PCI Express PTP Processor
Model TSync-PCIe-PTP

The TSync-PCIe-PTP timing card adds support for precision time protocol (PTPv2 IEEE-1588) to the popular TSync PCI Express timing card. It is a complete timecode reader/generator package for servers and computers to realize sub-microsecond synchronization over the LAN. In slave mode, the PCIe card is a PTP client as known as an “ordinary clock”. It synchronizes to a PTP master and provides precision time-stamping functions to local applications as well as providing precision timing signals to external devices. This provides an alternative to synchronizing with GPS antennas and receivers when a precise network timing protocol is in place.

The TSync-PCIe-PTP can also operate in master mode when connected to a precision timing signal such as IRIG timcode. In this case, the on-board precision oscillator is locked to the external reference and is used to accurately synchronize PTP clients on the network. This function is well-suited for facilities that are migrating from a dedicated timing infrastructure (such as IRIG over coaxial cable) to one that leverages network infrastructure.

The card features all the other timing functions available from Spectracom’s TSync bus-level timing platform. For example it offers industry-leading time-stamp accuracy with ±4 nanosecond resolution and near zero-latency time reads. Time-stamping up to 4 different external events occurs at 5 nanosecond resolution at a rate up to 50 kHz. Additionally 4 programmable time match/frequency outputs are provided. Other features include two unique timecode outputs, multiple programmable square waves or “heartbeats”, multiple programmable “alarm” time match start/stop time outputs, a 10 MHz sine wave output, and 1PPS pulse output.

Key to the TSync functionality is the ability to generate interrupts. Using a Spectracom driver package for the latest version of Linux and Windows, you may configure your card using interrupt-driven algorithms.
PTP Interface

**Master or Slave Operation**
IEEE 1588v2-2008 fully compliant
10/100 Mb Ethernet, RJ45
8 nS (± 4nS) packet timestamping resolution
30nS accuracy (3σ) Master to Slave via crossover cable
1 step or 2 step operation

**Slave Mode**
Outputs IRIG Time codes, frequency, and general purpose outputs and events tagging

**Time Code Input**
**Code Format (AM or DCLS)**
IRIG A, IRIG B, IRIG G, NASA36 (autodetected) IEEE 1344/C37.118 (selectable)

**AM**
Amplitude
500mV p-p min, 10V p-p max

Modulation Ratio
2:1 min, 6:1 max

Input Impedance
>10K Ohms

Common Mode Voltage
±150V DC max

Input Stability
Better than 100 ppm

**DCLS (Differential or Single Ended)**
**Differential Amplitude**
200mV p-p min, 5V p-p max
±7V DC max common mode voltage (RS-485 compatible)

**Single Ended Amplitude**
+1.3V $V_i$ min, ±1V $V_i$ max (TTL compatible)

**DCLS (Differential or Single Ended)**
**Differential Amplitude**
1.5V p-p min, 3.3V p-p max
±1V $V_i$ min, +1.8V $V_i$ max common mode voltage (RS-485 compatible)

**Single Ended Amplitude**
(100 Ohm load)
+0.5V $V_i$ max, ±1.2V $V_i$ min

**Disciplined On-Board Clock**
Frequency
200 MHz

Resolution
5ns

Sync Sources
PTP, IRIG time code, 1PPS input

**Sine Output**
Frequency
10 MHz

Amplitude (50 Ohm load)
+13dBm, +3/-1dB

**Phase Noise (25C ambient)**
TCXO:
-110 dBc/Hz > 100 Hz
-135 dBc/Hz > 1 kHz
-140 dBc/Hz > 10 kHz

OCXO:
-85 dBc/Hz > 1 Hz
-110 dBc/Hz > 10 Hz
-120 dBc/Hz > 100 Hz
-140 dBc/Hz > 1 kHz
-150 dBc/Hz > 10 kHz
-150 dBc/Hz > 100 kHz

**Rate Stability**
Standard TCXO:
2.0E-7 short term “tracking”
1.0E-6 long term “loss of reference”

Optional OCXO:
2.0E-9 short term “tracking”
5.0E-8 long term “loss of reference”

**General Output (x4)**
**Periodic Output**
**Amplitude**
+0.55V $V_O$ max, +2.2V $V_O$ min
(TTL compatible)

**Frequency Range**
100ns min, 1s max in 5ns steps
(10 MHz–1 Hz)

Pulse Width (periodic dependent)
50ns max, 999ns max in 5ns steps

Polarity (selectable)
Positive or Negative

**Time-Match/Alarm Output**
Amplitude
+0.55V $V_O$ max, +2.2V $V_O$ min
(TTL compatible)

Range
100 days 5ns steps

**General**
Form Factor
Low-profile PCIe x1 board with connector on full-height mounting bracket

Power
+3.3V DC ±5% @ 0.7A typ
+12V DC ±8% @ 0.2A typ

Operating Temperature
-5° to +70°C (-23° to +158°F)

Storage Temperature
-40° to +85°C (-40° to +185°F)

**Drivers**
Linux* 64/32 bit, Windows 64/32 bit included
*Contact Sales for specific kernel versions.

**Agency Approval**
RoHS

**Ordering Information**
Model TSync-PCIe-PTP
Includes basic breakout cable for 1 each inputs: IRIG AM/DCLS, 1PPS, and general purpose; and 1 each outputs: IRIG AM and general purpose.

**Options**
Premium Cable Upgrade
Replaces basic breakout cable for all available inputs and outputs

PCle Opt-OCXO
OCXO on-board oscillator for extended holdover

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