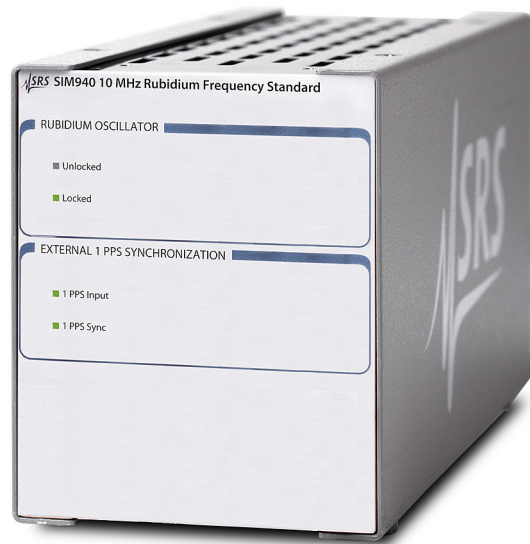


Small Instrumentation Modules

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 ... \$2995 (U.S. list)



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 and Allan variance. 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.

Output

| | |
|---------------------------------------|--|
| Output frequency | 10 MHz sine, 10 μ s wide 1 pps pulse |
| Amplitude ($\pm 10\%$) | 0.5 Vrms (+7 dBm) into 50 Ω |
| 1 pps pulse amplitude | 2.5 V into 50 Ω , 5 V into high impedance loads |
| Phase noise (SSB) | <-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) | < 5×10^{-11} (monthly) < 5×10^{-10} (yearly) 5×10^{-9} (20 years, typ.) |
| Short-term stability (Allan variance) | < 2×10^{-11} (1 s) < 1×10^{-11} (10 s) < 2×10^{-12} (100 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 | < 5×10^{-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 1 pps 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 | Three 10 MHz sine outputs (50 Ω) |
| DB15/M | SIM interface (power & communication) |

Environmental

| | |
|-----------------------|---|
| Operating temperature | +10 $^{\circ}$ C to +40 $^{\circ}$ C |
| Temperature stability | $\Delta f/f < \pm 1 \times 10^{-10}$ (+10 $^{\circ}$ C to +40 $^{\circ}$ C) |
| Storage temperature | -55 $^{\circ}$ C to +85 $^{\circ}$ C |
| Magnetic field | $\Delta f/f < 2 \times 10^{-10}$ for 1 Gauss field reversal |
| Relative humidity | 95% (non-condensing) |

General

| | |
|------------|---|
| Interface | Serial via SIM interface, direct to PRS10 |
| Power | Powered by SIM900 Mainframe, or by user-provided +24 VDC power supply (2.2 A at start-up, 0.6 A after warm-up period) |
| Dimensions | 3.0" \times 3.6" \times 7.0" (WHL) |
| Weight | 5 lbs. |
| Warranty | One year parts and labor on defects in materials and workmanship |



SIM940 rear panel

Ordering Information

| | | |
|--------|--------------------------------|--------|
| SIM940 | 10 MHz rubidium frequency std. | \$2995 |
|--------|--------------------------------|--------|