

# TPRO/TSAT-PCMCIA

Version 1.2

## Timecode Reader/Generator with PCMCIA Interface Timecode Reader/Generator with PCMCIA Interface and GPS Timing



The TPRO/TSAT-PCMCIA is a timing solution designed to plug into the PCMCIA port on a laptop computer. The unit attaches easily via a simple cable connection. The unit performs timing and synchronization functions referenced to an input timecode signal, and provides timing information to the application running on your PC. It synchronizes its on-board clock to the incoming timecode. The clock's time is also provided as an IRIG-B output. Other features include a "time-tag" TTL input, a programmable "heartbeat" pulse or squarewave output, and a programmable "match" start/stop time output—and it can generate a user-programmable interrupt to your application at the time of any of these events

In the absence of an input timecode, the unit continues to increment time (i.e., "freewheel"); once the signals are re-established, it resumes synchronization automatically.

The input timecode format (IRIG-B, IRIG-A, or NASA36) is detected automatically. Synchronization to the input timecode

is also automatic and can be enabled/disabled. To compensate for cable delays, a propagation delay offset can be specified. The timecode input is an amplitude modulated sine wave. An automatic gain control (AGC) circuit permits a wide range of input amplitudes. The timecode input is differential; the unit does not reference this signal to ground. A single-ended input (referenced to ground) is also acceptable.

The unit can be ordered with an option (-M) to synchronize to a one-pulse-per-second (1PPS) input instead of an incoming timecode. In this case, the initial time is programmed via the bus, and the board begins counting on the next 1PPS pulse.

### TSAT-PCMCIA

The TSAT-PCMCIA is a complete system package that includes a GPS Receiver/Antenna (housed in a common enclosure).

The unit 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 satellite signals are lost, the unit continues to increment time ("freewheel"). When the signals are re-established, it resumes synchronization automatically.

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

A programmable time offset allows for compensation for cable delays.

## Features

### Common Features

IRIG-B timecode generator

IRIG-A, IRIG-B, and NASA36 timecode reader

Time-Tag input

Programmable periodic output (pulse/squarewave) and interrupt capability

Programmable start/stop timeoutput and interrupt capability

### TPRO-PCMCIA Features

IRIG-A, IRIG-B, NASA36 timecode reader

### TSAT-PCMCIA Features

Complete GPS synchronized timecode reader/generator system

## Ordering Information

**TPRO-PCMCIA**

**TSAT-PCMCIA**

(+ Option Number, see reverse)



## TPRO-PCMCIA 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

Timing Accuracy: Better than 100ppm  
(not suitable for tape playback)

Common Mode Voltage: Differential input,  $\pm 100V$  max

### 1PPS Sync Input (Option -M only)

Input Voltage: 2.4V min, 16.0V max (high)  
(500uA max at 5Vin,  
12mA max at 16Vin)

Rise/Fall Time: 500ns max

Trigger Edge: Rising 1PPS accuracy:  
Must be 100ppm or better

## TSAT-PCMCIA Specifications

### GPS Receiver/Antenna (externally mounted)

No. of Satellites: 8

Acquisition Time: 5 minutes typ, 15 minutes max  
(cold start)

Re-acquisition: <10 seconds

Frequency: 1575MHz (receive only)  
(L1 band, C/A code {SPS})

Sync to UTC: Within  $\pm 1.0$  uS max

Position: 25m SEP (w/o SA) (82 feet)

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

Size: 147mm Diam., 100mm H  
(5.8" Dia, 3.9" H)

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

Operation Temp: -30 to +70 C (-22 to +158 F)

Storage Temp: -55 to +100 C (-67 to +212 F)

Waterproof: Submersion to 1m

Salt Fog: MIL-STD-202F, Method 101D  
Condition B

### Antenna Cable

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

Maximum Length: 92m (300')

Cable Size: 9mm (0.35") O.D.

Connector Size: 20mm (0.79") O.D.  
(*antenna end*)

Industry Standard DB-15  
(*board end & extension cable*)

## Common Specifications

### IRIG-B Output

Code Format: IRIG-B (B122)

Amplitude (mark): 2.6Vp-p (typical)

Modulation Ratio: 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: <5mA for logic 0  
<5mA for logic 1

Rise/Fall Time: 500ns max

Repetition Rate: 1000 events per second max

Timing Resolution: 1uS

### On-board Clock

Resolution: 1uS

Range: 366:23:59:59.999999

Date Format: Integer (001-366)

Propagation Delay

Correction: -1000uS through +8999uS  
(1uS resolution)

Propagation Delay

Setting: Programmed over bus

Synch Time: <20 seconds

### Heartbeat Output

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

Wave Shape: Pulse or Squarewave  
(programmable)

Pulse Width: 150ns min, 450ns max

Pulse Polarity: Negative

Squarewave: 45%-55%

Timing: Falling edge on-time  
(pulse or squarewave)

Range: Standard: 1 uS - 21.845mS  
in 1uS steps  
Option -HB1PPS: 1mS-65.536  
seconds (1kHz-0.0153 millihz)

Power-on Default Rate: 100PPS (pulse)

### Match Output

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

Setability: 1uS

### General

Size: H 106.7mm, L 174.6mm  
(H 4.2", L 6.875")

Power (from bus): +5Vdc @ 425mA max  
+12Vdc @ 225mA max  
-12Vdc @ 50mA max

Operating Temp: 0 to +50C (+32 to +122F)

Storage Temp: -40 to +80C (-40 to +176F)

Connectors: Two BNCs for timecode input  
and output.

DB-15 connector for GPS  
antenna, heartbeat output, match  
output, time-tag input.

Phase Noise: -138dBc/Hz @ 100Hz offset  
-145dBc/Hz @ 1kHz offset  
-149dBc/Hz @ 10kHz offset

## COMMON OPTIONS

### -HB1PPS

1PPS heartbeat output

### -FXB (TPRO-PCI)

### -FXA (TSAT-PCI)

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

### -HDRV

Provides an RS-422 driver for  
the heartbeat output

### -LOR1

Three outputs on three-pin  
header (1MHz, 1PPS, GND)

### -DCLOBNC

Provides a DC shift level output.  
Eliminates the modulated  
IRIG-B output.

## Device Drivers

<b>450-58</b>	LabView
<b>450-59-9x/00/ME</b>	Windows
<b>450-59-NT</b>	Win NT
<b>450-60</b>	Linux
<b>450-61-32B</b>	32-bit Solaris
<b>450-61-64B</b>	64-bit Solaris
<b>450-62</b>	SunOS
<b>450-63</b>	Lynx OS

## TPRO-PCMCIA OPTIONS

### -M

Syncs to 1PPS input instead  
of timecode

## TSAT-PCMCIA OPTIONS

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

100' extension cable for  
GPS antenna

