

MAX-M10 series



u-blox M10 standard precision GNSS modules

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 all major GNSS
- Proven excellent performance, even with small antennas
- Advanced spoofing and jamming detection
- Pin-compatible with previous MAX products



Standard

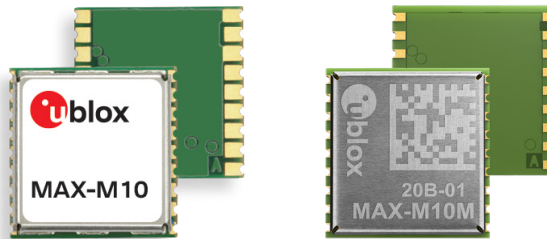


Professional



Automotive

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 major 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.

Depending on the environment, the low energy accurate positioning (LEAP) mode* reduces power consumption below 15 mW, retaining superior positioning accuracy.

The free AssistNow Predictive Orbits data download facilitates TTFF in under 2s. The Live Orbits data download furthermore improves the position accuracy after cold starts. 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-M10M-20B, MAX-M10S and MAX-M10N-00B modules integrate an LNA followed by a SAW filter in the RF path for maximum sensitivity in passive antenna designs. MAX-M10N-10B comes with an additional SAW filter in front of the LNA for the best RF immunity. 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.

All modules offer backwards pin-to-pin compatibility with previous u-blox generations, saving designers' time and cost when upgrading their designs.

* = selected products only

	MAX-M10M-00B	MAX-M10M-20B	MAX-M10S	MAX-M10N-00B	MAX-M10N-10B
Grade					
Automotive					
Professional	•	•	•	•	•
Standard					
GNSS					
GPS + QZSS/SBAS	•	•	•	•	•
GLONASS	•	•	•		
Galileo	•	•	•	•	•
BeiDou	•	•	•	•	•
Interfaces					
UART	1	1	1	1	1
DDC (I2C compliant)	1	1	1		
Features					
Power consumption**	19	30	24	24	
Power save mode	PSMCT	PSMCT	PSMCT	LEAP	LEAP
Data logging				•	•
Firmware upgradeable				•	•
AssistNow lifetime access	P	P	P	P + L	P + L
Additional SAW		1	1	1	2
Additional LNA		•	•	•	•
RTC crystal	•	•	•	•	•
Oscillator	•	•	•	•	•
Timepulse	1	1	1	1	1
Power supply					
1.76 V – 5.5 V	•	•		•	•
1.76 V – 3.6 V			•		

** = full power, 2 GNSS,
1.8 V supply voltage

L = Live Orbits / P = Predictive Orbits

MAX-M10 series

P

Product performance

Receiver type	u-blox M10 engine GPS L1 C/A QZSS L1 C/A L1S GLONASS L1OF ⁴	BeiDou B1I/B1C Galileo E1B/C SBAS L1 C/A	
Nav. update rate	Up to 25 Hz (single GNSS) Up to 10 Hz (≥ 3 concurrent GNSS)		
Horizontal position accuracy ¹	1.5 m CEP		
	MAX-M10M ¹	MAX-M10S ² / MAX-M10N ²	
Acquisition	Cold start	28 s	28 s
	Aided start	1 s	1 s/2 s
	Hot start	1 s	1 s/2 s
Sensitivity	Tracking & Nav.	-165 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
Odometer	Measures traveled distance with support for different user profiles
Data logging ⁵	Stores position/velocity/time information on the embedded flash memory without host interaction
Data batching	Stores position/velocity/time information over up to 10 min in RAM without host interaction
Protection level ⁴	Real-time position accuracy estimate with 95% confidence
PSMCT ⁴	Power save mode with cyclic tracking reduces the power consumption by 50%
LEAP ⁵	Low energy accurate positioning reduces the power consumption retaining superior position accuracy

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-00B	MAX-M10M-20B	MAX-M10S	MAX-M10N
Power save mode		PSMCT ³	PSMCT ³	PSMCT ³	LEAP ³
Power consumption [mW] at 1.8 V	2 GNSS	9	15	14	12
Continuous mode					
Power consumption [mW] at 1.8 V	2 GNSS	17	30	24	24
	3 GNSS	23	36	27	27
	4 GNSS	25	41	31	
Power consumption [mW] at 3 V	2 GNSS	20	51	27	27
	3 GNSS	25	61	30	30
	4 GNSS	28	68	34	

1 = GPS/Galileo + SBAS/QZSS
2 = GPS/Galileo/BeiDou + SBAS/QZSS
3 = 1 Hz navigation update rate
4 = MAX-M10M/S only
5 = MAX-M10N only

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.

Package

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

Environmental data, quality, and 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	Qualified according to u-blox qualification policy, based on a subset of AEC-Q104
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, RTCM 3.4 ⁵

Compatible u-blox location services

AssistNow	Achieves premium performance in challenging IoT environments
CloudLocate	Extends the life of energy-constrained IoT applications

Support products

EVK-M101	For MAX-M10S evaluation u-blox M10 GNSS evaluation kit with UBX-M10050-KB ROM chip and TCXO
EVK-M101C	For MAX-M10M evaluation u-blox M10 GNSS evaluation kit with UBX-M10050-KB ROM chip and oscillator
EVK-M102	For MAX-M10N evaluation u-blox M10 GNSS evaluation kit with firmware upgradeable UBX-M10150-CC chip and TCXO
u-center 2	Highly intuitive software for GNSS performance evaluation

Product variants

MAX-M10M-00B	u-blox M10 GNSS LCC module, firmware in ROM, oscillator
MAX-M10M-20B	u-blox M10 GNSS LCC module, firmware in ROM, LNA, SAW filter, oscillator
MAX-M10S	u-blox M10 GNSS LCC module, firmware in ROM, LNA, SAW filter, TCXO
MAX-M10N-00B	u-blox M10 LCC GNSS module, upgradeable firmware in flash memory, LNA, SAW filter, TCXO
MAX-M10N-10B	u-blox M10 LCC GNSS module, upgradeable firmware in flash memory, LNA, 2x SAW filter, TCXO

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