Low Noise Rubidium GNSS-Disciplined Frequency Standard

Jackson Labs

"the next generation in frequency and timing"

- **3.4 X 4.4 X 1.0 Inches**
- **Uses MAC Rubidium Atomic Clock**
- **Ultra Low Noise Crystal Post Filter**
- **GPS, Glonass, BeiDou, QZSS, SBAS**
- **PRELIMINARY SPECIFICATION**

TYPICAL ELECTRICAL SPECIFICATIONS:

Module Specification:	
Long-Term Oscillator Aging (without GNSS, Zero aging with GNSS)	<0.1ppb (ultimate and premium options), <0.3ppb (standard) per month
Frequency Stability Over Temperature (0°C to +70°C)	<0.07ppb (ultimate), <0.1ppb (premium), <0.7ppb (standard)
1 PPS Stability	±10ns to UTC RMS (1-Sigma) GPS Locked in Position Hold mode after 72 hours
Holdover Stability*	<±0.6us 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)	0.1s:<4E-13, 1s:<5E-13, 10s:<8E-13, 100s<2.5E-12, 1Ks: 2E-12, 10Ks:<5E-13, 100Ks:<8E-14
1 PPS Outputs (Rubidium or OCXO steered)	Two 5V CMOS outputs, one internal RS-422
10MHz Outputs	One buffered 10MHz Sine Wave +13dBm ±2dBm, two un-buffered low-noise direct OCXO sine wave outputs (+5dBm to +10dBm), one internal +13dBm
Options accessible internally to enclosure only	RS-422 (10MHz out, 1PPS out, 1PPS in, serial output), LCD port, 10MHz +13dBm Sine Wave, 5MHz CMOS, USB
RS-232/USB Control	SCPI-99 Control at 9.6K, 19.2K, 38.4K, 57.6K, 115.2K
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 5V
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 Typ: Rubidium: <8 min, Filter: <15 min
Supply Voltage (Vdd)	+8V to +36V max, +12V nominal
Power Consumption	<5.6W at +25°C steady-state, <17.5W warmup
Operating Temperature	-20°C to +70°C baseplate temperature
g-sensitivity	Rubidium: <0.2ppb/g/axis, Filter OCXO: <1ppb/g/axis
Rubidium Retrace Error (24hrs on, 48hrs off, 12hrs on)	<0.05ppb at +25°C
Magnetic Sensitivity	Less than 0.07ppb per Gauss
Storage Temperature	-55°C to +100°C
MTBF	>> 200,000 Hours at +40°C baseplate
USB, LCD support (accessible inside enclosure only)	RS-232 or USB controlled, supports 16x2 LCD Displays
Ordering Options	Ultimate Part Number: 1004031, Premium PN: 1004030, Standard PN: 1004029
Phase Noise ordering options *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 hours warmup. Low Noise outputs are measured.	

Offset	Ultimate PN*	Premium PN*	Standard PN
1Hz	<-114dBc/Hz	-108dBc/Hz	-70dBc/Hz
10Hz	<-145dBc/Hz	-141dBc/Hz	-98dBc/Hz
100Hz	<-155dBc/Hz	-152dBc/Hz	-125dBc/Hz
1KHz	<-162dBc/Hz	-160dBc/Hz	-145dBc/Hz
10kHz	<-165dBc/Hz	-163dBc/Hz	-153dBc/Hz
100kHz	<-167dBc/Hz	-165dBc/Hz	-154dBc/Hz

Low Noise Rubidium GPSDO: **MADE IN USA**

Jackson Labs Technologies, Inc, 1635 Village Ctr. Cir., Suite 150, Las Vegas, NV 89134
Phone: (702) 233-1334, Fax: (702) 233-1073, www.jackson-labs.com
sales@jackson-labs.com

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