

Rubidium Frequency Standard

NAC1 - Nano Atomic Clock SPECIFICATIONS

The **NAC1** is the newest and smallest addition to AccuBeat's line of Rubidium Frequency Standards. Incorporating proven traditional glass technology and based on Coherent Population Trapping (CPT), the NAC1 is an extremely small and compact atomic clock that has been designed as a board mounted component.



Key Features

- Phase noise (floor): -150dBc / Hz
- Power Consumption: < 1.2W
- Size: 32cc (41.1mm X 35.8mm X 22 mm)
- Aging: <7.5E-11/month
- Temp Stability: $\pm 1E-9$ / -20°C to 65°C
- Outputs: 10 MHz , 1PPS
- Supply voltage: 3.3 VDC
- UART interface for monitoring and control
- ROHS Compliant (Optional)

Description

NAC1 provides 10 MHz and 1PPS outputs and short term stability (Allan Deviation) of $2E-11$ @ 100 seconds with aging of $3E-10$ /month at 25°C. The NAC1 has a UART interface for monitoring and control, a Built in Test (BIT) output and a warm-up time of typically 180 seconds. Measuring just 41.1mm X 35.8mm X 22mm and weighing only 75 grams and with a power consumption of less than 1.2 Watts, the new NAC1 is a Rubidium atomic clock especially suitable and designed for a wide range of portable applications.

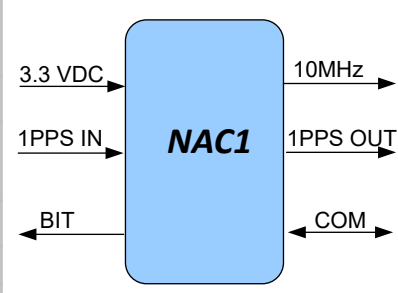
Applications

The NAC1 is specifically designed for low power applications such as

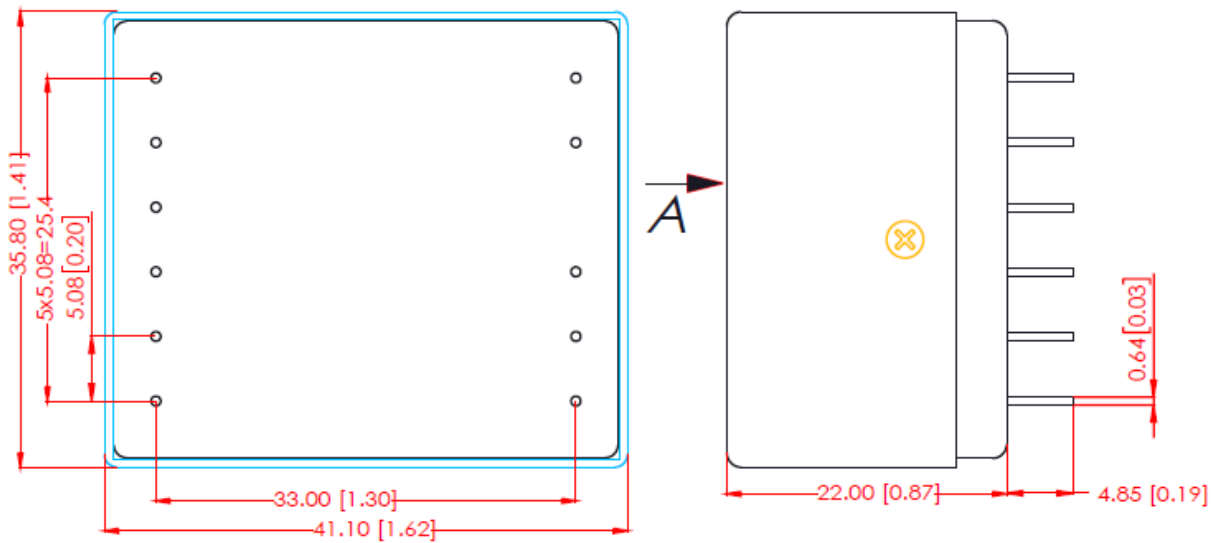
- GPS receivers
- UAV's
- Autonomous sensors
- Backpack secure communication radios

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

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



Physical Specifications and pinouts	
Size	41.1mm X 35.8 mm X 16 mm (1.61" X 1/4" X 0.63")
Weight	<75g



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Standard Product Specifications

Performance		
Frequency	Stability (Allan Deviation)	< 2E-10 @ TAU = 1sec < 8E-11 @ TAU = 10sec < 2E-11 @ TAU = 100sec
	Phase Noise	<-86 dBc/Hz @ 10Hz <-120 dBc/Hz @ 100Hz <-138 dBc/Hz @ 1kHz <-143 dBc/Hz @ 10kHz <-148 dBc/Hz @ 100kHz <-150 dBc/Hz @ Floor
	Aging ¹	< 3E-10 / month
	Maximum frequency change over operating temperature range	±1E-9 (-20°C to 65°C)
	Digital Tuning (Through Serial communication)	Range: ±2E-8 Resolution: 7.6E-13
	Initial offset at shipment	±5E-11
Time Accuracy	1PPS Sync. (Disciplined to External 1PPS)	±100nsec
	1PPS Accuracy (Holdover) – Option ²	< 100us for 30 days
Warm-up	Warm-up Time (Time to BIT)	180s (Typ)
Power Consumption	Operation	< 1.2W
	Warm-up	< 2.4W
Storage Temperature		-40°C to +90°C
No damage operating temperature		-40°C to 85°C but the clock is locked at -20°C to 65°C only

[1] After 30 days of continues operation

[2] After 30 days of continues operation, 24Hr of disciplining to external accurate 1PPS and under ambient temperature stability of ±2°C.

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

How to Order

AccuBeat P/N	Output Frequency	Wave Form	Special Features
NAC1004	10MHz	Square	Standard
NAC1C04	10MHz	Square	Without pin 11

Evaluation Kit

AccuBeat P/N	Description
AA50766	NAC1 Evaluation Kit