



GNSS Firmware v5.6

Release Notes

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Supported Products

Systems

- Topcon NET-G5, HiPer CR, HiPer VR, HiPer HR, GR-5+
- Sokkia GCX3, GNR5, GRX3

OEM

- Topcon B111, B111a, B125, B210 (DCM only)

Accompanying Topcon Software and Firmware

- To access all new features and improved functionality available in GNSS Firmware 5.5 or later the following Topcon software versions (or later) are recommended:
 - TRU v3.6.2 or above
 - MAGNET v8.1

Features and Changes

Major version update, including Job Programming at startup, NVRAM backup feature for all receivers with NAND (all except NOR-based GR5+ and B111-based receivers), all BDS-3 satellites support, and many tracking and positioning updates like improved Standalone positioning and PPP improvements.

General

- Added an indication of defective SD cards in non-Linux receivers in the form of BAD_CARD entries in the file system in case the SD card is not responding within SD card specification.
- Added antenna calibrations for GR-i3 with range pole adapter (TPSGRI3+RPM).
- Added GRIL command to enable of correcting base position set,/par/base/db/mode,{on,off} off by default
- Added new ambiguity resolution criteria and GRIL commands to control it. par/pos/rtk/normtest par/pos/rtk/normtestborder
- Allowed Job Programming scripts to execute without specifying output port
- Cell modem reports were improved for cases SIM cannot register in the network
- Changed Job Programming settings behavior to stay after 10s PWR button Parameters Reset while still resetting it by Clear NVRAM GRIL command.
- Changed scheduling of RTK algorithms to avoid spikes in the CPU consumption, disabled by default
- Changed the default settings for Receiver Clock Offset field in BINEX output to follow the specification
- Disabled VBS service support
- Fixed /par/pwr/curmode output for HiPer VR and GRX3
- Fixed behavior for GRIL power management commands
- Fixed command to disable Ethernet activity monitor
- Fixed false email notification about receiver movement at receiver start

- Fixed issue with used DNS servers priority changing
- Fixed issues with IS message generation
- Fixed PP logging start by PWR button in HiPer VR and GRX3
- Fixed various stability issues for non-Linux receivers if SD card is ejected during operation
- Improved CPU Load statistics message
- Improved error reporting for Cell modem if SIM is denied from registration in cell network
- Improved FTP multipush on Linux receivers in case of AFRM
- Improved handling of DHCP refresh for TCP clients b and c
- Improved handling of DIST OAF option
- Improved handling of SD Eject in Net-G5/GNR5
- Improved handling of storage removal on Linux receivers during DTP transfer
- Improved Job Programming to execute jobs in designated order
- Improved power management for GNR5\Net-G5 pwr/charge/bat
- Improved reconnection procedure in tcp client on Linux receivers
- Improved reporting of FS initialization state in GRIL which should help software to display it correctly
- Improved situation with missed and duplicated epoch under high CPU load including special indication via RK message
- Improved stability of B210 DCM when sending long GRIL commands
- Improved stability when connecting to receiver via Bluetooth
- Improved USB stability for GCX3 and HiPer CR
- Increased Job Programming command sets count to 16 and increased each Job Programming command length to 256
- Increased TCP Client reconnection interval for RTEMS based receivers
- Job Programming fix for receivers without memory storage
- Media autoformat is supported for GNR5, Net-G5, HiPer HR, GRX3, HiPer VR receivers if there is no valid partition at receiver start up.
- Supported /dev/udp/b for non-Linux receivers
- Supported files with international characters in Web File Manager
- Supported init,/setup/full command as an alias for init,/dev/nvm/a which resets normal settings and other data like job programming or navigation data
- Supported international characters for files on Linux receivers
- Supported NVRAM backup feature for Linux and non-Linux receivers.
- The set,/par/dev/nvm/a/bkp/erase,y command on non-Linux receivers is executed immediately without waiting for the set,reset,y command.
- Updated Power button behavior: now press and hold Power button for 30-35 secs not only perform Factory reset but also reset Job Programming feature. This applies to receivers that support Factory Reset by Power button press and hold.

