Silicom Connectivity Solutions

PE425G4TSi81L TimeSync Card

25Gigabit Ethernet TimeSync PCI Express Gen4 Server Adapter

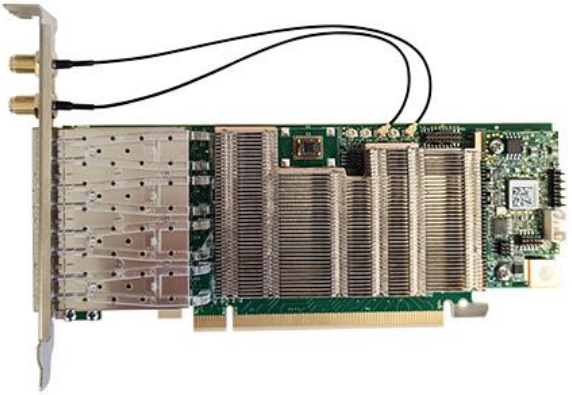
Product Description

STS
Silicom Time Sync
Technology

Silicom's Time Sync (STS) PE425G4TSi81L is a 25 Gigabit Ethernet PCI Express Gen4 TimeSync server adapter, designed for X86 Servers and high-end appliances.
The 25 Gigabit Ethernet TimeSync PCIe server adapter is based on Intel E810 chipset and best in the industry timing solution targeting 5G/ Class C wireless base station and carrier-grade systems.
Silicom's STS1 Support 4 port of 10G/25G capabilities to synchronize host system with external clock source using 1PPS and 10MHz. The STS1 TimeSync server adapter support both 1588v2/PTP and SyncE for high clock accuracy in Master and Slave mode. STS1 design is meeting O-RAN requirements for LLS-C1, LLS-C2 and LLS-C3, modes of operations with both Boundary and Transparent clocks.

Silicom STS line card for 4G and 5G NIC enable real-time data transmission with high timing accuracy at the lowest cost to power 5G DRAN and CRAN edge deployments:

- Support 1588/PTP over IPv4 / IPV6, IEEE1588v2
- Support SyncE /ITU-T G.8262
- T-BC/T-TSC Boundary Clock and TSC Slave Clock /G.8273.2
- T-GM Grand Master /G.8273.1 per G.8275.1 PTP Profile
- PRTC Primary Reference Time Clock Class B/G.8272
- T-TC Transparent Clock /G.8273.3
- 1588 Software Stack and Servo Software in x86



Key Features

TymeSync:

- Supports PTP Clock Grand Master* (GM) G.8273.1 Boundary Clock (T-BC) and Slave T-TSC G.8273.2
- PTP over IPv4 (IEEE-1588v2) / SyncE
- One step clock mode operation for PTP Master
- 10Mhz and 1PPS output for measurement purpose
- Full HW and SW TimeSync solution based on industry leading DPLL, Servo stack and PTP1588
- Incorporated accurate OCXO +/-10ppb to keep Long-term Holdover over 4h without physical layer assist < 25us
- Option for larger OCXO, +/-5ppb to keep Holdover over 4h < 3.5us
- Based on Three DPLL channels
    - Packet and physical-layer frequency, phase and time synchronization
    - Physical-layer compliance ITU-T G.8262, G.8262., G.813, G.812, Telcordia GR-1244. GR-253
    - Packet-timing compliance with ITU-T G.8261, G.8263, G.8273.2, G.8273.2 (class A, B &C), G.8273.4
    - Enable 5G/Class C wireless application with sub 10nS time/ phase alignment requirements

LAN and Virtualization Features:

- SR-IOV (Single Root I/O Virtualization): up to 256 Virtual Functions
- Support for standard and custom network headers
- Partially Programmable Pipeline and Advanced Traffic Steering
- Intel® Ethernet Flow Director – 8000 On-Die perfect match filters
- 1536 queues/Physical Function (PF), >64 RSS/PF and 256 VMDq/PF

Technical Information

PTP profiles support:	
Profile: IEEE-1588 (2008) Annex-J.3 Delay Request-Respond Default Profile	Ordinary Clock – Server Ordinary Clock- Client (including slave only OC) Boundary Clock
Profile: IEEE-1588 (2008) Annex-J.4 Peer-to-Peer	Ordinary Clock – Server Ordinary Clock- Client (including slave only OC) Boundary Clock
Profile: ITU-T G.8265.1 Telecom Profile for Frequency Synchronization	Telecom Grandmaster Telecom Slave

