PolaRx5TR
Multi-frequency GNSS Time and Frequency Transfer Receiver

Key Features

- Ultra-precise time synchronization for time transfer applications
- PPS IN 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 UI 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, the PolaRx5TR incorporates a calibration circuit to measure and compensate for the delay between the PPS input and the internal time reference. This ensures the measurement latching is always accurately synchronised with the PPS input. Additionally, PPS out signal allows for long-term monitoring of internal delay stability.

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

GNSS technology

PolaRx5TR is built around the GReCo4™ multi-constellation tracking processor, and provides 544 hardware channels which 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 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.
**FEATURES**

**GNSS Technology**
544 hardware channels for simultaneous tracking of all visible satellite signals
Supported signals: GPS (L1P, L1CA, 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)
P-code tracking on L1 and L2 to avoid CA-P biases
Up to 100 Hz raw data output (code, carrier, navigation data) (optional feature)
A Posteriori Multipath Estimator (APME+) including code and phase multipath mitigation
AIM+ interference mitigates against wide and narrow band interference
Spectrum analyzer
All multipath mitigation and smoothing algorithms can be enabled/disabled
PPS in delay calibration circuit can be enabled/disabled

**Formats**
Septentrio Binary Format (SBF), fully documented with sample parsing tools
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-IN
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 24 parallel data records
FTP server, FTP push, SFTP

**PERFORMANCE**

**Measurement precision**
- 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
- PPS in delay calibration precision: 20 ps

**Time accuracy**
- 1 PPS out: 5 ns
- 1 PPS out rise time: <2 ns
- Event: 20 ns

**Update rate**
Measurements: 100 Hz
Tracking performance (C/N0 threshold)
- 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: -8 dBm to +4 dBm (0.5 V pp to 2 V 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 V pp 10 MHz sine wave
- Time system: GNSS/REF IN/receiver internal time
- Output Impedance: 50 Ω

**SPECIFICATIONS**

**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**
3 – 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
PPS OUT: BNC female
Power: ODU 3 pins female
COM1: ODU 7 pins female
COM2: ODU 7 pins female
COM3/4/USB Host: ODU 7 pins female
IN: ODU 7 pins female
OUT: ODU 7 pins female
Ethernet: ODU 7 pins female
WiFi antenna: SMA female

**Certification**
- IP65, RohS, CE
- FCC Class B Part 15

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1 1 Hz measurement rate
2 Max speed 600 m/s
3 Depends on user settings on tracking loop parameters