GM-M52, Concurrently Track All Civil Navigation Systems, GPS/GNSS Smart Antenna Module

RoHS Compliant



Overview

Based on the AG3352 chip, GM-M52 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-M52 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

- FCC AFC for Wi-Fi 6E AP
- Navigation (autos, trains, boats, pedestrians etc.)
- ELD (Electronic Logging Device)
- Timing (precise clock, NTP time server, traffic lights etc.)

Features

- Based on AG3352 chip
- Tracks all civil navigation systems
- Concurrent tracking of positioning satellites[1]
  - Multi-constellation: GPS, GLONASS, GALILEO, BEIDOU, QZSS, SBAS
  - SBAS ranging (WAAS, EGNOS, MSAS, GAGAN, BDSBAS)
- SLAS (Sub-meter Level Augmentation Service) support in Japan
- High performance: -165dBm tracking sensitivity
- Smart jammer detection and suppression 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 for faster position fix
  - 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

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- Industrial operating temperature range: -40 ~ 85℃

Note: ™ Airoha trade mark

! Because of positioning algorithm, it is normal if there is no SV for some satellite system at the beginning.

Technical Specifications

Receiver Performance Data+

Receiver Type	AG3352 L1: 1602 MHz: GLONASS:L1OF 1575.42 MHz GPS & QZSS: L1 C/A SBAS: L1 QZSS L1 SAIF Galileo: E1 (E1B+E1C) BeiDou B1C 1561.098 MHz BEIDOU B1I Note: Only support BeiDou B1C at GNSS "GPS+BeiDou" Mode.
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 <25sec <25sec
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 9600/38400/115200(default)bps Proprietary PAIR command Proprietary Binary sentence
SBAS Support	● WAAS, EGNOS, MSAS, GAGAN,
AGPS/AGNSS	● EPO data: GPS, GLONASS, Galileo, Beidou ● EASY: GPS ● NVRAM auto saving
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)	34mA/TTL 37mA/RS232 75mA/USB, 26~36 SVs used in fix
Backup Power (V_BAT)	2~3.63 V
TTL I/O	V_{IH}: 2~3.3V, V_{IL}: 0~0.8V V_{OH}: ≥2.4V, V_{OL}≤ 0.4V

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

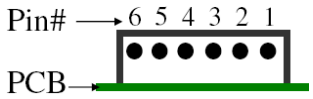
Others

Dimension	30*30*9 .8mm^3
Weight	13.3 g: GM-M52 (TTL) 13.4 g: GM-M52R (RS232) 13.5 g: GM-M52U (USB)

& 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.

6-pin Interface, pitch 1.0mm



Ordering Information

GM-M52R

Pin	Name	Function	I/O
1	GND	Ground	Input
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-M52T

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-M52P

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-M52Q

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-M52U/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.

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