

## Rubidium Frequency Standard NAC2 - Nano Atomic Clock

The NAC2 is the newest and smallest addition to AccuBeat's atomic clocks line of Rubidium Frequency Standards. Based on Coherent Population Trapping (CPT), the NAC2 is an extremely small and compact atomic clock that has been designed as a board mounted component.



### Key Features

- ADEV @ 1,000 sec: < 1E-11
- Power consumption < 350mW
- Phase noise (floor): < -150dBc / Hz
- Size: 23.6cc (41.1mm X 35.8mm X 16 mm)
- Long term stability: <3E-10/month
- Temp stability:  $\pm 5E-10$  @ -40°C to 80°C
- 1PPS Sync  $\pm 25$  ns
- Outputs: 10 MHz , 1PPS
- Supply voltage: 3.3 VDC

### Description

**NAC2** provides 10 MHz and 1PPS outputs and short term stability (Allan Deviation) less than  $2E-11$  @ 100 seconds with long term stability less than  $3E-10$ /month at 25°C. The NAC2 has a RS232 interface for monitoring and control, a Built in Test (BIT) output and a warm up time of less than 130 seconds. Measuring just 41.1mm X 35.8mm X 16mm and weighing only 38 grams and with power consumption of less than 350mW, the new NAC2 is a Rubidium atomic clock especially suitable and designed for a wide range of portable applications. The NAC2 accepts a 1PPS input that may be used to synchronize the unit's 1PPS output to an external reference clock with less than 10 ns RMS accuracy.

### Applications

The NAC2 is specifically designed for low power applications such as

- Communication
- GPS receivers
- UAV's
- Autonomous sensors
- Backpack secure communication radios.

All specs are @ 25°C, quiescent conditions and sea level ambient unless otherwise specified

Inputs & Outputs	
<b>10MHz Output</b>	CMOS, 3.3V@1MΩ
<b>1PPS Output</b>	CMOS compatible, 3V@1MΩ Rise / Fall time: <10 ns, Pulse width: 20 μs
<b>1PPS Input</b>	CMOS, 3V@1MΩ
<b>Built in test (BIT)</b>	CMOS compatible, 3.3V@1MΩ '0' = Normal operation, '1' = Alarm
<b>Voltage input</b>	3.3±0.1 VDC
<b>Serial Comm.</b>	Control and monitor interface RS232, format CMOS compatible, 3V@1MΩ, 115200BPS

Environmental Specifications	
<b>Operating Temperature</b>	-40°C to 80°C
<b>Radiated Emissions</b>	Compliant to FCC part 15, Class B, when mounted properly onto host PCB
<b>Vibration</b>	Maintains lock under MIL-STD-810G, Operational, 7.7 grms per Figure 514.7E-1. Category 24
<b>Humidity</b>	0%–95% RH per MIL-STD-810F, Method 507.4

Storage and Transport (Non-operating)	
<b>Temperature</b>	-55 °C to 85
<b>Vibration</b>	MIL-STD-810G, 7.7 grms per Figure 514.7E-1. Category 24
<b>Shock</b>	Survive 11 ms half-sine, 30g in 3 axis

Physical	
<b>Weight</b>	<38 g (<1.34 oz)
<b>Size (mm)</b>	41.1 × 35.8 × 16

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## Standard Product Specifications

Performance		
Frequency	Stability (Allan Deviation)	< 2E-10 @ TAU = 1sec < 8E-11 @ TAU = 10sec < 2E-11 @ TAU = 100sec < 1E-11 @ TAU=1,000sec
	Phase Noise	<-50 dBc/Hz @ 1Hz <-86 dBc/Hz @ 10Hz <-120 dBc/Hz @ 100Hz <-138 dBc/Hz @ 1kHz <-143 dBc/Hz @ 10kHz <-148 dBc/Hz @ 100kHz
	Long Term Stability*	< 3E-10 / month
	Maximum frequency change over operating temperature range	±5E-10 (-40°C to 80 °C)
	Maximum retrace (48 hours off)	±5E-10
	Digital Tuning	Range: ±2E-8 Resolution: 2E-11
	Time Accuracy	1PPS Sync. <25 nSec
Warm-up	Warm-up Time <130 s	
Power Consumption	At steady state < 350mW	

\*After 30 days of continues operation

All specifications at 25°C , Vcc =3.3VDC unless otherwise specified

MTBF: 250,000 Hours

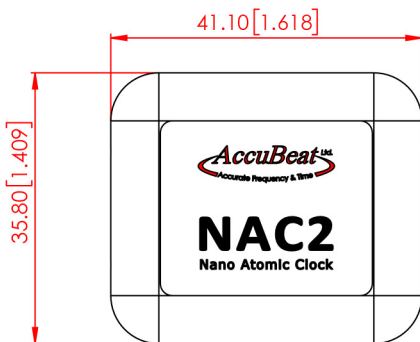
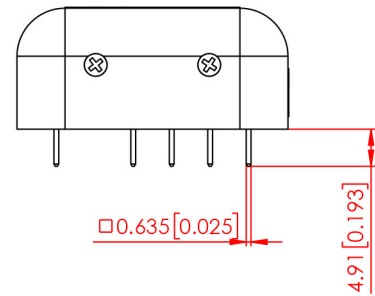
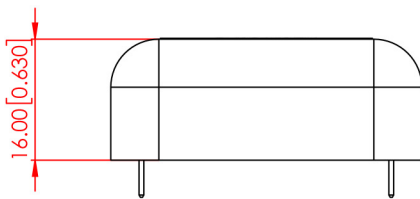
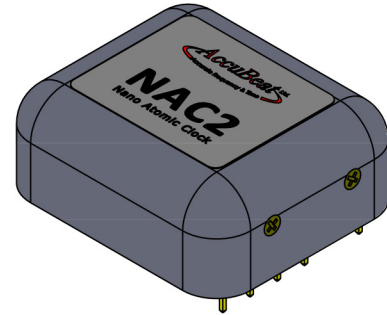
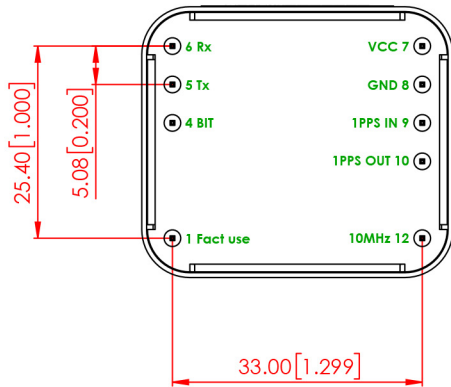
### How to Order

AccuBeat P/N	Output Frequency	Wave Form	Special Features
NAC2000	10MHz	Square	Standard

### Evaluation Kit

AccuBeat P/N	Description
AA50925	NAC2 Evaluation Kit

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