



# GPS-PCI 2U

## Multi-Function GPS Synchronized, Time and Frequency PCI Plug-in Card

### KEY FEATURES

- 1 Microsecond Accuracy to UTC
- GPS, IRIG A or B or 1 PPS Input
- IRIG B and 1 PPS Outputs
- 1 PPS to 1 MPPS Programmable Rate Synthesizer Output/Interrupt
- 1, 5, 10 MPPS Rate Generator Output/Interrupt
- External Event Input/Interrupt
- Programmable Time Compare Input/Interrupt
- Real Time Clock Backup
- Windows Control Panel Interface Software
- Optional Windows Software Developer's kit
- Zero Latency Time Reads
- 3.3V and 5.0V Universal Signaling

The GPS-PCI 2U provides very precise time to the bus of a PCI-compatible host computer. Time is derived from the GPS satellite system with an accuracy of 1 microsecond to UTC. The GPS-PCI 2U is an ideal master clock solution for synchronizing one or more computers to the UTC time reference.

Time can also be derived from an IRIG A or B time code input or the internal oscillator in the stand-alone generator mode. Synchronization to an external 1 PPS is also possible. The frequency of the internal oscillator is precisely disciplined to that of the external synchronization input.

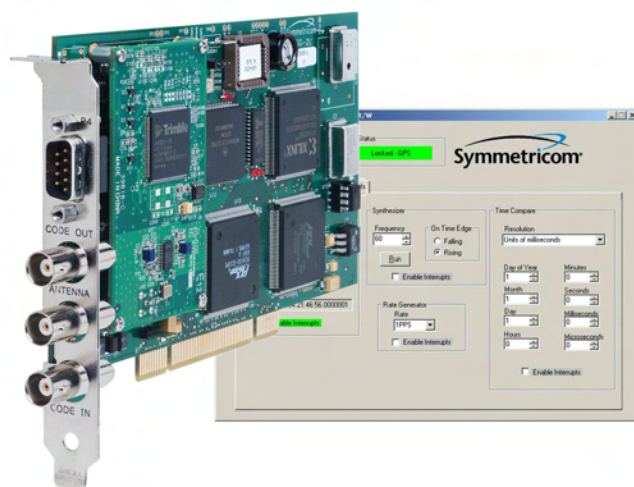
Time, microseconds through years, and status information and position are supplied on demand over the 32-bit PCI bus. In addition to time and status, the GPS-PCI 2U provides a 1 PPS pulse rate, a programmable time compare register, a programmable frequency pulse rate, an external event time capture, and an IRIG B serial time code output.

Rear panel BNC connectors are used for the IRIG code input/output and the antenna input for the GPS. A rear panel mounted multipin connector provides the 1 PPS pulse rate output,

the programmable pulse rate output, the external event input signal and the input/output connections for the RS-422 versions of the input/output IRIG time code. You can also configure the analog input code with various input impedance choices.

The GPS-PCI 2U automatically supports both the 3.3V and 5.0V signaling of the PCI bus. Information provided over the PCI bus includes time, status, antenna position and the time of occurrence of the external event. Interrupts generated by the programmable rate generator, the rate synthesizer, the occurrence of an external event input, and the time compare occurrence are also provided. Depending upon the operating mode, you can program the hours offset from UTC, leap second, year and daylight savings time. Year and leap second insertion are automatically provided when GPS mode is specified. An on-board, capacitor-powered clock maintains time during a power failure condition for up to 48 hours.

Integration of the module is easily facilitated with the optional driver developer's kit for Windows®.



GPS-PCI 2U GPS Synchronized Time & Frequency Processor

## GPS-PCI 2U Specifications

### GPS SYNCHRONIZATION MODE

- Timing accuracy: 1 microsecond to UTC
- Position accuracy: 25 meters SEP
- Receiver: 1575 MHz L1 C/A code; 8 parallel channels
- Acquisition time: Warm start (has ephemeris data and position) <3 minutes. Cold start <20 minutes.
- UTC to local offset: User selectable in hours and minutes
- Daylight saving: User selectable, U.S.DST only.
- Leap second: User programmable, automatic in GPS mode.
- Antenna: L1 GPS, 40 dB gain. RG-59/U cable, 50' (15 m) supplied; maximum cable length 200' (61 m). For longer cable runs, see Options.

### SYNCHRONIZED GENERATOR MODE

- Analog input code: IRIG A or B
  - Modulation ratio: 2:1 to 5:1
  - Input amplitude: 0.5 – 10 Vpp into 50-600-10k $\Omega$ , selectable
  - Timing accuracy: 3 microseconds
- RS-422 input code: IRIG A or B
  - Timing accuracy: 1 microsecond
  - Connector: 9 pin D subminiature, selectable to BNC
- Error bypass: Factory set to three frames
- External 1 PPS input<sup>1</sup>: 1 microsecond timing accuracy

### STAND-ALONE GENERATOR MODE

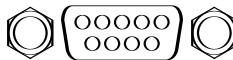
- Allows the user to preset, start and stop the GPS-PCI 2U over the PCI bus.

