

PolaRx2e@/PolaRx2eH

The PolaRx2eH and PolaRx2e@ are the new generation Heading and Multi-antenna receivers in the PolaRx2 platform. Implemented on a single Euro-card size board, the receivers address a wide range of precise heading or attitude positioning and navigation applications in fields like machine guidance, marine surveying and photogrammetry. Designed for tough field conditions, the PolaRx2eH and PolaRx2e@ are built around Septentrio's advanced GNSS chipset and offer high quality, high update rate positioning, heading, pitch and roll information.

Precise Heading and Attitude at 10 Hz

The PolaRx2eH and PolaRx2e@ receivers bring the quality and flexibility of the PolaRx2 platform, and output with high accuracy, the position and velocity at update rates of up to 10 Hz to the field of heading and attitude based applications.

The PolaRx2eH heading receiver is the latest variant in the PolaRx2e family and can be connected to 2 dual-frequency antennas to output accurate heading & pitch or heading & roll information. Its high precision and compact form design make the PolaRx2eH perfectly suitable for machine guidance solutions in agriculture and construction, as well as in marine surveying.

The PolaRx2e@ on the other hand, collects and outputs GPS data from up to 3 antennas simultaneously (heading, pitch and roll). It can also output relative positioning of 2 or 3 antennas, which can be used for steering an independently moving part, such as for agricultural and towed equipment. As such, the PolaRx2e@ forms a perfect solution for attitude determination and other multi-antenna applications

Unique Single-Board platform

PolaRx2eH and PolaRx2e@ are implemented on a single Euro-card size board. This lightweight and compact form design, together with flexibility and affordability bring important improvements to traditional GNSS-based heading and attitude applications, whilst conjunctively opening the door for new types of applications. They can be combined with RTK positioning on the same board, offering a unique combination of high precision positioning and attitude solutions.



PolaRx2eH can be connected to 2 dual-frequency antennas whereas PolaRx2e@ can be connected to up to 3 antennas, of which the main antenna can be dual-frequency while the auxiliary antennas are single-frequency. Both receiver types have 48 hardware channels, which can be flexibly assigned to track satellites in single or dual-frequency on 1, 2 or 3 antennas in parallel (i.e. without antenna multiplexing).

One or more channels can also track the L1 signal of up to 6 SBAS satellites. Next to rigid antenna set-ups, the receivers can also be used in situations where the relative positions of the antennas are not fixed. The receiver will then calculate and output relative positions precisely.

Superior GNSS technology platform

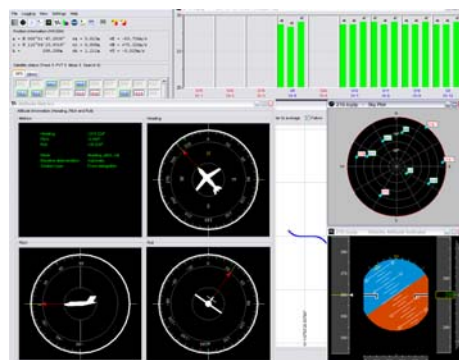
The precise accuracies and update rates available in PolaRx2eH and PolaRx2e@ receiver are made possible through the same high quality architecture used in all products of the PolaRx2 platform: it is built around Septentrio's GreFE front-end and GreCo GPS/SBAS baseband processor chips. Very low-noise Doppler measurements are the key to exceptionally precise velocities and position accuracies.

Both variants have the high tracking sensitivity and stability of phase tracking of all Septentrio receivers, allowing users to track more satellites for a longer period of time, even under adverse conditions. The receivers also incorporate Septentrio's mitigation technique APME, unique in its ability to tackle short-delay multipath.

Flexible Integration Options

The PolaRx2e Heading and Attitude variants are available as a standard Euro-card size board, ensuring easy integration. For ready-to-use solutions, they come in a waterproof IP65 rugged enclosure with sturdy connectors, allowing usage in tough and remote environments. The enclosed receiver offers 4 serial ports, a possibility of 256MB non-removable Compact Flash memory card and Ethernet access. New features include logging control via push button or external signals and programmable LEDs.

The intuitive Graphical User Interface program, RxControl, accompanies the variants. RxControl can be used with the receivers for configuration, for logging and remote control and includes advanced visualization possibilities. Possible data output formats are the industry standard NMEA format as well as a compact Septentrio owned binary format.



POLARx2EH/@ TECHNICAL SPECIFICATIONS

FEATURES

- 48 hardware channels for "all in view" GPS+SBAS parallel tracking
- All channels configurable to track satellites in single or dual-frequency on 1, 2 or 3 antennas in parallel (i.e. without antenna multiplexing)
- Dual frequency L1/L2 code/carrier tracking
- Includes SBAS channels (EGNOS, WAAS, other)
- Raw data output (code, carrier, SBAS navigation data)
- Up to 10 Hz raw measurement, position and attitude output rate (user selectable)
- Automatic or manual antenna calibration
- A Posteriori Multipath Estimator technique (APME)
- Differential GPS (rover)
- x PPS output (x = 1, 2, 5, 10)
- 10 MHz reference input / output
- RAIM module included
- Four bi-directional serial ports (RS232), baudrate up to 115 kbps
- NMEA v2.30 output
- Highly compact and detailed Septentrio Binary Format (SBF) output
- 6 LEDs for power, logging, LAN link, Multi-purpose, tracking status and position fix identification
- Start and stop Data output/Logging on Event
- Compact single-board Euro card solution
- OEM board or mounted in IP65 waterproof enclosure
- Sturdy connectors
- Includes intuitive GUI (RxControl) and detailed operating and installation manual

