Product summary

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.
### 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**
- Cold start: 24 s
- Aided start: 2 s
- Hot start: 2 s

**Sensitivity**
- 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 consumption**
  - 36 mA @ 3.0 V (4 GNSS continuous)
  - 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

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

### 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
- **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
- **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
- **OMA SUPL & 3GPP compliant**: Autonomous (up to 6 days)

### 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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**Further information**

For contact information, see www.u-blox.com/contact-us.

For more product details and ordering information, see the product data sheet.