Specification	AXGPS9000RB	Rev.: 1	Date: 2022-02-01

Oscillator type: **GPS-Disciplined Ultra-Low Noise Rubidium Frequency Reference in 19” rack (1 HU) with integrated distribution amplifiers for 1PPS and 10 MHz**

Features:

- **Very High Long-term Frequency Stability typical $2 \cdot 10^{-13}$ per day**
- **Short-term Stability (ADEV) typical $1 \cdot 10^{-12}$ @ τ = 100 sec**
- **Ultra-Low Phase Noise 10 MHz output**
- **Integrated distribution amplifiers for 1PPS & 10 MHz**
- **External 1PPS synchronization input**
- **RS-232 communication interface with NMEA-0183 standard**
- **Designed for long life time**
- **Slim 19” rack with 1 HU**

Models:

Item	(D)OCXO	(D)OCXO with integrated Distribution Amplifier	GPS-disciplined OCXO/Rubidium	Rubidium
Model*	AXIOM9000	AXDO9000	**AXGPS9000RB**	AXRB9000
Features	DOCXO option Ultra-Low Noise Very High Stability	AXIOM9000 Performance Low Noise High Isolation Frequency Distribution Amplifier with 4 to 16 Outputs	GPS Long-Term Stability < 1E-13 Ultra-Low Noise	Excellent Long-Term Stability 1E-12 Ultra-Low Noise
Optional Distribution Amplifier(s)	AXDA9000	AXDA9000	AXDA9000 AXDA9100	AXDA9000 AXDA9100

**See also our Cesium Primary Reference Clocks on our website*

Parameter	min.	typ.	max.	Unit	Condition
Nominal output frequency RF1		10.000		MHz	
Nominal output frequency RF2		1PPS			
Frequency stability					
Tracking accuracy (GPS locked)		$2 \cdot 10^{-13}$	$5 \cdot 10^{-13}$		24 hours average
Holdover stability over 24 hours		$1 \cdot 10^{-12}$			After 7 days locked
RF output RF1					
Number of output ports		8			
Signal waveform		Sine wave			
Load R_L		50		Ω	±5%
Output level per port	+12	+14	+16	dBm	
Isolation between ports	100			dB	
Harmonics			-40	dBc	
Spurious			-80	dBc	
Phase noise		-105 -140 -160 -165 -170	-100 -135 -155 -160 -165	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	@ 1 Hz @ 10 Hz @ 100 Hz @ 1 kHz @ ≥10 kHz
Short-term stability (ADEV) (GPS-locked)		$1 \cdot 10^{-11}$ $4 \cdot 10^{-12}$ $1 \cdot 10^{-12}$ $1 \cdot 10^{-12}$ $7 \cdot 10^{-13}$ $1 \cdot 10^{-13}$			@ τ = 1 sec @ τ = 10 sec @ τ = 100 sec @ τ = 1,000 sec @ τ = 10,000 sec @ τ = 100,000 sec
Warm-up time @ +25°C			15	min	Rubidium & GPS-locked
Output level indicator		LED at front panel			
RF output RF2					
Number of output ports		2			
Signal waveform		HCMOS/TTL			
Load R_L		50		Ω	±5%
Output level	3	4		Vpp	
Rise & decay time			5	ns	
1PPS indicator		LED at front panel			
External synchronization input (Note 2)					
Number of input ports		1			
Input frequency		1PPS			
Signal waveform		HCMOS/TTL			
Load R_L		50		Ω	
Input level	2.8			Vpp	
GPS input					
Input frequency (Note 3)		1575.42		MHz	GPS L1 band
Input impedance		50		Ω	
Receiver Sensitivity	-160		-144	dBm	
Antenna		Passive			5 V
Interface					
Baud rate		57600		bps	
RX/TX level		RS-232			
Communication		Status information / NMEA-0183			(Note 4)
Lock Detect Indicator		LED at front panel			Rubidium & GPS

Parameter	min.	typ.	max.	Unit	Condition
AC Supply voltage V_S	100	230	240	V	IEC 60320-1 / C14
AC Supply input frequency	50		60	Hz	
Power consumption			50	W	
Operating temperature range	+10		+50	°C	
Enclosure (see drawing) (WxDxH)	483x250x44			mm	Color "black"
Drawing number	AXZ10.01151.01				
RF Input Connector GPS	SMA female				@ Rear plate
RF Connectors	BNC female				@ Rear plate
Communication Connector	9-Pin D-Sub male with jack posts				@ Rear plate
Weight			8	kg	
Life time	Designed for >10 years				(Note 5)

Notes:

1. Terminology and test conditions are according to IEC60679-1 and MIL-PRF-55310, unless otherwise stated
2. Please see user manual for synchronization functionality
3. Beidou and Galileo bands available on request
4. See user manual for AXGPS9000RB
5. Please consult factory for extended warranty options and calibration service

