

MIRA™

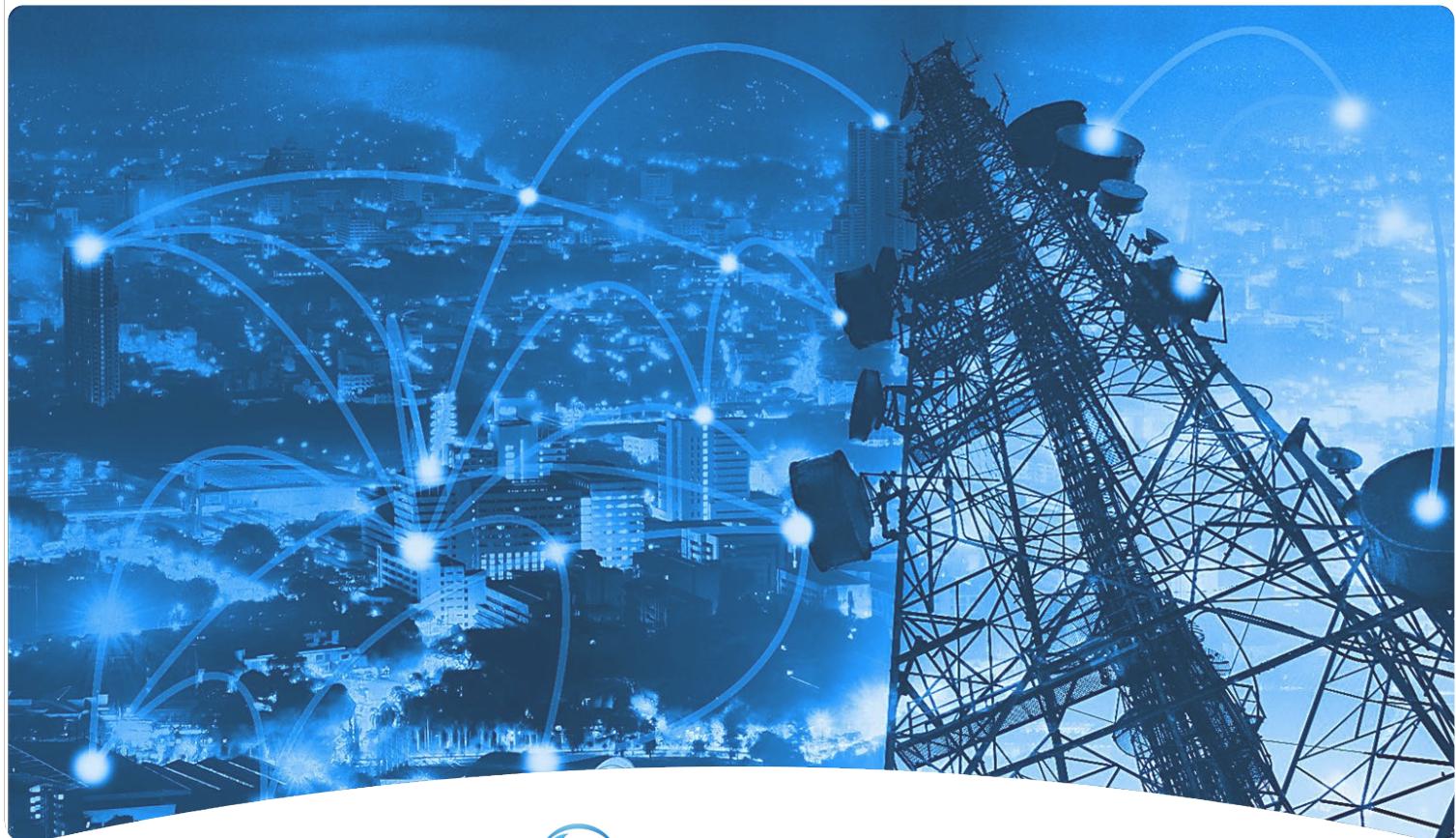
Miniature Rubidium Atomic clock

MAIN FEATURES

- High frequency stability miniature Rubidium atomic clock
- High performance integrated function
- Holdover <500ns within 24 hrs at fix temperature
- PPS disciplining
- Low SWaP (Size, Weight, Power) features.
- Low profile, reduced height to 16mm, ultra-portable packaging
- RoHS and REACH compliant
- Operating temperature: -20°C to +70°C (standard version),
-40°C to +80°C (Ruggedized version)



