

## SGTM16HP-UW

### High Performance Timing Module for underwater systems

#### PRODUCT OVERVIEW

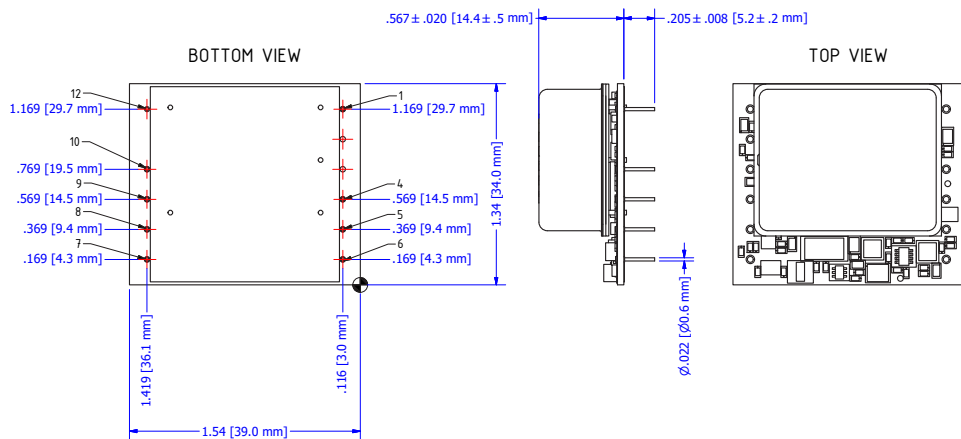
SGTM16HP-UW is the best trade-off between low aging drift and low power consumption within Syrlinks' SGTM portfolio. It uses the EWOS16HP OCXO at 16.384 MHz. The Timing module can be used as a PPS time keeper in all highly battery-constraint underwater systems needing a precision OCXO-based clock. The module will automatically adjust the OCXO frequency and phase to an external 1PPS reference signal given by a GNSS receiver. Once locked and disciplined, it can be deployed in GNSS-denied environment (underwater) and the module will keep a precise synchronization in hold-over mode for the embedded electronics (typical aging  $\pm 0.2$  ppb/day). SGTM16HP is ideal to reduce battery size and extend underwater mission time. Its thermal sensitivity is typically  $\pm 15$  ppb but can be improved down to typically  $\pm 1$  ppb thanks to a specific firmware calibration on demand (-CT model).



#### KEY FEATURES

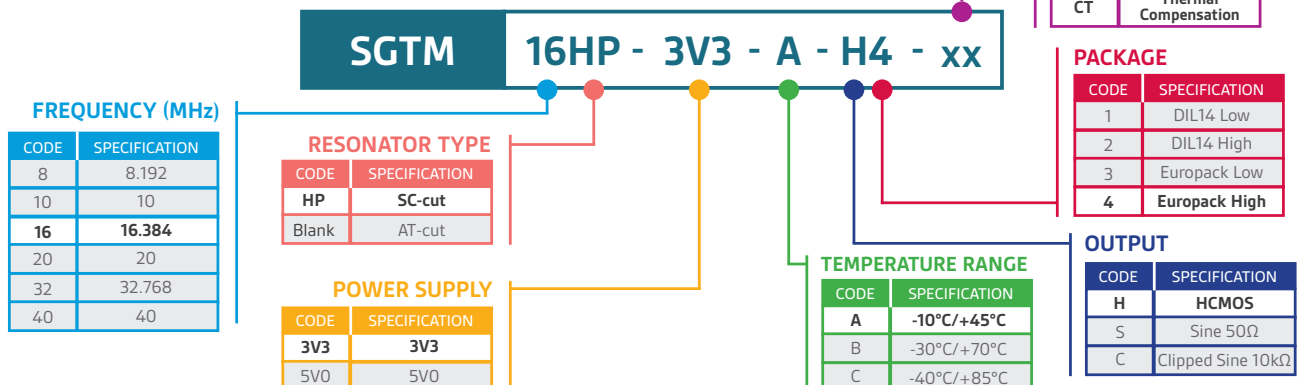
- 16.384 MHz HCMOS output
- Thermal sensitivity:  $\pm 15$  ppb or  $\pm 1$  ppb (typ.)
- 145 mW at 25°C (typ.)
- $\pm 0.2$  ppb/day after 30 days (typ.)
- Pin-to-pin compatible replacement of Chip Scale Atomic Clock

