Meinberg Radio Clocks
Lange Wand 9
31812 Bad Pyrmont, Germany
Phone: +49 (5281) 9309-0
Fax: +49 (5281) 9309-30
http://www.meinberg.de
info@meinberg.de

GPS180PEX: Low Profile GPS Clock (PCI Express)

The board GPS180PEX is designed as a low profile board for computers with PCI Express interface. The rear slot cover integrates the antenna connector, a BNC connector for modulated time codes, a 9pin D_SUB male connector and two status LEDs. With this standard height bracket you can use the D_SUB connector for I/O signals like RS-232 - PPS and PPM and you can use this interface for firmware updates.

The GPS180PEX will be delivered with a low profile bracket. You can mount this part instead of the standard bracket, to run the GPS180PEX in computers with smaller housing (e.g. 1U server).

Key Features

- PCI Express Interface
- 2 time trigger inputs
- Programmable Pulse Outputs
  NEW: Frequency Synthesizer and Time Code Mode
- Memory Mapped I/O time reads for high access rates
- RS232 interface
- IRIG-B/AFNOR time code outputs
- Plug and Play
- DCF77-simulation
- Antenna connected with up to 300m of standard coaxial cable RG58
- NEW: Configurable time scale (UTC/local, GPS time, TAI)
- Driver software for all popular operating systems
- Including [1]GPS antenna, 20m standard cable and manual on USB key

Description

This PCI Express slot card is the best choice for adding a highly accurate time base to your servers or workstations. It can be used as a stratum 0 reference time source for NTP and transforms any machine into a Stratum 1 NTP server without consuming additional physical space in your server room.

The GPS180PEX comes with a truckload of features to enable software developers to overcome the timing limitations of COTS operating systems like Linux or Windows. The powerful and highly functional Meinberg API (Application Programming Interface) delivers an easy to use and portable way of accessing all Meinberg bus level timing devices, including ISA, PCI, PCI-X, PCI Express and USB time synchronization products.

Legacy interfaces like IRIG, 1PPS or serial time strings can be used to connect other equipment to the PCIe slot card and transfer the time base over dedicated cable connections to systems which cannot be synchronized via NTP or other network protocols.

The new Memory Mapped Access feature offers a fast, simple and efficient way of reading the current time with high precision.

The drivers package for **Windows** contains a time adjustment service which runs in the background and adjusts the Windows system time continously and smoothly. A monitor program is also included which lets the user check the status of the device and the time adjustment service, and can be used to modify configurable parameters.

The driver package for **Linux** contains a kernel driver which allows the board to be used as a reference time source for the NTP daemon which is shipped with most Linux distributions. This also turns the computer into a NTP time server which can also provide accurate time to other NTP clients on the network. Some command line tools can be used to setup configurable parameters and monitor the status of the board.
In cooperation with Meinberg, the community developed a driver for OpenBSD (www.openbsd.org) which is called mbg.

Additional drivers packages are available for **DOS**, **Novell NetWare**, and **OS/2**. At the bottom of this page there's a link to the download area.

The device's serial port can be used to update the card's firmware. Additionally it can be connected to the serial port of a computer to use the card as reference time source under operating systems where a serial time string is supported, e.g. by NTP, but no kernel device driver is available.

