GSG-54

GPS 8-channel Simulator

- **Versatile 8-channel GPS signal generator with pre-configured test scenarios**
- **Operates with StudioView™ for easy trajectory creation via Google Maps**
- **Easy-to-use and intuitive**
- **Fully operational via front-panel, web-based remote control, or SCPI protocol**
- **Multiple interfaces for remote control**
- **Stand-alone, compact and portable bench-top chassis**
- **3GPP A-GPS Standards-based testing**
- **Affordable and powerful**

The GSG-54 provides a wide-range of capabilities for in-line production testing, including navigational fix and position testing with up to 8 GPS signals, while offering ease-of-operation and extremely fast test cycles. It also benefits engineering and development organizations for integrating GPS receivers into their devices.

Easy to Use

The easy-to-use GSG-54 is an 8-channel GPS constellation simulator. The user can configure scenarios on-the-fly without the need for an external PC and without pre-compilation phase. Via the front panel, the user can swiftly modify parameters such as user position and time and can define the scenario through a set of pre-defined antenna and atmospheric models, as well as trajectories and events. And using the optional StudioView™ software facilitates easily created scenarios via a Google Maps interface.

Flexibility

GSG-54 comes with a set of built-in trajectories (static, configurable circle, and rectangular as defined in 3GPP TS 25.171) or the user can upload their own trajectories in NMEA standard format. Create dynamic events such as fades and reflected signals to simulate various impairments. Ephemeris data is via standard RINEX format. Use the pre-loaded default data for any time periods, use your own ephemeris data, or configure scenarios to automatically download ephemeris data from official websites. Some restrictions apply.

Connectivity Extends Ease of Use and Flexibility

The GSG-54 can be controlled via an Ethernet network connection, USB or GPIB. A built-in web interface allows complete operation of the instrument through front panel controls. With the optional GSG StudioView™ PC Software, you can build, edit, and manage the most complex scenarios, including building trajectories via Google Maps, independent of the GSG-54, for later upload.

Suitable for Testing Timing Receivers

Besides the variety of built-in navigation/positioning tests, the GSG-54 is also suited for accurate testing of timing GPS-receivers. The GSG-54 comes equipped with a high stability OCXO timebase for precision timing of the satellite data, and to emulate the actual atomic clocks in the satellites, there is an input for external synchronization from a 10 MHz reference from e.g. a Cesium or Rubidium clock. A built-in 1-pps output, which is synchronized to the generated satellite data, allows comparison with the 1-pps signal from the timing receiver under test.

The Affordable Test Solution

The GSG-54 is a perfect fit for a wide-variety of test cases including:

- Test of simulated movements (user trajectories).
- Test of receivers' sensitivity to loss of satellites, multi-path, leap seconds, and atmospheric conditions.
- Fast production test of sensitivity and positioning receivers' accuracy (conducted or over-the-air).
- Test of timing receiver accuracy.
- Test of receivers' dynamic range.
- Test of receivers' susceptibility for noise (SNR limit testing).
- Test of leap second transition.

USA | 1565 Jefferson Road, Suite 460 | Rochester, NY 14623 | +1.585.321.5800 | sales@spectracomcorp.com
FRANCE | 3 Avenue du Canada | 91974 Les Ulis, Cedex | +33 (0)1 64 53 39 80 | sales@spectracom.fr
UK | 6A Beechwood | Chineham Park | Basingstoke, Hants, RG24 8WA | +44 (0)1256 303630 | info@spectracom.co.uk

Input and Output Specifications

RF Signal GPS L1

Connector: Type N female
DC Blocking: internal, up to 7 VDC; 470 Ω nominal load
Frequency: 1575.42 MHz (L1)
Number of output channels: 8
Data format/Frame structure: 50 bps (GPS C/A code)
Spurious transmission: <-40 dBc
Harmonics: <-40 dBc
Output signal level: -65 to -160 dBm; 0.1 dB resolution down to -150 dBm; 0.3 dB down to -160 dBm.
Power accuracy: ±1.0 dB
Pseudorange accuracy: 1mm
Inter-channel bias: Zero
Inter-channel range: ±54 dB
Limits:

- Altitude: 18,240 m (60,000 feet)
- Acceleration: 4.0 g
- Velocity: 515 m/s (1000 knots)
- Jerk: 20 m/s^3

External Frequency Reference Input

Connector: BNC female
Frequency: 10 MHz nominal
Input signal level: 0.1 to 5Vrms
Input impedance: >1kΩ

Frequency Reference Output

Connector: BNC female
Frequency: 10 MHz sine
Output signal level: 1Vrms in to 50 Ω load

External Trigger Input

Connector: BNC female
Frequency: TTL level, 1.4V nominal

1PPS Output

Connector: BNC female
Output signal level: approx. 0V to +2.0V in 50 Ω load
Accuracy: Calibrated to ±10 nSec of RF timing mark output

Built-in Timebase

Internal Timebase – High Stability OCXO

Ageing per 24 h: $<5x10^{-10}$
Ageing per year: $<5x10^{-8}$
Temp. variation 0...50°C: $<5x10^{-9}$
Short term stability (Adev @1s): $<5x10^{-12}$

Auxiliary Functions

Interface

GPIB (IEEE-488.2), USB 1.X or 2.X (USB-TMC-488), Ethernet (100/10 Mbps)

Settings

Predefined scenarios: 6; User can change date/time/position/trajectory/number of satellites/atmospheric model
User defined scenarios: Unlimited
Trajectory data: NMEA format (GGA or RMC messages, or both), convert from other formats with GSG StudioView™ (see separate datasheet)

General Specifications

Certifications

Safety: Designed and tested for Measurement Category I, Pollution Degree 2, in accordance with EN/IEC 61010-1:2001 and CAN/CSA-C22.2 No. 61010-1-04 (incl. approval)
EMC: EN 61326-1:2006, increased test levels per EN 61000-6-3:2001 and EN 61000-6-2:2005

Dimensions

WxHxD: 210 x 90 x 395 mm (8.25" x 3.6" x 15.6")
Weight: approx. 2.7 kg (approx. 5.8 lb)

Optional Antenna

Frequency: 1575.42 ±2MHz
Impedance: 50 Ω
VSWR: <2:1 (typ)
Connector: SMA male
Dimensions: 12 mm diameter x 38 mm length

Environmental

Class: MIL-PRF-28800F, Class 3
Temperature: 0°C to +50°C (operating); -40°C to +70°C non-condensing @ <12,000m (storage)
Humidity:
5-95 % @ 10 to 30°C
5-75 % @ 30 to 40°C
5-45 % @ 40 to 50°C

Power

Line Voltage: 90-265 VRMS, 45-440 Hz
Power Consumption: <25 W

Ordering information

Basic Model

GSG-54: GPS 8-channel simulator; with high stability OCXO timebase
Included with instrument

- User manual and GSG StudioView software (30-day trial) on CD
- RF cable, 1.5 m
- SMA to Type N adapter
- USB cable
- Certificate of calibration
- 3-year warranty[1]

[1]The warranty period may be dependent on country.

Optional Accessories

Option 01/70: Antenna
Option 22/90: Rack-mount kit
Option 27H: Heavy-duty hard transport case
Option 90/54: Calibration Certificate with Protocol
Option 95/05: Extended warranty to 5 years
OM-54: Users manual (printed)
GSG SudioView PC Software: License key enables full functionality, one key required per machine (file transfer functionality is available without a key)

August 29, 2012 - GSG-54 (H)
Specifications subject to change or improvement without notice.