GM-5709, SMT Mountable,

Ultra-High Performance,

GPS Module with Patch Antenna

Overview
GM-5709 is an easy to use, ultra-high performance, low power GPS receiver module with patch antenna for AVL /marine applications. The SMT mountable design allows mass production with automatic assembly.

GM-5709 supports multiple satellite positioning systems – GPS, QZSS and SBAS. Our experienced design fully exhibits the excellent performance of MT3339 chip. It works in GPS signal difficult environment, provides fast acquisitions and excellent tracking performance.

With GM-5709, the RF tuning efforts and also development time is reduced to the minimum.

In addition to the chip built-in power saving, an optional hardware controlled power switch was built-in GM-5709. It allows power cycling by the PWR_CTRL pin.

Applications
- Marine GPS plotters
- Vehicle navigation devices
- Automatic vehicle location
- Timing (GPS clock, FEMTO cell, traffic lights etc)
- DGPS (RTCM SC-104)*

Features
- High performance: -165dBm tracking sensitivity
- Low power: 30mA at continuous tracking
- SMT Mountable with built-in antenna
- GPS/QZSS/SBAS support
- Supported SBAS: WAAS/EGNOS/MSAS/GAGAN
- AGPS support with self-generated ephemeris for fast position-fix
- Self-generated ephemeris prediction
- 12 multi-tone active interference cancellers
- Indoor/outdoor multi-path detection & compensation
- Up to 10Hz update rate
- Optional data logger
- High accuracy 1PPS timing (10ns jitter)
- Easy to use: built-in patch antenna
- Optional support of I-PEX RF connector if patch antenna is not needed.
- RTCM support
- V_BAT pin support for faster position fix
- PWR_CTRL pin to switch GPS module on and off dynamically for easy power saving control.
- Green LED for position fix indication
- Fully EMI shielded
- Industrial operating temperature range: -40 ~ 85°C

Notes
1. Some features may conflict with other features
2. Some features need special firmware or command programmed by customer

Technical Specifications

<table>
<thead>
<tr>
<th>Receiver Performance Data</th>
</tr>
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<tbody>
<tr>
<td>Receiver Type</td>
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<td></td>
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</tbody>
</table>
Channels:
Tracking: 22 / acquisition: 66

Horizontal Position Accuracy
< 3.0m (Autonomous)
< 2.5m (SBAS)
(50% 24hr static, -130dBm)

Velocity Accuracy
<0.1 m/s (w/o SBAS)
<0.05 m/s (w/ SBAS)
(50%@30m/s)

Timing Accuracy
±10ns jitter (1PPS output)

Time To First Fix
Autonomous
Hot start <1sec
Warm start <35sec
Cold start <35sec
(50% -130dBm)

Sensitivity
-148dBm (acquisition)
(Autonomous) -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 V3.01, MTK proprietary
4800/9600(default)/38400/115200bps
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

Environmental Data

Operating temperature
-40 ~ 85°C

Storage temperature
-40 ~ 125°C

Vibration
5Hz to 500Hz, 5g

Shock
Half sine 30g/11ms

Mechanical Data

16-pin Interface

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Function</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>3.3–5.5VDC Power supply</td>
<td>Input</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
<td>No connection</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>V_BAT</td>
<td>2.1–4.2VDC backup battery supply</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>RXD0</td>
<td>Port 0 serial data input (GPS in)</td>
<td>Input</td>
</tr>
<tr>
<td>5</td>
<td>TXD0</td>
<td>Port 0 serial data output (GPS out)</td>
<td>Output</td>
</tr>
<tr>
<td>6</td>
<td>RXD1</td>
<td>Port 1 serial data input (GPS in)</td>
<td>Input</td>
</tr>
<tr>
<td>7</td>
<td>TXD1</td>
<td>Port 1 serial data output (GPS out)</td>
<td>Output</td>
</tr>
<tr>
<td>8</td>
<td>1PPS</td>
<td>1 Pulse Per Second signal</td>
<td>Output</td>
</tr>
<tr>
<td>9</td>
<td>nRESET</td>
<td>Active low, at least 250ms</td>
<td>Input</td>
</tr>
<tr>
<td>10</td>
<td>LED</td>
<td>LED display for position fix</td>
<td>Output</td>
</tr>
<tr>
<td>11</td>
<td>NC</td>
<td>No connection</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>Ground</td>
<td>Input</td>
</tr>
<tr>
<td>13</td>
<td>PWR_CTRL</td>
<td>“L”: turn off VCC; “H” or floating: normal</td>
<td>Input</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>Ground</td>
<td>Input</td>
</tr>
<tr>
<td>15</td>
<td>NC</td>
<td>No connection</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>NC</td>
<td>No connection</td>
<td>-</td>
</tr>
</tbody>
</table>

Electrical Data

Power Supply
3.3 ~ 5.5VDC

Power Consumption
30mA / 10-SV fix average - top 7 SVs: 40~45 dBHz

Backup Power
2.1 ~ 4.2 VDC
7uA @ 3.1V

Digital I/O
$V_{OH}$: 2~3.6V, $V_{OL}$: 0~0.8V

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Ordering Information
GM-5709X

<table>
<thead>
<tr>
<th>X=A</th>
<th>standard - patch: 25x25x4, 4800bps, N-8-1</th>
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<tr>
<td>X=B</td>
<td>standard - patch: 25x25x4, 9600bps, N-8-1</td>
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</tbody>
</table>

Evaluation Board:

(a) Top

(b) Bottom

(c) GM-5709 Mounted

(b) mini-USB Connected

*This document is subject to change without notice.*