

OCXO+Rb



QRb Sync

10 MHz or 100 MHz GPS/GNSS-DISCIPLINED LOW PHASE NOISE OCXO Rb CLOCK

Industry Leading ULN Oscillators
and Disciplined Rb Combined



Exceptional Phase Noise

Excellent Stability

Low-G-Sensitivity

Internal Vibration Isolation Options



Auto-Adaptive Smartiming+ SAASM/Non-SAASM
GPS/GNSS Disciplining Technology @ 1 ns Resolution

APPLICATIONS

- High Dynamic Platforms
- Tactical Helicopter
- Tactical Airborne
- Drone (UAV/UGA)
- Shipboard
- Ground Communications
- Mobile Satcom
- Tactical Aerial Radar

"Quietly the Best"



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KEY FEATURES

- Frequency-Disciplined Outputs 10 MHz or 100 MHz (2 Outputs of Selected Frequency)
- Frequency outputs to 500 MHz upon request
- Single Power Supply Voltage +16 ±1 VDC
- Compact Size with Internal Vibration Isolation Options
 - Rb & OCXO Hard Mounted 6 x 5.7 x 1.1" (152.4 x 144.78 x 27.94 mm) (a)
 - Rb Hard Mounted; OCXO Vibe Isolated 6 x 5.7 x 1.1" (152.4 x 144.78 x 27.94 mm) (b)
 - Rb & OCXO Vibe Isolated 6 x 5.7 x 1.4" (152.4 x 144.78 x 35.56 mm) (c)
- Initial Frequency Accuracy at Power-On ±5E-8 (until OCXO locks to Rb)
- Frequency Offset Over Op Temp Range <1E-10 over 0°C to +50°C
- Short-Term Stability ≤5E-12 at 1 sec, static; ≤2E-11 at 1 sec, dynamic
- Auto-Adaptive SmarTiming+ SAASM/Non-SAASM GPS/GNSS Disciplining Technology
 - REF Input 1PPS from SAASM/Non-SAASM GPS/GNSS
 - REF Locking Resolution 1 ns
 - REF Disciplining/Filtering/Controlling Auto Adaptive
 - Smart Loop Time Constant 280 - 100,000 sec, programmable
 - REF Locking Mode (User Settable) Sync or Track
 - REF Types (PRS/Stratum 1 Source) GPS, Cesium, E1/T1, eLoran, Maser
 - OUT-Disciplined Time 1 PPS (2 Outputs)
 - OUT Frequency Accuracy/Stability
 - PRS/Stratum 1 Locked 1E-12, typical
 - Holdover (No PRS) <5E-11/month
 - OUT Time Accuracy/Stability
 - GPS Locked <50 ns
 - Holdover (No GPS) < 2 μs/48 hrs or < 1 μs/24 hrs
- Power Consumption 34 Watts during warm-up
15 Watts, steady state @ +25°C
- Warm-up Time < 10 min, setting time < 30 min (a & b)
< 12 min, setting time < 30 min (c)
- Ultra-Low Aging < 5E-11/ month
- Ultra-Low Phase Noise Output 10 MHz or 100 MHz
-165 dBc/Hz -176 dBc/Hz
- Test Vibration Profile 10 kHz offset
0.01 g2/Hz random, 10-2000 Hz*
- RS232 Standard Interface *Testing can be completed using customer
provided vibration profile upon request
Control & Monitoring Commands, 9600 b/s
- Weight < 3 lbs (a & b)
< 4 lbs (c)

Notes:

- (a) Both Rb and OCXO are hard mounted within the assembly (no vibration isolation). Static or sine vibe environment applications.
- (b) Rb is secured directly to assembly floor and OCXO is mounted on vibration isolation tray for use in dynamic environments.
- (c) Both Rb & OCXO are mounted on vibration isolation trays for high vibration & shock level applications.



TYPICAL SPECIFICATIONS

SMARTIMING+® GPS/GNSS DISCIPLINING & FILTERING

Table with 4 columns detailing SMARTIMING+ specifications: 1 PPS INPUT (PPSREF), 1 PPS OUTPUTS (PPSOUT), BIT OUTPUTS (TTL Compatible), and SMART LOOP TIME CONSTANT.

ENVIRONMENTAL

Table with 2 columns detailing environmental specifications: VIBRATION, TEST VIBRATION PROFILE, OPERATING, DYNAMIC PHASE PERTURBATIONS, G-SENSITIVITY, OPERATING TEMPERATURE, EXPOSURE TEMPERATURE, OPERATING & NON-OP PRESSURE, HUMIDITY, SALT FOG, OPERATING ALTITUDE.

