GM-M01, Concurrently Track All Civil Navigation Systems, GPS/GNSS Smart Antenna Module

RoHS Compliant



Overview

Based on the AG3335 chip by 12nm technology, GM-M01 is able to concurrently track signals from all civil navigation systems, i.e. GPS, GLONASS, GALILEO, BEIDOU, QZSS, and SBAS. Thanks to this capability, big number of satellites are visible, positioning becomes easy and accurate even in the typical GPS difficult environments.

GM-M01 is an all-in-one GNSS smart antenna module that includes antenna, backup battery, LED, connector, and all circuits necessary for G3B high quality positioning.

In this small dimension, it also supports different communication options such as TTL, RS232, and USB.

=G3B: GPS/GLONASS/GALILEO/BEIDOU

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
  - Multi-constellation: GPS, GLONASS, GALILEO, BEIDOU, QZSS, SBAS
  - SBAS ranging (WAAS, EGNOS, MSAS, GAGAN)
- SLAS (Sub-meter Level Augmentation Service) 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) 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) orbit prediction
  - EASY™ (Embedded Assist System) self-generated orbit prediction
- LOCUS™ logger function
- All-in-one, plug-n-play smart antenna module
  - Built-in 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 UART/RS232 option
- 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℃

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Note: ™ Airoha trade mark

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
Horizontal Position Accuracy	2.5m (50% 24hr static, -130dBm)
Vertical Position Accuracy	3.75m (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
	9600(default)/38400/115200bps 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 (Average Tracking)	45mA/RS232, 50 SVs used 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

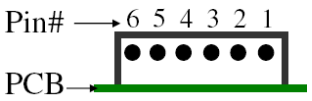
Environmental Data

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

Mechanical Data (mm)

30 x 30 x 9.8

6-pin Interface, pitch 1.0mm



Ordering Information

GM-M01R

Pin	Name	Function	I/O
1	GND	Ground	Input

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2	VCC	Power supply	Input
3	TXD-TTL	TTL level serial data output	Output
4	RX-RS232	RS232 level serial data input	Input
5	TX-RS232	RS232 level serial data output	Output
6	RXD-TTL	TTL level serial data input	Input

GM-M01T

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply	Input
3	TXD-TTL	TTL level serial data output	Output
4	PWR_CTRL	Power control, high/floating: ON, low: OFF	Input
5	1PPS-TTL	Pulse Per Second signal	Output
6	RXD-TTL	TTL level serial data input	Input

GM-M01P

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply	Input
3	TX-RS232	Serial data output	Output
4	RX-RS232	Serial data input	Input
5	1PPS-TTL	Pulse Per Second signal	Output
6	NC	No connection	-

GM-M01Q

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply	Input
3	TX-RS232	Serial data output	Output
4	RX-RS232	Serial data input	Input
5	1PPS-RS232 &	Pulse Per Second signal	Output
6	NC	No connection	-

GM-M01U/W

Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply	Input
3	D+	USB D+	I/O
4	D-	USB D-	I/O
5	NC	No connection	-
6	NC	No connection	-

Note. W connects DCD to 1PPS while U doesn't.

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

* This document is subject to change without notice.

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