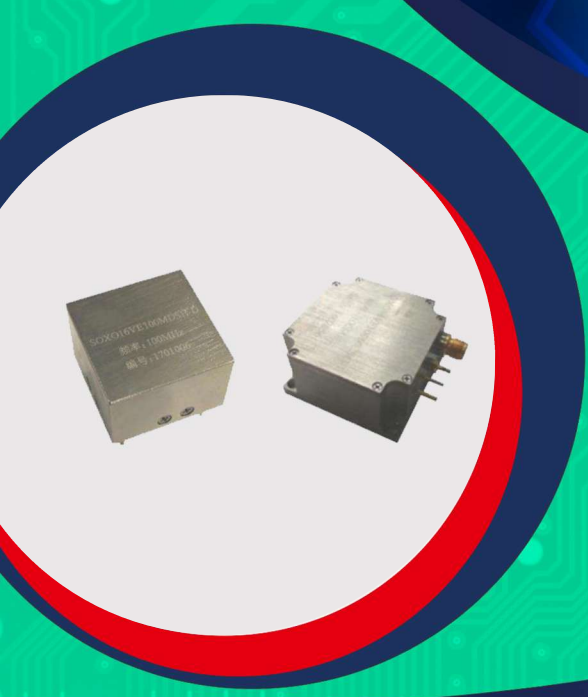
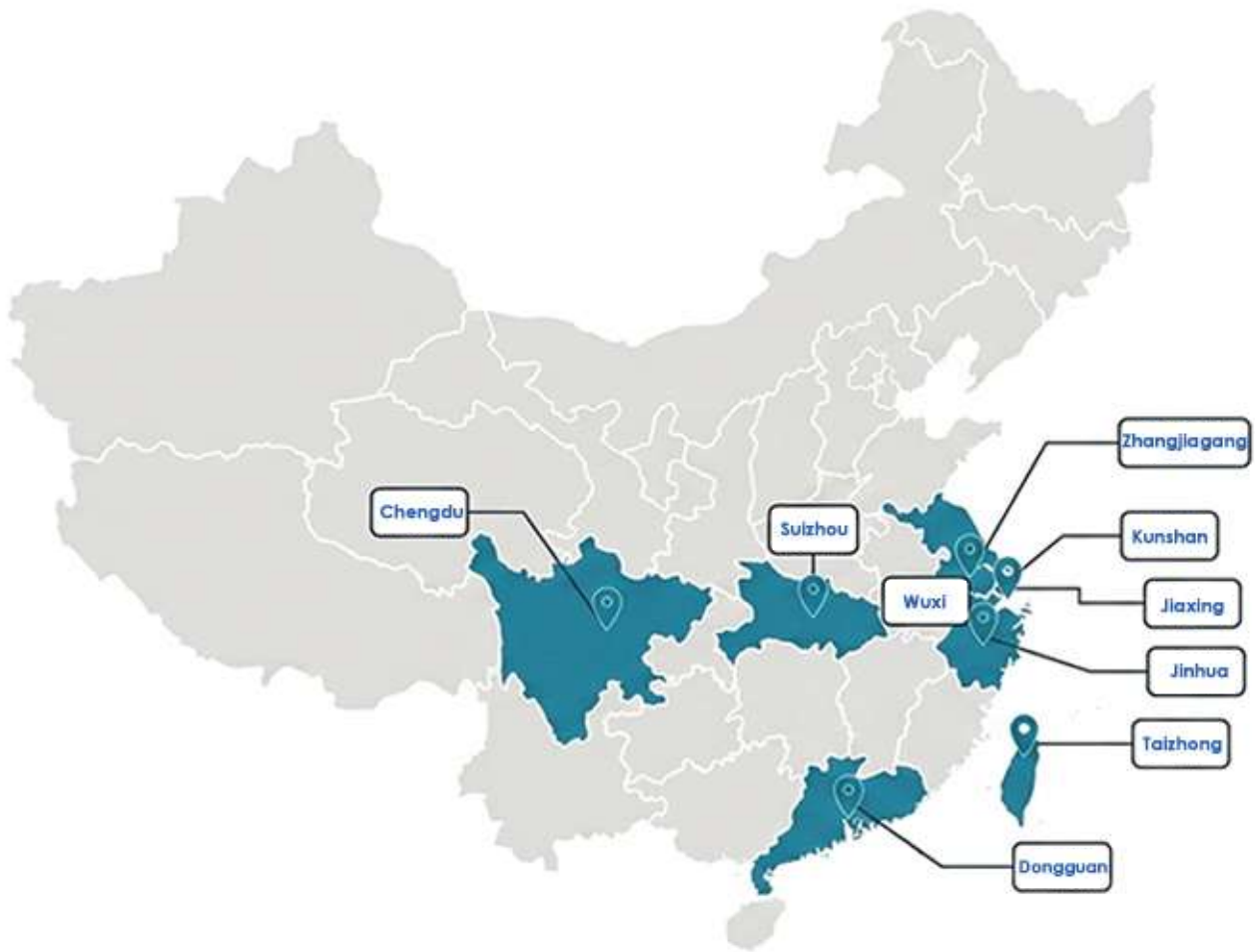




Chengdu
Manufacturing
Base Catalog



Manufacturing Footprint Map



WTL has deeply established its expertise in electronic components, with five production bases strategically located across nine cities in five provinces in China. Our facilities are situated in key industrial hubs across South China, East China, Central China, Southwest China, as well as Taiwan, leveraging a coordinated multi-base production network to integrate a full spectrum of product resources.

Backed by a well-structured production layout and robust supply chain capabilities, WTL offers a comprehensive product portfolio, complete specifications, and ample production capacity. We are fully equipped to meet diverse industry needs and application scenarios through one-stop procurement and customized solutions, while delivering stable, diversified, and end-to-end integrated solutions to our customers.

Rooted in China, Serving the Globe

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1.Spaceborne Atomic Clocks

Spaceborne Atomic Clock 1

XRAFS Spaceborne Rubidium Clock

Key Features

The spaceborne rubidium atomic clock represents the highest level of rubidium clock technology and serves as a core component of satellite navigation and positioning systems. Its accuracy directly determines the overall performance of the satellite system. Compared with ground-based atomic clocks, spaceborne rubidium clocks offer superior precision and reliability, and are designed to withstand the demanding conditions of space environments, including radiation and vacuum.

The spaceborne rubidium atomic clock developed by our company adopts advanced "three-cell, three-temperature-control" technology along with specially formulated buffer gas mixtures. It features a high signal-to-noise ratio, near-zero temperature coefficient, and ultra-low drift. Its technical performance is leading domestically and reaches an advanced international level.

Applications

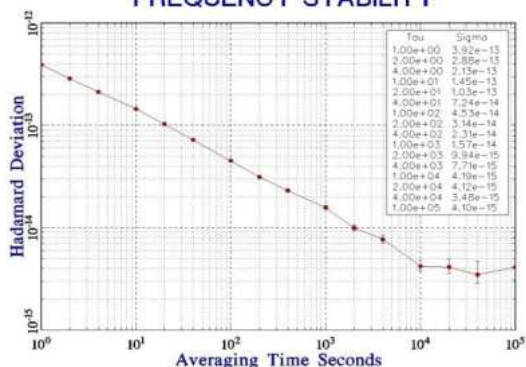
Navigation satellites, reconnaissance satellites, communication satellites, space stations, and other space systems.



Key parameters

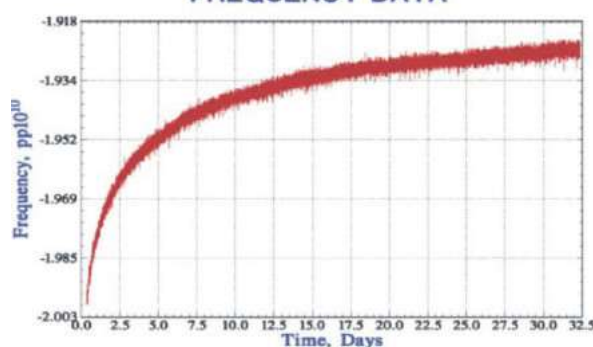
Test Item	Technical Specifications	
Performance parameter	High-performance type	High-performance variant
Frequency stability	≤1.0E-12/1s ≤3.0E-13/10s ≤1.0E-13/100s ≤3.0E-14/1000s ≤1.0E-14/10000s ≤1.oE_14/Day ≤1.oE_14/Flicker Platform	≤6.0E-13/1s ≤2.0E-13/10s ≤6.0E-14/100s ≤2.0E-14/1000s ≤8.0E-15/10000s ≤8.oE_15/Day ≤8.oE_15/Flicker Platform
Frequency drift	≤± 1E_13/days	≤± 5E_14/days
Frequency temperature characteristic	≤± 1E×13/°C	
Cumulative anti-irradiation dose	≥150krad（si）	
Outline dimension	240×148×140mm	
Weight	≤4.7kg	
Power dissipation	Steady-state power consumption <28 W	
The quantum physics system can be provided separately.		

FREQUENCY STABILITY



Actual measurement curve of frequency stability

FREQUENCY DATA



Actual measured curve of frequency drift rate

Starborne Atomic Clock 2

XRAFS-X2 Miniaturized Spaceborne Rubidium Clock

Key Features

- Horizontal installation design, radiation-resistant, tailored for Low Earth Orbit (LEO) satellite applications.
- Dual 10 MHz outputs with analog telemetry interface.
Equipped with RS-422 serial interface, supporting external pulse-per-second (PPS)
- disciplining and synchronization.
- Available as a standalone physical system.

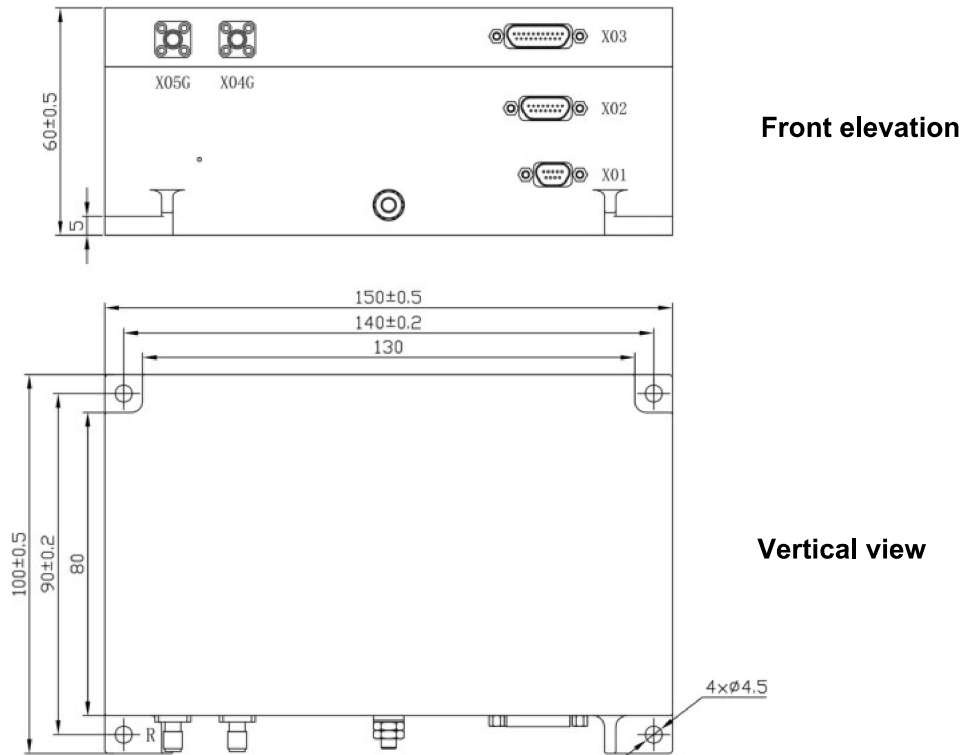


Key parameters

Technical parameterItems			Specification Requirements
Output signal			10MHz, 2 channels
Product weight			1.2±0.1kg
Outline dimension	Main shape	150 (length) × 90 (width) × 60 (height) mm	
	Maximum Envelope	150 (length) × 100 (width) × 60 (height) mm	
Operating temperature range			Vacuum base plate _ 20°C ~ +40°C
Power Source Characteristics	Supply electricity		Standard power supply 42 V DC;Compatible with 28~48 V;Ripple <600 mV (DC~10 MHz)
	Maximum power dissipation		<45W (full temperature range)
	Steady state power consumption		<28W (vacuum), <35W (atmospheric pressure)
	Power-on surge current		The current rise slope is <10 ⁻⁵ A/s, the duration is <5 ms, and the surge current amplitude is <2 A.
Frequency accuracy	Unsubmissive	Atmospheric pressure +20 °C	Better than ±5×10 ⁻⁹
		Vacuum +20°C	Better than ±5×10 ⁻¹⁰
	Tamed State		Superior to ±1E ₋₁₂ (after 2 hours of conditioning at 20°C under vacuum)
Output frequency Signal Characteristics	Wave form		Sinusoidal wave
	Output power		8 ± 1dBm (Load:50 Ω)
	Harmonic wave		<-30dBc
	Spurious waves (≤ 200 MHz)		<-70dBc
Frequency Stability (Allen Variance)	τ =1s		<5E-12
	τ =10s		<2E-12
	τ =100s		<7E-13
	τ =1000s		<5E-13
Temperature coefficient of frequency	Vacuum: 20°C to +40°C		< ± 5E-12/°C
Drift Rate	<±3E ₋₁₂ /day, tested continuously for over 30 days <±1E ₋₁₂ /day		
Phase noise	<-90dBc/Hz@1Hz; <-120dBc/Hz@10Hz; <-140dBc/Hz@100Hz; <-150dBc/Hz@1kHz; <-155dBc/Hz@10kHz;		
Magnetic Sensitivity	< ± 1E-11/Gauss		

Interface Description			
Name	Code name	Physical Fear	Major function
Power interface	X01	J30J-9ZK	Power supply busbar, fuse detection, command power supply
Telemetry Interface	X02	J30J-15ZK	8 A telemetry voltage for an internal parameter, and a power-on/off command
Remote Control Interface	X03	J30J-21ZK	RS422 serial port, LPPS input and output (RS422 level)
Radio Frequency Output Interface	X04G	SSMA-KF	10MHz signal output
	X05G	SSMA-KF	10MHz signal output

Mechanical interface



Other parameters

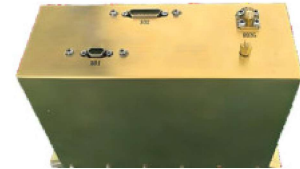
Heat Interface	External surface characteristics	Hard aluminum alloy 2A12, with blackened surface treatment
	Underplate material	Hard aluminum alloy 2A12
	Under surface flatness	≤0.1mm/100mm×100mm
	Bottom surface roughness	Better than 3.2 μm
Environmental adaptability requirements	Acceptance Class Test	Atmospheric pressure thermal cycling, thermal vacuum, sinusoidal vibration
	Classification-level test	Atmospheric pressure thermal cycling, thermal vacuum, sine vibration, random vibration, impulse response spectrum, acceleration, electromagnetic compatibility, strong magnetic field
	Environmental stress screening	Performed at 100%, including temperature cycling and random vibration.
Irradiation resistance		TID: 30krad (Si) , RDM≥2; SEL: 75MeV · cm ² /mg; SEU: 15MeV · cm ² /mg
Reliability		Continuous operation, ultimate reliability>0.985
Life span		Ground service life ≥5 years, orbital service life ≥7 years
Other appearance features		Manufacturer product information label at location I On-board equipment diamond-shaped mark at position L At ventilation hole 2, the diameter is φ1 mm. M4 gold-plated grounding pile at location 1

tarborne Atomic Clock 3

XRAFS-X3 Miniaturized Spaceborne Rubidium Clock

Key Features

- Vertical mounting design, radiation-resistant, optimized for low Earth orbit (LEO) satellite applications
- Excellent performance in drift rate, temperature coefficient, and magnetic sensitivity
- Single 10 MHz output with analog telemetry interface
- Available as a standalone physical system



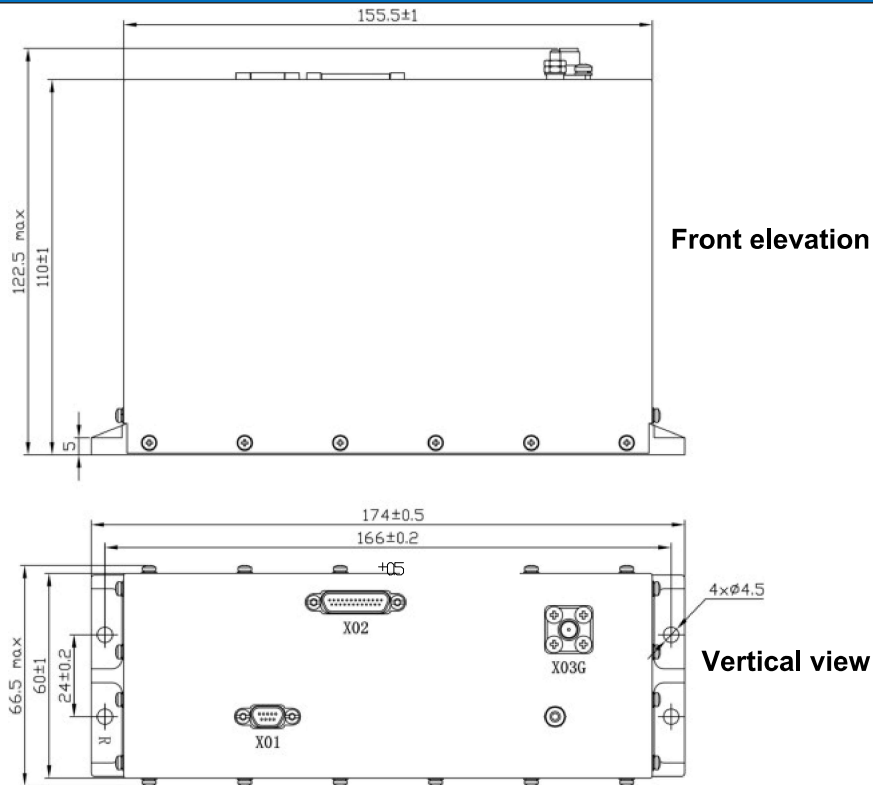
Key parameters

Technical parameterItems		Specification Requirements	
Output signal		10MHz, 1 channel	
Product weight		1.5±0.1kg	
Outline dimension	Main shape	155.5 (length) × 60 (width) × 110 (height) mm	
	Maximum Envelope	174.5 (length) × 66.5 (width) × 122.5 (height) mm	
Operating temperature range		Vacuum base plate 0°C~+35°C	
Power Source Characteristics	Supply electricity	Standard power supply 42 V DC;Compatible with 33—48 V;Ripple <600 mV (DC—10 MHz)	
	Maximum power dissipation	<45W (@42V, full temperature range)	
	Steady state power consumption	<28W (@42V, vacuum +25°C)	
	Power-on surge current	The current rise slope is <10 ⁻⁶ A/s, the duration is <5 ms, and the surge current amplitude is <2 A.	
Frequency accuracy	Atmospheric pressure +25°C	Better than ±5×10 ⁻⁹	
	Vacuum +25°C	Better than ±5×10 ⁻¹⁰	
Output frequency Signal Characteristics	Wave form		Sinusoidal wave
	Output power		8 ± 1dBm (Load:50 Ω)
	Harmonic wave		<-30dBc
	Clutter	≤200MHz	<-80dBc
		± 1MHz within	<-110dBc
Frequency Stability (Allen Variance)	τ =1s		<5E-12
	τ =10s		<2E-12
	τ =100s		<5E-13
	τ =1000s		<2E-13
Temperature coefficient of frequency	Vacuum: 0°C to +35°C		< ± 2E-12/°C
Drift Rate		<±1E ₋₁₂ /day, tested continuously for over 30 days <±5E ₋₁₃ /day	
Phase noise		<-90dBc/Hz@1Hz; <-125dBc/Hz@10Hz; <-140dBc/Hz@100Hz; <-145dBc/Hz@1kHz; <-150dBc/Hz@10kHz; <-155dBc/Hz@100kHz	
Magnetic Sensitivity		< ± 1E-12/Gauss	

Electrical Interface and Pin Definition

Name	Code name	Physical Fear	Major function
Power interface	X01	J30J-9ZK	Power supply busbar, fuse detection
Telemetry Interface	X02	J30J-25ZK	Telemetry voltage with I0 internal parameters
Radio Frequency Output Interface	X03G	SMA-KF	10MHz signal output

Mechanical interface



Other parameters

Heat Interface	External surface characteristics	IJ85 soft magnetic material, with gold plating on the surface
	Underplate material	Hard aluminum alloy 2A12
	Under surface flatness	≤0.1mm/100mm×100mm
	Bottom surface roughness	Better than 3.2 μm
Environmental adaptability requirements	Acceptance Class Test	Atmospheric pressure thermal cycling, thermal vacuum, sinusoidal vibration, random vibration, high-temperature aging
	Classification-level test	Atmospheric pressure thermal cycling, thermal vacuum, sine vibration, random vibration, impulse response spectrum, acceleration, electromagnetic compatibility, strong magnetic field
	Environmental stress screening	Performed at 100%, including temperature cycling and random vibration.
Irradiation resistance		TID: 30krad (Si) , RDM≥2; SEL: 75MeV · cm ² /mg; SEU: 15MeV · cm ² /mg
Reliability		Continuous operation; ultimate reliability>0.975
Life span		Ground service life ≥5 years, orbital service life ≥7 years
Other appearance features		Manufacturer product information label at location I On-board equipment diamond-shaped mark at position L At ventilation hole 2, the diameter is φ1 mm. M3 gold-plated grounding pile at location 1

2. Conventional Rubidium Atomic Clock

Conventional Rubidium Atomic Clock 1

XHTF1011

Key Features

High performance with low drift rate.

Functions

- One 10 MHz sine wave output;
- One 1PPS (one pulse per second) signal output;
- TTL-level lock parameter;
- RS-232 serial interface for control and monitoring;
- External second rapid disciplining capability.



