



TELECOM SOLUTIONS



X72

Precision Rubidium Oscillator

KEY FEATURES

- Disciplines to a 1 PPS Input
- Compact Form Factor for a Wide Range of Applications
- Low Power Operation (+10V to +32V)
- Wide Temperature Spectrum Performance (-40°C to +85°C)
- Multiple Output Frequencies and Characteristics
- Command, Control & Monitoring Through Serial Interface Protocol

APPLICATIONS

- GSM and UMTS Level Stability Without Need for Re-calibration
- Ideal Performance Levels for CDMA Networks
- Stratum 2, or Type II Level Performance for Synchronization for Central Offices / Network Nodes

Symmetricom's rubidium atomic oscillator, the X72®, reflects significant advances in physics miniaturization and integration. X72's compact form factor, low power consumption, and full-spectrum temperature operation make rubidium performance accessible to a wide range of synchronization applications, from telecom networks to handheld test and measurement devices.

The X72 technology, supported by patents, marks a new standard for precision atomic references. A complete range of output frequencies and characteristics are available to meet the needs of a large set of synchronization applications. The X72 can be disciplined to a precision 1 PPS reference input (such as GPS) or it can operate by itself as a precision stand-alone reference. X72's outputs also include a 1 PPS.

The X72 can communicate through its serial port to provide dynamic frequency control and selection and to enable or disable outputs. X72 can be queried for such information as serial number, operating hours, operating temperature, event history, self-test and other such performance indicators.

The X72 provides highly precise outputs using the inherent stability of the rubidium atom, in a compact form factor. This delivers an excellent value to the market for a wide range of applications.



The X72 rubidium atomic oscillator

X72 Specifications

ELECTRICAL SPECIFICATIONS

Frequency outputs:

Output 1 Derived Sine	Output 2 Master XO*	Output 3 ** Derived Square Wave *	Output 4 1 PPS
5,10,15 MHz	60 MHz	5,10,15 MHz	yes
13 MHz	52 MHz	13 MHz	yes
10.24 MHz	61.44 MHz	2.048 MHz	yes
10.29 MHz	61.76 MHz	1.544 MHz	yes
9.8304 MHz	58.982 MHz	.9152, 14.7456 MHz	yes

* digital

** any Master XO frequency/2

NOTE: The X72 provides 4 outputs. Typical factory settings are shown above. Other standard telecom frequencies are available. All outputs are programmable to enabled or disabled.

Sine output (for 10 MHz output)

Power: 4.5 dBm min. into 50Ω

Phase noise:

1 Hz	<-72 dBc/Hz
10 Hz	<-90 dBc/Hz
100 Hz	<-128 dBc/Hz
1 kHz	<-140 dBc/Hz
10 kHz	<-148 dBc/Hz

Spurious

Harmonic: <-60 dBc

Non-harmonic: <-53 dBc

Digital outputs: 5V AC MOS

Jitter: <10 ps RMS

Stability:

[Allan deviation] t=1 second <3E-11

t=10 second <1E-11

t=100 second <3E-12

Accuracy at shipment: <±5E-11 (25°C), typical

Retrace: <±2E-11 (on-off-on: 24 h, 48 h, 12 h @ 25°C)

Control range

With digital input: ±1E-6 with granularity of 1E-12

With analog input: ±1.5E-9, 0-5 V into 5 k Ω or

±6.5 E-09, 0-5 V into 5 k Ω

Warm-up time

Time to lock: 5 minutes (accuracy at lock <5E-8)

Time to <1E-9: 7.5 minutes

Supply voltages:

Warm-up: 10 to 32 V

Operating: 18 W max (+85°C to -40°C)

15 W @ -40°C, 10 W @ 25°C, 5 W @ 85°C baseplate

Voltage coefficient

10.00V -32.00V: magnitude |df/f| <3E-11 pp

Test/status

Built-in self-test (BIST)

ACMOS: Service /fault-unlock

Serial: SSIP

Application profiles:

Aging	Daily ¹	Monthly ²	Yearly	Temperature Coefficient	Performance
AP1	±1.2E-11	±5E-11	±5E-10	<1E-10 over -40 to 85°C	High performance
AP2	±1.2E-11	±5E-11	±5E-10	<3E-10 over 0 to 50°C	
AP3	±4E-11	±3E-10	±1E-9	<3E-9 over -10 to 70°C	Meets GSM specification, <5E-8 over 20 years

1: after 1 day of operation 2: after 1 month of operation 3: tempco could be positive or negative

Reliability: Benign, ground: MTBF: 527,000 hrs @ 40°C

ENVIRONMENTAL SPECIFICATIONS

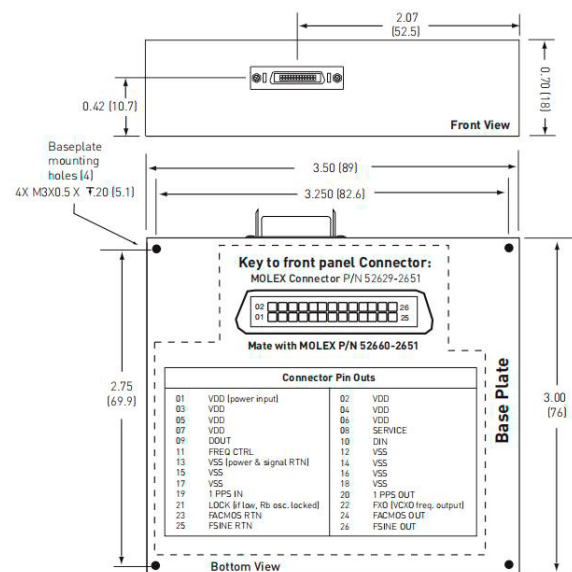
- Operating temperature: -40°C to +85°C baseplate for all AP levels
- Magnetic field sensitivity: dc (≤2 Gauss) <±4E-11/Gauss
- Humidity: GR-CORE-63, <5 to 95%, RH non-condensing
- Vibration (operating): GR-CORE-63, 5.4.2/4, locked to 1.0 g
- Storage and transport:
 - Temperature: -55°C to +100°C
 - Shock/vibration: GR-CORE-63 5.4.3 to 1.5 g

PHYSICAL SPECIFICATIONS

- Weight: 8.75 oz (250 g)
- Size: 3.5" L x 3.0" W x 0.70" H (89mm x 76mm x 17.7mm)
- Volume: 7.6 in.³ (124 ml)
- Warranty:
 - Electronics: 1 year

Notes: Consult factory for application support, test reports or special requirements. SSIP is the Symmetricom's Serial Interface Protocol. Values are typical, at 25°C baseplate and nominal voltage.

Technical specifications subject to change without notice. Contact Symmetricom for latest information.



The X72 connector diagram



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