



Scientific



Reference  
Network Stations

The PolaRx5S is the world's leading ionospheric GNSS receiver. With 544 channels, it provides I&Q correlations, phase, code and carrier-to-noise at up to 100 Hz for all GNSS L-band frequencies.

## KEY FEATURES

- ▶ Real time output of TEC and iono scintillation indices on all GNSS L-band frequencies
- ▶ 100 Hz unfiltered correlation output for in-depth scintillation analysis
- ▶ Full compatibility with common scintillation and TEC monitoring file formats
- ▶ 100 Hz code, phase and intensity output with user controlled noise bandwidth
- ▶ Unique interference monitoring and mitigation (AIM+)
- ▶ Powerful Web UI and logging tools
- ▶ Rugged housing and multiple interfaces

## BENEFITS

### Space Weather Applications

The PolaRx5S outputs an extensive set of GNSS measurements and iono-indices, including I&Q correlation, phase and intensity, up to 100 Hz. Featuring an ultra-low noise oscillator, it enables precise phase scintillation monitoring with a phase noise standard deviation ( $\Phi_{60}$ ) as low as 0.03 rad.

### GNSS+™ Technology

The A Posteriori Multipath Estimator (APME+), unique in its ability to tackle short-delay multipath, enhances the measurement quality while LOCK+ tracking guarantees robust tracking of rapid signal dynamics during scintillation events.

Radio interferences events, more and more present, are difficult to differentiate from scintillation events. The PolaRx5S incorporates advanced interference mitigation techniques to suppress interference before it can affect the iono indices.

### Networking, remote operation, and data logging

Communication and (remote) management of the PolaRx5S 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. Up to 40 independent data archives can be defined. Logged data can be accessed via the web UI server 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

All multipath mitigation and smoothing algorithms can be enabled/disabled

### Data formats and storage

Supported data formats:

- ▶ ISMR (Ionospheric Scintillation Monitoring Record)
- ▶ 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 format
- ▶ RTCM output (all MSM messages supported)<sup>1</sup>

16 GB Standard on-board logging

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

### Connectivity

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

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

Phase noise bandwidth 1-50 Hz  
(configurable)

Phi60 noise floor 0.03 rad

### Iono-indices<sup>2</sup>

- ▶ S4
- ▶ Phi01, Phi03, Phi10, Phi30, Phi60
- ▶ Code-Carrier divergence (CCD)
- ▶ Scintillation Intensity (SI)
- ▶ Phase spectrum slope and strength at 1 Hz (p&T)

### TEC

- ▶ Corrected for satellite biases<sup>3</sup>
- ▶ Calibration tool for receiver+antenna biases
- ▶ User-selectable signal combination
- ▶ No need for CA-P calibration table

### Update

Code, phase, intensity, correlations 100 Hz  
Iono indices and TEC 60 s

### Tracking performance (C/N0 threshold)<sup>4</sup>

Tracking 20 db-Hz  
Acquisition 33 db-Hz

## PHYSICAL AND ENVIRONMENTAL

**Size** 284 x 140 x 37 mm  
11.18 x 5.51 x 1.45 in

**Weight** 1.06 kg / 2.33 lb  
**Input voltage** 9 – 30 VDC

### Antenna LNA Power Output

Output voltage +5 VDC  
Maximum current 200 mA

**Power Consumption** 3.5 - 5.7 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 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** IP65, RohS, WEEE, CE FCC  
Class B Part 15



<sup>1</sup> Optional feature

<sup>2</sup> 3 Carriers per satellite

<sup>3</sup> If transmitted by the satellite

<sup>4</sup> Depends on user settings of tracking loops parameters

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