

# Model TPRO-cPCI

Version 1.3

## Timecode Reader/Generator Board



The TPRO-cPCI provides high-accuracy timing functions on a plug-in board for the CompactPCI computer bus. The board has an on-board clock, which is kept in sync to an external timecode input. Several timing functions are derived from the on-board clock, including a programmable periodic pulse rate output ("heartbeat"), a programmable start/stop output ("match"), a selectable frequency output ("oscillator out", 1KHz, 1, 5, or 10MHz), and a time-stamping input ("time-tag").

The TPRO-cPCI obtains time from an input timecode, which can be formatted as IRIG-A, IRIG-B or NASA36. The board automatically detects which format is being used. Timing accuracy is the same regardless of the format. The timecode conveys the day, hour, minute, and second. The on-board 10MHz oscillator is disciplined to maintain a 1 microsecond accuracy. The board's IRIG-B timecode output is in-sync with the incoming timecode.

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

The host computer communicates to the board through a set of memory-mapped registers. When the computer boots up, the board identifies itself to the CompactPCI bus by specifying the unique Subsystem Vendor ID. The host computer can then read the instantaneous time, and command the board to set time, and/or to provide an interrupt at a periodic rate, at a specified time, and/or when a time-tag event occurs.

### Features

- IRIG-B timecode generator
- IRIG-A, IRIG-B, NASA36 timecode reader
- Freewheel capability
- Time-tag Input
- Programmable start/stop time output and interrupt capability
- Freewheel capability
- High-performance, 2.5ppm oscillator

### Ordering Information

Model TPRO-cPCI (+ option #)

### Options

#### Drivers

All major Operating Systems are supported.



# Model TPRO-cPCI

Accurate, 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

### Timing Accuracy

Better than 100ppm  
(not suitable for tape playback)

### Common Mode Voltage

Differential input,  $\pm 100V$  max

### Timecode Output

Code Format (Autodetect)  
IRIG-B (B122)

### Amplitude (Adjustable)

4.0Vp-p typical (0V-20Vp-p)

### Modulation Ratio (Adjustable)

3:1

### Output Impedance

600 Ohms

### Time-tag Input

#### Input Voltage

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

#### Input Current

-600mA for logic 0, 100mA for logic 1

#### Rise/Fall Time

150 nS max

#### Repetition Rate

2000 events per second max

#### Timing Resolution

1  $\mu$ S

### On-board Clock

#### Resolution

1  $\mu$ S

#### Range

366:23:59:59:999999

#### Programmable Delay

-999  $\mu$ S through +999  $\mu$ S  
(1  $\mu$ S resolution)

#### Stability

Disciplined to timecode:  $2 \times 10^{-7}$   
Undisciplined:  $1 \times 10^{-6}$

### Heartbeat Output

#### Output Voltage

2.4V min at 2.5 mA (high)  
0.4V max at -2.5 mA (low)

#### Wave Shape

Pulse

#### Pulse Width

100 nS, 330 nS, 1  $\mu$ S, 1 mS

#### Pulse Polarity

Software Selectable

#### Range

200 nS to 65.5 seconds

#### Power-on default rate

Off

### Oscillator Output

#### Frequency

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

#### Type

RS-422

#### Differential Output Voltage

2.5Vp-p (1MHz),  
1.8Vp-p (10MHz)  
into 120 Ohms

#### Timebase Accuracy

same as clock

### Match Output

#### Output Voltage

3.8V min at 6 mA (high)  
0.3V max at -6 mA (low)

#### Setability

1  $\mu$ S

### In-Sync Flag Output

#### Type

Open Collector  
External Pullup

#### Voltage

-27VDC Max

#### Current

-20 mA max

#### Polarity

Conducts to ground when board is  
Synced to GPS or Timecode

### PCI Bus Interface

#### Interface

PICMG 2.0 compliant

#### I/O Address

64 Bytes

### General

#### Size

H 106.7 mm, L 175.6 mm

#### Power (from cPCI bus)

+5Vdc @ 425 mA max  
+1Vdc @ 225 mA max  
-12Vdc @ 50 mA max

#### Operating Temperature

-30 to +75 C (-22 to +167 F) Storage

#### Connectors

BNC & DB-15 depending on input/output

### Phase Noise

-100dBc/Hz @ 10Hz offset

-130dBc/Hz @ 10Hz offset

-145dBc/Hz @ 1kHz offset

-150dBc/Hz @ 10kHz offset

