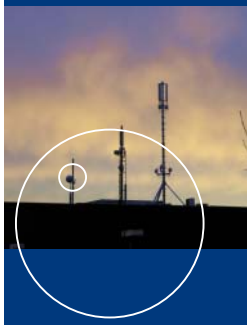
LEA-4T

ANTARIS® 4 Programmable GPS Module with Precision Timing

Infrastructure Applications

Preliminary Data

your position is our focus



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.

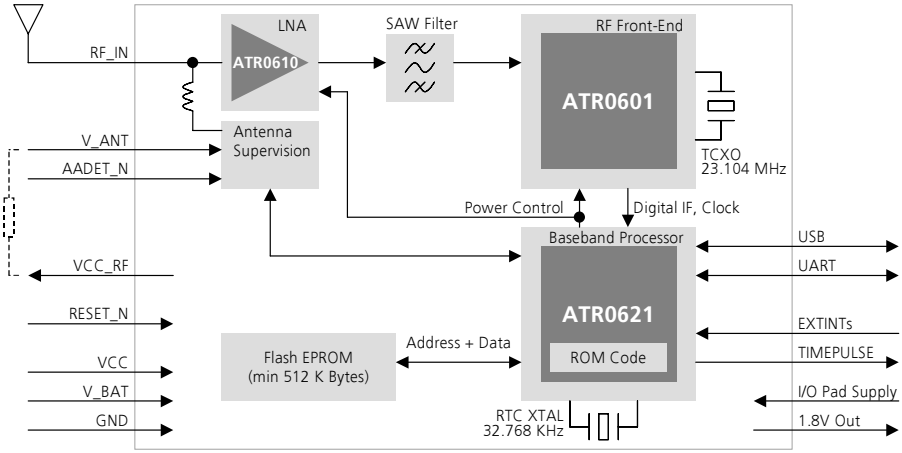
Highlights

- **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)

Block Diagram



Receiver Performance Data

Receiver Type	16 channel, L1 frequency, C/A code	
Max. Update Rate	4 Hz	
Accuracy	Position DGPS / SBAS	2.5 m CEP 2.0 m CEP [1]
Start-up Times [2]	Hot start Warm start Cold start Aided start Reacquisition	<3.5 sec 33 sec 34 sec 5 sec < 1 s
Sensitivity	Tracking Acquisition & Reacquisition Cold starts	-158 dBm -148 dBm -142 dBm
Raw Measurement Data	Carrier Phase Code Phase Doppler Measurements [Hz] Update rate:	[L1 cycles] [m] 10 Hz
Operational Limits	Altitude Velocity One of the limits may be exceeded but not both.	18,000 m 515 m/s

[1] Depends on accuracy of correction data provided by the DGPS or SBAS service

[2] Measured with good visibility and –125 dBm signal strength

Timer Performance Data

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

[3] Quantization error information can be used to compensate the granularity related error of the time pulse signal

Interfaces

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

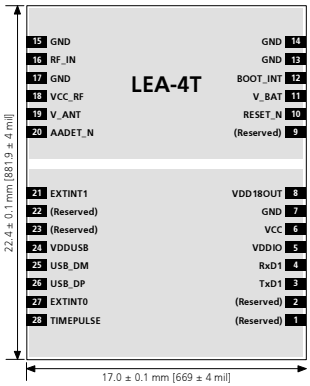
Electrical Data

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

Environmental Data

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

Mechanical Data



Support Products

AEK-4T ANTARIS 4 GPS Timing Evaluation Kit	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.

Ordering Information

LEA-4T-0-000-0

LEA-4T – Programmable GPS Module with Precision Timing

Delivery Packing
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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