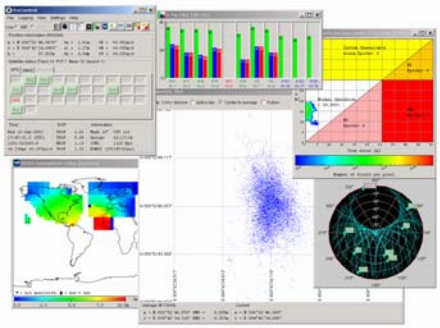
Septentrio
satellite navigation

PolaRx2

PolaRx2 is a versatile high-end dual-frequency GNSS receiver for precise positioning and timing applications. Original algorithms for superior tracking sensitivity and high accuracy positioning are combined with Septentrio's advanced GNSS chipset, yielding a powerful solution for high precision and integrity applications.

High-end Dual Frequency Receiver

PolaRx2 is a general-purpose 48-channel dual-frequency GNSS receiver for high-end OEM applications. It is built around Septentrio's GReFE® front-end and GReCo® GPS/GLONASS/SBAS baseband processor chips. PolaRx2 supports reception of the L1 and L2 signals from up to 16 GPS satellites and is ready to handle GLONASS signals. Based on the code and carrier tracking of the L1 and L2 signals, it outputs satellite range measurements and precise position, velocity, attitude and time information.



SBAS support for increased integrity

PolaRx2 can track the L1 signals from up to 6 SBAS augmentation satellites (such as EGNOS and WAAS). Not only does this increase the accuracy of the position, more importantly PolaRx2 offers your application vital integrity information (HPL, VPL), increasing the confidence in the positioning solution and allowing application in safety-critical environments.

Top Performance

PolaRx2 provides users the highest level of accuracy available for stand-alone and differential GPS positioning. Very low-noise Doppler measurements are the key to exceptionally precise velocities and contribute to the high accuracy of the position. PolaRx2 has a very high tracking sensitivity and exceptional stability of phase tracking, allowing users to track more satellites for a longer period of time, even under adverse conditions. And PolaRx2 includes the patent-pending multipath mitigation technique APME, unique in its ability to tackle short-delay multipath, which is the most prevalent and damaging form in practical circumstances.

RxControl is an intuitive, Java-based GUI to configure the PolaRx2 and log and monitor data. It includes advanced features, e.g. visualization of the SBAS ionospheric model and integrity information.

Ease of Use and Integration

PolaRx2 is available as a standard Eurocard-size board or packaged in a rugged enclosure. An optional extension board for PC-cards (formerly PCMCIA) can be used for CompactFlash Disk memory expansion or for Ethernet access. PolaRx2 is an open architecture receiver, designed to be used in single-board integrated GNSS-based devices. Combining TCP/IP access and a standard Linux-based OS, it is perfectly suited to incorporate user-side applications on the PolaRx2's main CPU.

Flexible Platform

PolaRx2 is a unique and versatile receiver, ready to be used either as base station or as rover receiver for differential GPS and RTK. The multi-antenna variant can also collect and output GPS data from up to 3 antennas simultaneously, a perfect receiver for attitude determination and other multi-antenna applications.

PolaRx2 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
- Dual frequency L1/L2 code/carrier tracking
- Includes up to 6 SBAS channels (EGNOS, WAAS, other)
- Raw data output (code, carrier, SBAS navigation data)
- Up to 10 Hz raw measurement and position output rate (user selectable)
- A Posteriori Multipath Estimator technique (APME)
- Differential GPS (rover)
- x PPS output (x = 1, 2, 5, 10)
- 10 MHz reference input / output
- EGNOS and WAAS compatible
- Provision of protection levels in SBAS positioning mode (HPL/VPL)
- RAIM module included
- Two bi-directional serial ports (RS232), baudrate up to 115 kbps
- NMEA v2.30 output
- Highly compact and detailed Septentrio Binary Format (SBF) output
- 3 LEDs/pins for power, logging, tracking status and position fix identification
- Compact single-board Eurocard solution
- OEM board or mounted in sturdy enclosure
- Industry standard backplane connector
- Includes intuitive GUI (RxControl) and detailed operating and installation manual

Options

- Differential GPS base station
- RTK (main antenna)
  - RTCM v2.2 or 2.3 input/output
  - Reference Station Network compatible (FKP)
  - CMR
- 2 Event markers
- PC-card slot for extension board, allowing
  - TCP/IP over Ethernet
  - Data logging on removable CompactFlash Memory
  - GPRS*

* planned 2005

Performance

Position accuracy[1,2]

	Vertical[3]	Horizontal[3]
Standalone	1.9 m	1.1 m
SBAS	1.2 m	0.7 m
DGPS	1.1 m	0.6 m

RTK performance[1,5]

Horizontal accurary[3]	1 cm + 1ppm
Vertical accuracy[3]	2 cm + 2ppm
Average time to fix[5]	7 sec
Availability[5]	99,8 %

Velocity Accuracy[1,2]

	Vertical[3]	Horizontal[3]
Standalone	2.8 mm/sec	1.5 mm/sec

Maximum Update rate	10 Hz
Latency	< 50 msec

Time accuracy[1,2]

1PPS	20 nsec

Measurement precision[1,3,6]

C/A pseudoranges[7]	0.15 m (GPS)[8]
	0.30 m (GPS)[9]
	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]		< 90 sec
Warm start[11]	After power-on	< 55 sec
	After reset	< 20 sec
Re-acquisition		2.5 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

Physical and Environmental

Size	178 x 100 x 13 mm (OEM board)
	230 x 140 x 37 mm (In housing)
Weight	120 gr (OEM board)
	720 gr (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	SMA female
10 MHz in/out	SMA female
OEM board	
Backplane	DIN 41612 type B, 64 pins male
Extension	(consult Septentrio)
Housing	
Power	LEMO 0B series, 3 pins
Com 1 & 2	9-pin male sub-D
General purpose	ERNI SMC type B right angle male

PolaRx2 Family : other products

PolaRx2SBAS - PolaRx2SBAS is a single-frequency receiver that tracks up to 6 SBAS augmentation satellites (such as EGNOS and WAAS) in addition to GPS satellites, increasing the accuracy of the position and offering your application vital integrity information increasing the confidence in the position solution for application in safety-critical environments.

PolaRx2@ - PolaRx2@ is a unique single-board dual-frequency receiver that can be connected to up to 3 antennas, bringing heading/attitude and other multi-antenna applications within economic and practical reach.

PolaRx2TR - PolaRx2TR (Timing/Reference) combines world-class performance in terms of measurement noise, sensitivity and tracking stability with user-oriented features such as Ethernet communication. PolaRx2TR also provides specific GPS timing functions (1PPS in and out).

RxControl - RxControl is an intuitive user interface to configure and control all types of PolaRx2 receivers and monitor, log and post data remotely.

SSNDS 01/2005/1a

Headquarters :
Ubicenter, Philipssite 5
B-3001 Leuven
Belgium

Phone: +32 16 300 800
Fax: +32 16 221 640
info@septentrio.com
www.septentrio.com