MEINBERG
The Synchronization Experts.

GNS183PEX

Product Highlights

- High-accuracy reference clock for installation in any desktop or server system with a free PCI Express slot
- 72-channel multi-GNSS receiver for optimum reception of GPS, Galileo, BeiDou, and GLONASS satellites from a fixed location or in mobile applications
- Ease of configuration using Meinberg Radio Clock Monitor tool



A High-Accuracy Clock Card for GNSS Synchronization in Your Desktop or Server

The GNS183PEX reference clock for PCI Express slots is symbolic of Meinberg's longest tradition of GNSS-based timekeeping—a robust 72-channel receiver-clock module capable of acquiring GNSS signals from the GPS, Galileo, BeiDou, and GLONASS constellations and using these to synchronize the host PC's clock and directly generate ultra-precise PPS clock signals as well as various time-of-day string formats for high-accuracy timekeeping.

The GNS183PEX is a self-contained reference clock module that uses the PCI Express interface to communicate with the host PC in order to synchronize the host PC's clock and also to allow management and monitoring using the free Meinberg Radio Clock Monitor tool "**MbgMon**".

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Basic Specifications

Receiver Type	72-channel multi-GNSS receiver
Compatible Antennas	Meinberg GNSS Multi-Band Antenna GNMANTv2

Accessories Included

- A Meinberg GNMANTv2 Antenna for outdoor installation, a mounting kit containing all the accessories required to mount the antenna on a pole or wall, and a 20 m (65.6 ft) RF240-ZH coaxial cable with pre-fitted connectors as standard*.
- Optional: MBG-S-PRO surge protector for in-line installation between the antenna and your GNS183PEX module.

* Meinberg also offers customized antenna cables to accommodate your specific installation requirements. Please reach out to your Meinberg Sales Representative for more information.

Oscillator Options

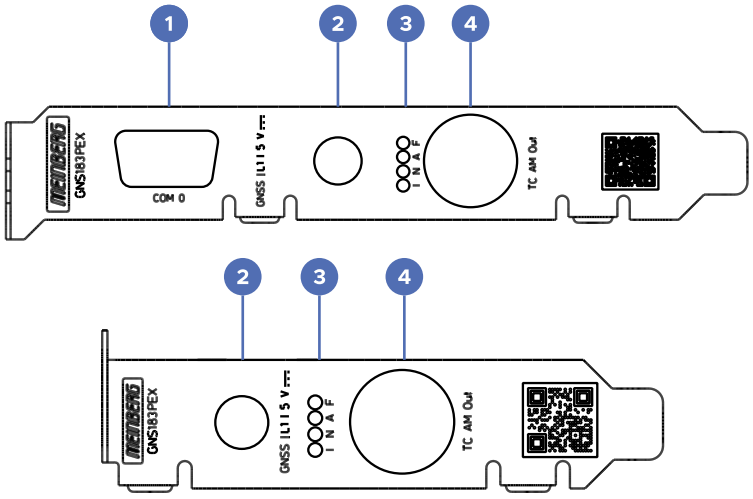
The GNS183PEX is shipped as standard with a "**TCXO**" type oscillator (temperature-controlled crystal oscillator), which provides excellent holdover performance if your GNS183PEX loses synchronization with its upstream references for any reason. The GNS183PEX may also be shipped on request with a more powerful "**OCXO SQ**" or "**OCXO HQ**" holdover solution. The performance metrics are listed below for comparison:

Type	Short-Term Stability (τ = 1 second)	Holdover Temperature Drift	Holdover Performance (1 Day)*	Holdover Performance (1 Year)*
TCXO	2×10^{-9}	$\pm 2 \times 10^{-7}$ (–20 °C to 70 °C)	± 4.3 ms	± 16 s
OCXO SQ	5×10^{-10}	$\pm 1 \times 10^{-7}$ (–10 °C to 70 °C)	± 65 µs	± 4.7 s
OCXO HQ	5×10^{-12}	$\pm 1 \times 10^{-8}$ (5 °C to 70 °C)	± 10 µs	± 788 ms

* The provided values were measured under an ambient temperature of approximately 20 °C (68 °F) without exposure to any acceleration forces such as vibration. Mechanical shocks and vibrations can adversely affect oscillator performance. Full holdover performance requires the system to have been synchronized for 24 hours previously.

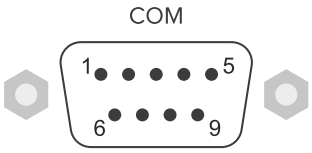
Connectors and Variants

The GNS183PEX is shipped with an alternative low-profile bracket that can be used as a replacement for the standard bracket. The low-profile bracket can be attached by the end user.



