Product Summary

MAX-M8 series

Small u-blox M8 GNSS modules

Small GNSS modules for easy manufacturing
- Concurrent reception of up to 3 GNSS (GPS, Galileo, GLONASS, BeiDou)
- Industry leading -167 dBm navigation sensitivity
- Product variants to meet performance and cost requirements
- Miniature LCC package
- Superior anti-spoofing and anti-jamming
- Pin-compatible with MAX-7 and MAX-6

Product description

The MAX-M8 series of concurrent GNSS modules is built on the exceptional performance of the u-blox M8 engine in the industry proven MAX form factor. The MAX-M8 modules utilize concurrent reception of up to three GNSS systems (GPS/Galileo together with either BeiDou or GLONASS) for more reliable positioning. The MAX-M8 series provides high sensitivity and minimal acquisition times while maintaining low system power. It also supports message integrity protection, geofencing, and spoofing detection.

The MAX-M8C is optimized for cost-sensitive applications and has the lowest power consumption, the MAX-M8Q provides best performance for passive and active antennas designs, while the MAX-M8W is optimized for active antennas with best performance. The industry-proven MAX form factor allows easy migration from previous MAX generations. Sophisticated RF architecture and interference suppression ensure maximum performance even in GNSS-hostile environments.

The MAX-M8 series combines a high level of integration capability with flexible connectivity options in a miniature package. This makes MAX-M8 perfectly suited for industrial applications with strict size and cost requirements. The MAX-M8Q is also halogen free (green) which makes it a perfect solution for consumer applications. The DDC (I2C compliant) interface provides connectivity and enables synergies with most u-blox cellular modules.

u-blox M8 modules use GNSS chips qualified according to AEC-Q100, are manufactured in ISO/TS 16949 certified sites, and fully tested on a system level. Qualification tests are performed as stipulated in the ISO16750 standard: “Road vehicles – Environmental conditions and testing for electrical and electronic equipment”.

<table>
<thead>
<tr>
<th>Grade</th>
<th>MAX-M8C</th>
<th>MAX-M8Q</th>
<th>MAX-M8W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Professional</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Standard</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GNSS</th>
<th>MAX-M8C</th>
<th>MAX-M8Q</th>
<th>MAX-M8W</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS/QZSS</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>GLONASS</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Galileo</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>BeiDou</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of concurrent GNSS</th>
<th>3</th>
<th>3</th>
<th>3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Interfaces</th>
<th>MAX-M8C</th>
<th>MAX-M8Q</th>
<th>MAX-M8W</th>
</tr>
</thead>
<tbody>
<tr>
<td>UART</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>USB</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>SPI</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>DDC (I2C compliant)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>MAX-M8C</th>
<th>MAX-M8Q</th>
<th>MAX-M8W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscillator</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>RTC crystal</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Timepulse</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
<th>MAX-M8C</th>
<th>MAX-M8Q</th>
<th>MAX-M8W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.65 V – 3.6 V</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>2.7 V – 3.6 V</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

❖ = Yes, but with higher backup current
C = Crystal / T = TCXO
**MAX-M8 series**

### Features

**Receiver type**
- 72-channel u-blox M8 engine
- GPS/QZSS L1 C/A, GLONASS L10F
- BeiDou B1I, Galileo E1B/C
- SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN

**Nav. update rate**
- Single GNSS: up to 18 Hz
- 2 Concurrent GNSS: up to 10 Hz

**Position accuracy**
- Autonomous: 2.5 m CEP

<table>
<thead>
<tr>
<th></th>
<th>MAX-M8Q/W</th>
<th>MAX-M8C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acquisition</strong></td>
<td>Cold starts:</td>
<td>26 s</td>
</tr>
<tr>
<td></td>
<td>Aided starts:</td>
<td>2 s</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>Tracking:</td>
<td>-167 dBm</td>
</tr>
<tr>
<td></td>
<td>Cold starts:</td>
<td>-148 dBm</td>
</tr>
<tr>
<td></td>
<td>Hot starts:</td>
<td>-157 dBm</td>
</tr>
</tbody>
</table>

**Assistance GNSS**
- AssistNow Online
- AssistNow Offline (up to 35 days)
- OMA SUPL & 3GPP compliant

**Oscillator**
- TCXO (MAX-M8Q/M8W)
- Crystal (MAX-M8C)

**RTC crystal**
- Built-in (MAX-M8Q/M8W)
- Cost efficient solution with higher backup current (MAX-M8Q)

**Anti jamming**
- Active CW detection and removal

**Memory**
- Onboard ROM

**Supported antennas**
- Active and passive

**Raw Data**
- Code phase output

**Odometer**
- Integrated in navigation filter

**Geofencing**
- Up to 4 circular areas
- GPIO for waking up external CPU

**Spoofing detection**
- Built-in

**Signal integrity**
- Signature feature with SHA 256

1 For default mode: GPS/ SBAS/ QZSS + GLONASS

### Electrical data

**Power supply**
- 1.65 V to 3.6 V (MAX-M8C)
- 2.7 V to 3.6 V (MAX-M8Q/M8W)

**Digital I/O**
- 1.65 V to 3.6 V (MAX-M8C)
- 2.7 V to 3.6 V (MAX-M8Q/M8W)

**Power Consumption**
- 23 mA @ 3 V (MAX-M8C)
- 5.4 mA @ 3 V (MAX-M8C)

**Backup Supply**
- 1.4 V to 3.6 V

### Package

- 18 pin LCC (Leadless Chip Carrier): 9.7 x 10.1 x 2.5 mm, 0.6 g

### Environmental data, quality & reliability

**Operating temp.**
- -40 °C to +85 °C

**Storage temp.**
- -40 °C to +85 °C (MAX-M8Q/M8W)
- -40 °C to +105 °C (MAX-M8C)

**RoHS compliant (lead-free)**

**Quality**
- Green (halogen-free): MAX-M8Q

**Qualification according to ISO 16750**

**Manufactured in ISO/TS 16949 certified production sites**

**Uses u-blox M8 chips qualified according to AEC-Q100**

### Interfaces

<table>
<thead>
<tr>
<th>Serial interfaces</th>
<th>1 UART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital I/O</td>
<td>Configurable: 0.25 Hz to 10 MHz</td>
</tr>
<tr>
<td></td>
<td>1 EXTINT input for Wakeup</td>
</tr>
</tbody>
</table>

**Protocols**
- NMEA, UBX binary, RTCM

### Support products

**u-blox M8 Evaluation Kits:**

- Easy-to-use kits to get familiar with u-blox M8 positioning technology, evaluate functionality, and visualize GNSS performance.

**EVK-M8N**
- u-blox M8 GNSS Evaluation Kit, with TCXO, supports MAX-M8Q/M8W

**EVK-M8C**
- u-blox M8 GNSS Evaluation Kit, with Crystal, supports MAX-M8C

### Product variants

<table>
<thead>
<tr>
<th>MAX-M8C</th>
<th>u-blox M8 GNSS LCC module, crystal, ROM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX-M8Q</td>
<td>u-blox M8 GNSS LCC module, TCXO, ROM</td>
</tr>
<tr>
<td>MAX-M8W</td>
<td>u-blox M8 concurrent GNSS LCC module, TCXO, active antenna supply, ROM</td>
</tr>
</tbody>
</table>

### Further information

For contact information, see www.u-blox.com/contact-us.

For more product details and ordering information, see the product data sheet.

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