

GPS Timing Board

Model TSAT-PMC



- Complete GPS-synchronized timecode reader/generator system
- GPS, IRIG-A, IRIG-B, NASA36 timecode reader
- IRIG-B time code generator
- Time-Tag input
- Programmable start/stop time output and interrupt capability
- Freewheel capability
- High-performance, 2.5 ppm oscillator

The TSAT-PMC provides high-accuracy timing functions on a plug-in board for the PMC bus. Its on-board clock is kept in sync to an external timecode input; the clock's time is also supplied as an IRIG-B output. The clock provides several timing functions, including a programmable periodic pulse rate output ("heartbeat"), a programmable start/stop output ("match"), a selectable frequency output ("oscillator out" at 1 kHz, 1, 5, or 10 MHz), and a timestamping input ("time-tag").

A complete system package, the TSAT-PMC includes an externally-mounted GPS antenna, a 100-foot cable to connect the antenna to the board, and a circuit card assembly for the bus. It automatically syncs its on-board clock to the time transmitted by GPS satellites, which provide continuous time and position information accurate to within one microsecond, and available anywhere in the world. The board outputs a timecode signal, in IRIG-B format, that conveys the day, hours, minutes, and seconds. It also has a 1 kHz carrier referenced to the on-board oscillator.

The TSAT-PMC can be used as a stand-alone timecode generator. The computer programs the day, hour, minute, and second. The board continues to count from that time, using the on-board oscillator as the timebase reference. This is called "freewheeling."



Specifications

Timecode Input

Code Format (Autodetect)
IRIG-A (A132), IRIG-B (B122),
NASA36

Amplitude

1.2 V_{p-p} min, 8.0 V_{p-p} max (IRIG B)

Polarity

Detected automatically

Modulation Ratio

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

Input Impedance

>10K Ohms

Input Time Accuracy

Better than 25 ppm
(not suitable for tape playback)

Common Mode Voltage

Differential input, ±100 V max

Timecode Output

Code Format

IRIG-B (B122)

Amplitude (Adjustable)

4.0 V_{p-p} typical (0 V–20 V_{p-p})
into ≥ 600 Ohm load

Modulation Ratio (Adjustable)

3:1

Output Impedance

50 Ohms

Settability

1 μS

On-Board Clock

Resolution

1 μS

Range

366:23:59:59:999999

Propagation Delay Correction

–999 μS through +999 μS
(1 μS resolution)

Stability

Disciplined to timecode: 2 x 10⁻⁷
Undisciplined: 1 x 10⁻⁶

Accuracy

1 μS max

Oscillator Output

Frequency

1 kHz, 1 MHz, 5 MHz, 10 MHz
or Off (software selectable)

Type

RS-422

Differential Output Voltage

2.5 V_{p-p} (1 MHz)
1.8 V_{p-p} (10MHz) into 120 Ohms

Timebase Accuracy

Same as on-board clock

Time-Tag Input

Input Voltage

–0.1 V min, +0.4 V max for logic 0
+2.2 V min, +5.1 V max for logic 1
Tags rising edge

Input Current

–600 μA for logic 0
100 μA for logic 1

Rise/Fall Time

150 nS max

Repetition Rate

2000 events per second maximum

Timing Resolution

1 μS

Heartbeat Output

Output Voltage

High: 2.4 V min at 2.5 mA
Low: 0.4 V max at –2.5 mA

Wave Shape

Pulse

Pulse Width

100 nS, 330 nS, 1 μS, 1 ms

Pulse Polarity

Software selectable

Range

200 nS to 65.5 seconds

Power-on Default Rate

Off

Match Input

Output Voltage

High: 3.8 V min at 6 mA
Low: 0.3 V max at –6 mA

Settability

1 μS

In-Sync Flag Output

Type

Open Collector
External Pullup

Voltage

+27 VDC max

Current

–20 mA max

Polarity

Conducts to ground when board is
synced to GPS or timecode.

Bus Interface

Interface

PICMG 2.0 compliant

I/O Address

64 bytes

General

Size

(H) 74 mm x (L) 149 mm
(2.91" x 5.87")

Power (from cPCI bus)

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

Operating Temperature

5° to +50° C (41° to +122° F)

Storage Temperature

–40° to +85° C (–40° to +185° F)

Connectors

Timing: Micro-D25
GPS Antenna: Micro-D15

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)

Drivers

Major operating systems are sup-
ported.

Ordering Information

Model TSAT-PMC (+ option #)

Options

TRIM-CAB-D-D-100

100' extension cable for GPS
antenna

GPS Optic Isolator