GR-M02, L1/L5 Dual-band GNSS, Concurrent 4-Satellite Navigation Systems, Supporting NavIC

RoHS Compliant



Overview

Based on the AG3335 chip by 12nm technology, GR-M02 is able to track signals from all civil navigation systems, i.e. GPS, GLONASS, GALIELO, BEIDOU, QZSS, and NavIC. With plenty of visible satellites, better fixing geometry and by using good signals both help to achieve better accuracy. In addition, it also tracks L1 and L5 bands simultaneously which allows canceling out errors introduced when signals pass through the ionosphere and troposphere. This results in higher accuracy compared to single-band GNSS. Thanks to these characteristics, positioning becomes easy and more accurate even in the typical GPS difficult environments.

The exceptional performance is carried out by the well-designed antenna, LED, connector, all circuits necessary for dual-band positioning, and the IPX7 housing.

This compact GR-M02 is a plug-and-play GNSS smart antenna allowing you to enjoy high performance GNSS function with minimum adoption efforts.

Applications

- Navigation (autos, trains, boats, pedestrians etc.)
- ELD (Electronic Logging Device)
- Timing (precise clock, FEMTO cell, traffic lights etc.)

Features

- Based on the 12nm technology AG3335 chip
- 135 channels, tracks all civil navigation systems
- Concurrent tracking of positioning satellites
  - L1/L5 dual-band
  - Multi-constellation: GPS, GLONASS, Galileo, BEIDOU, QZSS, NavIC.
  - SBAS ranging (WAAS, EGNOS, MSAS, GAGAN)
- SLAS (Sub-meter Level Augmentation) support in Japan
- High performance: -165dBm tracking sensitivity
- Support of smart jammer detection on GPS, GLONASS, Galileo, BEIDOU bands.
- 12 multi-tone AIC (active interference canceller) in both L1/L5 bands for removing unwanted signals.
- Indoor and outdoor multi-path detection and compensation
- PPS of ±10ns accuracy with adjustable duty cycle
- Up to 10Hz update rate
- RTCM ready (v2.3 and v3.3)
- AGPS/AGNSS
  - EPO™ (Extended Prediction Orbit)
  - EASY™ (Embedded Assist System) self-generated orbit prediction
- LOCUS™ logger function
- All-in-one, plug-n-play dual-band smart antenna
  - Built-in L1/L5 dual-band G3B= GNSS antenna
  - Connector, cable length could be customized
  - Built-in LED for position fix indication
  - UART/RS232/USB option
  - Backup battery option

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- IPX7 Waterproof
- Built-in magnet
- Fully EMI shielded
- Industrial operating temperature range: -40 ~ 85℃

Note: ™ Airoha trade mark

*G3B: GPS, GLONASS, GALILEO, and BEIDOU

Technical Specifications

Receiver Performance Data+

Receiver Type	135 channels, L1: 1602 MHz: GLONASS:L1OF 1575.42 MHz GPS & QZSS: L1 C/A SBAS: L1 QZSS L1 SAIF Galileo: E1 (E1B+E1C) 1561.098 MHz BEIDOU B1I L5: 1176.45 MHz GPS & QZSS: L5 Galileo: E5a BEIDOU: B2a NAVIC SPS
Horizontal Position Accuracy	1.5m (L1+L5 dual-band) (50% 24hr static, -130dBm)
Vertical Position Accuracy	2.25m (L1+L5 dual-band) (50% 24hr static, -130dBm)
Velocity Accuracy	<0. 05 m/s (speed, autonomous) (50%@30m/s)
Time Pulse Signal Accuracy	± 10 ns clear sky, 1-sigma
Time To First Fix Hot start Warm start	Autonomous (50% -130dBm) 1sec 24sec
Cold start	24sec
Sensitivity (Autonomous)	Acquisition: -148dBm Tracking: -165dBm
Max. Update Rate	10Hz (default 1Hz)
Max. Altitude	<18,000 m
Max. Velocity	<1,852 km/hr
Protocol Support	NMEA V3.01 & V4.10 GGA, GSA, GSV, RMC, VTG UART: N-8-1 38400/115200(default)/921600bps Proprietary PAIR command Proprietary Binary sentence
SBAS Support	WAAS, EGNOS, MSAS,GAGAN
AGPS/AGNSS	● EPO data: GPS, GLONASS ● QEPO data: GPS, GLONASS, GALILEO, BEIDOU ● EASY: GPS
Dynamics	<4g

