Product Summary
ZED-F9P

u-blox F9 high precision GNSS module

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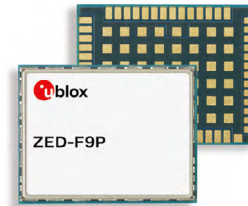**Multi-band receiver delivers centimeter-level accuracy in seconds**

- Concurrent reception of GPS, GLONASS, Galileo and BeiDou
- Multi-band RTK with fast convergence times and reliable performance
- High update rate for highly dynamic applications
- Centimeter accuracy in a small and energy-efficient module
- Easy integration of RTK for fast time-to-market

17.0 × 22.0 × 2.4 mm

Product description

The ZED-F9P positioning module features the new u-blox F9 receiver platform, which provides multi-band GNSS to high volume industrial applications in a compact form factor.

ZED-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.
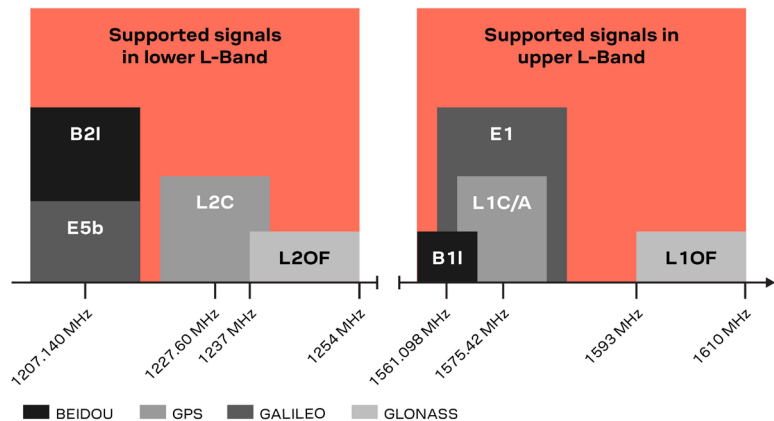
The ZED-F9P module is designed for easy integration and low design-in costs with minimal e-BOM. It is well-suited for mass market adoption, thanks to its small package size, light weight, and small power consumption.

ZED-F9P ensures the security of positioning and navigation information by using secure interfaces and advanced jamming and spoofing detection technologies.

ZED-F9P offers support for a range of correction services allowing each application to optimize performance according to the application's individual need. 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 can be upgraded to support future SSR-type correction services suitable for mass market penetration.

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".

Supported signals in lower L-Band

B2I
E5b
L2C
L2OF

1207.140 MHz
1227.60 MHz
1237 MHz
1254 MHz

Supported signals in upper L-Band

E1
L1C/A
B1I
L1OF

1561.098 MHz
1575.42 MHz
1593 MHz
1610 MHz

■ BEIDOU   ■ GPS   ■ GALILEO   ■ GLONASS

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)	RTK base station	Carrier phase output	Additional SAW	Timepulse	Standard	Professional	Automotive
ZED-F9P		●			●	●	●	●	4		●	2	●	●	●	●	●	●	●	1		●	

u-blox

ZED-F9P

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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 L2C	
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
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	

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
Timepulse	Configurable: 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM version 3.3

Electrical data

Supply voltage	2.7 V to 3.6 V
Power consumption	68 mA @ 3.0 V (continuous)
Backup supply	1.65 V to 3.6 V

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)	
ETSI-RED compliant	
Qualification according to ISO 16750	
Manufactured and fully tested in ISO/TS 16949 certified production sites	
High vibration and shock resistance	

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	u-blox F9 high precision GNSS module with rover and base 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.