MAX-M8

u-blox M8 concurrent GNSS modules

| Standard | **Professional** | Automotive |

Highlights

- 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 to MAX-7 and MAX-6
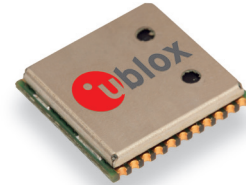
MAX-M8 series
9.7 x 10.1 x 2.5 mm

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 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".

Product selector

Model	Category				GNSS					Supply		Interfaces				Features									Grade		
	Standard Precision GNSS	High Precision GNSS	Dead Reckoning	Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	1.65 V – 3.6 V	2.7 V – 3.6 V	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data logging	Additional SAW	Additional LNA	RTC crystal	Oscillator	Built-in antenna	Built-in antenna supply and supervisor	Timepulse	Standard	Professional	Automotive
MAX-M8C	•				•	•	•	•	3	•		•			•					♦	C			1		▓	
MAX-M8Q	•				•	•	•	•	3	•		•			•					•	T			1		▓	
MAX-M8W	•				•	•	•	•	3	•		•			•					•	T		•	1		▓	

♦ = Yes, but with a 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
Postition 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

Supply voltage	1.65 V to 3.6 V (MAX-M8C) 2.7 to 3.6 V (MAX-M8Q/M8W)
Digital I/O voltage level	1.65 – 3.6 V
Power Consumption[2]	23 mA @ 3 V (Continuous) 5.4 mA @ 3V Power Save mode (1 Hz)
Backup Supply	1.4 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

Pinout

Pin	Name		Pin	Name
10	GND		9	RESET_N
11	RF_IN		8	VCC
12	GND		7	VCC_IO
13	LNA_EN/Reserved		6	V_BCKP
14	VCC_RF	MAX-M8 Top View	5	EXTINT
15	V_ANT/Reserved		4	TIMEPULSE
16	SDA		3	RXD
17	SCL		2	TXD
18	SAFEBOOT_N		1	GND
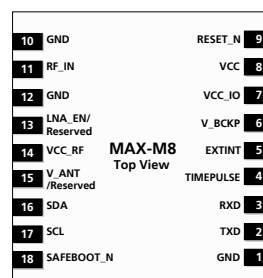
Environmental data, quality & reliability

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 (I²C 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.