

# SAM-M8Q



## Easy-to-use u-blox M8 GNSS antenna module

### Smart antenna module for easy and reliable integration

- 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



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 ISO16750 standard.

SAM-M8Q

	SAM-M8Q
<b>Grade</b>	
Automotive	
Professional	•
Standard	
<b>GNSS</b>	
GPS / QZSS	•
GLONASS	•
Galileo	•
BeiDou	
Number of concurrent GNSS	3
<b>Interfaces</b>	
UART	1
USB	
SPI	
DDC (I <sup>2</sup> C compliant)	1
<b>Features</b>	
Additional SAW	•
Additional LNA	•
RTC crystal	•
Oscillator	T
Built-in antenna	•
Timepulse	1
<b>Power supply</b>	
2.7 V – 3.6 V	•

T = TCXO

# SAM-M8Q antenna module



## Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L1OF 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	2.5 m CEP
Acquisition <sup>1</sup>	
Cold starts:	26 s
Aided starts:	2 s
Reacquisition:	1 s
Sensitivity <sup>1</sup>	
Tracking & Nav.:	-165 dBm
Cold starts:	-146 dBm
Hot starts:	-155 dBm
Assistance GNSS	AssistNow Online AssistNow 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

<sup>1</sup> Default mode: GPS/SBAS/QZSS+GLONASS

## Electrical data

Supply voltage	2.7 V to 3.6 V
Digital I/O voltage level	2.7 V to 3.6 V
Power Consumption (2 concurrent GNSS)	29 mA @ 3.0 V (Continuous) 9.5 mA @ 3.0 V Power Save mode (1 Hz)
Backup Supply	1.4 V to 3.6 V

## 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](#).

## Package

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

## Environmental data, quality & reliability

Operating temp. -40°C to +85°C

RoHS compliant (lead-free)

Qualification according to ISO 16750

Uses u-blox M8 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 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 LCC antenna module,  
TCXO, SAW, LNA

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