GE-M16, L1/L5 Multi-satellite Systems, GNSS Timing Engine Board

RoHS Compliant



Overview

Based on the AG3335 chip by 12nm technology, the GE-M16 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.

Survey-in mode is supported to get the accurate position before entering position hold timing mode. With known position, position hold timing mode could be entered directly. Delay compensation of up to ±0.1 second is allowed to compensate for long antenna running from higher location.

The industry leading 2 ns 1PPS accuracy allows it to be used in highly demanding timing applications such as 5G RU, Femtocell, Microcell, and base stations. It can serve as the backbone for communication networks, smart grid systems, military defense networks, data network centers, financial transaction systems, traffic control systems, video surveillance systems, and other systems requiring highly accurate time synchronization. It well meets the stringent demands of modern telecommunications and industrial infrastructure.

Applications

- Time synchronization
- 5G RU、Femtocell、Microcell、Base station
- High Speed Router
- Network Switch
- Financial Transaction System
- Traffic Control System
- Energy Control System
- Data Network Center
- Video Surveillance System
- Military Defense Network
- Smart Grid System

Features

- PPS of ±2ns accuracy with adjustable duty cycle
- Survey-in mode support
- Position hold mode support
- Cable delay compensation support
- Powered by Airoha AG3335A chip
- Concurrent tracking of positioning satellites
  - L1/L5 dual-band
  - Multi-constellation: GPS, GLONASS, GALILEO, BEIDOU, QZSS, NavIC
  - SBAS ranging (WAAS, EGNOS, MSAS, GAGAN)
- High performance: -165dBm tracking sensitivity
- Support of smart jammer detection on GPS, GLONASS, Galileo, BEIDOU bands.

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- 12 multi-tone AIC (active interference canceller) in both L1/L5 bands for removing unwanted signals.
- Indoor and outdoor multi-path detection and compensation
- 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
- External active antenna short circuit protection
- Fully EMI shielded
- Industrial operating temperature range: -40 ~ 85℃

Note: ™ Airoha trade mark

Technical Specifications

Receiver Performance Data+

Supported GNSS Constellations	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)
1PPS Time Pulse Signal Accuracy	± 2 ns clear sky, 1-sigma
Time To First Fix (TTFF) Hot start Aided 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

Electrical Data

Power Supply (VCC)	3 ~ 5 V
Power Consumption	52mA/average tracking

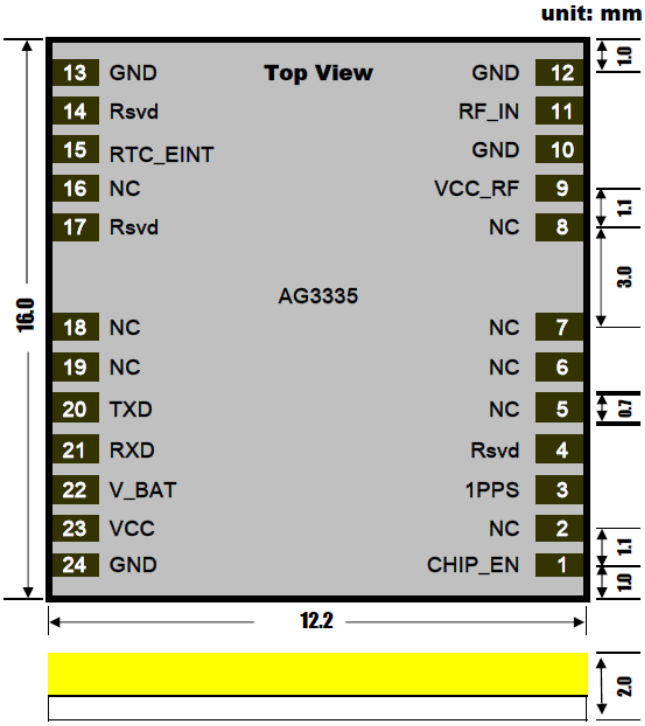
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Backup Power (V_BAT)	2~5 V
TTL I/O	V_{IH}: 1.75~3.1V, V_{IL}: -0.3~0.7V V_{OH}: ≧2.1V, V_{OL}≦ 0.35V

Environmental Data

Operating temperature	-40 ~ 85℃
Storage temperature	-40 ~ 85℃

Mechanical Data – 12.2x16.0x2.0 (mm)



24-Pin Definition

Name	PINs	Function	I/O
CHIP_EN	1	Pull low (0) to power OFF. Pull high (1) to power ON. Leave it open if this pin is not used.	Input
NC	2, 5, 6, 7, 8, 16, 18, 19	No Connection	-
1PPS	3	One pulse per second,	Output
VCC_RF	9	VCC antenna power supply option. Leave it open if this pin is not used.	Output
GND	10, 12, 13, 24	Ground	Input
RF_IN	11	GNSS signal from antenna	Input
RSVD	4,14,17	Reserved. Do not connect.	-
RTC_EINT	15	Pull high 1ms to wakeup it from the low power RTC mode. Leave it open if this pin is not used.	Input
TXD	20	UART TXD	Output
RXD	21	UART RXD	Input
V_BAT	22	Backup power input	Input
VCC	23	Power supply	Input

Indicative 1PPS Accuracy

- Comparing the 1PPS time difference of two GE-M16S over 24 hours: 1.32ns, 1-sigma.

Ordering Information

GE-M16X, X = S

Model	Description
GE-M16S	Standard, default 115200bps

*This document is subject to change without notice.

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