



# Timecode & GPS Reader/Generator

Model TSAT-PCI-66U



- 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-66U 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-66U 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  $\mu\text{s}$  data access. Universal signaling allows the unit to function in either 5.0V or 3.3V backplanes.

The 10 MHz oscillator, central to the TSAT-PCI-66U 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-66U 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-66U 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 V<sub>p-p</sub> min, 8.0 V<sub>p-p</sub> 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 V<sub>p-p</sub> typical

#### Modulation Ratio

3:1

#### Output Impedance

600 Ohms

### On-Board Clock

#### Resolution

1 μS

#### Range

366:23:59:59:999999

#### Date Format

Integer (001–366)

#### Propagation Delay Correction

–1000 μS through +8999 μS

#### Propagation Delay Setting

Programmed over bus

#### Synchronization Time

<20 seconds

#### Stability

Disciplined to timecode:  $2 \times 10^{-7}$   
Undisciplined:  $1 \times 10^{-6}$

### 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 μS

### 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 μS to 21.845 mS in 1 μS 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 μS

### Bus Interface

#### PCI Local Bus

3.0 compliant  
PCI-X compatible  
32-bit data interface  
better than 1 μs 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 μS 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-66U Timecode & GPS  
Reader/Generator (+ option #)

### Options

–CC: Conformal Coating

#### TRIM-CAB-D-D-100:

100' extension cable for GPS Antenna

#### GPS Optic Isolator