NEO-6T / LEA-6T u-blox 6 timing GPS modules

Highlights

- Precision Timing:
 - 1 or 2 timepulse outputs (up to 10 MHz)
 - Single-satellite operation
 - Stationary (survey-in) mode for enhanced timing accuracy • Time mark of external event inputs
- Raw pseudo-range data output
- UART, USB and DDC (I²C compliant) interfaces
- Onboard RTC Crystal for faster warm and hot starts

Features

- u-blox 6 position engine:
 - Navigate down to -162 dBm and -148 dBm coldstart
 - Faster acquisition with AssistNow Autonomous • 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-5T or LEA-4T (LEA-6T)
- LCC package for reliable and cost effective manufacturing
- Optional upgradeable Firmware support
- 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



NEO-6T: 12.2 x 16.0 x 2.4 mm



LEA-6T: 17.0 x 22.4 x 2.4 mm

Product description

The NEO-6T/LEA-6T modules provide precision GPS timing for demanding synchronization applications such as basestations. This module features user configurable frequency and timepulse outputs. An accuracy of up to 15 ns is achievable by using the quantization error information to compensate the granularity of the time pulse. NEO-6T/LEA-6T feature a time mode function whereby the GPS receiver assumes a stationary 3D position, whether programmed manually or determined by an initial self-survey.

During stationary operation GPS timing is possible with only one visible satellite. This means that time can be maintained even under adverse signal conditions or in environments with poor sky visibility. A built-in time mark and counter unit provide precise time measurement of external event inputs. T-RAIM (Timing Receiver Autonomous Integrity Monitoring) is available to detect faulty GPS measurements. NEO-6T/LEA-6T deliver raw pseudorange data for survey and specialist applications.

NEO-6T/LEA-6T 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".

| Model | Туре | | | Supply | | I | Interfaces | | | Features | | | | | | | | | Grade | | | | | | | | |
|---|------------|---------|---------|--------|--------------------|----------------|---------------------------|----------------|---------------|----------|-----|-----|---------------------|----------------------|--------------|----------------|----------------|-------------|---------------------|----------------|---|---------------------------------------|------------------|-----------------------------|----------|--------------|------------|
| | GPS / QZSS | GLONASS | Galileo | BeiDou | 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 | Additional SAW | Additional LNA | RTC crystal | Internal oscillator | Antenna supply | Antenna short circuit detection / protection | Antenna open circuit detection pin | Timepulse output | External interrupt / Wakeup | Standard | Professional | Automotive |
| NEO-6T | • | | | | • | | | | • | • | • | • | • | | | • | • | • | Т | 0 | | | • | • | | | |
| LEA-6T-0 | • | | | | • | | | | • | • | • | | • | | | • | • | • | Т | • | • | 0 | • | • | | | |
| LEA-6T-1 | • | | | | • | | | | • | • | • | | • | • | | • | • | • | Т | • | • | 0 | • | • | | | |
| \mathbf{O} = Optional not activated per default or requires external components \mathbf{T} = TCXO | | | | | | | | | | | | | | | | | | | | | | | | | | | |

O = Optional, not activated per default or requires external components

T = TCXC



Product selector

Receiver performance data

| Receiver type | 50-channel u-blox 6 engine GPS L1 C/A code SBAS: WAAS, EGNOS, MSAS | | | | | | |
|------------------------|--|----------------------------------|--|--|--|--|--|
| Navigation update rate | up to 5 Hz (2 Hz | for LEA-6T-1) | | | | | |
| Accuracy | Position SBAS | 2.5 m CEP 2.0 m CEP | | | | | |
| Acquisition | Cold starts: Aided starts: Hot starts: | 26 s 1 s 1 s | | | | | |
| Sensitivity | Tracking: Cold starts: Hot starts: | –162 dBm –148 dBm –157 dBm | | | | | |

Timing performance data

| Timing accuracy | RMS | 30 ns |
|-----------------|-------------|--------------------|
| | 99% | < 60 ns |
| | Granularity | 21 ns |
| | Compensated | 15 ns ¹ |

Quantization error information can be used to compensate the granularity related error of the timepulse signal

Electrical data

| Power supply | 2.7-3.6V |
|---------------------|--|
| Power consumption | 123 mW @ 3.0 V (LEA-6T) 120 mW @ 3.0 V (NEO-6T) |
| Backup power | 1.4 V – 3.6 V, 22 μA |
| Supported Antennas | Active and passive |
| Antenna power | External or internal VCC_RF (LEA-6T) |
| Antenna supervision | Integrated short-circuit detection and antenna shutdown, open circuit detection with minimal external circuitry (LEA-6T) |

Interfaces

| Serial interfaces | 1 UART 1 USB V2.0 full speed 12 Mbit/s 1 DDC (I ² C compliant) 1 SPI (NEO-6T only) | | | | | | |
|-------------------------|--|--|--|--|--|--|--|
| Digital I/O | 2 configurable timepulse (1 for NEO-6T) 1 EXTINT input for Timemark | | | | | | |
| | 1 reset (LEA-6T only) | | | | | | |
| Serial and I/O voltages | 2.7 V – 3.6 V | | | | | | |
| Timepulse | Configurable 0.25 Hz to 10 MHz | | | | | | |
| Protocols | NMEA, UBX binary, RTCM | | | | | | |

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Package

NEO-6T: 24 pin LCC (Leadless Chip Carrier): 12.2 x 16.0 x 2.4 mm, 1.6 g LEA-6T: 28 pin LCC (Leadless Chip Carrier): 17.0 x 22.4 x 2.4 mm, 2.1 g Pinout 15 GND 16 RF_IN GND 14 GND 13 17 GND Reserved 12 LEA-6T 13 GND GND 12 18 VCC_RF 19 V_ANT V_BCKP 11 RESET_N 10 14 MOSI/CFG_COM0 15 MISO/CFG_COM1 16 CFG_GPS0/SCK Top View RF_IN 11 GND 10 CC_RF 9 20 AADET_N TIMEPULSE2 9 VCC_RF 17 Reserved Reserved 8 NEO-6T VDDUSB 7 21 NC VCC OUT 18 SDA2 GND 7 VCC 6 NC 5 22 NC 23 NC Top View USB_DP 6 19 SCL2 20 TxD1 21 RxD1 22 V_BCKP USB_DM 5 EXTINTO 4 24 VDDUSB 25 USB_DM 26 USB_DP RxD1 4 TxD1 3 TIMEPULSE 3 23 VCC 24 GND SS_N 2 Reserved 1

Environmental data, quality & reliability

27 EXTINTO

28 TIMEPULSE

| 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 | | | | | | |

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-6T u-blox 6 Evaluation Kit with Precision Timing

Product variants

| NEO-6T | u-blox 6 GPS module, Precision Timing, TCXO |
|--------|--|
| LEA-6T | u-blox 6 GPS Module, Precision Timing, TCXO |

Further information

For contact information, see www.u-blox.com/contact-us. For more product details and ordering information, see the product data sheet.

SCL2 2

SDA2 1