Satellite Tracking & Positioning

- Accelerated possibility of BeiDou usage in RTK
- Added a feature to manually control AGC discriminator working point to improve tracking under interference conditions via GRIL parameter [/par/raw/dutycycle/probability with default value

0.5, and 0.95 recommended for interference conditions, which may cause slight degradation of the SNR in the absence of interference.

- Added a setting to provide additional control of conditions for RTK fix
- Added BDS 38-59 support for BINEX
- Added blacklist for Lband satellites to avoid incorrect Lband autoselection without active subscription.
- Added command to control source of DGNSS corrections when SBAS is available
- Added commands `/par/dev/nvm/a/bkp/erase` and `/par/dev/nvm/a/bkp/enable` to erase backups on next start and pause backup creation until restart
- Added `extratrust` parameter to increase availability in extrapolation mode, disabled by default
- Added GRIL parameters to get information about contents of incoming corrections
- Added handling for base station change in SkyBridge Base Estimation
- Added individual reporting of DGPS and SBAS solution types in pi message
- Added Job Programming feature to run jobs at startup with guaranteed execution via parameter `sess/job/<N>/type` which supports `at_time` and `at_start` enumeration values.
- Added letter "F" in "pi" message and used bit 8 in PI message to indicate IF mode in RTK WLIF configuration
- Added `msg/def4` set based on rX message
- Added new AMP RTK mode for conditions of strong ionospheric disturbances. Can be enabled with GRIL command `set,/par/pos/rtk/sec,scint`
- Added new Station IDs and Statuses for different PPP services (QZSS Madoca, GAL HAS, BDS B2b, etc.)
- Added parameter `[/par/]lband/checkinterval` that specifies the interval of check lock status of L-band satellite. Added parameter `[/par/]lband/selectedsat` that specifies the L-band satellite, selected by auto mode.
- Added PCV support for Starpoint Ntrip PPP streams
- Added possibility to ignore preamble and accelerate satellites usage in PPP.
- Added pX TPS message with combined position data
- Added reporting of 2nd power input for NET-G5 in the PW message
- Added RTCM135 to Web interface if Radio firmware supports it
- Added settings to control PPP integer ambiguity resolution procedure
- Added special mode for RTK kinematic scenario with obstacles
- Added storing BeiDou CNAV navdata in NVRAM
- Added support for more than 64 satellites to `jps/Lh` Log History message
- Added support for RINEX 4.01
- Added support for RTCM3 message 1013
- Added support of Free PPP Galileo HAS Service, including HAS corrections decoding, GRIL commands `pos/ppp/source,galhas`, OAF dependance SPPP bit#5 and use in PPP positioning
- Added support of Triple/Quad frequency PPP engine
- Added support to automatically select available L-band satellite when position is computed
- Added TI message with troposphere and ionosphere data
- Allow OAF installation via RWEB if options are expired
- Automatic Gain Control fixed for B210 DCM
- Changed default setting 'pdp' to prioritize velocity computation quality in 100Hz mode, customers who don't need velocity data when working in 100Hz mode are strongly encouraged to change this mode to normal by setting `pdp=on`

