

AsteRx2eH Firmware Package v3.4.0

Release Notes

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Versions 3.x of the firmware for AsteRx2eH receivers introduce a new and improved RTK & heading engine that uses both GPS and GLONASS satellites to compute a Fixed RTK & heading solution. Compared to 2.x versions of the firmware, 3.x versions provide a shorter time-to-Fixed RTK & heading, as well as more robust RTK & heading operation in difficult environments. The position update rate is currently limited to 10 Hz. A firmware version supporting higher update rates will be introduced later on, until which time users requiring update rates higher than 10 Hz should use versions 2.x of the firmware. In order to indicate that the 2.x firmware needs to be loaded on the receiver, the option "P2273" should be specified when ordering.

These Release Notes describe version 3.4.0 of the Firmware Package used with the Septentrio AsteRx2eH Product Group (based on SSRC2). This Firmware Package, possibly delivered on a Companion USB Flash Drive, contains components of the AsteRx2eH firmware and the relevant manuals.

Release References

Firmware Package version:	3.4.0
Applicable Product Group:	AsteRx2eH
Supported Receiver Platform:	SSRC2
Release Date:	04 November 2014
AsteRx2eH Firmware version:	3.4.0, composed of:
Bootloader version:	2.5
Upgrade Firmware version:	1.0.4
GNSS Firmware version:	3.4.0
FPGA Configuration version:	00B21102
AsteRx2eH User Manuals:	
Firmware User Manual for firmware version:	3.4.0
Command and Log Reference Card for firmware version:	3.4.0
Command Line Interface Reference Guide for firmware version:	3.4.0
SBF Reference Guide for firmware version:	3.4.0
SNMP' Technical Note version:	1.2
Antenna Information version:	1.6.2

Deliverables

One AsteRx2eH Firmware Package v3.4.0 Companion USB Flash Drive, or an equivalent cd-AsteRx2eH-FWP-3.4.0/ directory, containing:

1. RelNotes.pdf, these Release Notes
2. License.txt, the license for the AsteRx2eH firmware
3. Copyright.txt, the copyright for the AsteRx2eH firmware

4. `gpl.txt`, the GNU Public License, version 2
5. Directory `manuals/` containing the receiver manuals:
 - 5.1. `Firmware User Manual.pdf`, the manual of the AsteRx2eH firmware
 - 5.2. `AsteRx2eH Firmware v3.4.0 Command And Log Reference Card.pdf`, a Reference Card showing all the commands, SBF and NMEA messages supported by the AsteRx2eH
 - 5.3. `AsteRx2eH Firmware v3.4.0 Command Line Interface Reference Guide.pdf`, the Reference Guide explaining the details of the AsteRx2eH Command Line Interface
 - 5.4. `AsteRx2eH Firmware v3.4.0 SBF Reference Guide.pdf`, the Reference Guide explaining the details of the Septentrio Binary Format
 - 5.5. `SNMP' Technical Note.pdf`, the technical note explaining the details of Septentrio's SNMP' binary interface
6. Directory `firmware/` containing:
 - 6.1. `ssrc2-1.0.4_upgrade_all.suf`, an integrated firmware upgrade file for AsteRx2eH, in SUF format, containing the Bootloader v2.5 and the Upgrade Firmware v1.0.4
 - 6.2. `ssrc2-fw-3.4.0.suf`, an integrated firmware upgrade file for AsteRx2eH, in SUF format, containing the GNSS Firmware v3.4.0, the FPGA configuration 00B21102 and the antenna information file
 - 6.3. Subdirectory `fwcomponents/` containing AsteRx2eH upgrade files:
 - 6.3.1. `ssrc2-1.0.4_upgrade.suf`, the Upgrade Firmware v1.0.4, in SUF format
 - 6.3.2. `ssrc2-fpgacfg-00B21102.srec`, the FPGA configuration in S-Record format
 - 6.3.3. `ssrc2-gnssfw-trkp-3.4.0.srec`, the GNSS Firmware for the tracker processors, in S-Record format
 - 6.3.4. `ssrc2-gnssfw-mainp-3.4.0.srec`, the GNSS Firmware for the main processor, in S-Record format
 - 6.4. Subdirectory `antinfo/` containing the antenna information files, which provide absolute antenna offsets and phase centre variations for various antennas:
 - 6.4.1. `ant_info.abs`, the antenna information source file in ABS format
 - 6.4.2. `ant_info.srec`, the antenna information file in S-Record format, derived from `ant_info.abs`
 - 6.4.3. `ant_info.suf`, the antenna information file in SUF format, derived from `ant_info.abs`

Note: The `<upgradefile>.srec` S-Record files are used by the manual upgrade procedure.

