| | Standard | **Professional** | Automotive |

NEO-M8U

u-blox M8 UDR module including 3D inertial sensors

Highlights

- World's first untethered dead reckoning GNSS solution
- Independent of any electrical connection to the car
- Positioning accuracy in dense cities and covered areas
- Complete positioning solution with integrated 3D sensors
- Compatible with all modules of the NEO family
- Real-time positioning update rate of up to 20 Hz

NEO-M8U
12.2 x 16.0 x 2.4 mm

Product description

The NEO-M8U module introduces u-blox's Untethered Dead Reckoning (UDR) technology, which provides continuous navigation without requiring speed information from the vehicle. This innovative technology brings the benefits of dead reckoning to installations previously restricted to using GNSS alone and significantly reduces the cost of installation for after-market dead reckoning applications.

The strength of UDR is particularly apparent under poor signal conditions, where it brings continuous positioning in urban environments, even to devices with antennas installed within the vehicle. Useful positioning performance is also available during complete signal loss, for example in parking garages and short tunnels. With UDR, positioning starts as soon as power is applied to the module, before the first GNSS fix is available.

The NEO-M8U may be installed in any position within the vehicle without configuration. In addition to its freedom from any electrical connection to the vehicle, the on-board accelerometer and gyroscope sensors result in a fully self-contained solution, perfect for rapid product development with reliable and consistent performance.

The intelligent combination of GNSS and sensor measurements enables accurate, real-time positioning at rates up to 20 Hz, as needed for smooth and responsive interactive applications. Native high rate sensor data is made available to host applications such as driving behaviour analysis or accident reconstruction.

The NEO-M8U includes u-blox's latest generation GNSS receiver, which adds Galileo to the multi-constellation reception that already includes GPS, GLONASS, BeiDou and QZSS. The module provides high sensitivity and fast GNSS signal acquisition and tracking. UART, USB, DDC (I²C compliant) and SPI interface options provide flexible connectivity and enable simple integration with most u-blox cellular modules.

u-blox M8 modules use GNSS chips qualified according to AEC-Q100 and are manufactured in ISO/TS 16949 certified sites. Qualification tests are performed as stipulated in the ISO16750 standard: "Road vehicles – Environmental conditions and testing for electrical and electronic equipment".

Product selector

Model	Category	GNSS				Supply	Interfaces				Features								Grade		
	Standard Precision GNSS / High Precision GNSS / Dead Reckoning / Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	2.7 V – 3.6 V	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data logging	Additional SAW	Additional LNA	RTC crystal	Oscillator	Built-in sensor	Timepulse	Standard	Professional	Automotive
NEO-M8U	UDR	•	•	•	•	3	•	•	•	•	•	•	•			•	C	•	1			

ADR = Automotive Dead Reckoning / UDR = Untethered Dead Reckoning   C = Crystal / T = TCXO

u-blox

Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN
Nav. update rate	Up to 20 Hz
Position accuracy	2.0 m CEP
UDR position error	Typically <10% of distance covered without GNSS (up to 60 s)
Acquisition	Cold starts: 26 s Aided starts: 3 s Reacquisition: 1 s
Sensitivity	Tracking & Nav: –160 dBm[1] Cold starts: –148 dBm Hot starts: –157 dBm
Assistance	AssistNow GNSS Online AssistNow GNSS Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant
Oscillator	Crystal
RTC	Built-in
Sensor	Onboard accelerometer and gyroscope
Supported antennas	Active or passive antenna
Raw Data	Code phase output
Odometer	Integrated in navigation filter
Geofencing	Up to 4 circular areas GPIO for waking up external CPU
Spoofing detection	Built-in
Signal integrity	Signature feature with SHA 256
Data-logger	For position, velocity, time, and odometer data

[1] Limited by FW for best DR performance

Interfaces

Serial interfaces	1 UART 1 USB V2.0 full speed 12 Mbit/s 1 SPI (optional) 1 DDC (I²C compliant)
Timepulse	Configurable 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM

Electrical data

Supply voltage	2.7 V to 3.6 V
Power consumption	29 mA @ 3.0 V (Continuous, default concurrent mode)
Backup Supply	1.4 to 3.6 V

Package

24 pin LCC (Leadless Chip Carrier): 12.2 x 16.0 x 2.4 mm

Pinout

	NEO-M8U TOP VIEW		
13 GND		GND	12
14 LNA_EN		RF_IN	11
15 RESERVED		GND	10
16 RESERVED		VCC_RF	9
17 RESERVED		RESET_N	8
18 SDA / SPI CS_N		VDD_USB	7
19 SCL / SPI CLK		USB_DP	6
20 TXD / SPI MISO		USB_DM	5
21 RXD / SPI MOSI		EXTINT	4
22 V_BCKP		TIMEPULSE	3
23 VCC		D_SEL	2
24 GND		SAFEBOOT_N	1

Environmental data, quality & reliability

Operating temp.	–40° C to 85° C
Storage temp.	–40° C to 85° C

RoHS compliant (lead-free)

Qualification according to ISO 16750

Manufactured and fully tested in ISO/TS 16949 certified production sites

Uses u-blox M8 chips qualified according to AEC-Q100

Support products

u-blox M8 Evaluation Kits:

Easy-to-use kits to get familiar with u-blox M8 positioning technology, evaluate functionality, and visualize GNSS performance.

EVK-M8U	u-blox M8 Untethered Dead Reckoning GNSS evaluation kit, supports NEO-M8U

Product variants

NEO-M8U	u-blox M8 GNSS LCC module with Untethered Dead Reckoning and onboard sensors

Further information

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

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