Product summary

MAX-M10 series

u-blox M10 standard precision GNSS modules

Standard

Professional

Automotive

Ultra-low-power GNSS receiver for high-performance asset-tracking devices

- Less than 25 mW power consumption without compromising GNSS performance
- Maximum position availability with concurrent reception of 4 GNSS
- Proven excellent performance, even with small antennas
- Advanced spoofing and jamming detection
- Pin-compatible with previous MAX products

9.7 × 10.1 × 2.5 mm

Product description

The MAX-M10 series is built on the ultra-low-power u-blox M10 GNSS platform, which provides exceptional sensitivity and acquisition times for all L1 GNSS systems.

The extremely low power consumption of less than 25 mW in continuous tracking mode allows great power autonomy for all battery-operated devices, such as asset trackers, without compromising on GNSS performance.

MAX-M10 supports concurrent reception of four GNSS (GPS, GLONASS, Galileo, and BeiDou). The high number of visible satellites enables the receiver to select the best signals. This maximizes the position availability, in particular under challenging conditions such as in deep urban canyons.

u-blox Super-S technology offers great RF sensitivity and can improve the dynamic position accuracy by up to 25% with small antennas or in a non-line-of-sight scenario.

The MAX-M10S module integrates an LNA followed by a SAW filter in the RF path for maximum sensitivity in passive antenna designs. MAX-M10M offers a cost and power optimized setup without LNA and SAW filter.

MAX-M10 detects jamming and spoofing attempts and reports them to the host, so that the system can react to such events. Advanced filtering algorithms mitigate the impact of RF interference and jamming, thus enabling the product to operate as intended.

Both modules offer backwards pin-to-pin compatibility with previous u-blox generations, which saves designers time and cost when upgrading their designs.

	MAX-M10M	MAX-M10S
Grade		
Automotive		
Professional	•	•
Standard		
GNSS		
GPS + QZSS/SBAS	•	•
GLONASS	•	•
Galileo	•	•
BeiDou	•	•
Number of concurrent GNSS	4	4
Interfaces		
UART	1	1
DDC (I2C compliant)	1	1
Features		
Additional SAW		•
Additional LNA		•
RTC crystal	•	•
Oscillator	C	T
Timepulse	1	1
Power supply		
1.76 V – 5.5 V	•	
1.76 V – 3.6 V		•

C = Crystal / T = TCXO

MAX-M10 series

Product performance

Receiver type	u-blox M10 engine GPS L1 C/A, QZSS L1 C/A L1S, GLONASS L1OF BeiDou B1I/B1C, Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN
Nav. update rate	Up to 5 Hz (4 concurrent GNSS) Up to 18 Hz (single GNSS)
Horizontal position accuracy [1]	1.5 m CEP

		MAX-M10M [1]	MAX-M10S [2]
Acquisition	Cold start	28 s	28 s
	Aided start	2 s	1 s
	Hot start	1 s	1 s
Sensitivity	Tracking & Nav.	–164 dBm	–167 dBm
	Reacquisition	–160 dBm	–160 dBm
	Cold start	–148 dBm	–148 dBm
	Hot start	–159 dBm	–159 dBm

Tracking features

u-blox Super-S	Improved accuracy with small antennas
Data batching	Autonomous tracking up to 10 min at 1 Hz
Odometer	Measure traveled distance with support for different user profiles
Protection level	Real-time position accuracy estimate with 95% confidence

Security features

Signal integrity	RF interference and jamming detection and reporting Spoofing detection and reporting
Device integrity	Receiver configuration lock by command
Secure interface	Signed UBX messages (SHA-256) JTAG debug interface disabled by default

Electrical data

	MAX-M10M	MAX-M10S
Tracking mode	Continuous (PSM [3])	Continuous (PSM [3])
Power consumption at 3 V	2 GNSS: 19 (9) mW 3 GNSS: 22 (10) mW 4 GNSS: 25 mW	2 GNSS: 28 (18) mW 3 GNSS: 30 (19) mW 4 GNSS: 34 mW
Power consumption at 1.8 V	2 GNSS: 19 (9) mW 3 GNSS: 22 (10) mW 4 GNSS: 25 mW	2 GNSS: 24 (14) mW 3 GNSS: 27 (15) mW 4 GNSS: 30 mW
Power supply	1.76 V to 5.5 V	1.76 V to 3.6 V
Backup supply	1.65 V to 3.6 V	1.65 V to 3.6 V

1 = GPS/Galileo + SBAS/QZSS continuous tracking
2 = GPS/Galileo/Beidou + SBAS/QZSS continuous tracking
3 = Power save mode, 1 Hz cyclic tracking

Package

18 pin LCC (Leadless Chip Carrier): 9.7 × 10.1 × 2.5 mm, 0.6 g

Environmental data, quality & reliability

Operating temp.	–40 °C to +85 °C
Storage temp.	–40 °C to +85 °C
Environmental grade	2015/863/EU RoHS-3
EMC (electromagnetic compatibility)	2014/53/EU RED
Environmental testing	ISO 16750
Quality management	Manufactured and fully tested in IATF 16949 certified production sites

Interfaces

Serial interfaces	1 UART 1 DDC (I2C compliant)
Digital I/O	Configurable timepulse 1 EXTINT input for Wakeup
Raw Data output	Code phase data
Timepulse	Configurable: 0.25 Hz to 10 MHz
Supported antennas	Active and passive
Protocols	NMEA 4.11, UBX binary

Compatible u-blox location services

AssistNow	Real-time online A-GNSS service with assured global availability
CloudLocate	Extends the life of energy-constrained IoT applications

Support products

EVK-M101	u-blox M10 GNSS evaluation kit with UBX-M10050-KB chip and TCXO
EVK-M101C	u-blox M10 GNSS evaluation kit with UBX-M10050-KB chip and crystal oscillator
u-center 2	Highly intuitive software for GNSS performance evaluation

Product variants

MAX-M10M	u-blox M10 concurrent GNSS LCC module, firmware in ROM, crystal oscillator
MAX-M10S	u-blox M10 concurrent GNSS LCC module, firmware in ROM, SAW filter, LNA, TCXO

Further information

For contact information, see **www.u-blox.com/contact-u-blox**.

For more product details and ordering information, see the product data sheet.