

## SGTM16-UW

### Ultra Low Power Timing Module for Underwater

#### PRODUCT OVERVIEW

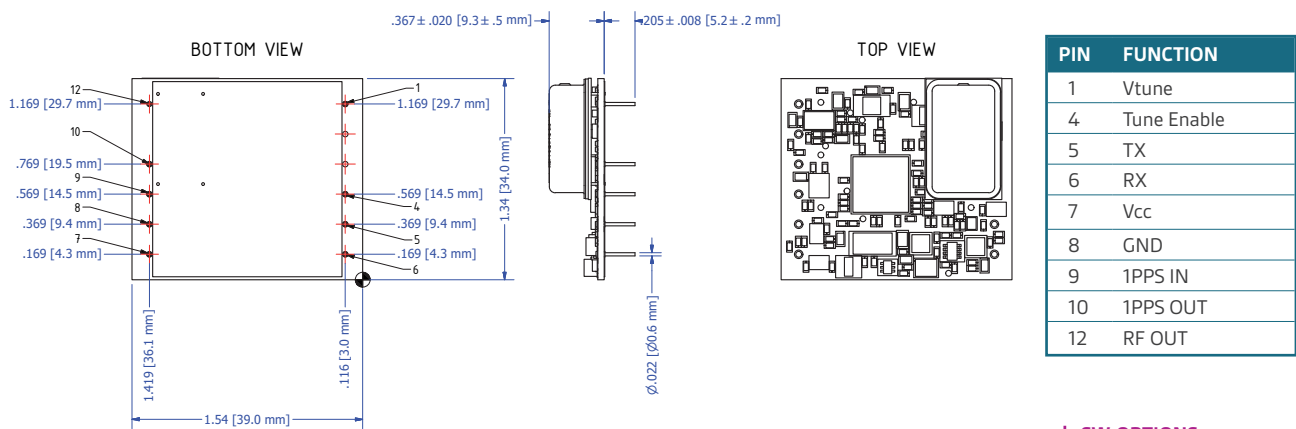
SGTM16-UW is the least consuming precision clock module of Syrlinks. It uses a 50mW 16.384 EWOS and the SGTM16 can be used as a PPS time keeper in all highly battery-constraint underwater systems. The Module will automatically adjust the OCXO frequency and phase to the external PPS reference (under GNSS) with an record high precision at 10-11 level (0,02ppb). Once locked, it can be deployed in GNSS-denied environment (underwater) and will keep a precise synchronization in free-running mode for the embedded electronics. SGTM16 is ideal to reduce battery size and extend underwater mission time. Its thermal sensitivity is about  $\pm 50$ ppb but can be improved down to  $\pm 2$ ppb thanks to a specific firmware on demand.



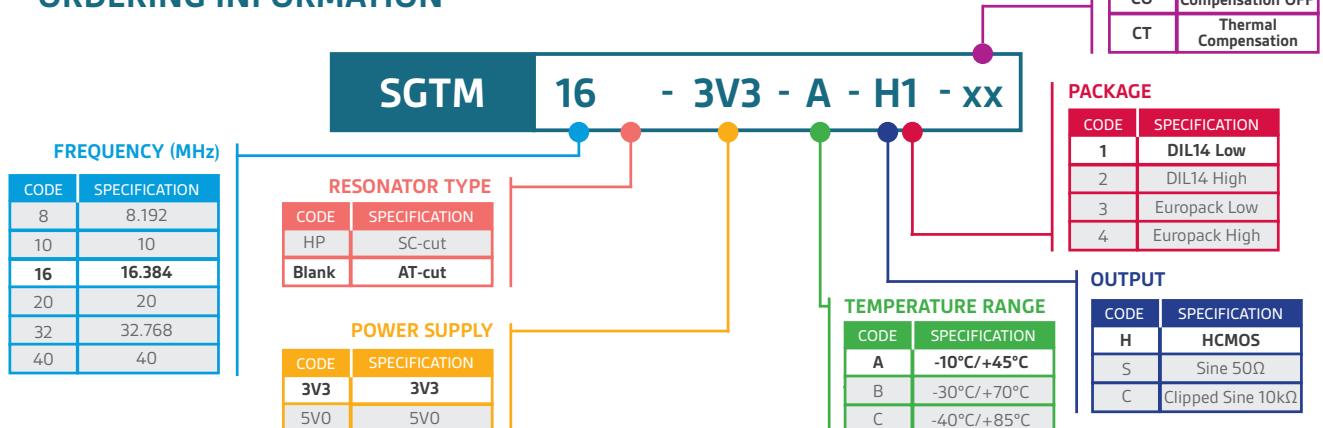
#### KEY FEATURES

- 16.384 MHz HCMOS output
- $\pm 2$  or  $\pm 50$  (typ.) ppb with or without thermal compensation
- 90 mW at 25°C (typ.)
- $\pm 2$  ppb/day after 30 days (typ.)
- Possible replacement of Chip Scale Atomic Clock

#### DIMENSIONS & PIN-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 / 20s max @ 5°C
• Steady state / -10°C	mA		42	50	1	
• Steady state / +5°C	mA		34	39	1	
• Steady state / +25°C	mA		27	31	1	
• Steady state / +45°C	mA		18	21	1	
<b>Frequency Stability</b>						
• Initial frequency accuracy	ppm		±0.5	±1	1	+25°C referred to nominal frequency
• Vs operating temperature range	ppb		±50	±90	1	peak to peak drift
	ppb		±2	±4	1	peak to peak drift
• Vs supply voltage variation	ppm		±0.1	±0.2	2	3.3V ± 5%
• Vs load	ppm		±0.1	±0.2	2	10kΩ // 15 pF load ±10%
• Short-term (τ=0.1s)	10 <sup>-11</sup>		2	10	2	Allan deviation @ 16.384 MHz
	10 <sup>-11</sup>		3	10	2	
• Aging						
	Per day	ppb	±2	±5	2	After 30 days
	First year	ppm		±1.5	2	
	After 10 years	ppm		±5	2	
• Acceleration sensitivity	ppb/G		±1		2	Worst direction
• Warm-Up Time	sec			10	3	to ± 1 ppm of final frequency (1 hour) at 25°C
	sec			60	3	to ± 100 ppb of final frequency (1 hour) at 25°C
• Retrace	ppb			±10	3	24h work after 24 off
<b>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	±100		±600		over 24h (at +25°C)
<b>Weight</b>	grams		10			

### 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%