

PolaRx5

Multi-frequency GNSS Reference Receiver



The PolaRx5 and its variant the PolaRx5e are versatile and robust multi-frequency GNSS reference receivers. They provide measurements with the lowest noise and cycle slip rate on the market while continuously monitoring and protecting against interference, multipath and other environmental effects.

- ▶ **Tracks all visible signals (GPS, GLONASS, Galileo, BeiDou, IRNSS, 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 (PolaRx5e variant only)**

Tracking all visible signals

The PolaRx5 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 PolaRx5 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 PolaRx5 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.

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 GNSS+ patented technologies:

- ▶ AIM+ unique anti-jamming and monitoring system against narrow and wideband interference
- ▶ APME+ a posteriori multipath estimator for code and phase multipath mitigation. All multipath mitigation and smoothing algorithms can be enabled/disabled.
- ▶ LOCK+ superior tracking robustness under heavy mechanical shocks or vibrations

Spectrum analyser

Scalable power consumption

RTK and DGNS 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

FTP server, FTP push, SFTP, SYNC+

NTRIP (v1 and v2) client, server and caster

PERFORMANCE

Measurement precision ^{1,2}

		Unsmoothed pseudorange (cm)
GPS	L1C/A, L2C	16
	P code	10
	L5	6
GLONASS	L1 C/A, L2 C/A	25
	P code	10
Galileo	E1	8
	E5a, E5b	6
	E5AltBOC	1.5
	E6	7
	B1/B2	8
BeiDou	B3	6
	L5	16
QZSS	L1 C/A, L2C	16
	L5	6

Carrier phase

All signals 1 - 1.3 mm

Maximum update rate

Measurements 100 Hz

Time accuracy

1 PPS out ³	5 ns
1 PPS out rise time	< 2 ns
Event	< 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

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 The internal battery charger can operate between 0°C and +55 °C (-4 °F to +131 °F)

PHYSICAL AND ENVIRONMENTAL

PolaRx5 standard model

Power consumption	1.8 - 4.7 W
Size	235 x 140 x 37 mm (9.25 x 5.51 x 1.45 in)
Weight	0.9 kg (1.98 lb)
Humidity	5 % to 95 % (non-condensing)
IP Rating	IP65
Operating temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)

PolaRx5e IP68 compliant with battery

Power consumption	1.9 - 4.8 W
Size	222 x 190 x 58 mm (8.74 x 7.48 x 2.28 in)
Weight	1.9 kg (4.23 lb)
Humidity	5 % to 95 % (non-condensing)
IP Rating	IP68
Internal battery⁸	7.5 V, 6400 mAh, Li-Ion
Continuous operation	~24 hours
Operating temperature⁸	-20 °C to +55 °C (-4 °F to +131 °F)
Storage temperature	-20 °C to +55 °C (-4 °F to +131 °F)



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, CE FCC Class B Part 15
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