PolaRx5TR

Multi-frequency GNSS Time and Frequency Transfer Receiver

septentrio

Scientific

Timing

Dedicated to time and frequency transfer applications, the PolaRx5TR is optimised for quality of code and carrier phase measurements. The PolaRx5TR is fully compliant with recommendation CCTF 5 (2015) of the Consultative Committee for Time and Frequency.

KEY FEATURES

- **Ultra-precise time synchronisation for time transfer applications**
- **PPS IN internal delay auto-calibration**
- **CGGTTS V2E compliant**
- **Tracks all visible signals (GPS, GLONASS, GALILEO, BEIDOU, NAVIC)**
- **OSNMA Support**
- **High-precision, low-noise measurements**
- **Unique interference monitoring and mitigation**
- **Powerful Web UI and logging tools**

BENEFITS

Timing

As well as the standard inputs for time and frequency, the PolaRx5TR incorporates a calibration circuit to measure and compensate for the delay between the PPS input and the internal time reference. This ensures the measurement latching is always accurately synchronised with the PPS input. Additionally, PPS out signal allows for long-term monitoring of internal delay stability.

CGGTTS data for the GPS, GLONASS, Galileo and BeiDou constellations is generated with RxTools both on the receiver board and on PC and can be automatically transferred over FTP. The CGGTTS files are fully compliant with V2E, in accordance with recommendation CCTF 4 (2015).

GNSS technology

PolaRx5TR is built around the GReCo4™ multi-constellation tracking processor, and provides 544 hardware channels which are assigned automatically and on-the-fly to all visible satellites. Advanced interference analysis and mitigation using adaptive filtering facilitates operation in difficult radio environments, including near chirp jammers.

Networking, remote operation and data logging

Communication and (remote) management of PolaRx5TR is made easy with a powerful built-in Web UI accessible over WiFi, network or USB connection. The Web UI features secured access to all receiver settings and status information, data storage, and fast and robust firmware upgrading. SBF, RINEX and BINEX data logging is possible on both a built-in 16 GB memory and on an externally connected device.

PolaRx5TR

FEATURES

GNSS technology

544 Hardware channels for simultaneous tracking of all visible satellite signals

P-code tracking on L1 and L2 to avoid CA-P biases

Independent tracking of L2C (GPS)

Up to 100 Hz Raw data output (code, carrier, navigation data) (optional feature)

Septentrio's patented GNSS+ technologies

- **AIM+** unique anti-interference system monitors, flags and mitigates narrow and wideband interference, jamming and spoofing
- **APME+** a posteriori multipath estimator for code and phase multipath mitigation. All multipath mitigation and smoothing algorithms can enabled/disabled.
- **LOCK+** superior tracking robustness under heavy mechanical shocks or vibrations

OSNMA Support

Spectrum analyser

PPS in delay calibration circuit can be enabled/disabled

Supported data formats

- CGGTTS V2E both on board and on PC
- Septentrio Binary Format (SBF), fully documented with sample parsing tools
- RINEX (obs, nav, meteo) v2.x, 3.05, 4.00
- BINEX
- NMEA v2.30 and v4.10 output
- RTCM output (all MSM messages supported)[1]
- 16 GB Standard on-board logging
- Up to 48 logging jobs (8 independent sessions x 6 data formats)

Connectivity

10 MHz reference input
1 PPS-IN with monitoring functionality
x PPS output (max 100 Hz)
10 MHz reference output
4 Hi-speed serial ports
1 Ethernet port (100 MBps)
Integrated WiFi (802.11 b/g/n)
Power over ethernet
1 Full-speed USB port
1 USB host for external disk
HTTP/HTTPS
Advanced Web UI providing all receiver controls, and status monitoring. Alternatively, a light Web UI for low bandwidth connections
FTP server, FTP push, SFTP, SYNC+, CloudIT
NTRIP (v1 and v2) client, server and caster
Point-to-Point communication protocol

PERFORMANCE

Measurement precision[2]

Code-carrier bias	0 by design
Inter-frequency code bias	<10 ns
Inter-system code bias in common carrier	<2 ns
Code measurements	<0.5 ns
Phase measurements	< 5 ps
PPS in delay calibration precision	20 ps

Time accuracy

1 PPS out	5 ns
1 PPS out rise time	<2 ns
Events	20 ns

Update rate

Measurements	100 Hz

Tracking performance (C/N0 threshold)[3,4]

Tracking	20 dB-Hz
Acquisition	33 dB-Hz

HARDWARE PARAMETERS

Time reference input

Signal type:	1 PPS
Input impedance:	10k Ω
	(compatible with 50 Ω 1PPS sources)
Level:	-0.5 to 5.5 V

Frequency reference input

Signal type:	10 MHz
Input impedance:	50 Ω
Amplitude	-8 dBm to +18 dBm
	(0.5 V pp to 10 V pp)

Time reference output

Signal type	5 V-level PPS (up to 100 Hz)
Time system	GNSS/UTC/receiver internal time
Output impedance	50 Ω

Frequency reference output

Signal type	1.1 V pp 10 MHz sine wave
Time system	GNSS/REF IN/receiver internal time
Output impedance	50 Ω

PHYSICAL AND ENVIRONMENTAL

Size	235 x 140 x 37 mm 9.25 x 5.51 x 1.45 in
Weight	940 g / 2.07 lb
Input voltage	9 – 30 VDC

Antenna LNA power output

Output voltage	+5 VDC
Maximum current	200 mA

Power consumption	3 – 5 W
Operating temperature	-40° C to +65° C -40° F to 149° F
Storage temperature	-40° C to 85° C -40° F to 185° F
Humidity	5 % to 95 % (non-condensing)

Connectors

Antenna	TNC female
REF IN	BNC female
REF OUT	BNC female
PPS IN	BNC female
PPS OUT	BNC female
Power	ODU 3 pins female
COM1	ODU 7 pins female
COM2	ODU 7 pins female
COM3/4/USB	ODU 7 pins female
USB Host	ODU 5 pins female
IN	ODU 7 pins female
OUT	ODU 5 pins female
Ethernet	ODU 4 pins female
WIFi antenna	SMA female

Certification IP65, RohS, WEEE, CE, FCC

[1] Optional feature
[2] 1 Hz measurement rate
[3] Max speed 600 m/s
[4] Depends on user settings on tracking loop parameters

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BBr 54002/2025 - v. 5.3

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