

SAM-M8Q module



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 × 15.5 × 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

| Grade | |
|----------------------------------|---|
| Automotive | |
| Professional | • |
| Standard | |
| GNSS | |
| GPS / QZSS | • |
| GLONASS | • |
| Galileo | • |
| BeiDou | |
| Number of concurrent GNSS | 3 |
| Interfaces | |
| UART | 1 |
| USB | |
| SPI | |
| DDC (I ² C 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

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 ¹ | |
| Cold starts: | 26 s |
| Aided starts: | 2 s |
| Reacquisition: | 1 s |
| Sensitivity ¹ | |
| 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 |

1 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 Consump- tion (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 |

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 ² 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 |
|---------|--|

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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