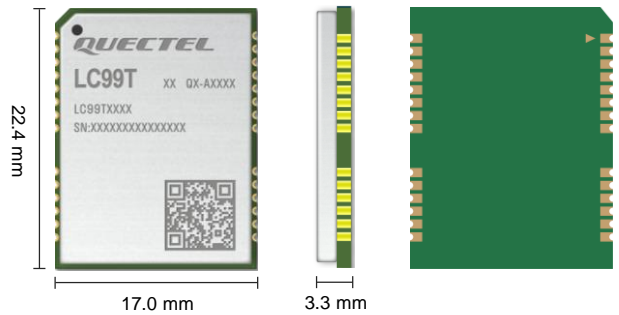


Quectel LC99T (IA)

High-Precision Timing GNSS Module



Quectel LC99T (IA) is a dual-band high-precision timing GNSS module, which can concurrently track GPS, GLONASS, Galileo, BDS, QZSS and NavIC satellite signals. It also supports SBAS (including WAAS, EGNOS, MSAS and GAGAN) and the AGNSS functionality. In contrast to single-band GNSS modules, it tracks a substantially greater number of visible satellites, enhancing overall signal reception. With nanosecond timing accuracy, the module is particularly well suited for infrastructure applications with precise timing requirements.

LC99T (IA) is designed to meet the most stringent timing synchronization requirements within global 4G/5G mobile networks. In addition, the module can generate a 10 MHz sine wave for various applications. By effectively minimizing timing errors of the primary source of cellular network synchronization, it empowers operators to maximize their network performance. Simultaneously, LC99T (IA) meets the strict synchronization demands of the next-generation networks across various vertical industries such as 5G X-Haul, smart grid, data centers, satellite communications, calibration services, and industrial automation applications.

The module's multi-band capability reduces timing errors to less than 13.6 ns under open-sky conditions. Additionally, it is designed and manufactured in accordance with the stringent Quality Management System, aligning with the IATF 16949:2016 Standard.



Key Features

- ✓ Multi-GNSS engine for GPS, GLONASS, Galileo, BDS, QZSS and NavIC
- ✓ Ideal for dense urban canyons and multi-path environments
- ✓ AGNSS
- ✓ Optimized accuracy and availability with survey-in (Auto Position Hold) and single-satellite timing
- ✓ L1 + L5 bands
- ✓ PPS, synchronized to GNSS/UTC within 13.6 ns (1 sigma)
- ✓ 10 MHz frequency output



AGNSS
Technology



Multi-Constellation
System



RoHS Compliant



Tracking Sensitivity:
-160 dBm



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



Anti-jamming

Quectel LC99T (IA)

GNSS Module	LC99T (IA)
Dimensions	22.4 mm × 17.0 mm × 3.3 mm
Weight	Approx. 2.0 g
Temperature Range	
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +90 °C
GNSS Features	
Supported Bands	GPS: L1 C/A; L5 GLONASS: L1 Galileo: E1; E5a BDS: B1I; B2a QZSS: L1 C/A; L5 NavIC: L5
Default Constellations	GPS + GLONASS + Galileo + BDS + QZSS + NavIC
Number of Channels	80 Tracking Channels 4 Fast Acquisition Channels
Number of Concurrent GNSS constellations	5 + QZSS
SBAS	WAAS, EGNOS, MSAS and GAGAN
Horizontal Position Accuracy ^①	Autonomous: 1.0 m
Velocity Accuracy ^②	Without Aid: 0.1 m/s
Acceleration Accuracy ^②	Without Aid: 0.1 m/s ²
1PPS Timing Accuracy ^②	< 13.6 ns @ 1σ
1PPS Jitter ^②	±6.5 ns
Frequency Reference ^②	10 MHz ±0.05 ppm
TTFF (with AGNSS) ^③	Warm Start: 5 s
TTFF (without AGNSS) ^②	Cold Start: 35 s Warm Start: 28 s Hot Start: 2 s
Sensitivity (@ Default Constellations) ^④	Acquisition: -145 dBm Tracking: -160 dBm Reacquisition: -153 dBm
Dynamic Performance ^②	Maximum Altitude: 18000 m Maximum Velocity: 515 m/s Maximum Acceleration: 4g
Certifications	
Regulatory	Europe: CE
Others	RoHS
Interface	
UART	Adjustable: 115200–921600 bps Default: 460800 bps Update Rate: 1 Hz (default), up to 10 Hz
Protocol	
Protocol	NMEA 0183
External Antenna Interface	
Antenna Type	Active
Antenna Power Supply	External or through VDD_RF pin
Electrical Characteristics	
Supply Voltage Range	3.0–3.6 V, Typ. 3.3 V
I/O Voltage	Following VCC
Current Consumption (@ Default Constellations, 3.3 V) ^②	Normal Operation: 290 mA (957 mW) @ Acquisition 285 mA (940.5 mW) @ Tracking Power Saving Mode: 55 μA (181.5 μW) @ Backup mode

NOTE:

- ①: CEP, 50 %, 24 hours static, -130 dBm, more than 6 SVs.
- ②: Default constellations, room temperature, all satellites at -130 dBm.
- ③: Open-sky, active high-precision GNSS antenna.
- ④: Tested with an external LNA with 16.5 dB gain and 0.85 dB noise figure.