1 COM I/O

Pin	Function	Signal Level
1	+ 5 V DC / Programmable Signal Out 1*	PPO1: RS-232
2	RS-232 RxD (Receive)	RS-232
3	RS-232 TxD (Transmit)	RS-232
4	Programmable Signal Out 2*	RS-232
5	GND (Ground)	-
6	Capture Input 0	TTL
7	Capture Input 1 / DCLS Timecode*	Capture Input: TTL DCLS Timecode: TTL with 50 Ω load
8	Programmable Signal Out 1*	RS-232
9	Programmable Signal Out 2*/ Programmable Signal Out 3*	RS-232



* Requires DIP switch adjustment on the GNS183PEX board.

Connector Type	D-Sub 9-pin, male
Supported Time Strings * (Output)	Meinberg Standard *(Default)*, Meinberg Capture, Meinberg GPS, SAT, NMEA RMC, NMEA GGA, NMEA ZDA, NMEA RMC GGA *(RMC followed by GGA)*, NMEA GGA ZDA *(GGA followed by ZDA)*, Uni Erlangen, Computime, Sysplex 1, SPA, RACAL, ION, ION Blanked, IRIG-J-1x, 6021, Freelance
Baud Rates	19200 *(Default)*, 9600, 4800, 2400, 1200, 600, 300
Framing Options	7N2, 7E1, 7E2, 8N1 *(Default)*, 8N2, 8E1, 8O1
Supported Cable Type	Standard RS-232 (female) for time string output Modified or custom D-Sub 9 cable (female) for other signal output

** The supported time strings depend on the firmware version of the PCI Express computer clock.*

2 GNSS Antenna Connector

Connector Type	SMA female
Impedance	50 Ω
Recommended Cable	RF240-ZH (max. 70 m / 230 ft)
Output Voltage	5 V DC (used to power antenna)
Output Current	max. 120 mA

* For more detailed information on the recommended **GNMANTv2** antenna, request a copy of the manufacturer data sheet from your Meinberg Sales Representative, or download it directly from the Meinberg website:

  http://www.mbg.link/gnssant

3 LED Status Indicators

"I" LED (Initialization) System Status	**"N" LED (Navigation) Reference Signal Status**	**"A" LED (Antenna) Geolocation Status**	**"F" LED (Fail) Initialization Status**
Indicates initialization by the on-board firmware and the host operating system and the warm-up state of the onboard oscillator	Indicates whether the GNS183PEX module has been able to complete geolocation by locating at least four satellites	Indicates whether the antenna is correctly connected and functional and whether a signal has been received	Indicates initialization by the on-board firmware and the host operating system and the warm-up state of the onboard oscillator

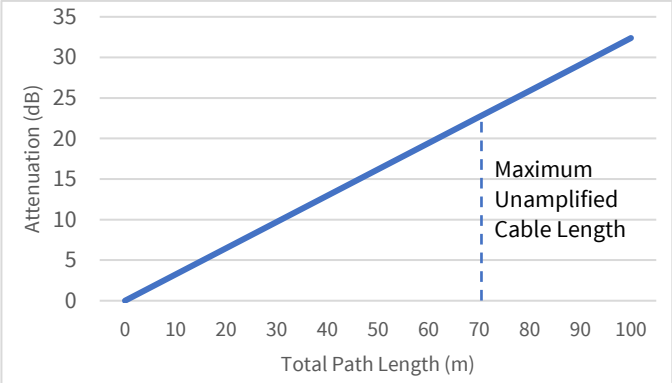
4 AM Timecode Output

Connector Type	BNC, female (for shielded coaxial cable)
Output Signal	Sine wave signal, unbalanced, amplitude modulated
Signal Level	3 V_{pp} / 1 V_{pp} (MARK/SPACE) with 50 Ω load
Carrier Frequency	1 kHz
Supported Time Code Formats	IRIG-B (B122, B123, B126, B127), AFNOR NF S87-500, IEEE 1344, C37.118

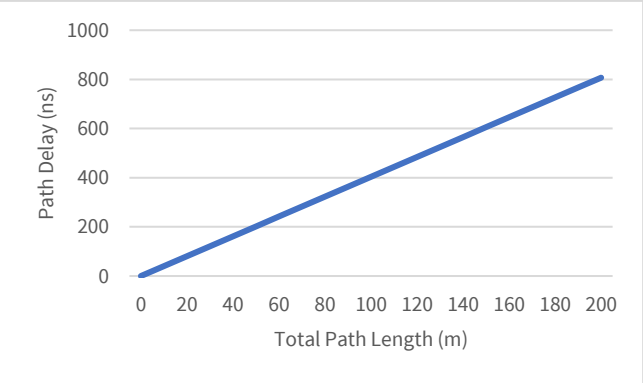
Coaxial Cable: Signal Transmission Performance

The GNS183PEX is specified for operation with a GNMANTv2 antenna with RF240-ZH coaxial cable when synchronized to a GNSS reference source. The diagrams below illustrate how signal attenuation progresses linearly over a single unamplified route when no inline amplification is employed, and how signal path delay accumulates with increasing route distance and should be compensated for by the reference clock as a known and constant offset.

