

# PolaRx5TR

Multi-frequency GNSS Time and Frequency Transfer Receiver



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## Key Features

- ▶ **Ultra-precise time synchronization for time transfer applications**
- ▶ **PPS input internal delay auto-calibration**
- ▶ **CGGTTS V2E compliant**
- ▶ **Tracks all visible signals (GPS, GLONASS, GALILEO, BEIDOU, IRNSS)**
- ▶ **High-precision, low-noise measurements**
- ▶ **Unique interference monitoring and mitigation**
- ▶ **Powerful web interface and logging tools**

**Dedicated to time and frequency transfer applications, the PolaRx5TR is optimized for quality of code and carrier phase measurements. The PolaRx5TR is fully compliant with recommendation CCTF 5 (2015) of the Consultative Committee for Time and Frequency.**

## Timing

As well as the standard inputs for time and frequency latching, the PolaRx5TR incorporates a calibration circuit to measure and compensate for the delay between the PPS input and the internal time reference ensuring measurement latching is always accurately synchronized. Additionally, the PPS out signal allows for long term monitoring of internal delay stability.

CGGTTS files for the GPS, GLONASS, Galileo and BeiDou constellations are generated in real-time with RxTools and can be automatically transferred over FTP. The CGGTTS are fully compliant with V2E, in accordance with recommendation CCTF 4 (2015).

## GNSS technology

The PolaRx5TR is built around the GReCo4™ multi-constellation tracking processor, and provides 544 hardware channels that are assigned automatically and on-the-fly to all visible satellites. Advanced interference analysis and mitigation using adaptive filtering facilitates operation in difficult radio environments, including near chirp jammers.

## Networking, remote operation and data logging

Communication and (remote) management of PolaRx5TR is made easy with a powerful built-in web interface, which 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 8 separate logging sessions can be defined.

## Any device, any platform

Use any device with a web browser to monitor and configure the PolaRx5TR via the built-in webserver accessible over WiFi, network or USB connection. The PolaRx5TR comes with RxTools, a suite of applications that complements the web interface with advanced display, conversion and analysis tools.

## FEATURES

### Technology

544 hardware channels for simultaneous tracking of all visible satellite signals

Supported signals: GPS (L1, L2, L5), GLONASS (L1, L2, L3) GALILEO (E1, E5ab, AltBoc, E6), BEIDOU (B1, B2, B3), SBAS (L1, L5), IRNSS (L5), QZSS (L1, L2, L5) (Galileo, BeiDou and IRNSS are optional features)

Up to 100Hz Raw data output (code, carrier, navigation data) (optional feature)

A Posteriori Multipath Estimator (APME+) including code and phase multipath mitigation

AIM+/WIMU interference mitigation unit, including chirp jammers

Spectrum analyzer

All multipath mitigation and smoothing algorithms can be enabled/disabled

Scalable power consumption

### Formats

Fully documented Septentrio Binary (SBF) output  
CGGTTS V2E

RINEX (obs, nav, meteo) v2.x, 3.x

BINEX

NMEA v2.30 and v4.10 output

RTCM output (all MSM messages supported)

### Connectivity

10 MHz reference input

1 PPS input

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

16 GB standard on-board logging

Up to 8 simultaneous logging sessions

Advanced web interface providing all receiver controls and status monitoring.

FTP server, FTP push

Ntrip (server, caster)

Includes intuitive GUI (RxControl, Web UI and RxTools) and detailed operating and installation manual

## PERFORMANCE

### Measurement precision<sup>1,2,3</sup>

Code-carrier bias 0 by design

Inter-frequency code bias <10 ns

Inter-system code bias in common carrier <2 ns

Code measurements <0.5 ns

Phase measurements < 5 ps

### Time accuracy<sup>2</sup>

1 PPS out 5 ns

1 PPS out rise time <2 ns

### Update rate

Measurements 100 Hz

### Tracking performance (C/N0 threshold)<sup>4,5</sup>

Tracking 20 dB-Hz

Acquisition 33 dB-Hz

## HARDWARE PARAMETERS

### Time reference input

Signal type: 1 PPS

Input impedance: 10k Ω

(compatible with 50 Ω 1PPS sources)

Level: -0.5 to 5.5 V

### Frequency reference input

Signal type: 10 MHz

Input impedance: 50 Ω

Amplitude -8dBm to +4dBm  
(0.5V pp to 2V pp)

### Time reference output

Signal Type 5 V-level PPS (up to 100 Hz)

Time system GNSS/UTC/receiver internal time

Output Impedance 50 Ω

### Frequency reference output

Signal Type 1.1 Vpp 10 MHz sine wave

Time system GNSS/REF IN/receiver internal time

Output impedance 50 Ω



## PHYSICAL AND ENVIRONMENTAL

**Size** 235 x 140 x 37 mm  
(9.25 x 5.51 x 1.45 in)

**Weight** 940 g (2.07 lb)

**Input voltage** 9 – 30 VDC

### Antenna LNA Power Output

Output voltage +5 VDC

Maximum current 200 mA

**Power Consumption** 2.2 – 5 W

**Operating temperature** -40 °F to 149 °F  
(-40°C to +65 °C)

**Storage temperature** -40 °F to 185 °F  
(-40 °C to 85 °C)

**Humidity** 5 % to 95 % (non condensing)

### Connectors

Antenna TNC female

Ref in BNC female

Ref out BNC female

PPS in BNC female

1PPS 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, CE  
FCC Class B Part 15

<sup>1</sup> 1Hz measurement rate

<sup>2</sup> 1σ level

<sup>3</sup> C/N0 = 45 dB-Hz, unsmoothed

<sup>4</sup> Max speed 600 m/s

<sup>5</sup> Depends on user settings on tracking loop parameters

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