Characteristics

Type of receiver	12 channel GPS C/A-code receiver
Type of antenna	Remote powered [1]GPS antenna/converter unit, up to 300m distance to antenna with RG58 and up to 700m distance with RG213 cable
Status info	Fail-LED shows that the internal timing has not been synchronized or that a system error occurred Lock-LED shows that the calculation of the position has been achieved after reset
Synchronization time	Max. 1 minute in normal operation mode, approx. 12 minutes after a cold start (discharged buffer battery)
Frequency outputs	Frequency output 10 MHz, TTL level
Pulse outputs	3 Programmable TTL outputs, per default configured as: Channel 0: Pulse per second (TTL, RS232 level), pulse duration: 200 msec Channel 1: Pulse per minute (TTL), pulse duration: 200 msec Channel 2: DCF77 compatible pulses (TTL level), pulse width: 100/200 msec
Accuracy of pulse outputs	Depends on oscillator option: Standard: TCXO
Interface	Single serial RS232 interface
Data format PC interface	Binary, byte serial (compatible with Meinberg DCF77 Slot Card PEX511)
Data format of interfaces	Baudrate: 300, 600, 1200, 2400, 4800, 9600, 19200 Baud Data format: 7N2, 7E1, 7E2, 8E1, 8N1, 8N2 Time telegram: [2]Meinberg Standard-Telegram, SAT, Uni Erlangen (NTP), SPA, NMEA0183 (RMC) or [3]capture-telegramm
Statusbyte	Informations about free running mode, daylight savings time and DST pre-switch anouncement, synchronization since last reset, GMT/UTC time and validity of the hardware clock data
Unmodulated time code output	DCLS, TTL into 50 ohm (active high or active low)
Modulated time code output	IRIG AM sine wave signal: 3Vpp (MARK), 1Vpp (SPACE) into 50 ohm
Generated time codes	IRIG B002: 100pps, DCLS signal, no carrier, BCD time of year IRIG B122: 100pps, AM sine wave signal, 1 kHz carrier, BCD time of year IRIG B003: 100pps, DCLS signal, no carrier, BCD time of year, SBS time of day IRIG B123: 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day IRIG B006: 100 pps, DCLS Signal, no carrier, BCD time-of-year, Year IRIG B126: 100 pps, AM sine wave signal, 1 kHz carrier frequency, BCD time-of-year, Year IRIG B007: 100 pps, DCLS Signal, no carrier, BCD time-of-year, Year, SBS time-of-day IRIG B127: 100 pps, AM sine wave signal, 1 kHz carrier frequency, BCD time-of-year, Year, SBS time-of-day IEEE1344: Code according to IEEE1344-1995, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day, IEEE1344 expansion for date, time zone, daylight saving and leap second in Control Funktions Segment C37.118: Like IEEE1344 - with turned sign bit for UTC-Offset AFNOR: Code according to NFS-87500, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, complete date, SBS time of day

Generated time codes	IRIG B002: 100pps, DCLS signal, no carrier, BCD time of year IRIG B122: 100pps, AM sine wave signal, 1 kHz carrier, BCD time of year IRIG B003: 100pps, DCLS signal, no carrier, BCD time of year, SBS time of day IRIG B123: 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day IRIG B006: 100 pps, DCLS Signal, no carrier, BCD time-of-year, Year IRIG B126: 100 pps, AM sine wave signal, 1 kHz carrier frequency, BCD time-of-year, Year IRIG B007: 100 pps, DCLS Signal, no carrier, BCD time-of-year, Year, SBS time-of-day IRIG B127: 100 pps, AM sine wave signal, 1 kHz carrier frequency, BCD time-of-year, Year, SBS time-of-day IEEE1344: Code according to IEEE1344-1995, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day, IEEE1344 expansion for date, time zone, daylight saving and leap second in Control Funktions Segment C37.118: Like IEEE1344 - with turned sign bit for UTC-Offset AFNOR: Code according to NFS-87500, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, complete date, SBS time of day
Time-Trigger inputs	Resolution: 100 nsec, triggered by falling TTL slope Time of trigger event readable via computer slot or optional second RS232-interface
Electrical connectors	BNC female connector for antenna BNC female connector for modulated timecode 9 pin sub D male connector
Computer interface	Single lane (x1) PCI Express (PCIe) Interface PCI Express r1.0a compatible
Backup battery type	When main power supply fails, hardware clock runs free on quartz basis, almanac data is stored in RAM Life time of lithium battery min. 10 years
Board type	Low Profile card (68,90 x 150 mm)
Ambient temperature	0 ... 50°C / 32 ... 122°F
Humidity	Max. 85%
Options	**Oscillator upgrade:** * OCXO-LQ, -MQ or -HQ (instead of TCXO) for extended Holdover capabilities (see [4]oscillator table for further details)
RoHS-Status of the product	This product is fully RoHS compliant
WEEE status of the product	This product is handled as a B2B category product. In order to secure a WEEE compliant waste disposal it has to be returned to the manufacturer. Any transportation expenses for returning this product (at its end of life) have to be incurred by the end user, whereas Meinberg will bear the costs for the waste disposal itself.

Manual

The english manual is available as a PDF file: [5]Download (PDF)

Links:

[1] http://www.meinberg.de/english/products/gpsant.htm
[2] http://www.meinberg.de/english/products/specs/timestr.htm
[3] http://www.meinberg.de/english/products/specs/capstr.htm
[4] http://www.meinberg.de/english/products/specs/gpsopt.htm
[5] http://www.meinberg.de/download/docs/manuals/english/gps180pex.pdf