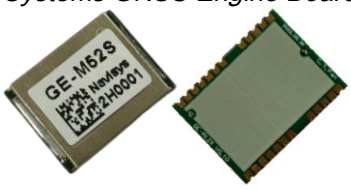
GE-M52, GNSS Engine Board, Concurrently Track All Civil Navigation Systems,

RoHS Compliant



Overview

Based on the Airoha AG3352 chip, GE-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, positioning becomes easy even in the typical GPS difficult environments.

To simplify the RF design, GE-M52N allows direct connection of passive patch antenna without additional gains added. GE-M52S supports external active antenna.

Applications

- AFC (Automatic Frequency Coordination)
- Timing (precise clock, FEMTO cell, traffic lights etc.)
- Navigation (autos, trains, boats, pedestrians etc.)
- Tracking (tracker, racing cars etc.)

Features

- Based on AG3352 chip
- Tracks all civil navigation systems
- Concurrent tracking of positioning satellites
  - 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
- 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
- Allows passive antenna connection
- Fully EMI shielded
- 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) 1561.098 MHz BEIDOU B1I, B1C Note: Only support BeiDou B1C at GNSS “GPS+BeiDou” Mode.

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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 38400/115200/921600bps 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±0.3 V
Power Consumption	22mA/average tracking
Backup Power (V_BAT)	1.62~3.63 V
TTL I/O (at VCC = 3.3V)	V_{IH}: 2~3.3V, V_{IL}: 0~0.8V V_{OH}: ≥2.4V, V_{OL}≤ 0.4V

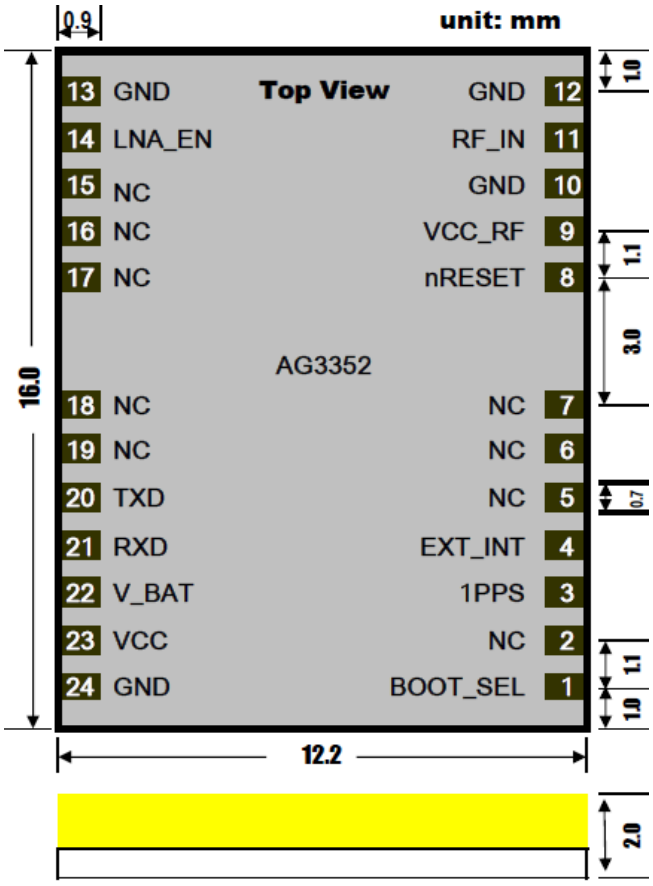
Environmental Data

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

Mechanical Data (mm)

12.2 x 16.0 x 2.0

24-pin Interface,



Pin	Name	Function	I/O
1	BOOT_SEL	To download flash, pull low when power on. Leave this pin open as it is not used.	Input
2	NC	No connection	-
3	1PPS	One pulse per second,	Output
4	EXT_INT	External interrupt	Input
5	NC	No connection	-
6	NC	No connection	-

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7	NC	No connection	-
8	nRESET	Reset, active low	Input
9	VCC_RF	Antenna power supply. Leave it open if this pin is not used.	Output
10	GND	Ground	Input
11	RF_IN	GNSS signal from antenna	Input
12	GND	Ground	Input
13	GND	Ground	Input
14	LNA_EN	RF ON indication	Output
15	NC	No connection	-
16	NC	No connection	-
17	NC	No connection	-
18	NC	No connection	I/O
19	NC	No connection	I/O
20	TXD	UART TXD	Output
21	RXD	UART RXD	Input
22	V_BAT	Backup power input	Input
23	VCC	Power supply	Input
24	GND	Ground	Input

Ordering Information

GE-M52N, for patch antenna, default 9600bps

GE-M52S, for active antenna, default 115200bps

! Baud rate and output sentences are customizable.

* This **document** is subject to change without notice.

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