LN Rubidium GPSDO

Low Noise Rubidium GNSS-Disciplined Frequency Standard

Defense | 5G Communications | SATCOM | Transportation
Data Center Energy | Financial | Critical Infrastructure

The LN Rubidium GPSDO™ reference provides better Phase Noise and ADEV performance, lower thermal sensitivity, better holdover performance, longer lifetime and MTBF, and lower cost than comparable units.

The LN Rb GPSDO units integrate the latest-generation GNSS receiver with GPS/Glonass/BeiDou/QZSS and SBAS support and can optionally be disciplined by an external SAASM GPS receiver. The LN Rb GPSDO comes in variants that offer different phase noise/ADEV performance levels as well as different atomic clock performance levels and technologies (both Rubidium and Cesium miniature atomic clocks can be ordered).

The unit is backwards compatible with the VIAVI CSAC GPSDO products line, supporting both SCPI as well as NMEA communications interfaces. LN Rb contains an avionics-compatible power supply that can operate from 8 V to 36 V, with 5.6 W steady-state power consumption.

LN Rubidium GPSDO

Highlights

- Ultra Low Phase Noise/ADEV
- GPS/Glonass tracking at -167 dBm
- Sub 1 us holdover
- Less than 5.6 W Power Consumption
- Small form factor, 3.4 x 4.4 x 1.0 inches
- 72 Channel multi-GNSS receiver allowing for simultaneous tracking of any two GNSS systems
- Ruggedized gold-plated aluminum enclosure variants available
- Backwards compatible to the VIAVI LN CSAC GPSDO product line
- The lowest phase noise and best ADEV performance on the market

Typical Electrical Specifications

Module Specifications	Description
Long-Term Oscillator Aging	<0.1 ppb (ultimate and premium options), <0.3 ppb (standard) per month without GNSS
	Zero aging with GNSS
Frequency Stability Over Temperature (0°C to +70°C)	<0.07 ppb (ultimate), <0.1 ppb (premium), <0.7 ppb (standard)
1 PPS Stability	±10 ns to UTC RMS (1-Sigma) GPS Locked in Position Hold mode after 72 hours
Holdover Stability*	<±0.6 µs over 24 Hour Period @+25°C (Ult and Prem, after 48 hours with GPS lock)
ADEV (Ultimate OCXO option, 96+ hours GPS-locked, +25°C, no airflow, no vibration, no tilt)	
0.1 s	<4E-13
1 s	<5E-13
10 s	<8E-13
100 s	<2.5E-12
1K s	2E-12
10K s	<5E-13
100K s	<8E-14
1 PPS Outputs (Rubidium or OCXO steered)	Two 5 V CMOS outputs, one internal RS-422
10 MHz Outputs	One buffered 10 MHz Sine Wave +13 dBm (±2 dBm), two un-buffered low-noise direct OCXO sine wave outputs (+5 dBm to +10 dBm), one internal +13 dBm
Options Accessible Internally to Enclosure Only	RS-422 (10 MHz out, 1 PPS out, 1 PPS in, serial output), LCD port, 10 MHz +13 dBm Sine Wave, 5 MHz CMOS, USB
RS-232/USB Control	SCPI-99 Control at 9.6 K, 19.2 K, 38.4 K, 57.6 K, 115.2 K
RS-232/RS-422/USB NMEA Output Sentences	NMEA 0183 rev. 2.3, Sentences: GGA, RMC, ZDA, GSV, PASHR, and others
GNSS Frequency, Antenna	L1 GPS and/or Glonass, Active Antenna 5 V
GNSS Receiver	72 Channels, GPS, Glonass, BeiDou, QZSS, SBAS: WAAS/EGNOS/MSAS/GAGAN
GNSS Sensitivity	
Acquisition	-148 dBm
Tracking	-167 dBm (GPS and Glonass)
GPS Receiver Motion Adaptive Filter Settings	Optimized depending on vehicle velocity (Auto-sensing, Auto-switching option)
TTL Alarm Output	GNSS Unlock and Hardware Failure indicator
Warm Up Time/Stabilization Time Without GPS	+25°C to <2E-010 accuracy typical: Rubidium: <8 min, Filter: <15 min
Supply Voltage (Vdd)	+8 V to +36 V max, +12 V nominal
Power Consumption	<5.6 W at +25°C steady-state, <17.5 W warmup
Temperature	
Operating Temperature	-20°C to +70°C baseplate temperature
Storage Temperature	-55°C to +100°C

Typical Electrical Specifications continued

Module Specifications	Description			
g-sensitivity	Rubidium: <0.2 ppb/g/axis, Filter OCXO: <1 ppb/g/axis			
Rubidium Retrace Error (24hrs on, 48hrs off, 12hrs on)	<0.05 ppb at +25°C			
Magnetic Sensitivity	Less than 0.07 ppb per Gauss			
MTBF	>200,000 Hours at +40°C baseplate			
USB, LCD Support (accessible inside enclosure only)	RS-232 or USB controlled, supports 16x2 LCD Displays			
Phase Noise Ordering Options	*Offset*	*Ultimate PN**	*Premium PN**	*Standard PN*
	1 Hz	<-114 dBc/Hz	-108 dBc/Hz	-70 dBc/Hz
	10 Hz	<-145 dBc/Hz	-141 dBc/Hz	-98 dBc/Hz
	100 Hz	<-155 dBc/Hz	-152 dBc/Hz	-125 dBc/Hz
	1 kHz	<-162 dBc/Hz	-160 dBc/Hz	-145 dBc/Hz
	10 kHz	<-165 dBc/Hz	-163 dBc/Hz	-153 dBc/Hz
	100 kHz	<-167 dBc/Hz	-165 dBc/Hz	-154dBc/Hz

* It is assumed that the test is performed under static conditions (no vibration), in still air (unit shielded from airflow), and after a minimum of 48-hour warmup. Low Noise outputs are measured.

NOTE: Specifications subject to change without notice.

Product Ordering Information

VIAVI offers the LN Rubidium GPSDO in the following configurations:

Product Number	Description	Std PN	Prem PN	Ultimate PN	ADEV	Encl
22174881	LN Rb GPSDO SA.53 Standard PN no/Encl - RoHS	•				
22174877	LN Rb GPSDO SA.53 Premium PN/ADEV w/Encl - RoHS		•		•	•
22174878	LN Rb GPSDO SA.55 Ultimate PN/ADEV w/Encl - RoHS			•	•	•
22174879	LN Rb GPSDO SA.53 Premium PN/ADEV w/Encl 422 pin rerouting - RoHS		•		•	•
22174880	LN Rb GPSDO SA.55 Ultimate PN no/Encl MMCX - RoHS			•		
22174882	LN Rb GPSDO SA.55 Ultimate PN/ADEV no/Encl MMCX/J1 Vrt/J4USB - RoHS			•	•	

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