PCI Express PTP Processor
Model TSync-PCIe-PTP

- ±4 nS resolution PTP packet time-stamping
- PCIe x1 Local Bus Operation
- Master/Slave Operation PTPv2 (IEEE-1588-2008)
- Onboard Oscillator for Internal Time-Keeping (OCXO Optional)
- Many Other Timing Functions (IRIG, 1PPS, Frequency, Event Capture, Heartbeats, Alarms/Time Match)

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

Master Mode
IRIG, 1ppS or other Time Code Input
Capacity: >512 Syncs/sec
dependent on number of slaves

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
(audetect) 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 Vi min, +2V Vi max (TTL compatible)

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”

1PPS Sync Input
Amplitude
+0.8V Vi min, +2V Vi max
(TTL compatible)
Polarity
Positive
Pulse Width
100ns min

1PPS Output
Amplitude
+0.55V Vo max, +2.2V Vo min
(TTL compatible)

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

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