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz signal	Wave form	Sinusoidal wave
		Output power	7–10 dBm (matched to 50 Ω load)
		Harmonic wave	<-40dB
		Clutter	<-85dB
	Short-term frequency stability		refer to quotation/specification
	Frequency drift rate		refer to quotation/specification
	Phase noise		refer to quotation/specification
	Frequency temperature characteristic		refer to quotation/specification
	Secondary second taming accuracy		60 enter the E _{II} order of magnitude per minute 90 Enter the E _{I2} order of magnitude per minute
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		<2E-11
	Geomagnetic effect		<2E-11
	1pps Output amplitude		5V $\pm$ 1V
	Output frequency adjustment range (serial port adjustment)		> $\pm$ 1E-9
	Quick Lock Precision	Lock time (25°C)	$\leq$ 5min
		20 min accuracy	< $\pm$ 1E-10
	Frequency of transmission accuracy		< $\pm$ 3E-11
Environment and Power Supply	Power Supply Scope		+22V~+30VDC (Typical value+24VDC)
	Power consumption (+24VDC)		Full temperature range $\leq$ 43.2 W
			Steady state $\leq$ 12W
	Operating ambient temperature		-40°C~+70°C
	Storage ambient temperature		-55°C~+85°C
Structural Characteristics	Relative humidity		$\leq$ 95% (30°C)
	External dimensions		100 $\times$ 94 $\times$ 32mm
	Installation size		See structural dimensions
	Weight		$\leq$ 0.5kg
	Interface	Radio frequency interface	SMA-K
		Low-frequency interface	J30J-15ZK

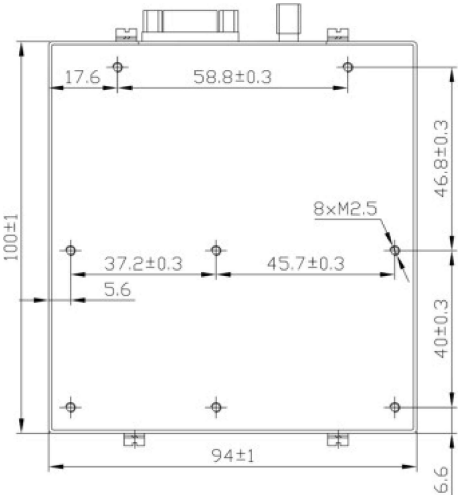
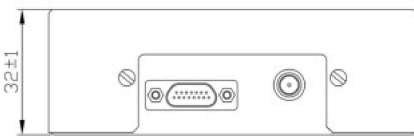
Order Instructions

Model Name	Product model	Short-term frequency stability option	Frequency and Temperature Characteristics Options	Phase Noise Option	Drift Rate Option
Not entirely domestically produced	XHTF1011X	-XX	-X	-X	-XX
Produced nationwide	XHTF1011DC				

Example: XHTF1011X_o8_T_lo represents the stability of 8E-12/1s, frequency-temperature characteristics ($-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$) $\leq 4\text{E-}10$, and drift rate $\leq \pm 1\text{E-}12$.

Option List				
Short-term stability		Default or option lo	Option o8	Option o5
		$<1\text{E-}11/1\text{s}$	$<8\text{E-}12/1\text{s}$	$<5\text{E-}12/1\text{s}$
		$<5\text{E-}12/10\text{s}$	$<3\text{E-}12/10\text{s}$	$<1.5\text{E-}12/10\text{s}$
		$<1\text{E-}12/100\text{s}$	$<8\text{E-}13/100\text{s}$	$<5\text{E-}13/100\text{s}$
Frequency temperature characteristic		Default or Options (J)	Option _T	Option _B
		$-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$	$-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$	$-40^{\circ}\text{C} \sim +60^{\circ}\text{C}$
		$\leq 6\text{E-}10$	$\leq 4\text{E-}10$	$\leq 2\text{E-}10$
Phase noise	Option	Default or Option _L		Option _U
	1Hz	$<-80\text{dBc/Hz}$		$<-87\text{dBc/Hz}$
	10Hz	$<-90\text{dBc/Hz}$		$<-107\text{dBc/Hz}$
	100Hz	$<-130\text{dBc/Hz}$		$<-142\text{dBc/Hz}$
	1kHz	$<-145\text{dBc/Hz}$		$<-152\text{dBc/Hz}$
	10kHz	$<-150\text{dBc/Hz}$		$<-155\text{dBc/Hz}$
Drift Rate		Default or Option _3o		Option _lo
		$\leq \pm 3\text{E-}12/\text{days}$		$\leq \pm 1\text{E-}12/\text{days}$

structure size

 Bottom view		Pin number	Function
		1	GND
 Front elevation		2	RXD
		3	TXD
Interface (J3oJ port)		4	GND
		5	+24VDC
		6	+24VDC
		7	Frequency Adjustment
		8	lpps Input
		9	lpps Output
		10	Lock status parameter(5V: Unlocked, oV:locked)
		11	Keep parameterOn
		12	N/A
		13	N/A
		14	GND
		15	GND

Conventional Rubidium Atomic Clock 2

XHTF1011D

Key Features

Fully domestically developed, high performance, and low drift rate.

Functions

- One 10 MHz sine wave output
- One 1PPS (pulse per second) output
- TTL-level lock parameter
- External 1PPS fast disciplining capability
- RS-232 serial interface for control and monitoring



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz signal	Wave form	Sinusoidal wave
		Output power	7–10 dBm (matched to 50 Ω load)
		Harmonic wave	<-40dB
		Clutter	<-80dB
	Short-term frequency stability		Refer to quotation/specification
	Frequency drift rate		Refer to quotation/specification
	Phase noise		Refer to quotation/specification
	Frequency temperature characteristic		Refer to quotation/specification
	Secondary second taming accuracy		60 enter the E _{II} order of magnitude per minute 90 Enter the E _{I2} order of magnitude per minute
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		<2E-11
	Geomagnetic effect		<2E-11
	1pps Output amplitude		5V $\pm$ 1V
	Output frequency adjustment range (serial port adjustment)		> $\pm$ 1E-9
	Quick Lock Precision	Lock time (25°C)	$\leq$ 5min
		20 min accuracy	< $\pm$ 1E-10
	Frequency of transmission accuracy		< $\pm$ 3E-11
Environment and Power Supply	Power Supply Scope		+22V~+30VDC (Typical value+24VDC)
	Power consumption (+24VDC)	Full temperature range $\leq$ 43.2 W	
		Steady state $\leq$ 12W	
	Operating ambient temperature		-40°C~+70°C
	Storage ambient temperature		-55°C~+85°C
Structural Characteristics	Relative humidity		$\leq$ 95% (30°C)
	External dimensions		100×94×32mm
	Installation size		See structural dimensions
	Weight		$\leq$ 0.5kg
	Interface	Radio frequency interface	SMA-K
		Low-frequency interface	J30J-15ZK

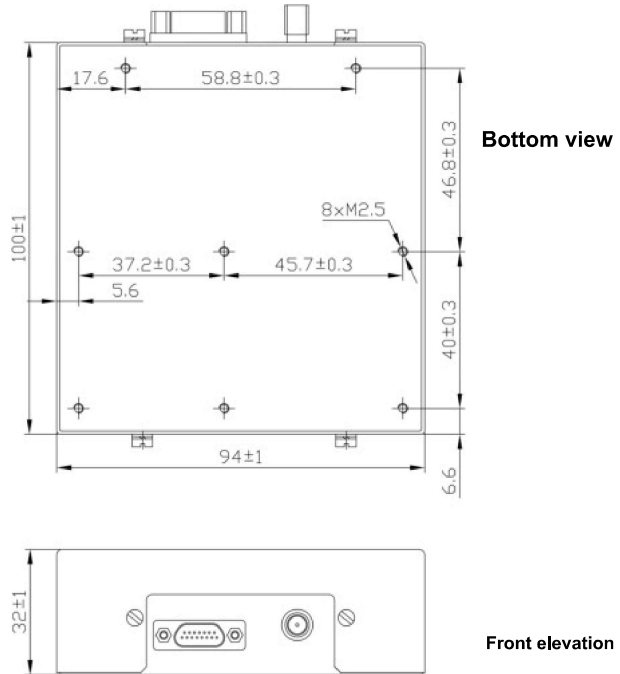
Order Instructions

Model	XHTF1011D	-XX	-X	-X	-XX
Meaning	Serial model No	Frequency Stability Option	Frequency and Temperature Characteristics Options	Phase Noise Option	Drift Rate Option

Example: XHTF1011D_I5_lo represents stability $<1.5E-11/s$; default frequency-temperature characteristics ($-40^{\circ}C \sim +60^{\circ}C$) $\leq 2E-10$; drift rate $<\pm 1E-12$.

Option List				
Short-term stability		Default or option_I5	Option_lo	Option_o5
		$<1.5E-11/s$ $<7E-12/10s$ $<1.5E-12/100s$	$<1E-11/s$ $<3E-12/10s$ $<1E-12/100s$	$<5E-12/s$ $<2E-12/10s$ $<5E-13/100s$
Frequency temperature characteristic		Default or Option_B	Option_A	
		$-40^{\circ}C \sim +60^{\circ}C$ $\leq 2E-10$	$-40^{\circ}C \sim +60^{\circ}C$ $\leq 1E-10$	
Phase noise	Option	Default or Option_L	Option_N	
	10Hz	$<-90dBc/Hz$	$<-100dBc/Hz$	
	100Hz	$<-130dBc/Hz$	$<-132dBc/Hz$	
	1kHz	$<-145dBc/Hz$	$<-145dBc/Hz$	
	10kHz	$<-150dBc/Hz$	$<-150dBc/Hz$	
Drift Rate		Default or Option_3o	Option_lo	
		$<\pm 3E-12/days$	$<\pm 1E-12/days$	

structure size

 Bottom view Front elevation		Pin number	Function
		1	GND
		2	RXD
		3	TXD
		4	GND
		5	+24VDC
		6	+24VDC
		7	N/A
		8	Ipps Input
		9	Ipps Output
		10	Lock status parameter(3,3: Unlocked, o:locked)
		11	N/A
		12	N/A
		13	N/A
		14	GND
		15	GND

Conventional Rubidium Atomic Clock 3

XHTF1021

Key Features

Compact size and low power consumption

Functions

- One 10 MHz output (selectable waveform)
- One 1PPS (one pulse per second) signal output
- TTL-level lock indication
- External 1PPS fast disciplining capability
- RS232 serial interface for control and monitoring



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters	
			XHTF1021	XHTF1021GC
Output Signal Characteristics	10MHz signal	Waveform, amplitude	Refer to quotation/specification	
		Harmonic (only sine wave)	<-40dB	
	Short-term frequency stability		Refer to quotation/specification	
	Frequency drift rate		$\leq \pm 5E_{-12}/\text{days}$	
	Phase noise	10Hz	<-100dBc/Hz	
		100Hz	<-130dBc/Hz	
		1kHz	<-140dBc/Hz	
	Frequency temperature characteristic		Refer to quotation/specification	
	Secondary second taming accuracy		Taming for 24 hours is superior to $1E_{-12}$	
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 2E_{-11}$	
	Geomagnetic effect		$\leq 2E_{-11}$	
	1pps Output amplitude		3.3 V CMOS Level	
	Output frequency adjustment range (serial port adjustment)		$\geq \pm 1E_{-9}$	
	Lock time (25°C)		$\leq 7\text{min}$	
	Frequency of transmission accuracy		$< \pm 5E_{-11}$	
Environment and Power Supply	Power Supply Scope		+11.4V~+18VDC	+12V~+15VDC
	Power consumption (+12VDC)		Full temperature range $\leq 21\text{ W}$	Power consumption across the entire temperature range $\leq 32\text{ W}$
			Steady state $\leq 7.8\text{ W}$	Steady state $\leq 10\text{ W}$
	Operating ambient temperature		-40°C~+60°C	-40°C~+75°C
	Storage ambient temperature		-40°C~+70°C	
Structural Characteristics	Relative humidity		$\leq 95\%$ (30°C)	
	External dimensions		89×76×28mm	
	Installation size		82.6×69.6mm	
	Weight		$\leq 0.27\text{kg}$	
	Interface	Radio frequency interface	SMA-K	
		Low-frequency interface	DE_9 (Needle)	

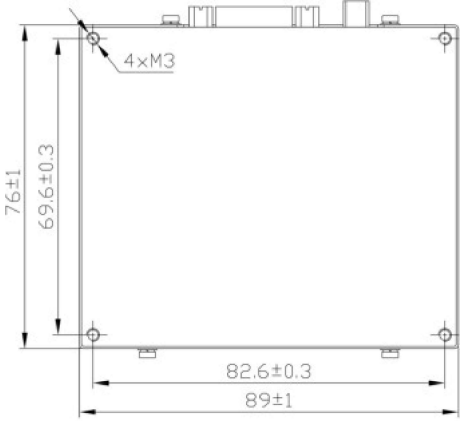
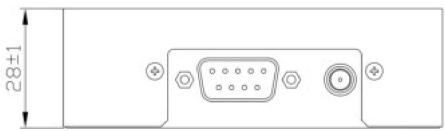
Order Instructions

Model		-X	-X	-X	-X
Not entirely domestically produced	XHTF1021	Output waveform options	Frequency and Temperature Characteristics Options	Frequency Stability Option	Taming Function Options
Produced nationwide	XHTF1021GC				

Example: XHTF1021_S_C_30_I denotes a sine wave output with the following specifications: operating temperature range of 20°C to +50°C; frequency-temperature characteristic $\leq 6E_{-10}$; stability $\leq 3E_{-11}/s$; and a smoothing function.

Option List					
10MHz signal	Option_S			Option_H	
	Sine wave: 7–13 dBm (matched to 50 Ω load)			Square Wave HCMOS	
Frequency-temperature characteristics (XHTF1021)	Option_A	Option_C		Option_E	Option_F
	-40°C~+60°C $\leq 6E_{-10}$	-20°C~+50°C $\leq 6E_{-10}$		-20°C~+60°C $\leq \pm 2E_{-10}$	-10°C~+55°C $\leq 3E_{-10}$
Frequency-temperature characteristics (XHTF1021GC)	Option_A	Option_B	Option_C	Option_D	Option_F
	-40°C~+60°C $\leq 6E_{-10}$	-40°C~+60°C $\leq 3E_{-10}$	-20°C~+50°C $\leq 3E_{-10}$	-20°C~+50°C $\leq 2E_{-10}$	-40°C~+75°C $\leq 6E_{-10}$
Short-term stability	Option 30		Option 15		Option 10
	$\leq 3E_{-11}/s$ $\leq 1E_{-11}/10s$ $\leq 3E_{-12}/100s$		$\leq 1.5E_{-11}/s$ $\leq 5E_{-12}/10s$ $\leq 1.5E_{-12}/100s$		$\leq 1E_{-11}/s$ $\leq 3E_{-12}/10s$ $\leq 1E_{-12}/100s$
Taming Function	Option 0			Option_1	
	No taming function			Has a taming function	

structure size

 bottom view	Pin No.	function
	1	Lock instruction
 Front	2	Power supply location
	3	RXD
View Interface (DE_9 Pin)	4	TXD
	5	N/A
	6	lppS Input
	7	12V Power Supply
	8	lppS Output
	9	N/A

Traditional Rubidium Atomic Clock 4

XHTF1021G

Key Features

Fully domestically developed; compact size, low power consumption, and wide operating temperature range.

Functions

- One 10 MHz output (optional dual outputs available)
- One 1 PPS (pulse per second) output
- TTL-level lock status parameter
- External 1PPS fast disciplining capability



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters	
Output Signal Characteristics	MoMHz signal	Wave form	Sinusoidal wave	Square wave (optional)
		Amplitude/L level	7-13 dBm (5Ω load)	HCMOS
		Harmonic (sine wave)	<-40dBc	
	Short-term frequency stability		Refer to quotation/specification	
	Long-term stability		Refer to quotation/specification	
	Frequency drift rate		<± 5E ₋₁₂ /days	
	Phase noise	10Hz	≤-100dBc/Hz	
		100Hz	≤-130dBc/Hz	
		1kHz	≤-150dBc/Hz	
	Frequency temperature characteristic		Refer to quotation/specification	
	Secondary second taming accuracy		Taming for 24 hours is superior to 1E ₋₁₂	
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		≤2E-11	
	Geomagnetic effect		≤2E-11	
	1pps Output amplitude		3.3 V CMOS Level	
	Output frequency adjustment range	External level adjustment	≥ ± 1E-9	
		Serial adjustment (Option T)	≥ ± 1E-9	
Environment and Power Supply	Lock time (25°C)		≤7min	
	Frequency of transmission accuracy		< ± 5E-11	
	Power Supply Scope		+12V~+15VDC	
	Power dissipation		Power consumption across the entire temperature range ≤32 W	
			Steady state ≤ 10W (25°C)	
	Operating ambient temperature		-45°C~+75°C	
Structural Characteristics	Storage ambient temperature		-45°C~+85°C	
	Relative humidity		<95% (30°C)	
	External dimensions		89×76×28mm	
	Installation size		82.6×69.6mm	
	Weight		≤0.27kg	
	Interface	Radio frequency interface	SMA-K	
		Low-frequency interface	DE ₋₉ (Needle)	

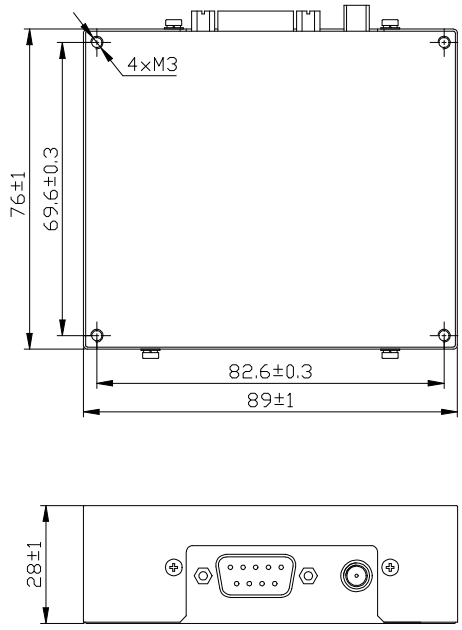
Order Instructions

Model	XHTF1021G	-XX	-X	-X	-XX	-X
Meaning	Serial model No	Short-term frequency stability option	Frequency and Temperature Characteristics Options	Output waveform options	Time Stability	Serial communication function

Example: XHTF1021G_3o_A_S features frequency stability $\leq 3E-11/s$, maximum frequency deviation $\leq 6E-10$ across the temperature range of $-45^{\circ}C$ to $+75^{\circ}C$, and outputs a sine wave frequency signal.

Option List						
Frequency stability	Default or option_I5		Option 3o		Option_lo	
	≤1.5E-11/1s		≤3E-11/1s		≤1E-11/1s	
	≤5E-12/10s		≤1E-11/10s		≤3.2E-12/10s	
	≤1.5E-12/100s		≤3E-12/100s		≤1E-12/100s	
Frequency temperature characteristic	Default or Option_A	Option _B	Option _C	Option _D	Option _E	Option _F
	-45°C~-+75°C ≤6E-10	-45°C~-+75°C ≤3E-10	-40°C~-+60°C ≤6E-10	-40°C~-+60°C ≤3E-10	-20°C~-+50°C ≤3E-10	-20°C~-+50°C ≤2E-10
Radio frequency connector output waveform	Default or /S			Option _H		
	Sinusoidal wave			Square Wave HCMOS		
Time Stability	No label or option_o5		Option_ol		Option o3	
	≤5.0E-12		≤1.0E-12		≤3.0E-12	
Serial communication function	Give tacit consent to			Option _T		
	No serial communication function			It has serial communication functionality.		

structure size

 bottom view front elevation Interface (DE_9 pin)	Pin No.	function	
	1	Lock instruction	
	2	Power supply location	
	3	MHz sinusoidal output option	T: RXD
	4	Power supply location Option	T: TXD
	5	Frequency Adjustment	
	6	lppS Input	
	7	12V Power Supply	
	8	lppS Output	
	9	Locking Monitoring	

Conventional Rubidium Atomic Clock 5

XHTF1031H

Key Features

Ultra-miniature rubidium atomic clock, comparable in size to a temperature-controlled crystal oscillator (OCXO).

