

## **GPS133 – Compact GPS Disciplined Rubidium Atomic Clock**

The **GPS133** is a 10MHz GPS Disciplined Rubidium Atomic Clock which provides accurate time & frequency even in a GPS denied environment. GPS133 incorporates numerous features into a single box, including AccuBeat's proven Rubidium Frequency Standard (AR133), a GPS receiver and communication ports. Furthermore, the GPS133 includes as an option a unique algorithm that ensure that it will continue to provide accurate timing even during a GPS **jamming** or **spoofing** attack.



### **Key Features**

- 10MHz GPS Disciplined Rubidium Atomic clock
- 1PPS accuracy: <10nSec to UTC RMS (1 sigma)
- Small footprint
- Option- Anti spoofing capabilities providing accurate time & frequency in a GPS denied & spoofed environment

### **Description**

AccuBeat's AR133 Rubidium Standard functions as a local oscillator and this is phase-locked to the GPS receiver 1PPS. All outputs are derived from the Rubidium Clock, which maintains accurate time and frequency when the GPS is interrupted.

The GPS receiver module is based on the AR71 and the rubidium frequency standard module is based on the AR133. Therefore, the performance of the GPS133 shall be equal or better than those modules.

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

## Performance

Mode of work		Standard	
Time (1PPS)	1PPS accuracy	Discipline	<10ns RMS
		Free running	<1 μs / 24 hours (typical) After 24 hours of disciplining
Frequency	Long Term Stability	Discipline	≤ 1E-12 (Disciplined to GPS or to external 1PPS)
		Free running	≤ 1E-10 / month
	Short Term Stability (ADEV)		<3E-11 @ 1s
			<5E-12 @ 100s
	Temperature Stability		±3E-10 over -40°C to +65°C
Phase Noise (@ 10MHz)		≤ -108dBc/Hz @ 1Hz ≤ -116dBc/Hz @ 10Hz ≤ -142dBc/Hz @ 100Hz ≤ -154dBc/Hz @ 1KHz ≤ -158dBc/Hz @ 10KHz ≤ -165dBc/Hz @ 100KHz	

	Basic Configuration		Comment
Outputs	SMA Connectors	2 x 10MHz Sine Wave (12±2 dBm) 1 x 1PPS (3V TTL/50Ω, PW: 20uS)	
Inputs	SMA Connector	1 x GPS Antenna	
Control and monitor	1 x CLI (RS422) 1 x CLI (RS232) 1 x H/W overall BIT (open collector)		<ul style="list-style-type: none"> <li>• <b>BIT monitoring</b> <ul style="list-style-type: none"> <li>○ GPS Usability</li> <li>○ Clock Usability</li> <li>○ Temperature</li> </ul> </li> <li>• <b>GPS</b> <ul style="list-style-type: none"> <li>○ <b>Data(NMEA)</b> - Lat/Log/ Altitude</li> <li>○ <b>Status</b> - Number Satellite, Lock status.</li> </ul> </li> </ul>

### Power Supply

Power Supply	11 – 32 V DC
Power Consumption	< 25W Warm-up , < 10W Steady state

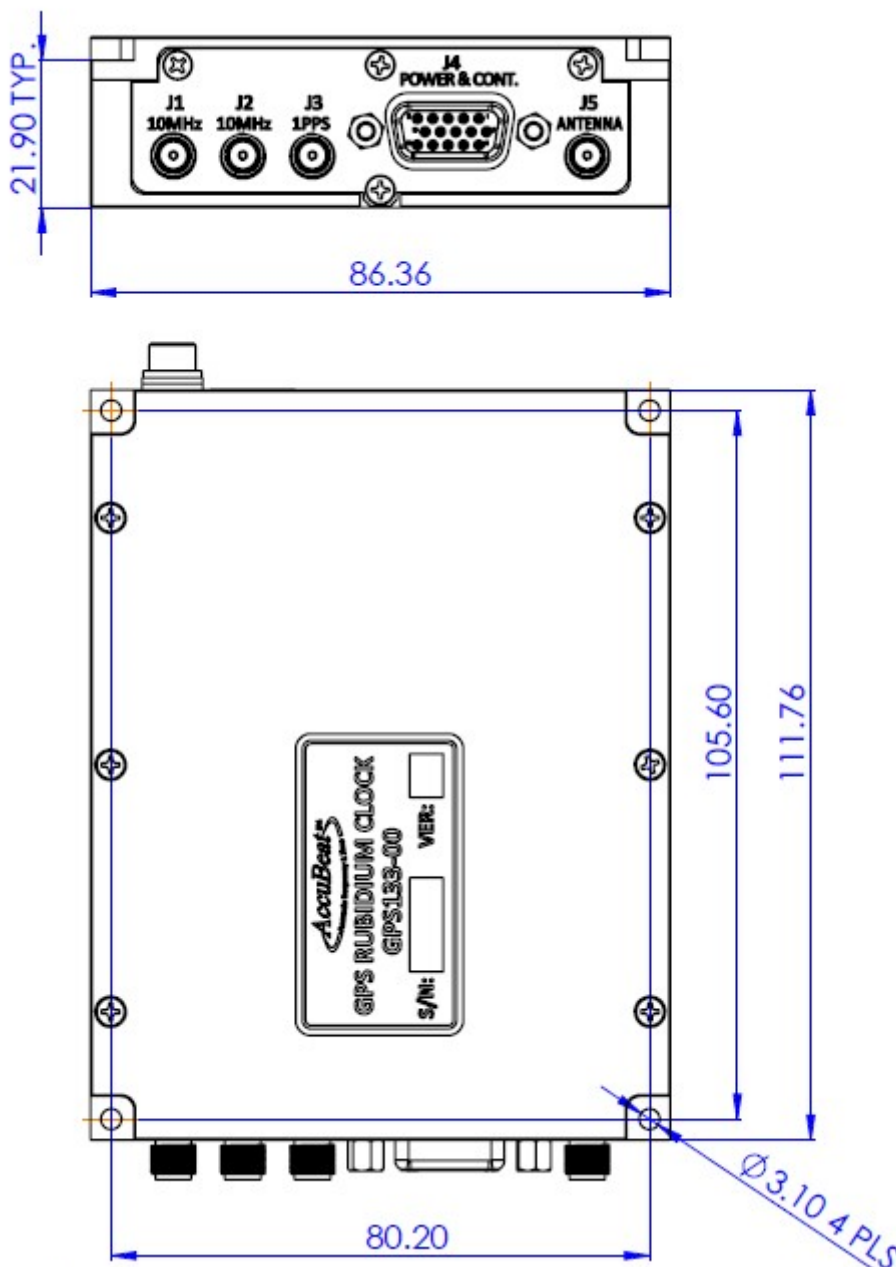
### Environmental

Operating Temperature	-40°C to +65 °C
Storage Temperature	-40°C to +75 °C
G sensitivity of the internal OXO	< ±3E-10/g
Humidity	Up to 95% at 35°C, non-condensed
Weight	360 grams

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### Mechanical ICD

- RF Connectors: SMA F
- Controls Connector: D-Type 9 Pin – M
- Size:



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GPS133 DATA SHEET- REVISION: 11/23

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