

# Compact PCI Conduction-cooled Timing Controller



- **Ruggedized cPCI timing with GPS receiver**
- **Designed for conduction-cooling**
- **Field-proven internal OCXO clock**
- **High performance under shock, vibration and temperature**
- **Variety of 1PPS and 10 MHz signals via J2**
- **External references: 1PPS, 10 MHz, and NMEA timecode**
- **Customization available**

The compact PCI conduction-cooled timing controller is an example of a semi-custom precision timing board designed to operate in harsh environments. This 3U cPCI card is ruggedized and designed for conduction cooling per ANSI/VITA 30.1-2002.

GPS is used to synchronize an ovenized crystal oscillator (OCXO) to keep timing accurate to Coordinated Universal Time (UTC). The card includes an on-board GPS receiver, but can also accept a NMEA GPS time message from an external source.

Spectracom's industry-leading timing engine provides a stable and reliable timing reference, a comprehensive management system, and a wide variety of input/output functionality. Front panel connections provide synchronization to external 1PPS and 10 MHz signals, as well as a 1PPS output. The J2 connector provides six (6) 1PPS differential signals, three (3) 1PPS LVDS signals, ten (10) 10 MHz differential signals, and three (3) 10 MHz LVDS clocks. Through an extremely flexible software-defined design approach, this board can be supplied to offer other signals and interfaces as is uniquely required by your application.

Drivers for Linux™, Solaris™ and Windows® are included.

## Reference Inputs

### GPS Reference

#### Internal GPS Receiver

- Frequency: L1 (1575.42 MHz)
- Connector: SMB jack (+5V at 55 mA max supplied to power antenna pre-amp – antenna not supplied)
- Satellite Tracking: 1 to 12, GPS T-RAIM satellite error management
- Synchronization Time: cold start < 15 minutes (includes almanac download), warm start < 5 minutes (assumes almanac download)
- Sensitivity: -136 dBm (acquisition), -141 dBm (tracking)
- 1PPS Accuracy (1-sigma): <15 ns (stationary mode), <45 ns (mobile mode)

#### External GPS

NMEA 0183 message (GGA, ZDA, RMC formats) via RS-232 port on J2

### 10 MHz

- Connector: SMA jack
- Input Impedance: 50 ohms
- Level: 0 dBm (0.64 Vp-p)

### 1PPS

- Connector: SMA jack
- Input Impedance: High impedance, 5 pF
- Level: 5V tolerant

## Outputs

### 10 MHz Differential Sine Wave

#### Outputs via J2

**Harmonics:** <-40 dBm

**Spurious:** <-70 dBm

**Phase Noise:** (at 25C ambient)

- 10 Hz offset, < -120 dBc/Hz
- 100 Hz offset, < -135 dBc/Hz
- 1 KHz offset, < -135 dBc/Hz
- 10 KHz offset, < -145 dBc/Hz
- 100 KHz offset, < -145 dBc/Hz

### Ten (10) Differential Pairs:

3.3 Vp-p, 1.5 V common mode

- Impedance: Five (5) 50 ohm transformer coupled, five (5) 120 ohm

### 10 MHz LVDS Clocks via J2

- Three (3) LVDS differential pairs
- Impedance: 100 ohm
- Duty cycle: 50%
- Rise time: <10 ns

### 1PPS Differential Outputs via J2

- Six (6) differential pairs: 3.3 Vp-p, 1.5 V common mode
- Three (3) LVDS differential pairs
- Impedance: 100 ohm
- Pulse width: 1 ms
- Rise time: <10 ns

### 1PPS Output

- One (1) 3.3 V LVCMOS
- Pulse width: 1 ms
- Rise time: <10 ns
- Connector: SMA jack

### External NMEA via J2

Same characteristics as external reference

## General

### Form Factor

**3U Compact PCI (cPCI) Compliant:**  
PCMIG 2.0 r3.0

### Conduction Cooling

- Per ANSI/VITA 30.1-2002
- Thermal frame is available upon request
- Component elevations available for custom thermal frame design

### Power from cPCI bus via J1

- +5 VDC +/-5% @2.75 A
- +3.3 VDC +/-5% @0.75A
- +12VDC +/-8% @0.02A
- -12VDC +/-5% @0.02A

### Environmental Temperature

- Operating: -40° to +80° C (-40° to +176° F) at card edge with conduction cooled frame



Shown with optional thermal frame

- Storage: -40° to +85° C (-40° to +185° F)

### Shock

- Operating: 20g, 11ms, 1/2 sine, 3 hits in each directions in each axis
- Storage: 30g, 11ms, 1/2 sine, 3 hits in each direction in each axis

### Vibration

- Operating: 5Hz to 500Hz at 2g RMS with a maximum peak displacement of 0.75 inch
- Storage: 5Hz to 2000Hz at 5g RMS with a maximum peak displacement of 1 inch

### Low Pressure (Altitude):

40,000 ft in accordance with MIL-STD-810F, Method 500.4

**Humidity:** 95% relative humidity at +60°C for 5 cycles of 48 hours per cycle

### Drivers

Linux\* 64/32 bit, Windows 64/32 bit, Windows Embedded, Solaris 10  
\* Contact sales for specific kernel versions