GR-950, u-blox M9 NEO-M9V-Based MDR GNSS Smart Antenna w/ 50Hz Update Rate Support

RoHS Compliant



Overview

Based on u-blox NEO-M9V, GR-950 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 MDR (Multi-mode Dead Reckoning) – UDR (Untethered Dead Reckoning with built-in accelerometer and gyroscope sensors) + ADR (Automotive Dead Reckoning). If ADR is absent, it falls back to UDR only mode automatically.

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.

GR-950 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.

Support ADR signals of WT (Wheel Ticks) and DIR (Direction) from a 4-wheel vehicle directly saves adopters efforts of handling these signals. 12/24VDC-compliant power source allows power supply from vehicle directly.

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. USB or TTL/RS232 communication interfaces are available.

Applications

- Vehicle navigation
- Fleet management
- High speed racing

Features

- Based on u-blox NEO-M9V, supporting ADR+UDR
- Fallback to UDR automatically if ADR is absent
- Support of ADR signals from vehicle directly
- 12VDC/24VDC power source-compliant
- 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
- Connector: PS2, Microfit, RJ45, DB9, USB etc.

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- Cable length: 0.1m ~ 15m.
- Backup battery support for faster position fix
- LED for position fix indication
- IPX7 Waterproof
- Built-in magnet
- 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, 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	2% distance travelled w/ UDR+ADR 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: 1Hz
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	4.5 ~ 32 VDC
Power Consumption	52mA/average tracking (USB)
Protocols	NMEA, u-blox Binary

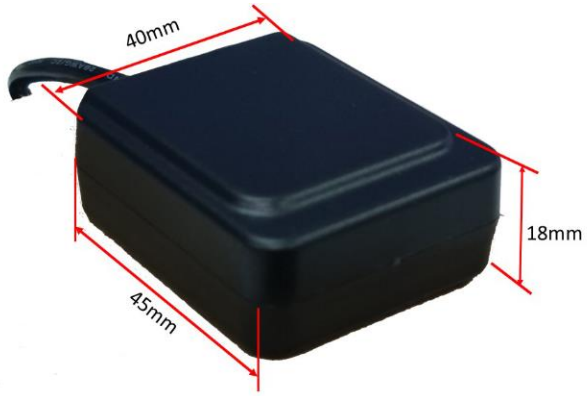
Environmental Data

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

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Waterproof	IPX7

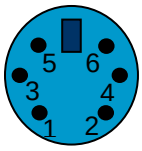
Dimension (mm): 40 x 45 x 18



Other Data

Cable Length (Default)	1.5m for GR-950U 3m for GR-950R 1m for GR-950T
LED	Amber

Interfaces

GR-950Q/R/S/T	GR-950U
	
	
Mini-Din 6-pin PS/2, Male Plug	USB Type A, Male Plug

Ordering Information

Pin	GR-950Q	GR-950R	GR-950S	GR-950T	GR-950U
1	GND	GND	GND	GND	VDD 5V
2	VCC	VCC	VCC	VCC	D-
3	TX-RS232	TX-RS232	TXD-TTL	TXD-TTL	D+
4	RX-RS232	RX-RS232	RXD-TTL	RXD-TTL	GND
5	WT	1PPS-RS232	WT	1PPS-TTL	-
6	DIR	-	DIR	-	-

Pin	Name	Function	I/O
1	GND	Ground	Input
	VDD 5V	USB 5V power supply	
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	WT 1PPS-RS-232[&] 1PPS-TTL	Wheel tick ADR signal from vehicle, grounded with Pin 1; Leave it open if not used. RS-232 level 1PPS signal TTL level 1PPS signal	Input Output Output
6	DIR	Direction ADR signal from vehicle, grounded with Pin 1; Leave it open if not used.	Input

* MOQ-based customizations are welcome.

[&] Please be noted that the RS232 line transceiver would introduce 0.3 us pulse skew to the 1PPS signal of RS232 model

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

*This document is subject to change without notice.

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