POS LV V5 Release Notes

Document # **PUBS-CINS-004273**

Revision: **35**

Date: **November 29, 2020**

<u>Table of Contents</u>

1. Introduction

This document contains software release notes for POS LV V5 products.

Significant enhancements, changes and bug fixes from one released version to another are described.

2. POS Software 10.5 (Firmware 10.50 and POSView 10.5)

Release date November 2020

- **Introducing automatic calibration of GNSS lever arm and IMU Boresight**

  POSView 10.5 now allows for calibrate of the Primary GNSS Lever Arm as well as the IMU boresight angles (misalignment between reference and vehicle frames) in real-time. Please refer to the manual section 4 for more details.

- **Adding new antenna to the selection list in POSView**

  The following antenna were added to be selected via POSView

  - Zephyr 3
  - Zephyr 3 Rugged
  - AV28
  - AV28w. Ground Plane

- **Miscellaneous improvement to RTCM 3.2 RTK**
  Various low level improvements to decoding of RTCM 3.2 corrections.

- **Resolved an issue with erroneous DMI rejections on LV125 and AP15**

  The issue where the real time navigator would incorrectly reject valid DMI data was fixed. This issue occurs only on LV125 and AP15 setups where the Reference and Vehicle frames are not co-aligned.

- **NTRIP client improvements**

  Fixed a compatibility issue where the NTRIP client was not able to communicate with casters that required GGA string to be sent first before connection could be established.

- **Group 401/402 output rate fixed on Real-Time port**

  Fixed an issue where groups 401 and 402 would not output at a pre-specified rate on the Real-Time port.

- **Output Group 5 in Standby**

  Group 5 is now output when POS is in Standby

3. POS Software 10.3 (Firmware 10.30 and POSView 10.3)

Release date May 2020

- **Introducing POS Auto Upgrade**

  When connected to the internet, POSView can now check for and notify users if a new POS software is available. If the unit is eligible for upgrade, then download and upgrade to the new software will commence automatically. Please see manual under section "POS Auto Upgrade" for more details

- **Introducing support for RTCM 3.2 MSM type 4 & 7**
  POS is now able to decode and use in real-time RTCM 3.2 MSM type 4 and 7

- **Enable tracking B3 and E6 on BD992 systems**
  All POS with BD992 receiver will now track B3 and E6.

- **Improved diagnostics for RTCM 3.x in POSView**
  Base diagnostics in POSView is improved to display all messages decoded by POS LV.

- **Introducing QZSS SLAS Support**
  Introducing QZSS Sub-meter Level Augmentation Service tracking in POS. This augmentation, which corrects for ionospheric delay, is only applied to QZSS and GPS observations. For more details, please go to - https://qzss.go.jp/en/overview/services/sv05_slas.html

- **Simplified DGPS and OmniSTAR® selections on POSView**

  DGPS selection is now simplified such that users no longer need to select their regional service. Instead POS will automatically track the regional service (WAAS / EGNOS / MSAS etc).

  OmniSTAR® selection is now simplified such that users no longer need to select a specific mode. Instead POS will automatically track the subscribed mode and system will now automatically switch to the next available accuracy solution level when GNSS reception is occluded.
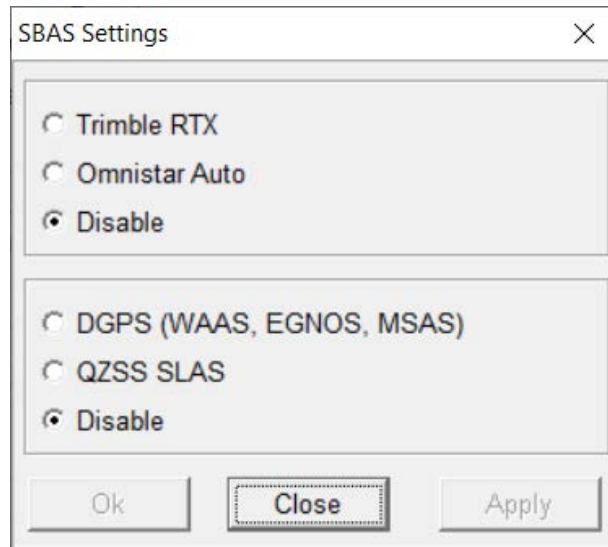
- **New NMEA message GGAT**

  A new non-standard NMEA message, GGAT is being introduced for customers who want higher precision on Latitude and Longitude output. The format is different than GGA so please refer to the user manual for details.

