



DL1612M9





Dalang Communication Technology Co., Ltd Product Specification

Product Name:	GNSS module
Product Model:	DL1612M9
Version Number:	V 1.0
Revision Date:	2024.06.12

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Shenzhen Dalang Communication Technology Co., Ltd

1 Product Application Scenarios

The DL1612M9 module uses the advanced u-blox M9 GNSS chip, providing excellent sensitivity, fast signal acquisition, and support for all L1 GNSS systems. It offers meter-level accuracy and can simultaneously receive signals from four GNSS systems, enhancing positioning accuracy in complex environments like urban canyons. The module features interference and spoofing detection, advanced filtering to mitigate RF interference, and integrates LNA and SAW filters for stable operation even in strong RF interference environments. See Figure 1 for details.



Figure 1 Product Application Scenarios

2 Features

In this chapter, we will delve into and comprehensively elaborate on the functionalities and operating principles of the DL1612M9, detailing how it plays a pivotal role in various applications as follows:

1. Simultaneous reception of signals from four GNSS constellations, ensuring excellent positioning accuracy.
2. Advanced spoofing and interference detection features.
3. Superior RF interference suppression capabilities.
4. Pin compatibility with previous NEO series products.

3 Structural Characteristic

In this section, we will thoroughly present and analyze the design details of the product, depicting its exterior features through comprehensive imagery. This view offers a holistic perspective, facilitating an understanding of the product's architecture. Refer to Figure 2, Figure 3, Table 1.

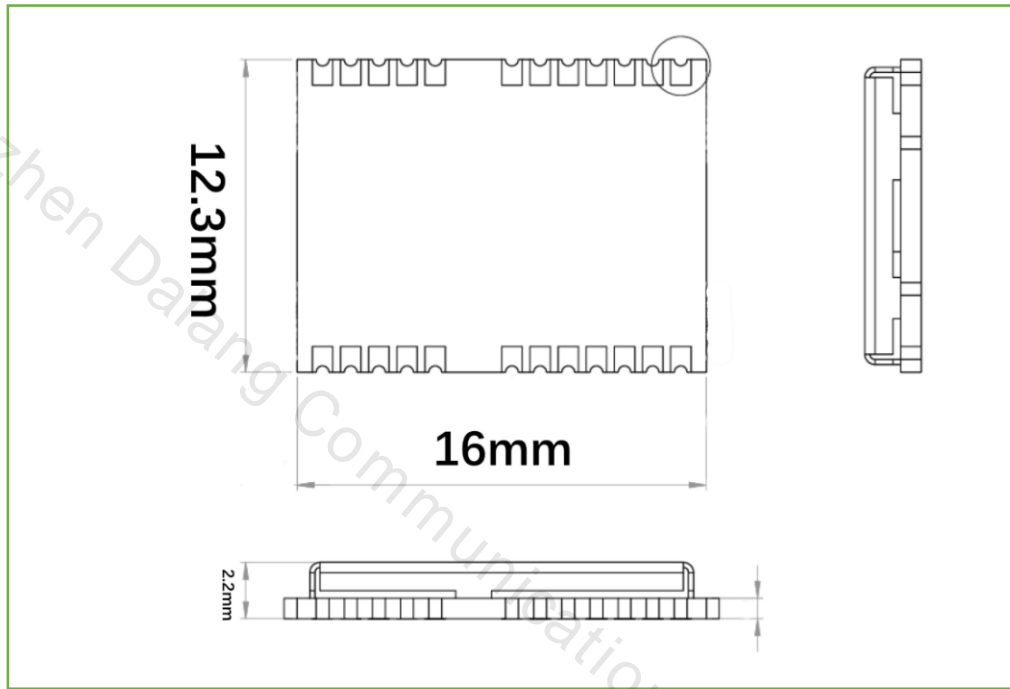


Figure 2 Dimensional Drawing (in millimeters)

