Product summary
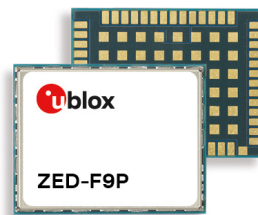# ZED-F9P module

u-blox F9 high precision GNSS module

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Multi-band receiver delivers centimeter-level accuracy in seconds

- Concurrent reception of GPS, GLONASS, Galileo and BeiDou
- Multi-band RTK with fast convergence times and reliable performance
- Centimeter-level accuracy in a small and energy-efficient module
- Easy integration of RTK for fast time-to-market
- Open SSR formats including SPARTN and Compact SSR for efficient delivery

17.0 × 22.0 × 2.4 mm

u blox

ZED-F9P

Product description

The ZED-F9P positioning module integrates multi-band GNSS and real time kinematics (RTK) technology in a compact form factor, to deliver centimeter-level accuracies in seconds for the industrial navigation and robotics markets.

ZED-F9P concurrently uses GNSS signals from all four GNSS constellations (GPS, GLONASS, Galileo, and BeiDou). GNSS signals from multiple frequency bands (L1/L2/L5) combined with RTK technology enables fast convergence times and reliable performance for scalable applications, including robotic lawnmowers, unmanned autonomous vehicles (UAV), and semi-automated or fully automated machinery.

With its high update rate and low power consumption levels, the ZED-F9P module is ideal for highly dynamic applications such as UAVs. ZED-F9P ensures the security of positioning and navigation information by using secure interfaces and advanced jamming and spoofing detection technologies. The receiver enables easy integration and helps product developers quickly bring their ideas to the market.

ZED-F9P offers support for a range of correction services allowing each application to optimize performance according to the application's unique set of needs. ZED-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 supports SPARTN format SSR-type correction services suitable for mass market applications.

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".

	ZED-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	•
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	•

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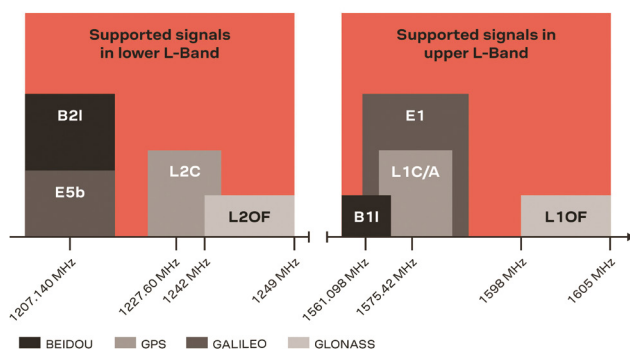# ZED-F9P module

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Features

Receiver type	184-channel u-blox F9 engine GPS L1C/A L2C, GLO L1OF L2OF, GAL E1B/C E5b, BDS B1I B2I, QZSS L1C/A L1S L2C, SBAS L1C/A	
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	24 s
	Aided starts	2 s
	Reacquisition	2 s
Sensitivity	Tracking & Nav.	-167 dBm
	Cold starts	-148 dBm
	Hot starts	-157 dBm
	Reacquisition	-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	
Moving base	For attitude sensing and heading applications	
Supported antennas	Active	

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 GEOFENCE status
Timepulse	Configurable: 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM v. 3.3, SPARTN v. 2.0

Package

54-pin LGA (land grid array)
17 x 22 x 2.4 mm

Environmental data, quality & 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	68 mA at 3.0 V (continuous)
Backup supply	1.65 V to 3.6 V

Related 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

u-blox support products provide reference design, and allow efficient integration and evaluation of u-blox positioning technology.

C099-F9P	u-blox ZED-F9P application board, with ODIN-W2 for connectivity. Includes multi-band antenna (ANN-MB). One board per package.

Product variants

ZED-F9P-01B	u-blox high precision GNSS module with rover and base functionality
ZED-F9P-02B	u-blox high precision GNSS module with SBAS support
ZED-F9P-04B	u-blox high precision GNSS module with SPARTN and CLAS support

Further information

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

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