Product summary

NEO-F9P module

u-blox F9 high precision GNSS module

Standard

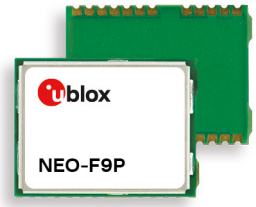
Professional

Automotive

Multi-band receiver delivers centimeter-level accuracy in seconds

- Concurrent reception of GPS, GLONASS, Galileo, and BeiDou
- Multi-band L1/L5 RTK with fast convergence times and reliable performance
- Centimeter accuracy in a compact and energy-efficient module
- Easy integration of RTK for fast time-to-market
- Native support for PointPerfect simplifies integration
- Small form factor

12.2 × 16.0 × 3.6 mm



Product description

The NEO-F9P positioning module features the u-blox F9 receiver platform, which provides multi-band GNSS positioning to high-volume industrial applications in a small form factor. NEO-F9P is a multi-band GNSS module with integrated u-blox multi-band RTK technology for centimeter-level accuracy. The module enables precise navigation and automation of moving industrial machinery by means of a small, surface-mounted module.

The NEO-F9P module is designed for easy integration and low design-in costs with minimal eBOM. Thanks to its small package size, light weight, and small power consumption it is well-suited for mass market adoption.

NEO-F9P ensures the security of positioning and navigation information by using secured interfaces and advanced jamming and spoofing and mitigation detection technologies.

NEO-F9P offers support for a range of open correction services allowing each application to optimize performance according to the application's individual needs. NEO-F9P comes with built-in support for standard RTCM corrections, supporting centimeter-level navigation from local base stations or from virtual reference stations (VRS) in a Network RTK setup. The module also uses PPP-RTK services suitable for mass-market applications formatted as SPARTN.

u-blox modules are manufactured in ISO/TS 16949 certified sites and are 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".

	NEO-F9P
Grade	
Automotive	
Professional	•
Standard	
GNSS	
GPS + QZSS / SBAS	•
GLONASS	•
Galileo	•
BeiDou	•
Number of concurrent GNSS	4
Multi-band	•
Interfaces	
UART	2
USB	1
SPI	1
DDC (I2C compliant)	1
Features	
Programmable (flash)	•
Data logging	•
Carrier phase output	•
Additional SAW and LNA	•
RTC crystal	•
Oscillator	T
RTK rover	•
RTK base station	•
Moving base	
Survey-in and fixed mode	•
Timepulse	1
Power supply	
2.7 V – 3.6 V	•

T = TCXO

NEO-F9P module

Features

Receiver type	184-channel u-blox F9 engine GPS L1C/A L5, GLO L1OF, GAL E1B/C E5a, BDS B1I B2a, QZSS L1C/A L1S L5, SBAS L1C/A NavIC L5	
Nav. update rate	RTK	up to 20 Hz[1]
Position accuracy[2]	RTK	0.01 m + 1 ppm CEP
Convergence time[2]	RTK	< 10 sec
Acquisition	Cold starts Aided starts Reacquisition	27 s 3 s 4 s
Sensitivity	Tracking & Nav. Cold starts Hot starts Reacquisition	-167 dBm -148 dBm -157 dBm -160 dBm
Assistance	AssistNow Online OMA SUPL & 3GPP compliant	
Oscillator	TCXO	
RTC crystal	Built-in	
Anti-jamming	Active CW detection and removal Onboard band pass filter	
Anti-spoofing	Advanced anti-spoofing algorithms	
Memory	Flash	
Supported antennas	Active and passive	

1 The highest navigation rate can limit the number of supported constellations

2 Depends on atmospheric conditions, baseline length, GNSS antenna, multipath conditions, satellite visibility, and geometry

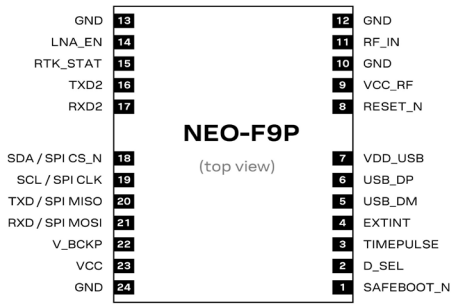
Interfaces

Serial interfaces	2 UART 1 SPI 1 USB 1 DDC (I2C compliant)
Digital I/O	Configurable timepulse EXTINT input for wakeup RTK fix status
Timepulse	Configurable: 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM v. 3.3, SPARTN v. 2.0, CLAS as UBX-RXM-PMP

Package

24-pin LCC (leadless chip carrier)
12.2 x 16.0 x 3.6 mm

Pinout



Environmental data, quality, and reliability

Operating temp.	–40 °C to +85 °C
Storage temp.	–40 °C to +85 °C
RoHS compliant (2015/863/EU)	
Green (halogen-free)	
EU Radio Equipment Directive compliant 2014/53/EU	
Qualification according to ISO 16750	
Manufactured and fully tested in ISO/TS 16949 certified production sites	
High vibration and shock resistance	

Electrical data

Supply voltage	2.7 V to 3.6 V
Power consumption	72 mA at 3.0 V (continuous)
Backup supply	1.65 V to 3.6 V

Compatible u-blox products and services

Products	NEO-D9S correction receiver NEO-D9C correction receiver
Location services	AssistNow A-GNSS service PointPerfect GNSS augmentation service

Support products

Easy-to-use kits to get familiar with u-blox F9 positioning technology, evaluate functionality, and visualize GNSS performance.

EVK-F9P-16	u-blox NEO-F9P GNSS Evaluation Kit, with active multi-band antenna (ANN-MB1). Supports NEO-F9P.

Product variants

NEO-F9P-15B	u-blox high precision GNSS module with rover and base functionality

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.