



## GPS Timing Board

### Model TSAT-PCI



- IRIG-A, IRIG-B, NASA36 timecode reader
- IRIG-B timecode generator
- IRIG-B output
- Time-Tag input
- Programmable periodic output (pulse/squarewave) and interrupt capability
- Programmable start/stop time output and interrupt capability

The TSAT-PCI is a complete GPS synchronized timecode reader/generator system package that includes the GPS Receiver/Antenna (housed in a common enclosure) and a circuit card assembly for the PCI bus.

The board synchronizes its on-board clock to Coordinated Universal Time (UTC). Other features include a time-tag TTL input, a programmable "heartbeat" pulse or squarewave output (with interrupt capability), and a programmable "match" start/stop time output (with interrupt capability).

In the unlikely event that the reception of the satellite signals is lost, the board continues to increment time ("freewheel"). When the signals are re-established, the board resumes synchronization automatically.

The GPS satellites provide Coordinated Universal Time (UTC) accurate to within one microsecond. They also provide position with longitude, latitude, and elevation.

A programmable time offset allows for compensation for cable delays.



## Specifications

### Timecode Input

#### Code Format (Autodetect)

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

#### Amplitude

1.2Vp-p min, 8.0Vp-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,  $\pm 100V$  max

### IRIG-B Output

#### Code Format

IRIG-B (B122)

#### Amplitude (Adjustable)

2.6Vp-p typical

#### Modulation Ratio (Adjustable)

3:1

#### Output Impedance

600 Ohms

### Time-Tag Input

#### Input Voltage

-0.5V min, +0.8V max for logic 0  
+2.0V min, +5.5V 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  $\mu$ S

### Match Output

#### Output Voltage

3.8V min at 6 mA (high)  
0.4V max at -6 mA (low)

#### Stability

1  $\mu$ S

### On-Board Clock

#### Resolution

1  $\mu$ S

#### Range

366:23:59:59:999999

#### Date Format

Integer (001-366)

#### Propagation Delay Correction

-1000  $\mu$ S through +8999  $\mu$ S

#### Propagation Delay Setting

Programmed over bus

#### Synchronization Time

<20 seconds

#### Stability

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

Undisciplined:  $1 \times 10^{-6}$

### Heartbeat Output

#### Output Voltage

3.8V min at 6 mA (high)  
0.4V max at -6 mA (low)

#### 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  $\mu$ S to 21.845 mS in 1  $\mu$ S steps  
(1 MHz to 45.7771 Hz)

#### Power-on Default Rate

100 PPS (Pulse)

### General

#### PCI Local Bus

2.2 compliant

#### Size

H 106.7 mm, L 174.6 mm

#### Power (from bus)

+5Vdc @ 425 mA max

+12Vdc @ 225 mA max

-12Vdc @ 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

8

#### Acquisition Time

5 minutes typ, 15 minutes max (cold start)

#### Re-acquisition

<10 seconds

#### Frequency

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

#### Sync to UTC

Within  $\pm 1.0 \mu$ S max

#### Position

25 m SEP (w/o SA) (82')

#### Altitude

0 m to +18,000 m (0' to 59,055')

#### Size

147 mm Diam, 100 mm H  
(5.8" Diam, 3.9" H)

#### Pole Mount

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

#### Operating Temperature

-30° to +70° C (-22° to +158° F)

#### Storage Temperature

-55° to +100° C (-67° to +212° F)

### Waterproof

Submersion to 1 m

### Salt Fog

MIL-STD-202F, Method 101D, Condition B

### Antenna Cable

#### Length

30.5 m  $\pm 0.2$  m (100'  $\pm 8$ ")

#### 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)

## Ordering Information

### Model TSAT-PCI (+ option #)

### Options

#### -HB1PPS

Extended frequency range for heartbeat output

#### -FXA

RS-422 driver for the heartbeat output  
(includes option -HB1PPS)

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

Extension cable for antenna

#### -GPS Optic Isolator

### Drivers

All major operating systems are supported.