Product summary
MAX-M10 series
u-blox M10 standard precision GNSS modules

Ultra-low-power GNSS receiver for high-performance asset-tracking devices
• Less than 25 mW power consumption without compromising GNSS performance
• Maximum position availability with concurrent reception of 4 GNSS
• Proven excellent performance, even with small antennas
• Advanced spoofing and jamming detection
• Pin-compatible with previous MAX products

Product description
The MAX-M10 series is built on the ultra-low-power u-blox M10 GNSS platform, which provides exceptional sensitivity and acquisition times for all L1 GNSS systems.

The extremely low power consumption of less than 25 mW in continuous tracking mode allows great power autonomy for all battery-operated devices, such as asset trackers, without compromising on GNSS performance.

MAX-M10 supports concurrent reception of four GNSS (GPS, GLONASS, Galileo, and BeiDou). The high number of visible satellites enables the receiver to select the best signals. This maximizes the position availability, in particular under challenging conditions such as in deep urban canyons.

u-blox Super-S technology offers great RF sensitivity and can improve the dynamic position accuracy by up to 25% with small antennas or in a non-line-of-sight scenario.

The MAX-M10S module integrates an LNA followed by an SAW filter in the RF path for maximum sensitivity in passive antenna designs. MAX-M10M offers a cost and power optimized setup without LNA and SAW filter.

MAX-M10 detects jamming and spoofing attempts and reports them to the host, so that the system can react to such events. Advanced filtering algorithms mitigate the impact of RF interference and jamming, thus enabling the product to operate as intended.

Both modules offer backwards pin-to-pin compatibility with previous u-blox generations, which saves designers time and cost when upgrading their designs.

<table>
<thead>
<tr>
<th>Grade</th>
<th>MAX-M10M</th>
<th>MAX-M10S</th>
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<tbody>
<tr>
<td>Automotive</td>
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<tr>
<td>Professional</td>
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<tr>
<td>Standard</td>
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<tr>
<th>GNSS</th>
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<th>MAX-M10S</th>
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<tbody>
<tr>
<td>GPS + QZSS/SBAS</td>
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<tr>
<td>GLONASS</td>
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<td>Galileo</td>
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<td>BeiDou</td>
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<tr>
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<th>MAX-M10S</th>
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<tbody>
<tr>
<td>UART</td>
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<tr>
<td>SPI</td>
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<tr>
<td>DDC (I2C compliant)</td>
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<tr>
<th>Features</th>
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<tr>
<td>Additional SAW</td>
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<tr>
<td>Additional LNA</td>
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<tr>
<td>RTC crystal</td>
<td>C</td>
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</tr>
<tr>
<td>Oscillator</td>
<td></td>
<td>T</td>
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<tr>
<td>Timepulse</td>
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<th>Power supply</th>
<th>MAX-M10M</th>
<th>MAX-M10S</th>
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<tr>
<td>1.8 V – 5.5 V</td>
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<td>2.7 V – 3.6 V</td>
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C = Crystal / T = TCXO
MAX-M10 series

Product performance

Receiver type  u-blox M10 engine
GPS L1 C/A, QZSS L1 C/A/S, GLONASS L10F
BeiDou B1/B1C, Galileo E1B/C
SBAS L1 C/A, WAAS, EGNOS, MSAS, GAGAN

Nav. update rate  Up to 10 Hz (4 concurrent GNSS)

Horizontal position
accuracy  1.5 m CEP

MAX-M10M  MAX-M10S
Acquisition
Cold start  26 s  24 s
Aided start  3 s  2 s
Hot start  1 s  1 s

Sensitivity
Tracking & Nav.  –164 dBm  –167 dBm
Reacquisition  –161 dBm  –161 dBm
Cold start  –148 dBm  –148 dBm
Hot start  –159 dBm  –159 dBm

Tracking features
u-blox Super-S  Improved accuracy with small antennas
Data batching  Autonomous tracking up to 10 min at 1 Hz
Odometer  Measure traveled distance with support for different user profiles

Security features
Signal integrity  RF interference & jamming detection and reporting
Active GNSS in-band filtering
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-M10M  MAX-M10S
Power supply  1.8 V to 5.5 V  2.7 V to 3.6 V
Power consumption
at 3 V  2 GNSS: 19 mW
3 GNSS: 23 mW
4 GNSS: 27 mW
Backup supply  1.65 V to 3.6 V

1 = For continuous tracking in default mode: GPS/BeiDou/Galileo + SBAS/QZSS

Package

18 pin LCC (Leadless Chip Carrier): 9.7 × 10.1 × 2.5 mm, 0.6 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
EMC (electromagnetic compatibility)  2014/53/EU RED

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 timepulse
1 EXTINT input for Wakeup
Raw Data output  Code phase data
Timepulse  Configurable: 0.25 Hz to 10 MHz
Supported antennas  Active and passive
Protocols  NMEA 4.10, UBX binary

Services

Assisted GNSS  AssistNow GNSS Online: Data valid 2-4 hours
AssistNow GNSS Offline: Data valid up to 35 days
AssistNow Autonomous: Data valid up to 6 days
OMA SUPL & 3GPP compliant

Support products

EVK-M101  u-blox M10 GNSS evaluation kit with
UBX-M10050-KB chip and I/O interface
u-center  Highly interactive and easy-to-use GNSS
evaluation software

Product variants

MAX-M10M  u-blox M10 concurrent GNSS LCC module,
firmware in ROM, crystal oscillator
MAX-M10S  u-blox M10 concurrent GNSS LCC module,
firmware in ROM, SAW filter, LNA, TCXO

NOTE:
This document provides an objective specification overview of this product. Please refer to the data sheet for details on firmware-related performance and feature support.

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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