



### PE310G4TSF4I71

#### Quad Port SFP+ 10 Gigabit Ethernet PCI Express Time Stamp Server Adapter Intel® Based

##### Product Description

Silicom's 40 Gigabit Ethernet PCI Express Time Stamping server adapter is designed for high-precision time-stamping of Ethernet frames with wire speed network performance.

The Silicom's 40 Gigabit Ethernet PCI Express Time Stamping server adapter is based on a standard Intel XL710 controller, Silicom's hardware based 4ns resolution precision time stamping and NTOP/Silicom DNA (Direct NIC Access) acceleration driver.

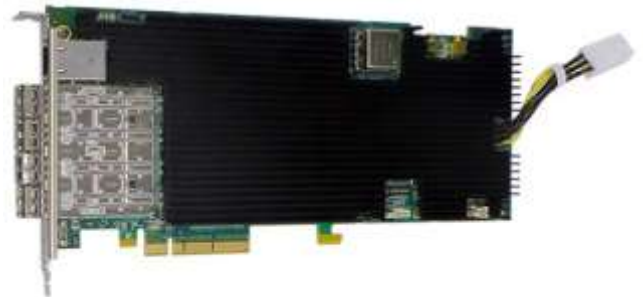
The Silicom's 40 Gigabit Ethernet PCI Express Time Stamping server adapter unique architecture leverages capabilities of a standard Intel controller to enable time stamping of every packet in wire speed.

The Silicom's 40 Gigabit Ethernet PCI Express Time Stamping server adapter offers the simplest integration into any monitoring device due to the use of the standard Intel XL710 Network controller with all its features as a leading controller in the market, with the addition of the time stamp capabilities added to it and with the DNA accelerating driver for Monitoring applications.

##### Key Features

###### Key Features:

- On board hardware Time Stamp Engine insertion for every received packet
- On board precision OCXO oscillator of 25MHz / 0.1PPM
- 4nS time stamp resolution
- UTC format via synchronization to host OS: GPS or PTP1588v2
- Micro USB connector in front of the card for input external 1PPS clock source and output 1PSS clock
- MCX connectors on board input and output 1PPS clock for chain connections from/to other server adapter
- Based on a standard Intel MAC controller using all its features
- Based on NTOP/Silicom DNA acceleration driver
- Supports line rate packet processing for any packet size
- Supports Hardware based merged mode
- Supports packet re-ordering utilized by the DNA driver



- Supports merged or independent mode done by DMA driver
- In merged mode, received packets from both ports are inserted into a single DMA host buffer in the order in which they were received, done with DMA driver
- Supports Intel XL710 MAC controller features without any limitation
- Supports PTP1588v2 synchronization via Intel WGI210AT Ethernet Controller
- SHPK software uses time stamp data in order to provide time information descriptor for upper application use
- Supports full 64 bit Time Stamp mode
- Thermal sensors monitors on board

#### **SFP+ 10Gigabit Ethernet:**

- -SR: Fiber 10 Gigabit Ethernet 10GBASE-SR
  - 10BASE-SR with 10Gigabit 850nm Small form Factor Pluggable (SFP+)
- -LR: Fiber 10 Gigabit Ethernet 10GBASE-LR
  - 10BASE-LR with 10Gigabit 1310nm Small form Factor Pluggable (SFP+)

#### **Host Interface:**

- Support PCI Express Base Specification 3.0 (8GT/s) X8 lanes

#### **Copper Gigabit Ethernet 1000Base-T (PTP port):**

- Support 100m CAT-5 Ethernet cable
- RJ-45 Connector integrated magnetics with LEDs
- Auto MDI-X feature

#### **Performance Features:**

- IPv4 and IPv6 Supports for IP/TCP and IP/UDP Receive Checksum offload
- Fragmented UDP checksum offload for Packet Reassembly
- CPU utilization- the XL710 supports reduction in CPU utilization, mainly by supporting Receive Side Coalescing (RSC)
- Support for 128 virtual machine Device Queues (VMDq) per port
- Support Direct Cache Access (DCA)
- Priority Flow Control (draft IEEE 802.1Qbb)
- Enhanced Transmission Selection (draft IEEE802.1az)
- Supports Virtual Ethernet Bridge (EVB) as defined in the IEEE P802.1Qbg specification
- Advanced memory architecture reduces latency by preceding Transmit Segmentation Offload (TSO) packets. A TSO packet may be interleaved with other packets going to the wire
- Minimized device I/O interrupts using MSI and MSI-X

- Offload of TCP/IP/UDP checksum calculation and TCP segmentation
- Large on chip receive packet buffer (968 KB)
- Statistics Reports: Physical Ports, Virtual Switch elements, FCoE statistics are collected per PCI function, RFC2863
- Configurable Packet Filtering
- Hardware Queue Pairs – Up to 1.5K (non-RDMA); up to 256K (RDMA)
- 1PPS Clock recovery
- HW and SW Time Stamp Compensation engine

