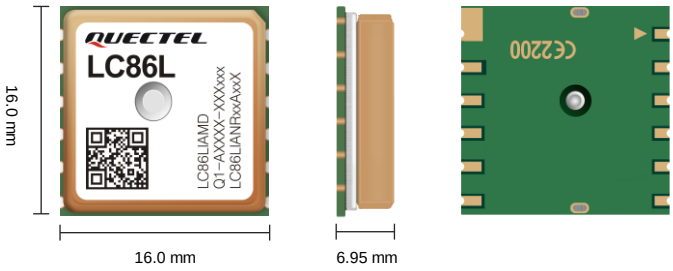
Quectel LC86L

Compact GNSS Module Integrating Patch Antenna



The LC86L is an ultra-compact GNSS module with an integrated patch antenna and a GNSS chipset engine that achieves perfect performance by supporting two or three concurrent GNSS constellations (Depending on the internal chipset version) and QZSS. The module is compatible with Quectel GPS module L80.

Combining advanced EASY™ (Embedded Assist System) with the LOCUS feature, the LC86L achieves the highest performance and fully meets the industrial standard. The EASY™ technology allows the LC86L module to calculate and predict orbits automatically by using the ephemeris data (up to 3 days) stored in an internal RAM memory. That way, the LC86L can fix position quickly even at lower signal levels and under low power consumption. Additionally, the embedded logger function called LOCUS allows the LC86L to log position information to internal flash memory at default intervals of 15 seconds and provides typically more log capacity without any added costs.

The LC86L also supports automatic antenna switching function. The module can switch between an integrated patch antenna and an external active antenna. Moreover, the LC86L keeps tracking even during the switching process.

Due to its compact design, high precision and high sensitivity, the LC86L module is perfect solution for a wide range of M2M applications, such as portable devices, automotive applications, personal tracking, smart safety, and industrial PDA. It is especially suitable for special applications, like GNSS mouse and OBD.

Key Features

- Extremely compact footprint: 16.0 mm × 16.0 mm × 6.95 mm
- Multi-GNSS engine for GPS, GLONASS, Galileo (or BeiDou) and QZSS
- Automatic antenna switching function
- Antenna detection and antenna short-circuit protection functions
- Support for DGPS and SBAS (WAAS/EGNOS/MSAS/GAGAN)
- AGNSS technology
- Support for EASY™, an advanced AGNSS technology (no external memory required)
- Integrated LNA for better sensitivity
- SDK commands developed by Quectel