Functions

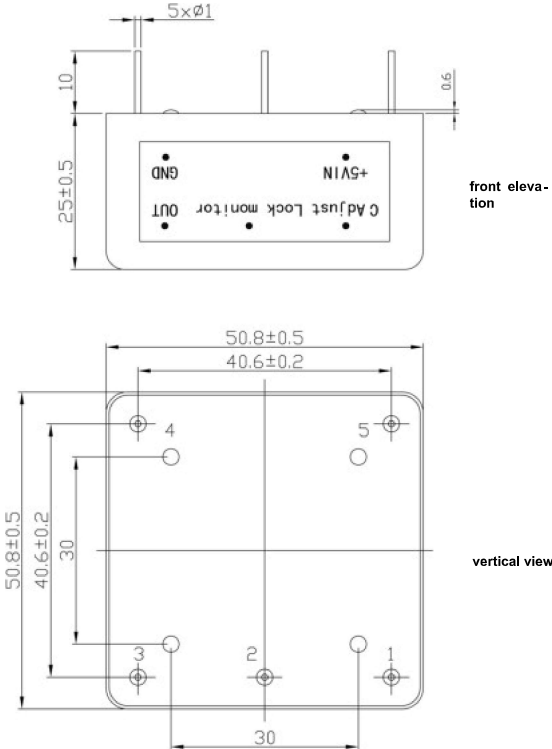
- 1X10 MHz output
- Signal lock indication



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	MoMHz signal	Waveform, amplitude	3.3 V AC MOS square wave
	Short-term frequency stability		$\leq 5E-11/1s$ $\leq 1.8E-11/10s$ $\leq 7E-12/100s$ $\leq 3E-12/1000s$
	Frequency drift rate		$\leq \pm 5E_{-12}/\text{days}$
	Phase noise		$1\text{Hz} \leq -65\text{dBc/Hz}$ $10\text{Hz} \leq -95\text{dBc/Hz}$ $100\text{Hz} \leq -125\text{dBc/Hz}$ $1\text{kHz} \leq -135\text{dBc/Hz}$ $10\text{kHz} \leq -140\text{dBc/Hz}$
	Frequency temperature characteristic		$-5^{\circ}\text{C} \sim +60^{\circ}\text{C}: \leq 8E-10;$ $+20^{\circ}\text{C} \sim +40^{\circ}\text{C}: \leq 2E-10$
	Frequency Reproducibility		$\leq 2E-11$
	Geomagnetic effect		$\leq 2E-11$
	Output frequency adjustment range (level adjustment)		$\geq \pm 1.5E-9$
	Lock time (25°C)		$\leq 7\text{min}$
	Frequency of transmission accuracy		$< \pm 5E-11$
Environment and Power Supply	Power Supply Scope		+4.9V~+5.1VDC
	Power dissipation		Full temperature range $\leq 18\text{ W}$
			Steady-state power $\leq 6\text{ W}$ (25°C)
	Operating ambient temperature		$-5^{\circ}\text{C} \sim +60^{\circ}\text{C}$
Structural Characteristics	Storage ambient temperature		$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
	External dimensions		50.8×50.8×25mm
	Weight		$\leq 200\text{g}$

structure size

 front elevation vertical view	<table> <tr> <th>Pin No.</th><th>function</th></tr> <tr> <td>1</td><td>Frequency Adjustment</td></tr> <tr> <td>2</td><td>Lock instruction</td></tr> <tr> <td>3</td><td>moMHz Output</td></tr> <tr> <td>4</td><td>GND</td></tr> <tr> <td>5</td><td>+5V Power Supply</td></tr> <tr> <td></td><td></td></tr> <tr> <td></td><td></td></tr> </table>	Pin No.	function	1	Frequency Adjustment	2	Lock instruction	3	moMHz Output	4	GND	5	+5V Power Supply				
Pin No.	function																
1	Frequency Adjustment																
2	Lock instruction																
3	moMHz Output																
4	GND																
5	+5V Power Supply																

Conventional Rubidium Atomic Clock 6

XHTF1031R

Key Features

Miniature rubidium atomic clock with a form factor comparable to a temperature-controlled crystal oscillator (OCXO).

Functions

- One 10 MHz output (selectable waveform)
- Lock status parameter
- RS-232 serial interface for control and monitoring



Key parameters

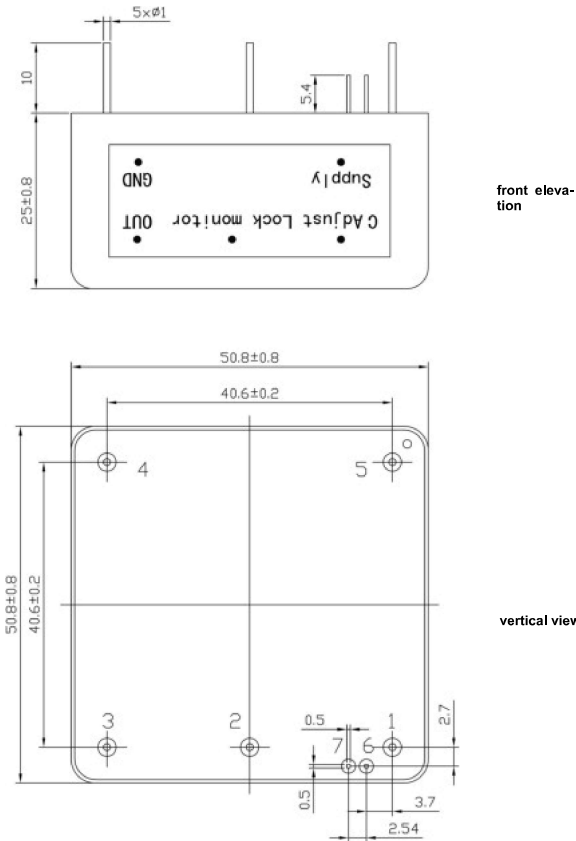
Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz signal	Waveform, amplitude	Refer to quotation/specification
		Harmonic (only sine wave)	$< -40\text{dB}$
	Short-term frequency stability		$\leq 5\text{E-}11/\text{s}$ $\leq 1.6\text{E-}11/10\text{s}$ $\leq 5\text{E-}12/100\text{s}$
	Frequency drift rate		$\leq \pm 5\text{E-}12/\text{days}$
	Phase noise		Refer to quotation/specification
	Frequency temperature characteristic		Refer to quotation/specification
	Frequency Reproducibility		$\leq 2\text{E-}11$
	Geomagnetic effect		$\leq 2\text{E-}11$
	Output frequency adjustment range (level adjustment)		$\geq \pm 1.5\text{E-}9$
	Lock time (25°C)		$\leq 5\text{min}$
	Frequency of transmission accuracy		$< \pm 5\text{E-}11$
Environment and Power Supply	Power Supply Scope		+12V~+15VDC
	Power dissipation		Power consumption across the entire temperature range $\leq 20\text{W}$
			Steady-state power $\leq 6\text{ W (25°C)}$
	Operating ambient temperature		$-30^\circ\text{C} \sim +65^\circ\text{C}$ or $-30^\circ\text{C} \sim +75^\circ\text{C}$
	Storage ambient temperature		$-55^\circ\text{C} \sim +85^\circ\text{C}$
Structural Characteristics	Relative humidity		$\leq 95\%$ (30°C)
	External dimensions		50.8×50.8×25mm
	Weight		$\leq 200\text{g}$

Order Instructions

Model	Phase noise	Frequency temperature characteristic	Discharge waveform
XHTF1031R-50-J	10Hz $\leq$ -95dBc/Hz 100Hz $\leq$ -125dBc/Hz 1kHz $\leq$ -135dBc/Hz	+15°C~+65°C: $\leq$ 2E-10 -30°C~+65°C: $\leq$ 8E-10	Sine wave , 7-13 dBm
XHTF1031R-50-J-H	10Hz $\leq$ -95dBc/Hz 100Hz $\leq$ -125dBc/Hz 1kHz $\leq$ -135dBc/Hz	+15°C~+65°C: $\leq$ 2E-10 -30°C~+65°C: $\leq$ 8E-10	3.3V COMS
XHTF1031R-LN	10Hz $\leq$ -95dBc/Hz 100Hz $\leq$ -130dBc/Hz 1kHz $\leq$ -140dBc/Hz 10kHz $\leq$ -143dBc/Hz	+4°C to +7°C: $\leq$ 2E _{lo} +3°C to +7°C: $\leq$ 8E _{lo} +75°C: Locked as normal	3.3V COMS

Example: XHTF1031R_50_J_H indicates a stability factor $\leq$ 5E_{ll}/s, frequency-temperature characteristics with $\leq$ 2E_{lo} over the range of 15°C to +65°C and $\leq$ 8E_{lo} over 30°C to +65°C, and square-wave output.

structure size

		Pin No.	function
		1	Frequency Adjustment
		2	Lock instruction
		3	moMHz Output
		4	GND
		5	12V Power Supply
		6	TXD
		7	RXD

Traditional Rubidium Atomic Clock 7

XHTF1012LN

Key Features

High performance with low phase noise

Functions

- One 10 MHz sine wave output
- One 1 PPS (pulse per second) output
- Lock status parameter
- External 1 PPS fast disciplining capability
- RS-232 interface for control and monitoring



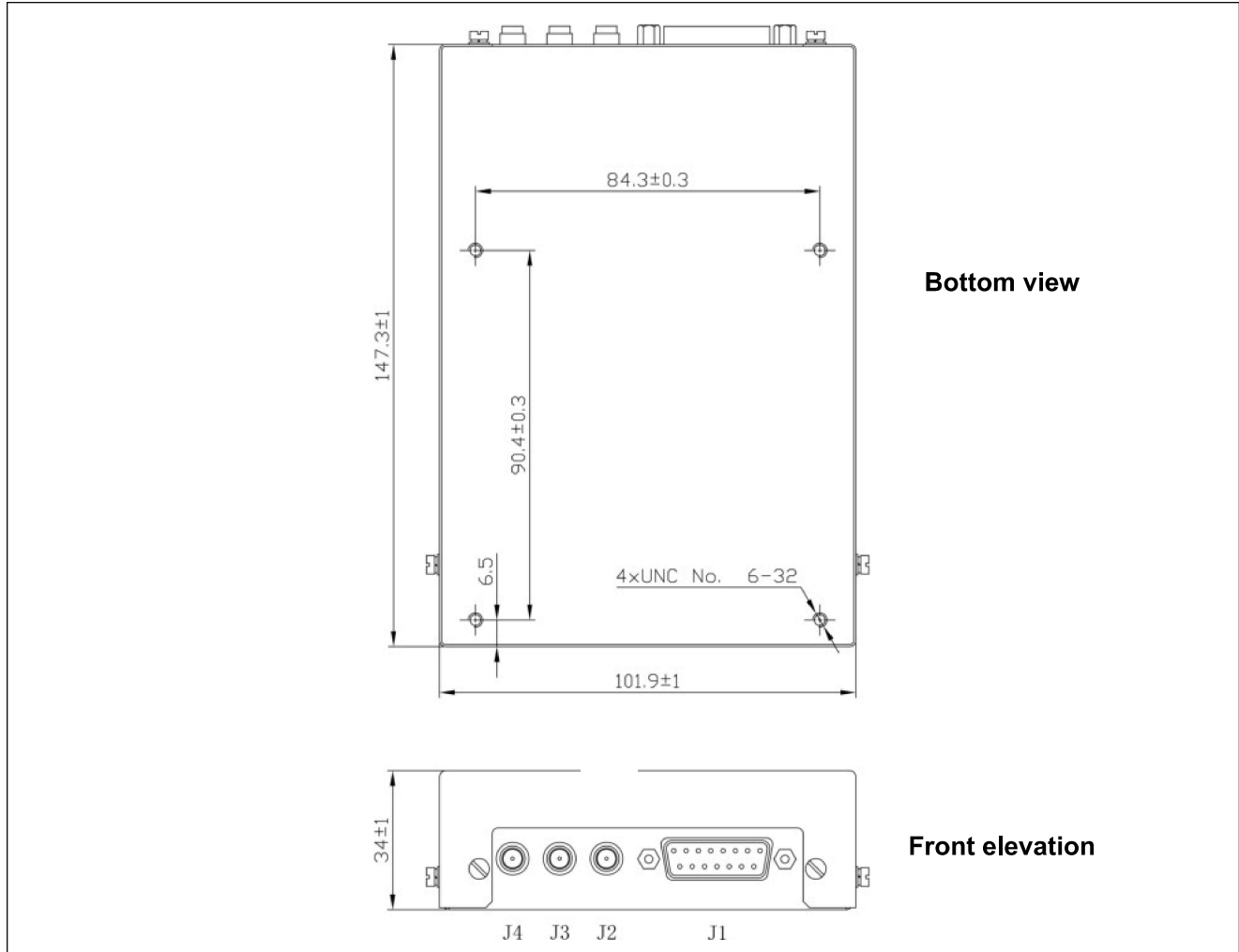
Key parameters

Functional characteristics	Technical Specifications		1012LN Technical Specifications/Parameters	1012LN_1 Technical Specifications/parameters
Output Signal Characteristics	MoMHz signal	Wave form	Sinusoidal wave	
		Output power	7~10dBm (match 50Ω)	6~8 dBm (matched to 5 Ω)
		Harmonic wave	<-40dB	
	Short-term Frequency Stability		<5E-12/1s; <5E-12/10s; <1E-12/100s。	<9E-12/1s; <4E-12/10s; <1E-12/100s
	Frequency drift rate		<± 3E-12/days	
	Phase noise	1Hz	<-100dBc/Hz	<-101dBc/Hz
		10Hz	<-130dBc/Hz	<-131dBc/Hz
		100Hz	<-145dBc/Hz	<-145dBc/Hz
		1kHz	<-153dBc/Hz	<-153dBc/Hz
		10kHz	<-158dBc/Hz	<-158dBc/Hz
		100kHz	<-160dBc/Hz	
	Frequency and Temperature Characteristics (Frequency Variation)		≤2E-10 (-20℃~+50℃)	≤3E-10 (0-50℃)
	Secondary second taming accuracy (hot-state taming)		It enters the E 11 order within 5 minutes; it enters the E 12 order within 20 minutes.	≤1E-12 (1pps trained for 24 hours)
	Maintain performance			≤LUS (trained for 24 hours;time stopped after 24 hours)
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		<2E-11	
	Geomagnetic effect		<2E-11	
	1pps Output amplitude		5V CMOS level	3.3V CMOS Level
	Output frequency adjustment range (serial port adjustment)		> ± 1E-9	> ± 2E-9
	Locking time	25℃	<5min	<10min
		-20℃	<15min	
	Frequency accuracy at output (25℃)		< ± 3E-11	< ± 5E-11
Environment and Power Supply	Power Supply Scope		+22V~+30VDC (+24VDC)	+12~+13VDC
	Power dissipation		Full temperature range ≤5℃	Power consumption across the entire temperature range ≤36 W
			Steady state ≤ 17W (25℃)	Steady state ≤ 12W (25℃)
	Operating ambient temperature		-20℃~+65℃	-30℃~+65℃
	Storage ambient temperature		-40℃~+70℃	-55℃~+85℃
Structural Characteristics	Relative humidity		≤95% (30℃)	
	External dimensions		147.3×101.9×34mm	
	Installation size		84.3×90.4mm	
	Weight		≤1kg	
	Interface	Radio frequency interface	SMA-K	
		Low-frequency interface	DB_15 For	

Order Instructions

The model series XHTFlol2LN and XHTFlol2LN_L are orderable models.

structure size



Interface	Pin number	Function	Pin number	Function
J1 (DB_15 socket)	1	+24VDC	7	lpps Input
	2	+24VDC	8	Lock instruction
	3	GND	9	Not used
	4	GND	10	lpps Output
	5	RXD	11~15	Not used
	6	TXD		
J2 (SMA)	lpps Output			
J3 (SMA)	lpps Input			
J4 (SMA)	MoMHz Output			

Traditional Rubidium Atomic Clock 8

XHTF1007

Key Features

Ultra-high performance with low drift rate and excellent temperature stability.

Functions

- One 10 MHz sine wave output
- One 1 PPS (pulse per second) signal output
- Lock status indication
- Fast disciplining via external 1 PPS reference
- RS-232 interface for control and monitoring



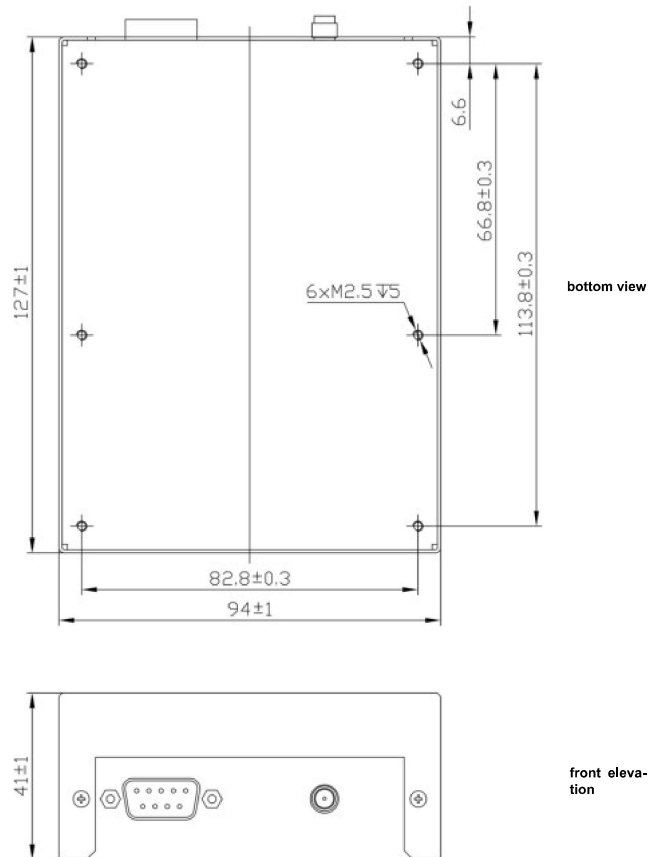
Key parameters

Functional characteristics	Technical Specifications		1007 Technical Specifications parameters	1007-M Technical Specifications/Parameters
Output Signal Characteristics	10MHz signal	Wave form	Sinusoidal wave	
		Output power	7-10 dBm (matched to 50 Ω load)	
		Harmonic wave	<-40dB	
		Clutter	<-85dB	
	Frequency stability		<8E-13/1s <3E-13/10s <1E-13/100s <5E-14/1000s	
	Frequency drift rate		< $\pm 1E_{-12}$ /days	
	Phase noise	1Hz	<-95dBc/Hz	
		10Hz	<-120dBc/Hz	
		100Hz	<-140dBc/Hz	
		1kHz	<-150dBc/Hz	
		10kHz	<-152dBc/Hz	
	Frequency and Temperature Characteristics (Frequency Variation from 0°C to +50°C)		$\leq 5E-11$	
	Secondary second taming accuracy		<1E ₋₁₂ (after taming 12h)	
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		<2E-11	
	Geomagnetic effect		<2E-11	
Environment and Power Supply	Power Supply Scope		+22V~+30VDC (Typical value+24VDC)	
	Power dissipation		Power consumption across the entire temperature range $\leq 48W$ Steady state $\leq 15 W (25^{\circ}C)$	
	Operating ambient temperature		0°C~+40°C	
	Storage ambient temperature		-55°C~+85°C	
	Relative humidity		$\leq 95\% (30^{\circ}C)$	
	Frequency of transmission accuracy		< $\pm 3E-11$	
Structural Characteristics	External dimensions		127×94×41mm	
	Installation size		See structural dimensions	
	Weight		$\leq 0.8kg$	
	Interface	Radio frequency interface	SMA-K	
		Low-frequency interface	DB_9 Needle	

Order Instructions

The XHTFI007 model in this series is an orderable model.

structure size



Interf-ace	Pin No.	function	Pin No.	function
J1 (DB-9 needle)	1	GND	6	+24V
	2	lpps Input	7	lpps Output
	3	TXD	8	GND
	4	RXD	9	NC empty
	5	Lock instruct- ion		
J2 (SMA)	10MHz sine output			

3.CPT Atomic Clock

CPT Atomic Clock 1

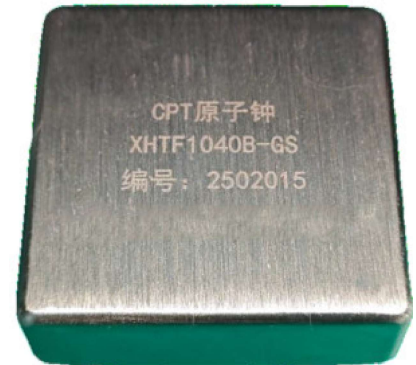
XHTF1040B-G CPT Atomic Clock

Key Features

Compact size with 100% domestic (China-made) components.

Functions

- One 10 MHz sine wave output
- One 1 PPS (pulse per second) signal output
- Lock status indication
- Fast disciplining via external 1 PPS reference
- RS-232 interface for control and monitoring



Key parameters

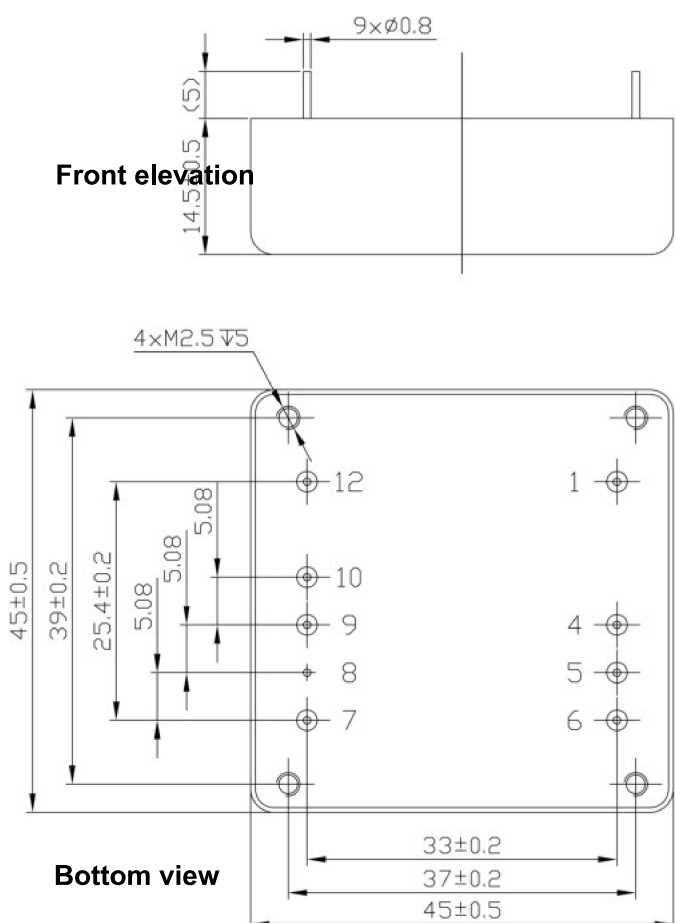
Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	MoMHz signal specification	Waveform, amplitude	3.3V CMOS Level
	Short-term stability		$\leq 3E-10/1s$ $\leq 1E-10/10s$ $\leq 3E-11/100s$
	Frequency drift rate		$\leq \pm 3E-11/days$
	Phase noise	1Hz	$\leq -50dBc/Hz$
		10Hz	$\leq -78dBc/Hz$
		100Hz	$\leq -113dBc/Hz$
		1kHz	$\leq -128dBc/Hz$
	Frequency temperature characteristic		$-45^{\circ}C \sim +70^{\circ}C$ $\leq 1E-9$
	Second-by-second taming performance	lpps Synchronization accuracy	$\leq 50ns$
		Frequency taming accuracy (taming period: 24 hours)	$\leq 5E-12$
	Maintain performance (pass the 24-hour continuous stress test)		$\leq 5us$
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 1E-10$
	Geomagnetic effect (design assurance)		$\leq 2E-10$
	lpps Output amplitude		3.3V CMOS Level
	Output frequency adjustment range (design guarantee)		$\geq \pm 2E-8$
Environment and Power Supply	Locking time	+25°C	$\leq 6min$
		-45°C	$\leq 18min$
	Frequency of transmission accuracy		$\leq \pm 5E-11$
	Power Supply Scope		+3.2V~+3.4VDC
	Power dissipation	Full temperature range	$\leq 7W$
		Steady state (25°C)	$\leq 2.5W$
Structural Characteristics	Operating ambient temperature		$-45^{\circ}C \sim +70^{\circ}C$
	Storage ambient temperature		$-55^{\circ}C \sim +85^{\circ}C$
	Relative humidity		$\leq 95\% (40^{\circ}C)$
	External dimensions		45×45×14.5mm
	Weight		$\leq 65g$

Order Instructions

Model	XHTF1040B-G	X
Meaning	Serial model No	Quality Grade Option

Option List		
Quality grade	S	C
	B Level	C Level

Structure Dimensions and Pin Definition

		Pin number	Function
 Front elevation 9x$\varnothing 0.8$ 14.5± 0.5 (5) Bottom view 4xM2.5$\nabla 5$ 12, 10, 9, 8, 7, 1, 4, 5, 6 45± 0.5, 39± 0.2, 25.4± 0.2, 5.08, 33± 0.2, 37± 0.2, 45± 0.5		1	N/A
		2	Empty
		3	Empty
		4	Lock instruction
		5	TXD
		6	RXD
		7	+3.3V
		8	GND
		9	lpps Input
		10	lpps Output
		11	Empty
		12	MoMHz Output

CPT Atomic Clock 2

XHTF1040B

Key Features

Compact size, high reliability, and vibration-resistant design.

