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
- ±1ms 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 an external 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 μs 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 Orolia 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

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 x 10⁻⁷
Undisciplined: 1 x 10⁻⁶

Time-Tag Input
Input Voltage
~0.5 V min, ~0.8 V max for logic O
+2.0 V min, +5.5 V max for logic 1
Tags rising edge
Input Current
<5 mA for logic O 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 1μS steps
(1 MHz to 45.7771 Hz)
Power-on Default Rate
100 PPS (Pulse)

Time Match Output
Output Voltage
High: 3.8 V mm at 6 mA
Low: 0.4 V max at ~6 mA
Setability
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
CA05R-1515-0050:
50’ extension cable for GPS Antenna/Receiver
GPS Optic Isolator