L1 Band

Multi-Constellation System

Ultra-Compact Size

RoHS Compliant

Wide Operating Temperature Range: -40 °C to +85 °C

Low Power Consumption

Version: 1.4 | Status: Released

Quectel LC86L

GNSS Module	LC86L (A)	LC86L (B)	LC86L (C)
Region	Global	Global	Global
Dimensions	16.0 mm × 16.0 mm × 6.95 mm	16.0 mm × 16.0 mm × 6.95 mm	16.0 mm × 16.0 mm × 6.95 mm
Weight	Approx. 6.0 g	Approx. 6.0 g	Approx. 6.0 g
Embedded Antenna	●	●	●
Temperature Range			
Operating Temperature Range	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
Storage Temperature Range	-40 °C to +90 °C	-40 °C to +90 °C	-40 °C to +90 °C
GNSS Features			
Supported Bands	GPS L1 C/A, QZSS L1: 1575.42 MHz BeiDou B1I: 1561.098 MHz GLONASS L1: 1602.5625 MHz	GPS L1 C/A, QZSS L1: 1575.42 MHz BeiDou B1I: 1561.098 MHz GLONASS L1: 1602.5625 MHz	GPS L1 C/A, QZSS L1: 1575.42 MHz BeiDou B1I: 1561.098 MHz GLONASS L1: 1602.5625 MHz Galileo E1: 1575.42 MHz
Default GNSS Constellations	GPS + GLONASS + QZSS	GPS + BeiDou + QZSS	GPS + GLONASS + QZSS ①
Number of Tracking Channels	26	26	26
Number of Concurrent GNSS	2	2	3
Horizontal Position Accuracy ②	Autonomous: 2.5 m CEP	Autonomous: 2.5 m CEP	Autonomous: 2.5 m CEP
Velocity Accuracy ③	Without Aid: 0.1 m/s	Without Aid: 0.1 m/s	Without Aid: 0.1 m/s
Acceleration Accuracy ③	Without Aid: 0.1 m/s²	Without Aid: 0.1 m/s²	Without Aid: 0.1 m/s²
Accuracy of 1PPS Signal ③	100 ns	100 ns	100 ns
TTFF (with AGNSS)	Cold Start: 15 s Warm Start: 5 s Hot Start: 2 s	Cold Start: 15 s Warm Start: 5 s Hot Start: 2 s	Cold Start: 15 s Warm Start: 5 s Hot Start: 2 s
TTFF (without AGNSS) ③	Cold Start: 35 s Warm Start: 30 s Hot Start: 2 s	Cold Start: 35 s Warm Start: 30 s Hot Start: 2 s	Cold Start: 35 s Warm Start: 30 s Hot Start: 2 s
Sensitivity ④	Acquisition: -148 dBm Tracking: -166 dBm Reacquisition: -161 dBm	Acquisition: -148 dBm Tracking: -166 dBm Reacquisition: -161 dBm	Acquisition: -148 dBm Tracking: -166 dBm Reacquisition: -162 dBm
Dynamic Performance ③	Maximum Altitude: 10000 m Maximum Velocity: 515 m/s Maximum Acceleration: 4g	Maximum Altitude: 10000 m Maximum Velocity: 515 m/s Maximum Acceleration: 4g	Maximum Altitude: 10000 m Maximum Velocity: 515 m/s Maximum Acceleration: 4g
Certifications			
Regulatory	**Europe:** CE	**Europe:** CE	**Europe:** CE
Others	RoHS	RoHS	RoHS
Interface			
UART Interface	Adjustable: 9600 to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 Hz	Adjustable: 9600 to 921600 bps Default: 115200 bps Update Rate: 1 Hz (Default), up to 10 Hz	Adjustable: 9600 to 921600 bps Default: 9600 bps Update Rate: 1 Hz (Default), up to 10 Hz
Protocol	NMEA 0183	NMEA 0183	NMEA 0183
External Antenna Interface			
Antenna Type	Active	Active	Active
Active Antenna Power Supply	Internal	Internal	Internal
Electrical Features			
Supply Voltage Range	2.8–4.3 V, typ. 3.3 V	2.8–4.3 V, typ. 3.3 V	2.8–4.3 V, typ. 3.3 V
I/O Voltage	Typ. 2.8 V	Typ. 2.8 V	Typ. 2.8 V
Current Consumption (@ 3.3 V)	**Normal Operation:** 32 mA @ Acquisition (GPS + GLONASS) 31 mA @ Tracking (GPS + GLONASS) **Power Saving Modes:** 1.8 mA @ Standby Mode 6 µA @ Backup Mode	**Normal Operation:** 33 mA @ Acquisition (GPS + BeiDou) 30 mA @ Tracking (GPS + BeiDou) **Power Saving Modes:** 1.8 mA @ Standby Mode 6 µA @ Backup Mode	**Normal Operation:** 32 mA @ Acquisition (GPS + GLONASS) 30 mA @ Tracking (GPS + GLONASS) **Power Saving Modes:** 1.8 mA @ Standby Mode 7 µA @ Backup Mode

NOTE:
1. ①: Support configuration as GPS + GLONASS + Galileo + QZSS when the baud rate is 19200 bps or higher.
2. ②: CEP, 50%, 24 hours static, -130 dBm, more than 6 SVs.
3. ③: Room temperature, all satellites at -130 dBm.
4. ④: Room temperature, demonstrated with good LNA.
5. ●: Supported.

HQ address: Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Tel: +86 21 51086236 Email: info@quectel.com