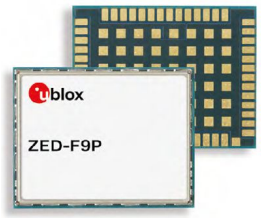
FW 1.00 HPG 1.50

ZED-F9P

Release Note



Abstract

This document contains general information, interface changes and firmware changes (features, improvements), along with known limitations for FW 1.00 HPG 1.50.

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Document information

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Contents

1 General information

1.1 Scope

This Release Note applies to ZED-F9P with Firmware 1.00 HPG 1.50.

The document covers the changes in the ZED-F9P firmware compared to firmware version FW 1.00 HPG 1.32. Please refer to u-blox ZED-F9P Release Note FW 1.00 HPG 1.32 for a full description.

1.2 Released firmware image

File	UBX_F9_100_HPG_150_ZED_F9P.82afa0b888dab694869a5098bf3a9f0b.bin
Firmware version	EXT CORE 1.00 (f17067) FWVER=HPG 1.50
ROM base support	ROM 1.02 - ROM BASE 0x118B2060 ROM 1.01 - ROM BASE 0xDD3FE36C ROM 0.40 - ROM BASE 0xCAAF619C

Table 1: Released firmware image for u-blox ZED-F9P

1.3 Related software

Version 24.05 (or later) of u-center GNSS evaluation software is recommended for use with the released firmware. Please contact FAE if this version is not available on the official web site.

1.4 Open-Source declaration

This u-blox positioning product described in this release note, comprising the company's proprietary software, does not contain open-source software to declare.

1.5 Related documents

[1] HPG 1.50 Interface description, UBXDOC-963802114-12815
[2] ZED-F9P-05B Data sheet, UBXDOC-963802114-12824
[3] ZED-F9P Integration manual, UBXDOC-963802114-10977
[4] ZED-F9P Release note FW 1.00 HPG 1.32, UBX-22004887

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2 Firmware description

This section highlights selected features supported by this firmware.

- The firmware image contains multi-band (L1/L2) RTK base and rover using all major GNSS constellations.
- The firmware image supports raw code and carrier phase measurement output for all supported GNSS signals.

2.1 Supported GNSS constellations and signals

- GPS: L1C/A, L2C
- GLONASS: L1, L2
- Galileo: E1B, E5b
- BeiDou: B1I, B2I
- QZSS: L1C/A, L2C

2.2 High precision GNSS features

- New features:
  - Beidou support for SPARTN
  - Jamming detector with logging
  - Galileo OSNMA including extensions to validate position and time
  - Department of Homeland Security Allows List data validation
  - Conservative Ambiguity resolution mode for applications requiring reduced false RTK fixing while increasing time to ambiguity fix
  - Support for RTCM version 3.4
  - Improved modelling for SPARTN services during periods of elevated ionospheric activity
- RTK rover receiver features:
  - High precision RTK fixed navigation using multi-band, multi-constellation GNSS
  - RTCM input support (details below), supporting Network RTK (VRS) and local base stations, e.g. another ZED-F9P module
  - SPARTN input support for GPS, GLONASS, Galileo and Beidou with fast reconvergence time
  - CLAS input support for QZSS
    - The CLAS augmentation service is broadcasted by a QZSS L6 signal which is not part of the frequency range covered by ZED-F9P. As such, ZED-F9P does not support receiving, demodulating and decoding of the QZSS L6 signal. This is supported by NEO-D9C which then must pass the correction stream to ZED-F9P in the form of UBX-RXM-QZSSL6 messages. This enables the ZED-F9P to directly use these messages and extract the compact SSR (cSSR) formatted corrections in order to use them directly without further processing or reformatting by an intermediary.
  - SBAS
- RTK reference receiver features:
  - Fixed position mode and Survey-in mode
  - Output RTCM standard format
- Raw measurements:
  - Multi-band, multi-GNSS raw measurement data output (UBX-RXM-RAWX)
  - Navigation data subframe output (UBX-RXM-SFRBX)
- UBX messages on all interfaces

- Protection Level output to indicate level of trust in position output
- Secondary standard precision GNSS output in addition to RTK output
- Embedded spectrum analyzer to visualize in-band noise sources
- Direct physical connection with L-band receiver
- Moving base

3 Message interface

The message interface is described in the u-blox F9 HPG 1.50 Interface description, UBXDOC-963802114-12815. The released firmware supports UBX protocol version 27.50.

