Solarflare SFA7942Q ApplicationOnload™ Engine Quick Start Guide

Solarflare Dual-Port 40GbE QSFP+ PCIe 3.0 ApplicationOnload™ Engine
Part numbers: SFA7942Q

Information in this document is subject to change without notice.

A list of patents associated with this product is at http://www.solarflare.com/patent

SF-119950-CD
Issue 2

1.1 Overview

The SFA7942Q ApplicationOnload™ Engine (AOE) moves the processing of network traffic to the adapter to accelerate real-time network application performance. The adapter delivers guaranteed full 40G line rate packet capture, hardware timestamping of packets and precision time synchronization from a single half-length, full-height PCIe adapter. Physical ports can be independently configured to support 2 x 40GbE (QSFP+) or up to 8 x 10GbE (SFP+ via breakout cable).

Incorporating an Altera Stratix V FPGA, the SFA7942Q is an advanced custom compute platform creating bump-in-the-wire pre- and post-processing of high speed network traffic using the AOE on-board processing and logic engine. A firmware development API means customized application logic can be developed by users to run directly in the FPGA.

User Guides

For comprehensive installation instructions, configuration and tuning guidance, and user guides for Solarflare network acceleration, security, monitoring and capture products, please consult the Solarflare user documentation.

(i) Solarflare user documentation can be downloaded from https://support.solarflare.com

Drivers

The SFA7942Q server adapter supports the following OS distributions; Linux RHEL6 and 7, SLES11 and 12, Ubuntu 14.04, 14.10 and 15.04, Debian 7.0, and 8.0.

(i) Drivers can be downloaded from https://support.solarflare.com

Onload

Solarflare server adapters also support Onload – a 'kernel bypass' accelerated user-level TCP/IP network stack, providing extremely low latency. Onload links with the application using the standard POSIX BSD sockets API, meaning no modifications are required to the application being accelerated. Onload is enabled via AppFlex licensing.

(i) To learn more about Onload please visit http://www.openonload.org

Precision Time Protocol

The SFA7942Q server adapter is equipped with a Stratum 3 oscillator to support hardware timestamping of PTP packets and server synchronization. Solarflare's Enhanced PTP is enabled via AppFlex licensing, and can synchronize multiple adapters to a PTP source.

(i) Solarflare's Enhanced PTP daemon is available from https://support.solarflare.com

CSS Solution Paks

Capture SolarSystem solution paks are pre-configured, performance-optimized, appliance products for packet capture. Solution Paks comprise the following elements:

- SFA7942Q adapter
    - ports on the adapter are pre-configured in 2 x 40G mode
    - adapter firmware is optimized for packet capture
- AppFlex Capture-SolarSystem40G activation key – factory installed
- AppFlex SolarCapture Pro activation key – factory installed
- AppFlex PTP/HW timestamping activation key – factory installed
- AppFlex Onload activation key – factory installed.

Solarflare adapters covered by this guide

The following table lists the Solarflare SFN7000 series QSFP+ server adapters that are covered by this *Quick Start Guide*:

Part number	PTP HW timestamps	Onload support	SolarCapture Pro	Regulatory product code
SFA7942Q-A5-0	via user upgrade[1]	Yes	via user upgrade[1]	SR201
SFA7942Q-A7-4	via user upgrade[1]	Yes	via user upgrade[1]	SR201
SFA7942Q-A7-4-PTP	Yes	Yes	via user upgrade[1]	SR201

1. User upgradable features can be enabled when the user installs an AppFlex™ activation key.

Support

If you have any questions on your Solarflare products please contact your sales representative or contact Solarflare.

ⓘ For support on Solarflare products please email support@solarflare.com

Limited warranty

Before using any of the Products, Purchaser shall determine the suitability of the Products for Purchaser's intended use by considering such factors as overall product design and the processing and environmental conditions to which the Products will be subjected. Solarflare warrants solely to Purchaser, for a period of 3 years from the date a Product is delivered to Purchaser (the "Warranty Period"), that the Product will conform in all material respects to Solarflare's published specifications for such Product in effect as of the date of purchase (the "Limited Warranty").

To view the whole warranty, visit http://www.solarflare.com/Media/Default/PDFs/Support/Solarflare_3yrWarranty_ServerAdapters.pdf

1.2 Installing the adapter

Solarflare SFA7942Q server adapters are compatible with Intel and AMD x86 PCs with 8-lane or 16-lane PCIe 3.0 (8GT/s), PCIe 2.0 (5GT/s) or PCIe 1.x (2.5GT/s) slots.

CAUTION: Servers contain high voltage electrical components. Before removing the server cover, disconnect the mains power supply to avoid the risk of electrocution. Before handling computer components, discharge static electricity from yourself by touching a metal surface, or wear a correctly fitted anti-static wrist band.


Inserting the adapter in a PCI Express slot

The SFA7942Q QSFP+ dual-port adapter is a full-height, half-length, 8-lane PCIe 3.0 form factor adapter.