Absolute Maximum Ratings

Parameter	min.	max.	Unit	Condition
AC Supply Voltage V_S	90	260	V	
AC Supply input frequency	47	63	Hz	
AC Supply input current		2	A	Fuse accessible at rear plate
Maximum 1PPS input level	-0.5	+6	V	
Load R_L	25	∞	Ω	No damage
Storage Temperature	-20	+70	°C	

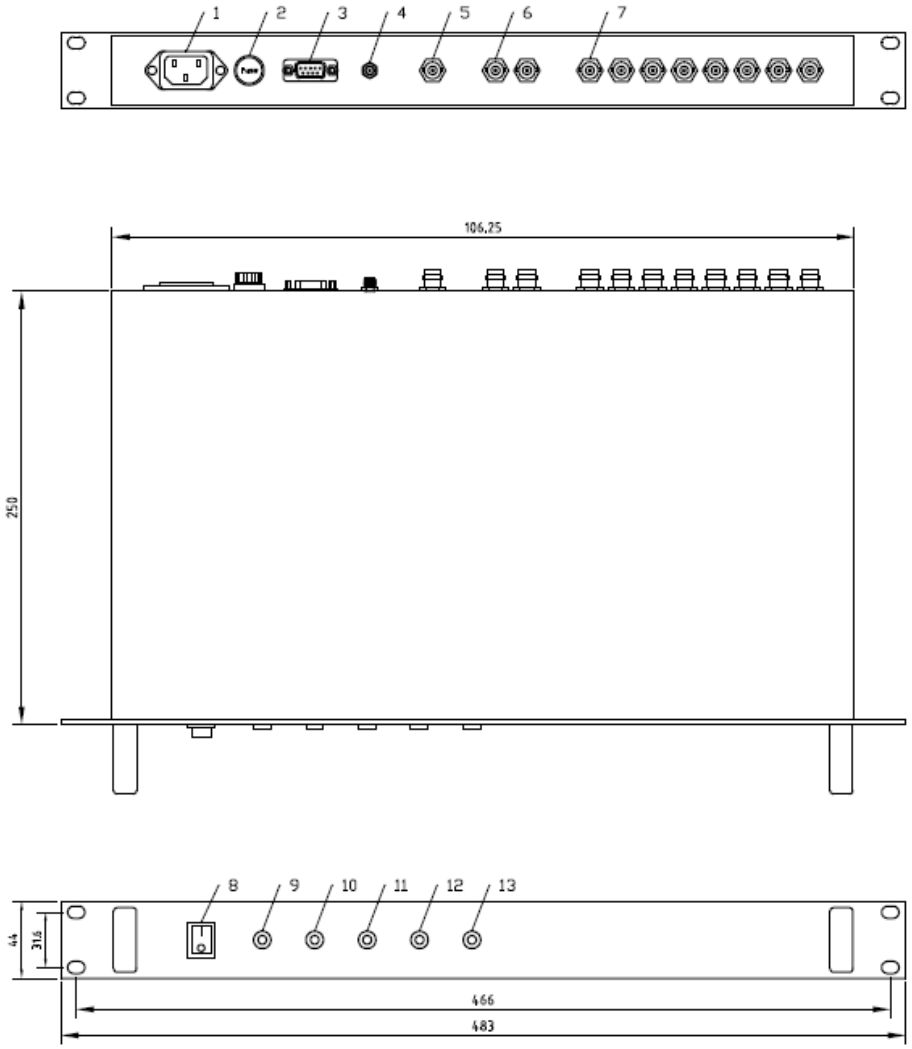
Ordering Code

Model	Revision	Frequency [MHz]
AXGPS9000RB	Rev.1	10.000

Handling & Testing

Parameter	Procedure / Test condition
Sinusoidal vibration	max. 0.15 mm <10 Hz, 1 g at 10~2000 Hz
Random vibration	max. 0.001 g^2/Hz, 10~2000 Hz
Mechanical shock	max. 10 g, 6 ms half sine
Handling and Testing	Careful handling. Avoid excessive air flow, vibration and shock during operation.
VDE 0701-0702 Tested	✖ Yes ☐ No
RoHS-Compliant	✖ Yes ☐ No
CE Conformity	✖ Yes ☐ No

