GM-M04: L1/L5 Dual-Band GNSS Smart Antenna Module with Compass Support & 4-Constellation Tracking



RoHS Compliant

Overview

Powered by the 12nm AG3335 platform, the GM-M04 supports all major civilian GNSS constellations — GPS, GLONASS, Galileo, BeiDou, QZSS, and NavIC — and further extends capability with an integrated Compass system on the module. With access to more satellites and improved geometry, the module delivers faster and more robust positioning. Its concurrent L1/L5 dual-band reception minimizes ionospheric and tropospheric errors, enabling significantly higher accuracy compared to single-band GNSS. These combined advantages ensure dependable performance even in environments where traditional GPS signals are challenged.

The GM-M04's exceptional performance is enabled by its carefully engineered antenna, integrated Compass module, status LED, robust connector, and optimized dual-band signal circuitry. Every component is designed to ensure stable reception and reliable operation across diverse environments. This compact GM-M04 is a true plug-and-play GNSS smart antenna module, allowing users to achieve high-performance dual-band positioning with minimal integration effort.

Applications

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

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

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- Up to 10Hz update rate
- RTCM ready (v2.3 and v3.3)
- AGPS/AGNSS
  - EPO™ (Extended Prediction Orbit) orbit prediction
  - EASY™ (Embedded Assist System) self-generated orbit prediction
- LOCUS™ logger function
- All-in-one, plug-n-play smart antenna module
  - Built-in L1/L5 dual-band G3B= GNSS antenna
  - Built-in wire-to-board digital connector
  - Built-in backup battery for faster position fix
  - Built-in LED for position fix indication
  - Built-in compass, MMC5983MA, (±8 Gauss, 3-axis)
- External backup power option via I/O pin is available for special application of high working temperature.
- Fully EMI shielded
- Industrial operating temperature range: -40 ~ 85℃

Note: ™ Airoha trade mark

=G3B: GPS/GLONASS/GALILEO/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 Cold start	Autonomous (50% -130dBm) 1sec 24sec 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

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Compass MMC5983MA

Full Range (Each Axis)	Total applied field: ±8 Gauss
Heading Accuracy	±1.0 degrees (using MEMSIC's proprietary software or algorithm)
Sensitivity Accuracy	16384 counts/Gauss With 18 bits operation

Ordering Information

GM-M04T

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply	Input
3	TXD-TTL	TTL level serial data output	Output
4	RXD-TTL	high/floating: ON, low: OFF	Input
5	I2C_SCL	I2C clock of compass	Input
6	I2C_SDA	I2C data of compass	I/O

* This document is subject to change without notice.

Electrical Data

Power Supply (VCC)	3.3 ~ 5 V (TTL)
Power Consumption (average tracking, 77-SV in fix)	56mA (TTL)
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

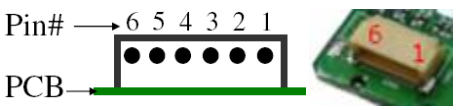
Environmental Data

Operating temperature	-40 ~ 85℃, w/o battery -20~60℃, with battery
Storage temperature	-40 ~ 85℃, w/o battery -40~60℃, with battery
Vibration	5Hz to 500Hz, 5g
Shock	Half sine 30g/11ms

Others

Dimension	30*30*11.8 mm^3
Weight	19.3g: GM-M04T

6-pin Interface, pitch 1.0mm



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