

Multi-function Timecode Reader/Generator



The TPRO-S performs timing and synchronization functions referenced to an input timecode signal. The board synchronizes its on-board clock to the incoming timecode. The on-board clock's time is also provided as an IRIG-B output. An input is provided to time-tag external events.

The board continues to increment time ("freewheel") in the absence of an input timecode. Thus, the board can be used as an IRIG-B timecode generator by setting the initial time via the bus.

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 via software. A propagation delay offset can be specified to compensate for any delays.

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 board does not reference this signal to ground. A single-ended input (referenced to ground) is also acceptable.

The board can be ordered with 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 1 PPS pulse.

Features

IRIG-A, IRIG-B, NASA36 timecode reader

IRIG-B timecode generator

Time-Tag input

Ordering Information

Model TPRO-S (+ option #)

Options

-M

Sync to external 1 PPS

- HB1PPS

Extended Frequency Range for Heartbeat Output

Drivers

All major operating systems are supported.



Model TPRO-S

Multi-function, User-programmable

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 max

Timing Resolution
1 μ S

General

Size
L 150 mm, W 84 mm, H 21 mm

Power (from bus)
+5Vdc @ 0.4 Amps max
+12Vdc @ 100 mA max
-12Vdc @ 20 mA max

Operating Temperature
-30 to +70 C (-22 to +156 F)

Storage Temperature
-40 to +80 C (-40 to +176 F)

Connectors

BNCs for timecode input and output;
DB-15 (socket) for timecode input and
output, heartbeat output, match output,
time-tag input, and 1 PPS input

On-board Clock

Resolution
1 μ S

Range
366:23:59:59:999999

Date Format
Integer (001-366)

Propagation Delay Correction
-1000 μ S through +8999 μ S

Propagation Delay Setting
Programmable

Synchronization Time
<20 seconds

Stability
Disciplined to timecode: 2×10^{-7}
Undisciplined: 1×10^{-6}

S-Bus Interface

Offset 8000
Time (lower 32 bits)

Offset 8004
Time (upper 32 bits)

Offset 8008
Command register

Offset 8009
Software event trigger

Offset 800A
FIFO (read only)

Offset 800B
Status register

Offset 800C
(reserved)

Offset 800D
Software reset

Offset 800E
(reserved)

Time Between Accesses
100 μ S min

Necessary Accesses
2 (read time, 32-bit mode)
14 (read time, 8-bit FIFO mode)
12 (read time-tag, 8-bit FIFO mode)
11 (set time)

1PPS Sync Input (Option -M only)

Input Voltage
2.4V min, 16.0V max (high);
(500 μ A max at 5V_{in}, 12mA max at 16V_{in})

-15V min, +0.8V max (low)
(500 μ A max at 0.0V_{in})

Rise/Fall Time
500nS max

Trigger Edge
Rising

1PPS Accuracy
Must be 100ppm or better