3.1 UBX

The ZED-F9P relies exclusively on the configuration interface using the UBX-CFG-VALSET, UBX-CFG_VALGET and UBX-CFG-VALDEL. Although some undocumented legacy UBX-CFG-* messages are functional, users are strongly discouraged from using these deprecated messages.

The protocol is completely documented in the Interface description.

3.2 NMEA

FW 1.00 HPG 1.50 supports up to NMEA protocol version 4.11.

Five NMEA standards are supported. The default NMEA version is 4.11, and, alternatively, versions 4.10, 4.0, 2.3, and 2.1 can be enabled.

3.3 RTCM

FW 1.00 HPG 1.50 supports up to RTCM3 standard version 3.4.

3.4 SPARTN

FW 1.00 HPG 1.50 supports up to SPARTN protocol version 2.0.1.

3.5 Interface changes

☞ Interfaces changes are comparing HPG1.32 to this version.

3.5.1 New

Message / Configuration item	Description / Comment
CFG-HW-ANT_ON_SHORT_US	Delay in microseconds between turning the antenna power supply on and enabling the antenna short circuit detection.
CFG-MSGOUT-UBX_SEC_SIGLOG_I2C CFG-MSGOUT-UBX_SEC_SIGLOG_SPI CFG-MSGOUT-UBX_SEC_SIGLOG_UART1 CFG-MSGOUT-UBX_SEC_SIGLOG_UART2 CFG-MSGOUT-UBX_SEC_SIGLOG_USB	Output rate of the UBX-SEC-SIGLOG message on port I2C/SPI/UART1/UART2/USB
CFG-MSGOUT-UBX_SEC_SIG_I2C CFG-MSGOUT-UBX_SEC_SIG_SPI CFG-MSGOUT-UBX_SEC_SIG_UART1 CFG-MSGOUT-UBX_SEC_SIG_UART2 CFG-MSGOUT-UBX_SEC_SIG_USB	Output rate of the UBX-SEC-SIG message on port I2C/SPI/UART1/UART2/USB

Message / Configuration item	Description / Comment
CFG-SBAS-ACCEPT_NOT_IN_PRNMASK	Accept corrections from SBAS SV, even if not self included in PRN MASK (Message Type 1)
SPARTN-1X-HPAC_BDS	BeiDou high-precision atmosphere correction (HPAC)
SPARTN-1X-OCB_BDS	BeiDou orbit, clock, bias (OCB)
UBX-SEC-SIG	Signal security information
UBX-SEC-SIGLOG	Signal security log
CFG-GAL-OSNMA_MINTAGLENGTH CFG-GAL-OSNMA_TIMESYNC CFG-GAL-USE_OSNMA	Configuration items for OSNMA. See HPG 1.50 interface description for more information.
UBX-SEC-OSNMA	Information related to the execution of OSNMA protocol
CFG-MSGOUT-UBX_SEC_OSNMA_I2C CFG-MSGOUT-UBX_SEC_OSNMA_SPI CFG-MSGOUT-UBX_SEC_OSNMA_UART1 CFG-MSGOUT-UBX_SEC_OSNMA_UART2 CFG-MSGOUT-UBX_SEC_OSNMA_USB	Output rate of the UBX-SEC-OSNMA message on port I2C/SPI/UART1/UART2/USB
CFG-MSGOUT-UBX_NAV_TIMETRUSTED_I2C CFG-MSGOUT-UBX_NAV_TIMETRUSTED_SPI CFG-MSGOUT-UBX_NAV_TIMETRUSTED_UART1 CFG-MSGOUT-UBX_NAV_TIMETRUSTED_UART2 CFG-MSGOUT-UBX_NAV_TIMETRUSTED_USB	Output rate of the UBX-NAV-TIMETRUSTED message on port I2C/SPI/UART1/UART2/USB
CFG-NAVSPG-MAX_TIMETRUSTED_ACC	Maximum trusted time accuracy value to perform time authentication
CFG-SBAS-ACCEPT_NOT_IN_PRNMASK	If enabled, the receiver will still use the SBAS data, even when the SBAS SV itself is not included in its PRN MASK. This is only useful for BDSBAS and not compatible whith current EGNOS implementation.
CFG-SEC-JAMDET_SENSITIVITY_HI	When set, go for a more sensitive jamming detection (at the cost of increased false alarm rate).
CFG-SEC-SPOOFDET_SIM_SIG_DIS	Disabling the simulated signal spoofing detection
CFG-NAVSPG-ONLY_AUTHDATA	If enabled, the receiver uses only signals with authenticated navigation data. Default: disabled (loose mode)
CFG-NAV2-NAVSPG_ONLY_AUTHDATA	If enabled, the receiver uses only signals with authenticated navigation data. Default: disabled (loose mode)

