

# Public Release Notes

<b>Topic :</b>	<b>u-blox M8 Flash Firmware 3.01 TIM 1.10</b>
	UBX-16004908
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- 1 General Information.....2**
  - 1.1 Applicability ..... 2
  - 1.2 Released firmware image ..... 2
  - 1.3 Released documentation ..... 2
  - 1.4 Released software tools ..... 2
    - 1.4.1 u-center ..... 2
    - 1.4.2 Firmware update tool ..... 2
  - 1.5 USB drivers ..... 2
  - 1.6 USB identification u-blox M8 ..... 3
  - 1.7 Multiple-GNSS Assistance Library ..... 3
- 2 Features ..... 3**
  - 2.1 Standard features ..... 3
  - 2.2 Time Sync product variant ..... 3
  - 2.3 Default configuration..... 4
- 3 Protocol Message changes ..... 4**
  - 3.1 New Protocol Messages ..... 4
  - 3.2 Modified Protocol Messages ..... 5
- 4 Improvements and changes ..... 5**
  - 4.1 New Features..... 5
    - 4.1.1 BeiDou sensitivity ..... 5
    - 4.1.2 BeiDou UTC conversion ..... 5
    - 4.1.3 Galileo reception ..... 5
    - 4.1.4 Galileo SAR / RLM ..... 5
    - 4.1.5 Signature for message integrity ..... 5
    - 4.1.6 Geofencing ..... 5
    - 4.1.7 Spoofing detection ..... 6
    - 4.1.8 Wrist use case mitigation..... 6
    - 4.1.9 Power Save Mode improvements..... 6
  - 4.2 Changes ..... 6
    - 4.2.1 'Boot screen' and in UBX-MON-VER ..... 6
    - 4.2.2 Firmware Update..... 6
    - 4.2.3 Week number rollover..... 6
- 5 Limitations ..... 7**

5.1	Time-base selection .....	7
5.2	Navigation rate .....	7
5.3	Coordinate frames.....	7
5.4	Selective control of GNSS reception .....	7
5.5	Cold start just before leap-second .....	7
5.6	Power-Save Mode with active-LO time-pulse .....	7
5.7	Phase offsets in multi-GNSS operation .....	7
5.8	UBX-AID-INI Time report .....	7
5.9	UBX-TIM-TP .....	7
5.10	Application of Time and Position accuracy thresholds.....	8

## 1 General Information

### 1.1 Applicability

This firmware operates with LEA-M8T and NEO-M8T modules.

### 1.2 Released firmware image

#### Flash image for u-blox M8

Files: `UBX_M8_301_TIM_110.9a999e9cf84f0b3a0a7ed0146d20e5cc.bin`

FW ID String: `EXT CORE 3.01 FWVER=TIM 1.10`

Supports ROM base: 2.01, 3,01

### 1.3 Released documentation

Receiver Description / Protocol Specification:

Content	File
u-blox M8, u-blox 8 : UBX Protocol v22	UBX-13003221

### 1.4 Released software tools

Note that the minimum version of tools specified below is required to re-program (Flash) a module running this version of firmware.

#### 1.4.1 u-center

u-center v8.20 and later should be used together with this firmware.

#### 1.4.2 Firmware update tool

The firmware update utility tool v2.01 supports this product.

### 1.5 USB drivers

- u-blox Windows USB CDC-ACM driver v1.2.0.8
- u-blox Windows USB Sensor driver v2.22

The latest drivers are available from the Product Resources section of the u-blox web-site <http://www.u-blox.com>

## 1.6 USB identification u-blox M8

Vendor ID: 0x1546  
Product ID: 0x01A8  
Driver String: u-blox GNSS receiver

## 1.7 Multiple-GNSS Assistance Library

libMGA v1.04 supports this product.

## 2 Features

### 2.1 Standard features

This release incorporates the standard features of **u-blox M8 version 3.01 Standard Precision GNSS Firmware** described in Release Notes UBX-16000319 unless identified below.

