NEO-M8P

## u-blox M8 high precision GNSS modules

Highlights

- Centimeter-level GNSS positioning for the mass market
- Integrated Real Time Kinematics (RTK) for fast time-to-market
- Smallest, lightest, and energy-efficient RTK module
- Complete and versatile solution due to base and rover variants
- World-leading GNSS positioning technology

NEO-M8P:
12.2 x 16.0 x 2.4 mm

Product description

The NEO-M8P module combines the high performance u-blox M8 positioning engine with u-blox's Real Time Kinematic (RTK) technology. The NEO-M8P provides cm-level GNSS performance designed to meet the needs of unmanned vehicles and other machine control applications requiring accurate guidance.

Communication link

NEO-M8P-2 (Base)   NEO-M8P-0 (Rover)
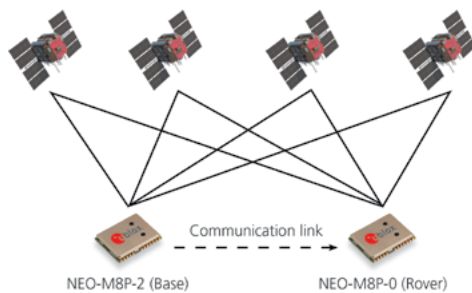
u-blox's RTK technology introduces the concept of a "rover" (NEO-M8P-0) and a "base" (NEO-M8P-2) on the M8 platform for stunning cm-level accuracy in clear sky environments. The base station module sends corrections via the RTCM protocol to the rover module via a communication link enabling the rover to output its position relative to the base station at cm-level accuracies.

The NEO-M8P is ideal for applications requiring vehicles to move faster and more accurately, operate without physical boundaries (e.g. wires or fences), and automatically return to base station platforms. Such applications include UAV, unmanned vehicles (e.g. robotic lawn mowers), and Precision Agriculture guidance.

The NEO-M8P module enables the system integrator to access u-blox's complete end-to-end RTK solution including the stationary "survey-in" functionality that is designed to reduce the setup time and increase the flexibility of the application. NEO-M8P modules are compatible with a wide range of communication technologies (Cellular, WiFi, BlueTooth, UHF) enabling the user to select the communication link best suited to their application. With u-blox's RTK technology, integration and software development efforts can be reduced, ensuring a minimal cost of ownership.

u-blox M8 modules use GNSS chips qualified according to AEC-Q100, are manufactured in ISO/TS 16949 certified sites, and fully tested on a system level. 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	Carrier phase output	Additional SAW	Additional LNA	RTK rover	Base station with survey-in	Timepulse	Standard	Professional	Automotive
NEO-M8P-0		•			•	•			2	•	•	•	•	•	•	•	•	•	•	•		1			
NEO-M8P-2		•			•	•			2	•	•	•	•	•	•	•	•	•	•	•	•	1			

Advance Information

u-blox

Features

Receiver type	72-channel u-blox M8 engine GPS L1 C/A, GLONASS L1OF	
Nav. update rate	RTK	up to 5 Hz [1]
	Carrier phase data	up to 10 Hz
Position accuracy [2]	Standalone	2.5 m CEP
	RTK	0.025 m + 1 ppm CEP [3]
Convergence time [2]	RTK	3 min
Acquisition	Cold starts	26 s
	Aided starts	2 s
	Reacquisition	1 s
Sensitivity	Tracking & Nav	−160 dBm [4]
	Cold starts	−148 dBm
	Hot starts	−156 dBm
	Reacquisition	−158 dBm
Assistance	AssistNow GNSS Online OMA SUPL & 3GPP compliant	
Oscillator	TCXO	
Noise figure	On-chip LNA with extra LNA for lowest noise figure	
Anti jamming	Active CW detection and removal. Extra onboard SAW band pass filter.	
Memory	Flash	
Supported antennas	Active and passive	
Survey-in base station	For generating sub-meter base station positions (for NEO-M8P-2)	

[1]   Limited to 2 Hz on early samples
[2]   Depends on atmospheric conditions, baseline length, GNSS antenna, multipath conditions, satellite visibility, and geometry
[3]   ppm limited to baselines up to 10 km
[4]   Limited by FW for best performance

Interfaces

Serial interfaces	1 UART 1 USB V2.0 full speed 12 Mbit/s 1 SPI (optional) 1 DDC (I²C compliant)
Digital I/O	Configurable timepulse 1 EXTINT input for Wakeup RTK Fix Status GEOFENCE Status
Timepulse	Configurable 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM version 3.x

Electrical data

Supply voltage	2.7 V to 3.6 V
Power consumption	23 mA @ 3.0 V (continuous, GPS only) 12 mA @ 3.0 V (PSM, 1 Hz, GPS only)
Backup Supply	1.4 V to 3.6 V

Package

24 pin LCC (Leadless Chip Carrier): 12.2 x 16.0 x 2.4 mm, 1.6 g

Pinout

13	GND	GND	12
14	ANT_ON	RF_IN	11
15	RTK_STAT	GND	10
16	GEOFENCE_STAT	VCC_RF	9
17	Reserved	RESET_N	8
	NEO-M8P **Top View**		
18	SDA	VDD_USB	7
19	SCL	USB_DP	6
20	TxD	USB_DM	5
21	RxD	EXTINT	4
22	V_BCKP	TIMEPULSE	3
23	VCC	D_SEL	2
24	GND	SAFEBOOT_N	1
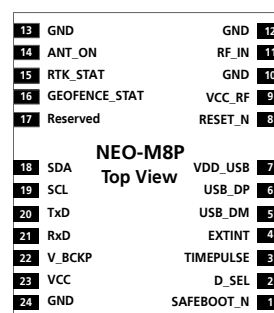
Environmental data, quality & reliability

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

Application board provides reference design, and allows efficient integration and evaluation of u-blox M8 high precision GNSS technology.

C94-M8P	Two NEO-M8P application boards with NEO-M8P-2 (rover and base station functionality) for evaluating RTK applications

Product variants

NEO-M8P-0	u-blox M8 high precision module with rover functionality
NEO-M8P-2	u-blox M8 high precision module with rover and base station functionality

Further information

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

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