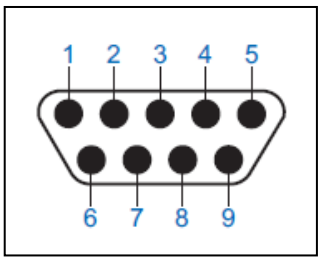
Enclosure drawing



Connections and operation

#	Panel	Symbol	Function
1	**Rear**	POWER IN	AC Supply Input (IEC 60320-1 / C14)
2		FUSE	2 A Slow 5x20 mm Fuse
3		COMM	Interface for Monitoring & Control (see pin connections below)
4		GPS IN	GPS Input
5		RF IN	External Synchronization Input 1PPS
6		RF OUT	RF Outputs 1…2 RF2 – 1PPS
7		RF OUT	RF Outputs 1…8 RF1 – 10 MHz
8	**Front**	POWER SWITCH	Power Switch ON/OFF
9		POWER ON	LED – Power ON Indicator
10		LOCK DETECT	LED – Rubidium Ready Indicator (Locked)
11		LOCK DETECT	LED – Lock Detect Indicator (GPS)
12		OL	LED – Output Level Indicator (Internal Rubidium)
13		PPS	LED – 1PPS Indicator

Pin connections D-Sub connector



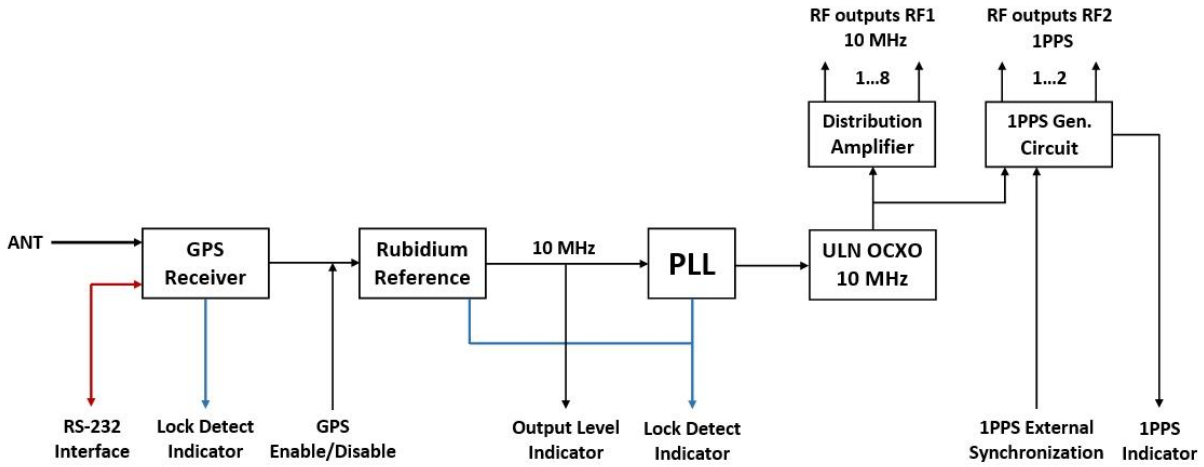
Front View D-Sub connector

Pin connections

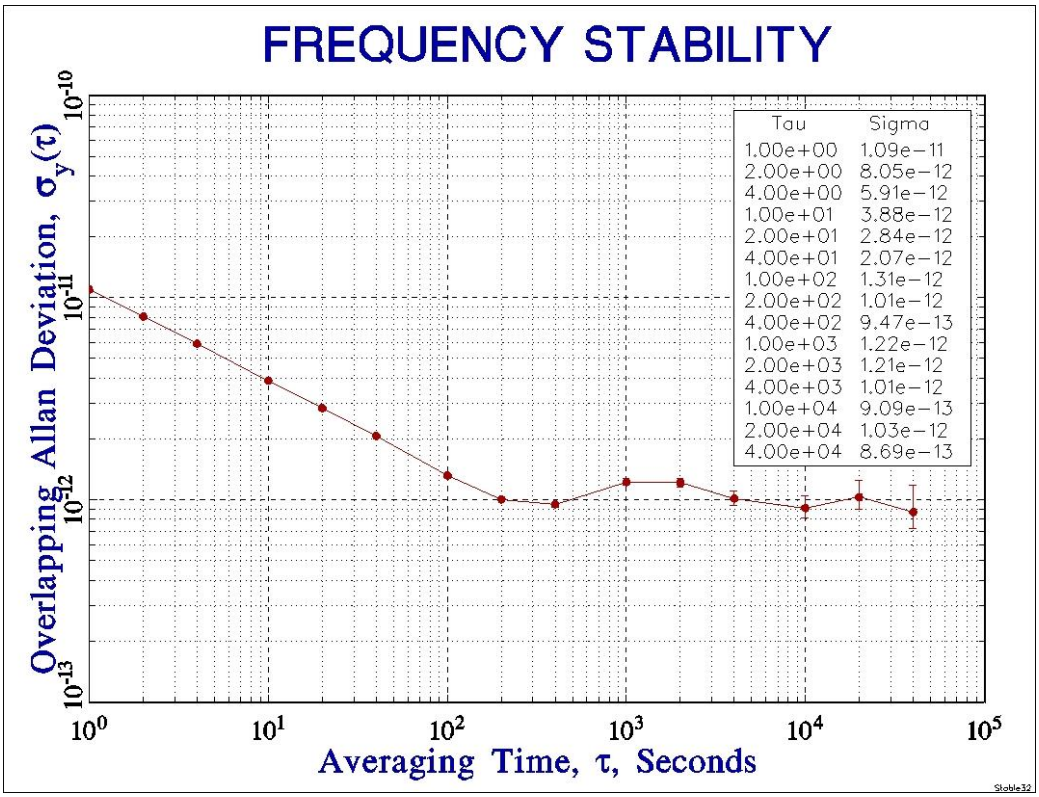
#	Symbol	Function	Type	Description
1	GPS	GPS Enable/Disable	Control	5V Logic Level, High = GPS enabled (default – internal pull-up) Low = GPS disabled (Rubidium Free-running)
2	RX	Receive Data	Monitor/Control	RS-232 Logic Level
3	TX	Transmit Data	Monitor/Control	RS-232 Logic Level
4	SYNC	Synchronization Control	Control	5V Logic Level See user manual
5	GND	Ground	-	-
6	LD1	Lock Detect	Monitor	5V Logic Level, High = Rubidium & OCXO Locked
7	LD2	Lock Detect	Monitor	5V Logic Level, High = GPS Locked
8	OL	Output Level	Monitor	5V Logic Level, High = Output Level Rubidium OK
9	PPS	1PPS	Monitor	5V Logic Level, 1PPS Pulse

