

# NEO-M9N



## u-blox M9 standard precision GNSS module

### Ultra-robust meter-level GNSS positioning module

- Maximum position availability with concurrent reception of 4 GNSS
- Advanced spoofing and jamming detection
- Excellent RF interference mitigation
- Pin-compatible with previous NEO products



### Product description

The NEO-M9N module is built on the robust u-blox M9 GNSS chip, which provides exceptional sensitivity and acquisition times for all L1 GNSS systems. The u-blox M9 standard precision GNSS platform, which delivers meter-level accuracy, succeeds the well-known u-blox M8 product range.

NEO-M9N 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.

NEO-M9N 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.

A SAW filter combined with an LNA in the RF path is integrated in the NEO-M9N module. This setup allows normal operation even under strong RF interferences, for example when a cellular modem is co-located with NEO-M9N.

NEO-M9N offers backwards pin-to-pin compatibility with previous u-blox generations, which saves designers time and cost when upgrading their design. Software migration requires little effort thanks to the continuous support of UBX messages across product generations.

NEO-M9N

	NEO-M9N
<b>Grade</b>	
Automotive	
Professional	•
Standard	
<b>GNSS</b>	
GPS + QZSS/SBAS	•
GLONASS	•
Galileo	•
BeiDou	•
Number of concurrent GNSS	4
<b>Interfaces</b>	
UART	1
USB	1
SPI	1
DDC (I2C compliant)	1
<b>Features</b>	
Firmware upgrade	•
Data logging	•
RTC crystal	•
Oscillator	T
Antenna supply & supervisor	
Timepulse	1
<b>Power supply</b>	
2.7 V – 3.6 V	•

T = TCXO



## Product performance

Receiver type	92-channel u-blox M9 engine GPS L1 C/A, QZSS L1 C/A/S, GLONASS L10F 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	1.5 m CEP	
Acquisition <sup>1</sup>	Cold start	24 s
	Aided start	2 s
	Hot start	2 s
Sensitivity <sup>1</sup>	Tracking & Nav.	-167 dBm
	Reacquisition	-160 dBm
	Cold start	-148 dBm
	Hot start	-159 dBm

## Tracking features

Power save modes	On/off, cyclic
Data batching	Autonomous tracking up to 10 min
Data-logger	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 disabled by default

## Electrical data

Power supply	2.7 V to 3.6 V
Power	36 mA @ 3.0 V (4 GNSS continuous)
Consumption <sup>1</sup>	31 mA @ 3.0 V (2 GNSS continuous) 27 mA @ 3.0 V (1 GNSS continuous)
Backup Supply	2.7 V to 3.6 V

<sup>1</sup> = For default mode: GPS/GLONASS/BeiDou/Galileo + SBAS/QZSS

## Further information

For contact information, see [www.u-blox.com/contact-us](http://www.u-blox.com/contact-us).

For more product details and ordering information, see the [product data sheet](#).

## Package

24 pin LCC (Leadless Chip Carrier): 12.2 x 16.0 x 2.4 mm, 1.6 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	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 USB (NEO-M9N) 1 SPI (optional) 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 4.10, UBX binary, RTCM 3.3

## Services

Assistance GNSS	AssistNow Online AssistNow Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant
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## 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

NEO-M9N	u-blox M9 concurrent GNSS LCC module, firmware in RAM, upgradeable firmware, USB interface, flash memory, SAW filter, LNA
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