



P425G410G8TS81 TimeSync Card STS4

12 Ports 25/10 Gigabit Ethernet Grand Master, Boundary Clock, Slave Clock, PCIe GEN4 TimeSync card

Product Description

5G Open RAN solutions rely on stringent time synchronization requirements for end-to-end latency and jitter. Timing synchronization has become a critical capability and now is fully available on COTS hardware using specific NICs with time synchronization support.

5G requires support of time synchronization accuracy across the whole network below 3 microseconds for Time-Division Duplex (TDD) carriers, and even more stringent when using MIMO or Carrier Aggregation. Contrary to non-Open RAN technologies, Frequency Division Duplex (FDD) carriers also require stringent synchronization to sustain eCPRI-based fronthaul interface. Silicom announce today a new STS4 card with 12 ports 10/25G to ensure time precision on COTS hardware using PCIe NIC with Synchronous Ethernet (SyncE) and IEEE 1588v2 Precision Time Protocol (PTP). This breakthrough opens the 5G market to any COTS (Commercial of the Shelf Server) vendor to become a based station provider.

Silicom's STS4 capable to synchronize host system with external clock source using 1PPS and 10MHz. The STS TimeSync server adapter support both 1588v2/PTP and SyncE for high clock accuracy in Master and Slave mode. STS4 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



STS
Silicom Time Sync
Technology

Key Features

GM/TimeSync:

- Supports Grand Master clock per G.8275.1 Class-A PRTC/T-GM
- Supports Boundary Clock (BC) OC (Master / Slave)
- PTP over IPv4 / IPV6 (IEEE-1588v2) / SyncE
- One step and two step clock modes operation for PTP Master
- 10Mhz and 1PPS programmable output
- Full HW and SW GM/TimeSync solution based on industry leading DPPLL, Servo stack and PTP1588
- Incorporates accurate OCXO
- Incorporates Global Navigation Satellite System (GNSS) receiver
- Packet and physical-layer frequency, phase and Grand Master GM/Time Synchronization
- Enable 5G/Class C wireless application

LAN and Virtualization Features:

- SR-IOV (Single Root I/O Virtualization): up to 256 Virtual Functions
- 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

Silicom Grand Master GM/TimeSync	
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
STS4/ 12 Ports: P425G410G8TS81-XR: General Technical Specifications	
Interface Standard:	PCI-Express Base Specification Revision 4.0 (16 GTs)
Board Size:	Dual slot Standard height add-in card, FHHL: 167.64mm X 111,15 mm (6.6"X 4.376")
PCI Express Card Type:	Electrical 2x8 G4 Bifurcation, Mechanical x16
USB Connector:	PCB4: 4x1 header PCB2: 4x1 header
Voltage:	PCIe +12V +/-8%
Wight	Without transceivers : 440 gr With transceivers : 594 gr
PCI Connector:	Gold Finger: x16 Lane
Controllers:	Intel E810-CAM2 Intel E810-CAM1
1588/ SyncE PHY:	BCM81385 (4x25G) BCM82870 (8x10G)
DPLL:	1588 / SyncE Microchip ZL30793, Skyworks Si5323-C-GM
GNSS:	U-blox, ZED-F9T
OCXO:	OX-2281-EAE-5000-20M000, 20MHz, 2 ppb, A1
Network ports	QSFP28, QSFP+, 4xSFP+
Holder:	Metal Bracket
Power Consumption -XR	For P425G410G8TS81-XR: 39.96W, 3.28A at 12V: Typical No SFP+/QSFP Max: calculated: 60W
Power Consumption -ZS	For P425G410G8TS81-ZS: 47.28W, 3.94A at 12V: Typical full traffic and link on 12 ports Max: calculated: 60W
Operating Temperature	0°C – 45°C (32°F – 113°F)
Air Flow requirements	For 45°C its recommended : 400 LFM for Hot aisle 300 LFM for Cold Aisle See thermal specification for more details

Storage:	-40°C–65°C (-40°F–149°F)
Regulation:	CE, FCC Class A, ROHS requirements
LEDs:	PCB4: Ports 0-3: 4x Green LEDs, one per port: Turns on for Link, Blinks for Activity. Ports 4-7: 4x Green LEDs, one per port: Turns on for Link, Blinks for Activity. Ports 8-11: Option A: 4x Green LEDs, one per port: Turns on for Link, Blinks for Activity. Option B: One Green LED for all 4 ports. Turns on for Link, Blinks for Activity. PCB2: Ports 0-3: 4 x 10 Gbps Green LEDs per port: Turn on Link. Ports 4-7: 4 x 10 Gbps Green LEDs per port: Turn off on Link. Ports 8-11: Turn off at Product Rev 2.40 (will be corrected on future revision)
LEDs location:	Ports 0-3: On Metal Bracket, above 4 SFP+s Ports 4-7: On Metal Bracket, right side of QSFP+ Ports 8-11: On Metal Bracket, right side of QSFP28
QSFP28 25Gigabit Ethernet Technical Specifications Adapters:	
QSFP28 (Small Form Factor Pluggable) supports:	(x4) SFI interfaces supports 25GBase-R PCS and 25 Gigabit PMA in order to connect with QSFP to 25GBase-SR (MPO)
25GBase-SR QSFP: IEEE Standard / Network topology:	Fiber 25Gigabit Ethernet, 25GBASE-SR (850nm LAN PHY). 25.78125GBd MMF Multi-Mode fiber
QSFP+/ SFP+ 10Gigabit Ethernet Technical Specifications Adapters:	
QSFP /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 (MPO)
10GBase-SR: IEEE Standard / Network topology:	Fiber 10Gigabit Ethernet, 10GBASE-SR (850nm LAN PHY). 10.3125GBd MMF Multi-Mode fiber

Order Information

P/N	Description	Notes
P425G410G8TS81-XR	12 Port 25/10 Gigabit Ethernet GM/ TimeSync PCI Express Server Adapter	STS4, x16 Gen4, bifurcation 2x8 G4, FHHL, dual slot
P425G410G8TS81-ZS	8 Port 10 Gigabit (SR) and 4 Port 25 Gigabit (SR) Ethernet GM/ TimeSync PCI Express Server Adapter	STS4, x16 Gen4, (w/ SR transceivers) bifurcation 2x8 G4, FHHL, dual slot