Signal Attenuation: RF240-ZH Cable at 1575 MHz*



Signal Path Delay: RF240-ZH Cable at 1575 MHz*



* Test conditions: Propagation time and signal attenuation measured on 75 m of RF240-ZH coaxial cable. Graph calculated based on the known assumptions that (a) if cable specifications and frequency are constant, path attenuation has a linear relationship to path length and (b) if cable specifications are constant, path delay has a linear relationship to path length.

  1575 MHz was selected as the representative frequency due to its use as the widely used GPS L1 and Galileo E1 bands. When using lower-frequency bands such as those employed by GLONASS L1OF, signal attenuation will be accordingly slightly higher.

  Cable routes exceeding 70 m must be extended using a suitable inline amplifier. The Meinberg INA-20 and INA-30 are specified for this purpose.

Output Timecode Support

IRIG AM	IRIG B122, B123, B126, B127
IRIG DCLS*	IRIG B002, B003, B006, B007
AFNOR	AFNOR NF S 87-500
IEEE	IEEE 1344, IEEE C37.118

* DCLS timecode output is available via pins 4, 7, 8, or 9 of the D-Sub 9 COM port.

Programmable Signal Modes

Idle	The programmable pulse output is essentially disabled when set to “Idle”.
Timer	The output generates a voltage signal with a fixed daily schedule. It is possible to define up three times in a day when the output is switched on, and three times in a day when the output is switched off.
Single Shot	A single pulse of defined length is generated once a day at a set time of day.
Cyclic Pulse	A regular pulse is generated at defined intervals starting at midnight local time of each day.
Pulse-per-Second	A regular pulse of defined length is generated once a second.
Pulse-per-Minute	A regular pulse of defined length is generated once a minute.
Pulse-per-Hour	A regular pulse of defined length is generated once an hour.
Position OK	Generates a continuous signal as long as the GNSS receiver has successfully determined its position.
Time Sync	Generates a continuous signal as long as the clock is synchronized to its reference source.
All Sync	Generates a continuous signal as long as “Position OK” and “Time Sync” as described above are both true.
DCF77 Marks	A simulated time string is output that follows the structure of the signal transmitted by the German DCF77 time code transmitter.
DCLS Timecode	Generates DCLS Timecode in accordance with the configured IRIG or other timecode standard.
Synthesizer Frequency	Generates a custom frequency.
Time Sync	Generates a continuous signal if GNS183PEX is synchronized to its reference.

The supported modes depend on the firmware version of the PCI Express computer clock.

Miscellaneous Technical Information

Card Type	PCI Express card
Operating Temperature	0 °C to 50 °C (32 °F to 122 °F)
Storage Temperature	-20 °C to 70 °C (-4 °F to 158 °F)
Relative Humidity	Max. 85 % at 30 °C (86 °F), non-condensing
Other Surge Protection	Integrated surge protector to protect connected antenna from voltage surges

Support & Compliance

Technical Support	Free lifetime support via telephone and email, including firmware updates.
Warranty	Three-year warranty, extendable upon request
RoHS Compliance	The product is fully RoHS-compliant.
WEEE Status	The purchase of this product is considered to be a “B2B” transaction (non-household product) for the purposes of the European Union Waste of Electrical and Electronic Equipment Directive; the product falls under Category 6, “Small IT and Telecommunications Equipment”. For disposal, it must be returned to the manufacturer to ensure WEEE compliance. Any transportation expenses for returning this product (at end-of-life) must be covered by the end user, while Meinberg will cover the costs for the waste disposal itself.

Revision History

Version (Date)	Changes
2026-11-05	- Removed erroneous mention of 10 MHz output in intro text - Replaced mentions of legacy PCTEL and Meinberg Multi-GNSS Antenna with Meinberg GNMANTv2 - Replaced references to Belden H155 and Ultraflex coaxial cable with new standard RF240-ZH - Removed unnecessary images in “Connectors and Variants” - Minor layout adjustments
2025-04-16	- Initial version