#### LAN Features:

- IEEE 802.x flow control support
- IEEE 802.1q VLAN tagging support
- L2 Tag Handling and Software Based Tag Insertion
- IEEE 802.1p layer 2 priority encoding
- Jumbo Frame (up to 9.5KB)
- RFC2819 RMON MIB statistics
- TCP Segmentation Offload Up to 256KB
- Transmit L3 and L4 Integrity Offload
- Ethernet CRC Insertion and Striping

## Technical Specifications

SFP+ 10Gigabit Ethernet Technical Specifications Adapters	
<b>SFP+ (Small Form Factor Pluggable) supports:</b>	SFI interfaces supports 10GBase-R PCS and 10 Gigabit PMA in order to connect with SFP+ to 10GBase-SR/LR
<b>10GBase-SR SFP+: IEEE Standard / Network topology</b>	Fiber 10Gigabit Ethernet, 10GBASE-SR (850nm LAN PHY)
<b>10GBase-SR SFP+: Data Transfer Rate :</b>	10.3125GBd
<b>10GBase-SR SFP+: Cables and Operating distance Up to</b>	62.5um, 160MHz/Km 26m 62.5um, (OM1)200MHz/Km 33m 50um, 400MHz/Km 66m 50um, (OM2)500 MHz/Km 82m 50um, (OM3)2000MHz/Km 300m

<b>10GSFP+Cu :</b> <b>IEEE Standard / Network topology</b>	Copper 10Gigabit Ethernet, 10GSFP+Cu (Direct Attach)
<b>10GSFP+Cu :</b> <b>Cables and Operating distance Up to</b>	10m
<b>10GBase-LR SFP+:</b> <b>IEEE Standard / Network topology</b>	Fiber 10Gigabit Ethernet, 10GBASE-LR (1310nm LAN PHY)
<b>10GBase-LR SFP+:</b> <b>Data Transfer Rate:</b>	10.3125GBd
<b>10GBase-LR SFP+:</b> <b>Cables and Operating distance Up to</b>	Single-Mode: 10000m at 9um
<b>– SR: Fiber 10GBASE-SR Ethernet Technical Specifications</b>	
<b>Output Transmit Power:</b>	Typical: -2.39 dBm Minimum: -5 dBm
<b>Optical Receive Sensitivity:</b>	Typical: -14.32 dBm Maximum: -11.1 dBm
<b>Maximum Input Power:</b>	Maximum: +0.5dBm
<b>– LR: Fiber 10GBASE-LR Ethernet Technical Specifications</b>	
<b>Output Transmit Power:</b>	Typical: -1.77 dBm Minimum: -8.2 dBm
<b>Optical Receive Sensitivity:</b>	Typical: -17 dBm Maximum: -12.5 dBm
<b>Maximum Input Power:</b>	Maximum: +0.5dBm
<b>Copper Gigabit Ethernet Technical Specifications (PTP Port)</b>	
<b>IEEE Standard / Network topology</b>	Gigabit Ethernet, 1000Base-T Fast Ethernet, 100Base-TX Ethernet, 10Base-T

<b>Full duplex / Simplex</b>	Support both Simplex & Full duplex operation in all operating speeds
<b>Auto negotiation</b>	Auto-negotiation between Full duplex and simplex operations and between 10Mb/s 100Mb/s speeds and duplex 1000Mb/s
<b>Data Transfer Rate</b>	1000 Mb/s, 100 Mb/s and 10 Mb/sec in simplex mode. 2000Mb/s 200 and 20 Mb/s in full duplex mode
<b>Cables and Operating distance</b>	10Base-T Category 3, 4, or 5 maximum 100m 100Base-Tx Category 5 maximum 100m 1000Base-T Category 5E maximum 100m
<b>Operating Systems Support</b>	
<b>Operating system support:</b>	Linux FreeBSD Windows
<b>General Technical Specifications</b>	
<b>Interface Standard:</b>	PCI-Express Base Specification Revision 3.0 (5GT/s)
<b>Board Size:</b>	Standard height : 241.3 x 111.15mm (9.5" x 4.376")
<b>PCI Express Card Type:</b>	X8 Lane
<b>PCI Express Voltage</b>	+12V +/- 8
<b>PCI Connector:</b>	X8 Lane
<b>Controller:</b>	Intel FTX710AM1, Intel WGI210AT
<b>Holder:</b>	Metal Bracket
<b>Power Consumption (PE310G4TSF4I71-SR):</b>	32.1W 2.675A at 12V: Typical, all ports operate at 10Gb/s. 24.5W 2.040A at 12V: Typical, No link
<b>Power Consumption (PE310G4TSF4I71-LR):</b>	32.4W 2.7A at 12V: Typical, all ports operate at 10Gb/s. 27.38W 2.282A at 12V: Typical, No link
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 50°C (32°F – 122°F)