SCREENING

Table with 2 columns detailing screening specifications: VIBRATION, NON-OPERATING; THERMAL, NON-OPERATING; SHOCK, OPERATING.



STANDARD 10 MHz MODEL SPECIFICATIONS

PART NUMBER	501-30428*	501-30429	501-30430		
DESCRIPTION	Both Rb & 10 MHz OCXO Hard Mounted	Rb Hard Mounted; 10 MHz OCXO Vibe Isolated	Both Rb & 10 MHz OCXO Vibe Isolated		
APPLICATIONS	Static or Sine Vibration Environments	Dynamic Environments; Significant Random Vibration	Dynamic Environments; High Random Vibration & Shock		
ELECTRICAL SPECIFICATIONS					
Frequency	10 MHz, sine				
Number of Outputs	2				
Output Level	+10 ±2 dBm, each output				
Output Load Impedance	50 ohms				
Harmonics	≤ -30 dBc				
Spurious	≤ -80 dBc				
Initial Accuracy at Turn-On	±5E-8 until OCXO locks to Rb				
Aging, Free-Running Freq Accuracy @ +25°C	≤ 5E-11/month after 30 min settling time				
Short Term Stability	1 second	≤5E-12, static; ≤2E-11, dynamic			
	10 seconds	≤5E-12, static; ≤2E-11, dynamic			
Frequency Offset Over Op Temp Range	≤ 1E-10, 0°C to +50°C				
Settling Time	≤ 30 minutes				
Warm-up Time	≤ 10 minutes		≤ 12 minutes		
Phase Noise L(f), dBc/Hz	Static		Dynamic**		
	Offset	(no vibe isolation)	(~50 Hz vibe isolation system)	(~50 Hz vibe isolation system)	
** Expected performance considering Test Vibration Profile. Testing can be completed using customer provided vibration profile upon request.	1 Hz	-105***	-85***	-105***	-85***
	10 Hz	-135	-95	-135	-95
	50 Hz	-145	-108	-145	-104
	100 Hz	-155	-114	-155	-125
	1 kHz	-164	-134	-164	-164
*** Expected, not measured.	2 kHz	-164	-141	-164	-164
	10 kHz	-165	-165	-165	-165
	100 kHz	-165	-165	-165	-165
Supply Voltage	+16 ±1 VDC				
Warm-up Power	34 Watts, typical				
Steady State Power	15 Watts, typical @ +25°C				
MECHANICAL SPECIFICATIONS					
Size (L x W x H)	6 x 5.7 x 1.1" (152.4 x 144.78 x 27.94 mm)		6 x 5.7 x 1.4" (152.4 x 144.78 x 35.56 mm)		
Mechanical Layout	See Figure 1		See Figure 2		
Weight	≤ 3 lbs (1.36 Kg)		≤ 4 lbs (1.81 Kg)		
Mounting	Helicoil, #4-40 (0.180" deep), on base, 4 places				
Connectors	RF Input / Outputs: SMA(f) ; Power & Monitoring: (2) 9-pin D-sub				
COMMUNICATION INTERFACE					
RS-232	See commands for control & monitoring below, including timing & locking control functions VMGA messages				
Protocol Speed	9600, n, 8, 1				