OPTIONS

- Differential GPS base station
- RTK (main antenna)
 - RTCM v2.2, 2.3 or 3.0 input/output
 - Reference Network compatible (FKP)
 - CMR 2.0
- 2 Event markers
- On Board Logging (non removable Compact Flash Memory Card)
- Programmable LEDs
- TCP/IP over Ethernet

PERFORMANCE

Position accuracy ^{1,2}	Horizontal ³		Vertical ³	
	Standalone	SBAS	DGPS	RTK ^{4,5}
	1.1 m	0.7 m	0.6 m	1 cm + 1 ppm
	1.9 m	1.2 m	1.1 m	2 cm + 2 ppm

Velocity Accuracy ^{1,2}	Horizontal ³		Vertical ³	
	Standalone			
	1.5 mm/sec		1,9 mm/sec	

Attitude Accuracy ^{1,2,14,16}	Horizontal ³		Vertical ³	
	Standalone			
1 m antenna separation				
Heading			0.3°	
Pitch/Roll			0.6°	
3 m antenna separation				
Heading			0.1°	
Pitch/Roll			0.2°	
10 m antenna separation				
Heading			0.03°	
Pitch/Roll			0.06°	

Auxiliary Antenna positions ¹⁵	
	0.6 mm

Maximum Update rate	10 Hz
Latency	< 50 msec

1 PPS accuracy ^{1,2}	10 nsec
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Measurement precision ^{1,3,6}	C/A pseudoranges ⁷	
		0.15 m (GPS) ⁸
	0.35 m (SBAS)	
P1/P2 pseudoranges ⁷	0.1 m	
L1 carrier phase	0.2 mm	
L2 carrier phase	1 mm	
L1/L2 doppler	2.5 mHz (0.5 mm/sec)	

Time to first fix	Cold start ¹⁰		Warm start ¹¹	
		After power-on	< 90 sec	After reset
		< 20 sec		< 2 sec
Re-acquisition		< 2 sec		< 2 sec
Time to first heading/ attitude output		45 sec		

Tracking performance (C/N ₀ threshold) ^{12,13}	
Code phase tracking	19 dB-Hz
Carrier phase tracking	26 dB-Hz
Acquisition	33 dB-Hz
Acceleration	4 g
Jerk	3 g/sec

1 1 Hz measurement rate
 2 Performance depends on environmental conditions
 3 1σ level
 4 Fixed ambiguities
 5 Baseline < 20 km
 6 C/N₀ = 45 dB-Hz
 7 non-smoothed
 8 Multipath mitigation disabled
 9 Multipath mitigation enabled
 10 No information available (no almanacs, no approximate position)
 11 Almanacs and approximate position known, no ephemeris known
 12 95%
 13 Max speed 515 m/sec, max altitude 18 000 m
 14 Attitude accuracy increases linearly with antenna separation
 15 No multipath
 16 PolaRx2EH only Heading and Pitch

PHYSICAL AND ENVIRONMENTAL

Size	160 x 100 x 13 mm (OEM board) 285 x 140 x 37 mm (In housing)
Weight	120 g (OEM board) 930 g (In housing)
Input voltage	5 VDC ± 5% (OEM board) 9-30 VDC (In housing)
Antenna LNA Power Output	Output voltage + 5VDC Maximum current 200 mA
Power consumption	5 W typical, 7W max
Operating temperature	-30 to +70 °C
Storage temperature	-40 to +85 °C
Humidity	5% to 95% (non condensing)
Connectors	Antenna TNC female 10 MHz in BNC female PPS out BNC female
OEM board	Backplane DIN 41612 type B, 64 pins male
Extension Housing	(consult Septentrio)
Power	ODU 3 pins female
COM1	ODU 7 pins female
COM2	ODU 7 pins female
OUT/COM3&4	ODU 5 pins female
IN	ODU 7 pins female
Ethernet	ODU 4 pins female

POLARx2E FAMILY : OTHER PRODUCTS

PolaRx2e and PolaRx2e_OEM - PolaRx2e is a versatile dual-frequency GNSS receiver platform for high-end applications. Based on code and carrier tracking of the L1 and L2 signals, it provides the user with satellite range measurements and position, velocity and time.

PolaRx2e_SBAS - The single-frequency variant tracks up to 6 SBAS augmentation satellites (such as EGNOS and WAAS) in addition to GPS satellites, offering vital integrity information for application in safety-critical environments.

PolaRx2C - The PolaRx2C can track up to 4 satellites in L2C mode. For these satellites, the CA, P1, P2 and L2C measurements are available simultaneously.

PolaNt - A lightweight precise positioning and survey single or dual-frequency antenna for use with PolaRx family.

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