**Timecode Reader/Generator**

**Model TPRO-cPCI**

- IRIG-A, IRIG-B, NASA36 timecode reader
- IRIG-B timecode generator
- Time-Tag input
- Freewheel capability
- Programmable periodic output (pulse/squarewave) and interrupt capability
- Programmable start/stop time output and interrupt capability
- High-performance, 2.5 ppm oscillator

The TPRO-cPCI provides high-accuracy timing functions on a plug-in board for the Compact PCI 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," 1 kHz, 1, 5, or 10 MHz), 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. An AGC circuit on the time code input accommodates a wide range of input amplitudes. The timecode conveys the day, hour, minute, and second. The on-board 10 MHz oscillator is disciplined to the time code input carrier frequency. 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 Compact PCI 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.
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 25 ppm
- **Common Mode Voltage:** Differential input, ± 100 V max

Timecode Output
- **Code Format (Autodetect):** IRIG-B (B122)
- **Amplitude (Adjustable):** 4.0 Vp-p typical (0 V–20 Vp-p) into >= 600 Ohm load
- **Modulation Ratio (Adjustable):** 3:1
- **Output Impedance:** 50 Ohms

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:** IRIG-A time code: 10 μS max
  IRIG-B, NASA36 time code: 15 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 Vp-p (1 MHz)
  1.8 Vp-p (10 MHz) 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 Output
- **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 time-code.

Bus Interface
- **Interface:** PICMG 2.0 compliant
- **I/O Address:** 64 bytes

General
- **Size:** (H) 100 mm x (L) 160 mm (3.94” x 6.30”)
- **Power (from cPCI bus):**
  - +5 VDC @ 425 mA max
  - +12 VDC @ 225 mA max
  - –12 VDC @ 50 mA max
- **Operating Temperature:**
  - 5º to +50º C (41º to +122º F)
- **Storage Temperature:**
  - –40º to +85º C (–40º to +185º F)
- **Connectors:** DB15 input/output

Drivers
Major operating systems are supported.

Ordering Information
- **Model:** TPRO-cPCI
- **Options**
  - -6U: 6U bracket (no charge)

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