



Product summary

ZED-F9R module

Fully integrated high precision sensor fusion solution



Professional

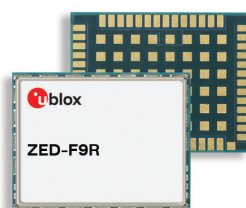


Automotive

High precision sensor fusion for ultimate performance

- Continuous navigation in most challenging environments
- Low latency and high update rate for real time applications
- Fully integrated solution for fast time-to-market
- Fast RTK convergence times
- Full GNSS raw data support

17.0 × 22.0 × 2.4 mm



Product description

The ZED-F9R positioning module features the u-blox F9 receiver platform providing a reliable multi-band GNSS sensor fusion solution for industrial applications in a compact form factor. The wide bandwidth allows to receive many satellites in parallel, resulting in high availability of RTK solutions and quick convergence time.

The high performance sensor fusion module has an integrated inertial measurement unit (IMU) for RTK positioning. The sophisticated built-in algorithms fuse the IMU data, GNSS measurements, wheel ticks, correction data, and a vehicle dynamics model to provide optimal positioning accuracy where GNSS alone would fail.

The module operates under open sky, in the wooded countryside, in difficult multipath environments, and even in covered areas. Designed for autonomous industrial applications like agricultural machinery or heavy trucks, ZED-F9R is the ultimate solution for modern autonomous industrial applications where control and position availability are key to success.

The device is a turnkey self-contained solution, which provides the best possible performance: no latencies or similar system considerations to worry about. This eliminates the technical risk and effort of selecting and integrating RF components and third-party libraries such as precise positioning engines. ZED-F9R offers support for a range of correction services allowing each application to optimize performance according to the application's unique needs. ZED-F9R comes with built-in support for RTCM-formatted corrections, enabling high precision navigation using internet or satellite data connectivity.

The ZED-F9R 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". The ZED-F9R-00B professional grade module adheres to industrial standard quality specifications and production flow.

ZED-F9R

	ZED-F9R
Grade	
Automotive	
Professional	•
Standard	
GNSS	
GPS / QZSS	•
GLONASS	•
Galileo	•
BeiDou	•
Number of concurrent GNSS	4
Multi-band	•
Interfaces	
UART	2
USB	1
SPI	1
DDC (I2C compliant)	1
Features	
Programmable (flash)	•
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	•

T = TCXO

ZED-F9R module



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	Up to 30 Hz	
Position accuracy	RTK	< 0.2 m + 1 ppm CEP
ADR position error	< 2% of distance traveled without GNSS	
Convergence time	RTK	<10 s
Acquisition	Cold starts	24 s
	Aided starts	4 s
	Reacquisition	2 s
Built-in	TCXO, RTC, flash memory, 3D accelerometer, 3D gyroscope, diplexer, SAW filters	
Sensitivity	Tracking & nav. ¹	-160 dBm
	Cold starts	-147 dBm
	Hot starts	-158 dBm
Supported antennas	Active	

¹ Limited by firmware for best DR performance

Software features

Assistance	AssistNow Online OMA SUPL & 3GPP compliant	
Anti-jamming	Active CW detection and removal Onboard band pass filter	
Anti-spoofing	Advanced anti-spoofing algorithms	
Raw data	Carrier phase, Code phase, Pseudoranges, IMU data output	
Protocols	NMEA, UBX binary, RTCM version 3.3	

Interfaces

Serial interfaces	2 UART 1 USB 1 SPI (optional) 1 DDC (I2C compliant)	
Digital I/O	Configurable timepulse	
Timepulse	Configurable: 0.25 Hz to 10 MHz	

Electrical data

Supply voltage	2.7 V to 3.6 V	
Power consumption	85 mA at 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 (lead-free, 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		
Uses u-blox F9 chips qualified according to AEC-Q100		

Support products

C102-F9R	Easy to use evaluation board with various communication interfaces
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Product variants

ZED-F9R-00B	u-blox F9 dual band GNSS module with high precision sensor fusion
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Further information

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

For more product details and ordering information, see the [product data sheet](#).

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