GPS-Disciplined Rubidium Clock

AR83A-11

10 Outputs

Key Features

- *10 outputs:*
  - *2 fixed outputs:*
    - *10MHz (Sine) / 1PPS (50Ω/TTL)*
    - *10MHz (Sine)*
  - *8 customized outputs selected from: 10MHz, 5MHz, 1MHz (Sine/Sqr), 1PPS (50Ω/TTL), 5MHz/1PPS_iDEN, E1, T1 or other frequencies.*
- *Frequency accuracy : 2E-12*
- *1PPS accuracy < 50ns (Typ.)*
- *Holdover: 1µs/24 hours, 5E-11/month*
- *Ext. 1PPS / 2.048MHz / 10MHz Input*
- *RS232 Input/Output for remote control and status.*
- *Digital frequency adjust < 1E-12 steps, > 5E-7 range and BIT status*
- *Setup and Control GUI for Windows XP O/S (Option)*
- *Supply Voltage: 90-260 VAC or 22-32 VDC*
- *Ruggedized for harsh environment (Option)*

Description

The AR83A-11 is a 1 U x 19” rack-mount Rubidium Frequency Standard which is synchronized to the Global Positioning System (GPS), thereby providing extremely accurate time & frequency. The unit incorporates numerous features into a single box, including a Rubidium Standard, an internal GPS receiver (or input from external 1PPS) and Rubidium-GPS DPLL (disciplining) circuit. The Rubidium Clock is phase-locked to an internal GPS receiver or to an external 1PPS input. All outputs are derived from the Rubidium Atomic Clock, which maintains accurate time and frequency when GPS or other inputs are interrupted.

The internal Rubidium Standard comprises a crystal oscillator which is locked to the Rubidium Atomic Resonance via a unique Digital FLL (Frequency-Lock-Loop). The FLL utilizes an embedded microprocessor and a special patented algorithm which optimizes the performance vs. external disturbances.

A built-in synthesizer allows (in free running mode) a very fine digital frequency control via a standard RS-232 interface using special GUI software.

The AR83A-11 offers several standard configuration outputs as describes in the "Standard Configurations" below.

The product can also offers customize outputs configuration of 2 fixed: 10MHz (Sine),1PPS (50Ω/TTL) or 10MHz (Sine) and 8 customized outputs selected from: 10MHz, 5MHz, 1MHz (Sine/Sqr), 1PPS (50Ω/TTL), 5MHz/1PPS_iDEN, 2.048MHz or 1.544MHz. Contact factory for more information. All outputs trace the atomic + GPS accuracy and provide excellent phase-noise.

Applications

- Wireless communication
- Wireline / Network/ Computers communication
- Navigation
- Power Utility
- Transport
- Software Defined Radio Technology
- Scientifics & Calibration
- Digital broadcasting systems

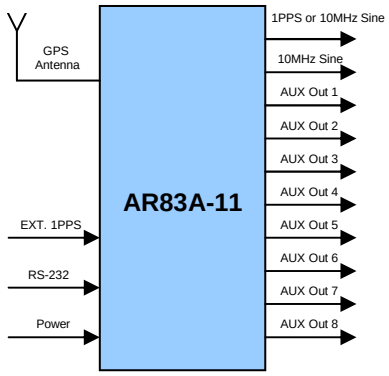
SPECIFICATIONS

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

Input & Outputs

Outputs	10 outputs:
	• 2 fixed outputs:
	  • 10MHz (Sine) / 1PPS (50Ω/TTL)
	  • 10MHz (Sine)
	• 8 customized outputs selected from: 10MHz, 5MHz, 1MHz (Sine/Sqr), 1PPS (50Ω/TTL), 5MHz/1PPS_iDEN, E1, T1 or other frequencies (for outputs configurations see Standard Configuration table).

Input	GPS Antenna - 50Ω, TNC
	1 PPS – TTL, 50Ω / 2.048MHz, Sine wave/ 10MHz, Sine wave
	Inputs priorities for synchronization: (1) External 1PPS, (2) GPS
Monitor & Control	RS-232



Performance

		Disciplined to:		Free running Rubidium-Standard (Holdover mode)
	Mode of work:	Ext. 1PPS	GPS	
Time (1PPS)	**Long- term accuracy**	100ns RMS @ 25℃ (50n Typ.)	< 200ns	1μs / 24 hours (after loss of synch)
Frequency	**Long Term Stability**	< 2E-12 (24 hrs average)	< 2E-12 (24 hrs average)	< 5E-11 / month (from 2nd year) < 2E-9 / year (1st year) < 5E-10/year (2nd year)
	Short Term Stability	< 3E-11 @ 1sec < 5E-12 @ 100sec		
	Temperature Stability	± 2E-10max. / -10℃ to+50℃; ; ± 5E-11 / +10℃ to +40℃		
	Phase Noise (*)	< -130 dBc/Hz @ 100Hz < -140 dBc/Hz @ 1KHz < -145 dBc/Hz @ 10KHz		
	Harmonics (10MHz)	<-40dBc		
	Spurious (10MHz)	< -75dBc @ ± 100KHz from carrier		
	Warm-up	5 minutes to lock 5E-10 within 7 minutes < 5E-11 within 1 hour from start		
	Level	13±2dBm		
	Retrace	< 5E-11 within 1 Hr from start (after <24 Hrs shut off and at the same conditions)		
	Accuracy @ shipment	< 5E-11		

(*) This phase noise values are for main output J6. For all other AUX outputs the phase noise may be degraded up to 3 dB.