Functions

- One 10 MHz signal output
- One 1 PPS signal output
- Lock status indication
- External second synchronization (external disciplining)
- LV TTL serial interface for control and monitoring



Key parameters

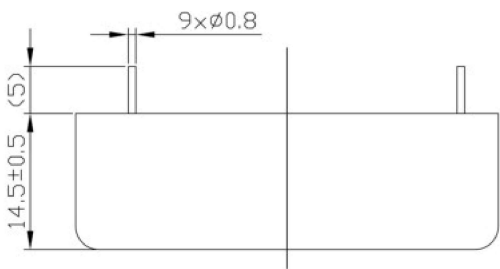
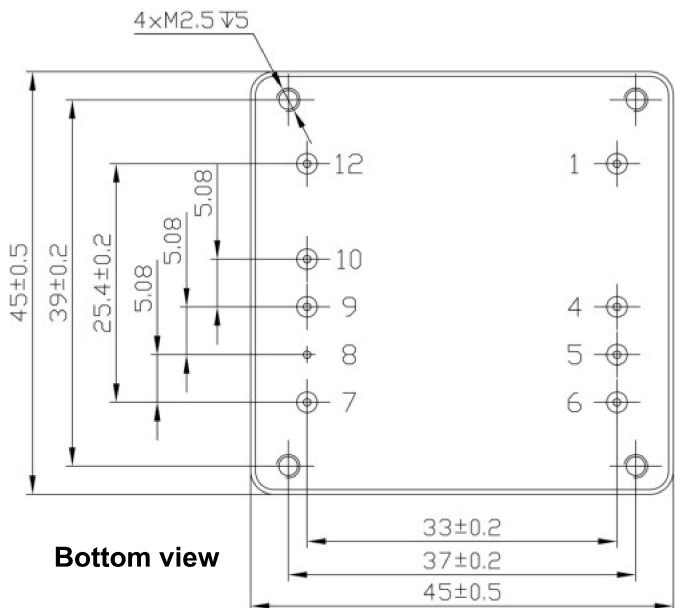
Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	MoMHz signal specification	Waveform, amplitude	Refer to quotation/specification
		Harmonic (only sine wave)	$\leq -50\text{dBc}$
	Short-term stability		$\leq 1.5\text{E}-10/1\text{s}$ $\leq 5\text{E}-11/10\text{s}$ $\leq 1.5\text{E}-11/100\text{s}$
	Frequency drift rate		$\leq \pm 3\text{E}-11/\text{days}$
	Phase noise	10Hz	$\leq -90\text{dBc}/\text{Hz}$
		100Hz	$\leq -120\text{dBc}/\text{Hz}$
		1kHz	$\leq -140\text{dBc}/\text{Hz}$
		10kHz	$\leq -145\text{dBc}/\text{Hz}$
	Frequency temperature characteristic		Refer to quotation/specification
	Second-by-second taming performance	lpps Synchronization Accuracy	$\leq 50\text{ns}$
		Frequency taming accuracy (tamed for 24 hours)	$\leq 5\text{E}-12$
	Maintain performance (pass the 24-hour continuous stress test)		$\leq 5\mu\text{s}$
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 1\text{E}-10$
	Geomagnetic effect (design assurance)		$\leq 2\text{E}-10$
	lpps Output amplitude		3.3V CMOs Level
Environment and Power Supply	Power Supply Scope		+3.2V~+3.4VDC
	Power dissipation	Full temperature range	$\leq 6\text{W}$
		Steady state (25°C)	$\leq 2\text{W}$
	Operating ambient temperature		-45°C to $+7^{\circ}\text{C}$ or -55°C to $+75^{\circ}\text{C}$
	Storage ambient temperature		-55°C ~ $+85^{\circ}\text{C}$
Structural Characteristics	Relative humidity		$\leq 95\%$ (40°C)
	External dimensions		45×45×14.5mm
	Weight		$\leq 60\text{g}$

Order Instructions

Model	XHTF1040B	-X	-X
Meaning	Serial model No	Frequency and Temperature Characteristics Options	Output waveform options

Option List		
Frequency temperature characteristic	Give tacit consent to	Option -W
	-45°C~+70°C ≤1E-9	-55°C~+75°C ≤1E-9
Discharge waveform	Give tacit consent to	Option -T
	Sine wave ≥ 10dBm	Square wave 3.3V CMOs

Structure Dimensions and Pin Definition

Front elevation 	Pin number	Function
	1	N/A
Bottom view 	2	Empty
	3	Empty
	4	Lock instruction
	5	TXD
	6	RXD
	7	+3.3V
	8	GND
	9	lpps Input
	10	lpps Output
	11	Empty
	12	MoMHz Output

CPT Atomic Clock 3

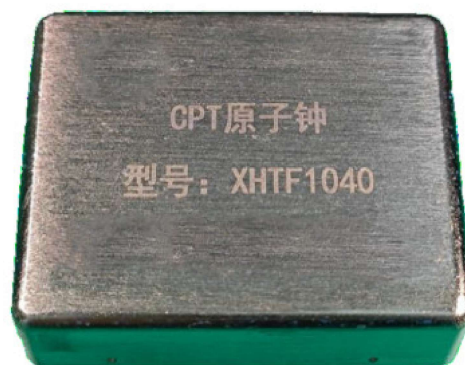
XHTF1040-M Miniaturized CPT Atomic Clock

Key Features

- Compact size
- High cost-performance ratio
- Pin-compatible with SA.45

Functions

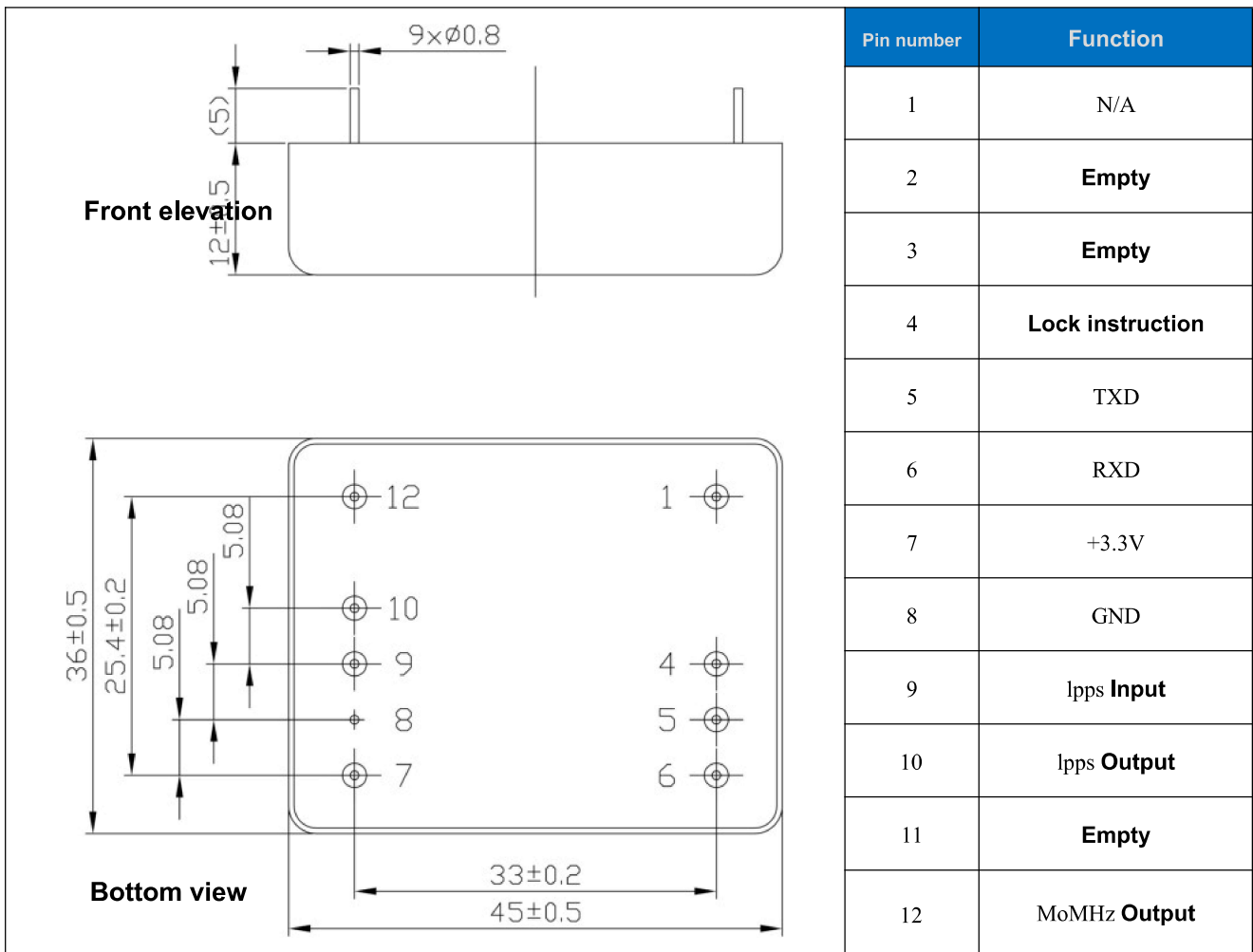
- One 10 MHz signal output
- One 1 PPS signal output
- Lock status indication
- External second synchronization (external disciplining)
- LVTTTL serial interface for control and monitoring



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz Signal Specifications		3.3V CMOS Level
	Short-term stability		$\leq 1.5E-10/1s$ $\leq 5E-11/10s$ $\leq 1.5E-11/100s$
	Frequency drift rate		$\leq \pm 3E-11/\text{days}$
	Phase noise	10Hz	$\leq -90\text{dBc/Hz}$
		100Hz	$\leq -120\text{dBc/Hz}$
		1kHz	$\leq -140\text{dBc/Hz}$
		10kHz	$\leq -145\text{dBc/Hz}$
	Frequency temperature characteristic		$-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ $\leq 1E-9$
	Second-by-second taming performance	1ppS Synchronization accuracy	$\leq 50\text{ns}$
		Frequency taming accuracy (taming period: 24 hours)	$\leq 5E-12$
	Maintain performance (pass the 24-hour continuous stress test)		$\leq 5\mu\text{s}$
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 1E-10$
	Geomagnetic effect (design assurance)		$\leq 2E-10$
	1ppS Output amplitude		3.3V CMOS Level
	Output frequency adjustment range (design guarantee)		$\geq \pm 2E-8$
Environment and Power Supply	Locking time	+25°C	$\leq 6\text{min}$
		-40°C	$\leq 18\text{min}$
	Frequency of transmission accuracy		$\leq \pm 5E-11$
	Power Supply Scope		+3.2V~+3.4VDC
	Power dissipation	Full temperature range	$\leq 6\text{W}$
		Steady state (25°C)	$\leq 2.2\text{W}$
Structural Characteristics	Operating ambient temperature		$-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$
	Storage ambient temperature		$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
	Relative humidity		$\leq 95\%$ (40°C)
	External dimensions		45×36×12mm
	Weight		$\leq 45\text{g}$

Structure Dimensions and Pin Definition



Precautions for using the CpT atomic clock:

1. The external LPPS input (atom clock pin 9, i.e., the LPPS signal output from the Beidou/GPS receiver) must be maintained at a 3.3 V CMOS logic level; otherwise, it may cause input circuit failure. The LPPS pulse width should exceed 100 microseconds, with the rising edge leading.
2. To ensure reliable product operation, this product imposes specific requirements on the power supply startup characteristics: the voltage rise time must be less than 10ms, and there should be no instantaneous voltage drop during the rise process.

CPT Atomic Clock 4

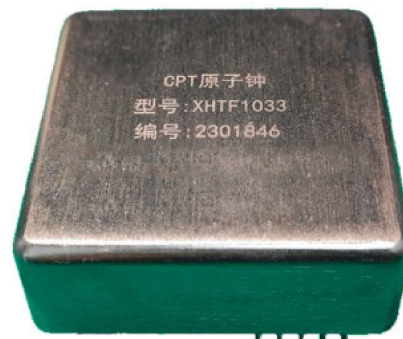
XHTF1033

Key Features

- Compact CPT (Coherent Population Trapping) atomic clock design.

Functions

- One 10 MHz output
- One 1 PPS (pulse-per-second) output
- Lock status indication
- External 1 PPS fast disciplining capability
- LVTTTL serial interface for control and monitoring



Key parameters

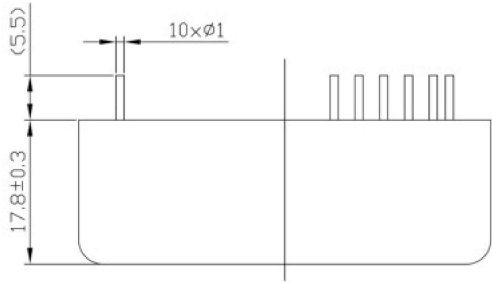
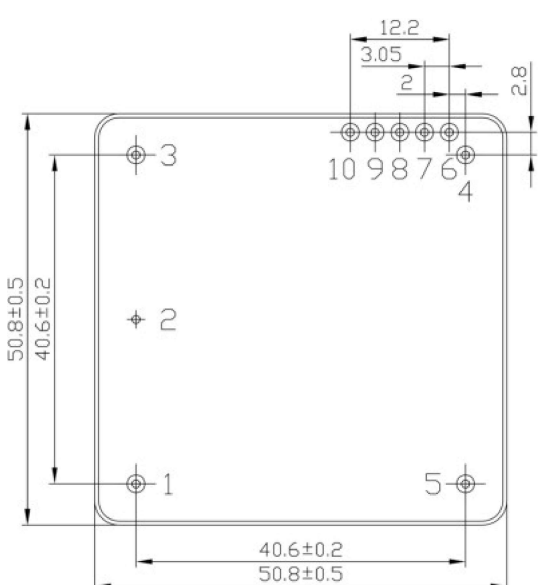
Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz Output	Waveform, amplitude	Waveform optional
	Frequency drift rate		$\leq \pm 2E_{-11}/\text{days}$
	Phase noise	10Hz	$\leq -90\text{dBc}/\text{Hz}$
		100Hz	$\leq -120\text{dBc}/\text{Hz}$
		1kHz	$\leq -140\text{dBc}/\text{Hz}$
		10kHz	$\leq -145\text{dBc}/\text{Hz}$
	Frequency temperature characteristic		Refer to quotation/specification
	Second-by-second taming performance	lpps Synchronization Accuracy	$\leq 50\text{ns}$
		Taming accuracy (24h)	$\leq 1E-12$
	Maintain performance (pass the 24-hour continuous stress test)		$\leq 1\mu\text{s}$
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 1E-10$
	Geomagnetic effect (design assurance)		$\leq 2E-10$
	lpps Output amplitude		3.3V CMOS
	Output frequency adjustment range (design guarantee)		$\geq \pm 2E-8$
	Lock time (25°C)		$\leq 6\text{min}$
	Frequency of transmission accuracy		$< \pm 5E-11$
	Frequency stability		$\leq 5E-11/1\text{s}$
			$\leq 1.5E-11/10\text{s}$
			$\leq 5E-12/100\text{s}$
Environment and Power Supply	Power Supply Scope		+4.9V~+5.1VDC
	Power dissipation	Power consumption during startup	$\leq 13\text{W}$
		Steady state power consumption	$\leq 3\text{W}$
	Operating ambient temperature		$-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ or $-55^{\circ}\text{C} \sim +75^{\circ}\text{C}$
	Storage ambient temperature		$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
Structural Characteristics	Relative humidity		$\leq 95\%$ (40°C)
	External dimensions		50.8×50.8×17.8mm
	Weight		$\leq 100\text{g}$

Order Instructions

Model	XHTF1033	-X
Meaning	Serial model No	Frequency and Temperature Characteristics Options

Option List		
Frequency temperature characteristic	Give tacit consent to	Option -D
	-40°C~+70°C ≤5E-10	-55°C~+75°C ≤5E-10

Structural dimensions and connections脚definition

		Pin number	Function
Front elevation		1	lpps Input
		2	Case
Bottom view		3	MoMHz Output
		4	GND
		5	+5V
		6	TXD
		7	RXD
		8	Lock instruction
		9	lpps Output
		10	N/A

CPT Atomic Clock 5

XHTF1033GC

Key Features

- Compact design; fully domestically developed and manufactured.

Functions

- One 10 MHz output.
- One 1PPS (one pulse per second) signal output.
- Lock status indication.
- Fast disciplining via external second signal.
- LVTTTL serial interface for control and monitoring.



Key parameters

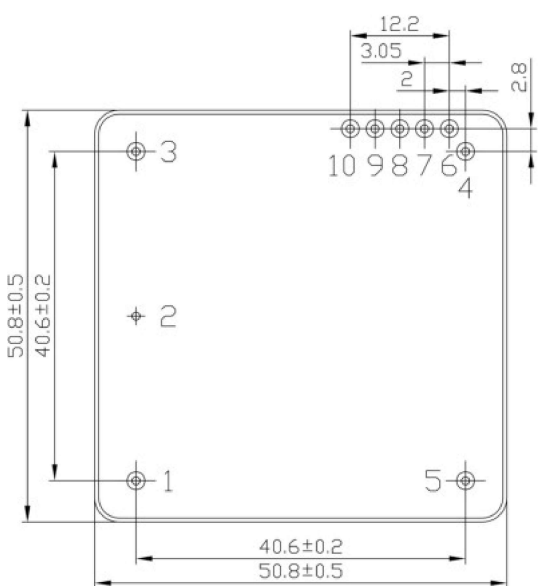
Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz Output	Waveform, amplitude	Waveform optional
	Frequency drift rate		$\leq \pm 2E_{-11}/\text{days}$
	Phase noise	10Hz	$\leq -90\text{dBc}/\text{Hz}$
		100Hz	$\leq -120\text{dBc}/\text{Hz}$
		1kHz	$\leq -140\text{dBc}/\text{Hz}$
		10kHz	$\leq -145\text{dBc}/\text{Hz}$
	Frequency temperature characteristic		Refer to quotation/specification
	Second-by-second taming performance	lpps Synchronization Accuracy	$\leq 50\text{ns}$
		Taming accuracy (24h)	$\leq 1E-12$
	Maintain performance (pass the 24-hour continuous stress test)		$\leq 1\mu\text{s}$
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 1E-10$
	Geomagnetic effect (design assurance)		$\leq 2E-10$
	lpps Output amplitude		3.3V CMOS
	Output frequency adjustment range (design guarantee)		$\geq \pm 2E-8$
	Lock time (25°C)		$\leq 6\text{min}$
	Frequency of transmission accuracy		$< \pm 5E-11$
	Frequency stability		$\leq 5E-11/1\text{s}$
			$\leq 1.5E-11/10\text{s}$
			$\leq 5E-12/100\text{s}$
Environment and Power Supply	Power Supply Scope		+4.9V~+5.1VDC
	Power dissipation	Power consumption during startup	$\leq 13\text{W}$
		Steady state power consumption	$\leq 3\text{W}$
	Operating ambient temperature		$-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ or $-55^{\circ}\text{C} \sim +75^{\circ}\text{C}$
	Storage ambient temperature		$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
	Relative humidity		$\leq 95\%$ (40°C)
Structural Characteristics	External dimensions		50.8×50.8×17.8mm
	Weight		$\leq 100\text{g}$

Order Instructions

Model	XHTF1033GC	-X
Meaning	Serial model No	Frequency and Temperature Characteristics Options

Option List		
Frequency temperature characteristic	Give tacit consent to	Option -D
	-40°C~+70°C ≤5E-10	-55°C~+75°C ≤5E-10

Structure Dimensions and Pin Definition

		Pin number	Function
Front elevation		1	lpps Input
		2	Case
Bottom view		3	MoMHz Output
		4	GND
		5	+5V
		6	TXD
		7	RXD
		8	Lock instruction
		9	lpps Output
		10	N/A

CPT Atomic Clock 6

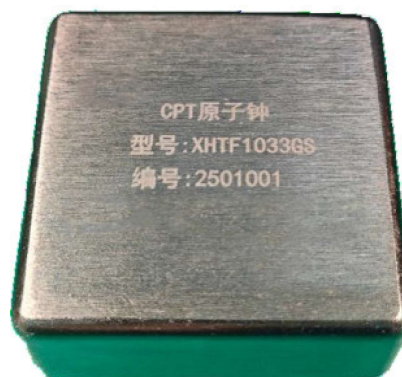
XHTF1033GS High-Performance CPT Atomic Clock

Key Features

- Fast lock acquisition; fully domestically developed model.