<b>Storage:</b>	-40°C–65°C (-40°F–149°F)
<b>EMC Certifications:</b>	<p>FCC Part 15, Subpart B Class A</p> <p>Conducted Emissions</p> <p>Radiated Emissions</p> <p>CE EN 55022: 1998 Class A Amendments A1: 2000; A2: 2003</p> <p>Conducted Emissions</p> <p>Radiated Emissions</p> <p>CE EN 55024: 1998 Amendments A1: 2000; A2: 2003</p> <p>Immunity for ITE Amendment A1: 2001</p> <p>CE EN 61000-3-2 2000, Class A</p> <p>Harmonic Current Emissions</p> <p>CE EN 61000 3-3 1995, Amendment A1: 2001</p> <p>Voltage Fluctuations and Flicker</p> <p>CE IEC 6100-4-2: 1995</p> <p>ESD Air Discharge 8kV. Contact Discharge 4kV.</p> <p>CE IEC 6100-4-3:1995</p> <p>Radiated Immunity (80-1000Mhz), 3V/m 80% A.M. by 1kHz</p> <p>CE IEC 6100-4-4:1995</p> <p>EFT/B: Immunity to electrical fast transients 1kV Power</p> <p>Leads, 0.5Kv Signals Leads</p> <p>CE IEC 6100-4-5:1995</p> <p>Immunity to conductive surges COM Mode; 2kV,</p> <p>Dif. Mode 1kV</p> <p>CE IEC 6100-4-6:1996</p> <p>Conducted immunity (0.15-80 MHz) 3VRMS 80% A.M.</p> <p>By 1kHz</p> <p>CE IEC 6100-4-11:1994</p> <p>Voltage Dips and Short Interruptions</p> <p>V reduc &gt;95%, 30% &gt;95% Duration 0.5per, 25per, 250per</p>
<b>LEDs</b>	
<b>LEDs:</b>	<p>SFP+ Ports:</p> <p>Two LEDs per port.</p> <p>Link /ACT: Turns on link, blinks on activity (Green).</p> <p>Link Speed: Turns on for 10Gbps speed (Blue).</p> <p>PTP Port (RJ-45):</p> <p>Two LEDs.</p> <p>Link/ACT: Turns on link, blinks on activity (Green).</p> <p>Speed: Turns on 100 Mbit/s link (Green).</p> <p>Turns on 1000 Mbit/s link (Yellow)</p>
<b>LEDs location:</b>	<p>SFP+ Ports :</p> <p>LEDs are located on the PCB, visible through light pipes above the SFP+ cage. (See Appendix</p>

	<p>A)</p> <p>PTP Port (RJ-45):</p> <p>Integrated LEDs in RJ-45 connector. (See Appendix A)</p>
<b>Connectors:</b>	<p>(1) Press-fit 1x4 SFP+ cage.</p> <p>(2) On board MCX connectors (1PPS clocks input and output).</p> <p>(1) On Front Metal Bracket Mini-USB connector Type B (1PPS clocks input and output) for cable adapter USB to Female 2xSMA.</p> <p>(1) Shielded RJ-45</p>

## Order Information

P/N	Description	Notes
<b>PE310G4TSF4I71-XR</b>	Quad Port SFP+ 10 Gigabit Ethernet PCI Express Adapter Time Stamp Server Adapter	<p>X8 Gen3, Based on Intel XL710 w/ Time Stamp Engine</p> <p>with PTP RJ45 GBE, 9.5" length (3/4) , standard height.</p> <p>Support Direct Attached Copper cable, Support Silicom SFP+ approved transceiver.</p> <p>RoHS compliant</p>
<b>PE310G4TSF4I71-SR</b>	Quad Port Fiber (SR) 10 Gigabit Ethernet PCI Express Time Stamp Server Adapter	<p>X8 Gen3, Based on Intel XL710 w/ Time Stamp Engine</p> <p>with PTP RJ45 GBE, 9.5" length (3/4) , standard height</p> <p>on board support for Fiber SR. RoHS compliant</p>
<b>PE310G4TSF4I71-LR</b>	Quad Port Fiber (LR) 10 Gigabit Ethernet PCI Express Time Stamp Server Adapter	<p>X8 Gen3, Based on Intel XL710 w/ Time Stamp Engine,</p> <p>with PTP RJ45 GBE, 9.5" length (3/4) , standard height</p> <p>on board support for Fiber LR. RoHS compliant</p>