### 2.2 Time Sync product variant

The Time Sync features supported by this release are summarized in the table below:

Feature Name	Description
<b>Fixed/time mode operation</b>	The receiver can be configured to assume a fixed position. This improves timing output wander, especially under poor signal conditions and allows continuity of timing with a signal from just one satellite if required. This feature can be controlled by CFG-TMODE2.
<b>Survey in</b>	The receiver can determine its own fixed position (see above) based on an average of observations over time. The minimum time of the survey (typically several hours) can be configured along with a threshold for maximum variance between observations. Once survey in is finished, the receiver will switch into fixed/time mode. This feature can be controlled by CFG-TMODE2, additionally the state of survey in can be observed with TIM-SVIN
<b>Raw measurement output</b>	The receiver provides raw code phase, carrier phase as well as Doppler measurements to the user. The measurements are provided by the RXM-RAWX message.
<b>High sensitivity GPS aided start acquisition</b>	This feature supports acquisition of GPS signals at very low levels using aiding meeting the following minimum requirements: <ol style="list-style-type: none"><li>1. Position with at least 3000 km accuracy</li><li>2. Time with at least 1s accuracy.</li><li>3. Current ephemeris</li></ol> It can take up to 20 minutes for the receiver to find the weakest signals.

## 2.3 Default configuration

The default configuration is optimized for timing applications and is compatible with the previous release FW2.30 TIMRAW1.02. The following table summarizes the significant differences between GNSS firmware 3.01 and the TIM1.x firmware.

Configuration	FW2.30 TIMRAW1.02 (previous release)	FW3.01 TIM1.10 (this release)	FW3.01 (SPG) (standard precision products)
CFG-TP5 (gridUtcGnss)	1 – GPS	1 – GPS	0 – UTC
CFG-NAV5 (utcStandard)	3 – USNO	3 – USNO	0 – Automatic
CFG-NAV5 (dynModel)	2 – stationary	2 – stationary	2 – portable
CFG-NAVX5 (minCNO)	9	9	6
CFG-GNSS	SBAS disabled	SBAS disabled	SBAS enabled
CFG-PM2 (waitTimeFix)	1	1	0

## 3 Protocol Message changes

This release note identifies changes compared with u-blox M8 firmware version 2.30 TIMRAW 1.02 and should be read in conjunction with Release Notes UBX-15012995 for a comprehensive list of changes with respect to earlier versions.

### 3.1 New Protocol Messages

Message	Remark
UBX-CFG-DYNSEED	Dynamic key for signing messages
UBX-CFG-FIXSEED	Secret key and configuration for signing messages
UBX-CFG-GEOFENCE	Geofencing configuration
UBX-CFG-PMS	Power mode setup
UBX-MGA-BDS	Extension of MGA to support BeiDou
UBX-MGA-GAL	Extension of MGA to support Galileo
UBX-NAV-EOE	End of epoch indication
UBX-NAV-GEOFENCE	Geofencing status
UBX-NAV-TIMEGAL	Galileo time information
UBX-NAV-TIMELS	Provides leap second information (current value and future events)
UBX-RXM-IMES	IMES beacon information (replacement for UBX-NAV-IMES)
UBX-RXM-PMREQ	New version to request a power management task with additional fields
UBX-RXM-RLM	Galileo SAR RLM messages (short and long)
UBX-SEC-SIGN	Message signature
UBX-SEC-UNIQID	Retrieving unique chip ID

## 3.2 Modified Protocol Messages

Message	Remark
UBX-CFG-GNSS	Added parameters to cover Galileo
UBX-CFG-NAV5	New dynamic model "wrist" added
UBX-CFG-PM2	New fields
UBX-CFG-TP5	Added support for Galileo time-base
UBX-MON-GNSS	Added support for Galileo
UBX-NAV-PVT	Added flags for UTC time and date confirmation
UBX-NAV-STATUS	Addition of spoofing status flag
UBX-RXM-SFRBX	Added support for Galileo

## 4 Improvements and changes

### 4.1 New Features

This chapter summarizes the new Timing features in this release compared with FW 2.30 TIMRAW 1.02. These features are described in detail in to u-blox 8 / u-blox M8 Protocol Specification (UBX-13003221) specified above.

#### 4.1.1 BeiDou sensitivity

BeiDou acquisition sensitivity has been improved in this release.

#### 4.1.2 BeiDou UTC conversion

Accuracy of NTSC UTC timing output has been improved during the latter part of the BeiDou week.

#### 4.1.3 Galileo reception

This release supports reception of signals from the Galileo constellation.

#### 4.1.4 Galileo SAR / RLM

This release supports reception of Galileo SAR (Search And Rescue) RLM (Return Link Message) messages.

#### 4.1.5 Signature for message integrity

This release offers a mechanism to ensure the integrity of messages passed over receiver IO interfaces. The mechanism can be activated using the message UBX-CFG-FIXSEED

#### 4.1.6 Geofencing

FW3.01 provides a feature that can set up to 4 circular geofences, and upon configuring UBX-CFG-GEOFENCE, a PIO can be toggled on entering or exiting a geofence. Polarity of the PIO can be configured as well.

The geofence status can be retrieved also polling the message UBX-NAV-GEOFENCE.

