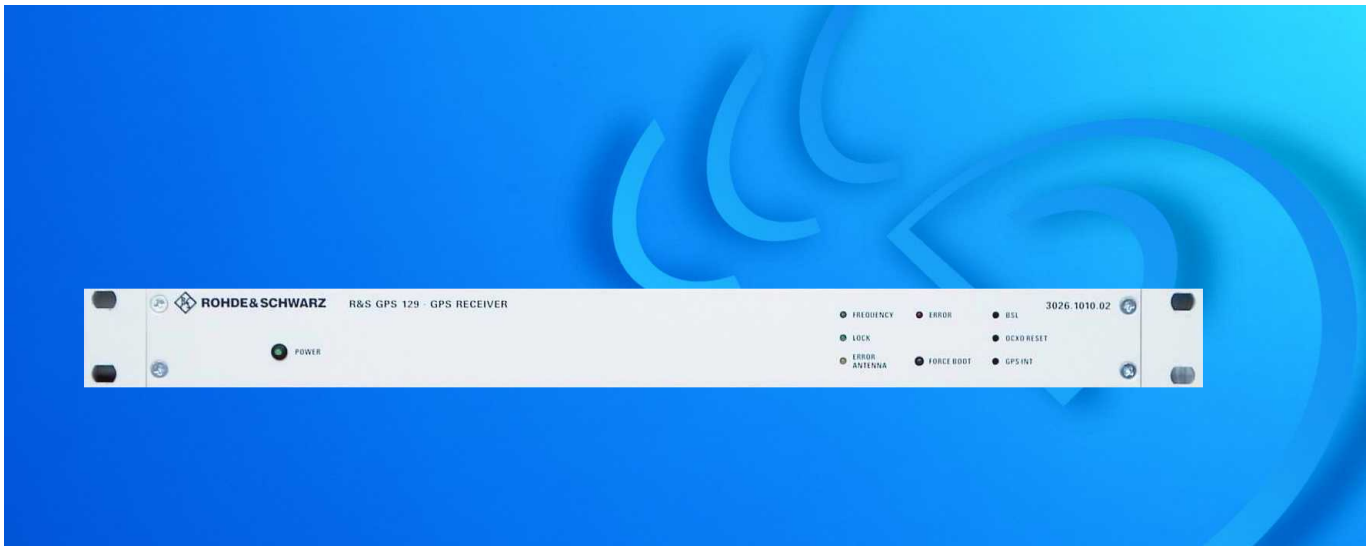


# Technical Information

Subject to change [28-May-2002, 8SPM-pf/sd, Version 1.1]



## GPS Receiver R&S GPS129

### GPS receiver with reference frequency generator

- ◆ GPS receiver and reference frequency generator combined in a single unit
- ◆ High precision due to GPS-based operation
- ◆ Compact design: 19" rackmount with a height of just 1 unit for integration into system racks
- ◆ Suitable for stationary, transportable and mobile applications
- ◆ Available with AC or DC power supply
- ◆ Remote-controlled operation for optimum integration into monitoring systems, especially Spectrum Monitoring and Management System R&S ARGUS-IT or Coverage Measurement System R&S ARGUS-FMTV

## Introduction

The GPS Receiver R&S GPS129 has been designed to provide the user with extremely precise time and position data.

When it comes to direction finding and location of radio emitters, the exact position of the DF antenna must be known in order to calculate the target location from the bearings and location of two or more direction finders. The R&S GPS129 provides GPS-based position information via serial interface.

In addition, the R&S GPS129 offers high-accuracy 2.048 MHz and 10 MHz frequency outputs to increase the frequency accuracy of receivers if the receiver is fitted with a frequency reference input.

## Overview

The R&S GPS129 consists of a GPS receiver and a satellite-controlled clock together with a power supply unit, all installed in a metal 19" rackmount and ready to operate. It is available with AC or DC power supply. The interfaces and input/output signals provided by the R&S GPS129 are accessible via connectors on the rear panel.

The global positioning system (GPS) is a satellite-based radio positioning, navigation, and time-transfer system. GPS is based on accurately measuring the propagation time of signals transmitted from satellites to the receiver.

The R&S GPS129 has been developed for applications where conventional radio-controlled clocks cannot meet the growing precision requirements. High precision available 24 hours a day around the world is the main feature of this unit which receives its information from the satellites of the global positioning system.

## Control elements and interfaces

Five LEDs at the front panel indicate the status of the unit:

- ◆ The POWER LED indicates that the unit is switched on
- ◆ The FREQUENCY LED indicates that the unit has reached its operating parameters and that the accuracy of the frequency outputs is  $10^{-9}$
- ◆ The LOCK LED is turned on after power-up when the receiver has acquired at least four satellite signals and has computed its position; the LED is turned off when the accuracy of the output frequencies is reached
- ◆ The ANTENNA LED indicates a fault in the antenna or the antenna cable
- ◆ The ERROR LED indicates that the unit is not yet ready to operate, either because it is still booting or does not receive a satellite signal

The FORCE BOOT key forces the receiver into the boot mode. This may be necessary if the satellite data in the memory is too old or if the receiver position has changed by some hundred kilometers since the last operation.



