

GTR50 - Time & frequency transfer receiver



PN (RN): 2065.100.01

The GTR50 is intended for time & frequency comparisons via GPS common views. The receiver supports both code and phase measurements. Thanks to large receiver bandwidth and advanced signal processing, even the code measurements provide sub-nanosecond accuracy.

Description

The double frequency version of the receiver provides additionally high accurate ionospheric delay measurement. Critical elements are placed in a thermostat box. The receiver can be directly connected to a local net/internet which allows remote control and output data download.

The operation is fully automatic. After the very first configuration, the receiver continuously collects and stores the measurement data. Several standard/proprietary output protocols can be generated from the collected data. The data processing can be started manually or by a scheduler which enables routine processing at given times (daily, weekly, ...). The resulting data files can be downloaded from the receiver or automatically uploaded to a server. A brief message is sent to an e-mail address after the processing is finished.

The receiver can be controlled from any computer on the net. The User Interface has the form of a web page which can be accessed using a web browser. It enables control of the receiver, monitoring of the receiver operation, and download of the measurement data. Authorization is required to access the receiver.

The diagnostic system indicates several dozens of operational events and states. The diagnostic messages can be recorded in the log, displayed in the User Interface, and sent to an e-mail address.

History of operational parameters (time difference, temperature, satellite elevation/azimuth, ...) is displayed in graphs in the User Interface.

Receiver Operation

An authorized user can control the receiver from any PC connected to the net. No special software at the PC is required. Security of the communication is efficiently protected.

The receiver measurement runs automatically. The processed output data can be downloaded to a PC. When the receiver is not connected to a net, the output data is saved to a USB flash drive.

The receiver operation can be controlled by a scheduler in addition to a manual control. The scheduler starts routine measurements and data processing at prescribed times. The scheduler also sends the output data by FTP or e-mail to a computer or enables a download.

A configurable diagnostic system records operational events into a log. Faults can be reported to a user via e-mail. Graphical representation of monitored parameters history is available.

Supported measurement modes

The measurement is related to an input 1 PPS mark or a selected zero-crossing of an input 10/5 MHz signal.

The zero-crossing can be selected with respect to an input 1 PPS mark or a 1 PPS UTC estimation. The second case doesn't require any input 1 PPS mark, which enables a simple remote frequency comparison. The last zero-crossing before the reference mark, the nearest

zero-crossing to the reference mark, or the first zero-crossing after the reference mark is selected.

Standards and Recommendations

Receiver operation, parameters and output data formats comply with the following recommendations:

CGGTTS guidelines for manufacturers of GNSS receivers used for timing. Consultative Committee for Time and Frequency - Group on GNSS Time Transfer Standards (CGGTTS), June 2001.

Gurtner W.: RINEX The Receiver Independent Exchange Format, version 2.10. Astronomical Institute University of Berne 2000.

Allan D.W.; Thomas C.: Technical Directives for Standardization of GPS Time Receiver Software. Metrologia vol. 31 (1994), p. 69-79.

Technical parameters

Time reference input

Input signal 1 PPS (leading edge)

Input impedance 50 Ω

Trigger level 0 V to 2 V adjustable

Max. level < 5.5 V/50 Ω

Min. level > -0.1 V/50 Ω

Precision

Code measurement < 1 ns rms (CGGTTS protocol, short-baseline common-view)

Phase measurement < 80 ps rms (short-baseline common-view)

Ionospheric delay < 2 ns rms (CGGTTS protocol)

Output data formats

CGGTTS all tracks/all satellites in view, L1/L2 iono-delay

RINEX observation/navigation files

L3P_30s standard P3 data, 30 s sampling period

L3P_1s P3 data, 1 s sampling period

RAW proprietary format, both code and carrier phase data

EL_MASK CNR analysis and search for obstacles

STAT statistics of collected measurement data

GPS receiver

Frequency channels L1/L2

Type of measurement code/carrier phase referenced to the input time mark

Receiver bandwidth 22 MHz

Time interval counter

Precision < 50 ps rms

Thermostat based on thermoelectric modules

Dimensions 19"/2U standard chassis

Power supply 100 VAC to 240 VAC/50 Hz to 60 Hz

Operating temperature 0 °C to +50 °C

Antenna

Antenna supply 5 V/up to 90 mA (plus on the inner contact of connector)

Recommended antenna Novatel GPS-702 (dual frequency)

Set

Time & frequency transfer receiver set GTR50 - (2065.000.12)

Documentation

GTR50 operating instructions 2065.010.01