Product summary

MAX-F11/M11 series

u-blox F11 standard precision GNSS modules

Standard

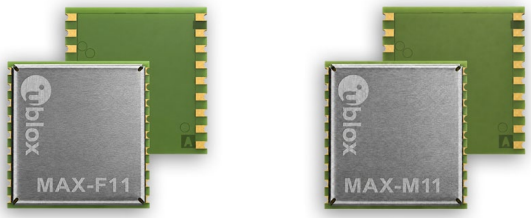
Professional

Automotive

Ultra-low-power GNSS receiver with seamless L1/L5 dual band for best accuracy in all environments

- 10 mW in Low Energy Accurate Positioning (LEAP) mode
- Selective use of L5 band for best balance of power and accuracy
- Proven excellent performance, even with small antennas
- Upgradable firmware and embedded flash memory
- Pin-compatible with previous MAX products

9.7 × 10.1 × 2.5 mm



Product description

The MAX-F11/M11 series is built on the u-blox F11 GNSS platform with exceptional meter-level positioning accuracy in all environments.

MAX-F11N supports selective L1/L5 band operation for improved position accuracy in urban environments, while MAX-M11N operates in the L1 band.

Depending on the environment, the Low Energy Accurate Positioning (LEAP) mode reduces power consumption below 10 mW while retaining superior position accuracy.

The free AssistNow Predictive Orbits data download facilitates TTFF in <2 s. The Live Orbits data download furthermore improves the position accuracy after cold starts.

The SAW - LNA - SAW filter RF circuit provides excellent RF immunity against co-located cellular transmitters.

The firmware is upgradable and the flash memory stores data from logging, AssistNow, and use-case-optimized product configurations.

MAX modules are highly integrated and designed to minimize customer development effort.

All modules offer backwards pin-to-pin compatibility with previous u-blox generations, saving designers' time and costs when upgrading their designs.

	MAX-F11N	MAX-M11N
Grade		
Automotive		
Professional	•	•
Standard		
GNSS		
GPS + QZSS/SBAS	•	•
GLONASS		
Galileo	•	•
BeiDou	•	•
NavIC	•	
Bands	L1/L5/E5a/B2a	L1
Interfaces		
UART	1	1
Features		
Embedded flash memory	•	•
Data logging	•	•
Upgradable firmware	•	•
Selective L5 band operation	•	
Carrier phase output	•	•
AssistNow lifetime access	P	P
Additional SAW	2	2
Additional LNA	•	•
RTC crystal	•	•
Oscillator	T	T
Timepulse	1	1
Power supply		
1.76 V – 3.6 V	•	•

L = Live orbits, P = Predictive orbits

T = TCXO

MAX-F11/M11 series

Product performance

Receiver type	u-blox F11 engine GPS L1 C/A, L5 [1] GAL E1B/C, E5a [1] BDS B1I, B1C, B2a [1] QZSS L1 C/A, L1S, L1Sb, L5 [1] SBAS L1 C/A, BDSBAS B1C NavIC L5 [1]
Nav. update rate	Up to 10 Hz (≥ 3 concurrent GNSS) Up to 25 Hz (single GNSS)
Horizontal position accuracy	1.0 m [1] / 1.5 m CEP (with SBAS) 1.5 m [1]/ 2.0 m CEP (without SBAS)
Acquisition [2]	Cold start 28 s Aided start 2 s Hot start 2 s
Sensitivity	Tracking & Nav. –167 dBm Reacquisition –160 dBm Cold start –148 dBm Hot start –159 dBm

Tracking features

Odometer	Measures traveled distance with support for different user profiles (with >99% accuracy)
Data logging	Stores position/velocity/time information on the embedded flash memory without host interaction
Data batching	Stores position/velocity/time information over up to 10 min in RAM without host interaction
LEAP	Low energy accurate positioning reduces the power consumption retaining superior position accuracy
Selective L1/L5 use [1]	Smart use of L1/L5 dual band only when beneficial to improve the position accuracy

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

		MAX-F11N			MAX-M11N	
Power save mode		LEAP	L1	L1/L5	LEAP	L1
Power consumption at 3.3 V [mW]	2 GNSS	13	19	30	11	20
	3 GNSS	14	21	34	11	23
Power consumption at 1.8 V [mW]	2 GNSS	10	16	25	10	17
	3 GNSS	11	18	30	10	20
Power supply		1.76 V to 3.6 V				
Backup supply		1.65 V to 3.6 V				

1 = MAX-F11N only 2 = GPS/Galileo/Beidou + SBAS/QZSS

Package

18 pin LCC (Leadless Chip Carrier): 9.7 × 10.1 × 2.5 mm, 0.6 g

Environmental data, quality, and reliability

Operating temp.	–40 °C to +85 °C
Storage temp.	–40 °C to +85 °C
Environmental grade	2015/863/EU RoHS-3
EMC (electromagnetic compatibility)	2014/53/EU RED
Environmental testing	Qualified according to u-blox qualification policy, based on a subset of AEC-Q104
Quality management	Manufactured and fully tested in IATF 16949 certified production sites

Interfaces

Serial interfaces	1 UART
Digital I/O	Configurable timepulse 1 EXTINT input for Wakeup
Raw Data output	Code phase data, carrier phase data
Timepulse	Configurable: 0.25 Hz to 10 MHz
Supported antennas	Active and passive
Protocols	NMEA 4.11, UBX binary, RTCM 3.4

Compatible u-blox location services

AssistNow	Achieves premium performance in challenging IoT environments
CloudTrack	Ultra-low-power asset tracking service

Support products

EVK-F112	u-blox F11/M11 GNSS evaluation kit with a firmware-upgradable chip and TCXO
u-center 2	Highly intuitive software for GNSS performance evaluation

Product variants

MAX-F11N-00B	u-blox F11 GNSS LCC module, upgradable firmware in flash, 2 SAW filters, LNA, TCXO
MAX-M11N-00B	u-blox M11 GNSS LCC module, upgradable firmware in flash, 2 SAW filters, LNA, TCXO

Further information

For contact information, see **www.u-blox.com/contact-u-blox**.
For more product details and ordering information, see the product data sheet.

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