

UBX-M10 series



u-blox M10 standard precision GNSS chip

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

- Less than 15 mW power consumption without compromising GNSS performance
- Maximum position availability with concurrent reception of all major GNSS
- Proven excellent performance, even with small antennas
- Upgradeable firmware for future-proof designs
- Advanced spoofing and jamming detection



Standard

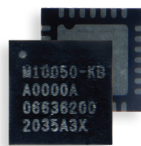


Professional



Automotive

4.0 x 4.0 x 0.55 mm



5.0 x 5.0 x 0.55 mm



Product description

The UBX-M10 chips, which are part of the u-blox M10 standard precision GNSS platform, provide exceptional sensitivity and acquisition times for all major L1 GNSS systems.

The extremely low power consumption of <15 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 the power consumption below 10 mW retaining superior position accuracy.

The free AssistNow Predictive Orbits data download facilitates TTFF <2s. The Live Orbits data download furthermore improves the position accuracy after coldstarts. u-blox Super-S (Super-Signal) 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.

UBX-M10150-KB operates with a firmware uploaded from the host or located on an external flash, which allows firmware upgrades. UBX-M10050-KB runs the firmware from ROM. All chips are pin-compatible with their UBX-F10 variants for easy migration to L1/L5 dual-band GNSS.

The UBX-M10 family detects jamming and spoofing events 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.

UBX-M10 chips are qualified according to JEDEC JESD47 and are manufactured in IATF 16949 certified sites.

	UBX-M10050-KB	UBX-M10050-KB-RW	UBX-M10150-KB	UBX-M10150-KB-AN
Grade				
Automotive				
Professional	•	•	•	•
Standard				
GNSS				
GPS + QZSS/SBAS	•	•	•	•
GLONASS	•	•		
Galileo	•	•	•	•
BeiDou	•	•	•	•
Interfaces				
UART	1	1	1	1
SPI	1	1	1	1
DDC (I2C compliant)	1	1	1	1
Features				
Power save mode	PSMCT	PSMCT	LEAP	LEAP
Data logging			•	•
Firmware upgradeable			•	•
AssistNow lifetime access	P	P	P	P + L
Carrier phase output		•		
RTC crystal	S	S	S	S
Oscillator	C/T	C/T	T	T
Antenna supervisor	S	S	S	S
Timepulse	1	1	1	1

L = Live Orbits / P = Predictive Orbits
 S = supported, may require ext. components
 C = Crystal / T = TCXO

UBX-M10 series



Product performance

Receiver type	u-blox M10 engine		
	GPS L1 C/A	BeiDou B1I/B1C	
	QZSS L1 C/A, L1S, L1Sb ⁴	Galileo E1B/C	
	GLONASS L1OF ³	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		
		UBX-M10050-KB	UBX-M10150-KB
Acquisition ¹	Cold start	28 s	28 s
	Aided start	1 s	2 s
	Hot start	1 s	2 s
Sensitivity ¹	Tracking & Nav.	-167 dBm	-167 dBm
	Reacquisition	-160 dBm	-160 dBm
	Cold start	-148 dBm	-148 dBm
	Hot start	-159 dBm	-159 dBm

External components

Oscillator	Crystal or TCXO
RTC input (optional)	32.768 kHz
Antenna supply & supervisor	External circuit required for short and open circuit detection
Flash memory (optional)	SPI interface

Tracking features

u-blox Super-S	Improved accuracy with small antennas
Data batching	Stores position/velocity/time information over up to 10 min in RAM without host interaction
Data logging ⁴	Stores position/velocity/time information on the embedded flash memory without host interaction
Odometer	Measures traveled distance with support for different user profiles
Protection level ³	Real-time position accuracy estimate with 95% confidence
PSMCT ³	Power save mode with cyclic tracking reduces the power consumption by 50%
LEAP ⁴	Low energy accurate positioning reduces the power consumption retaining superior position accuracy

Security features

Signal integrity	RF interference & 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

		UBX-M10050-KB		UBX-M10150-KB	
Power save mode		None	PSMCT	None	LEAP
Power consumption ² [mW]	2 GNSS	15	8	17	8
	3 GNSS	18	9	21	10
	4 GNSS	21			
Supply voltage	1.0 V to 1.8 V				
Digital I/O voltage	1.8 V or 3.3 V				
Backup supply	1.65 V to 3.6 V				

1 = GPS/Galileo + SBAS/QZSS

2 = Supply voltage 1.0 V, digital I/O voltage 1.8 V, 1Hz navigation update rate

3 = UBX-M10050-KB (-RW) only

4 = UBX-M10150-KB(-AN) 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

28 pin QFN: 4.0 x 4.0 x 0.55 mm
28 pin QFN: 5.0 x 5.0 x 0.55 mm

Environmental data, quality & reliability

Operating temp.	-40°C to +85°C
Storage temp.	-40 °C to +125 °C
MSL	1
Environmental grade	2015/863/EU RoHS-3, Green, IEC-61249-2-21 halogen-free
Environmental testing	JEDEC JESD47
Quality management	Manufactured and fully tested in IATF 16949 certified production sites

Interfaces

Serial interfaces	1 UART 1 DDC (I2C compliant) 1 SPI
Digital I/O	1 configurable time pulse 1 EXTINT interrupt input
Raw data output	Code phase data, carrier phase data
Memory	SPI interface for optional Flash
Protocols	NMEA 4.11, UBX binary, RTCM 3.4 ⁴

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	u-blox M10 GNSS evaluation kit with UBX-M10050-KB-RW ROM chip and TCXO
EVK-M101C	u-blox M10 GNSS evaluation kit with UBX-M10050-KB-RW ROM chip and crystal oscillator
EVK-M102	u-blox M10 GNSS evaluation kit with firmware upgradeable UBX-M10150-CC chip and TCXO. For UBX-M10150-KB evaluation.
u-center 2	Highly intuitive software for GNSS performance evaluation

Product variants

UBX-M10050-KB -A0100A	u-blox M10 GNSS chip, 28 pin QFN, GPS/GAL as default configuration
UBX-M10050-KB -A0103A	u-blox M10 GNSS chip, 28 pin QFN, GPS/GAL/BDS as default configuration
UBX-M10050-KB-RW	u-blox M10 GNSS chip, 28 pin QFN, GPS/GAL/BDS as default configuration, carrier phase raw data
UBX-M10150-KB	u-blox M10 GNSS chip, 28 pin QFN, GPS/GAL/BDS as default configuration, upgradeable firmware
UBX-M10150-KB-AN	u-blox M10 GNSS chip, 28 pin QFN, GPS/GAL/BDS as default configuration, upgradeable firmware, AssistNow live orbits

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