Note: Please be aware of the different logic levels for the various monitor & control functions.

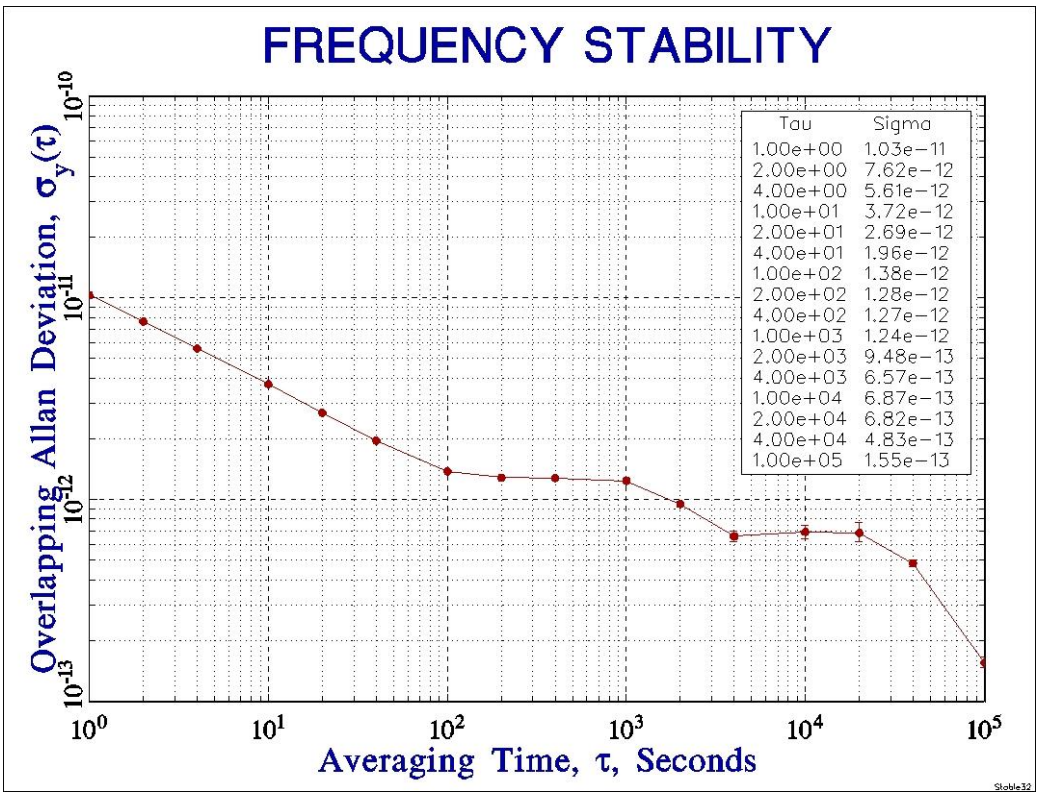
Block diagram



Typical frequency stability (free-running & GPS-locked)



Frequency stability (ADEV) – Free-running



Frequency stability (ADEV) – GPS-locked

Data sheet is for information purposes only and may be subject to modifications or may be discontinued without notice.

Revision History

Rev.	Drawing	Date [dd.mm.yyyy]	Remarks	Author	Checked
1	D0	01.02.2022	First issue	HH	ME