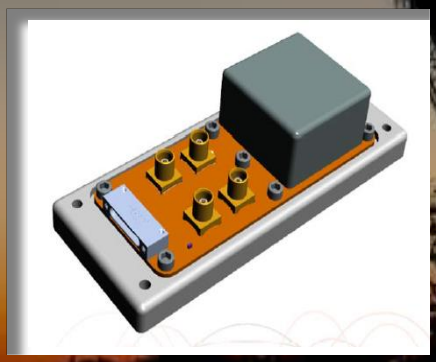
HYAS – Master Reference Oscillator (MRO)

bliley technologies



FEATURES

- ✓ ±10 PPB holdover stability
- ✓ -90 dBc/Hz phase noise @ 10Hz
- ✓ 1.69e-11 ADEV @ 1sec
- ✓ 2.25 W steady-state power
- ✓ 3.0W start-up power
- ✓ 1.35"x3.35" (34mmx85mm) Package

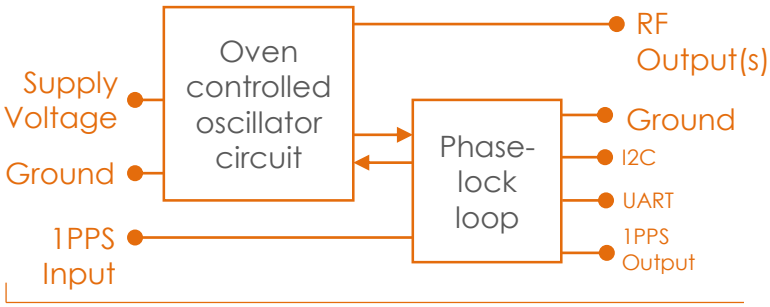
GPS Disciplined MRO

#blileytakesyoufurther

Description

Hyas is a GPS disciplined MRO designed to provide precision timing and reference frequency.
The small form-factor provides a lower cost precision timing source for small satellite platforms

Block Diagram



HYA _ O S - _ M - _ _ _ _

Project Identifier	Oven Type	Center Frequency	Connector Type	Number of Connectors	UART Options	Programmable I2C Address
	S: Standard	10, 50, 100 MHz	S: SMA-F M: MCX-F	1, 2, 4	S: Serial B: Balanced	37: 0x37 38: 0x38 39: 0x39 40: 0x40

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Performance Specifications

Parameter	Conditions	Values			Unit
Frequency Stability		MIN	TYP	MAX	
Frequency			10, 50, 100		MHz
Initial Tolerance	@ +25˚C±1˚C			±100	ppb
Warmup	Tested at 25°C, 1PPS locked				
	Within 100 seconds		±1		ppm
	Within 5 minutes		±10		ppb
Frequency Stability					
vs. Temperature	Referenced to +25˚C			±100	ppb
vs. Load	± 5% Δ in Load		±10		ppb
vs. Voltage	± 5% Δ in supply		±10		ppb
ADEV (typ)					
	@ 1 second (unlocked)		$1.69 \times 10e^{-11}$		
	@ 10 seconds (unlocked)		$8.09 \times 10e^{-11}$		
	@ 100 seconds (locked)		$6.98 \times 10e^{-10}$		
	@ 1,000 seconds (locked)		$7.19 \times 10e^{-10}$		
Aging(3rd year)	MIL-PRF-55310		±500		ppb
Holdover Stability	Constant temperature		±10		ppb
Power	Conditions	MIN	TYP	MAX	
Supply Voltage		4.75	5	5.25	Vdc
Power Dissipation (Oven Type: Option S)					
Start-up	@ 25°C			6.5	W
Steady-state	@ 25°C		3.0		W

Note(s):
1. All values typical of 100MHz output frequency unless otherwise specified

Performance Specifications

Parameter	Conditions	Values			Unit
Phase Noise		MIN	TYP	MAX	
Phase Noise	Tested at 25C (10MHz output)				
	1Hz			-90	dBc/Hz
	10Hz			-123	dBc/Hz
	100Hz			-145	dBc/Hz
	1kHz			-150	dBc/Hz
	10kHz			-160	dBc/Hz
	100kHz			-160	dBc/Hz

Performance Specifications

Parameter	Conditions	Values			Unit
RF Output Characteristics (Sinusoid)		MIN	TYP	MAX	
Output Level (1 Output)		10.0 ±1			dBm
Output Level (4 Outputs)		3.0 ±1			dBm
Output Power Balance (multi-output)				±1	dB
Output Phase Balance (multi-output)				±3	deg
Harmonics				-30	dBc
Spurious				-70	dBc
Load			50		Ω
BITE Output Characteristics (CMOS)		MIN	TYP	MAX	
High Output Level	Logic “1”, Normal Operation	2.5		3.0	Vdc
Low Output Level	Logic “0”, Alarm			0.3	Vdc
Impedance		0.1		1	MΩ
1PPS Output Characteristics (CMOS)		MIN	TYP	MAX	
High Output Level	Logic “1”	2.5		3.0	Vdc
Low Output Level	Logic “0”			0.3	Vdc
Rise/Fall				10	nSec
Duty Cycle		45	50	55	%
Impedance		0.1		1	MΩ
Accuracy	Relative to 1PPS input			±10	ppb
Pulse width	1 second delay	100			µSec

