

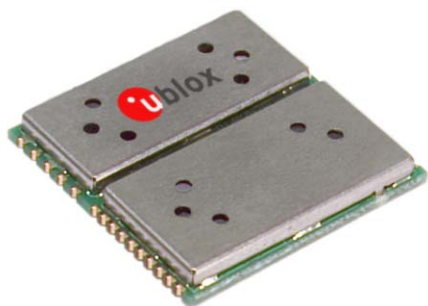


# TIM-LF

## GPS Receiver Module

### ANTARIS® Positioning Engine

The TIM-LF is an ultra-low power OEM GPS receiver module suitable for active antennas. It provides two 3V (5V TTL input compatible) serial ports, SPI and configurable 1.8V I/O ports. The TIM-LF provides system resources for user application software. The combination of high performance, maximum flexibility, and innovative packaging technology makes the TIM-LF suitable for high-volume applications requiring cost-effective and tight system integration.



#### Overview

The leading ANTARIS® GPS Engine, jointly developed by Atmel and u-blox, provides excellent navigation performance under dynamic conditions in areas with limited sky view like urban canyons, high sensitivity for weak signal operation without compromising accuracy, and support of DGPS and multiple SBAS systems like WAAS and EGNOS. The 16 parallel channels and 8192 search bins provide fast start-up times. The aiding functionality accelerates start-up times even further. The low power consumption and FixNow™ power saving mode make this product suitable for handheld and battery-operated devices.

#### Small Form Factor

Innovative packaging technologies enable high integration of a GPS receiver in a small module measuring just 25.4 x 25.4 mm and allowing straightforward integration in particularly small end products and opportunities in new application fields. The small form factor and the SMT pads allow a fully automatic assembly process with standard pick-and-place equipment and reflow soldering, enabling cost-efficient high-volume production.

#### Benefits

- High acquisition and tracking sensitivity
- Ultra-low power consumption
- Excellent GPS performance
  - Excellent navigation accuracy even at low signal levels
  - Active multipath detection and removal
  - Fast Time-to-first-fix (TTFF)
  - Accelerated TTFF with aiding functionality
- Highly integrated GPS module
  - Automatic pick and place assembly
  - Reflow solderable
- Maximum flexibility
  - Extensively configurable
  - Integration of user application software
- Fully EMI shielded
- Active antenna support

#### Features

- 16 channel GPS receiver
- 8192 simultaneous time-frequency search bins
- 4 Hz position update rate
- ANTARIS Positioning Engine
  - ATR0600 RF front-end IC
  - ATR0620 Baseband IC with ARM7TDMI inside
- FLASH memory
- DGPS and SBAS (WAAS, EGNOS) support
- FixNOW™ power saving mode
- Operating voltage 2.7...3.3 V
- Battery supply pin for internal backup memory and real time clock
- Industrial operating temperature range -40...85°C
- Small size: 25.4 x 25.4 x 3 mm, weight: 3g

#### Support Products

##### ANTARIS EvalKit

Use the ANTARIS EvalKit to experience the power of TIM-LF.

##### ANTARIS SCKit

The ANTARIS Software Customization Kit (SCKit) enables you to implement your own code on TIM-LF.

*your position  
is our focus*



## Specifications

### Receiver Performance Data

<b>Receiver Type</b>	16 channel, L1 frequency, C/A code
<b>Max. Update Rate</b>	4 Hz
<b>Accuracy</b>	Position 2.5 m CEP DGPS / SBAS 2.0 m CEP <sup>1</sup>
<b>Start-up Times</b>	Hot start <3.5 sec Warm start 33 sec Cold start 34 sec Aided start 5 sec
<b>Signal reacquisition</b>	< 1 s
<b>Sensitivity</b>	Acquisition -140 dBm Tracking -149 dBm
<b>Timing Accuracy</b>	RMS 50 ns 99% <100 ns
<b>Dynamics</b>	< 4 g
<b>Operational Limits</b>	COCOM restrictions apply

<sup>1</sup> Depends on accuracy of correction data of DGPS or SBAS service

### Electrical Data

<b>Power Supply</b>	2.7 – 3.3 V
<b>Power Consumption</b>	typ. 153 mW @ 3.0 V typ. 138 mW @ 2.7 V Sleep mode: typ. 100 µA
<b>Backup Power</b>	1.95 V – 3.6 V
<b>Serial Ports</b>	2 USARTs @ 3 V levels 5V TTL compatible inputs
<b>Digital IOs</b>	TIMEPULSE @ 1.8 V
<b>Protocols</b>	NMEA, UBX binary, RTCM

Interleaving multiple protocols via same serial interface is supported

<b>Interface</b>	30 pin leadless chip carrier reflow solderable
<b>Antenna Power</b>	External or Internal VCC_RF
<b>Active Antenna Recommendations</b>	Gain ≥ 25 dB Noise figure ≤ 1.5 dB
<b>Antenna Supervision</b>	Integrated short-circuit detection and antenna shutdown  Open circuit detection is supported with little external circuitry

### Available Resources<sup>2</sup>

<b>Processor</b>	ARM7 @ 23MHz 3.75 – 9 MIPS <sup>3</sup> @ 1Hz Navigation update
<b>Memory</b>	FLASH 1 MB SRAM 8 kB
<b>Interfaces</b>	SPI @ 1.8 V
<b>Digital IOs</b>	8 GPIOs @ 1.8 V

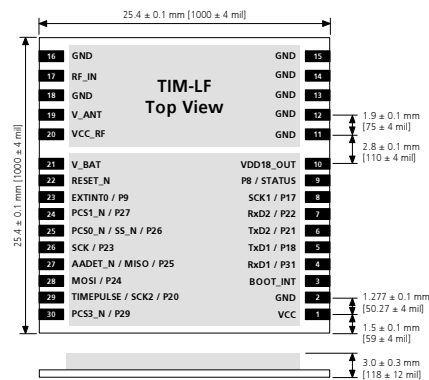
<sup>2</sup> For use with TIM-LF-9 (8 Mbit version). ANTARIS SCKit is required.

<sup>3</sup> "VAX MIPS", calculated using Dhrystone, available for user code

### Environmental Data

<b>Operating Temp.</b>	-40°C to 85°C
<b>Storage Temp.</b>	-40°C to 125°C
<b>Vibration</b>	5 Hz to 500 Hz, 5g (IEC 68-2-6)
<b>Shock</b>	Half sine 30g / 11ms (DIN 40046-7)

### Mechanical Data



### Ordering Information

<b>TIM-LF-0-000-0</b>	TIM-LF - GPS Receiver Module
	<b>Delivery Packing</b>
	0 = Single samples 1 = Tape on reel (100 pieces) 5 = Tape on reel (500 pieces)
	<b>Flash EPROM Configuration</b>
	0 = Standard GPS functionality. Not for ANTARIS SCKit users
	For ANTARIS SCKit users only: 8 = 8 Mbit (SST S3T39WF800A) 9 = 8 Mbit (AMD AM29SL800DT)
<b>AEK-LS-0-000-0</b>	ANTARIS EvalKit - Evaluation Kit
<b>ASK-LS-0-000-0</b>	ANTARIS SCKit - Software Customization Kit

Parts of this product are patent protected.

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