### ELECTRICAL SPECIFICATIONS

- IRIG B Serial code output (analog)
  - Amplitude: 3 Vpp into 600 $\Omega$
  - Ratio: 3:1
  - Connector: BNC
- IRIG B Serial code output (RS-422)
  - Amplitude: RS-422 levels
  - Input termination: Selectable, 120 $\Omega$  or none
  - Connector: 9 pin D subminiature, selectable to BNC (ACMOS)
- Oscillator
  - Accuracy: 5x10E-8 (when disciplined to IRIG Code or GPS)
  - Stability: 2.5 PPM, 0°C to +50°C, unlocked
- 1 PPS Pulse rate output
  - Amplitude: 0 – 5 Vdc<sup>2</sup>, positive edge on time, 50% duty cycle
  - Connector: 9 pin D subminiature, selectable to BNC
- Programmable pulse rate generator output
  - Rates: 1 PPS, 10 PPS, 100 PPS, 1 kPPS, 10 kPPS, 100 kPPS, 1 MPPS, 5 MPPS, 10 MPPS
  - Outputs: Interrupt and pulse, 0 – 5 Vdc<sup>2</sup>
  - Connector: 9 pin D subminiature, selectable to BNC
- Pulse rate synthesizer output
  - Rates: 1 PPS to 1 MPPS, step size 1 PPS
  - Outputs: Interrupt and pulse, 0 – 5 Vdc<sup>2</sup>
  - Connector: 9 pin D subminiature, selectable to BNC
- External event time capture
  - Resolution: 100's ns – years
  - Output: Interrupt and time/event capture
  - Event input: Selectable positive or negative edge of 2 – 5 Vdc pulse into approximately 2k $\Omega$
  - Connector: 9 pin D subminiature
- Time compare output
  - Resolution: 100's ns – years
  - Outputs: Interrupt and pulse at compare time
  - Amplitude: +5 Vdc<sup>2</sup> on compare
  - Connector: 9 pin D subminiature
- Real time clock
  - Bus request resolution: 100's ns
  - Latency: Zero
  - Time format: BCD

### MECHANICAL/ENVIRONMENTAL SPECIFICATIONS

- Connector
  - Code out: BNC
  - Antenna: BNC
  - Code in: BNC
  - P4-module I/O: 9-pin D



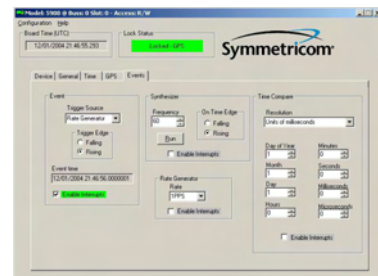
Pin	Direction	Signal
1	input	External Event/1 PPS
2	n/a	GND
3	Input +	DC Reference Code or TTL
4	Input -	DC Reference Code
5	Output	1 PPS
6	Selectable:	Time Compare or Rate Synthesizer
7	Output	Rate Generator
8	Output +	DC Generator Code or TTL
9	Output -	DC Generator Code

- PCI local bus™
  - Specification: PCI Local Bus™
    - 2.2 compliant
    - 2.3 compatible: does not provide interrupts at system start-up and therefore does not support the PCI Local Bus Specification Revision 2.3 feature of software disable of interrupts at start-up
    - PCI-X compatible
    - Not compatible with dual core processors
- Size: Single-width (4.2" x 6.875")
- Device type: PCI Target, 32 bit, 5V universal signaling
- Data transfer: Byte, Half Word, Word
- Power: +12VDC @ 200 mA  
-12VDC @ 50 mA  
+5VDC @ 1500 mA
- Operating temperature: 0°C to +50°C
- Storage temperature: -17°C to +85°C
- Humidity: To 95%, noncondensing
- Antenna
  - Size: 3" Dia. x 3" H (7.62 cm x 7.62 cm)
  - Weight: 0.55 lb. (0.25 kg)
  - Operating temperature: -40°C to +70°C
  - Storage temperature: -55°C to +85°C
  - Humidity: 100%, condensing
- Certification: FCC, CE, UR
- Real time clock: On board capacitor-powered clock maintains time during power fail conditions for up to 48 hours

- Complete specifications can be found in the manual located at [http://www.symmttm.com/pdf/Bus/um\\_PCI-2U.pdf](http://www.symmttm.com/pdf/Bus/um_PCI-2U.pdf)

### SOFTWARE

The GPS-PCI 2U includes the Symmetricom PCI\_Panel application program Windows NT/2000/XP. Using this program you can review the GPS-PCI 2U card status and adjust board configuration and output parameters. The program can also operate as a background task keeping the host computer clock synchronized to the GPS-PCI 2U card.



### PRODUCT INCLUDES

- GPS-PCI 2U GPS Synchronized Time & Frequency card, L1 GPS antenna, 50 feet (15m) antenna cable, PCI\_Panel application program, Windows .dll and .sys drivers, manual, 9-pin D connector kit, one year warranty

### OPTIONS

- Windows Software Developer's Kit
- Extended cable up to 300-1500' (91-457 m); may require signal amplification
- Antenna options: lightning arrestor, splitter kit, inline amp, down/up converter
- Transformer coupled input or output code

<sup>1</sup> When external 1 PPS is used as sync input, the external event is not available.

<sup>2</sup> 5 Vdc outputs have CMOS levels.



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