13	GND	GND	12
14	LNA_EN	RF_IN	11
15	Reserved	GND	10
16	Reserved	VCC_RF	9
17	Reserved	RESET_N	8
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18	SDA / SPI CS_N	V_USB	7
19	SCL / SPI SLK	USB_DP	6
20	TXD / SPI MISO	USB_DM	5
21	RXD / SPI MOSI	EXTINT	4
22	V_BCKP	TIMEPULSE	3
23	VCC	D_SEL	2
24	GND	SAFEBOOT_N	1

Figure 3 Pin Function Diagram

Table 1 Pin Function Definitions

NO.	NAME	I/O	DESCRIPTION
1	SAFEBOOT_N	I	SAFEBOOT_N (used for FW updates and reconfiguration, leave open)
2	D_SEL	I	Interface select (open or VCC UART +12C: GND SPI)
3	TIMEPULSE	O	TIMEPULSE (1 PPS)
4	EXTINT	I	EXTINT (PIO 7)
5	USB_DM	I/O	USB data (DM)
6	USB_DP	I/O	USB data (DP)
7	V_USB	I	USB supply
8	RESET_N	I	RESET (active low)
9	VCC_RF	O	Voltage for external LNA
10	GND	I	Ground
11	RF_IN	I	GNSS signal input
12	GND	I	Ground
13	GND	I	Ground
14	LNA_EN	O	Antenna/LNA control
15	Reserved	-	Reserved
16	Reserved	-	Reserved
17	Reserved	-	Reserved
18	SDA/SPICS_N	I/O	12C data if D_SEL VCC (or open): SPI chip selects if D_SEL GND
19	SCL/SPI SLK	I/O	12C clock if D_SEL VCC (or open); SPI clock if D_SEL GND
20	TXD/SPI MISO	O	UART output if D_SEL VCC (or open); SPI MISO if D_SEL GND
21	RXD/SPI MOSI	I	UART input if D_SEL VCC (or open): SPI MOSI if D_SEL GND
22	V_BCKP	I	Backup voltage supply
23	VCC	I	Supply voltage
24	GND	I	Ground

4 Specifications

In this section, we will provide a detailed list and explanation of the product's chip features, sensitivity, accuracy, operating principles, and other technical details, as detailed in Table 2.

Table 2 Product Specifications

Chip characteristics	Chip	UBX-M9140-KB
	Operating Frequency	GPS L1 C/A, QZSS L1 C/A/S, GLONASS L10F BeiDou B1I, Galileo E1B/C SBAS L1 C/A: WAAS,EGNOS,MSAS, GAGAN
	Reception Channels	92 channels, u-blox M9 engine
Sensitivity	Tracking	-167 dBm
	Reacquisition	-160 dBm
	Cold Start	-148 dBm
	Hot Start	-159 dBm
Time to First Fix (TTF)	Cold Start	24s
	Hot Start	2s
	Reacquisition	2s
Accuracy	Horizontal Accuracy	1.5m CEP (with SBAS)
		2.0m CEP (without SBAS)
	Velocity Accuracy	0.2m/s
	Pulse Per Second (PPS) Accuracy	RMS: 30ns
99% : 60ns		
Output Data	Baud Rate	38400bps (default)
	Output Interface	TTL
	Output Protocol	NMEA0183
	Update Rate	Default 1Hz(Up to 25 Hz (4 concurrent GNSS))
	Carrier Phase Output	Supported, outputs RAWX sentences
	FLASH	Built-in
Environment	Operating Temperature	-40°C-85°C
	Storage Temperature	-40°C-85°C
Electrical Specifications	Operating Voltage	2.7V-3.6V DC
	Power Consumption	<100mW
Physical Parameters	Dimensions	16*12.3*2.2mm
	Weight	2g

5 Product Photos

In this chapter, we will showcase real-life images of the product, as shown in Figure 4. These images provide a detailed view of our product from various angles and perspectives. We believe that through authentic representation, we can better convey the value and concept of the product, thereby enhancing your trust and satisfaction.



Figure 4 Product Images