



# LEA-4T

## ANTARIS® 4 Programmable GPS Module with Precision Timing Infrastructure Applications

Preliminary Data

### Overview

The LEA-4T, supporting precision GPS timing and raw measurement data for demanding positioning applications, provides high sensitivity, exceptionally low power consumption and USB connectivity.

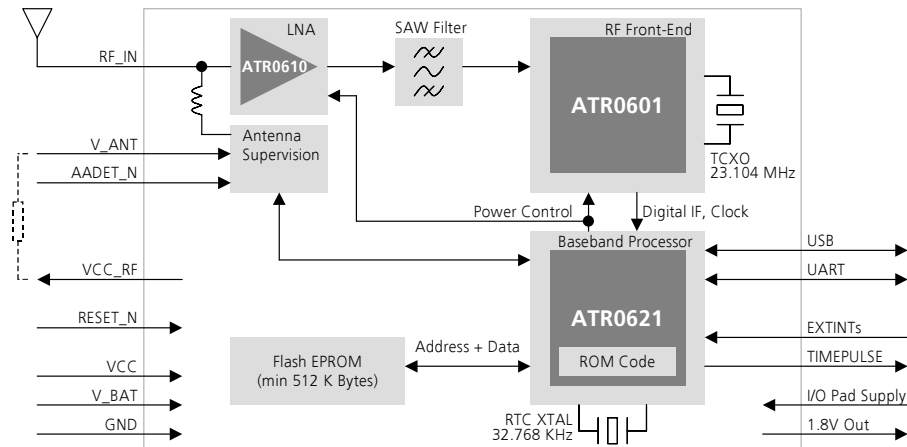


17 x 22.4 x 3 mm

The LEA-4T features a Time Mode function whereby the GPS receiver assumes a stationary 3D position, whether programmed manually or determined by an initial self-survey. Stationary operation enables GPS timing with only one visible satellite and eliminates timing errors which otherwise result from positioning errors. The accuracy of the time pulse is as good as 50 ns, synchronized to GPS or UTC time. An accuracy of 15 ns is achievable by using the quantization error information to compensate the granularity of the time pulse. The built-in 2-channel time mark and counter unit provides precise time measurement of external signals (EXTINT0 and 1).

The LEA-4T also supports raw measurement data (carrier phase with half-cycle ambiguity resolved, code phase and Doppler measurements) which can be used in external applications that offer precision positioning, real-time kinematics (RTK) and attitude sensing.

### Block Diagram



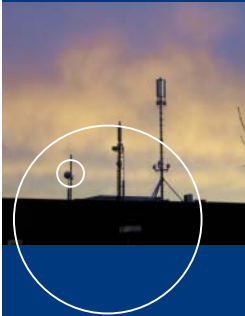
### Highlights

- Stationary Mode for GPS timing operation
- 15 ns timing accuracy (error compensated)
- 1-Satellite GPS timing
- 10 Hz raw measurement data output
- Flash EPROM: programmable and configurable
- SuperSense® Indoor GPS

### Features

- 16 channel ANTARIS 4 positioning engine
- Supports DGPS, WAAS, EGNOS and MSAS
- 4 Hz position and time update rate
- Configurable time pulse: 0.1 Hz to 1 KHz
- Ultra low power consumption
- 2 channel precision time mark / counter
- A-GPS and autonomous mode, AssistNOW™ ready
- 1 USB and 1 UART port
- Configurable I/O and UART voltage levels
- Supports passive and active antennas
- Antenna short and open circuit detection and protection
- Power brown-out protection:  
No external reset hardware needed
- Operating temperature range: -40 to 85°C
- RoHS compliant (lead-free)

*your position  
is our focus*



## 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> <sup>2</sup>	Hot start <3.5 sec Warm start 33 sec Cold start 34 sec Aided start 5 sec Reacquisition < 1 s
<b>Sensitivity</b>	Tracking -158 dBm Acquisition & Reacquisition -148 dBm Cold starts -142 dBm
<b>Raw Measurement Data</b>	Carrier Phase [L1 cycles] Code Phase [m] Doppler Measurements [Hz] Update rate: 10 Hz
<b>Operational Limits</b>	Altitude 18,000 m Velocity 515 m/s One of the limits may be exceeded but not both.

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

<sup>2</sup> Measured with good visibility and -125 dBm signal strength

## Timer Performance Data

<b>Timing Accuracy</b>	RMS 50 ns 99% <100 ns Granularity 43 ns Compensated 15 ns <sup>3</sup>
<b>Time pulse</b>	Configurable 0.1 ... 1000 Hz
<b>Time Mark / Counter</b>	# of Inputs 2 Granularity 43 ns

<sup>3</sup> Quantization error information can be used to compensate the granularity related error of the time pulse signal

## Interfaces

<b>USB</b>	V1.1 (V2.0 compatible)
<b>Serial Ports</b>	1 UART
<b>Digital I/O</b>	Configurable time pulse 2 EXTINTs inputs for time mark / counter
<b>Serial and I/O Voltages</b>	Configurable output levels between 1.65 and 3.6V 5V tolerant inputs
<b>Protocols</b>	NMEA, UBX binary, RTCM. Supports protocol mixing over same serial and USB ports

## Electrical Data

<b>Power Supply</b>	2.7 – 3.3 V
<b>Power Consumption</b>	typ. 39 mA @ 3.0 V typ. 38 mA @ 2.7 V Sleep mode: typ. 80 µA
<b>Backup Power</b>	1.5 V – 3.6 V, typ. 5 µA
<b>Antenna Power</b>	External or Internal VCC_RF
<b>Antenna Supervision</b>	Integrated short-circuit detection and antenna shutdown, open circuit detection is supported with AADET_N input and little external circuitry

## 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



## Support Products

<b>AEK-4T</b>	An easy-to-use kit to get familiar with the GPS Timing and raw data features on ANTARIS 4 platforms, and to evaluate functionality and to visualize GPS performance.
<b>ANTARIS 4 GPS Timing Evaluation Kit</b>	

## Ordering Information

<b>LEA-4T-0-000-0</b>	LEA-4T – Programmable GPS Module with Precision Timing
	<b>Delivery Packing</b> 0 = Single samples 1 = Tape on reel (100 pieces)

Semiconductor technology provided by ATMEL.

Parts of this product are patent protected.

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