ELECTRONICS & DEFENSE

GXCLOK-500 GPS/GNSS OCXO CLOCK MODULE

SMART, LOW COST, ULTRA SMALL

The GXClok-500 is a smart, low cost, compact and fully integrated GPS/GNSS receiver & crystal oscillator module. It uses the adaptive SmarTiming+ technology, disciplining the GPS/GNSS reference noise at 1ns resolution, providing a host of complex time and frequency features in one package, while achieving state-of-the-art performance, reliability and extended lifetime.

Applications

Telecom

Navigation

Broadcast

Defense

Instrument

Safran Electronics & Defense is with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance.

SAFRAN

Key Features

- Low aging in holdover mode : <±3E-10/ day
- Low g sensitivity options available
- Frequency offset over temperature : <2E-10*
- Integrated GPS/GNSS receiver : MMCX input connector (1575.42MHz signal from GPS/GNSS antenna)
- SmarTiming+ GPS/GNSS disciplining technology : 1ns resolution
- Short-term stability : < 2E-12 @ 1s
- Output frequency accuracy/stability:
  - PRS/Stratum 1 locked : typical 31E-12 (avg 24 hrs)
  - Holdover (no GPS/GNSS/PRS) : < 10µs / 24hrs
- Output time accuracy/stability:
  - GPS locked : <50ns
- Small volume : 3.6 inch3 (3x0.8x1.5” / 76*20*38 mm)
- Single power supply : 12V
- Communication & control : RS232 interface (9600 b/s)
  NMEA 0183 messages (standard $GPRMC and $GPZDA)

* For any 10°C temperature change within the full operating range

Technical Specifications

ELECTRICAL

Spec	Smart GXClok-500	
Type	**Standard**	**Options**
RFOUT Frequency	10 MHz	Not applicable
Frequency Change	≤6E-9	
Operating temperature range	-10°C to +70°C	-40°C to +85°C
(Thermal chamber with air flow)		**(order code : E85)**
Frequency Accuracy locked to GPS	+- 1E-12 (24h avg)	
Frequency Accuracy when not locked to GPS	+- 3E-10 (24h avg)	
Aging		**(order code: A)**
(After 3 months of continuous operation)	± 3E-10 / day	± 1E-10 / day
Short Term Stability		**(order code: S)**
1sec	5E-12	2E-12
Phase Noise (dBc/Hz)		
(RFOUT=10MHz)		
1 Hz	-95	
10 Hz	-120	
100 Hz	-140	
1k Hz	-145	
10K Hz	-150	
Frequency Retrace	< 1E-8	
Off/On (In stable temperature, gravity, pressure & magnetic field conditions)	24 hrs / 15 minutes	
Warm-up Time @ +25°C	< 7 minutes	
Frequency Stability	< 1E-7	
Frequency accuracy when locked to GPS signals	< 3 E-12	
Digital Frequency Adjustment Internal crystal oscillator freq.	>±4E-7 divided in 65536 steps	
Resolution	< 2E-11 / step	
(Through RS-232 commands)		
RFOUT SINE		**(order code: NF)**
Outputs	3 floating sine waves, 0.5 Vrms (± 10% / 50Ω)	No floating
Output impedance	50 Ω ±20%	
Harmonics	< -25dBc	
Spurious fO ± 100kHz	< -80dBc	
RFOUT TTL Output level	0-5V (10mA sink/source)	
RFOUT LVDS	Typ. 340 mV / 100Ω	
Differential Output voltage magnitude		
Steady-state common-mode output voltage	Typ. 1.2V	
Communication Interface	RS-232 control & monitoring (see commands below)	
Protocol speed	9600, n, 8, 1	
Supply Voltage (DC)	12V (11.7V to 12.9V)	
Max Power Supply Ripple	< 50 mV peak to peak (from 1Hz to 1 MHz frequency band)	
Input Current		
Warm up @+25°C (typical)	< 700 mA	
+25°C	< 250 mA	
Conformal coating	None	Included (order code: CC)
Reverse Voltage Protection	< -40V (up to -40V on power input / no damage)	

ENVIRONMENTAL

Spec	Smart GXClok-500	
Type	Standard	Options
Magnetic Field Sensitivity	< 2E-10 / Gauss in worst axis	
Storage Temperature	- 55°C to + 85°C	
Humidity	GR-CORE-63, Section 5.1.2	
Operating Vibration	GR-CORE-63, Section 5.4.2	
	Random and Sinusoidal MIL-PRF-28800F, Class 3, 4	
Shock	Survival: 40g / 11ms	
G-Tip-Over Test	< 2E-9 / g in worst axis	
Dynamic sensitivity	< 2E-9 / g in worst axis	**(order code: g1)** < 1E-9 / g in worst axis **(order code: g2)** < 5E-10 / g in worst axis