*Enclosure appearance subject to change



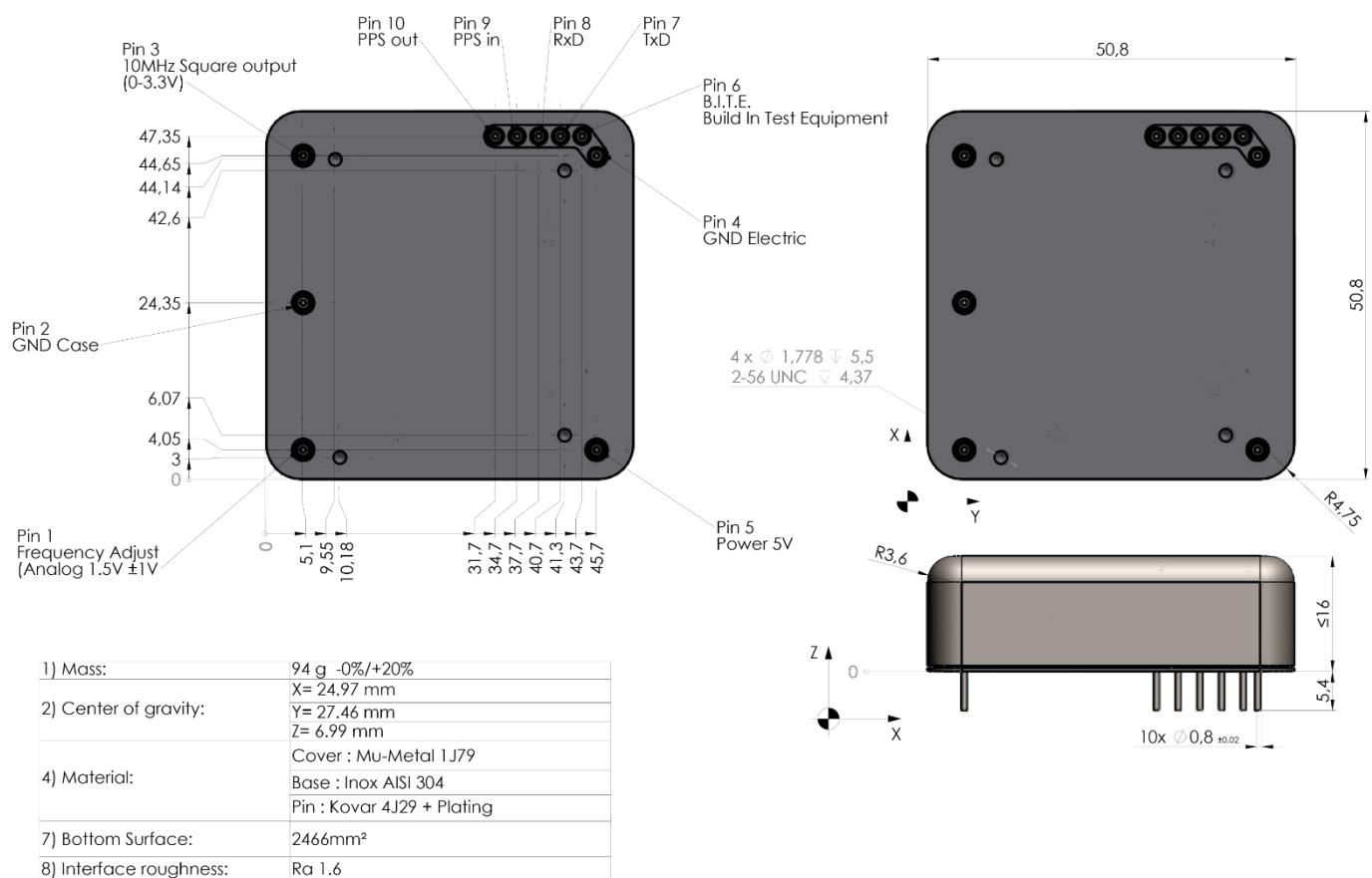
Micro Rubidium Atomic clock

SOLUTION

- Standard clock for industrial applications, Ruggedized clock for toughest applications.
- High stability frequency source.
- Telecom & mobile network synchronization.
- Military airborne, ground, mobile and unmanned radio communications.
- Oil & gas sensor-based exploration.
- Instrumentation.
- Portable & battery-sensitive applications.
- GPS/GNSS-based applications.

