GM-8018, u-blox M9 NEO-M9V-Based GNSS Smart Antenna Module w/ 50Hz Update Rate Support

RoHS Compliant



Overview

Based on u-blox NEO-M9V, GM-8018 supports concurrent reception of four GNSS. The high number of visible satellites allows it to select the best signals. This maximizes the position **accuracy**, in particular under challenging conditions such as deep urban canyons.

In addition, it supports **UDR** (Untethered Dead Reckoning) with built-in accelerometer and gyroscope sensors.

After it is calibrated, DR (Dead Reckoning) allows navigation to start as soon as power is applied before GNSS fix is available. DR is particularly useful under poor signal conditions, where it brings continuous positioning in environments even during complete signal loss such as basement, parking garages, and tunnels.

GM-8018 can combine GNSS and DR measurements and compute a position solution at update rates of up to **50 Hz.** It is especially useful for timing-critical applications such as high speed racing. The typical GNSS only output is also available.

The all-in-one compact design allows **plug-n-play**. It is an easy to use, ultra-high performance, low power, industrial grade GNSS smart antenna module. USB or TTL/RS232 communication interfaces are available.

Applications

- Vehicle navigation
- Fleet management
- High speed racing

Features

- Based on u-blox NEO-M9V, supporting UDR
- 50-Hz fused (GNSS+DR) update rate support (by priority messages only)
- Concurrent multi-navigation systems support
  - GPS/Galileo/QZSS/SBAS/GLONASS/BeiDou
- SBAS (WAAS, EGNOS, MSAS, GAGAN) support
- QZSS L1S SLAS (Sub-meter Level Augmentation Service) support
- Sensitivity w/ GPS+GLONASS+Galileo+BeiDou
  - Acquisition: -147dBm
  - Tracking & navigation: -159Bm
- Assisted GNSS support, AssistNow Online
- RF interference and jamming detection and reporting
- Spoofing detection and reporting
- Electrical interface support: USB, RS232, TTL
- Backup battery support for faster position fix
- LED for position fix indication
- Windows location sensor support
- Linux/Android support
- Fully EMI shielded
- Industrial operating temperature range: -40 ~ 85℃

Technical Specifications

Receiver Performance Data+

Receiver Type	92-channel u-blox M9 engine GPS L1 C/A, SBAS L1 C/A,

NaviSys Technology Corp.
Tel : +886-3-5632598
Sales contact: sales@navisys.com.tw
Address: 2F, No.56, Park Ave. II, Hsinchu Science Park, Hsinchu, 30844, Taiwan (R.O.C.)
https://www.navisys.com.tw/
Fax: +886-3-5632597
Technical support: service@navisys.com.tw

	QZSS L1 C/A/S Galileo E1 B/C L1, E1: 1575.42MHz, GLONASS: L1OF:1598.0625~1605.375MHz BeiDou BI1: 1561.098 MHz
SBAS Support	WAAS, EGNOS, MSAS, GAGAN
Position Accuracy (CEP, 50%)	1.5m Horizontal 3m Vertical (Open sky with SBAS and QZSS enabled, -130dBm, >6 SVs)
Velocity Accuracy	0.08 m/s (speed) (68%@30m/s)
Dynamic Attitude Accuracy	0.3° Heading 0.4° Pitch 0.6° Roll (68%@30m/s)
Position Error w/o GNSS, 3Km travel	10% distance travelled w/ UDR
Time Pulse Signal Accuracy	RMS 30 ns 99% 60ns
Time Pulse Frequency	0.25 Hz ~ 10 MHz
Time To First Fix (TTFF) Hot start Cold start	Autonomous, GPS + GLONASS + Galileo + BeiDou 2 sec 24 sec (50% -130dBm)
Sensitivity (Autonomous)	GPS+GLONASS+Galileo+BeiDou -147dBm (acquisition) -159dBm (tracking & navigation)
Navigation. Update Rate	0~50Hz; Default: ● 50Hz: RMC GGA, ● 1Hz: VTG, GLL, GSA, GSV

Max. Altitude	80,000 m
Max. Velocity	< 500m/sec or 1,800 km/hr
Max. Dynamics	≦ 4 g
Protocol Support	NMEA 4.11 (default), 4.10, 4.0, 2.3, and 2.1. UART N,8,1; 4800~921600 bps, default: 115200 bps Priority NMEA, up to 50Hz: RMC, VTG, GNS, GGA, GLL Non-priority NMEA, up to 20Hz: GSA, GSV, GST, ZDA

+: according to GNSS IC spec

Electrical Data

Power Supply	3.3 ~ 5.5 VDC
Power Consumption	52mA/average tracking (USB)
Protocols	NMEA, u-blox Binary

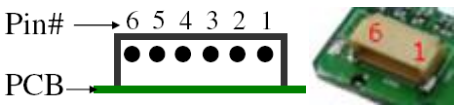
Environmental Data

Operating temperature	-40 ~ 85℃ except battery: -20~60℃
Storage temperature	-40 ~ 85℃ except battery: -20~60℃
Operating humidity	5% ~ 95% non-condensing