PHYSICAL

Spec	Smart GXClok-500
Type	Standard
Volume / Size (L x W x H)	3.6inch3 (3x0.8x1.5" / 76*20*38 mm)
Weight	40g (1.4 oz)
Mounting & Mechanical Layout	See drawings
Connectors	
Dual in line 16 pins (2*8) 2mm	Hirose DF11-16DP-2DSA01
RFOUT coaxial	3 MMCX (10MHz output each)
GPS/GNSS Input coaxial	1 MMCX straight

INTEGRATED GPS/GNSS RECEIVER WITH SMARTIMING+® DISCIPLINING TECHNOLOGY

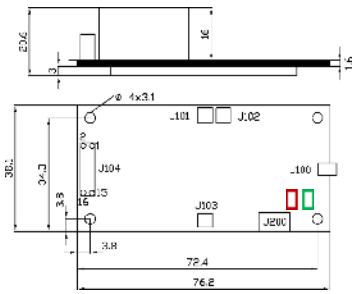
Spec	Smart GXClok-500		
Type	**Standard**	**Options**	
Integrated GPS/GNSS Receiver	GPS/GNSS	-	
GPS/GNSS Antenna Kit Input		**(order code : PA)**	
Cable connector	None	MMCX	
Active antenna voltage		5V	
Antenna type		Patch antenna	
		6 m/19.7' Included	
GPS/GNSS Antenna Kit	Not applicable	**(order code: PA)**	**(order code: RA)**
Antenna type		Patch antenna	Rooftop antenna
Lightning surge protector		Not applicable	Included
Cable length		≥5 m/16.4'	**(order code: CA)** 5+15m/16.4' +49'
Antenna mounting bracket	Not applicable	**(order code: BRA)**	
Disciplining mode	Auto-adaptive thru SmarTiming+® technology (request White Paper) Sync (phase alignment) or	Not applicable	
Architecture Model	Track (frequency alignment) See Operational Principles below		
GPS/GNSS Receiver Control	Request GPS/GNSS iSync+ Connectivity AppNotes		
T-RAIM @ startup time	Auto-configured, if supported by receiver	Auto-configured	
Position hold @ startup time	Auto-configured, if supported by receiver	Auto-configured	
PPSOUT TTL	1PPS		
Output Level	0-5V (10 mA sink/source) User settable,		
Pulse Width or duty cycle (PW)	0 to 1s in 50ns/step		
PPSOUT LVDS	1PPS		
Differential Output voltage magnitude	Typ. 340 mV / 100Ω		
Steady-state common-mode output voltage	Typ. 1.2V		
PPSREF	1PPS IN		
Level	CMOS 0-5V (< 0.8V, >3,7V)		
Pulse width	>100 ns, <0.5 sec		
Rising edge	<20 ns		
GPS/GNSS vs. PPSREF	User settable by software		

MODEL ORDERING INSTRUCTIONS

GXClok-500 / 10M / xx

Type Frequency Options (S/RA/etc)

MECHANICAL DRAWING



J104 Connector*					
		I/O			I/O
1	+10MHz LVDS	O	2	-10MHz LVDS	O
3	10MHz TTL	O	4	-1PPS LVDS	O
5	+1PPS LVDS	O	6	GND	I
7	Device OK O-3V +5k	O	8	RX 232 (O-5V)	I
9	TX RS232 (O-5V)	O	10	1PPS OUT TTL	O
11	1PPSIN C-MOS	I	12	GND	I
13	Alarm Track/Sync O-3V +5k	O	14	GND	I
15	+12V	I	16	+12V	I

***J104 Mating Connector Supplier:**

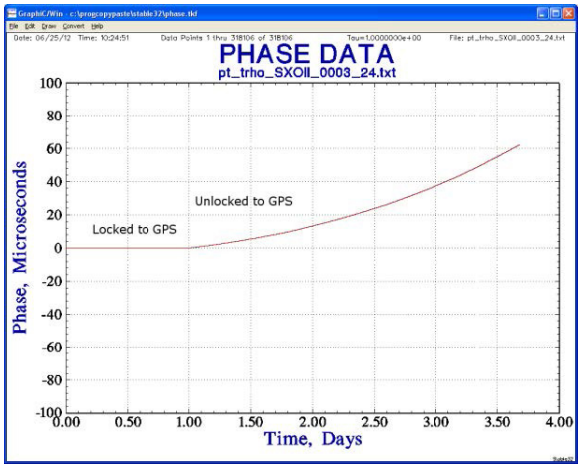
Header PN 1688348 at www.newark.com/hrs-hirose/df11-16dp-2dsa-24/header-2mm- 16way/dp/49P5026?Ntt=1688348