NOTE: The Solarflare SFA7942Q server adapter requires an 8-lane or 16-lane PCI Express slot. For maximum performance the adapter should be installed in a PCIe 3.0 slot, but is compatible with PCIe 2.0 or PCIe 1.x.

Shut down the server and unplug it from its power source. Remove the server cover to access the PCI Express slots in the server. Locate an 8-lane or 16-lane PCI Express slot (refer to the server manual if necessary) and insert the Solarflare server adapter. Secure the adapter bracket in the slot.

Byte blaster
adapter slot

QSFP+ ports

PPS OUT

PPS IN
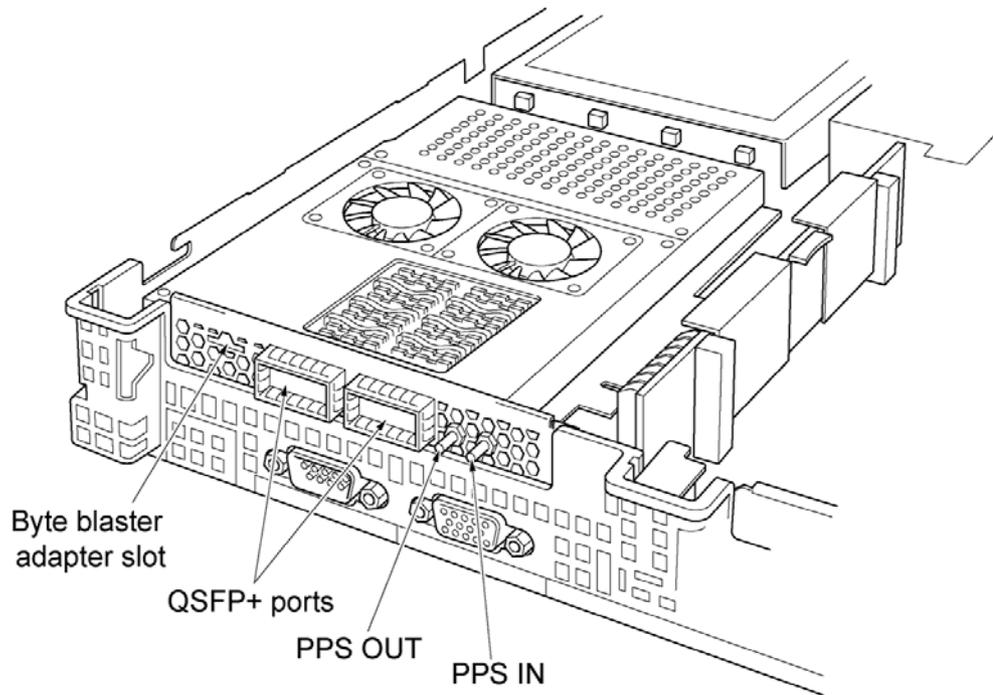
⚠️ **CAUTION:** To ensure an unobstructed airflow, a ventilation gap, no less than 4mm, should be maintained between the AOE cooling fans surface and any adjacent surface. Preferably a PCI slot next to the AOE adapter should be left unoccupied. **Server cooling fans must be fully operative to prevent damage to the adapter.**

Connecting a ByteBlaster Device (Optional)

For users developing custom applications to run on the FPGA, a ByteBlaster device can be connected to the ByteBlaster Adapter board (*AOE-BB-ADAP2-SOLR*) which slides into the front bracket slot as shown below. Supported devices include the ByteBlaster II, USB-ByteBlaster and EthernetBlaster II.

ByteBlater
Adapter
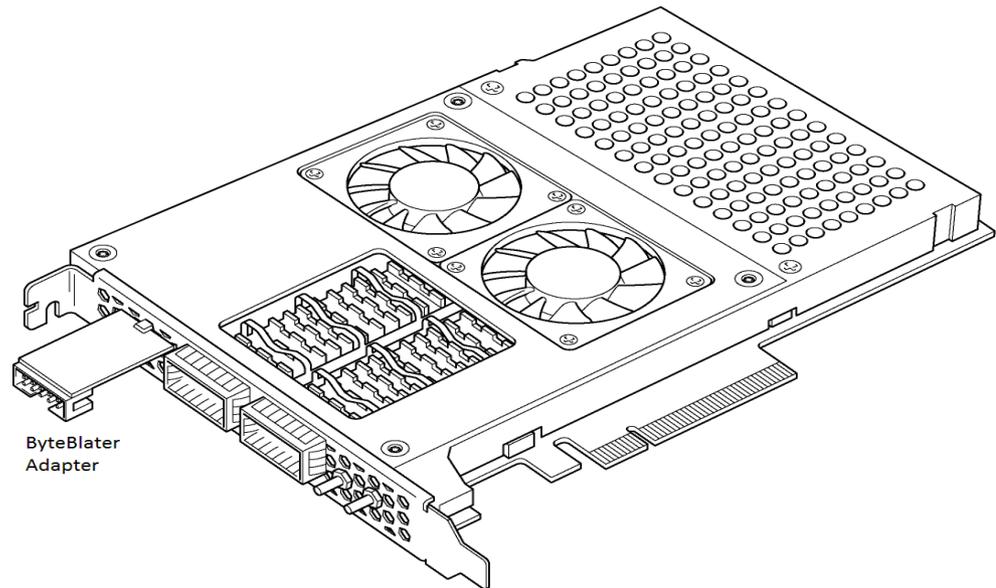
Cables and transceivers

Solarflare QSFP+ server adapters support a wide range of QSFP+ direct attach cables, 40G BASE-SR4 and 10G BASE-SR optical transceiver modules and QSA (QSFP+ to SFP+) adapters.