- Changed default values for some settings from [/par/]binex/meas/...
- Changed nmea/ZDA to output data only if time is computed
- Code measurements for B111(a) has been fixed.
- Code measurements for BeiDou B2 on GR5+ have been tuned.
- Default value of param /par/lband/sat changed to "auto". Default value of param /par/lband/checkinterval changed to 30
- Added parameter [/par/]base/satellites/include that instructs the receiver, configured as an RTK base, which satellites to include to transmitted CMR/RTCM/RTCM3 messages
- Added parameter [/par/]base/signals/safemode that instructs the receiver, configured as an RTK base, which signals to include to transmitted CMR/RTCM/RTCM3 messages
- Enabled by default separate processing of BDS Phase 2 and Phase 3 in RTK
- Expanded PI message to 2 bytes. Using 9-10 bits for DGPS corrections source
- Extended precision of pppb/userseed RMS printing up to 3 digits after comma
- Extended standard message set with additional diagnostics
- Fixed a minor issue when ordering jps/rd message
- Fixed an issue when TEAM 'access denied' error code was returned in case not related to TEAM
- Fixed connection issues to some specific Ntrip 2.0 casters
- Fixed customer reported issue that remove,/log/ changes the active log message set to default
- Fixed displaying "HiPer_CR" receiver model in "Bus reported device description"
- Fixed error code in case of empty raw/clp/qll parameter
- Fixed fast GPS almanac data collection
- Fixed freezing of time since last loss-of-lock in case of _RAW option is equal to 5
- Fixed GALILEO INAV in RINEX output
- Fixed GLN L2C autonomous tracking mode
- Fixed GPS L1P, L2P specific tracking logic
- Fixed handling of manually entered base line in HD2 mode
- Fixed how RMS is stored for user provided PPP estimated base station data
- Fixed incorrect time scale bit output in rD message
- Fixed IRNSS/NavIC alert flag checking.
- Fixed issue with FTP push of rinex files by making the file names unique
- Fixed issue with incomplete NMEA GSV output if SBAS are tracked
- Fixed issue with incorrect filling of PDOP values during blind DION extrapolation
- Fixed issue with missing QZSS L6 measurements in tps files (did not affect positioning)
- Fixed issue with stepover behavior and not RTK solution types
- Fixed issues with GLONASS L3 tracking
- Fixed issues with sourcetable reporting when using Ntrip UDP
- Fixed NMEA GSV output when elevation and azimuth are not available
- Fixed output of GAL F/NAV almanac data
- Fixed output of GD message, tlm field specifically.
- Fixed output of solution type in Skybridge mode
- Fixed rare issue with duplicated epochs output
- Fixed rare issue with IRNSS tracking
- Fixed rare issues with GPS P-code acquisition that may lead to RTK outliers
- Fixed reporting of RTK usage status for SBAS satellites
- Fixed RINEX file names for hourly data files
- Fixed RMS reporting for BufferCorrector solution

- Fixed saving of GNSS signal tracking parameters in NVRAM for B210 DCM
- Fixed Scintillation indices output in IS message
- Fixed simultaneous output of messages from QZSS L6 demodulator (QD, rd, qs)
- Fixed SNR20 counter for GAL E1B signal
- Fixed spurious output of rd and qs messages
- Fixed the bias in IRNSS L5 code measurements
- Fixed typo in TCP connection prompt for HiPer VR receiver
- Fixed WD message output (SBAS raw data)
- Fixes for RAIM for B210 DCM
- Full support of BeiDou satellites has been add to tracking and raw data generation.
- Implemented automatic detection of correction type for any period of corrections
- Improved acquisition time of GPS L2C
- Improved all RTK modes including WLIF to detect and correct big RTK outliers
- Improved B2 handling in RTK, specifically increased priority of B2b over B2a and improved B2b and B2i mixed usage.
- Improved CMRx decoder for Galileo and Beidou
- Improved Correction Age reporting in ST message
- Improved detection of Galileo phase measurements ambiguity on acquisition
- Improved Ethernet stability at start up for GNR5\Net-G5
- Improved file system mounting in GCX3, HiPer CR and OEM boards to avoid affecting navigation
- Improved file system support for non-Linux receivers
- Improved Galileo acquisition
- Improved Galileo E5A raw data measurements
- Improved GLONASS biases detection logic when working with RTCM3 corrections coming from 3rd party base stations
- Improved GLONASS L3 phase measurements generation
- Improved GNSS signal acquisition time for B210 DCM
- Improved GNSS signal acquisition when using USB for non-Linux receivers
- Improved handling of GPS L2P and L2C simultaneously present in RTK corrections
- Improved handling of Skybridge base position seeding parameter if receiver is restarted
- Improved handling of static to kinematic switching in stop and go mode
- Improved HD2 accuracy in extrapolation mode
- Improved ionospheric detection indicators (IS message)
- Improved reliability of BDS B2a signal acquisition
- Improved reliability of carrier phase ambiguity detection for BDS B1C signal
- Improved reliability of GPS L1P, L2P signal acquisition
- Improved reporting of satellites statuses that cannot be used for RTK
- Improved RMS estimations for PPP modes
- Improved RMS output for BC mode used for kinematic scenarios with obstacles
- Improved RMS reporting for RTK
- Improved RTK TTFF
- Improved satellite acquisition on B111A based receivers when using USB
- Improved SBAS and DGPS RTCM2 positioning if ionofree standalone mode is enabled
- Improved stability and tracking by optimizing CPU usage at startup
- Improved stability of cell in NET-G5 and GNR5
- Improved stability when DHCP is used in non-Linux receivers

