PolaRx5e

Rugged, Multi-frequency GNSS Reference Receiver

septentrio

Scientific

Reference Network Stations

The PolaRx5e is a versatile and robust multi-frequency GNSS reference receiver in a rugged, IP68 enclosure. It provides measurements with the lowest noise and cycle slip rate on the market while continuously monitoring and protecting against interference, multipath and other environmental effects.

KEY FEATURES

- **Tracks all visible signals (GPS, GLONASS, Galileo, BeiDou, NAVIC, QZSS and SBAS)**
- **High precision, low noise measurements**
- **AIM+ interference monitoring and mitigation system**
- **Low and scalable power consumption**
- **Smart telemetry system (SYNC+)**
- **Internal battery for autonomous ~24-hour operation (optional configuration)**

BENEFITS

Tracking all visible signals

The PolaRx5e tracks all visible signals generating ultra low-noise measurements. It produced the lowest number of cycle slips to offer the highest number of observations per slip during independent competitive testing.

GNSS+ technology

AIM+ can suppress the widest variety of interferers, from simple continuous narrowband signals to the most complex wideband and pulsed jammers. APME+ multipath estimator, unique in its ability to tackle short-delay multipath, enhances measurement quality while LOCK+ guarantees robust tracking of rapid signal dynamics during scintillation events or earthquakes.

Storage integrity

Automatic transfer of data from a receiver to a remote server can result in lost data or the unnecessary retransmission of complete data files. Specifically developed to minimize network usage for telemetry, the PolaRx5e features SYNC+, a fast differencing algorithm that analyses data files at the remote location and transfers only the missing parts.

Networking, remote operation and data logging

Communication and (remote) management of the PolaRx5e is made easy with a powerful built-in Web UI which features secured access to all receiver settings and status information, data storage and fast firmware upgrading.
SBF, RINEX, BINEX, MSM and NMEA data logging is possible on both the internal 16 GB memory and to an externally connected device. Up to 40 data jobs can be defined and logged data can be accessed via the Web UI or automatically pushed to a FTP server.

PolaRx5e

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

Spectrum analyser

Scalable power consumption

RTK and DGNSS corrections (optional feature)

PPP for seismic applications (optional feature)

Data formats and storage

Supported data formats:

- Septentrio Binary Format (SBF), fully documented with sample parsing tools
- RINEX (obs, nav, meteo) v2.x, 3.x
- BINEX
- NMEA v2.30 and v4.10 output
- RTCM output (All MSM messages supported)
- CMR 2.0 output
- Support for standard MET/Tilt sensors

16 GB Standard on-board logging

Up to 40 logging jobs (8 independent sessions x 5 data formats)

Connectivity

10 MHz reference input

10 MHz reference output

x PPS output (max 100 Hz)

4 Hi-speed serial ports

1 Ethernet port (100 MBps)

Integrated WiFi (802.11b/g/n)

Power over ethernet

1 Full-speed USB port

1 USB host socket 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[1,2]

		Unsmoothed pseudorange (cm)
GPS	L1C/A, L2C	16
	P code	10
	L1C	8
	L5	6
GLONASS	L1 C/A, L2 C/A	25
	P code	10
Galileo	E1	8
	E5a, E5b	6
	E5AltBOC	1.5
	E6	7
BeiDou	B1I,B1C, B2I	8
	B2a, B3I	6
NavIC	L5	16
QZSS	L1 C/A, L2C, L1S	16
	L1C	8
	L5	6
		Carrier phase
All signals		1 - 1.3 mm

Static performance (RMS)

Static and rapid static

Horizontal	3mm + 0.5ppm
Vertical	5mm + 0.5ppm

Static high precision

Horizontal	3mm + 0.1ppm
Vertical	3.5mm + 0.4ppm

Maximum update rate

Measurements	100 Hz

Time accuracy

1 PPS out[3]	5 ns
1 PPS out rise time	< 2 ns
Events	< 20 ns

Time to first fix

Cold start[4]	< 45 s
Warm start[5]	< 20 s
Re-acquisition	avg 1.2 s

Tracking performance (C/N0 threshold)[6,7]

Tracking	20 db-Hz
Acquisition	33 db-Hz

INCLUDING

- RxTools: complete and intuitive GUI tool set for receiver control, monitoring, data analysis and conversion. It is available for both Windows and Linux
- GNSS receiver communication SDK

PHYSICAL AND ENVIRONMENTAL

Power consumption	1.9 - 4.8 W
Size	222 x 190 x 58 mm
Weight[8]	1.9 kg
Humidity	5 % to 100 % (non-condensing)
IP Rating	IP68
Internal battery[9]	7.5 V, 6400 mAh, Li-Ion
Continuous operation	~24 hours
Operating temperature[9]	-40°C to +65°C
Storage temperature	-40°C to +85°C
Input voltage	9 – 30 VDC
Antenna LNA power output	
Output voltage	+5 VDC
Maximum current	200 mA
Connectors	
Antenna	TNC female
REF IN	BNC female
REF OUT	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

RohS, WEEE, CE FCC Class B Part 15, ISO 9001-2015

[1] 1σ level
[2] C/N0 = 45 dB-Hz
[3] Includes software compensation of sawtooth effect
[4] No information (almanac, approx. position) available
[5] Ephemeris and approximate position known
[6] Max speed 600 m/s
[7] Depends on user settings of tracking loop parameters
[8] Weight without battery: 1.65 kg
[9] The internal battery can operate between -20°C and +55°C

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