Other Data

Dimension (mm)	30 x 30 x 9.5
Weight	14g
LED	Amber

6-pin W2B Interface, pitch 1.0mm

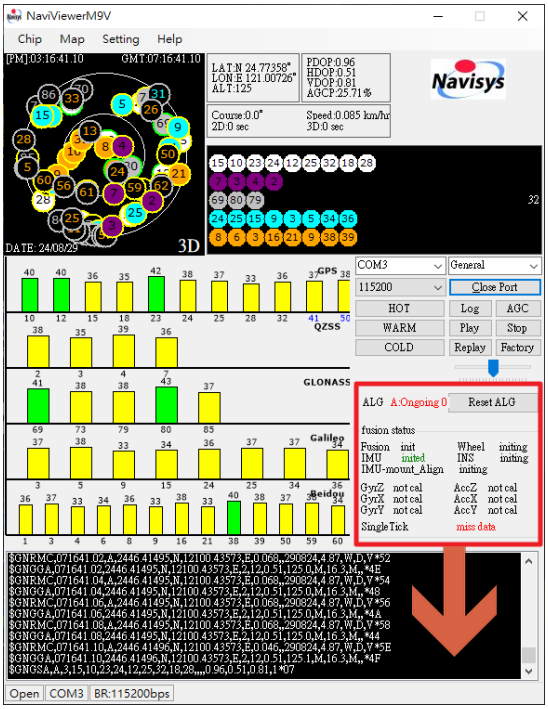


Application

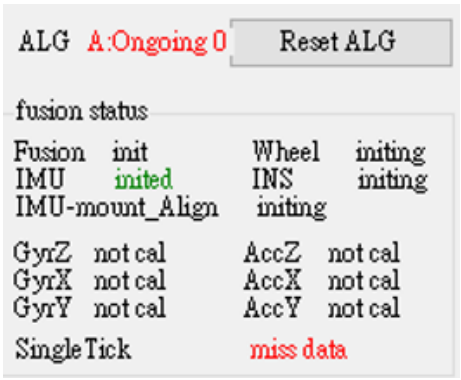
The accuracy of the 50Hz position update is enhanced

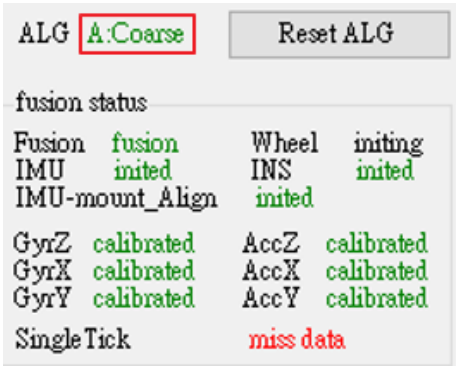
with the help of UDR. Before using it, UDR calibration is strongly suggested as described below.

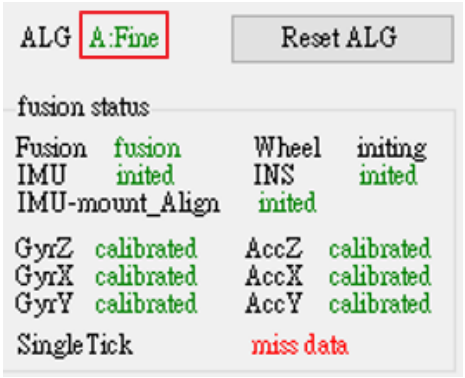
- Drive to an open area, such as a parking lot, with good GNSS signal conditions. Stay stationary until a reliable GNSS fix can be achieved for at least 3 minutes.
- Drive a figure-of-eight pattern 3 times, or equivalently do a series of approximately 10 left and right turns (at least 90 degrees), at a minimum speed of 30 km/h.
- Drive straight for at least 100 meters at a minimum speed of 40 km/h.
- If do the test with NaviViewerM9V,



one can see the calibration status transitions similar to below.







Road Test

Thanks to the 50Hz high update rate, the details of a turn curve is clearly presented as shown by picture below.



Indicative Indoor UDR Test

Drive into the indoor MingChih parking tower. Drive up to second floor along the outer rectangle and then drive down along the inner rectangle as shown by picture below. Length of indoor path is about 400m. The indoor log path roughly matches the real path with a few deviations because of error introduced by travelling.



Ordering Information

Pin	GM-8018R	GM-8018T	GM-8018U
1	GND	GND	VDD 5V
2	VCC	VCC	D-
3	TX-RS232	TXD-TTL	D+
4	RX-RS232	RXD-TTL	GND
5	1PPS-TTL	1PPS-TTL	-
6	-	-	-

Pin	Name	Function	I/O
1	GND VDD 5V	Ground USB 5V power supply	Input
2	VCC D-	Non-USB power supply USB D-	Input I/O
3	TXD-TTL TX-RS232/ D+	TTL level serial data out from GPS RS232 level serial data out from GPS USB D+	Output Output I/O
4	RXD-TTL RX-RS232	TTL level serial data into GPS RS232 level serial data into GPS	Input Input
5	1PPS-TTL	TTL level 1PPS signal	Output
6	-	-	-

* MOQ-based customizations are welcome.

* For non-standard demand (baud rate, update rate etc.), please specify them when ordering.

*This document is subject to change without notice.

NaviSys Technology Corp. https://www.navisys.com.tw/
Tel : +886-3-5632598 Fax: +886-3-5632597
Sales contact: sales@navisys.com.tw Technical support: service@navisys.com.tw
Address: 2F, No.56, Park Ave. II, Hsinchu Science Park, Hsinchu, 30844, Taiwan (R.O.C.)