

MIA-M10 series



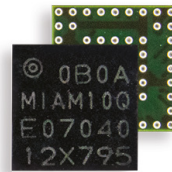
u-blox M10 standard precision GNSS SiP modules

Ultra-low-power GNSS module for miniature asset-tracking devices

- 4.5 x 4.5 mm chip-sized module requiring no external components
- Less than 25 mW power consumption without compromising GNSS performance
- Twice the battery life by leveraging optimized power save modes
- Maximum position availability with concurrent reception of 4 GNSS
- Proven excellent performance, even with small antennas



4.5 x 4.5 x 1.0 mm



Product description

The MIA-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.

MIA-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 in 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.

MIA-M10Q integrates an LNA followed by a SAW filter in the RF path for maximum sensitivity in passive antenna designs. MIA-M10C without an LNA or SAW filter offers the flexibility for active antenna designs.

The small, highly integrated System-in-Package requires only 20 mm² board space without the need of any external components.

MIA-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.

	MIA-M10C	MIA-M10Q
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	o	o
Oscillator	C	T
Timepulse	1	1
Protection level		•
Power supply		
1.35 V – 1.98 V	•	
1.76 V – 3.6 V		•

C = Crystal / T = TCXO

o = Optional, or requires external components



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 10 Hz (4 concurrent GNSS) Up to 25 Hz (single GNSS)		
Horizontal position accuracy ¹	1.5 m CEP		
		MIA-M10C	MIA-M10Q
Acquisition ¹	Cold start	28 s	27 s
	Aided start	2 s	1 s
	Hot start	1 s	1 s
Sensitivity ¹	Tracking & Nav.	-163 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	MIA-M10Q supports 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

	MIA-M10C	MIA-M10Q
Tracking mode	Continuous (PSM ²)	Continuous (PSM ²)
Power consumption at 3 V	Not applicable	2 GNSS: 30 (19) mW
	Not applicable	3 GNSS: 34 (20) mW
	Not applicable	4 GNSS: 37 mW
Power consumption at 1.8 V	2 GNSS: 30 (13) mW	2 GNSS: 25 (15) mW
	3 GNSS: 35 (15) mW	3 GNSS: 30 (16) mW
	4 GNSS: 41 mW	4 GNSS: 32 mW
Power supply	1.35 V to 1.98 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/BeiDou + SBAS/QZSS continuous tracking

2 = Power save mode, 1 Hz cyclic tracking

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

53 pin S-LGA (soldered land grid array): 4.5 x 4.5 x 1.0 mm, 0.06 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	
RTC crystal	Optional, can be connected to external RTC clock	
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

MIA-M10C	u-blox M10 concurrent GNSS SiP module, firmware in ROM, crystal oscillator, 1.8 V
MIA-M10Q	u-blox M10 concurrent GNSS SiP module, firmware in ROM, SAW filter, LNA, TCXO, 1.8/3 V

NOTE:

This document provides an objective specification overview of this product. Please refer to the data sheet for details on firmware-related performance and feature support.

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