Functions

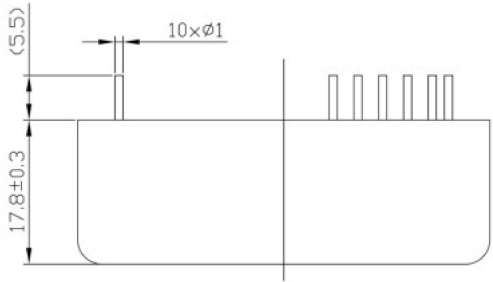
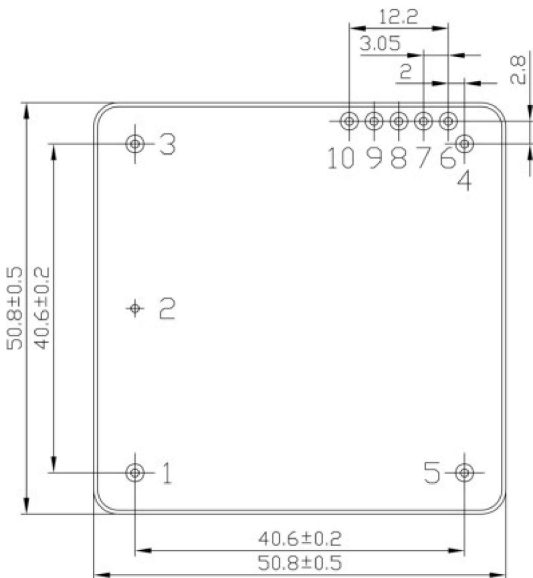
- One 10 MHz output.
- One 1PPS (pulse-per-second) signal output.
- Lock status parameter.
- External 1PPS fast disciplining capability.
- LVTTTL serial interface for control and monitoring.



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	10MHz Output	Waveform, amplitude	Square wave 3.3 V CMOS
	Frequency stability		$\leq 1E-10/1s$ $\leq 3E-11/10s$ $\leq 1E-11/100s$
	Frequency drift rate		$\leq \pm 2.0E_{-11}/day$
	Phase noise	10Hz	$\leq -90dBc/Hz$
		100Hz	$\leq -120dBc/Hz$
		1kHz	$\leq -140dBc/Hz$
		10kHz	$\leq -145dBc/Hz$
	Frequency temperature characteristic		$-40^{\circ}C \sim +70^{\circ}C$ $\leq 5E-10$
	Second-by-second taming performance	1pps Synchronization accuracy	$\leq 50ns$
		Taming accuracy (24h)	$\leq 1E-12$
	Maintain performance (pass the 24-hour continuous stress test)		$\leq 3us$
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 1E-10$
	Geomagnetic effect (design assurance)		$\leq 2E-10$
	1pps Output amplitude		3.3V CMOS
	Output frequency adjustment range (design guarantee)		$\geq \pm 2E-8$
Environment and Power Supply	Lock time (25°C)		$\leq 5min$
	Frequency of transmission accuracy		$< \pm 5E-11$
	Power Supply Scope		+4.9V~+5.1VDC
	Power dissipation	Power consumption during startup	$\leq 15.0W$
		Steady state power consumption	$\leq 3.5W$
	Operating ambient temperature		$-40^{\circ}C \sim +70^{\circ}C$
Structural Characteristics	Storage ambient temperature		$-55^{\circ}C \sim +85^{\circ}C$
	Relative humidity		$\leq 95\% (40^{\circ}C)$
	External dimensions		50.8×50.8×17.8mm
	Weight		$\leq 100g$

Structure Dimensions and Pin Definition

front elevation		Pin number	function
		1	lpps Input
bottom view		2	case
		3	moMHz Output
		4	GND
		5	+5V
		6	TXD
		7	RXD
		8	Lock instruction
		9	lpps Output
		10	N/A

CPT Atomic Clock 7

XHTF1045 Low-Power Chip-Scale Atomic Clock

Key Features

- Compact size
- Ultra-low power consumption
- Multiple frequency options
- Pin-to-pin compatible replacement for SA.45

Functions

- One standard signal output
- One 1PPS (one pulse per second) output
- Lock status parameter
- External 1PPS disciplining (external second synchronization)
- LVTTTL serial interface for control and monitoring



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output Signal Characteristics	Output Signal Specifications	Signal frequency	Refer to quotation/specification
		Waveform, amplitude	CMOS level: High level ≥ 2.5 V
	Short-term stability		Refer to quotation/specification
	Frequency drift rate		Refer to quotation/specification
	Phase noise (Nominal frequency ≤ 30 MHz)	1Hz	≤ -50 dBc/Hz
		10Hz	≤ -70 dBc/Hz
		100Hz	≤ -113 dBc/Hz
		1kHz	≤ -128 dBc/Hz
		10kHz	≤ -135 dBc/Hz
		100kHz	≤ -140 dBc/Hz
	Frequency temperature characteristic		Refer to quotation/specification
	1pps Synchronization accuracy		≤ 100 ns
	Maintain performance (Tamed: 24-hour continuous playback)	24h	≤ 5 us
		3oDay (Design Assurance)	≤ 1 ms
	Frequency Reproducibility (On 2h, Off 24h, On 2h)		$\leq 5E-10$
	Magnetic Sensitivity		$\leq 5E-10$
	1pps Output amplitude		CMOS level: High level ≥ 2.5 V
	Output frequency adjustment range (design guarantee)		$> \pm 2E-8$
	Locking time (+25°C)		≤ 5 min
	Frequency of transmission accuracy		$< \pm 5E-11$
Environment and Power Supply	Power Supply Scope		+3.3V ± 0.15 VDC
	Power dissipation		Refer to quotation/specification
	Operating ambient temperature		Refer to quotation/specification
	Storage ambient temperature		-40°C~+85°C
	Relative humidity		30%~95%
Structural Characteristics	External dimensions		41 $\times$ 35 $\times$ 11.4mm
	Weight		≤ 35 g

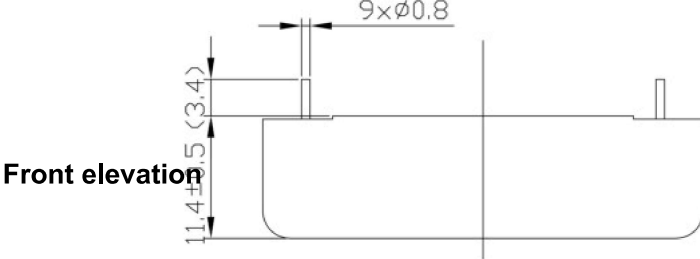
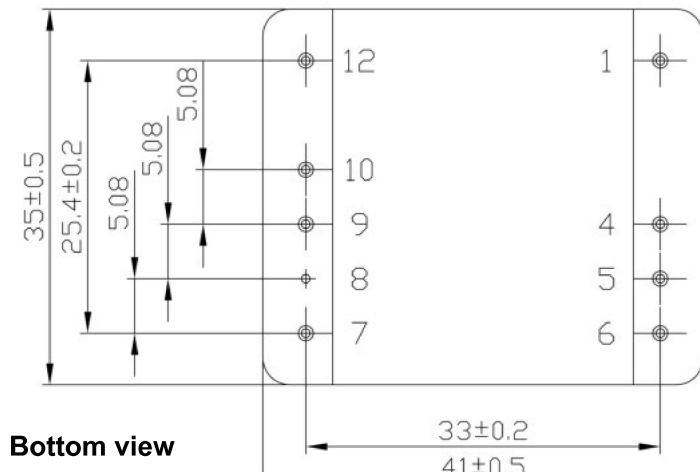
Order Instructions

Model	XHTF1045	X	-X	-X	-X	-XXMXXX
Meaning	Serial model No	Service environ-ment	Frequency stability	Frequency temperature cha-racteristic	Steady state power cons-umption	Output frequency option

Example: The XHTF1045 optional parameter G_L_R_V_16M384 specifies a chip atomic clock with the following specifications: ground environment conditions; frequency stability $\leq 6 \times 10^{-10}$ per second; frequency-temperature characteristics (10°C to +50°C) $\leq 5 \times 10^{-10}$; steady-state power consumption $\leq 150 \mu\text{W}$; drift rate better than $\pm 3 \times 10^{-11}$ per day; and output frequency of 16.384 MHz.

Option List				
Service environment	Option G		Option A	
	The earth's surface		Airborne	
Frequency stability	Option _L		Option _H	
	$\leq 6\text{E-}10/1\text{s}$ $\leq 1.9\text{E-}10/10\text{s}$ $\leq 6\text{E-}11/100\text{s}$ $\leq 1.9\text{E-}11/1000\text{s}$		$\leq 3\text{E-}10/1\text{s}$ $\leq 9.5\text{E-}11/10\text{s}$ $\leq 3\text{E-}11/100\text{s}$ $\leq 9.5\text{E-}12/1000\text{s}$	
Frequency temperature characteristic	Option _N		Option _R	
	$-10^{\circ}\text{C} \sim +70^{\circ}\text{C}$ $\leq 5\text{E-}10$		$+10^{\circ}\text{C} \sim +50^{\circ}\text{C}$ $\leq 5\text{E-}10$	
Steady state power consumption	Option _V		Option _H	
	$\leq 150\text{mw}$		$\leq 500\text{mw}$	
Output signal frequency	Option _N		Option _H	
	$\leq 150\text{mw}$		$\leq 500\text{mw}$	
Output signal frequency	Option _N		Option _H	
	$\leq 150\text{mw}$		$\leq 500\text{mw}$	
Output signal frequency	Option _N		Option _H	
	$\leq 150\text{mw}$		$\leq 500\text{mw}$	
Output signal frequency	Option _N		Option _H	
	$\leq 150\text{mw}$		$\leq 500\text{mw}$	

Structural dimensions and leads definition

 Front elevation	Pin number	Function
	1	N/A
 Bottom view	2	N/A
	3	N/A
	4	Lock instruction
	5	TXD
	6	RXD
	7	+3.3V Power Supply
	8	GND
	9	lpps Input
	10	lpps Output
	11	N/A
	12	Standard-frequency signal

4. Cesium Atomic Clock

Cesium Atomic Clock

TA1000 / TA2000 Series Laser-Pumped Compact Cesium Atomic Clocks

Operating Principle

Atomic state preparation is achieved through interaction between atoms and the pumping laser. After preparation, the atoms interact with microwave signals to produce Ramsey resonance transitions. The frequency response signal is obtained by detecting optically excited atoms undergoing these transitions, enabling closed-loop frequency locking control.

Key Features

- Utilizes laser pumping and laser detection technologies
- High reliability and long operational lifetime
- Automatic monitoring and reporting of operating status

Applications

As a primary frequency standard, it is widely used in high-precision timekeeping and timing distribution, digital communications, power system synchronization, and time-frequency metrology.

Application Areas

- Atomic timekeeping systems
- Telecommunications, power, and transportation sectors
- Time synchronization systems
- Time and frequency measurement



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters
Output signal	5 MHz signal	Wave form	Sinusoidal wave
		Power	(13±1) dBm
	MoMHz signal	Wave form	Sinusoidal wave
		Power	(13±1) dBm
		Harmonic wave	≤-40dBc
		Clutter	≤-80dBc
		Phase noise	≤-100dBc/Hz @1Hz ≤-130dBc/Hz @10Hz ≤-145dBc/Hz @100Hz ≤-150dBc/Hz @1000Hz ≤-154dBc/Hz @10000Hz ≤-154dBc/Hz @100000Hz
		Frequency Reproducibility (On 24h, Off 24h, On 24h)	≤5.0E-13
		Frequency accuracy	Standard type: ≤1.0E-12 Premium type: ≤5.0E-13
Output signal	5 MHz signal	Wave form	Sinusoidal wave
		Power	(13±1) dBm

		Rise time	≤5ns
		Front-end jitter	≤1ns
		Synchronization Precision	≤±20ns
Incoming signal	lpps_sYNC,external second synchronization,l path		
Environment and Power Supply	Supply electricity		DC: +22 V~+75 V DC, typical value +48 V DC, 1 channel. AC: 220 V (±10%), frequency 50 Hz (±2%), 1 channel. (When both AC and DC power supplies are connected, the device automatically selects AC.)
	Power dissipation	Preheat ≤ 120 W	
		Steady state ≤ 100w	
		Operating ambient temperature	
Structural Characteristics	External dimensions		19 inches,4U chassis (deep 553mm *length 454mm *height 177mm)
	Weight		≤40kg
	Input/Output Interface		BNC/TNC
Life span	≥10 year (design guarantee)		
MTBF	≥100,000h (Design Guarantee)		

10MHz rate Technical specifications for calibration

Index Item	TA1000 series bright atomic clock		TA2000 series bright atomic clock	
	TA1000 (Standard type)	TA1000A (Premium grade)	TA2000 (Standard Type)	TA2000A (Premium Type)
1s	$\leq 5.0\text{E-}12$	$\leq 5.0\text{E-}12$	$\leq 3.5\text{E-}12$	$\leq 2.0\text{E-}12$
10s	$\leq 3.5\text{E-}12$	$\leq 3.5\text{E-}12$	$\leq 3.0\text{E-}12$	$\leq 1.0\text{E-}12$
100s	$\leq 2.7\text{E-}12$	$\leq 8.5\text{E-}13$	$\leq 5.0\text{E-}13$	$\leq 2.0\text{E-}13$
1000s	$\leq 8.5\text{E-}13$	$\leq 2.7\text{E-}13$	$\leq 2.0\text{E-}13$	$\leq 1.0\text{E-}13$
10000s	$\leq 2.7\text{E-}13$	$\leq 8.5\text{E-}14$	$\leq 5.0\text{E-}14$	$\leq 2.0\text{E-}14$
100000s	$\leq 8.5\text{E-}14$	$\leq 2.7\text{E-}14$	$\leq 2.0\text{E-}14$	$\leq 8.5\text{E-}15$

Customizable Items (● Standard)

○ custom made)

LCD		●No O exists
DC power supply		●+22V~+75V ○-22V~-75V
Output signal	5MHz	●Route 2
	10MHz	●2. Route O4 (Select this option to disable the 5 MHz frequency signal output)
	1PPS	●Route 3
	2.048MHz	●No O2 path
	2.048Mbit/s	●No O2 path, O4 path (Select this option to disable the 2.048 MHz frequency signal output)

※Precautions: The Yan Atomic Clock is a high-end precision instrument. Please follow the instructions in the manual to shut it down; do not disconnect the power supply directly!

5.Cold Atom Clock

Cold Atom Clock 1

Compact Rubidium Fountain Clock

Key Features

- Utilizes laser cooling and atomic fountain technology
- High accuracy, excellent long-term stability, and extremely low frequency drift
- Power-on self-start with closed-loop operation, status monitoring and logging, easy to operate
- High performance, high reliability, and long service life
- Portable and easy to transport

Applications

Can be used as a secondary (^{87}Rb) reference clock or master clock, suitable for applications such as time and frequency metrology calibration, high-precision timekeeping and synchronization, and digital communications.



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters			
Output Signal Characteristics	Output Signal Specifications	Signal frequency	5 MHz/10 MHz			
		Waveform	sinusoidal wave			
		Power	7-13 dBm			
	Version		High-performance version		Standard edition	
	Accuracy		Better than 8E_15		Better than 2E_14	
	Stability		1 s	≤3.0E-13	1 s	≤5.0E-13
			10 s	≤9.5E-14	10 s	≤1.6E-13
			100 s	≤3.0E-14	100 s	≤5.0E-14
			1000 s	≤9.5E-15	1000 s	≤1.6E-15
			10000 s	≤3.0E-15	10000 s	≤5.0E-15
			100000 s	≤1E-15	100000 s	≤2E-15
	Frequency drift rate		≤1E_16/Tian		≤2E_16/Day	
	Phase noise (dBc/Hz)	1 Hz	≤-118		≤-115	
		10 Hz	≤-140		≤-137	
100 Hz		≤-150		≤-150		
1 kHz		≤-155		≤-155		
10 kHz		≤-155		≤-155		
Environment and Power Supply	Power Supply Scope		220 VAC or customized			
	Operating ambient temperature		20-30℃			
	Relative humidity		Below 70%			
Structural Characteristics	External dimensions		1.2 m×0.8 m×0.4 m			

Order Instructions

According to the naming convention, the option list comprehensively summarizes the shelf product specifications; tier options may be omitted.

Cold Atom Clock 2

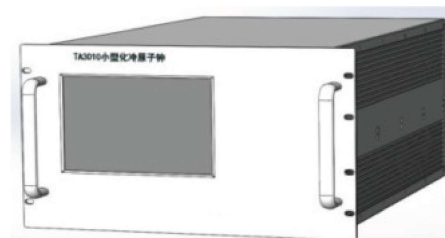
Miniaturized Cold Atom Clock

Key Features

- Utilizes laser cooling and in-situ detection technology
- Excellent long-term stability with low frequency drift rate
- Automatic closed-loop startup upon power-on, with status monitoring and logging for ease of operation
- High performance, high reliability, and long service life

Applications

Serves as a high-precision timekeeping standard, suitable for time and frequency metrology and calibration, precision timing and synchronization, and digital communications.



Key parameters

Functional characteristics	Technical Specifications		Technical Specifications/Parameters	
Output Signal Characteristics	Output Signal Specifications	Signal frequency	5 MHz/10 MHz	
		Wave form	Sinusoidal wave	
		Power	7-13 dBm	
	Accuracy		Better than 5E ₋₁₄	
	Stability		1 s	≤7.8E-13
			10 s	≤2.5E-14
			100 s	≤7.8E-14
			1000 s	≤2.5E-14
			10000 s	≤7.8E-15
			100000 s	≤8E-15
	Frequency drift rate		≤1E ₋₁₅ /Tian	
	Phase noise (dBc/Hz)	1 Hz	≤-110	
		10 Hz	≤-140	
		100 Hz	≤-143	
		1 kHz	≤-143	
		10 kHz	≤-143	
		100 kHz	≤-143	
Environment and Power Supply	Power Supply Scope		220 VAC	
	Operating ambient temperature		20-30°C	
	Relative humidity		Below 70%	
Structural Characteristics	External dimensions		6U chassis, depth 675mm	

Order Instructions

According to the naming convention, the option list comprehensively summarizes the shelf product specifications; tier options may be omitted.

6. Quantum Sensors

Atomic Magnetometer

XHTF1061 (Mz Type)

Key Features

- High-precision scalar magnetic field measurement
- Miniaturized magnetic probe

Applications

- Resource exploration
- Aeromagnetic surveying
- Geophysics

Functions

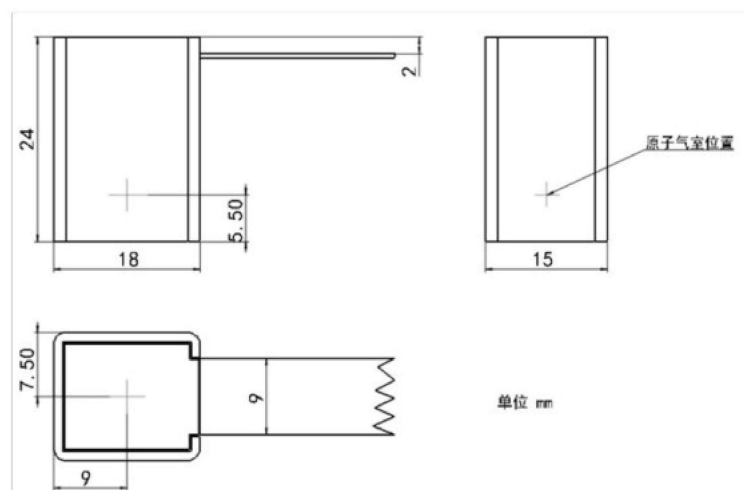
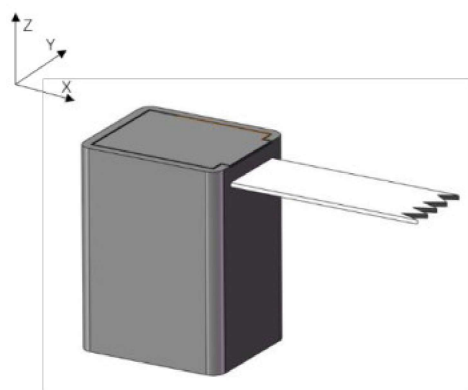
- Digital signal output
- Magnetic field data acquisition via host computer software



Key parameters

Technical Specifications	Technical Specifications/Parameters
Magnetic field measurement sensitivity	$\leq 5 \text{ pT/Hz}^{1/2}$
Tape width	50 Hz
Sampling rate	400 Hz
Dynamic range	1000 nT - 100000 nT
Size	Magnetic probe: 24 mm × 15 mm × 18 mm Control circuit: 22 mm × 42 mm × 94 mm
Detection Dead Zone	Equatorial plane (perpendicular to the X-axis)
Service voltage	+5 V
The communicating party is timid.	USB
Working temperature	-30°C - +50°C
Power dissipation	Steady-state power consumption: 7.5 W at 25°C
Cable length	Typical: 3 m (customizable)

Probe Structure



Stabilized Light Sources

The TA-SAS-780/795/852/895 Series Miniature Frequency-Stabilized Light Sources

Key Features

- High wavelength stability
- Absolute wavelength reference
- Compact size and low power consumption

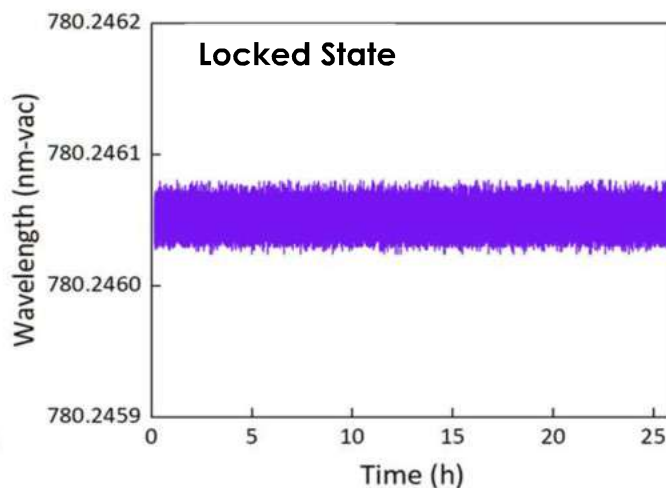
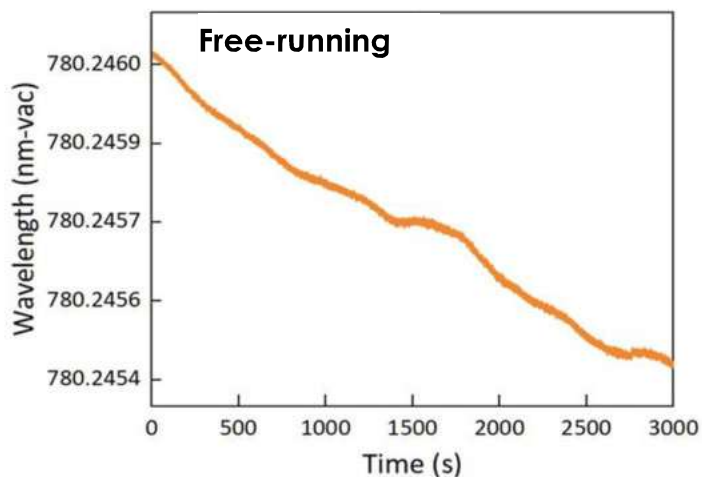
Applications

As a highly stable laser source, it is widely used in measurement and calibration, digital communications, and scientific research.