STANDARD 100 MHz MODEL SPECIFICATIONS

PART NUMBER	501-30432*		501-30433		501-30434		
DESCRIPTION	Both Rb & 100 MHz OCXO Hard Mounted		Rb Hard Mounted; 100 MHz OCXO Vibe Isolated		Both Rb & 100 MHz OCXO Vibe Isolated		
APPLICATIONS	Static or Sine Vibration Environments		Dynamic Environments; Significant Random Vibration		Dynamic Environments; High Random Vibration & Shock		
ELECTRICAL SPECIFICATIONS							
Frequency	100 MHz, sine						
Number of Outputs	2						
Output Level	+10 ±2 dBm, each output						
Output Load Impedance	50 ohms						
Harmonics	≤ -30 dBc						
Spurious	≤ -80 dBc						
Initial Accuracy at Turn-On	±5E-8 until OCXO locks to Rb						
Aging, Free-Running Freq Accuracy @ +25°C	≤ 5E-11/month after 30 min settling time						
Short Term Stability	1 second	≤ 5E-12, static; ≤ 2E-11, dynamic					
	10 seconds	≤ 5E-12, static; ≤ 2E-11, dynamic					
Frequency Offset Over Op Temp Range	≤ 1E-10, 0°C to +50°C						
Settling Time	≤ 30 minutes						
Warm-up Time	≤ 10 minutes				≤ 12 minutes		
Phase Noise L(f), dBc/Hz		Static	Dynamic** (no vibe isolation)	Static	Dynamic** (~50 Hz vibe isolation system)	Static	Dynamic** (~50 Hz vibe isolation system)
Offset							
** Expected performance considering Test Vibration Profile. Testing can be completed using customer provided vibration profile upon request.	1 Hz	-70***	-64***	-70***	-64***	-70***	-64***
	10 Hz	-100	-74	-100	-74	-100	-74
	50 Hz	-120	-87	-120	-81	-120	-81
	100 Hz	-130	-93	-130	-100	-130	-100
	1 kHz	-155	-113	-155	-143	-155	-143
*** Expected, not measured.	2 kHz	-160	-119	-160	-155	-160	-155
	10 kHz	-176	-172	-176	-172	-176	-172
	100 kHz	-176	-176	-176	-176	-176	-176
Supply Voltage	+16 ±1 VDC						
Warm-up Power	34 Watts, typical						
Steady State Power	15 Watts, typical @ +25°C						
MECHANICAL SPECIFICATIONS							
Size (L x W x H)	6 x 5.7 x 1.1" (152.4 x 144.78 x 27.94 mm)				6 x 5.7 x 1.4" (152.4 x 144.78 x 35.56 mm)		
Mechanical Layout	See Figure 1				See Figure 2		
Weight	≤ 3 lbs (1.36 Kg)				≤ 4 lbs (1.81 Kg)		
Mounting	Helicoil, #4-40 (0.180" deep), on base, 4 places						
Connectors	RF Input / Outputs: SMA(f) ; Power & Monitoring: (2) 9-pin D-sub						
COMMUNICATION INTERFACE							
RS-232	See commands for control & monitoring below, including timing & locking control functions VMGA messages						
Protocol Speed	9600, n, 8, 1						

