Standard | Professional | Automotive

POSITIONING

CAM-M8 series

u-blox M8 concurrent GNSS antenna modules

Highlights

- Concurrent reception of up to 3 GNSS (GPS, Galileo, GLONASS, BeiDou)
- Miniature size and weight with low power consumption
- Embedded, omnidirectional and wideband antenna
- Industry leading –167 dBm navigation sensitivity
- Optional external antenna
- Product variants to meet performance and cost requirements

CAM-M8 series
9.6 x 14.0 x 1.95 mm

Product description

The u-blox CAM-M8 series antenna modules are built on the exceptional performance of the u-blox M8 GNSS engine. The CAM-M8 modules utilize concurrent reception of up to three GNSS systems (GPS/Galileo together with BeiDou or GLONASS), offering high sensitivity and strong signal levels in an ultra compact form factor.

Incorporating the CAM-M8 series modules into customer designs is simple and straightforward, thanks to the embedded GNSS antenna, small footprint of 9.6 x 14 x 1.95 mm, and sophisticated interference suppression that ensures maximum performance even in GNSS-hostile environments. The low power consumption and thin design allow end devices to be slimmer and smaller. The CAM-M8 modules also support message integrity protection, geofencing, and spoofing detection.

Despite of miniature size, the chip antennas in the CAM-M8 series modules perform extremely well against traditional patch antennas. Optimal performance is achieved by following design instructions available in the Hardware Integration Manual as customer PCB is part of the antenna solution.

The omnidirectional radiation pattern increases flexibility for device installation. Optionally, CAM-M8 series modules can be connected to an external GNSS antenna. The SMD design keeps manufacturing costs to a minimum and the small mass ensures high reliability.

The CAM-M8 modules target industrial and consumer applications that require concurrent GPS/Galileo and GLONASS or GPS/Galileo and BeiDou reception. The CAM-M8C is optimized for cost sensitive applications and has the lowest power consumption, while the CAM-M8Q provides best performance. The CAM-M8 modules are form-factor compatible to UC530 and UC530M modules, allowing the upgrade of existing designs with minimal effort.

CAM-M8 modules use GNSS chips qualified according to AEC-Q100 and are manufactured in ISO/TS 16949 certified sites. 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
CAM-M8Q	•				•	•	•	•	3		•	•		•	•			•	•	•	T	•		1			
CAM-M8C	•				•	•	•	•	3	•		•		•	•			•	•	♦	C	•		1			

C = Crystal / T = TCXO

♦ = Yes, but with a higher backup current

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
Position accuracy	Autonomous 2.5 m CEP

Acquisition[1]

	CAM-M8Q	CAM-M8C
Cold start:	26 s	26 s
Aided start:	2 s	3 s
Hot start:	1 s	1 s

Sensitivity[1]

Tracking:	–167 dBm	–164 dBm
Cold start:	–148 dBm	–148 dBm
Hot start:	–157 dBm	–157 dBm

Assistance GNSS	AssistNow GNSS Online AssistNow GNSS Offline (up to 35 days) AssistNow Autonomous (GPS only, up to 3 days) OMA SUPL & 3GPP compliant
Oscillator	TCXO (CAM-M8Q) Crystal (CAM-M8C)
RTC crystal	Built-In (CAM-M8Q) or cost efficient solution with higher Backup current (CAM-M8C)
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 For default mode: GPS/SBAS/QZSS+GLONASS

Electrical data

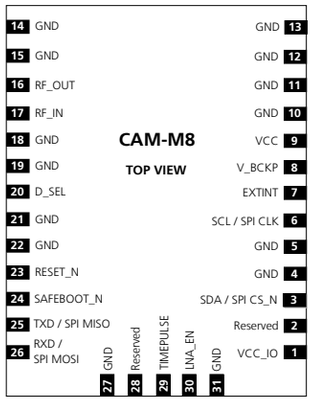
Supply voltage	1.6 V to 3.6 V (CAM-M8C) 2.7 V to 3.6 V (CAM-M8Q)
Digital I/O voltage level	1.6 V to 3.6 V (CAM-M8C) 2.7 V to 3.6 V (CAM-M8Q)
Power consumption[2]	28 mA @ 3.0 V (Continuous) 10.1 mA @ 3.0 V (Power Save Mode, 1 Hz)
Backup Supply	1.4 V to 3.6 V

2 CAM-M8C, GPS/SBAS/QZSS+GLONASS (default mode)

Package

31 pin LCC (Leadless Chip Carrier): 9.6 x 14.0 x 1.95 mm, 0.5 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 ISO16750

Manufactured in ISO/TS 16949 certified production site

Uses u-blox M8 chips qualified according to AEC-Q100

Interfaces

Serial interfaces	1 UART 1 SPI (Optional) 1 DDC (I^2C 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-M8QCAM:	u-blox M8 concurrent GNSS evaluation kit (TCXO), supports CAM-M8Q
EVK-M8CCAM:	u-blox M8 concurrent GNSS evaluation kit, (Crystal), supports CAM-M8C

Product variants

CAM-M8Q	u-blox concurrent GNSS LCC antenna module, TCXO, SAW, LNA
CAM-M8C	u-blox concurrent GNSS LCC antenna module, Crystal, 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.