3.5.2 Modified

Message / Configuration item	Description / Comment
UBX-NAV-PL	Message now reports invalidity reasons for position, velocity and time protection levels

Message / Configuration item	Description / Comment
UBX-RXM-SPARTNKEY	When the receiver accepts a valid message, it sends a UBX-RXM-SPARTNKEY-POLL message back to the caller, to indicate success
CFG-NAVSPG-WKNROLLOVER	Updated from 2265 to 2320
CFG-NAVHPG-DGNSSMODE	Added RTK_CAR for conservative ambiguity resolution
UBX-NAV-PVT, UBX-NAV2-PVT	Added NMA fix status (nmaFixStatus) and Time authentication status (authTime)
UBX-NAV-SIG, UBX-NAV2-SIG	Added authentication status (authStatus) of the navigation data used to compute the satellite's position in current navigation epoch
UBX-MGA-GAL	Added new message versions for delivering public key and Merkle tree root for Galileo OSNMA service
UBX-MGA-INI	Added new indicator 'trustedSource' for replay attack detection

3.5.3 Removed

Message / Configuration item	Description / Comment
UBX-CFG-ITFM CFG-ITFM-ENABLE CFG-ITFM-ENABLE_AUX CFG-ITFM-CWTHRESHOLD CFG-ITFM-ANTSETTING CFG-ITFM-BBTHRESHOLD	Jamming/interference monitor configuration
CFG-LOGFILTER-ONCE_PER_WAKE_UP_ENA	Logfilter configuration

4 Improvements

- UBX-RXM-COR reports correctly when SPARTN correction sourse is set to LBAND
- UBX-RXM-COR and UBX-RXM-SPARTN messages get output for encrypted SPARTN protocol corrections, while the configuration item CFG-SPARTN-USE_SOURCE is set to IP and no valid key is available in UBX-RXM-SPARTNKEY
- Encrypted SPARTN protocol corrections received on UART2 are reported as SPARTN input in UBX-MON-COMMS and UBX-MON-MSGPP, while the configuration item CFG-SPARTN-USE_SOURCE is set to IP and no valid key is available in UBX-RXM-SPARTNKEY
- UBX-MON-RF repeated block updated to match documentation in Interface Description
- SPARTN keys switch to next one works even if “valid from ToW” (i.e. start of the week) value is zero
- PointPerfect keys switch correctly if the server is sending messages with GLONASS timetags. This fixes an issue in previous ZED-F9P firmware release (HPG 1.32) causing the key switch to happen 3 hours too early when the PointPerfect service sends a stream with GLONASS messages. This had the consequence of a 3 hour window where the decrypted messages were invalid.
- Improved the robustness of the recovery mechanism of the antenna supervisor
- Improved fixing rate with CLAS corrections
- Increased robustness of receiving SBAS corrections
- Improved UBX-INF-ERROR message reporting on UART2 interface
- Static hold mode works reliably also with navigation rates higher than 1 Hz
- Improved SPI robustness with large messages
- Enabled BDS satellites 38 to 58 for HPG processing
- Increase SPARTN DB slots to accomodate increased total satellite numbers with correction streams.
- Improve SPARTN troposphere quality mapping to improve fix rate with LPP correction stream.
- Improve receiver robustness in a case of bad 2D fix
- Improved carrier range status (CarrSoln) reporting in UBX-NAV-PVT

5 Known limitations

- A receiver moving at very slow speed (less than 10 cm/s) does not update the heading information in UBX-NAV-PVT. The velocity vectors can be used reliably.
- Geofence status pin must not be re-assigned to another pin
- If the receiver is configured to output RTCM messages on several ports, the ports must have the same RTCM configuration, otherwise the MSM multiple message bit might not be set correctly
- Time pulse can only be synced to GNSS. Configuration items and relevant flag cannot be set to false (CFG-TP-SYNC_GNSS_TP1, UBX-CFG-TP5)
- In FW HPG 1.50, ZED-F9P-05B update rate is lower than the previous FW version. For more details, see Data sheet.