- **Ethernet logging improvements**

  The Ethernet logging port would on occasion refuse connection following a temporary disconnect. This is now fixed such that the connection is no longer refused.
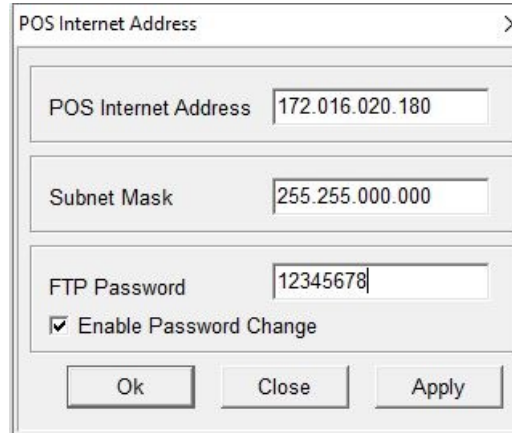
- **POSFT improvements**

  Fixed an issue were POSFT would crash when trying to download logged data if the logging medium was full.

4. POS Software 10.2 (Firmware 10.2 and POSView 10.2)

Release date December 2019

- **Added capability to set a custom FTP password**

The password for FTP access to POS LV, used to access backup logged data, can now be changed using POSView. To do so, go to Settings->Installation->POS IP Address and check "Enable Password Change".

Once this box is checked a new FTP password may be entered. Click apply to make the change. The password must be between 4 and 8 characters long, and may include upper and lower case letters or numbers only.

The username remains "guest".

- **BD982 Firmware 5.42**

Various low level improvements.

- **RMC message fix**

The default RMC message state was set to incorrect value in firmware 10.1 It has now been reverted in order to match what is in the manual.

- **NTRIP Client improvements**
  1. Added support to handle NTRIP clients that do not state what protocol (HTTP1 or HTTP 1.1) it supports.

  2. Changed the client such that POSView no longer needs to be connected to stream NTRIP data once connection is established.

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3. Supressed popup warning about internet disconnect. NTRIP window will show that the system is attempting to reconnect.

4. Increased reconnect attempt from 20 to 1000.

5. POS Software 10.1 (Firmware 10.11 and POSView 10.1)

Release date September 2019

- **Software support for BD992**

  Release of stand alone PCS with BD992 GNSS receiver (replacing the BD982). The GNSS firmware released for BD992 is 5.42.

- **Correct PASHR message output bug**

  PASHR message had erroneous data when the roll and/or pitch had negative values, this is now fixed.

- **NTRIP Client Improvement**

  NTRIP client now accepts Trimble Internet Base Station Service (IBSS).

- **Output Group 3 and 11 in Standby**

  Group 3 and 11 are now output when POS is in Standby.

- **Added RTXNA beam to POSView selection**

  The RTXNA beam can now be selected from POSView custom RTX beam setting, thus customers no longer need to enter it manually.

6. POS Software 10.0 (Firmware 10.0 and POSView 10.0)

Release date May 2019

- **NTRIP Client Improvement**
  - Support for NTRIP servers with incomplete source tables
  - Client now attempts reconnection to server if connection is dropped
  - Resolved issues with rover GGA output string
  - Added capability for Omnistar correction input

- **GGA and ZDA message output when initializing in DR**

  GGA and ZDA time fields are now populated when system is initialized without GNSS. POS time is used for the time field.

- **Resolved compatibility issues with USB keys that were formatted using Windows 10**

  PCS now supports USB - W95 FAT32 (LBA) partition format, default format setting in Windows 10. In the past only W95 FAT32 was supported, this was the formatting option built in to older versions of Windows

- **Improved robustness of GNSS when tracking BeiDou and QZSS**

  Resolved the occasional occurrence of GNSS real-time data gap that occurred when both BeiDou and QZSS satellites are tracked

- **QZSS PRN 199 Support**

  Enabling QZSS PRN 199 to be tracked starting real-time firmware 10.0. The minimum required GNSS firmware is 5.40. Please note: POSPac 8.4 is required for decoding this PRN.

