

# A1000 Rubidium Frequency Reference

## Features

- <1.5us holdover per 24 hours
- Available from 1 to 100MHz
- Short term stability  $<6 \times 10^{-13}$  at 1sec
- Accuracy of  $5 \times 10^{-11}$
- Ultra Low phase noise -115dBc at 1Hz
- Available 1 to 16 outputs
- Synch and auto calibration via external 1PPS input



## Description

The Quartzlock A1000 rubidium frequency reference is a 10 MHz, high-stability Rubidium frequency standard with flexible output options and very low cost of ownership primarily for production test of quartz oscillators and RF instrumentation frequency referencing. The A1000 incorporates the latest high stability and low drift designs. It can be configured to frequencies from 1 to 100MHz outputs presented on the rear panel.

## Applications

- Frequency Calibration
- Telecom Network Synchronization
- Broadcast – Radio & TV & Satellite Communications
- HDTV
- Production Test Reference for instrumentation
- Microwave Test Bench or Test Solution

### Standard configuration:

1 x 10MHz sine BNC connector, Phase noise standard, Short term stability option standard, 1PPS output BNC connector, 1PPS input BNC connector, RS232 interface for monitoring data & settings

## Related frequency reference products

- **A10-M**: Low Phase Noise 1U 19" rack mount Rubidium Frequency standard up to 12 output, 1 to 100MHz
- **E10-Y**: Low Phase Noise Desktop/Bechtot Rubidium Frequency standard, 1 to 8 output, 1 to 100MHz
- **E10-LN**: Low Phase Noise Rubidium oscillator module
- **E10-X**: Low cost Desktop Rubidium frequency reference, 1 to 4 outputs
- **E10-P**: Portable Desktop & Bench top Frequency reference 1 to 4 outputs

## A1000 Specification

### Outputs *See options*

10MHz	+10dBm ( $\pm 2$ dBm) into 50 Ohms, 0.7V <sub>rms</sub>
Connect	BNC (Standard), SMA (specify)

### Frequency Stability *Allan Deviation*

	Standard	Options B	Options C
	10MHz	10MHz	10MHz
$\tau = 1s$	$\leq 2 \times 10^{-12}$	$\leq 8 \times 10^{-13}$	$\leq 6 \times 10^{-13}$
$\tau = 10s$	$\leq 3 \times 10^{-12}$	$\leq 5 \times 10^{-12}$	$\leq 6 \times 10^{-13}$
$\tau = 100s$	$\leq 6 \times 10^{-12}$	$\leq 5 \times 10^{-12}$	$\leq 7 \times 10^{-13}$
$\tau = 1000s$	$\leq 3 \times 10^{-12}$	$\leq 2 \times 10^{-12}$	$\leq 8 \times 10^{-13}$

### Phase Noise (SSB)

Frg.	Standard		Options B		Options C	
	10MHz	5MHz	10MHz	5MHz	10MHz	5MHz
1Hz	-108 dBc	-110 dBc	-110 dBc	-115 dBc	-115 dBc	-123 dBc
10Hz	-130 dBc	-135 dBc	-138 dBc	-138 dBc	-140 dBc	-145 dBc
100Hz	-145 dBc	-150 dBc	-145 dBc	-152 dBc	-152 dBc	-155 dBc
1kHz	-154 dBc	-154 dBc	-155 dBc	-155 dBc	-160 dBc	-155 dBc
10KHz	-158 dBc	-158 dBc	-160 dBc	-160 dBc	-165 dBc	-160 dBc
100KHz	-158 dBc	-158 dBc	-160 dBc	-160 dBc	-165 dBc	-160 dBc

### Harmonics

	Options C			
	10MHz	5MHz	10MHz	5MHz
	<-30dBc	<-30dBc	<-40dBc	<-40dBc

### Spurious

100 KHz BW	<-100dBc	<-100dBc	<-100dBc	<-100dBc
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### Aging (After 30 days)

Frequency	10MHz	5MHz
<i>Per day</i>	$3 \times 10^{-12}$	$1 \times 10^{-12}$
<i>Per Month</i>	$3 \times 10^{-11}$	$4 \times 10^{-11}$
<i>Per Year</i>	$3 \times 10^{-10}$	$4 \times 10^{-10}$

### Frequency accuracy

Accuracy at shipping  $5 \times 10^{-11}$

### Frequency retrace

After 1 hours of continuous operation  $3 \times 10^{-11}$

### Frequency Adjustment

Mechanical	$\pm 2 \times 10^{-9}$ minimum adjust, resolution 1E-14	<b>Optional</b>
Digital (RS232)	$\pm 2 \times 10^{-9}$ minimum adjust, resolution 1E-14	<b>Standard</b>

### Warm up time

<10 minutes, time to lock  
<7 minutes to  $1 \times 10^{-9}$  at room temperature 25°C

**Included with shipment:** Calibration certificate, Certificate of Conformance, product test sheet and 24 month warranty.