Profile: ITU-T G.8275.1 PTP Telecom Profile for Phase with Full timing Support	Telecom Grandmaster (T-GM) Telecom Boundary Clock (T-BC) Telecom Time Slave Clock (T-TSC)
Profile: ITU-T G.8275.2 PTP Telecom Profile for Phase with Partial timing Support	Telecom Grandmaster (T-GM) Assisted / Partial Telecom Boundary Clock (T-BC) Assisted / Partial Telecom Time Slave Clock (T-TSC)
Device Types:	Ordinary Clock Boundary Clock
References Selection:	Default BMCA (Best Master Clock Algorithm) Alternate BMCA based on ITU G.781 – Synchronization layer functions for frequency synchronization based on the physical layer
Transport Mappings:	PTP/UDP/IPv4 Annex D PTP/UDP/IPv6 Annex E PTP/Ethernet Annex F
NIC TS (Time Stamp) granularity	1ns
General Technical Specifications: PE425G4TSi81L-XR	
Interface Standard:	PCI-Express Base Specification Revision 4.0 (16 GTs)
Board Size:	Low profile short add-in card: 167.64mm X 64.39mm (6.6”X 2.535”)
PCI Express Card Type:	x16 Lane
On Board Connector Voltage:	+12V +/-8%
PCI Connector:	Gold Finger: x16 Lane
Controllers:	Intel E810-CAM1
DPLL:	1588 / SyncE
OCXO:	Default option for low requirements to holdover performance: Vectron, OX-601, 20MHz 10ppb 7.4 x 9.6 x 4.1 mm For improved holdover: Vectron OX-401, 20MHz 5ppb 20.7 x 13.1 x 8.5 mm

Holdover:	Long-term Transient Response (Holdover) performance, without physical layer assist, in 50 +/- 10°C TA: For OX-4011, expected 3.5us TE over 4 hours For OX-6011, expected 25us TE over 4 hour
1588/ SyncE PHY:	BCM81385
Holder:	Metal Bracket
Weight:	242 gr.
Power Consumption:	Typical, 25G-SR: (with full network load, all ports) : 2.9A @12V, 34.8W Typical 10G-LR: (with full network load, all ports): 3.02@ 12V, 36.24W Max: calculated: 45W
Operating Temperature:	0°C – 45°C (32°F – 113°F)
Air Flow Requirements:	200 LFM (linear ft./min)
Storage:	-40°C–65°C (-40°F–149°F)
Regulation:	Card shall meet CE, FCC Class B, ROHS requirements.
MTBF*:	Environment: GB, Temperature: 40.00 °C,F.R.(FIT): 276.28 , MTBF (hours): 3619520.13 MTBF (years): 413.19.
LEDs	
LEDs:	Each Port has 2 LEDs to indicate link status and speed. Link: Physical link Speed: • Green stay on – physical link on with 25G Speed (Max speed) • Yellow stay on – physical link on with 10G / 1G / 100M (Not max Speed) • Off – physical link off. Link /ACT: Logic Link/Activity, Green • Green stay on – logic link up, no activity • Green blinking – logic link up, activity • Off – logic link off
LEDs location:	LEDs are located on the PCB, visible by light pipe via the metal bracket, above SFP
SFP28 25Gigabit Ethernet Technical Specifications Adapters:	
SFP28 (Small Form Factor Pluggable) supports:	SFI interfaces supports 25GBase-R PCS and 25 Gigabit PMA in order to connect with SFP28 to 25GBase-SR
25GBase-SR SFP28: IEEE Standard / Network topology:	Fiber 25Gigabit Ethernet, 25GBASE-SR (850nM LAN PHY), 25.78125Gbps, Maximum link 100M/OM4/MMF, LC, 0-70C
25GBase-LR SFP28: IEEE Standard / Network topology:	Fiber 25Gigabit Ethernet, 25GBASE-LR (1310nM LAN PHY)

SFP+ 10Gigabit Ethernet Technical Specifications Adapters:	
SFP+ (Small Form Factor Pluggable) supports:	SFI interfaces supports 10GBase-R PCS and 10 Gigabit PMA in order to connect with QSFP to 10GBase-SR/ LR (MPO)
10GBase-SR: IEEE Standard / Network topology:	Fiber 10Gigabit Ethernet, 10GBASE-SR (850nM LAN PHY). 10.3125GBd MMF Multi-Mode fiber
10GBase-LR IEEE Standard / Network topology:	Fiber 10Gigabit Ethernet, 10GBASE-LR (1310nM LAN PHY) 10G.3125GBd (SMF) Single-Mode fiber : 10000m at 9um

Order Information

P/N	Description	Notes
PE425G4TSi81L-XR	Quad Port SFP28 25/10 Gigabit Ethernet PCI Express Server Adapter	x16 Gen4, Low Profile, Based on Intel E810-CAM1
PE425G4TSi81L-ZS	Quad Port Fiber (ZS) 25/10 Gigabit Ethernet PCI Express Server Adapter	x16 Gen4, Low Profile, Based on Intel E810-CAM1