Small Instrumentation Modules

SIM940 — 10 MHz rubidium frequency standard

Three 10 MHz outputs

- 1 pps input and output for GPS synchronization
- 20 year aging less than 0.005 ppm
- Ultra-low phase noise (< -130 dBc/Hz at 10 Hz)
- 72 hour Stratum 1 level holdover



-SIM940 10 MHz Rubidium Frequency Standard-

The SIM940 integrates a rubidium oscillator (SRS model PRS10) into the SIM900 platform. It provides stable and reliable performance with an estimated 20 year aging of less than 5×10^{-9} and a demonstrated rubidium oscillator MTBF of over 200,000 hours. The SIM940 is an ideal instrument for calibration and R&D laboratories or any application requiring a precision frequency standard.

There are three 10 MHz outputs with exceptionally low phase noise (-130 dBc/Hz at 10 Hz offset) and one second Allan variance ($<2 \times 10^{-11}$). The SIM940 can be phase-locked to an external 1 pps reference (like GPS), providing Stratum 1 performance. A 1 pps output is also provided that has less than 1 ns of jitter and may be set with 1 ns resolution.

All functions of the SIM940 can be controlled from a computer via the SIM900 Mainframe. Both RS-232 and GPIB interfaces are supported by the mainframe.

Distribution in the UK & Ireland



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SIM940 Specifications

Output

Output frequency Amplitude (±10 %) 1 pps pulse amplitude Phase noise (SSB)	10 MHz sine, 10 μ s wide 1 pps pulse 0.5 Vrms (+7 dBm) into 50 Ω 2.5 V into 50 Ω , 5 V into high impedance loads < -130 dBc/Hz (10 Hz) < -140 dBc/Hz (100 Hz) < -150 dBc/Hz (1 kHz) < -155 dBc/Hz (10 kHz)
Spurious	< -100 dBc (100 kHz BW)
Harmonics	< -60 dBc
Accuracy at shipment	$\pm 5 \times 10^{-11}$
Aging (after 30 days)	$<5 \times 10^{-11}$ (monthly)
	$<5 \times 10^{-10}$ (yearly)
	5×10^{-9} (20 years, typ.)
Short-term stability	
(Allan variance)	$<2 \times 10^{-11} (1 \text{ s})$
	$<1 \times 10^{-11} (10 \text{ s})$
	$<2 \times 10^{-12} (100 \text{ s})$
Holdover	72 hour Stratum 1 level (1×10^{-11})
Frequency retrace	$\pm 5 \times 10^{-11}$ (72 hrs. off, then 72 hrs. on)
Settability	$<5 \times 10^{-12}$
Trim range	$\pm 2 \times 10^{-9}$ (0 to 5 VDC)
	±0.5 ppm (remote interface)
Warm-up time	<6 minutes (time to lock)
	<7 minutes (time to 1×10^{-9})

Front-Panel Indicators (LEDs)

Locked	Indicates frequency is locked to rubidium
Unlocked	Indicates frequency is unlocked
1 pps input	Blinks with each 1 pps reference
	input applied to rear panel
1 pps sync	"On" when 1 pps output is
	synchronized within $\pm 1 \ \mu s$ of
	1pps input

Rear-Panel Connections

Frequency adjust	0 to 5 VDC adjusts frequency by
	±0.002 ppm
1 pps input	100 k Ω input. Requires CMOS
	level pulses (0 to 5 VDC). If an
	external 1 pps input is applied, lock
	is maintained between the 1 pps
	input and 1 pps output with computer
	adjustable time constant from 8 minutes
	to 18 hours.
1 pps output	50 Ω pulse output

10 MHz outputs DB15/M

Three 10 MHz sine outputs (50 Ω) SIM interface (power & communication)

Environmental

Operating temperature Temperature stability
Storage temperature Magnetic field

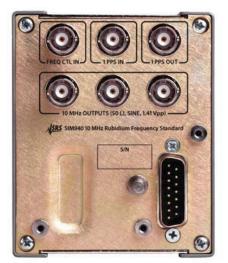
e +10 °C to +40 °C $\Delta f/f < \pm 1 \times 10^{-10}$ (+10 °C to +40 °C) -55 °C to +85 °C $\Delta f/f < 2 \times 10^{-10}$ for 1 Gauss field reversal 95 % (non-condensing)

General

Relative humidity

Interface Power

Dimensions Weight Warranty Serial via SIM interface,direct to PRS10 +24 V (2.2 A at start-up, 0.6 A after warm-up period) 3.0" × 3.6" × 7.0" (WHL) 5 lbs. One year parts and labor on defects in materials and workmanship



SIM940 rear panel

Ordering Information

SIM940 10 MHz rubidium frequency std.

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