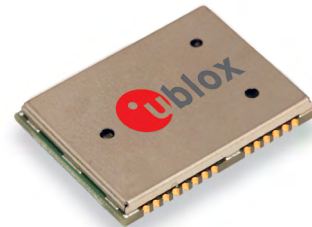


LEA-6R

u-blox 6 dead reckoning GPS module

Highlights

- Automotive Dead Reckoning (ADR) technology:
 - 100% coverage, continuous positioning even in tunnels
 - 1 Hz combined DR+GPS navigation rate
 - Speedpulse sensor monitoring via I/O pin or as messages
 - Gyroscope/Temperature sensor monitoring
 - Automatic sensor calibration / temperature compensation
- UART and USB interfaces
- Integrated antenna supervisor
- Extra front-end LNA



LEA-6R:
17.0 x 22.4 x 2.4 mm

Features

- u-blox 6 position engine:
 - Navigate down to -162 dBm and -147 dBm coldstart
 - Hybrid GPS/SBAS engine (WAAS, EGNOS, MSAS)
 - Anti-jamming technology
- Simple integration with u-blox wireless modules
- A-GPS: AssistNow Online and AssistNow Offline services, OMA SUPL compliant
- Backward compatible (hardware and firmware); easy migration from LEA-4R
- LCC package for reliable and cost effective manufacturing
- Compatible with u-blox GPS Solution for Android
- Based on GPS chips qualified according to AEC-Q100
- Manufactured in ISO/TS 16949 certified production sites
- Qualified according to ISO 16750

Product description

The LEA-6R provides 100 % coverage, combining the high performance u-blox 6 positioning engine with u-blox' ADR Dead Reckoning technology. ADR supplements GPS satellite position information with heading and distance data provided by additional sensors. When GPS satellites are out of sight, location is extrapolated using distance and angle information from the gyroscope and speedpulse sensors. The speedpulse sensor signal can be received either as a digital tick signal or as messages via the serial interface. The gyroscope is monitored via an external ADC over the SPI interface.

ADR enables accurate navigation even in locations with poor or absent GPS signals such as tunnels, indoor parking facilities and deep urban canyons. In addition, ADR effectively eliminates the impact of multipath effects in urban canyon environments. This makes the LEA-6R the ideal solution for applications requiring accurate, reliable positioning, all of the time.

LEA-6R modules are manufactured in ISO/TS 16949 certified sites. Each module is tested and inspected during production. Qualification tests are performed as stipulated in the ISO16750 standard: "Road vehicles – Environmental conditions and testing for electrical and electronic equipment".

Product selector

Model	Type	Supply	Interfaces	Features
	GPS / QZSS GLONASS BeiDou Galileo Timing & Frequency Dead Reckoning Precise Point Positioning	1.65 V – 3.6 V 2.7 V – 3.6 V	UART USB SPI DDC (I2C compliant)	Programmable (Flash) Data logging Extra front-end LNA Front-end SAW filter RTC crystal Internal oscillator Antenna supply Antenna short circuit detection / protection Antenna open circuit detection pin Timepulse output External interrupt / Wakeup
LEA-6R ¹	•	•	• • X	• • • • C • ○ ○ • •

¹ = Hardware interface for sensor data
C = Crystal

X = SPI available for communication with external sensors only
○ = Optional, not activated per default or requires external components

Receiver performance data

Receiver type	50-channel u-blox 6 engine GPS L1 C/A code SBAS: WAAS, EGNOS, MSAS	
Navigation update rate	1 Hz (GPS + ADR)	
Accuracy	Position	2.5 m CEP
	SBAS	2.0 m CEP
	ADR (estimate)	5% of distance travelled without GPS
Acquisition	Cold starts:	27 s
	Aided starts:	3 s
	Hot starts:	1 s
Sensitivity	Tracking:	-162 dBm
	Cold starts:	-147 dBm
	Hot starts:	-156 dBm

Electrical data

Power supply	2.7 V – 3.6 V
Power consumption	120 mW @ 3.0 V (continuous)
Backup power	1.4 V – 3.6 V, 22 µA
Supported antennas	Active and passive
Antenna power	External or internal VCC_RF
Antenna supervision	Integrated short-circuit detection and antenna shutdown, open circuit detection with minimal external circuitry

Interfaces

Serial interfaces	1 UART 1 USB V2.0 full speed 12 Mbit/s
Speedpulse sensor	via digital I/O or as messages via serial interface
Gyroscope sensor	via ADC and SPI (Temp. sensor mandatory)
FWD sensor (optional)	via digital I/O pin
Serial and I/O	Voltages 2.7 V – 3.6 V
Timepulse	Configurable 0.25 Hz to 1 kHz
Protocols	NMEA, UBX binary, RTCM

Environmental data, quality & reliability

Operating temp.	-40° C to 85° C
Storage temp.	-40° C to 85° C
RoHS compliant (lead-free)	
Qualification according to ISO 16750	
Manufactured in ISO/TS 16949 certified production sites	

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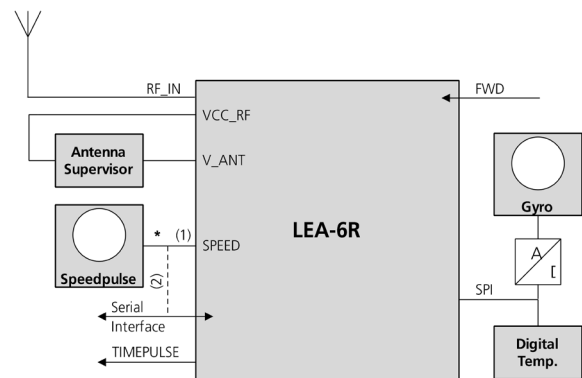
Package

28 pin LCC (Leadless Chip Carrier): 17.0 x 22.4 x 2.4 mm, 2.1 g

Pinout

LEA-6R Top View			
15	GND	GND	14
16	RF_IN	GND	13
17	GND	Reserved	12
18	VCC_RF	V_BCKP	11
19	V_ANT	RESET_N	10
20	AADET_N	SPI_SCS2_N	9
21	FWD	VCC_OUT	8
22	SPI_SCS1_N	GND	7
23	SPI_SCK	VCC	6
24	VDDUSB	NC	5
25	USB_DM	RxD1	4
26	USB_DP	TxD1	3
27	SPEED	SPI_MISO	2
28	TIMEPULSE	SPI_MOSI	1

Block diagram



* Speedpulse monitoring via digital I/O pin (1) or serial interface (2)

Support products

u-blox 6 Evaluation Kits:

Easy-to-use kits to get familiar with u-blox 6 positioning technology, evaluate functionality, and visualize GPS performance.

EVK-6R u-blox6 Evaluation Kit with Dead Reckoning

Ordering information

LEA-6R-0 u-blox 6 GPS Module, DR hardware sensor interface, TCXO, 17x22.4mm, 250 pcs/reel

Available as samples and tape on reel

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