Geofence can be used in combination with the power save modes.

### 4.1.7 Spoofing detection

FW3.01 features a spoofing detection mechanism which monitors the GNSS signals for certain patterns indicating that the received signals may not be genuine. A flag in UBX-NAV-STATUS alerts the user to potential spoofing.

### 4.1.8 Wrist use case mitigation

A new dynamic model has been added in UBX-CFG-NAV5 primarily for sports use-cases. The 'WRIST' model mitigates the effect of the wrist movement while walking or running.

### 4.1.9 Power Save Mode improvements

Power save modes may be applied in positioning applications for any supported GNSS signals with this release. Support for timing applications in power save mode is limited to GPS on/off low duty-cycle mode.

In order to simplify configuration of power save modes, the message UBX-CFG-PMS offers a selection of pre-defined settings. The following pre-set configurations are available: Balanced (default), Full Power, Aggressive 1Hz, 2Hz and Interval. Interval setup allows setting two additional parameters for fine tuning the ON/OFF mode.

## 4.2 Changes

### 4.2.1 'Boot screen' and in UBX-MON-VER

In order to generate consistent information across our positioning product line, the 'boot screen' and message UBX-MON-VER have been adapted. (The boot screen is text output sent from the receiver's interfaces during initialisation.)

The major differences are:

1. Date and time of the compilation have been removed
2. Line for FWVER which mentions the type of build
3. GNSS supported system is now split into major GNSS (in that case GPS, GLO, GAL and BDS) and augmentation systems (here SBAS, IMES and QZSS)

UBX-MON-VER has been updated to provide the same information of the boot screen in the same format.

### 4.2.2 Firmware Update

The mechanism for firmware update has changed. The messages UBX-UPD-UPLOAD, UBX-UPD-DOWNL and UBX-UPD-EXEC have been replaced. Please ensure you have access to the tools identified in Section 1.4 before changing firmware.

### 4.2.3 Week number rollover

The week number rollover is set to 1867 (October 2015). For test purposes (e.g. with historical simulations) the week number rollover can be adjusted in message UBX-CFG-NAV5.

## 5 Limitations

This release is optimized for timing applications. As a result of these optimizations, performance in navigation applications may be marginally worse than a u-blox Standard Precision GNSS release.

### 5.1 Time-base selection

The firmware may be configured to select the GNSS-specific time-base used for time-pulse alignment and uncertainty estimation automatically based on an order of preference (see u-blox M8 Protocol Specification UBX-13003221 for details). However, in timing applications we recommend explicit selection of the preferred time-base using fields in UBX-CFG-TP5 and UBX-NAV5 (UTC selection). In general the selected time-base should match one of the received constellations.

### 5.2 Navigation rate

The maximum reliable navigation rate is 4Hz in multi-constellation modes (3Hz with Galileo enabled) and 10Hz in single constellation modes.

### 5.3 Coordinate frames

The different GNSS systems employ different coordinate frames to express their satellite positions. However, all output in NMEA and UBX is related to WGS84, regardless of the GNSS used.

### 5.4 Selective control of GNSS reception

Changes to UBX-CFG-GNSS require the receiver to re-start with a consequential interruption to timing. The ranges of tracking channels that can be assigned to each constellation is more restrictive than in previous releases. Please contact your local u-blox support team for guidance on use of multiple constellations in timing applications.

### 5.5 Cold start just before leap-second

The receiver may not handle leap-second change events correctly when a cold-start is initiated in the 60s before the change event.

### 5.6 Power-Save Mode with active-LO time-pulse

The receiver may reset repeatedly on entering sleep mode in on/off power save mode if the time-pulse is configured active-LO and no time fix of sufficient accuracy has been achieved within the configured time-out.

### 5.7 Phase offsets in multi-GNSS operation

Phase differences of up to 20ns may be observed in some circumstances when concurrent GNSS operation is enabled compared with single GNSS.

### 5.8 UBX-AID-INI Time report

The time reported when polling deprecated message UBX-AID-INI is correct only if GPS is selected as the Timegrid in UBX-CFG-TP5.

### 5.9 UBX-TIM-TP

The UBX-TIM-TP message (reporting the precise time of the following time-pulse) is generated every second regardless of the configured time-pulse rate and delivers correct information only for a time-pulse configured at a 1Hz rate.

## 5.10 Application of Time and Position accuracy thresholds

Please note that the position accuracy thresholds configured in UBX-CFG-NAV5 for navigation (pAcc) and timing (tAcc) fixes apply independently. Timing is available for fixes within the tAcc threshold alone, regardless of the pAcc threshold.