(All files whose names end with `.pdf` are Adobe PDF documents, which can be read and printed with Adobe Reader and other programs. All files whose names end with `.txt` are plain text files.)

AsteRx2eH Firmware

Version 3.4.0 of the AsteRx2eH firmware has been tested with version 1.10.2 of RxTools, which can be obtained either from <http://www.septentrio.com/machine-control> or from Septentrio Support (support@septentrio.com).

Installing the AsteRx2eH Firmware

In order to upgrade the firmware to version 3.4.0, the following steps should be taken:

1. It should be ensured that the bootloader of the main processor is up-to-date. If the current version of the bootloader of the main processor is 2.5, this step is not required (the actual version of the bootloader of the main processor can be retrieved with *lif,identification*) and should preferably be omitted. It is necessary to ensure that the power is maintained during the procedure, as the receiver will have to be returned to Septentrio for reprogramming if the upgrade fails. The upgrade should be accomplished by utilizing the standard upgrade procedure that is described in the section *Upgrading the receiver* of the RxControl manual, in conjunction with the `ssrc2-1.0.4_upgrade_all.suf` file that is located in the `firmware/` directory. Note that a successful upgrade updates not only the bootloader of the main processor (to version 2.5), but also the Upgrade Firmware (to version 1.0.4).
2. The bootloader of the tracker processors, the GNSS Firmware (of the main and tracker processors), the FPGA configuration and the antenna information should be installed by means of the standard upgrade procedure that is described in the section *Upgrading the receiver* of the RxControl manual, in conjunction with the `ssrc2-fw-3.4.0.suf` file that is located in the `firmware/` directory.

It should be noted that the section *Upgrade the Receiver* of the Firmware User Manual also describes a manual upgrade procedure requiring neither RxControl nor RxUpgrade. This procedure can be used, for example, to install the GNSS Firmware (of the main and tracker processors) separately (if ever it becomes necessary to do so), by utilising first the `ssrc2-gnssfw-trkp-3.4.0.srec` file, and subsequently the `ssrc2-gnssfw-mainp-3.4.0.srec` file. These files are to be found in the `firmware/fwcomponents/` directory.

Differences with previous versions

Differences between v3.4.0 and v3.3.0

Version 3.4.0 brings the following new features:

1. It is now possible to transform TERRASTAR D positions in the IGS2008 datum to a standard geodetic datum. The receiver supports transformations to ETRS89 (ETRF2000), NAD83 (2011) and GDA94 (2010). Additionally, the user can enter a custom transformation.
2. Moving base is now supported by the new RTK engine, increasing the availability and reliability of the solution in challenging environments.
3. RTCMv3 and CMR messages can now be used to get a DGNSS solution, even if RTK rover is not permitted.
4. RTCM3 MSM4 messages for GPS (MT1074), GLONASS (MT1084) and BeiDou (MT1124) constellations are now supported (rover and base).
5. UDP support has been added: the receiver can transmit NMEA, SBF or differential corrections via UDP.
6. The IP ports can now be used as input of differential corrections, both in TCP and UDP mode

7. The receiver now supports the PSSN,GGK NMEA message.

Version 3.4.0 brings the following small improvements (bug-fixes):

1. The robustness of the DGNSS solution in difficult environments has been improved.
2. The NTRIP client can now connect to NTRIP casters based on Geo++ GNSMART (e.g. 06-GPS)
3. In the AuxAntPositions SBF block, the velocities relative to the main antenna are incorrect.