Package:

all dimensions in mm



TECHNICAL SPECIFICATIONS

ELECTRICAL

Type	MIRA™	
	Standard version	Ruggedized version
Frequency	10 MHz	
Frequency change within operating temperature range	1E-10 peak-to-peak, <5E-12 / °C (TBC) over -20°C to +70°C	1E-10 peak-to-peak, <5E-12 / °C (TBC) over -40°C to +80°C
Linear drift measured over minimum 14 days After 3 months operations*	≤5E-12 / day	
Short term stability*	1 sec 10 sec 100 sec 1000 sec 10 000 sec	≤ 4E-11 ≤ 1.3E-11 ≤ 4E-12 ≤ 3E-12 (typical) ≤ 5E-12 (typical)
Phase noise (10 MHz) in dBc/Hz*	1 Hz 10 Hz 100 Hz 1000 Hz 10000 Hz	≤ -70 ≤ -97 ≤ -120 ≤ -135 ≤ -140
Frequency retrace*	<1E-10	
Warm-up time	Lock < 2 minutes at over the full temperature range	
Analog frequency adjustment (+1.5V ±1V) For stable operation, an external voltage shall be applied (cf. the manual of the MIRA for electrical scheme)	± 5.4E-9 (± 20%) peak to peak	
Digital frequency adjustment range with serial RS-232 port.	Fine: ± 8.1E-9 (resolution 2.5E-13) ± 20% Coarse: ± 1E-7 (resolution 1.24E-9)	
Output level	Square wave 0-3V	
Spurious f_o ±100kHz	< -80dBc	
Supply voltage	5V	
Max Power Supply Ripple	< 50 mV peak to peak (from 1Hz to 1MHz frequency band)	
Input power @ 25°C	0.5W steady state 2.5W start-up 1.5W steady state, using high performance function 5W start up, using high performance function	
B.I.T.E. Indicator	Alarm No Alarm	> 2.7V (unloaded) < 0.4V
Communication with serial RS-232 port		
	Rx and Tx signals are idle at low level (to invert polarity use option COMSTD)	

ENVIRONMENTAL**

Type	MIRA™	
Magnetic field sensitivity	< 1E-10 / Gauss, range [-1;+1] Gauss	
Storage Temperature	- 55°C to + 105°C	
Operating Temperature	- 20°C to + 70°C	- 40°C to + 80°C (maximum temperature of the thermal chamber with air flow around unit)
Altitude	Meets MIL-STD-810H, Method 500.6 40 000 ft	Max 70,000 ft
Vibration	MIL-STD-810H, Method 514.8 annex C 4 gRMS	7.7 gRMS
Shocks	MIL-STD-202 30g, 11 ms, half sinus	50g, 11ms, half sinus
Acceleration		Load factor of 12g during 1mn in any axis or direction
Humidity	MIL-STD-810H, Method 507.6 35°C, 95% relative humidity	DO160G, section 6 65°C, 95%
g-tip-over test	2E-10/g on worst sensitive axis	
MTBF	MIL-HDBK-217F Notice 2 >150 000 h Ground Begin at 40°C	Same to standard + >40 000 FH for ARW50 environment

*in stable temperature, gravity, pressure and magnetic field conditions

**pass/fail criteria = no loss of lock. Each one tested independently (no combination of environmental tests)

DISCIPLINING

Type	MIRA™
PPSREF Level	CMOS 0 - 3V
PPSOUT Output Level	CMOS 0 - 3V 20mA sink/source (50Ω serial resistor)
PPSOUT Duty cycle programmable pulse width	100 ns/step from 0 to 1s
PPSOUT to PPSREF Sync Error due to hardware delay	<50 ns No PPSRef noise, ± 1°C temp fluctuations
PPSOUT to PPSREF programmable delay	100ns/step from 0 to 1s
PPSOUT Holdover Time Stability After one day disciplining	< 500ns / 24 hr (Target)
Temperature window	Within ± 0.2°C
Digital loop time constant	10s to 100,000s

PHYSICAL

Type	MIRA™
Size	50.8 x 50.8 x 16 mm (+/- 0.1mm) 2" x 2" x 0.63"
Weight	94 g 0/+20% 3.98 oz max
Volume	< 42 cc

MORE ON APPLICATIONS

The MIRA has been designed to meet the highest requirements necessary to support various levels of military and commercial applications.



AEROSPACE

GNSS operation through interference
Low Earth Orbit satellite missions



MILITARY

Military communication systems
Key Infrastructure Emergency Vehicles
Radars
Aircraft and UAVs



COMMERCIAL

Secured telecom
Underwater geological applications
Autonomous cars
Aircrafts