- Improved Standalone positioning accuracy for all boards besides B111, B111A and GR5+
- Improved Starpoint PPP engine behavior when the set of satellites in the Ntrip corrections changes.
- Improved storing of data in NVRAM which will help to avoid issues after upgrading or downgrading firmware version
- Improved the acquisition reliability of GAL E5 signals
- Improved time to get SBAS solution
- Improved TTFF time for receivers with leased options
- Iono-free mode improvements to reduce first fix shifts.
- Job Programming fix for receivers without memory storage
- jps/rP message added to def/msg2 set
- Parameter /par/dev/blk/<b,d>/autoexport now is stored in permanent area of NVRAM
- Port CSSR tropospheric delay calculation from PostPPP to FW
- Removed obsolete parameters from /par/raw and /par/lock
- Removed SMTP free Topcon settings because the service was discontinued.
- RTK Availability for B210 DCM is improved.
- Started to correctly report the FS checking state at start
- Starting from version 5.6, the FLD command determines during downgrade that the new FW does not support the NVRAM backup mechanism and erases the NAND partition in which this backup is stored.
- Support of PPP degraded subscription
- Support of Satellite Navigation Status Code 03 for value 'cors' for [/par/]binex/meas/filter
- Supported ARP cache timeout management via /par/net/arpkeep parameter to work in simple local networks
- Supported BDS Phase 3 satellites in various modes of PPP engine
- Supported BDS-only mode fully, even in cold start.
- Supported BufferCorrector algorithm to improve availability, disabled by default
- Supported Ionospheric Scintillations indices (SigmaPhi)
- Supported Job Programming scripts for the case when there is no file storage
- Supported locked sat statistics in XS message when in PPP mode
- Supported Multi frequency PPP subscription in S2 message
- Supported multipath reduction bit in BINEX ObsFlags(1) field
- Supported multiple jps/rD messages per epoch for the case when number of satellites exceeds maximum for one message.
- Supported PDOP mask for DION solutions
- Supported PW TPS message with battery and charging information.
- Supported reporting PDOP for DION prolonged solutions
- Supported reporting scintillation indicators independently from use in positioning
- Supported SB message with sat usage statistics for SkyBridge
- Supported SD hot eject on non-Linux receivers
- Supported smoothing in RINEX if msg/def2 is used
- Supported Standalone IonoFree
- Switched antenna database from NGS14 to NGS20
- The "set,lock/notvis" command working for QZSS SAIF has been tuned.
- This WIPELDR loader, after loading FW into NAND, in addition to cleaning NVRAM, cleans the NVRAM backup partition.

- Tracking of L1C GPS/QZSS for B111/B111A has been tuned.
- Unified reference time as GPS independently of the systems enabled for positioning
- Updated antenna calibrations for SOKGRX3, SOKGRX3+PS, TPSHIPER_VR+PS
- Use RTCM 2.2 output by default for DNGSS base