Note(s):
1. All values typical of 100MHz output frequency unless otherwise specified

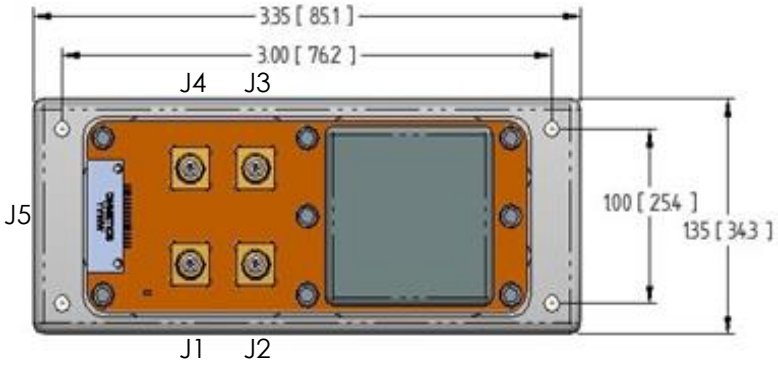
Performance Specifications

Parameter	Conditions	Values			Unit
1PPS Input Characteristics		MIN	TYP	MAX	
Format	Rising edge				
High Input Level	Logic "1"	2.5		3.0	Vdc
Low Input Level	Logic "0"			0.3	Vdc
Impedance				1	MΩ
Accuracy				50	ns RMS
Serial Communication Characteristics (UART/CMOS)		MIN	TYP	MAX	
Protocol	UART/CMOS				
Impedance		0.1		1	MΩ
Baud rate	8-N-1, no flow control			57,600	
Serial Communication Characteristics (UART/CMOS)		MIN	TYP	MAX	
Protocol	I2C/TTL				
Impedance		0.1		1	MΩ
Bit rate	8-N-1, no flow control			100k	Bits/sec
Memory		MIN	TYP	MAX	
Non-Volatile		20,000			Write Cycles

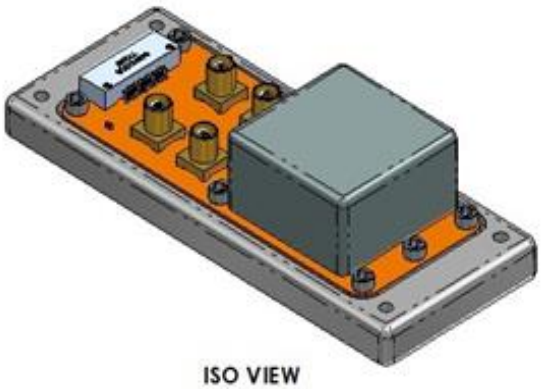
Environmental Compliance

Parameter	Conditions	Values			Unit
Environmental & Reliability		MIN	TYP	MAX	
Operating Temperature		-40		+85	°C
Storage Temperature		-55		+95	°C
Shock	MIL-STD-202G, Method 213 Test Procedure E	Survive			
Vibration	MIL-STD-810, Method 514.5, Procedure 1, maintains lock			7.7	g_{rms}

Physical Specifications

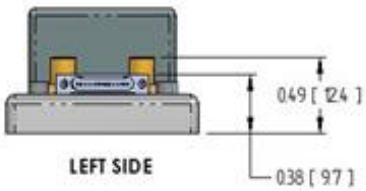


TOP VIEW

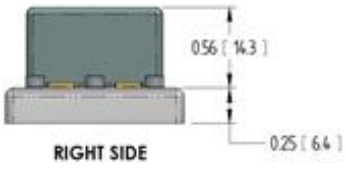


ISO VIEW

FRONT VIEW



LEFT SIDE



RIGHT SIDE

BOTTOM

PIN	FUNCTION
J5.1	HW Reset
J5.2	PPS In (From GPS Receiver)
J5.3	PPS Out
J5.4	BITE
J5.5	I2C – SDA
J5.6	I2C – SCL
J5.7	PWR Return GND
J5.8	Vcc

PIN	FUNCTION
J5.9	Vcc
J5.10	PWR Return GND
J5.11	UART – Tx (TTL Logic Level)
J5.12	UART – Rx (TTL Logic Level)
J5.13	Signal GND
J5.14	UART – Tx (RS-232 Logic Level)
J5.15	UART – Rx (RS-232 Logic Level)

CONNECTOR	FUNCTION
J1	RF Output
J2, J3, J4	RF Output / NC

Tolerances (mm) .X = ± 0.5, .XX = ±0.2 unless otherwise specified

Notes:
- None