Front view of R&S GPS129



Rear view of R&S GPS129

All interfaces of the GPS receiver are located on the rear panel as shown in the figure above:

- ◆ COM0  
Serial RS-232-C interface providing position and time information and allowing the unit to be controlled remotely
- ◆ COM1  
Serial RS-232-C interface providing time information
- ◆ TIME CAPTURE / PULSE OUTPUT  
Special TTL inputs for storing time stamps and two TTL outputs providing pulses every second on the second or every minute on the minute
- ◆ 2.048 MHz  
Output for a precise 2.048 MHz reference frequency
- ◆ 2.048 MHz SWITCHED  
Output for a precise 2.048 MHz reference frequency that is switched on when the specified accuracy has been reached.
- ◆ 10 MHz  
Output for a precise 10 MHz reference frequency
- ◆ 10 MHz SWITCHED  
Output for a precise 10 MHz reference frequency that is switched on when the specified accuracy has been reached
- ◆ ANTENNA  
RF input for connecting the GPS antenna
- ◆ Power supply input

## Specifications

### General

Receiver	6 channel C/A code receiver with external antenna/converter unit
Antenna	antenna/converter unit with remote power supply
Time to synchronization	$\leq 2$ minutes (with known receiver position and valid almanac) $\leq 12$ minutes (cold boot)
Pulse outputs	every second on the second (P_SEC, TTL level) every minute on the minute (P_MIN, TTL level)
Pulse accuracy	better than $\pm 250$ ns (after synchronization and 20 minutes of operation) better than $\pm 2$ $\mu$ s (during the first 20 minutes of operation)
Frequency accuracy	$\pm 1 \cdot 10^{-10}$ (with GPS-synchronous operation and 2 hours of operation) $\pm 1 \cdot 10^{-12}$ (with GPS-synchronous operation, averaged over 24 h) $\pm 5 \cdot 10^{-10}$ (1 day, free running) $\pm 1 \cdot 10^{-7}$ (1 year, free running)
Short-term stability	$< 5 \cdot 10^{-12}$ (Allen Variance (1s, 10s))
SSB phase noise	-100 dB/Hz (1 Hz beside carrier) -130 dB/Hz (10 Hz beside carrier) -145 dB/Hz (100 Hz beside carrier) -155 dB/Hz (1 to 10 kHz beside carrier)

### Interfaces

COM0	9-pin D-Sub connector, serial RS-232-C interface (default setting: 19200, 8N1)
COM1	9-pin D-Sub connector, serial RS-232-C interface (default setting: 9600, 8N1)
TIME CAPTURE / PULSE OUTPUT	9-pin D-Sub connector providing TTL inputs for storing time stamps and TTL outputs with pulses every second on the second or every minute on the minute
2.048 MHz	BNC jack, 2.048 MHz reference frequency, 3.0 V pp into 50 $\Omega$
2.048 MHz SWITCHED	BNC jack, 2.048 MHz reference frequency, 3.0 V pp into 25 $\Omega$ , switched on when the specified accuracy has been reached
10 MHz	BNC jack, 10 MHz reference frequency, 3.0 V pp into 50 $\Omega$
10 MHz SWITCHED	BNC jack, 10 MHz reference frequency, 3.0 V pp into 25 $\Omega$ , switched on when the specified accuracy has been reached
ANTENNA	N jack, RF input (GPS antenna/converter unit)
Power supply input	model 02: mains connector, 100 to 240 V <sub>AC</sub> model 04: DC connector, 19 to 35 V <sub>DC</sub>

**General data**

Limit temperature range

0°C to +50°C

Humidity

85% relative humidity

EMC

meets EMC directive of EU (89/336/EEC)  
and German EMC law

Quality standard

developed and manufactured in compliance with  
ISO 9000

Power supply

model 02: 100 to 240 V<sub>AC</sub>, 50 to 60 Hz, 20 VAmodel 04: 19 to 35 V<sub>DC</sub>, max. 2 A / 20 W

Dimensions (W x H x D)

19" rackmount

1 HU – 483 mm x 44 mm x 345 mm

Weight

3 kg

## Ordering information

### Basic versions

GPS Receiver with reference frequency generator, 100 to 240 V <sub>AC</sub> operation, including GPS antenna	R&S GPS129	3026.1010.02
GPS Receiver with reference frequency generator, 19 to 35 V <sub>DC</sub> operation, including GPS antenna	R&S GPS129	3026.1010.04