#### DIMENSIONS & PIN-OUT



PIN	FUNCTION
1	Vtune
4	Tune Enable
5	TX
6	RX
7	Vcc
8	GND
9	1PPS IN
10	1PPS OUT
12	RF OUT

#### ORDERING INFORMATION



**ELECTRICAL CHARACTERISTICS**

PARAMETERS	Unit	Min	Typ.	Max	Note	Comments
<b>Output Frequency</b>	MHz		16.384		1	
<b>Temperature Range</b>						
• Operating	°C	-10		+45		Stay functional at +50°C but stability may not be met
• Storage	°C	-55		+95		
<b>Supply Voltage</b>	V	3.15	3.3	3.45		±5% or 5V on request
<b>Supply Current</b>						
• Warm-up	mA			230	3	During 10s max @ 25°C / 40s max @ 5°C
• Steady state / -10°C	mA		82	88.5	1	
• Steady state / +5°C	mA		68	73.5	1	
• Steady state / +25°C	mA		45	48	1	
• Steady state / +45°C	mA		28	34	1	
<b>Frequency Stability</b>						
• Initial frequency accuracy	ppm		±0.05	±0.1	1	+25°C referred to nominal frequency
• Vs operating temperature range	ppb		±15	±30	1	Order code -CO (without thermal calibration firmware)
			±1	±3		Order code -CT (with thermal calibration firmware)
• Vs supply voltage variation	ppb			±2	3	3.3V ± 5%
• Vs load	ppb			±2	3	10kΩ // 15 pF load ±10%
• Short-term (τ=0.1s)	10 <sup>-11</sup>		0.5	1	3	Allan deviation @ 16.384 MHz
	(τ=1s)		1	5	3	
• Aging						
	Per day	ppb	±0.2	±0.5	3	After 30 days
	First year	ppb		±50	3	
	After 10 years	ppb		±300	3	
• Acceleration sensitivity	ppb/G			±1	3	Worst direction
• Warm-Up Time	sec			30	3	to ± 1 ppm of final frequency (1 hour) at 25°C
	min			3	3	to ± 100 ppb of final frequency (1 hour) at 25°C
• Retrace	ppb			±10	3	24h work after 24 off
<b>HC MOS RF Output Level</b>						
• Load	pF		15		3	1 MΩ
• Signal Level - Vh	V	2.4			3	
• Signal Level - Vl	V			0.4	3	
• Rise \ Fall Time	ns			8	3	10% - 80%
• Duty Cycle	%	45		55	3	
<b>1 PPS Output Parameters</b>						
• Load	pF		10		3	1 MΩ
• Rise \ Fall Time	ns			8	3	10% - 80%
• Signal Level - Vh	V	2.4			3	
• Signal Level - Vl	V			0.4	3	
• Level	V	0		Vcc	3	
<b>1 PPS Input Parameters</b>						
• Format				Rising edge		
• Load	MΩ		1		3	
• Logic low level	V	< 0.4			3	
• Logic high level	V			2.4 to Vcc	3	
<b>Serial Communications</b>						
• Protocol				RS-232		
• Format	V	0		Vcc		CMOS
• Baud Rate			57600		3	
<b>1 PPS accuracy 1σ</b>	ns		±32			
<b>Hold over stability</b>	μs	±10		±60		over 24h (at +25°C)
<b>Weight</b>	grams		20			

**Notes**

1. Parameter inspected at 100% | 2. Parameter inspected by sampling | 3. Parameter guaranteed by design and characterization

**ENVIRONMENTAL CONDITIONS**

<b>Soldering instructions</b>	Hand soldering only, with recommended pins soldering temperature : 235°C ±5°C, t=10s ±0.5s (260°C max for 5s max) Reflow soldering and other soldering methods are prohibited
<b>Mounting instructions</b>	Pin receptacles mounted into PCB can be used. Reference example : 0338-0-15-XX-15-XX-10-0
<b>PCB cleaning/washing</b>	Not washable

**OCXO HERMETICITY**

Metallic housing hermetically sealed  
Fine Leaks and Gross Leaks tests performed 100%