7122F adapter has the following physical specifications (approximate):

- Length: 134 mm (5.3 in.)
- Width: 69 mm (2.7 in.)
- Height: Standard bracket 120 mm (4.725 in.); Low profile 79 mm (3.12 in.)
- Weight: 111 g (3.2 oz.) with standard bracket; 106 g (3.1 oz) with low profile bracket

Shipping box dimensions (approximate):

- Height: 189 mm (7.5 in.)
- Width: 90 mm (3.5 in.)
- Depth: 38 mm (1.5 in.)
- Weight: 205 g (7.0 oz.)

Operating environment

The SFN7122F adapter is supported in the following environment:

- Operating temperature: 0 to - 55 °C (32 to 131 °F)
- Storage temperature: -20 to 70 °C (-4 to 158 °F)
- Relative humidity (operating): 10% - 90%
- Relative humidity (storage): 5% - 95%

Warranty

One-year limited warranty. When installed in a System x server, the SFN7122F adapter assumes your system’s base warranty and any warranty upgrade.

Agency approvals

The SFN7122F adapter conforms to the following standards:

- UL60950-1 2nd edition 2011-12-19 (US)
- CSA C22.2 No.60950-1-07 (Canada)
- EN60950-1:2006+A12:2011 (Europe)
- IEC 60950-1:2005+A1:2009
- FCC CFR 47 Part 15 Class B (US)
- ICES 003 (Canada)
- EN60950 / CE (Europe)
- EN55022:2010 (Europe)
- EN55024:2010 (Europe)
- C Tick, AS/NZS, CISPR 22:2009 (Australia/New Zealand)
- VCCI, VCCI Regulations V-3 (Japan)
- KC, KN22, and KN24 (South Korea)
- BSMI and CNS 13438:2006 (Taiwan)
- RoHS compliant

Top-of-rack Ethernet switches

The SFN7122F adapter supports end-to-end 10 GbE connections to the top-of-rack Ethernet switches from Lenovo Networking that are listed in the following table.

The maximum cable distance (optical) is 300 m using OM3 multi-mode fibre.

Table 7. Top-of-rack Ethernet switches

Description	Part number
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8264CS (Rear to Front)	7159DRX
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6

For more information, see the Product Guides in the Top-of-rack switches categories:
http://lenovopress.com/networking/tor/10gb?rt=product-guide

Related publications

For more information, see the following documents:

- US Announcement Letter:
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS113-222
- Networking adapters for System x product page
  http://shop.lenovo.com/us/en/systems/servers/options/systemx/networking/adapters/
- System x Configuration and Options Guide:
  http://www.lenovo.com/us/en/cog/
- Device drivers, tools, and Solarflare Server Adapter User's Guide (no cost for registration is required):
  https://support.solarflare.com/index.php?option=com_cognidox&view=categories&Itemid=25
- Product Guide: Solarflare SFN5162F MR and SFN6122F LL Dual Port 10GbE SFP+ Adapters
  http://lenovopress.com/tips1021

Related product families

Product families related to this document are the following:

- 10 Gb Ethernet Connectivity
- Ethernet Adapters

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