Rubidium Clock

AR60A

INDUSTRIAL/RUGGEDIZED RUBIDIUM ATOMIC FREQUENCY STANDARD

Key Features

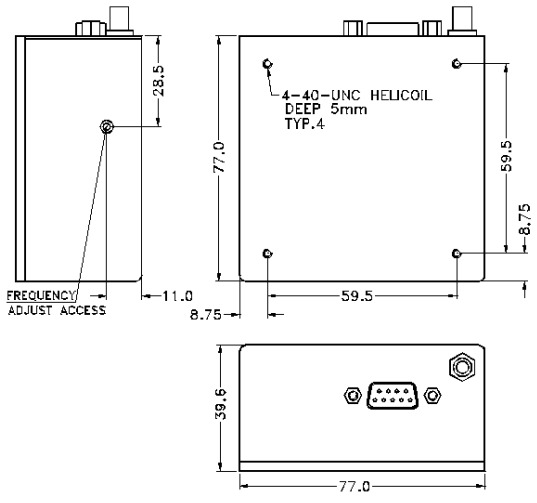
Output Frequency:	*10MHz (or 5MHZ)*
Low Aging:	*$5x10^{-10}$ per year*
Temperature:	*-40°C to +77°C (Opt.)*
Supply Options:	*15VDC, 12VDC, 28VDC*
Power consumption:	*9W @ 15VDC steady state*
Fast Warm-up:	*5Min to $5x10^{-10}$ (Opt.)*
Digital Frequency Control:	*<$1x10^{-12}$ steps over; >$1x10^{-6}$ range (Opt.)*
Holdover	*OCXO Hold Over*
High Reliability	*MTBF > 1,400,000 hrs.@ 25°C*
Extremely Small:	*77x77x39.6 mm*

Description

AR60A is an extremely small, very high performance Atomic Rubidium Frequency Standard designed to operate reliably in demanding applications and harsh environment.
AR60A includes a high performance Oven Controlled Crystal Oscillator (OCXO) that is locked to the Rubidium Atomic Resonance using a sophisticated digital FLL (Frequency Lock Loop) thus maintaining its very high stability and accuracy.
The unit contains a micro-processor which optimizes its performance vs. external disturbances.
(e.g. at a very high temperature or shock). In addition, a built-in synthesizer allows a very fine digital frequency control over a wide range (option).
The unit is a perfect replacement for larger and more expensive units available in the market today, as well as for high precision oscillators.

Applications

- ❖ Test Equipment
- ❖ Scientific Equipment
- ❖ Calibration
- ❖ Telecommunications
- ❖ Secure communication
- ❖ TV Stations
- ❖ Cellular Phone Base Stations
- ❖ Mobile Radio
- ❖ Internet and more.



Mechanical Layout - AR60A

D-Type Subminiature 9 pins (male):

pin 1 - +15V
pin 2 - GND
pin 3 - Lock (BIT)
pin 4 - Vref 5V (option)
pin 5 - GND
pin 6 - TxD (option)
pin 7 - factory use
pin 8 - Freq. Adjust (opt.)
pin 9 - RxD (option)

SMA:

RF output 10MHz

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AccuBeat Ltd.
Accurate Frequency & Time

SPECIFICATIONS

All specs are at room temperature, quiescent conditions, sea level ambient unless otherwise specified.

Parameter	Standard Version AR60A-00 (*)		Options (**)
Output Frequency	10MHz, sine wave, +(12±2) dBm / 50Ω		TTL, CMOS, 5MHz
Stability:			
Long Term (Aging):	<1 x 10^{-9}/year (after 3 months operation) <5 x 10^{-10}/year (2nd year)		<5 x 10^{-10} / year
Short Term (Allan Dev.):	<3 x 10^{-11} @ 1sec <3 x 10^{-12} @ 100sec		<1.5 x 10^{-11} @ 1sec <2 x 10^{-12} @ 100sec
Phase Noise: dBc / Hz	@ Frequency	Phase Noise	Phase Noise
	10Hz	<- 95	<- 100
	100Hz	<- 130	<- 140
	1000Hz	<- 140	<- 148
	10000Hz	<- 145	<- 154
Harmonics: **Spurious:**	<- 45 dBc <- 75 dBc at ± 1.5 MHz from carrier		<- 90 dB (10MHz ± 1MHz)
Warm-up:	4 min to lock 7.5 min to 5x10^{-10}		3.5min to lock 5 min to 5x10^{-10} (*) At -40°C warm up time is longer
Supply Voltage:	15Vdc ±5%		a) 12V±4% b) 18Vdc to 36Vdc,
Supply Current:	Steady state: ~0.6A @ 15Vdc		Steady state: ~0.8A @ 12Vdc ~0.4A @ 28Vdc
	Warm-up (<6min): ~1.7 A @ 15Vdc		Warm-up (<6min.): ~1.9A @ 12Vdc ~1A @ 28Vdc
Stability / Temperature:	±3x10^{-10} max. over -20℃ to +65℃		a)Standard option: -20℃ to +74℃ (base plate) with degradation above 71°C. b) -40℃ to +77℃ (base plate), contact factory. c) ±5x10^{-11} / -20℃ to +71℃, contact factory
Storage Temp:	-40℃ to +80℃		
Frequency Adjust:	Mechanical: ±3x10^{-9} Trimmer 10 turns.		Electrical: ±1.5x10^{-9} min/ 0 to 10VDC Digital: <1x10^{-12} steps / >1x10^{-6} range Included in this option: Software for PC
Connectors:	D-Type Subminiature 9 pins (male): see below SMA: 10MHz		
Dimensions:	77 x 77 x 39.6 mm		
Weight:	360g max.		
Magnetic Field Sensitivity:	<5x10^{-11}/gauss worst axis		
Vibrations:	Random: 3.0grms, 20 to 500Hz (with some degradation in performance)		5.7grms, 10 min per axis (Contact factory for details)
Shock:	20g half sine, 11ms, momentary offset <1x10^{-9}		
Hold-Over Mode:	If lock is lost, the internal OCXO continues to provide an output frequency with the last saved frequency and with the very good stability of an OCXO.		
Reliability:	>1,400,000 hrs @ 25℃, G.B. , >108,000 hrs @ 60℃, G.B. per MIL HDBK-217F		
Accuracy at Shipment:	5x10^{-11}		
Built In Test (Bit)	Detects > 97% of all failures. "1"=High Impedance=Unlock / "0"=Short to Ground=Ok (Lock)		

(*) All specs are at room temperature quiescent conditions, unless otherwise specified
(**) Some combinations of options are not available

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