Product summary

UBX-M9140

u-blox M9 standard precision GNSS chips

Standard

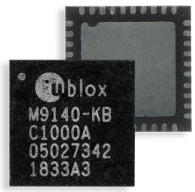
Professional

Automotive

Ultra-robust meter-level GNSS positioning chips

- Maximum position availability with concurrent reception of 4 GNSS
- 25 Hz position update rate for dynamic applications
- Advanced spoofing and jamming detection
- Migration path to dead reckoning and high precision technology

5.00 × 5.00 × 0.55 mm



Product description

The UBX-M9140 chips are part of the u-blox M9 standard precision GNSS platform, and provide exceptional sensitivity and acquisition times for all L1 GNSS systems. The u-blox M9 standard precision GNSS platform, which delivers meter-level accuracy performance, succeeds the well-known u-blox M8 product range.

The UBX-M9140 chips are available in different variants to serve automotive and industrial tracking applications, such as navigation, telematics and UAVs.

UBX-M9140 supports concurrent reception of four GNSS. The high number of visible satellites enables the receiver to select the best signals. This maximizes the position accuracy, in particular under challenging conditions such as in deep urban canyons.

UBX-M9140 offers a position update rate of up to 25 Hz. This allows dynamic applications such as UAVs to receive the position information with low latency.

UBX-M9140 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.

Thanks to a uniform pinout, customers avoid multiple designs when using different variants of UBX-M9140. The same PCB layout can feature different technologies, such as with or without dead reckoning.

	UBX-M9140-KA	UBX-M9140-KB
Grade		
Automotive	•	
Professional		•
Standard		
GNSS		
GPS + QZSS/SBAS	•	•
GLONASS	•	•
Galileo	•	•
BeiDou	•	•
Number of concurrent GNSS	4	4
Interfaces		
UART	2	2
USB	1	1
SPI	1	1
DDC (I2C compliant)	1	1
Features		
Upgradeable firmware	•	•
Firmware in ROM	•	•
Data logging	S	S
RTC crystal	S	S
Oscillator	T	T
Antenna supply & supervisor	S	S
Timepulse	2	2

S = supported, may require ext. components

T = TCXO

UBX-M9140

Product performance

Receiver type	92-channel u-blox M9 engine GPS L1 C/A, QZSS L1 C/A/S, GLONASS L1OF, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	
Nav. update rate	Up to 25 Hz (4 concurrent GNSS)	
Horizontal position accuracy[1]	1.5 m CEP (with SBAS) 2.0 m CEP (without SBAS)	
Acquisition[1]	Cold start Aided start Hot start	24 s 2 s 2 s
Sensitivity[1]	Tracking & nav. Reacquisition Cold start Hot start	–167 dBm –160 dBm –148 dBm –159 dBm

External components

Oscillator	TCXO
RTC input	32.768 kHz (optional)
Antenna supply and supervisor	External circuit required for short and open circuit detection
Flash memory	SPI, minimum 8 MBit
DC/DC converter	Built-in, external component required

Tracking features

Power save modes	On/off, cyclic
Data batching	Autonomous tracking up to 10 min
Data-logger[2]	Position, velocity, time, and odometer data
Geo-fencing	Up to 4 circular areas; GPIO for waking up the host CPU

Security features

Signal integrity	RF interference & jamming detection and reporting Active GNSS in-band filtering Spoofing detection and reporting
Device integrity	Secure boot of firmware downloaded from host or flash Receiver configuration lock by command
Secure interface	Signed UBX messages (SHA-256) JTAG debug interface port locked

Package

40 pin QFN: 5.00 x 5.00 x 0.55 mm

Environmental data, quality & reliability

Operating temp.	–40 °C to +85 °C (UBX-M9140-KB) –40 °C to +105 °C (UBX-M9140-KA)
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	AEC-Q100
Quality management	Manufactured and fully tested in IATF 16949 certified production sites AEC-Q004 Zero ppm strategy (UBX-M9140-KA)

Electrical data

Supply voltage	1.8 V or 3 V
Power consumption	32 mA at 3.0 V (4 GNSS continuous) 29 mA at 3.0 V (2 GNSS continuous) 23 mA at 3.0 V (1 GNSS continuous)
Backup supply	1.65 V to 3.6 V

Interfaces

Serial interfaces	2 UART 1 USB V2.0 full speed 12 Mbit/s 1 DDC (I2C compliant) 1 SPI
Digital I/O	2 configurable time pulse 2 EXTINT interrupt inputs 2 PIO for antenna supervision
Raw data output	Code phase data
Memory	SPI interface for optional flash
Protocols	NMEA 4.10, UBX binary, RTCM 3.3

Services

GNSS assistance	AssistNow

Support products

XPLR-M9	u-blox M9 GNSS Explorer Kit with easy-to-use software for first product evaluation
EVK-M91	u-blox M9 GNSS Evaluation Kit with UBX-M9140 chip and I/O interface

Product variants

UBX-M9140-KA	u-blox M9 GNSS chip, 40 pin QFN, Automotive grade
UBX-M9140-KB	u-blox M9 GNSS chip, 40 pin QFN, Professional grade

1 = For default mode: GPS/GLO/BDS/GAL+SBAS/QZSS
2 = External flash required

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.