Environmental

Operating Temperature	-10℃ to +50 ℃ (wide temperature range is optional)
Storage Temperature	-30℃ to +50℃
Humidity	Up to 95% at 35℃, non-condensed

SPECIFICATIONS *(continue)*

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

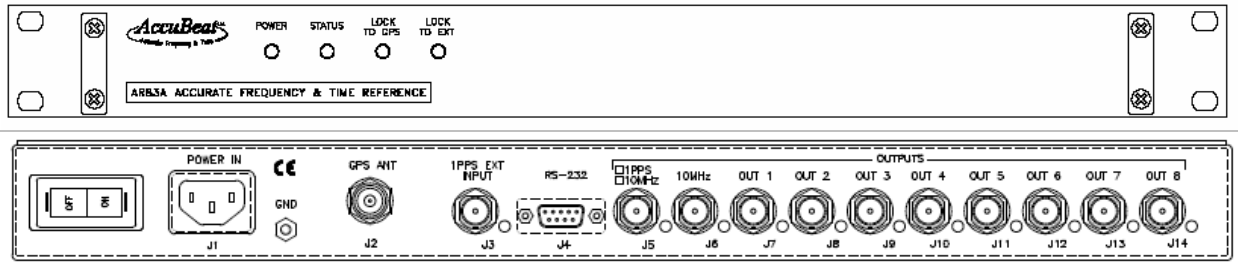
BIT		
LED Indications	4 LEDS on the front panel: Power, Status, Lock to GPS, Lock to Ext	
	LED on each output	

Power Supply		
AC	90-260 VAC 47/63 Hz (standard)	
DC	22-32 VDC (option)	
Power Consumption	@ steady state	< 25W
	@ start (<5 min)	< 40W

Dimensions & Weight		
19" x 1U Rack Mount	Size	43.7 (high) x 347 (depth) x 483 mm (width) / (19'',1U)
	Weight	< 4 kg

Standards	
CE Compliance	Safety per IEC950 / UL1950 / EN60950. EMI / EMC per EN50081, EN50082, EN50024 and FCC Part 15 Class A.

Mechanical ICD



Electrical ICD

Connector	Standard Type	Optional
o J1 - Power Supply	Standard Outlet	
o J2 - GPS Antenna Input	TNC, 50Ω, Female	
o J3 – Ext. 1PPS	BNC	TNC (Ruggedized option)
o J4 - RS232	D-Type	
o J5-14	BNC	TNC (Ruggedized option)

HOW TO ORDER

OPTIONS	AccuBeat P/N:
2.048MHz / 10MHz input instead of Ext. 1PPS	AR83011-04
Power Supply 28 VDC	By description
Wide Operating temperature range -30℃ to +60 ℃	By description
Ruggedized Option	By description

ACCESSORIES	AccuBeat P/N:
GPS Antenna 36 dB	P/N: EM30039
Antenna Cable RG-142 5m	P/N: AA50204
Antenna Cable RG-142 16m	P/N: AA50204-01
Antenna Cable RG-213 25m	P/N: AC50501

Standard configurations:

Configurations	J5 Fixed 1	J6 Fixed 2	J7 Output1	J8 Output2	J9 Output3	J10 Output4	J11 Output5	J12 Output6	J13 Output 7	J14 Output 8
1	1PPS	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	5MHz Sine	1MHz Sine	1PPS	1PPS	1PPS
2	1PPS	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	1PPS
3	1PPS	10MHz Sine	38.4MHz Sqr	38.4MHz Sqr	38.4MHz Sqr	38.4MHz Sine	38.4MHz Sine	38.4MHz Sine	1PPS	1PPS
4	1PPS	10MHz Sine	10MHz Sqr	10MHz Sqr	10MHz Sqr	10MHz Sqr	1PPS	1PPS	1PPS	1PPS
5	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sqr	10MHz Sqr
6	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sqr	10MHz Sqr	1PPS
7	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine
8	1PPS	10MHz Sine	10MHz Sine	10MHz Sine	10MHz Sine	5MHz Sine	1MHz Sine	10MHz Sqr	1PPS	1PPS
9	1PPS / 10MHz Sine	10MHz Sine	*Configure your own frequency configuration.* *Optional frequencies are: 1MHz (Sine/SQR), 10MHz (Sine/SQR), 5MHz (Sine/SQR), 1PPS, 5MHz/1PPS_Iden (others customized frequencies like E1/T1 are available*) NOTE: SOME COMBINATIONS ARE NOT AVAILABLE								

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