

**PRELIMINARY**

PCI Express Time Code Processor

Model TSync-PCle-PTP

- **Low-Profile PCIe Form Factor**
- **PCIe x1 Local Bus Operation**
- **Zero Latency Time Reads**
- **8 nS (+4) resolution PTP packet timestamping**
- **Operation as Master or Slave**
- **IRIG AM/DCLS Time Code Inputs or Outputs**
- **1PPS Input or Output**
- **Multiple External Event Time Capture/Interrupt**
- **Programmable Periodic Output/Interrupt (1Hz–10MHz)**
- **Programmable Time Match Output/Interrupt**
- **Optional GPS Synchronization (Grandmaster function)**
- **Optional OCXO Upgrade**
- **CE and RoHS Compliant**

The TSync-PCle-PTP, with optional GPS, is a complete synchronized time code reader/generator package offering flexibility and easy integration of precise timing into an embedded computing application. It supports multiple prioritized timing inputs. When an input is lost, the unit automatically switches to the next input.

The onboard oscillator is phase-locked to a wide variety of external timing signals and provides 5ns resolution to the time keeping hardware. The oscillator also “freewheels” to maintain time accuracy in the absence of a reference. For applications where “holdover” is essential, an ovencontrolled crystal oscillator (OCXO) is available for higher accuracy.

Four user-programmable time tag inputs may be used for multiple event capture at a rate higher than 10,000 events per second. Additionally, four programmable time match/frequency outputs are provided. Other features include two unique time code outputs, multiple programmable squarewaves or “heartbeats,” multiple programmable “alarm” time match start/stop time outputs, a 10 MHz sine wave output, and a 1PPS output.

Key to the TSync functionality is the ability to generate interrupts. Using a Spectracom driver package available for the latest versions of popular operating systems, you may configure your card using interrupt-driven algorithms to support your unique applications.

The TSync-PCle is the first timing board to offer field upgradeability. If you require a timing function after the initial deployment, let us know.



PTP Interface

Master or Slave Operation

IEEE 1588v2-2008 fully compliant
10/100 Mb Ethernet, RJ45
8 nS (+4nS) packet timestamping resolution
+25nS accuracy (3σ) Master to Slave via crossover cable
1 step or 2 step operation

Master Mode

IRIG, 1pps or other Time Code Input
Optional external GPS (Accutime 2000) for Grandmaster mode
Capacity: 100s of slaves at 100 Syncs/sec

Slave Mode

Outputs IRIG Time codes, frequency, and general purpose outputs and events tagging
Increased holdover with optional OCXO

Time Code Input

Code Format (AM or DCLS)

IRIG A, IRIG B, IRIG G, NASA36 (autodetect)

IEEE 1344 (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_{IL} min, +2V V_{IH} max (TTL compatible)

Time Code Output

Code Format (AM or DCLS)

IRIG A, IRIG B, IRIG E, IRIG G, IEEE 1344, NASA36

AM

Amplitude (adjustable)

500mV p-p min, 6V p-p max into 50 ohms

Modulation Ratio

3:1

Output Impedance

50 Ohms

DCLS

Differential Amplitude

1.5V p-p min, 3.3V p-p max

±1.5V min, +1.8V max common mode voltage

(RS-485 compatible)

Single Ended Amplitude (100 Ohm load)

+0.5V V_{OL} max, +2.5V V_{OH} min (TTL compatible)

Disciplined On-Board Clock

Frequency

200 MHz

Resolution

5ns

Sync Sources

PTP, GPS, 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 (GPS Sync)

Standard TCXO:

2.0E-7 short term "tracking"

1.0E-6 long term "loss of satellites"

Optional OCXO:

2.0E-9 short term "tracking"

5.0E-8 long term "loss of satellites"

1PPS Sync Input

Amplitude

+0.8V V_{IL} min, +2V V_{IH} max (TTL compatible)

Polarity

Positive

Pulse Width

100ns min

1PPS Output

Amplitude

+0.55V V_{OL} max, +2.2V V_{OH} min (TTL compatible)

Pulse Width

200ms default

User settable: 100ns min, 999ms max in 5ns steps

Polarity (Selectable)

Positive or negative

General Input (x4)

Event Time-Tag Input

Amplitude

+0.8V V_{IL} min, +2V V_{IH} max (TTL compatible)

Polarity (selectable)

Positive or Negative

Pulse Width

50ns min

Repetition Rate

More than 10,000 events per second

Resolution

5ns

General Output (selectable x4)

Periodic Output

Amplitude

+0.55V V_{OL} max, +2.2V V_{OH} min (TTL compatible)

Period

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

Pulse Width (periodic dependent)

50ns min, 999ms max in 5ns steps

Polarity (selectable)

Positive or Negative

Time-Match/Alarm Output

Amplitude

+0.55V V_{OL} max, +2.2V V_{OH} min (TTL compatible)

Range

100 days 5ns steps

General

Form Factor

Low-profile PCIe x1
Full-height mounting bracket provided

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

*Contact Sales for specific kernel versions.

Agency Approvals