Differences between v3.3.0 and v2.5.1

Version 3.3.0 brought the following features:

1. GLONASS is now used in the initialization of the RTK & attitude solution.
2. The resilience of the receiver against ionospheric effects in regions between the geomagnetic equator zone and magnetic pole areas has been significantly improved.
3. The reliability of the RTK solution in difficult environments has been improved significantly, by introducing a better modelling of the different error components of the GNSS signals.
4. The accuracy of DGNSS has been improved by 30% by having the receiver discriminate between static situations and motion.
5. The AsteRx2eH can now also output NMEA GGA messages with the position of the auxiliary antenna.
6. The tracking sensitivity of the receiver has been improved, allowing the receiver to track and use weaker satellite signals, increasing position performance in challenging environments
7. It is now possible to bridge RTK correction outages of up to 2 minutes with only a marginal degradation of the accuracy, without using satellite based corrections as back up. Afterwards, the position accuracy will gradually evolve to DGNSS level which can be held for 10 minutes, extending the availability of an accurate solution without receiving corrections. (use the "setDiffCorrMaxAge, 600,120" command to enable this)
8. The AsciiDisplay output now shows the number of satellites used for the attitude calculation per constellation.
9. The range of ports in the setIPPortSettings command has been extended from to 65535 (previously the maximum value was 32767).
10. The receiver can now automatically detect which differential correction format (RTCMv2, RTCMv3, CMR or CMR+) is received.
11. The SetRTCMv3Delay has been added to enable basestations sharing the same radiofrequency to transmit their data in different timeslots.
12. Now it's possible in the webinterface to select predefined SBF groups (e.g. 'Rinex', 'Support', 'Raw Data') for output or logging.
13. NTRIP Client is now supported on the receiver as beta functionality.
14. The Receiver Configuration page in the webinterface now displays all configurations. When a configuration is different from the default receiver settings a download link is shown to download the configuration. Note that when using Internet Explorer 8 or 9 the contents is copied to the clipboard instead of downloading the configuration.

Version 3.3.0 brought the following small improvements (bug-fixes):

1. A bug in the internal logging, where the files of day 366 of a leap year were stored in an incorrectly named directory, has been fixed.
2. The formatting of the web interface related to a firmware upgrade has been improved for Google Chrome.
3. The RTCMv3 message interpretation has been modified to increase compatibility with GLONASS L2 measurements.
4. The criteria for RAIM are relaxed when the receiver is configured as a static basestation. When a user enters a slightly incorrect basestation location, the receiver will now still output RTCM corrections. Note that the RTK position solution of the rover receivers will be relative to this basestation position entered by the user.

Known Issues and Limitations of v3.4.0

1. Simultaneous RTK & Heading calculation is limited to 10Hz
2. After a complete reinitialization of the system, the NMEA ZDA message may be time-tagged with GPS time instead of UTC time until the leap second information is received from the ephemeris.
3. The health status for GPS/GLONASS satellites is reported in the ChannelStatus SBF block separately for L1 and L2 signals. Only the health status value reported for L1-CA must be used as a valid health flag for a given satellite, while the health status flag provided for L2 can be ignored.
4. The PVTInfo flag in the ChannelStatus SBF block is always set to 0.
5. The scheduled sleep command is not fully supported in this release. In some situations, the receiver might not wake up at the predefined time. As such, it is not recommended to use this functionality in this release.
6. The FTP interface should not be used to create directories on the internal disk or to upload files to the receiver as this might cause the data logging to malfunction.
7. When logging is active and the receiver time is unknown, the receiver generates files with all zeros at the date related places in the file name. These files are also pushed upon closure to a remote FTP server.
8. When using the PPP positioning mode, the SetReceiverDynamics "max" setting cannot be used.
9. It is not recommended to use continuous IGS logging at 10Hz or faster in combination with DeleteOldest on SD cards of 2GB and smaller.
10. To ensure a successful firmware upgrade over an Ethernet connection using RxControl or RxUpgrade, no other application should be connected to the receiver.
11. To avoid high CPU loads and potential logging issues, it is advised to keep the size of the log files below 1GB and limit the maximum of files generated per day to 100 files.
12. FTP Upgrade from an Anonymous FTP server is not recommended. The feature will only work when a password is provided in the password field even though it is not used.
13. The web server on the receiver has been tested with Chrome (version 38), Firefox (version 33) and Internet Explorer (version 11). In some web browsers (e.g. Chrome), access to FTP might not be supported. If you experience any problems with your browser, please use a different client application.
14. In order to allow new antennas to be supported, a number of older antennas have been removed from the antenna list. In the case that a specific antenna is not supported, a workaround may be obtained from Septentrio customer support.

Legal Notice

Septentrio does not authorize the use of its products as critical components in devices or systems intended for safety-of-life applications or in devices or systems, of which the failure may endanger life or cause injuries, unless written approval is given.

All the firmware and documentation delivered with the AsteRx2eH Firmware Package is licensed, as explained in the `License.txt`, `Copyright.txt` and `gpl.txt` files.

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