SAM-M8Q

Standard | Professional | Automotive

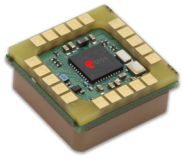
POSITIONING

u-blox M8 compact GNSS antenna module

Highlights

- Easy to design-in with no RF expertise required
- Consistently strong performance regardless of installation
- High accuracy thanks to concurrent reception of up to 3 GNSS (GPS, Galileo, GLONASS)
- Tiny form factor 15.5 x 15.5 x 6.3 mm
- Embedded wide-band patch antenna
- Surface-mount device, enabling simple and automated manufacturing

Top view
(patch antenna side)



Bottom view

SAM-M8Q
15.5 x 15.5 x 6.3 mm

Product description

SAM-M8Q is the u-blox GNSS patch antenna module that is ideal for easy and reliable GNSS integration. With the exceptional performance of the u-blox M8 concurrent GNSS (GPS, GLONASS, Galileo, QZSS and SBAS) engine, the SAM-M8Q delivers high sensitivity and minimal acquisition times in an ultra compact form factor.

Incorporating the SAM-M8Q module into customer designs is simple and straightforward, thanks to the embedded GNSS patch antenna, low power consumption, simple interface, and sophisticated interference suppression that ensures maximum performance even in GNSS-hostile environments.

The 15 x 15 mm patch antenna provides the best compromise between the performance of a Right Hand Circular Polarized (RHCP) antenna and a small size to be integrated in any design. The omni-directional radiation pattern increases flexibility for device installation. SAM-M8Q's robustness, easy design-in, surface embedded antenna, and easy interfacing ensure faster time to market and keep design and manufacturing costs to a minimum.

The SAM-M8Q module features an additional front-end LNA for optimized performance and a front-end SAW filter for increased jamming immunity.

The SAM-M8Q module targets industrial and consumer applications that require small, cost efficient, and ready-to-use GNSS solutions. SAM-M8Q is based on the u-blox M8 FW3 engine with cutting-edge performance and additional features not available on any other antenna modules in the market. It also provides message integrity protection, geofencing, spoofing detection, and odometer functionalities.

The SAM-M8Q module uses AEC-Q100 qualified GNSS chips and is fully tested at the system level. Qualification is done according to a subset of ISO16750.

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	2.7 V – 3.3 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
SAM-M8Q	•				•	•	•		3	•	•			•			•	•	•	T	•		1			

C = Crystal / T = TCXO

Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	
Max nav. update rate	Single GNSS 2 Concurrent GNSS	up to 18 Hz up to 10 Hz
Position accuracy	2.0 m CEP	
Acquisition[1]	Cold start: Aided start: Hot start:	26 s 2 s 1 s
Sensitivity[1]	Tracking & Navigation: Cold start: Hot start:	–167 dBm –148 dBm –157 dBm
Assistance	AssistNow GNSS Online AssistNow GNSS Offline (up to 35 days) AssistNow Autonomous (up to 3 days) OMA SUPL & 3GPP compliant	
Oscillator	TCXO	
RTC crystal	Built-In	
Noise figure	On-chip LNA and extra LNA for lowest noise figure	
Anti jamming	Active CW detection and removal. Extra onboard SAW band pass filter	
Memory	Onboard ROM	
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] Conductive mesurement in default mode: GPS/SBAS/QZSS+GLONASS

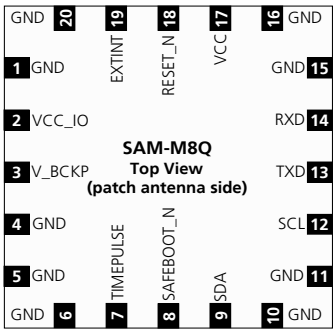
Electrical data

Supply voltage	2.7 V to 3.3 V
Digital I/O voltage level	2.7 V to 3.3 V
Power consumption (2 concurrent GNSS)	28 mA @ 3.0 V (Continuous) 11.5 mA @ 3.0 V (Power Save Mode, 1 Hz)
Backup Supply	1.4 V to 3.6 V

Package

20 pin LGA (Land Grid Array): 15.5 x 15.5 x 6.3 mm, 6 g

Pinout



Environmental data, quality & reliability

Operating temp.	–40° C to +85° C
Storage temp.	–40° C to +85° C

RoHS compliant (lead-free)

Qualification according to a subset of ISO16750

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-M8QSAM	u-blox M8 concurrent GNSS evaluation kit, supports SAM-M8Q

Product variants

SAM-M8Q	u-blox concurrent GNSS LGA antenna module, TCXO, SAW, LNA

Further information

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

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