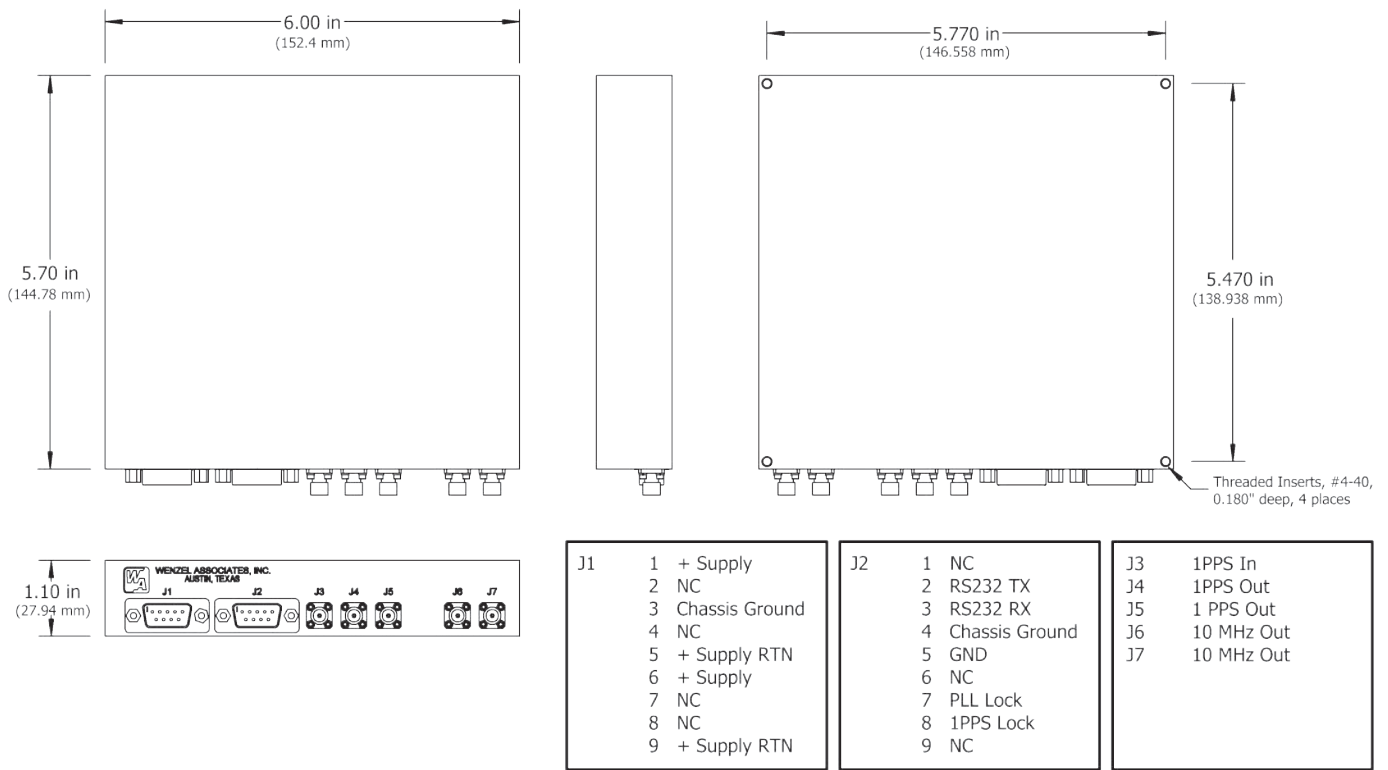


FIGURE 1

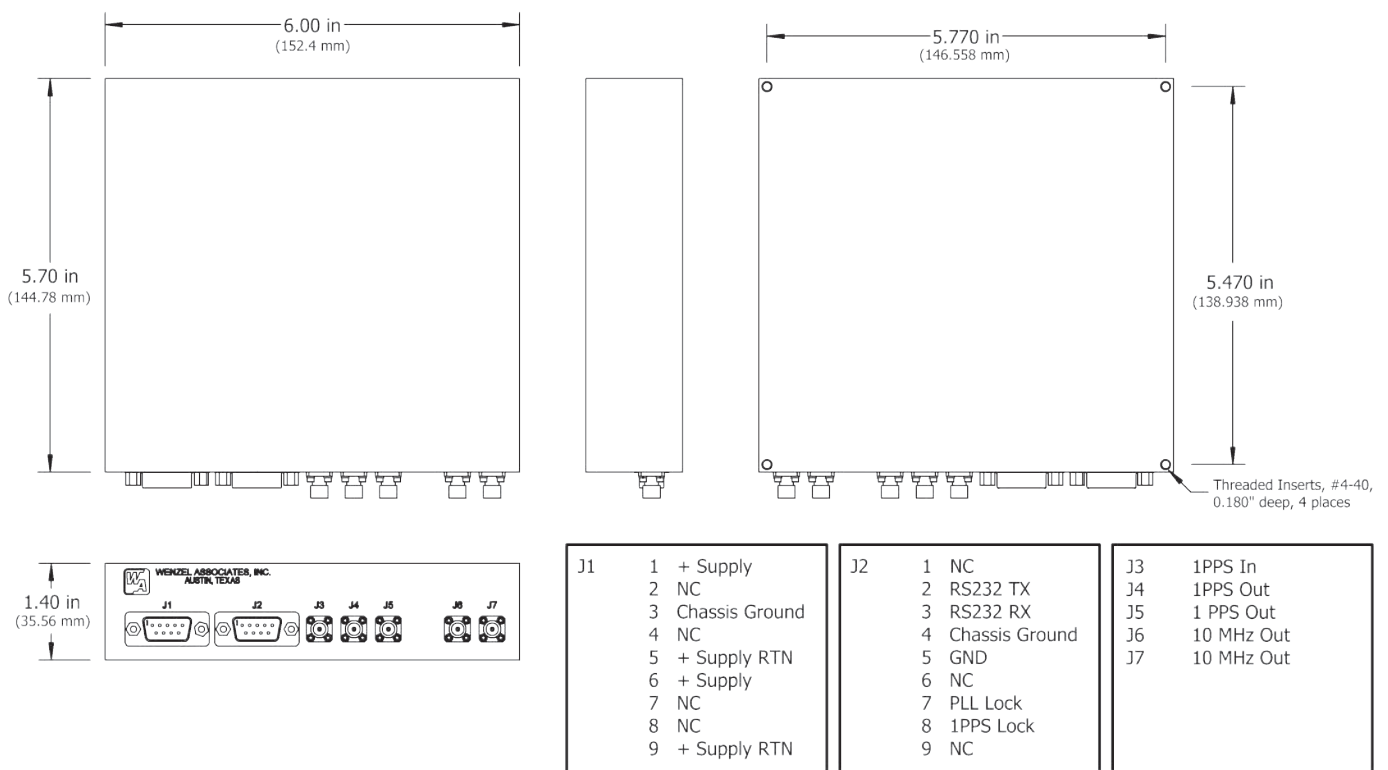


FIGURE 2