Dual cable PN 1688308 at www.newark.com/hrs-hirose/df11-16ds-2c/wire-to-board-connector-receptacle/dp/49P5027?Ntt=1688308

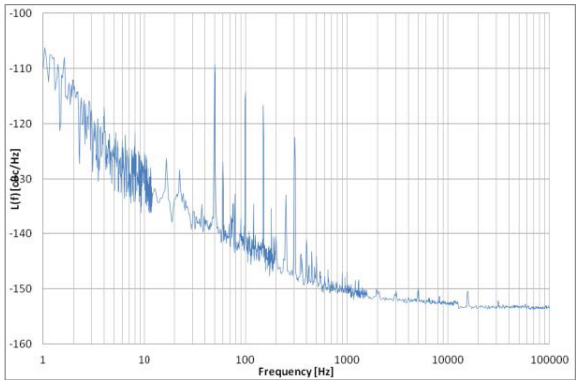
End cable crimp tin PN at 1688393 at www.newark.com/hrs-hirose/df11- 2428sc/contact-socket-28-24awg-crimp/dp/49P5045?Ntt=1688393

Crimp tool PN 1688394 at www.newark.com/hrs-hirose/df11-ta2428hc/tool-crimp-df11-awg-24-28/dp/49P5012?Ntt=1688394

HOLDOVER (Locked & Unlocked to GPS)
Condition: Lab environment

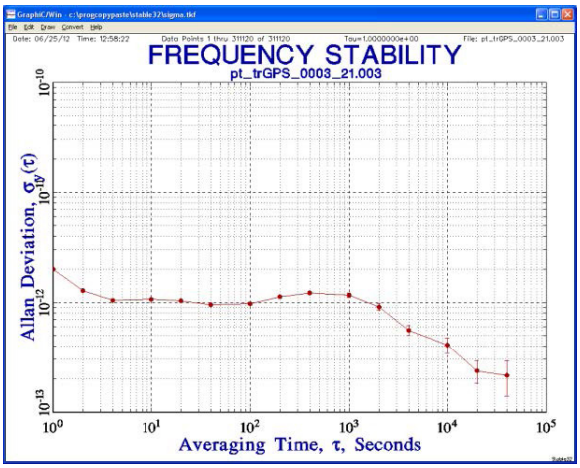


PHASE NOISE (10MHz)
Condition: Lab environnent

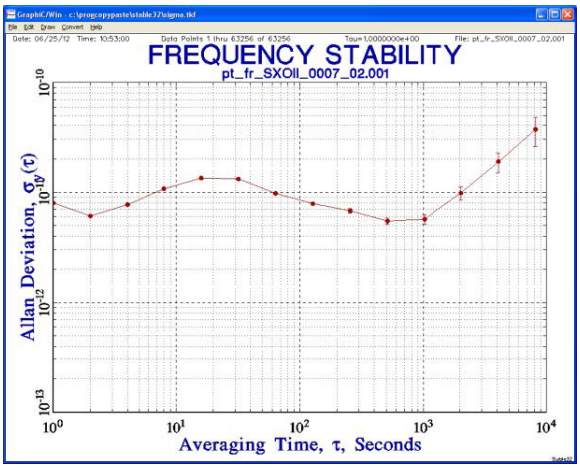


TYPICAL PERFORMANCE DATA

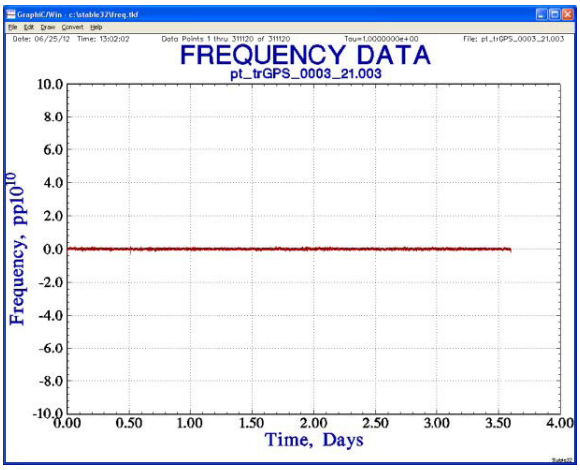
FREQUENCY STABILITY (Locked to GPS)
Condition: Time constant set at 4000s & insulated environment



FREQUENCY STABILITY (Unlocked)
Condition: Lab environment



FREQUENCY (Locked to GPS)
Condition: Time constant set at 4000s & insulated environment



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