### Environmental

<i>Temperature :</i>	Operating	-20°C +60°C
	Storage	-40°C +80°C
<i>Temp stability :</i>	-20°C +60°C	$1 \times 10^{-9}$
<i>Relative humidity :</i>	95% non-condensing	
<i>Magnetic Field sensitivity :</i>	$5 \times 10^{-11}$ Gauss	
<i>Atmospheric pressure :</i>	-60m -4000m $< 2 \times 10^{-11}$ Per mbar	
<i>Approximate MTBF :</i>	100,000 Hrs, Stationary	
<i>Dimensions :</i>	44mm (1.75") 1U 19" rack mount	

### Power supply

AC power: 90-245V AC, 47 to 63Hz  
Optional redundancy switch: see option 00

Seamless battery back-up switch

### Data output & monitoring

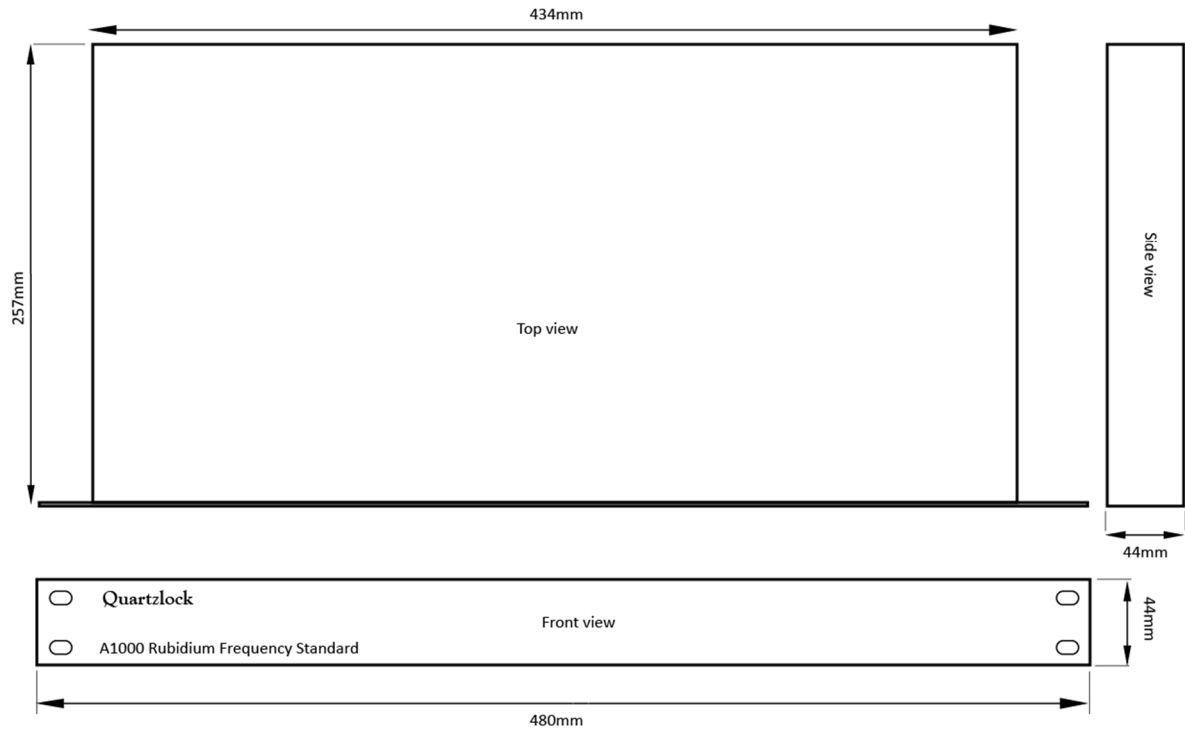
RS232, 9600 baud rate	Options D Ethernet
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### Built-in options

<b>Option 00:</b>	Redundant switchover for external power back-up
<b>Option 02:</b>	Output 2048kHz
<b>Option 03:</b>	Output 1544kHz
<b>Option 04:</b>	13MHz Output
<b>Option 05:</b>	Square wave Output, CMOS, TTL
<b>Option 06:</b>	6 x 1PPS Output, pulse width 10 millisecond
<b>Option 07:</b>	10.24MHz Output
<b>Option 08:</b>	10.23MHz Output
<b>Option 09:</b>	Add 6 Output Distribution Card
<b>Option 10:</b>	26MHz Output
<b>Option 11:</b>	1MHz Output
<b>Option 12:</b>	5MHz Output
<b>Option 18:</b>	Extended warranty to 3 years
<b>Option 20:</b>	External synch input. 1PPS, 5MHz or 10MHz
<b>Option 21:</b>	2 x 1PPS Output
<b>Option 42:</b>	Low noise floor -170dBc at 10KHz
<b>Option 52:</b>	Rack Mount 19" 2U
<b>Option 53:</b>	Rack Mount 19" 3U
<b>Option 62:</b>	AC Input 110V
<b>Option 64:</b>	DC input: Specify +12V, +24V, +48V or +60V
<b>Option 75:</b>	Add internal battery, up to 4 hours of battery life.

Contact us to configure this product to meet your requirement.  
Designed and manufactured in the U.K.

### A1000 1U enclosure mechanical drawing



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