

# MAX-8 series



## Small u-blox 8 GPS modules

### Small GPS modules for easy manufacturing

- High sensitivity of  $-166$  dBm for single GNSS reception
- Cost-efficient system
- TCXO-based variant for fastest time to first fix
- Low power consumption
- Superior anti-spoofing and anti-jamming
- Pin-compatible to MAX-7



9.7 × 10.1 × 2.5 mm



### Product description

The MAX-8 series of standard precision GNSS modules features the reliable performance of the u-blox 8 positioning engine, which receives GPS, GLONASS, QZSS and SBAS signals. The MAX-8 series delivers high sensitivity and minimal acquisition times in the ultra compact MAX form factor.

The economical MAX-8 series provides high sensitivity while featuring low power consumption and supporting advanced Power Save Modes. It also provides message integrity protection, geofencing, spoofing detection, and odometer functionalities.

The MAX-8C is optimized for cost sensitive applications with lowest power, while the MAX-8Q provides best performance. The industry proven MAX form factor allows easy migration from MAX-7 and MAX-6 modules by offering backward compatibility. Sophisticated RF-architecture and interference suppression ensure maximum performance even in GNSS-hostile environments. The MAX-8 series combines a high level of integration capability with flexible connectivity options in a miniature package. This makes it perfectly suited for industrial and mass-market end products with strict size and cost requirements. The DDC (I<sup>2</sup>C compliant) interface provides connectivity and enables synergies with most u-blox cellular modules.

u-blox 8 modules use GNSS chips qualified according to AEC-Q100 and are manufactured in ISO/TS 16949 certified sites. Qualification tests are performed as stipulated in the ISO16750 standard: "Road vehicles – Environmental conditions and testing for electrical and electronic equipment". MAX-8Q complies with green/halogen free standards.

	MAX-8C	MAX-8Q
<b>Grade</b>		
Automotive		
Professional	•	•
Standard		
<b>GNSS</b>		
GPS / QZSS	•	•
GLONASS	•	•
Galileo		
BeiDou		
Number of concurrent GNSS	1	1
<b>Interfaces</b>		
UART	1	1
USB		
SPI		
DDC (I <sup>2</sup> C compliant)	1	1
<b>Features</b>		
Oscillator	C	T
RTC crystal	◆	•
Timepulse	1	1
<b>Power supply</b>		
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 8 engine GPS/QZSS L1 C/A, GLONASS L1 FDMA, SBAS: WAAS, EGNOS, MSAS	
Nav. update rate	Up to 18 Hz	
Position accuracy	GPS	GLONASS
Autonomous	2.5 m CEP	4.0 m CEP
Acquisition <sup>1</sup>	29 s	30 s
Cold starts:	2 s	2 s
Aided starts:	1 s	1 s
Reacquisition:		
Sensitivity <sup>1</sup>		
Tracking:	-166 dBm	-166 dBm
Cold starts:	-148 dBm	-145 dBm
Hot starts:	-157 dBm	-156 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-8Q) Crystal (MAX-8C)	
RTC crystal	Built-in (MAX-8Q) Cost efficient solution with higher Backup current (MAX-8C)	
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	

<sup>1</sup> MAX-8Q

## Electrical data

Power supply	1.65 V to 3.6 V (MAX-8C) 2.7 V to 3.6 V (MAX-8Q)
Digital I/O voltage level	1.65 V to 3.6 V (MAX-8C) 2.7 V to 3.6 V (MAX-8Q)
Power Consumption <sup>2</sup>	16 mA @ 3 V (Continuous) 3.8 mA @ 3 V Power Save mode (1 Hz)
Backup Supply	1.4 V to 3.6 V

<sup>2</sup> MAX-8C, default mode: GPS incl. QZSS, SBAS

## 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
RoHS compliant (lead-free)	
Green (halogen-free):	MAX-8Q
Qualification according to ISO 16750	
Manufactured in ISO/TS 16949 certified production sites	
Uses u-blox 8 chips qualified according to AEC-Q100	

## Interfaces

Serial interfaces	1 UART 1 DDC (I <sup>2</sup> 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 8 Evaluation Kits:

Easy-to-use kits to get familiar with u-blox 8 positioning technology, evaluate functionality, and visualize GNSS performance.

EVK-8N	u-blox 8 GNSS Evaluation Kit, with TCXO, supports MAX-8Q
EVK-M8C	u-blox M8 GNSS Evaluation Kit (in single GPS or single GLONASS mode), with Crystal, supports MAX-8C

## Product variants

MAX-8C	u-blox 8 GNSS LCC module, crystal, ROM
MAX-8Q	u-blox 8 GNSS LCC module, TCXO, ROM

## Further information

For contact information, see [www.u-blox.com/contact-us](http://www.u-blox.com/contact-us).

For more product details and ordering information, see the [product data sheet](#).

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