



Timecode & GPS Reader/Generator

Model TSAT-PCI-U-2



- **PCI local bus operation**
- **PCI-X compatible**
- **Universal PCI bus signaling (3.3V and 5.0V/33 or 66 MHz)**
- **Autodetects IRIG-A, B, or NASA36 time code inputs**
- **GPS synchronization**
- **$\pm 1\mu\text{s}$ accuracy to input**
- **Zero latency time reads**
- **Freewheel capability**
- **IRIG-B timecode generator**
- **External event time capture/interrupt**
- **Programmable frequency output/interrupt**
- **Programmable alarm output/interrupt**



The TSAT-PCI-U-2 is a complete GPS synchronized timecode reader/generator package that includes the GPS receiver and antenna. When configured as a timecode unit, the input timecode format (IRIG-B, IRIG-A, or NASA36) is automatically detected and synchronization to the input timecode is automatic, enabled/disabled through the PCI bus.

The board can synchronize to an external 1PPS in lieu of an incoming timecode. The TSAT-PCI-U-2 provides precise, zero-latency time via the PCI bus on 33 and 66 MHz systems. With a 32-bit data interface, the unit offers better than 1 μs data access. Universal signaling allows the unit to function in either 5.0V or 3.3 volt backplanes.

The 10 MHz oscillator, central to the TSAT-PCI-U-2 timing functions, permits the board to increment time ("freewheel") based on the last known reference in the absence of an input source. When the timing reference is reestablished, the board synchronizes automatically.

The TSAT-PCI-U-2 may be used as an IRIG-B timecode generator. The user simply sets the initial time through the PCI bus. A propagation delay offset may be specified to compensate for cable delays. Other features include multiple event time-tag TTL inputs, a programmable periodic pulse or "heartbeat," and a programmable "alarm" start/stop time output.

Key to the TSAT-PCI-U-2 functionality is the ability to generate interrupts. With one of the many available Spectracom driver packages, the user may configure the card using interrupt-driven algorithms that support our customers' unique applications. The software packages include a demonstration program to exercise the board's functionality, as well as a clock utility to synchronize the host system.



Specifications

Timecode Input

Code Format (Autodetect)

IRIG-A (A132), IRIG-B (B122), NASA36

Amplitude

1.2 Vp-p min, 8.0 Vp-p max

Polarity

Detected Automatically

Modulation Ratio

2:1 min, 3:1 typ, 4:1 max

Input Impedance

>10K Ohms

Input Time Accuracy

Better than 100 ppm
(not suitable for tape playback)

Common Mode voltage

Differential input, ± 100 V max

Timecode Output

Code Format

IRIG-B (B122)

Amplitude

2.6 Vp-p typical

Modulation Ratio

3:1

Output Impedance

600 Ohms

DCLOBNC

FXA

HB1PPS

On-Board Clock

Resolution

1 μ S

Range

366:23:59:59:999999

Date Format

Integer (001–366)

Propagation Delay Correction

–1000 μ S through +8999 μ S

Propagation Delay Setting

Programmed over bus

Synchronization Time

<20 seconds

Stability

Disciplined to timecode: 2×10^{-7}
Undisciplined: 1×10^{-6}

Time-Tag Input

Input Voltage

–0.5 V min, +0.8 V max for logic 0
+2.0 V min, +5.5 V max for logic 1
Tags rising edge

Input Current

<5 mA for logic 0 and logic 1

Rise/Fall Time

500 nS max

Repetition Rate

1000 events per second maximum

Timing Resolution

1 μ SV

Heartbeat Output

Output Voltage

High: 3.8 V min at 6 mA
Low: 0.4 V max at –6 mA

Wave Shape

Pulse or squarewave (programmable)

Pulse Width

150 nS min, 450 nS max

Pulse Polarity

Negative

Squarewave

45% – 55%

Timing

Falling Edge on-time

Range

1.000 μ S to 21.845 mS in 1 μ S steps
(1 MHz to 45.7771 Hz)

Power-on Default Rate

100 PPS (Pulse)

Time Match Output

Output Voltage

High: 3.8 V min at 6 mA
Low: 0.4 V max at –6 mA

Settability

1 μ S

Bus Interface

PCI Local Bus

3.0 compliant
PCI-X compatible
32-bit data interface
better than 1 us data access

General

Size

H 106.7 mm, L 175.26 mm

Power (from bus)

+5 Vdc @ 425 mA max
+12 Vdc @ 225 mA max
–12 Vdc @ 50 mA max

Operating Temperature

–30° to +70° C (–22° to +156° F)

Storage Temperature

–40 to +80 C (–40 to +176 F)

Connectors

BNC and DB-15

GPS Receiver/Antenna

Number of Satellites

12

Acquisition Time

<50 seconds

Reacquisition Time

<2 seconds

Frequency

1575 MHz (receive only)
(L1 band, C/A code [SPS])

Sync to UTC

Within ± 1.0 μ S max

Position

Horizontal: <9 m

Altitude: <18 m

Size

95 mm Dia., 72.5 mm H
(3.74" Dia., 2.85" H)

Pole Mount

1.00" I.D., 14 turns/inch straight
(not tapered)

Operating Temperature

–40° to +85° C (–40° to +185° F)

Storage Temperature

–55° to +105° C (–67° to +221° F)

Antenna Cable

Length

30.5 m ± 0.2 m (100' ± 8 ")

Maximum Length

92 m (300')

Cable Size

9 mm (0.35") O.D.

Connector Size

20 mm (0.79") (antenna end)
46 mm (1.80") (board end and
extension cable)

Agency Approvals



Drivers

Linux* 64/32 bit, Windows 64/32 bit,
Solaris 10
*Contact Sales for specific kernel versions.

Ordering Information

TSAT-PCI-U-2 Timecode & GPS
Reader/Generator (+ option #)

Option

–CC: Conformal Coating

Contact factory for extended GPS cable
length options.

0709-TSAT-PCI-U-2(B)

Specifications subject to change or improvement without notice.
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