# TIME AND FREQUENCY TRANSFER RECEIVER


## GTR50

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

## Technical specifications

**Time Reference Input**

Input signal ..... 1 PPS (leading edge)
Input impedance ..... 50 Ω
Trigger level ..... (0 - 2) V adjustable

**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, L1/L2 receiver version only)

**Output Data Formats**

| | |
|---|---|
| CGGTTS | (all tracks/all satellites in view, L1/L2 iono-delay), |
| RINEX | (observation/navigation files), |
| L3P | (all tracks/all satellites in view, P3 combination), |
| RAW | (proprietary format, both code and carrier phase data), |
| EL_MASK | (analysis of CNR and search for obstacles around antenna), |
| STAT | (statistics of collected measurement data). |

**GPS Receiver**

Frequency channels ..... L1 or L1/L2 configurable
Type of measurement ..... code/carrier phase referenced to the input 1 PPS
Receiver bandwidth ..... 16 MHz

**Time Interval Counter**

**Precision** ..... < 50 ps rms

**Thermostat** ..... based on thermoelectric modules

**Dimensions** ..... 19”/2U standard chassis

**Power Supply** ..... 230 V AC

**Operating Temperature** ..... (0 to 30) $^0$C

**Antenna**

Antenna supply ..... 5 V/up to 90 mA
Recommended antenna ..... Novatel GPS-702 (dual frequency)
Recommended antenna cable ..... Andrew Heliax LDF1-50, TC < 10 ppm/K

## Remote control from any computer on the net

The GTR50 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.

## Automatic operation

After the very first configuration, the receiver continuously collects and stores the measurement data. Several standard/proprietary output protocol files 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.

## Diagnostic system

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

## Monitoring with graphical representation

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

## Standards and recommendations

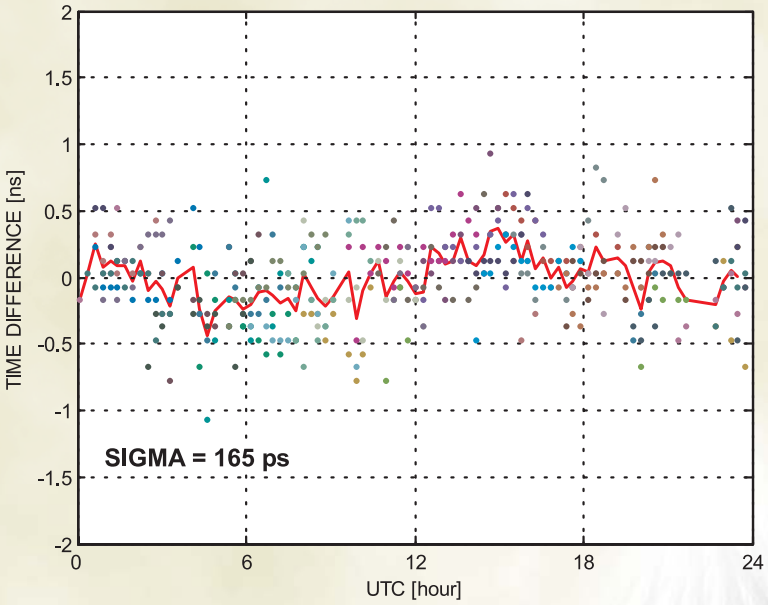
**Receiver operation, parameters and output data formats comply with the following recommendations:**

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.

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

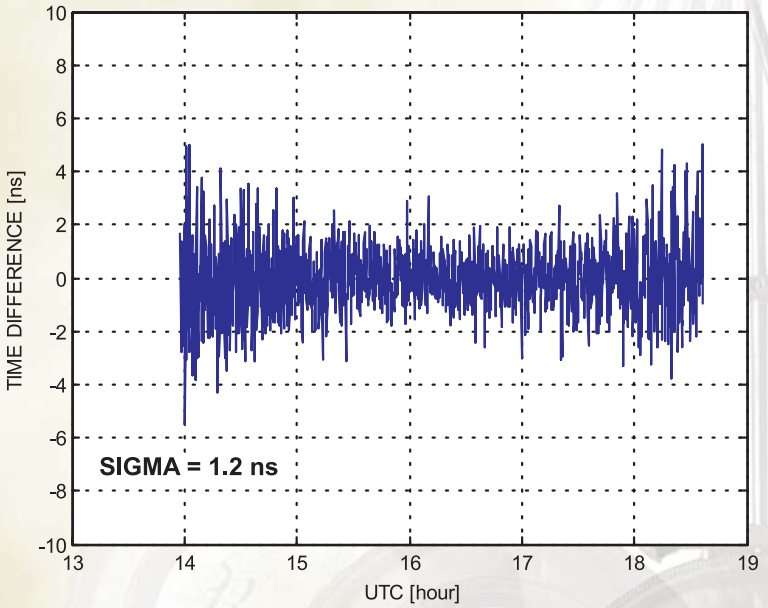
Gurtner W.: RINEX The Receiver Independent Exchange Format, version 2.10. Astronomical Institute University of Berne 2000.

# Typical measurement results



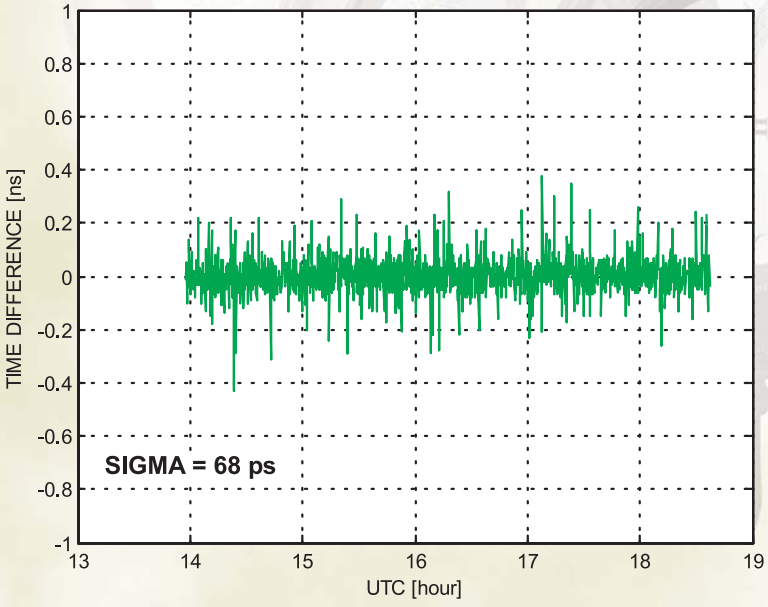

## CGGTTS Data

- commnon view based on CGGTTS data
- Prague 2004-05-30/MJD53155
- all tracks/all satellites in view
- short-baseline (3 meters)
- points represent tracks
- colors represent satellite IDs
- red line is average over visible satellites




## Code Measurement Data

- commnon view based on code measurement RAW data
- Prague 2004-06-06/MJD53162
- satellite PRN 27
- 10 s sample period
- short-baseline (3 meters)




## Phase Measurement Data

- commnon view based on phase measurement RAW data
- Prague 2004-06-06/MJD53162
- satellite PRN 27
- 10 s sample period
- short-baseline (3 meters)

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