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 $5 \times 10^{-9}$ 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.
### SIM940 Specifications

#### Output
- **Output frequency**: 10 MHz sine, 10 µs wide 1 pps pulse
- **Amplitude (+10%)**: 0.5 Vrms (+7 dBm) into 50Ω
- **1 pps pulse amplitude**: 2.5 V into 50Ω, 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**: ±5 × 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**: ±5 × 10⁻¹¹ (72 hrs. off, then 72 hrs. on)
- **Settability**: < 5 × 10⁻¹²
- **Trim range**: ±2 × 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 ±1 µs of 1 pps input

#### Rear-Panel Connections
- **Frequency adjust**: 0 to 5 VDC adjusts frequency by ±0.002 ppm
- **1 pps input**: 100 kΩ 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**: 50Ω pulse output
- **10 MHz outputs**: Three 10 MHz sine outputs (50Ω)
- **DB15/M**: SIM interface (power & communication)

#### Environmental
- **Operating temperature**: +10°C to +40°C
- **Temperature stability**: Δf/f < ±1 × 10⁻¹⁰ (+10°C to +40°C)
- **Storage temperature**: −55°C to +85°C
- **Magnetic field**: Δf/f < 2 × 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" × 3.6" × 7.0" (WHL)
- **Weight**: 5 lbs.
- **Warranty**: One year parts and labor on defects in materials and workmanship

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**Ordering Information**

SIM940 10 MHz rubidium frequency std. $2250