Key Indicators

Test Item		qualification			
		TA-SAS-780	TA-SAS-795	TA-SAS-852	TA-SAS-895
output wavelength		780nm	795nm	852nm	895nm
Wavelength stability	1s	3E-11			
	10s	1E-11			
	100s	3E-12			
output power		0.1~30mW (adjustable)			
Output shape size		Space Light/Fiber Optic (Optional)			
volume		180mL (86×55×36mm ³)			
power dissipation		5W			



TCG 01-G GNSS Clock

The TCG 01-G is a highly accurate, full featured Global Navigation Satellite System (GNSS) clock trusted and proven for use in electricity protection and control systems. The TCG 01-G supports IEEE 1588 v2 and conforms to IEC 61850.



Key Features

- References GPS and GLONASS networks
- Multi-level password protection
- Independently isolated outputs
- Isolated power supply
- High power line drivers
- Low noise characteristics due to balanced pair distribution
- UTC and LST with user defined DST options
- Remote configuration over Ethernet
- Configuration Security
- Enhanced security and encryption that exceeds NERC CIP requirements
- Remote firmware upgrades

The TCG 01-G can reference signals from either or both the GPS and GLONASS satellite networks. The clock synchronizes multiple IEDs (Intelligent Electronic Devices) within a network, including protection relays and remote telemetry units, and provides time-stamps to all electronic data being generated by the IEDs.

Supports

- IEEE 1588 (PTP C37-238, Telecom Slave only profile, ITU G.8265.1, Telecom Full profile ITU G-8275.1)*
- DC IRIG-B or Modified Manchester
- AM IRIG-B (Modulated)
- Serial Strings
- User defined pulses
- DCF77
- NTP/ SNTP (IEC 61850)*
- Event Recording



*Some optional features may incur extra costs

Physical

(W) 160 mm x (D) 155 mm x (H) 40 mm, 0.8 kg 1U 19" rack mount bracket accessory included IP40 (Ingress Protection rating)

Front Panel

The TCG 02-G has a 2 line x 16 character FSTN LCD display and two LEDs indicating multiple statuses, including:

- Sync Status
- Antenna cable fault
- Satellite acquisition mode
- Display mode button
- Alarm

GNSS Receiver

L1, C/ A code, 32 Channel Parallel-tracking receiver

Frequency:

1598 MHz

Sensitivity:

- Acquisition: -155 dBm
- Tracking: -160 dBm

Oscillator – TCXO

Holdover characteristics operating at 25 degrees C:

- TCXO 1PPS drifts 0.55 ms over a 24 hour period.
- Drift rate: 7 ppb per second

Inputs and Outputs

2 x independently programmable outputs, either:

- TTL 0 - 5 V, 150 mA (BNC or 2-pin)
- RS422 +/- 5 V, 50 unit loads (2-pin)
- HV switch MOSFET 300 V 1 A (2-pin)
- Fiber TX (62.5/ 125 μ m, λ 820 nm), compatible with multi-mode fiber (ST Fiber connectors)

Timing accuracy: <100 ns to UTC

Plus:

- 1 x RS232/ RS422 serial port, DCE wired (DB9) RS232: Signals are +/- 9 V, 15 mA.

Serial time messages can be configured to be output at 1200, 2400, 4800, 9600, 19200 and 38400 baud. Programmable pulse or IRIG-B available on pin 1.

Timing accuracy of RS232/ RS422 port:

- Serial Message: <1 bit time
- Pulse/ or IRIG-B time code: <1.5 μ s to UTC

Plus:

1 x AM IRIG-B, 8 Vpp, 120 ohm (BNC)

Timing accuracy: <2 μ s to UTC

Plus:

2 x Event recording inputs/ DC IRIG-B inputs (2 pin) Input rating: 5 V, 7 mA (10 V, 20 mA also accepted) Timing accuracy <100 ns

Plus:

1 x Antenna fail alarm (2 pin - Form A contact) Contact rating: 200 V, 150 mA DC or 150 V, 100 mA AC

Plus:

1 x Sync relay (2 pin - Form A contact) Contact rating: 200 V, 150 mA DC or 150 V, 100 mA AC

Plus:

1 x RJ45 10/100 Mbps UTP connector

Timing stamp accuracy: <100 ns to UTC (NTP/SNTP + PTP)

Protocols Supported:

ARP, UDP, ICMP, TFTP, DHCP, SNMP v1, v2c & v3; VLAN.

Back Panel:



*Some optional features may incur extra costs

Oscillator Options

OCXO

1PPS

Precision:

$< \pm 50 \text{ ns}$ UTC Time

Holdover Characteristics:

- $< \pm 5 \mu\text{s}$ / 8 hours (48-hours aging)
- $\pm 10 \mu\text{s}$ / 18 hours (48-hours aging)
- $\pm 10 \mu\text{s}$ / 24 hours (7-days aging)

10MHz

Stability:

$< \pm 1.0 \times 10^{-9}$ Peak to Peak

Precision:

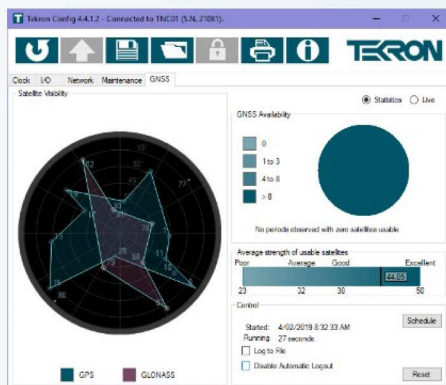
- $< \pm 1.0 \times 10^{-12}$ Avg per 24 hours
- $< \pm 1.0 \times 10^{-10}$ Root Allan
- Variance ($\tau=1$ second)

Holdover Characteristics:

$< \pm 1.0 \times 10^{-10}$ / 24 hours Common to 48-hours aging and 7-days aging

Atomic

Please contact us for information



Contact Us

- www.tekron.com
- Phone: +64 4 566 7722
- Sales Freephone: (Australia) 1800 608 572
- Sales Freephone: (North America) 1800 256 2309

Note:

The quickest and most effective method to request a quote is through the online quote request form on the Tekron website.

Configuration Software

Windows based configuration software is available for download on the Tekron website. Remote configuration over Ethernet includes the following user adjustable features:

- Multi-level access control
- Privacy & authentication methods equivalent to SNMP USM
- "Supervisor-mode" prevents non-approved changes
- Test mode
- Commissioning tool

Timing & Synchronization

Worldwide daylight savings and local time configuration using either rule based or fixed date methods. Options that allow equipment checks prior to full installation and adjustable hold-over times to increase reliability in the case of poor GNSS coverage. Adjustments to compensate for installation parameters such as delay of GNSS signal through antenna cable.

Programmable Outputs

- IRIG-B (B00x / B22x) time code with selectable C37.118.1 and AFNOR S87-500 extensions
- DCF77 time code, 1 kHz square wave
- User defined pulse sequences:
 - Repetition rates from 20 ms to 24 hours
 - Offsets and durations from 10 ms to 24 hours

Serial Strings

- NMEA-0183 ZDA
- NMEA-0183 RMC
- IRIG J-17
- Tekron A - H (Eight protocols for plug and play compatibility with a wide range of equipment).

SNMP

- v1, v2c & v3 support can be independently enabled
- Configurable v1, v2c community names & security groups
- Fully configurable via SNMP
- v3 User-based Security Module (USM) support
- USM authentication methods: MD5, SHA
- USM privacy methods: DES, AES
- USM MIB support
- Notifications
- SNMP trap generation v1, v2c & v3
- SNMPv3 traps can be authenticated & privatized via USM
- Syslog (RFC-3164 & 5424 varieties)

*Some optional features may incur extra costs

Aerospace-Grade Crystal Oscillator

1

Spaceborne surface-mount standard crystal oscillator SCXO11B/20A/19

Product Features and Applications/Features

- ◎High reliability, resistant to vibration and impact;
- ◎SMD ceramic-metal packaging, compact in size;
- ◎Total anti-irradiation dose ≥ 100 krad (Si);
- ◎Suitable for military and civilian aerospace engineering;
- ◎Detailed technical specifications can be customized according to user requirements.



Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Corporate Specifications: KJZ/61040101-2017 "Detailed Specifications for SCXO11B-E Series Quartz Crystal Oscillators"; Q/TD20430-2024 "Detailed Specifications for SCXO Series Surface-Mounted Crystal Oscillators"

Quality grade: Aerospace-grade (S grade), QJB (S), CN grade

Technical Specifications

◎Electrical performance parameters

Parameter Name		Characteristic
Frequency range		1~125MHz
Typical frequency (MHz)		1、10、20、25、50、60、100、120、125
Supply voltage		1.8V/2.5V/3.3V/5V
Frequency stability	VS. temperature	Frequency-Frequency Temperature Stability Table
Output	CMOS	Rising/Falling Edge
		Duty Cycle
		$\leq 6\text{ns}$
		$50\% \pm 10\%$
Current		25mA (Max) (1.8V) 30mA (Max) (2.5V) 40mA (Max) (3.3V) 50mA (Max) (5.0V)
Operating temperature range		Frequency-Frequency Temperature Stability Table
Three-state control		T: Yes N: No
Storage temperature range		$-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
Packaging size		Refer to the external dimensions diagram
Load		15pF

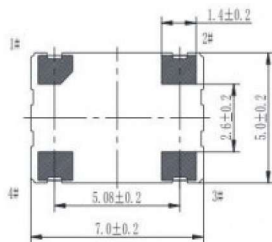
◎Frequency and Temperature Stability Table

Temperature range	Frequency and Temperature Stability (ppm)			
	A (± 20)	B (± 30)	C (± 50)	D (± 75)
D- $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$	*custom made		●	
E- $-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$	1	*custom made	●	●
H- $-55^{\circ}\text{C} \sim +105^{\circ}\text{C}$	1	1	●	●
G- $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$	1	1	*custom made	

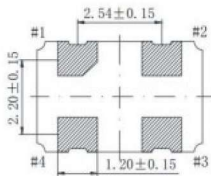
Order Instructions

Model	SCX0	11B	G	10M	D	H	I	T	-E
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Temperature Stability	Output Wave form	Source Voltage	Three States Control	Quality grade
	Conventional crystal oscillator	11B: (SMD7050) 20A: (SMD5032) 19: (SMD3225)	D: -40~+85℃ E: -55~+85℃ H: -55~+105℃ G: -55~+125℃	10M means 10MHz	B: ±30ppm C: ±50ppm D: ±75ppm	H: square wave	H: +5V I: +3.3V K: +2.5V L: +1.8V	T: have N: not have	E: astronavigation (S) /QJB (S) / CN class

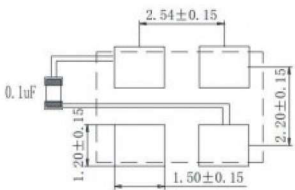
External dimensions and structural code



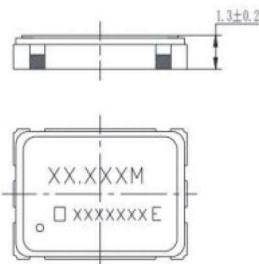
Pin number	Pin Function
1	Three-state control/Suspended state
2	The earth
3	Output
4	Source



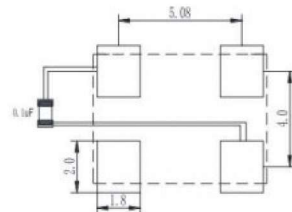
Pin number	Pin Function
1	Three-state control/Suspended state
2	The earth
3	Output
4	Source



Recommended pad size (mm)

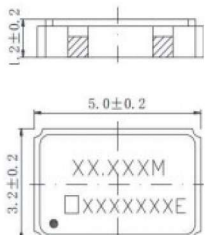


External dimensions (mm)



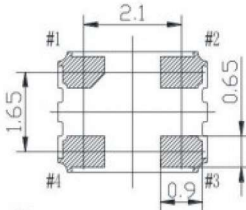
Recommended pad size (mm)

(Note: The 0.1 μF capacitor should be placed as close as possible to pin 4 of the crystal oscillator.)



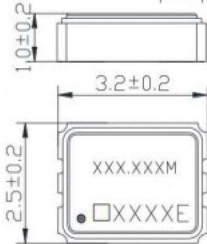
External dimensions (mm)

Structure Code: 11B

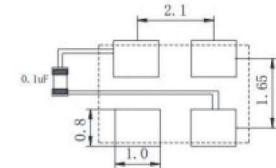


Pin number	Pin Function
1	Three-state control/Suspended state
2	The earth
3	Output
4	Source

Recommended pad size (mm)



External dimensions (mm)



(Note: The 0.1 μF capacitor should be placed as close as possible to pin 4 of the crystal oscillator.)

F capacitor should be placed as close as possible to pin 4 of the crystal oscillator.)

in 4 of the crystal

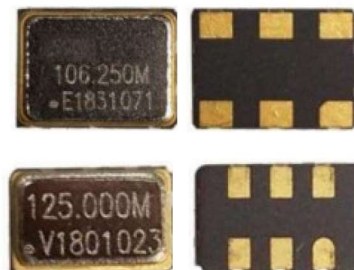
Structure Code: 19

Product Features and Applications/Features

◎High reliability, resistant to vibration and impact;

◎Differential signal output with low phase jitter;

◎Applicable to military and civilian aerospace engineering.



Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Specification: Q/TD20431-2024 "Detailed Specification for SCXO Series Label-Doped Differential Crystal Oscillators"

Quality grade:QJB (S)grade,CN grade

Technical Specifications

◎Electrical performance parameters

Parameter Name			Characteristic
Frequency range			50~250MHz
Typical frequency (MHz)			50、75、100、106.25、125、156.25、159.375、171.875、200、212.5、250
Supply voltage			2.5V/3.3V
Frequency stability		VS. temperature	Frequency-Frequency Temperature Stability Table
Output	E:PECL	Rising/Falling Edge	2ns (Max)
	V:LVDS	Duty Cycle	50%±5%
	C:HCSL		
Current			LVDS/HCSL:90mA (Max)
			PECL:100mA (Max)
Operating temperature range			Frequency-Frequency Temperature Stability Table
Three-state control			T: Yes; N: No; T1: 1-pin tri-state control; T2: 2-pin tri-state control;
RMS phase jitter			0.6ps (Max) (12KHz~20MHz)
Storage temperature range			-55℃~+125℃
Packaging size			Refer to the external dimensions diagram

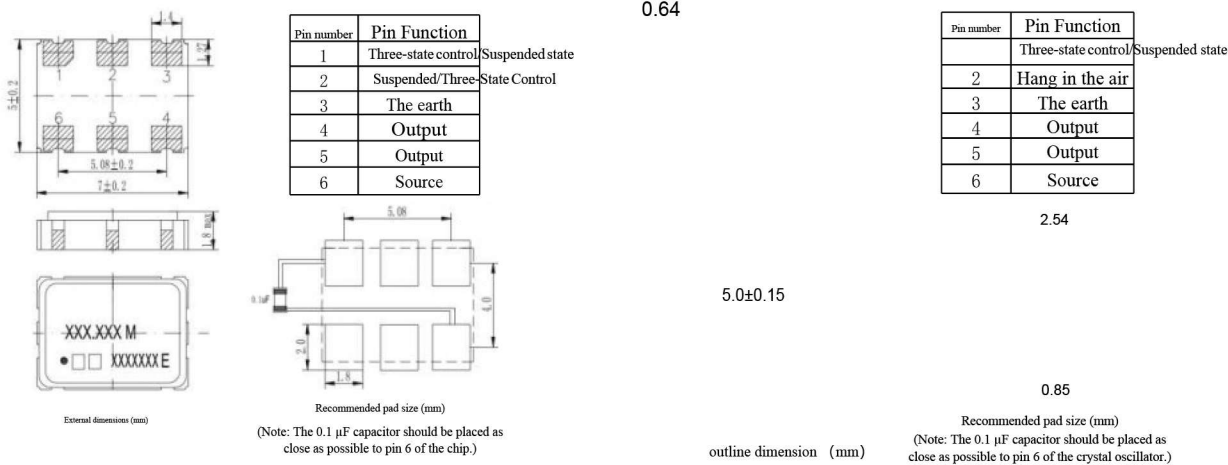
◎Frequency and Temperature Stability Table

Temperature range	Frequency and Temperature Stability (ppm)		
	A (±30)	B (±50)	C (±100)
D-40℃~+85℃	●	●	●
E-55℃~+85℃	¹	●	●
H-55℃~+105℃	¹	*custom made	●
G-55℃~+125℃	¹	*custom made	●

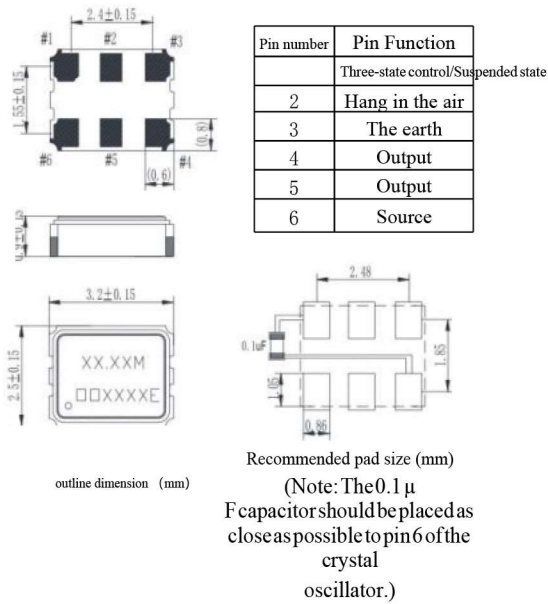
Order Instructions

Model	SCX0	23	G	100M	C	V	I	T1	-E
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Te- mperature Stability	Output Wave form	Source Voltage	Three States Control	Quality grade
	Conventional crystal oscillator	23: (SMD7050 differential) 24: (SMD5032 differential) 25: (SMD3225 differential)	D: -40~+85℃ E: -55~+85℃ H: -55~+105℃ G: -55~+125℃	100M means 100MHz	A: ±30ppm B: ±50ppm C: ±100ppm	E: PECL V: LVDS C: HCSL	I: +3.3V K: +2.5V	T1: 1 foot Control T2: 2 pins Control N: not have	E: astronavigation (S) /QJB(S)/C N-level

External dimensions and structural code



Structure Code: 23



Structure Code: 24

Structure Code: 25

Product Features and Applications/Features

- ◎ High reliability, resistant to vibration and impact;
- ◎ SMD ceramic-metal packaging, compact in size;
- ◎ Applicable to military and civilian aerospace engineering.

Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Specification: Q/TD20433-2024 "Detailed Specification for STXO2 Series Temperature-Tuned Quartz Crystal Oscillator"

Quality grade: QJB (S) grade, CN grade

Technical Specifications

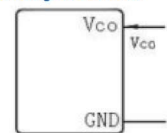
◎Electrical performance parameters

Parameter Name			Characteristic
Frequency range			5~52MHz
Typical frequency (MHz)			10、12.8、13、19.2、20、25、26、30、40、50
Supply voltage			3.3V
Frequency stability		VS. temperature	Frequency-Frequency Temperature Stability Table
Output	S: quasi-sine-wave	Output level	Vpp≥0.8V
	H:CMOS	Rising/Falling Edge	≤6ns
		Duty Cycle	50%±5%
Phase noise (20 MHz)			≤-130dBc/Hz@1kHz
Frequency Voltage Control			N: None V: Yes
			Range of adjustment: ≥±3 ppm (customizable)
Age-related aging			±0.5ppm/y~±2ppm/y
Current			10mA (Max)
Operating temperature range			Frequency-Frequency Temperature Stability Table
Storage temperature range			-55℃~+125℃
Packaging size			Refer to the external dimensions diagram

◎Frequency and Temperature Stability Table

Temperature range	Frequency and Temperature Stability (ppm)		
	K (± 0.28)	A (± 0.5)	B (± 1.0)
D- $-40^{\circ}C \sim +85^{\circ}C$	*custom made	●	●
E- $-55^{\circ}C \sim +85^{\circ}C$	*custom made	*custom made	●
K- $-40^{\circ}C \sim +105^{\circ}C$	*custom made	*custom made	●
H- $-55^{\circ}C \sim +105^{\circ}C$	*custom made	*custom made	●

Reference connection method for the voltage control circuit

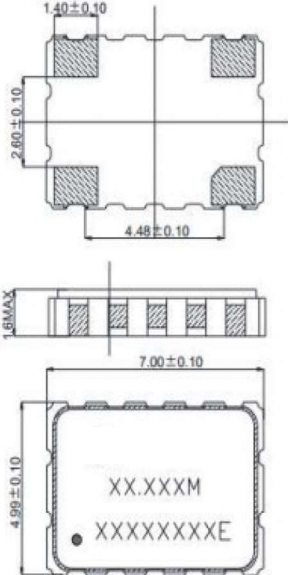


External voltage **Note:**
The voltage control terminal has no built-in bias; adjust the voltage control voltage to the center voltage (1.5 V).

