GN-5013 / GM-5014

Ultra-High Performance

GNSS Smart Antenna Module

Overview

GN-5013/GM-5014 is an easy to use, ultra-high performance, low power GNSS smart antenna module with patch antenna for vehicle/handheld applications. GN-5013/GM-5014 support multiple satellite positioning systems – GPS, GLONASS, Beidou, QZSS and SBAS.

Based on our experienced design, GN-5013/GM-5014 fully exhibits the excellent performance of MT3333 chip. It works in GNSS signal difficult environment, provides fast acquisitions and excellent tracking performance.

Applications

- Positioning
- Timing (GPS clock, FEMTO cell, traffic lights etc)
- DGPS (RTCM SC-104)

Features

- Multi-satellite positioning systems support
  - GPS/QZSS/GLONASS (GN-5013)
  - GPS/QZSS/Beidou (GM-5014)
- High performance: -165dBm tracking sensitivity
- Low power: 29 mA at continuous tracking
- SBAS (WAAS, EGNOS, MSAS, GAGAN) support
- Up to 3-day self-generated orbit predictions
- AGPS - up to 30-day orbit predictions from server
- 12 multi-tone active interference cancellers
- Indoor/outdoor multi-path detection & compensation
- Up to 10Hz update rate¹
- Optional high accuracy 1PPS timing

- Easy to use: built-in patch antenna & 6-pin wire to board connector w/ pitch of 1.0mm
- Optional RTCM support with 8-pin connector
- Optional support of I-PEX RF connector and w/o patch antenna
- Backup battery support for faster position fix
- Optional V_BAT pin support to replace backup battery
- Optional PWR_CTRL pin to disable GPS module
- Green LED for position fix indication
- Fully EMI shielded
- Industrial operating temperature range: -40 ~ 85°C

Notes

1. Some features need special firmware or command programmed by customer
2. MOQ-based customization is welcome.

Technical Specifications

<table>
<thead>
<tr>
<th>Receiver Type</th>
<th>GNSS Chipset: MT3333</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GPS/QZSS: L1 1575.42MHz</td>
</tr>
<tr>
<td></td>
<td>GLONASS (GN-5013):</td>
</tr>
<tr>
<td></td>
<td>L1OF 1598.0625 ~ 1605.375 MHz</td>
</tr>
<tr>
<td></td>
<td>BEIDOU (GM-5014):</td>
</tr>
<tr>
<td></td>
<td>B1 1561.098 MHz</td>
</tr>
<tr>
<td>Channels:</td>
<td>Tracking: 33 /acquisition: 99</td>
</tr>
</tbody>
</table>

| Horizontal Position | < 3.0m (Autonomous) | < 2.5m (WAAS) |
### GNSS Smart Antenna Module / GN-5013, GM-5014

**Accuracy**
- (50% 24hr static, -130dBm)
- <0.1 m/s (speed, w/o SBAS)
- <0.05 m/s (speed w/ SBAS)
  
- (50%@30m/s)

**Timing Accuracy**
- ±10ns RMS (1PPS output)

**Time To First Fix**
- Autonomous
- <1sec, average
- Warm start
- 24sec, average
- Cold start
- 28sec, average
- Reacquisition
- (50% -130dBm)

**Sensitivity**
- (-148dBm (acquisition))
- (-165dBm (tracking))

**Update Rate**
- Up to 10Hz, default 1Hz

**Max. Altitude**
- <18,000 m

**Max. Velocity**
- <1,852 km/hr

**Datum**
- WGS-84 (default)

**Protocol Support**
- NMEA 0183 V4.1, MTK NMEA 4800/9600 (default)/38400/115200 bps
- N,8,1 (No parity, 8 data bits, 1 stop bit);
- Default: GGA, GSA, RMC, VTG@1Hz, GSV@1/5Hz, GLL, ZDA@0Hz

**SBAS Support**
- WAAS, EGNOS, MSAS, GAGAN

**Dynamics**
- <4g

*Please contact Navisys for any customization demand.

### Electrical Data

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>3.3 ~ 5.5 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption</td>
<td>29mA/average tracking</td>
</tr>
<tr>
<td>Backup Battery</td>
<td>Nominal voltage: 3.0 V</td>
</tr>
<tr>
<td>TTL I/O</td>
<td>Vih: 2<del>3.15V, Vil: 0</del>0.8V</td>
</tr>
<tr>
<td>Voh: &gt;2.1V, VOL: &lt;0.72V</td>
<td></td>
</tr>
<tr>
<td>Protocols</td>
<td>NMEA, MTK NMEA</td>
</tr>
</tbody>
</table>

### Environmental Data

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>-40 ~ 85°C except battery: -20~60°C</th>
</tr>
</thead>
</table>

### Mechanical Data

- **Storage temperature**
  - 0°C ~ 85°C except battery: -40~60°C

- **Vibration**
  - 5Hz to 500Hz, 5g

- **Shock**
  - Half sine 30g/11ms

### 6-pin Interface, pitch 1.0mm

<table>
<thead>
<tr>
<th>Pin#</th>
<th>6 5 4 3 2 1</th>
</tr>
</thead>
</table>

**GN-5013R, GM-5014R:**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Function</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>Ground</td>
<td>Input</td>
</tr>
<tr>
<td>2</td>
<td>VCC</td>
<td>Power supply</td>
<td>Input</td>
</tr>
<tr>
<td>3</td>
<td>TXD-TTL</td>
<td>TTL level serial data output</td>
<td>Output</td>
</tr>
<tr>
<td>4</td>
<td>RX-RS232</td>
<td>RS232 level serial data input</td>
<td>Input</td>
</tr>
<tr>
<td>5</td>
<td>TX-RS232</td>
<td>RS232 level serial data output</td>
<td>Output</td>
</tr>
<tr>
<td>6</td>
<td>RXD-TTL</td>
<td>TTL level serial data input</td>
<td>Input</td>
</tr>
</tbody>
</table>

**GN-5013P, GM-5014P:**
### Pin Name Function I/O
1. GND Ground Input
2. VCC Power supply Input
3. 1PPS Time Pulse Per Second Output
4. RX-RS232 RS232 level serial data input Input
5. TX-RS232 RS232 level serial data output Output
6. PWR_CTL Power control; floating or high: ON Low : OFF Input

### Ordering Information
**GN-5013X, GM-5014X**

| X=R standard - patch: 25x25x4, 9600bps, N-8-1, GGA, GSA, RMC, VTG@1Hz, GSV@1/5Hz |

*This document is subject to change without notice.*