+ Note. According to IC Spec

Electrical Data

Power Supply (VCC)	3.3 ~ 5 V (TTL, RS232) 4.5 ~ 5.5 V (USB)
Power Consumption	94mA/average tracking, 77-SV in fix
Backup Power (V_BAT)	2~5 V
TTL I/O	V_{IH}: 2~3.15V, V_{IL}: 0~0.8V V_{OH}: >2.1V, V_{OL}< 0.72V

Environmental Data

Operating temperature	-40 ~ 85℃ w/o battery -20~60℃ w/ battery
Storage temperature	-40 ~ 85℃w/o battery -40~60℃ w/ battery
Operating humidity	5% ~ 95% non-condensing
Waterproof	IPX7

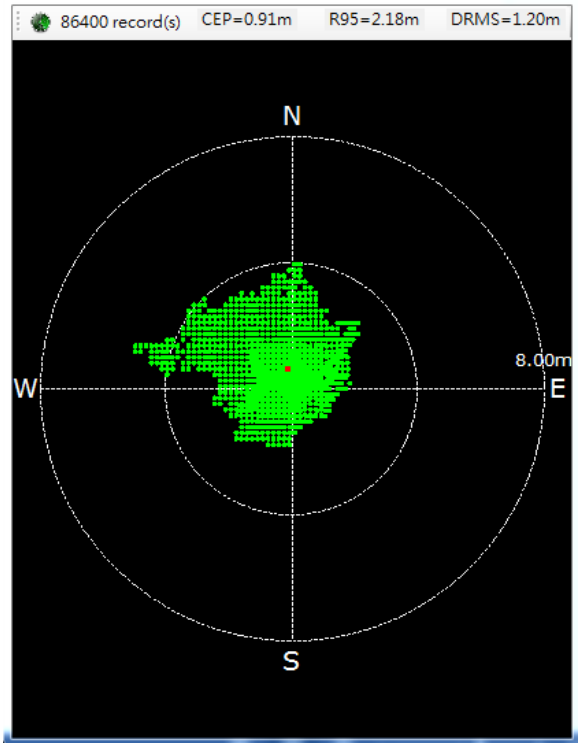
Mechanical Data (mm)

40 x 45 x 18.5

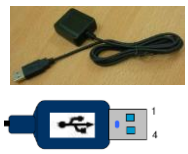


Indicative Accuracy

24 hour static scatter plot (w/ indoor repeater)



Interfaces/ Ordering Information%

GR-M02P/Q/R/T	GR-M02U/W
	
Mini-Din 6-pin PS/2 Male Plug	USB type A, Male Plug

Pin	GR-M02P	GR-M02Q	GR-M02R	GR-M02T	GR-M02U/W
1	GND	GND	GND	GND	VDD 5V
2	VCC	VCC	VCC	VCC	D-
3	TX-RS232	TX-RS232	-	TXD-TTL	D+
4	RX-RS232	RX-RS232	RX-RS232	PWR_CTL	GND
5	1PPS-TTL	1PPS-RS232&	TX-RS232	1PPS-TTL	-
6	-	-	-	RXD-TTL	-

& Please be noted that the RS232 line transceiver would introduce 0.3 us pulse skew to the 1PPS signal.

The GR-M02W makes PPS events visible to a compatible USB host system; they appear as DCD state changes to the PL2303 driver. Time precision will be limited by the USB polling interval, usually 0.5millisecond

% Customization of firmware/hardware are welcome.

* This document is subject to change without notice.

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