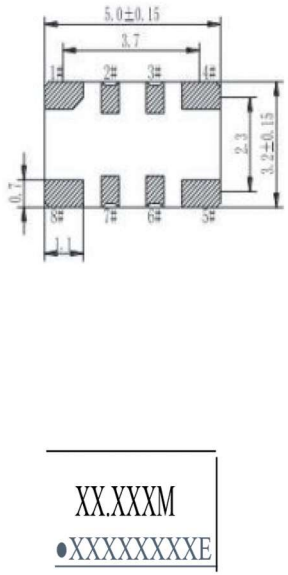
Order Instructions

Model	STX0	2XX	D	10M	A	H	I	V	-E
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Temperature Stability	Output Wave form	Source Voltage	Frequency Voltage Control	Quality grade
	Warming and Tonifying Crystal Oscillator	25F:SMD7050 27C:SMD5032	D: -40~+85℃ E: -55~+85℃ K: -40~+105℃ H: -55~+105℃	1 0 M equ-als 10 MHz	A: ±0. 5ppm B: ±1. 0ppm	S: Nearly sinu-soidal H: Square wave	I: +3. 3V	V: Pressure-controlled N: No pressure control	E: QJB (S) /CN Level

External dimensions and structural code



Pin number	Pin Function
1	Suspended/Pressure-controlled
2	The earth
3	Output
4	source



Pin number	Pin Function
1	Voltage Control/Suspended
2、3、6、7	Hang in the air
4	The earth
5	Output
8	Source

Structure Code: 25F

Structure code: 27C

Product Features and Applications/Features

- ◎Low-phase noise;
- ◎Total anti-irradiation dose: $\geq 100\text{krad}(\text{Si})$, $\geq 15\text{krad}(\text{Si})$ etc.;
- ◎Meet the requirements of aerospace engineering applications such as satellites;
- ◎Detailed technical specifications can be customized according to user requirements.



Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Specification: Q/TD20421-2024 "Detailed Specification for SOXO¹ 3X Series

Isothermal Quartz Crystal Oscillators" Q/TD20422-2024 "Detailed Specification for SOXO14X Series Isothermal Quartz Crystal Oscillators"

Q/TD20423-2024 "Detailed Specifications for SOXO15X Series Isothermal Quartz Crystal Oscillators"

Q/TD20424-2024 "Detailed Specifications for SOXO16X Series Isothermal Quartz Crystal Oscillators"

Q/TD20425-2024 "Detailed Specifications for SOXO17X Series Isothermal Quartz Crystal Oscillators" Quality Grade: Aerospace-grade(S), QJB(S), CN

Technical Specifications

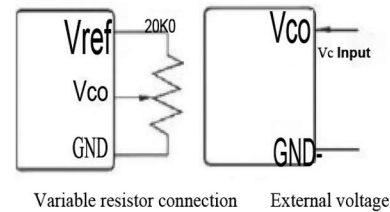
◎Electrical performance parameters

Parameter Name		Characteristic	
Frequency range		5~125MHz	
Typical frequency (MHz)		10、80、100、120	
Supply voltage		3V~15V	
Frequency stability		VS. temperature	Frequency-Frequency Temperature Stability Table
Output	Sinusoidal wave	Output power	≥7 dBm (customizable)
		Harmonic distortion	≤-30dBc
		Clutter	≤-80dBc
Phase noise (100 MHz)		Phase Noise Meter	
Power consumption (on/off/stable)		5W/2W (Max) @25℃	
Operating temperature range		Frequency-Frequency Temperature Stability Table	
Storage temperature range		-55℃~+85℃	
Frequency Adjustment		≥±0.3 ppm (customizable)	
Packaging size		Refer to the external dimensions diagram	

©Frequency and Temperature Stability Table

Temperature range	Frequency and Temperature Stability (ppm)			
	A(± 0.01)	B(± 0.05)	C(± 0.1)	D(± 0.5)
A-0°C~+50°C	●	●	●	●
B-10°C~+60°C	●	●	●	●
C-20°C~+70°C	●	●	●	●
D-40°C~+85°C	*custom made	●	●	●
E-55°C~+85°C	*custom made	●	●	●
F-40°C~+70°C		●	●	●

Reference connection method for the voltage control circuit

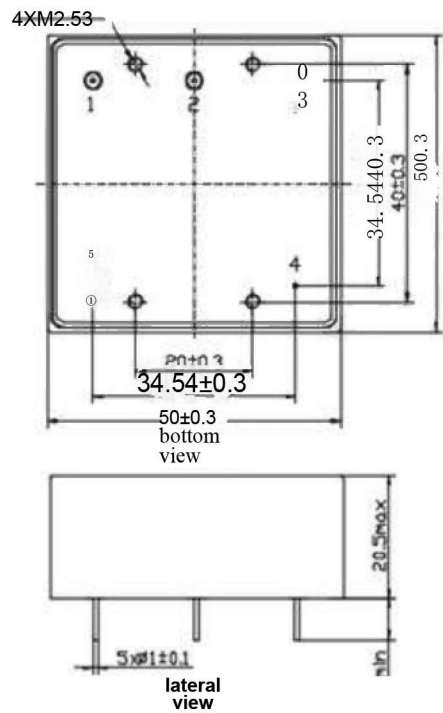


Note: The voltage control terminal is pre-set with a bias voltage. When no frequency calibration is required, keep the voltage control input terminal unconnected.

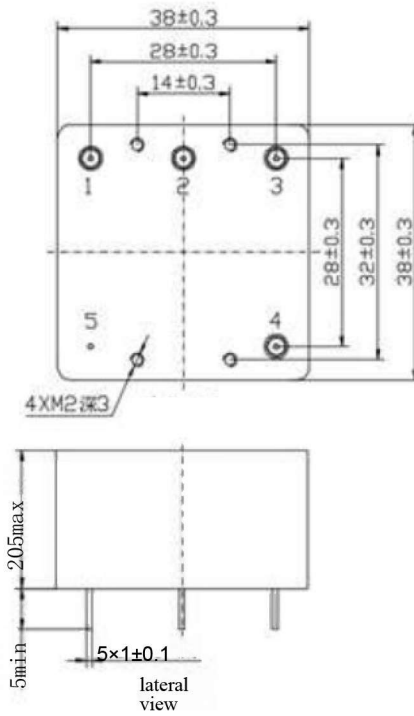
Phase Noise Meter

Deviation from the carrier frequency	Phase noise (dBc/Hz): fo <40 MHz (typical value: 10 MHz)				
	B	C	D	U	F
1Hz	-95	-100	-105	-110	*custom made
10Hz	-120	-125	-130	-135	
100Hz	-135	-140	-145	-150	
1kHz	-140	-145	-150	-155	
10kHz	-145	-150	-155	-160	
100kHz	-150	-155	-160	-165	
Deviation from the carrier frequency	Phase noise (dBc/Hz): fo ≥ 40 MHz (typical value: 100 MHz)				
	B	C	D	U	F
10Hz	-90	-95	-100	-105	*custom made
100Hz	-120	-125	-130	-135	
1kHz	-145	-150	-155	-160	
10kHz	-150	-155	-160	-165	
100kHz	-155	-160	-165	-165	

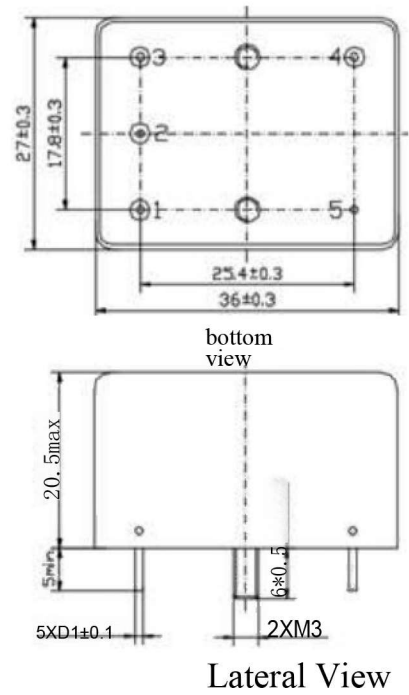
External dimensions and structural code



1、 Voltage-Controlled or Floating 2. Reference Voltage or Floating
3、 Output 4, Ground 5, Power Source

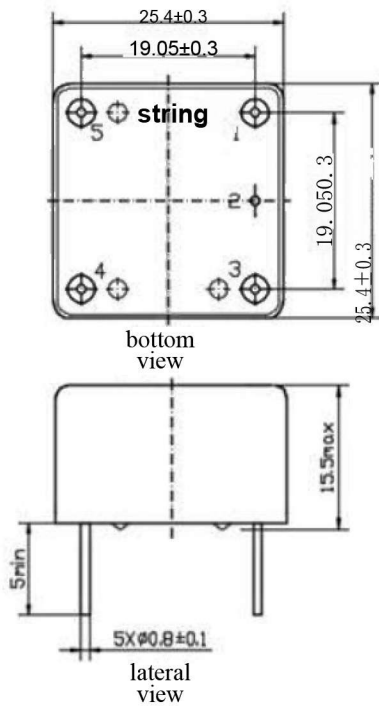


1、 Voltage-Controlled or Floating 2. Reference Voltage or Floating
3、 Power Source 4, Output 5, Ground



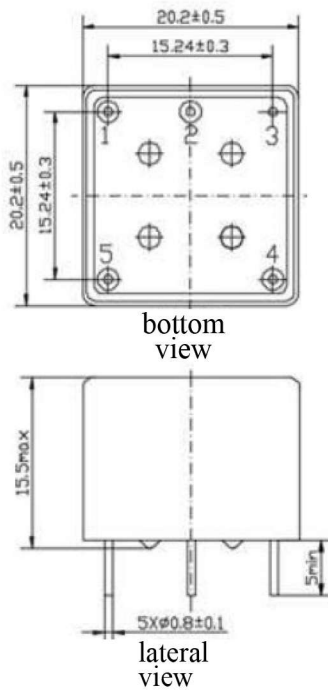
1、 Voltage-Controlled or Floating 2. Reference Voltage or Floating
3、 Power Source 4, Output 5, Ground

Structure Code: 13X



1、 Output 2, Ground 3, Pressure Control
or Suspension
4、 Reference voltage or floating 5, power
supply

Structure Code: 14X



1、 voltage-controlled or floating 2. Reference voltage or floating
3、 4. Output 5. Power Supply

Structure Code: 15X

Structure Code: 17X

Vibration-Resistant Crystal Oscillator

1 Vibration-Resistant, Temperature-Compensated Crystal Oscillator STXO14V/16V

Product Features and Applications/Features

©Low vibration phase noise, with an optimal value of ≤ -135 dBc/Hz at 1 kHz;

©High frequency stability;

©Designed for high-vibration environments such as airborne and missile-mounted applications.



Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Specification: Q/TD20126B-2016 "Product Specification for Airborne and Ground-Based Crystal Oscillators"

Q/TD20127B-2016 "Product Specification for Warm-Compensated Quartz Crystal Oscillators for Missile and Arrow Applications" Quality Grade: Military Grade (B)

Technical Specifications

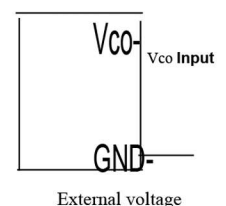
©Electrical performance parameters

Parameter Name	characteristic
Frequency range	50~120MHz
Typical frequency (MHz)	50、60、80、100、120
Supply voltage	5V/12V
Frequency stability VS. temperature	Frequency-Frequency Temperature Stability Table
Output power	≥ 5 dBm (customizable)
Sinusoidal wave Harmonic distortion	≤ -30 dBc
Clutter	≤ -70 dBc
Rising/Falling Edge TTL/HCMOS	≤ 6 ns
Duty Cycle	$50\% \pm 5\%$
Phase noise (100 MHz)	Static: ≤ -145 dBc/Hz at 1 kHz Dynamic: ≤ -125 dBc/Hz at 1 kHz
Power dissipation	0.25W (Max) @25°C
Storage temperature range	$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
Frequency Adjustment	$\geq \pm 1$ ppm (customizable)
Packaging size	Refer to the external dimensions diagram

©Frequency and Temperature Stability Table

Stability (ppm)	Frequency and Temperature			
	Temperature Range A (± 0.28)	B (± 0.5)	C (± 1)	D (± 2)
A $0^{\circ}\text{C} \sim +50^{\circ}\text{C}$	●	●	●	
B $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$	●	●	●	●
C $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$	●	●	●	●
D $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$	* custom made	●	●	●
E $-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$	1	* custom made	●	●
F $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$	●	●	●	●

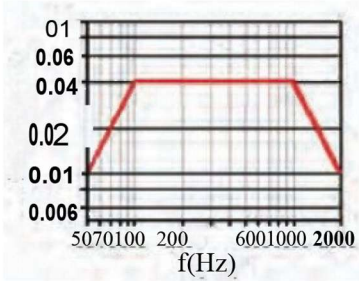
Reference connection method for the voltage control circuit



Note: The voltage control terminal is pre-set with a bias voltage. When no frequency calibration is required, keep the voltage control input terminal unconnected.

Phase Noise Meter

Deviation from the carrier frequency	Dynamic phase noise (dBc/Hz)				Note: 1. Dynamic phase noise is tested under vibration conditions. In the absence of special requirements, the vibration conditions shall comply with Article 214 of the GJB360B-2009 Random Vibration Method. Condition 1-B specifies the vibration requirements; the remaining vibration conditions can be customized. 2、 For static phase noise refer to the phase noise specifications of the STXO13 temperature-compensated crystal oscillator.
	A	B	C	E	
1kHz	-120	-125	-130	*custom made	

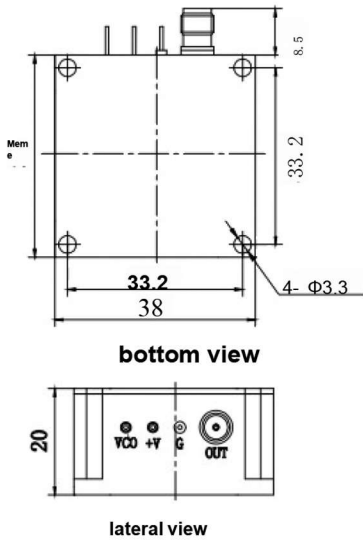


Typical dynamic phase noise curve for a 100 MHz crystal oscillator 1,000 MHz crystal vibration spectrum line graph

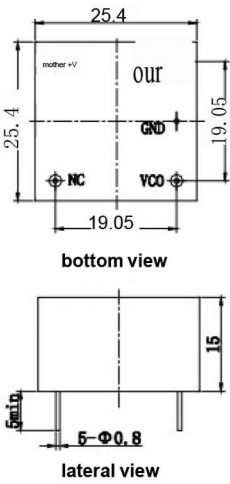
Order Instructions

Model	STXO	14V	E	100M	D	S	H	B	-G	-D
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Temperature Stability	Output Wave form	Supply voltage	Phase Noise	Domes-tication logo	Apply Environment
	Warning and Tonnifying Crystal Oscillator	14V: (38*38*20) 16 V: (25.4*25.4*15)	A: 0~+50℃ B: -10~+60℃ C: -20~+70℃ D: -40~+85℃ E: -55~+85℃ F: -40~+70℃	100M means 100MHz	A: ±0.28ppm B: ±0.5ppm C: ±1ppm D: ±2ppm	S: Sine wave H: Square wave	H: +5V I: +3.3V	See Phase Noise Table	None: No Nationalwide Industrialization G: Fully domestically produced Chemicalization	None: Onboard / Vehicle / Carrier-borne / Ground and other surfaces D: Arrow Year

External dimensions and structural code



Structure code: 14V



Structure code: 16V

Product Features and Applications/Features

◎The physical vibration isolation method is employed, achieving an optimal phase-noise level of ≤ -150 dBc/Hz at 1 kHz.

◎High frequency stability: 10^{-7} to 10^{-8} ;

◎ Suitable for high-vibration environments such as airborne, missile-mounted, and rocket-mounted applications.



Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Specification: Q/TD20125A-2016 "Product Specification for Airborne and Ground-Based Constant-Temperature Quartz Crystal Oscillators"

Q/TD20129B-2016 "Product Specification for Constant-Temperature Quartz Crystal Oscillators for Missiles and Arrows" Quality Grade: Military Grade (B)

Technical Specifications

◎ Electrical Performance Parameters

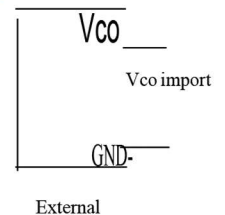
Parameter Name	Characteristic
Frequency range	10~160MHz
Typical frequency (MHz)	10、40、80、100、120
Supply voltage	5V/12V/15V
Frequency stability	VS. temperature Frequency-Frequency Temperature Stability Table
Output power	≥ 7 dBm (customizable)
Sinusoidal wave	Harmonic distortion ≤ -30 dBc
Clutter	≤ -80 dBc
Phase noise (1 0 0 MHz)	Static: ≤ -160 dBc/Hz@1 kHz Dynamic: ≤ -145 dBc/Hz@1 kHz
Age-related Aging	± 0.05 ppm ~ ± 0.5 ppm
Power consumption (on/off/stable)	3.6W/1.5W (Max) @25°C
Operating temperature range	Frequency-Frequency Temperature Stability Table
Storage temperature range	$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
Frequency Adjustment	$\geq \pm 1$ ppm (customizable)
Packaging size	Refer to the external dimensions diagram

◎ Frequency and Temperature Stability Table

Frequency and Temperature Stability (ppm)

temperature range	A (± 0.01)	B (± 0.05)	C (± 0.1)	D (± 0.5)
A $0^{\circ}\text{C} \sim +50^{\circ}\text{C}$	●	●	●	
B $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$	●	●	●	●
C $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$	●	●	●	●
voltage D: 40°C to $+85^{\circ}\text{C}$	1	* custom made	●	●
end has built-in bias voltage, E $-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$	1	*Customized	●	●
required for F -40°C to $+70^{\circ}\text{C}$	*Customized	●	●	●

Reference connection method for the voltage control circuit



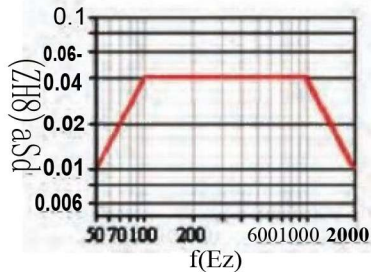
Note: The voltage control

No frequency calibration is

required for F -40°C to $+70^{\circ}\text{C}$ *Customized ● In this case, keep the voltage control input terminal free.

Phase Noise Meter

Deviation from the carrier frequency	Dynamic phase noise (dBc/Hz)					Note: 1. Dynamic phase noise is tested under vibration conditions. Unless otherwise specified, the vibration conditions shall comply with Condition I-B of Article 214 in the GJB360B-2009 Random Vibration Method; other vibration conditions may be customized as required. 2、 For static phase noise, refer to the phase noise specifications of the SOXO17 constant temperature crystal oscillator.
	A	B	C	D	E	
1kHz	-135	-140	-145	-150	*custom made	

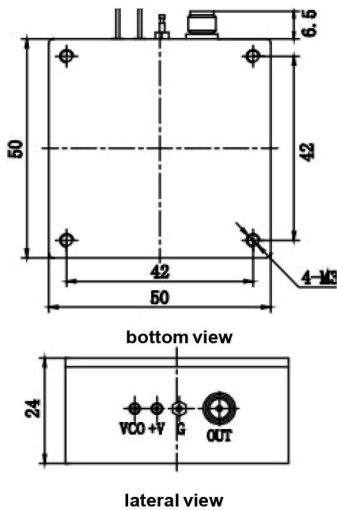


Typical dynamic phase noise curve for a 100 MHz crystal oscillator 1,000 MHz crystal vibration spectrum line graph

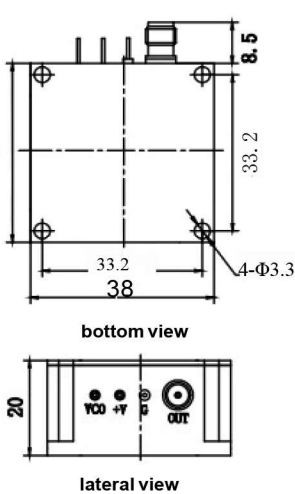
Order Instructions

Model	SOXO	14V	F	100M	C	S	H	B	-G	-D
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Temperature Stability	Output Wave form	Supply voltage	Phase Noise	Domestication logo	Apply Environment
	Thermostatic crystal oscillator	13V: (50*50*24) 14V: (38*38*20) 16V (25.4*25.4*15)	A: 0~+50℃ B: -10~+60℃ C: -20~+70℃ D: -40~+85℃ E: -55~+85℃ F: -40~+70℃	100M means 100MHz	A: ±0.01ppm B: ±0.05ppm C: ±0.1ppm ±0.5ppm	S: sinusoidal wave	F: +15V G: +12V H: +5V I: +3.3V	Phase detection Noise Table	None: No Fully domestically produced G: Fully domestically produced	None: On-board / Vehicle / Carrier-borne / Ground and other surfaces D: Arrow Year

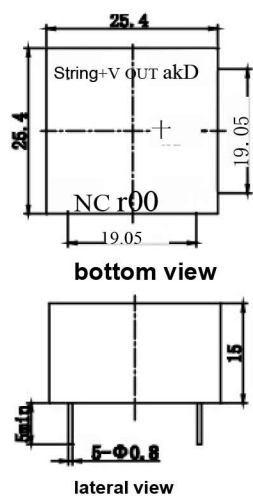
External dimensions and structural code



Structure code: 13V



Structure code: 14V



Structure code: 16V

Product Features and Applications/Features

- ◎ Low vibration phase noise, with an optimal value of ≤ -120 dBc/Hz at 1 kHz;
- ◎ The circuit compensation method is adopted, resulting in high frequency stability.
- ◎ Designed for high-vibration environments such as airborne and missile-mounted applications.

Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Standards: Q/TD20126B-2016 "Product Specification for Airborne and Ground-Based Thermally Compensated Quartz Crystal Oscillators"; Q/TD20127B-2016 "Product Specification for Thermally Compensated Quartz Crystal Oscillators for Missile and Arrow Systems"

Quality Grade: Military Grade (B)

Technical Specifications

◎ Electrical performance parameters

Parameter Name			Characteristic
Frequency range			20~120MHz
Typical frequency (MHz)			20、40、60、80、100、120
Supply voltage			3. 3V/5V
Frequency stability		VS. temperature	Frequency-Frequency Temperature Stability Table
Output	Sinusoidal wave	Output power	≥5 dBm (customizable)
		Harmonic distortion	≤-30dBc
		Clutter	≤-70dBc
	TTL/HCMOS	Rising/Falling Edge	≤6ns
		Duty Cycle	50%±5%
Phase noise (100 MHz)			Static: ≤-140 dBc/Hz @ 1 kHz
			Dynamic range: ≤-120 dBc/Hz at 1 kHz
Power dissipation			0. 25W (Max) @25℃
Storage temperature range			-55℃~+85℃
Frequency Adjustment			≥±1 ppm (customizable)
Packaging size			Refer to the external dimensions diagram

◎ Frequency and Temperature Stability Table

Temperature range	Frequency and Temperature Stability (ppm)			
	A (± 0.28)	B (± 0.5)	C (± 1)	D (± 2)
A 0°C~+50°C	●	●	●	●
B -10°C~+60°C	●	●	●	●
C -20°C~+70°C	●	●	●	●
D -40°C~+85°C	*custom made	●	●	●
E -55°C~+85°C	1	*custom made	●	●
F -40°C~+70°C	*custom made		●	●

Reference connection method for the voltage control circuit

Vco Vco Input

GND-External voltage

Note: The voltage control terminal is pre-set with a bias voltage. When no frequency calibration is required, keep the voltage control input terminal unconnected.

Phase Noise Meter

Deviation from the carrier frequency	Dynamic phase noise (dBc/Hz)			
	A	B	C	E
1kHz	-110	-115	-120	*custom made

Note: 1. Dynamic phase noise is tested under vibration conditions. In the absence of special requirements, the acceleration spectral density is 0.06 g²/Hz. According to the GJB 1032A-2020 classical spectral profile, other vibration conditions can be customized.

2、For static phase noise, refer to the phase noise specifications of the STXO13 temperature-compensated crystal oscillator.



100 Typical dynamic phase noise curve of an MHz crystal oscillator

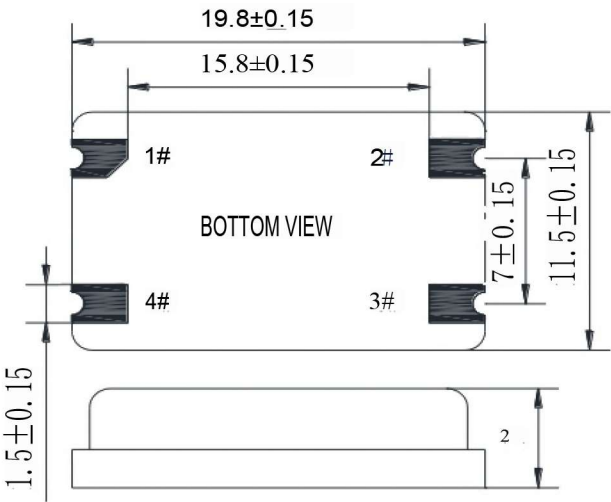
Frequency (Hz)	Spectrum density (g ² /Hz)
20~80	+3dB/oct
80~350	0.06
350~2000	-3dB/oct

100 MHz oscillator vibration conditions

Order Instructions

Model	STX0	13LG	E	100M	D	S	H	B	-G	-D
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Temperature Stability	Output Wave form	Supply voltage	Phase Noise	Domestication logo	Apply Environment
	Warming and Tonifying Crystal Oscillator	-	A: 0~+50℃ B: -10~+60℃ C: -20~+70℃ D: -40~+85℃ E: -55~+85℃ F: -40~+70℃	100M means 100MHz	A: ±0.28ppm B: ±0.5ppm C: ±1ppm D: ±2ppm	S: Sine wave H: Square wave	H: +5V I: +3.3V	See Phase Position Noise Table	None: Not domestically produced G: Fully domestically produced	None: Onboard/ Vehicle / Carrier-borne / Ground and other surfaces D: Arrow Year

External dimensions and structural code



For frequencies up to 50MHz,H=7mm;for frequencies beyond 50MHz,H=4.5mm.

Product Features and Applications/Features

- ◎Using circuit compensation, the vibration phase noise is low, with an optimal value of ≤ -110 dBc /Hz at 100 Hz and ≤ -130 dBc /Hz at 1 kHz.
- ◎High frequency stability: 10^{-7} to 10^{-8} ;
- ◎Suitable for environments with intense vibrations and impacts, such as airborne, missile-mounted, and rocket-mounted applications.

Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Standards: Q/TD20125A-2016 "Product Specification for Constant-Temperature Quartz Crystal Oscillators for Airborne and Ground Applications"; Q/TD20129B-2016 "Product Specification for Constant-Temperature Quartz Crystal Oscillators for Missile and Arrow Systems"

Quality Grade: Military Grade (B)

Technical Specifications

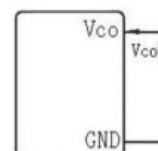
◎Electrical performance parameters

Parameter Name	Characteristic
Frequency range	100MHz
Typical frequency (MHz)	100
Supply voltage	5V/12V/15V
Frequency stability	VS. temperature Frequency-Frequency Temperature Stability Table
	Output power ≥ 7 dBm (customizable)
Sinusoidal wave	Harmonic distortion ≤ -30 dBc
	Clutter ≤ -80 dBc
Phase noise (100 MHz)	Static: ≤ -160 dBc/Hz at 1 kHz Dynamic: ≤ -130 dBc/Hz at 1 kHz
Age-related aging	± 0.05 ppm $\sim \pm 0.5$ ppm
Power consumption (stable on startup)	5.4W/1.8W (Max) @25°C
Operating temperature range	Frequency-Frequency Temperature Stability Table
Storage temperature range	$-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$
Frequency Adjustment	$\geq \pm 1$ ppm (customizable)
Packaging size	Refer to the external dimensions diagram

◎Frequency and Temperature Stability Table

Frequency and Temperature Stability (ppm)				
Temperature range: A (± 0.01), B (± 0.05), C (± 0.1), D (± 0.5)				
A $0^{\circ}\text{C} \sim +50^{\circ}\text{C}$	●	●	●	
B $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$	●	●	●	
C $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$	●	●	●	●
D $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$	1	* custom made	●	●
E $-55^{\circ}\text{C} \sim +85^{\circ}\text{C}$	1	* custom made	●	●
F $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$	* custom made	●	●	●

Reference connection method for the voltage control circuit

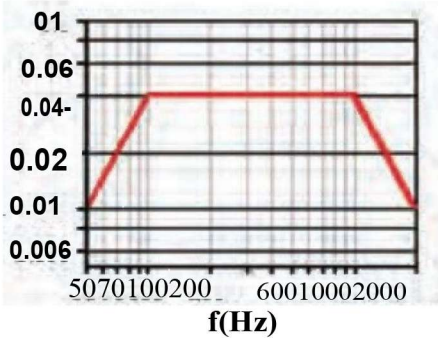


External voltage

Note: The voltage control terminal is pre-set with a bias voltage. When no frequency calibration is required, keep the voltage control input terminal unconnected.

Phase Noise Meter

Deviation from the carrier frequency	Dynamic phase noise (dBc/Hz)					Note: 1. Dynamic phase noise is tested under vibration conditions. Unless otherwise specified, the vibration conditions shall comply with Condition I-B of Article 214 in the GJB360B-2009 Random Vibration Method; other vibration conditions may be customized as required. 2. For static phase noise, refer to the phase noise specifications of the SOXO16 constant temperature crystal oscillator.
	A	B	C	D	E	
1kHz	-115	-120	-125	-130	*custom made	

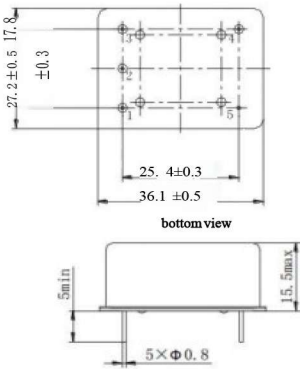


Typical dynamic phase noise curve for a 100 MHz crystal oscillator 1,000 MHz crystal vibration spectrum line graph

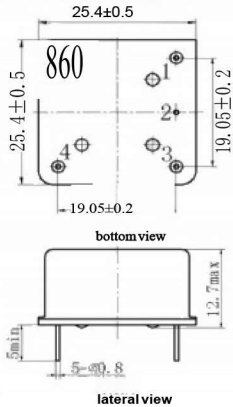
Order Instructions

Model	SOxO	14V	F	100M	C	S	H	B	-G	-D
Meaning Explanation	Crystal oscillator type	Structure Code	Temperature range	Nominal Frequency	Frequency and Temperature Stability	Output Wave form	Supply voltage	Phase Noise	Domestication logo	Apply Environment
	Thermostatic crystal oscillator	15LG: (36*27*15.5) 16LG: (25.4*25.4*12.7) 17LG: (20*20*11)	A: 0~+50℃ B: -10~+60℃ C: -20~+70℃ D: -40~+85℃ E: -55~+85℃ F: -40~+70℃	100M, which is 100 MHz	A: ±0.01ppm B: ±0.05ppm C: ±0.1ppm D: ±0.5ppm	S: sinusoidal wave	G: +12V H: +5V	Phase detection Noise Table	None: Not domestically produced G: Fully domestically produced	None: Onboard/ Vehicle / Carrier-borne / Ground and other surfaces D: Arrow Carrier

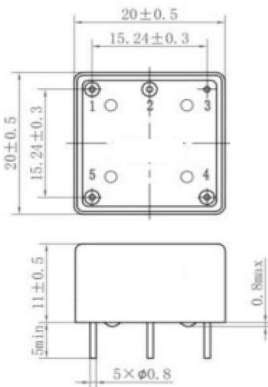
External dimensions and structural code



Structure code: 15LG

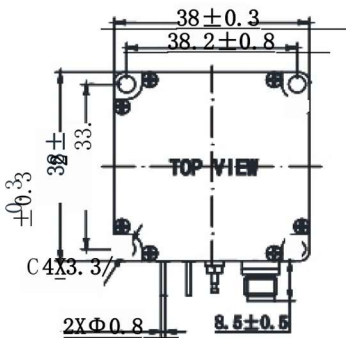
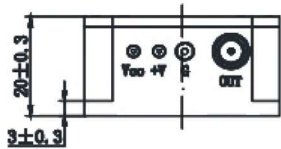


Structure code: 16LG



Structure code: 17LG

Product Name: Vibration-Resistant, Low-Phase Noise, Constant-Temperature Crystal Oscillator Product model: SOXO14VF100MCSG

Technical Indicator Items				Specification Requirements	
Nominal frequency		☒ 100MHz		Other recommended frequencies	80MHz、120MHz
Outline dimension		38×38×20mm ³		Product weight	☐ 100g (Max)
Temperature range		Working temperature		☒ -40℃~+70℃	
		Storage temperature		☒ -55℃~+85℃	
Quality grade		Military-grade (B), implementation specification: "Product Specification for Constant-Temperature Quartz Crystal Oscillators for Airborne, Ground, and Other Applications" Q/TD 20125A-2016			
		-D Military-grade (B), Implementation specification: "Product Specification for Constant-Temperature Quartz Crystal Oscillators Used in Munitions and Arrows" Q/TD20129B-2016			
Supply voltage	12V±5%	Working Current	Initial status	☒ ≤300mA (@25±2℃)	
			Stable state	☒ ≤100mA (@25±2℃)	
Output		Wave form		☒ sinusoidal wave	
		Output power		☒ ≥8 dBm (load: 50 ohms)	
		Harmonic wave		☒ ≤-30dBc	
		Clutter		☒ ≤-80dBc	
Frequency accuracy		Initial accuracy at the reference temperature		☒ ≤±0.5ppm(25℃±2℃)	
Frequency stability		Frequency and Temperature Stability		☒ ≤±0.1ppm(-40℃~+70℃)	
		Frequency and Voltage Stability		☐ ≤±0.01 ppm (voltage variation ±5%)	
Frequency regulation		Frequency adjustment range		☒ ≥±1ppm(0~8V)	
Phase noise (100 MHz)		Steady state			Dynamic (GJB360B Method 214 Condition I-B)
		☒ ≤-160dBc/Hz@1kHz; ☒ ≤-165dBc/Hz@10kHz; ☒ ≤-170dBc/Hz@100kHz。			☒ ≤-145dBc/Hz@1kHz; ☒ ≤-160dBc/Hz@10kHz; ☒ ≤-165dBc/Hz@100kHz。
Age		☒ ≤±5 ppb/day			
		☐ ≤±0.3 ppm/year			
外形 diagram and pin definition					
Pin number	Pin Function		 		
+V	Source (VCC)				
G	Ground (GND)				
OUT	Output (RFOUT)				
VCO	Voltage Control (VCO)				
The signal output is via the SMA interface.					
Remarks			1、The product model number is supplemented with the "D" designation, indicating it is designed for use in explosive or projectile environments. 2、 ☒ These conditions must be met and serve as the basis for product inspection. ☐ Reference indicators for design assurance; 3、1ppm=1E-6; 1ppb=1E-9。		

Product Features and Applications/Features

©Optimal vibration phase noise ≤ -150 dBc/Hz at 1 kHz;

©Integrated loop; low-noise phase-locked

©

It is widely applicable in military and civilian communications, radar, and other fields.

Quality Specification/Quality Assurance

General Specification: GJB1648A-2011 "General Specification for Crystal Oscillators"

Enterprise Specification: Q/TD20125A-2016 "Product Specification for Airborne and Ground-Based Constant-Temperature Quartz Crystal Oscillators"

Q/TD20129B-2016 "Product Specification for Constant-Temperature Quartz Crystal Oscillators for Missiles and Arrows" Quality Grade: Military Grade (B)

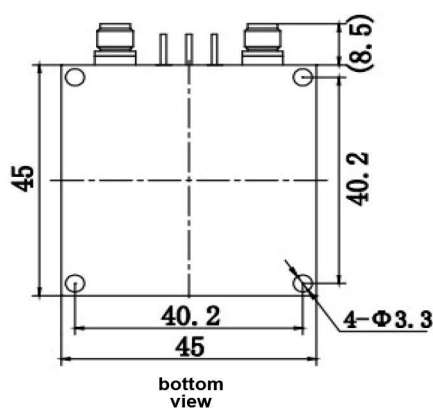


Technical Specifications

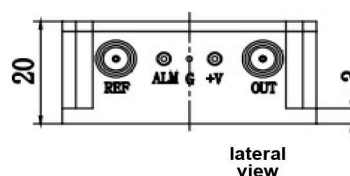
©Electrical performance parameters

Parameter Name			Characteristic
Input frequency range			10~125MHz
Output frequency range			10~160MHz
Supply voltage			12V/15V
Output	Sinusoidal wave	Output power	≥5 dBm (customizable)
		Harmonic distortion	≤-30dBc
		Clutter	≤-70dBc
Phase noise (100 MHz)			Static: ≤-160 dBc/Hz @ 1 kHz
			Dynamic range: ≤-145 dBc/Hz at 1 kHz
Power consumption (on/off/stable)			5W/2W (Max) @25℃
Lock instruction			≥3V@When locked
Operating temperature range			-55℃~+85℃
Storage temperature range			-55℃~+85℃
Packaging size			Refer to the external dimensions diagram

External dimensions and structural code



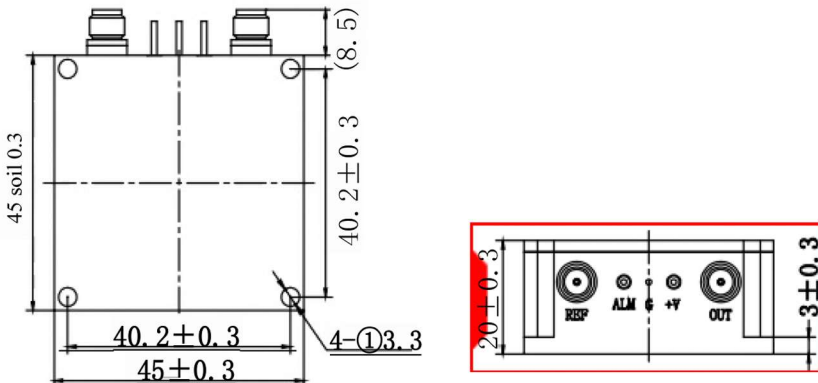
Pin number	Pin Function
REF	Reference Signal Input
ALM	Lock instruction
G	The earth
+V	Source
OUT	Output



Structure code: 11V

Product Name: Vibration-Absorbing Phase-Locked Loop Thermostable Crystal Oscillator

Product model: SPXO11V-10M-100M

Technical Indicator Items				Specification Requirements		
Nominal frequency		☒ 100MHz		Other recommended frequencies	80MHz、120MHz	
Outline dimension		45×45×20mm ³		Product weight	☐ 100g (Max)	
Temperature range		Working temperature		☒ -40℃~+70℃		
		Storage temperature		☒ -55℃~+85℃		
Quality grade		Military-grade (B), compliance standard: "Product Specification for Constant-Temperature Quartz Crystal Oscillators for Airborne, Ground, and Other Applications" Q/TD20125A-2016				
		-D Military-grade (B), Implementation specification: "Product Specification for Constant-Temperature Quartz Crystal Oscillators Used in Munitions and Arrows" Q/TD 20129B-2016				
Supply voltage	12V±5%	Working	Initial status	☒ ≤350mA (@25±2℃)		
		Current	Stable state	☒ ≤150mA (@25±2℃)		
Output		Wave form		☒ sinusoidal wave		
		Output power		☒ ≥10 dBm (load: 50 ohms)		
		Harmonic wave		☒ ≤-30dBc		
		Clutter		☒ ≤-70dBc		
Locking indicator level				☐ ≥3V when locked		
Steady-state phase noise (room temperature, locked)		Steady state			Dynamic (GJB360B Method 214 Condition I-B)	
		☒ ≤-160dBc/Hz@1kHz; ☒ ≤-165dBc/Hz@10kHz; ☒ ≤-170dBc/Hz@100kHz。			☒ ≤-145dBc/Hz@1kHz; ☒ ≤-160dBc/Hz@10kHz; ☒ ≤-165dBc/Hz@100kHz。	
Age		☐ ≤±0.3 ppm/year (internal crystal oscillator specification)				
Requirements for the reference input signal						
Reference frequency		10MHz				
Frequency accuracy		≤±0.5ppm				
Signal power		0~10dBm				
Phase noise		≤-120dBc/Hz@10Hz				
diagram and pin definition						
Pin number	Pin Function					
REF	Reference Signal Input					
ALM	Lock instruction					
G	The earth					
+V	Source					
OUT	Output					
Note: The signal input and output ports use SMA negative connectors.						
Remarks			1、The product model number is supplemented with the "D" designation, indicating it is designed for use in explosive or projectile environments. 2、 ☒ These conditions must be met and serve as the basis for product inspection. ☐ Reference indicators for design assurance; 3、1ppm=1E-6; 1ppb=1E-9。			

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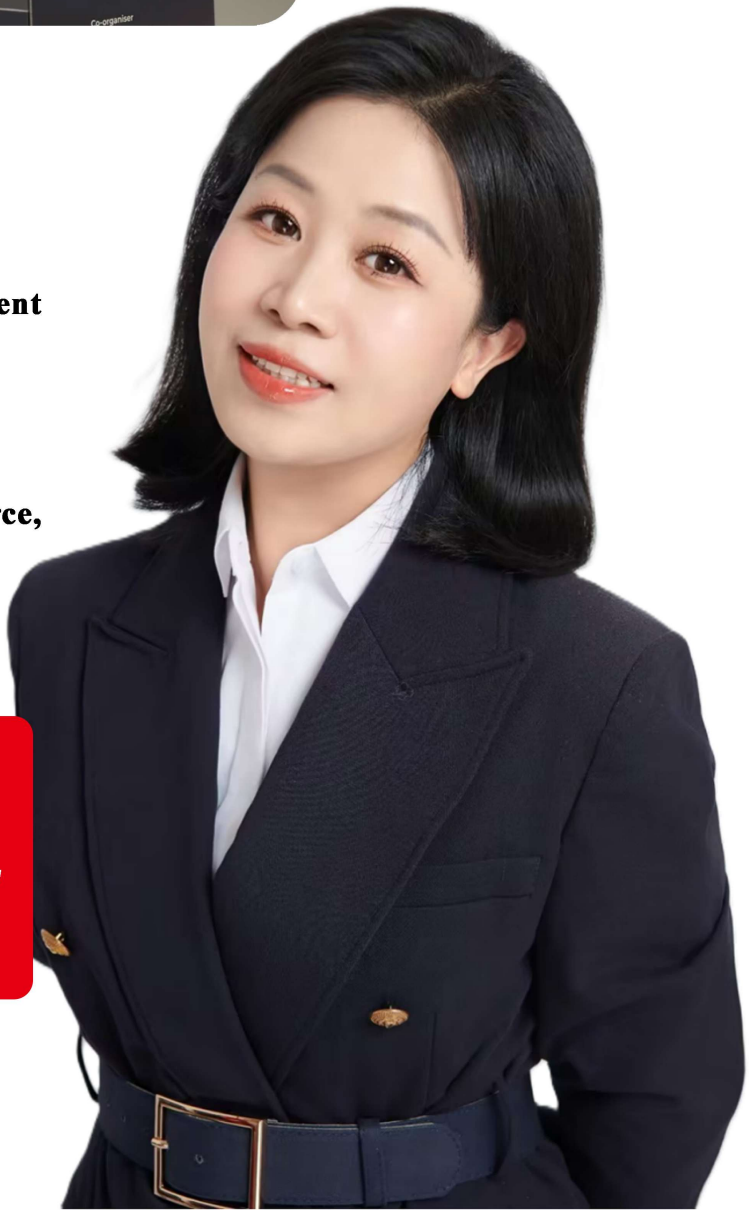
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