

SAM-M10Q module

u-blox M10 standard precision GNSS antenna module



15.5 x 15.5 x 6.3 mm



Product description

The SAM-M10Q is a patch antenna module built on the ultra-low-power u-blox M10 GNSS platform, which supports concurrent reception of four GNSS (GPS, GLONASS, Galileo, and BeiDou) and provides exceptional sensitivity and fast acquisition times for all L1 GNSS systems.

The extremely low power consumption of 37 mW in continuous tracking mode with four concurrent GNSS allows great power autonomy for battery-operated devices, without compromising on GNSS performance.

A front-end SAW filter and an LNA is integrated in the SAM-M10Q module. This setup ensures excellent out-band jamming immunity, for example when a cellular modem is nearby. SAM-M10Q also detects jamming and spoofing attempts and reports them to the host, so that the system can react to such events.

The high-gain 15 x 15 mm patch antenna provides the best balance between performance and small size. The omnidirectional radiation antenna pattern increases flexibility for device installation.

Incorporating the SAM-M10Q module into customer designs is easy and straightforward, thanks to the integrated antenna, robust design, and simple interface. SAM-M10Q is a surface-mount device, enabling simple and automated manufacturing.

SAM-M10Q is pin-to-pin compatible with the previous SAM-M8Q module, which saves designers time and cost when upgrading their designs to the advanced low-power u-blox M10 GNSS technology.

SAM-M10Q	
Grade	Automotive
Professional	.
Standard	.
GNSS	
GPS / QZSS	.
GLONASS	.
Galileo	.
BeiDou	.
Number of concurrent GNSS	4
Interfaces	
UART	1
DDC (I2C compliant)	1
Features	
Additional SAW	.
Additional LNA	.
RTC crystal	.
Oscillator	T
Built-in antenna	.
Timepulse	1
Power supply	
2.7 V – 3.6 V	.

T = TCXO

Product performance

Receiver type	u-blox M10 engine GPS L1 C/A, QZSS L1 C/A L1S, GLONASS L1OF BeiDou B1C, Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	
Nav. update rate	Up to 5 Hz (4 concurrent GNSS) Up to 18 Hz (single GNSS)	
Horizontal position accuracy ¹	1.5 m CEP	
Acquisition ¹	Cold start	23 s
	Aided start	1 s
	Hot start	1 s
Sensitivity ¹	Tracking & Nav.	-165 dBm
	Reacquisition	-158 dBm
	Cold start	-146 dBm
	Hot start	-157 dBm

Tracking features

u-blox Super-S	Improved accuracy with small antenna
Data batching	Autonomous tracking up to 10 min at 1 Hz
Odometer	Measure traveled distance with support for different user profiles
Protection level	Real-time position accuracy estimate with 95% confidence

Security features

Signal integrity	RF interference and jamming detection and reporting Spoofing detection and reporting
Device integrity	Receiver configuration lock by command
Secure interface	Signed UBX messages (SHA-256) JTAG debug interface disabled by default

Electrical data

Power consumption at 3 V	2 GNSS: 3 GNSS: 4 GNSS:	Continuous tracking 31 mW 34 mW 37 mW ¹	PSM ² 21 mW 21 mW N/A ³
Power supply	2.7 V to 3.6 V		
Backup supply	1.65 V to 3.6 V		

1 = Default mode: GPS/SBAS/QZSS+GLONASS+Galileo+BeiDou

2 = Power save mode, 1 Hz cyclic tracking

3 = Power save mode not available when BeiDou B1C is enabled

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
Storage temp.	-40 °C to +85 °C
Environmental grade	2015/863/EU RoHS-3
Environmental testing	ISO 16750
Quality management	Manufactured and fully tested in IATF 16949 certified production sites

Interfaces

Serial interfaces	1 UART 1 DDC (I2C compliant)
Digital I/O	Configurable timelpuse 1 EXTINT input for Wakeup
Raw Data output	Code phase data
Timelpuse	Configurable: 0.25 Hz to 10 MHz
Protocols	NMEA 4.11, UBX binary

Compatible u-blox location services

AssistNow	Real-time online A-GNSS service with assured global availability
CloudLocate	Extends the life of energy-constrained IoT applications.

Support products

EVK-M10QSAM	u-blox M10 concurrent GNSS evaluation kit supports SAM-M10Q
u-center 2	Highly intuitive software for GNSS performance evaluation

Product variants

SAM-M10Q	u-blox M10 concurrent GNSS LGA patch antenna module, ROM, TCXO, SAW, LNA
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NOTE:

This document provides an objective specification overview of this product.

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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