GRP GPS-receiver Rubidium Portable

MEINBERG FUNKUHREN

Portable frequency reference

Overview

The GRP is based on the Meinberg GPS-receiver GPS167SV, the interface board LIU and a Rubidium frequency reference, mounted in a metal desktop case. The integrated GPS-receiver allows the Rubidium oscillator to be locked to the extremely precise GPS-system before taking the GRP to the spot of the measurement task. Thus the advantages of precision of GPS and stability of a Rubidium reference are combined in a single case.

Applications

The large number of different outputs of the GRP allows the use for various tasks. Examples are:

- **Measurement and test of synchronization quality of Telecom networks**
- **Calibration and synchronization of laboratory equipment**
- **Test of synchronization of radio transmitters / base stations (GSM / CDMA / UMTS / DAB / DVB)**

Key features

GPS-receiver		
6 channel C/A-code receiver		
Status indication		
RS232 interface for configuration and monitoring		
Antenna cable max. 250 m (RG58C)		
Rubidium reference		
Accuracy GPS-locked	+/- 2 x 10^{-12} (τ=100 sec)	
Accuracy free run	+/- 1.5 x 10^{-11} / day	
	+/- 5 x 10^{-11} / month	
Unframed outputs		
1 x 5 MHz sinewave	0.6 Vrms, 50 Ω unbalanced, BNC	
1 x 10 MHz sinewave	0.6 Vrms, 50 Ω unbalanced, BNC	
2 x 1544/2048 kHz	G703, 75 Ω unbalanced, BNC	1)
2 x 1544/2048 kHz	G703, 120 Ω balanced, BNC Twinax	1)
Framed outputs		
1 x 1.544/2.048 Mbps	T1.403/G703, B8ZS/HDB3, 75 Ω unbalanced, BNC	1)
1 x 1.544/2.048 Mbps	T1.403/G703, B8ZS/HDB3, 120 Ω balanced, BNC Twinax	1)
Power supply		
100-240 VAC, 50-60 Hz	143-363 VDC	
1) Selection of E1- or T1-mode possible by switch		

Output signals

The board LIU was designed to convert the GPS-locked standard frequency of the rubidium oscillator into several timing signals that can be used for various synchronization or measurement tasks. The outputs of the LIU are accessible via BNC- or BNC-Twinax-connectors in the front panel of the board.

There are two seperate signal paths on the board LIU. One is for providing the standard frequencies, the second path is for generation of 'telecom-signals'.

Standard frequencies

The 5 MHz and 10 MHz standard frequencies are derived directly from the rubidium oscillator. Because of the locking of the rubidium oscillator to the precise PPS-signal (pulse per second generated from GPS-receiver), the standard frequencies are also locked to the PPS. After passing an additional filter and an amplifier circuit, they are fed to the BNC-connectors.

Telecom signals

These signals can be devided into two groups, the 'unframed' and the 'framed' outputs. They are provided by a framer and line interface unit on the board LIU. All clock signals needed for generation of the 'telecom outputs' are phase locked to a 4.096 MHz reference clock, which is generated by a frequency synthesizer on the board GPS167SV. This synthesizer is phase locked to the PPS-signal and frequency locked to the rubidium oscillator. The LIU is able to generate signals for the American T1- or the European E1-system. The mode of operation depends on the position of a switch in the rear panel of the GRP.

The 'unframed' outputs are standard frequencies of either 1544 kHz (T1) or 2048 kHz (E1). Two unbalanced and two balenced outputs according to ITU-T G703-10 (CCITT recommendation 'Physical/electrical characteristics of hieracrchical digital interfaces) are available via BNC- and BNC-Twinax-connectors.

The 'framed' outputs are consisting of data signals known from digital telephony, which are distributed by using a special frame structure. As a synchronization unit, the GRP only generates a 'framed all ones' signal (data byte 0xFF hex) with a transmission speed of either 1.544 Mbps (T1) or 2.048 Mbps (E1). An unbalanced and a balanced output according to ANSI T.403 (T1-mode) or ITU-T G703-6 (E1-mode) are available via BNC- and BNC-Twinax-connectors. Two different line codes used for error correction are known for the transmission of framed signals. The board LIU however generates B8ZS- (T1-mode) or HDB3-coded (E1-mode) output signals only.

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