



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



9.7 × 10.1 × 2.5 mm



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".

| | MAX-M8C | MAX-M8Q | MAX-M8W |
|----------------------------------|---------|---------|---------|
| Grade | | | |
| Automotive | | | |
| Professional | • | • | • |
| Standard | | | |
| GNSS | | | |
| GPS / QZSS | • | • | • |
| GLONASS | • | • | • |
| Galileo | • | • | • |
| BeiDou | • | • | • |
| Number of concurrent GNSS | 3 | 3 | 3 |
| Interfaces | | | |
| UART | 1 | 1 | 1 |
| USB | | | |
| SPI | | | |
| DDC (I ² C compliant) | 1 | 1 | 1 |
| Features | | | |
| Oscillator | C | T | T |
| RTC crystal | ◆ | • | • |
| Timepulse | 1 | 1 | 1 |
| Power supply | | | |
| 1.65 V – 3.6 V | • | | |
| 2.7 V – 3.6 V | | • | • |

◆ = Yes, but with higher backup current

C = Crystal / T = TCXO



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 | | |
| Positioning accuracy | Autonomous 2.5 m CEP | | |
| | | MAX-M8Q/W | MAX-M8C |
| Acquisition ¹ | Cold starts: | 26 s | 26 s |
| | Aided starts: | 2 s | 3 s |
| | Reacquisition: | 1 s | 1 s |
| Sensitivity ¹ | Tracking: | -167 dBm | -164 dBm |
| | Cold starts: | -148 dBm | -148 dBm |
| | Hot starts: | -157 dBm | -157 dBm |
| Assistance GNSS | AssistNow Online AssistNow Offline (up to 35 days) AssistNow Autonomous (GPS only, up to 3 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-M8C) | | |
| 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 voltage level | 1.65 V to 3.6 V (MAX-M8C) 2.7 V to 3.6 V (MAX-M8Q/M8W) |
| Power Consumption ² | 23 mA @ 3 V (Continuous) 5.4 mA @ 3 V Power Save mode (1 Hz) |
| Backup Supply | 1.4 V to 3.6 V |

² MAX-M8C, GPS/SBAS/QZSS + GLONASS (default mode)

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)

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

| | |
|-------------------|------------------------------------|
| Serial interfaces | 1 UART |
| | 1 DDC (I ² C compliant) |
| Digital I/O | Configurable timepulse |
| | 1 EXTINT input for Wakeup |
| Timepulse | Configurable: 0.25 Hz to 10 MHz |
| 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

| | |
|---------|--|
| MAX-M8C | u-blox M8 GNSS LCC module, crystal, ROM |
| MAX-M8Q | u-blox M8 GNSS LCC module, TCXO, ROM |
| MAX-M8W | u-blox M8 concurrent GNSS LCC module, TCXO, active antenna supply, ROM |

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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