ⓘ For a full list of supported cables and transceivers visit http://www.solarflare.com/Transceivers-and-Cables

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1.3 PXE booting

All Solarflare adapters comply with PXE 2.1, and support PXE booting.

This adapter is shipped with PXE booting enabled, and boot ROM support 'exposed'. The Boot ROM Agent runs during the machine bootup stage, allowing the user to enter the setup screens (via Ctrl+B) and enable or disable PXE support as required. The Boot ROM Agent can also be invoked using the Solarflare supplied `sfboot` utility. For detailed instructions, refer to the *Solarflare Server Adapter User Guide*.

1.4 Warnings

Changes or modifications not expressly approved by Solarflare Communications Inc., the party responsible for FCC compliance, could void the user's authority to operate the equipment.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Underwriters Laboratory Inc ('UL') has not tested the performance or reliability of the security or signaling aspects of this product. UL has only tested for fire, shock or casualty hazards as outlined in the UL's Standard for Safety UL 60950-1. **UL Certification does not cover the performance or reliability of the security or signaling aspects of this product. UL makes no representations, warranties or certifications whatsoever regarding the performance or reliability of any security or signaling related functions of this product.**

The laser safety of this product has been verified using the following certified laser device module (LDM). Refer to the manufacturer documentation for test certification details:

Manufacturer	Model
Finisar Corporation	FTL410QE2C-SL
Lumentum Operations	JQPR04SRAB1SF

When installed in a 40Gb Ethernet network interface card from the Solarflare SFN7000 series, the laser emission levels remain under Class I limits as specified in the FDA regulations for lasers, 21 CFR Part 1040.

The decision on what LDMs to use is made by the installer. For example, equipment may use one of a multiple of different LDMs depending on path length of the laser communication signal. This equipment is not basic consumer ITE.

This equipment is installed and maintained by qualified staff from the end user communications company or subcontractor of the end user organization. The end product user and/or installer are solely responsible for ensuring that the correct devices are utilized in the equipment and the equipment with LDMs installed complies with applicable laser safety requirements.

Do not install this product in hazardous areas where highly combustible or explosive products are stored or used without taking additional safety precautions. Do not expose this product to rain or moisture. This Class III SELV product is intended only to be powered by a certified limited power source.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that

interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

この装置は、クラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをして下さい。　VCCI-B

警告用戶：
這是一個 B 類 產品，在居住環境中使用時可能會導致無線電干擾，在這種情況下，用戶可能需要採取適當的措施。

B 급 기기 (가정용 방송통신기기): 이 기기는 가정용 (B 급) 으로
전자파적합등록을 한 기기로서 주로 가정에서 사용하는 것을 목적으로 하며，
모든 지역에서 사용할 수 있습니다 .

1.5 Regulatory approval

This adapter has the following regulatory approval:

Category	Specification	Details
EMC	Europe	BS EN 55022:2010, 55032:2012
		BS EN 55024:2010
	US	FCC CFR 47 Part 15 Class B
	Canada	ICES 003/NMB-003 Class B
	Taiwan	CNS 13438:2006 Class B
	Japan	VCCI Regulations V-3:2014.04 Class B
	South Korea	KCC KN-32, KN-24
	Australia	AS/NZS CISPR 22:2009 +A1:2010
Safety[1]	Europe	BS EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013
	US	UL 60950-1 2nd Ed.
	Canada	CSA C22.2 60950-1-07 2nd Ed.
	CB	IEC 60950-1:2005 2nd Ed.+AMI:2009 +AM2:2013
RoHS	Europe	Complies with EU directive 2011/65/EU

1. The safety assessment has been concluded on this product as a component /sub-assembly only.
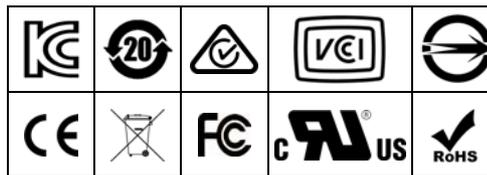
1.6 Solarflare Boot Manager

The Solarflare Boot Manager is installed in the adapter's flash memory. This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. Either the latest or an earlier version of the source code for the Solarflare Boot Manager can be requested by sending an e-mail to support@solarflare.com.