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Model GPS-PCI

GPS Synchronized PCI Plug-In Card for Computer Clock Synchronization

- **1 microsecond accuracy to UTC**
- **GPS, IRIG A or B input**
- **PCI local bus operation**
- **Zero latency**
- **IRIG B output**
- **1 PPS output**
- **Programmable pulse rate output/interrupt**
- **External event occurrence interrupt**
- **Time compare input/interrupt**
- **Optional software development kit and drivers**

The GPS-PCI provides very precise time, with zero latency, 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 is an ideal master clock solution for synchronizing one or more computers to the UTC time reference. Applications include time tagging processed data, test data reduction, and range instrument synchronization.

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 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 contains 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 single-ended analog input code with various input impedance choices. A transformer coupling option is also available. The output code is single ended in its standard configuration or you can specify the balanced transformer coupling option.

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 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.

A TrueTime software development kit, SDK for PCI/CPCI, is optionally available for Windows 95/98 and Windows NT. The SDK includes a Windows NT kernel mode device driver, a Windows 95/98 VxD device driver, a DLL for accessing either of the drivers, a sample program, and code examples. This TrueTime SDK is a tremendous time-saving tool for quickly integrating all of the features of the GPS-PCI into an application program. Complete access to timing information, status, and control is easily available using the SDK. See the TrueTime SDK for PCI/CPCI data sheet for complete specifications.

Specifications GPS-PCI

GPS Synchronization Mode

Timing Accuracy: 1 microsecond to UTC (with SA)

Position Accuracy: 25 meters SEP (without SA)

Receiver Input: 1575 MHz L1 C/A code

Tracking: 6 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 Savings: User programmable to select hour and day when DST begins and ends.

Leap Second: User programmable for day of occurrence, automatic with optional GPS mode.

Antenna: L1 GPS, 40 dB gain. RG-59/U cable, 50' supplied; maximum cable length 200'. For longer cable runs, see Options.

Synchronized Generator Mode

Analog Input Code: IRIG A or B

Ratio: 2:1 to 5:1

Amplitude: 0.5 to 10 Vpp

Impedance: 50-600-10k ohms, internal switch (single-ended) selectable

Connector: BNC

Timing Accuracy: 5 microseconds

RS-422 Input Code: IRIG A or B

Timing Accuracy: 5 microseconds

Input Termination: Selectable, 120 ohms or none

Connector: DE9

External 1 PPS*: 1 microsecond timing accuracy (uses external event input port)

Error Bypass: Factory set to three frames

Stand-Alone Generator Mode

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

General Specifications

IRIG B Serial Code Output (Analog):

Amplitude: Adjustable, 0.5–10 Vpp into 600 ohms
Ratio: Fixed, 3:1
Connector: BNC

IRIG B Serial Code Output (RS-422):

Amplitude: RS-422 levels

Connector: DE9

Oscillator:

Accuracy: $5x10^{-8}$ (when disciplined to IRIG code or GPS input)

Stability: 2.5 PPM, 0˚C to +50˚C, unlocked

1 PPS Pulse Rate Output:

Amplitude: 0–5 Vdc**
Timing: Positive edge on time
Duty Cycle: 50%
Connector: DE9

Programmable Pulse Rate Output:

Rates: 1 PPS, 10 PPS, 100 PPS, 1 kPPS, 10 kPPS
Outputs: Interrupt and pulse
Amplitude: 0–5 Vdc**
Connector: DE9

External Event Occurrence Input:

Resolution: Microseconds–years
Output: Interrupt and time/event capture
Event Input: Positive edge of 2–5 Vdc pulse
Impedance: Approximately 2k ohms
Connector: DE9

Time Compare Output:

Resolution: Microseconds–years
Outputs: Interrupt and pulse at compare time
Amplitude: 5 Vdc** on compare
Connector: DE9

Mechanical/Environmental

Receiver:

Power: <5 W
Size: PCI short card
Operating Temperature: 0˚C to +50˚C
Storage Temperature: -17˚C to +85˚C
Humidity: To 95%, noncondensing

Antenna:

Size: 2.625" x 1.5" (6.67 cm x 3.8 cm)
Weight: .55 lb. (.25 kg)
Operating Temperature: -40°C to +70°C
Storage Temperature: -55°C to +85°C
Humidity: 100%, condensing

Certification: CE pending, GPS WNRO, Year 2000

Software

The GPS-PCI includes the TrueTime TimeServer32 application program for Windows 95/98/NT that provides control over general time related settings and runs as a background task keeping the computer clock synchronized to the GPS-PCI card. TimeServer 32 is a 32-bit Windows application that can provide a Dynamic Data Exchange (DDE) linkage between your installed TrueTime hardware product and DDE-aware Windows applications, such as Microsoft® Excel.

Options

- TrueTime Software Development Kit (SDK) for PCI/CPCI for Windows 95/98 and Windows NT
- L1 GPS Antenna & Downconverter for long cable runs. Contact TrueTime for application-specific details.
- Transformer Coupled Input Code (single-ended or balanced)
- Transformer Coupled Output Code (balanced)

* When external 1 PPS is used as sync input, the external event is not available.

** 5 Vdc outputs have standard HCMOS levels.

Specifications subject to change without notice.

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