- **Releasing GNSS firmware 5.40**

  Various low level improvements.

- **Binary PPS message output fix**

  Binary PPS time field now increments correctly when no GNSS satellites are tracked.

- **Improved robustness of Aux input**

  Corrected occasional situation of Aux input rejection.

7. POS Software 9.97

Release date October 2018

- **Updated EGNOS support**

    Resolved an issue where EGNOS was no longer functional due to a change in the Satellite PRN broadcasting corrections. Version 9.97 supports tracking of PRN 136 which is in service commencing August 30, 2018.

8. POS Software 9.9 (Firmware 9.95 and POSView 9. 90)

Release date August 2018

- **NTRIP Client Improvement**

  GGA formats added to improve communication with the various NTRIP servers. Functionality added to store use name, server address and Port number in POSView, however password is not stored.

- **Releasing BD982 GNSS firmware 5.36**

  Various low level improvements as well as support of new QZSS satellites, improvement to RTX performance.

- **Support for Omnistar G2+, G4 and G4+**

  POS now supports G2+, G4 and G4+ Omnistar modes.

- **SNR display for QZSS and Galileo**

  Resolved issues with SNR display for QZSS and Galileo satellites.

- **Introducing POS File Transfer (POSFT)**

  Added a faster alternative to FTP for retrieval of internally logged/backup data – POS File Transfer (POSFT). POSFT Client provides an interface to list, select to download and delete logged data from internal storage directly from POSView controller.

- **Resolving upgrade compatibility issues**

  Resolved issues related to upgrading old hardware platforms.

9. POS Software 9.7 (Firmware 9.71 and POSView 9.71)

Release date May 2018

- **Release of IMU82 for 200 level products**

  IMU 82 is being released for LV for model 210 and 220. Please refer to product specific datasheet for performance specifications.

10.   POS Software 9.6 (Firmware 9.60 and POSView 9.60)

Release date March 2018

- **Release of IMU71 for 200 level products**

   IMU 71 is being released for LV for model 210 and 220. Please refer to product specific datasheet for performance specifications.

11.   POS Software 9.2 (Firmware 9.29 and POSView 9.22)

Release date September 2017

- **GNSS firmware upgrade via Ethernet**

  Added capability to upgrade the GNSS receiver firmware via Etherent. The upgrade can be accomplished either by using the new POSLoader (3.2), that contains the prepackaged GNSS receiver and POS firmware installer files, or by placing the "*.timg" GNSS firmware files on the PCS via FTP connections into the folder "/tnglogdata/gnss_fw_upgrade" and restarting the unit. The upgrade will begin once the PCS powers back up. The last method can be used to install any version of GNSS FW.

- **NTRIP client built into POSView**

  NTRIP client is now built into POSView. New POSView can directly connect to NTRIP caster or server and eliminates the need for external NTRIP clients and serial port connections.

- **Changes to default GNSS output rate**

  Changed default GNSS output rate from 5Hz to 1Hz. There is no benefit to logging the GNSS data at 5Hz as real time software and post processing is limited to 1Hz.

- **Correct USB size definition**

  False "Logging Device is Full" message no longer appears when logging to 8GB USB devices

12. POS Software 9.1 (Firmware 9.13 and POSView 9.10)

Release date March 2017

- **Decoding of QZSS and Galileo constellations**

  QZSS and Galileo constellations are now decoded. POSView now shows the number of tracked QZSS and Galileo satellites.

- **Release of IMU 80 for LV 500 level series**

  IMU 80 is being released for LV for model 510 and 520. Please refer to product specific datasheet for performance specifications.

- **NAD83 Datum Transformation Fix**

  NAD83 datum transformation for RTCM Message 1 and 9 is fixed such that POS will correctly transform corrections in NAD83 to WGS84. In previous releases the transformation was not done correctly and lead to incorrect position.

- **Fixed the rectified pulse count in group 10006**

  Rectified pulse count for DMI has been fixed to correctly count upward to the specified range in the ICD (0 to 2^{24}-1). Previously the rectified pulse count could have taken a value outside of the range specified by ICD.

- **Fixed group 401 and 402 for correct output**

  Velocity outputs of group 401 and 402 are now in navigation frame. Prior to this fix the velocities were in reference frame.

- **Augmentation of LV400 level systems with IMU 7**

  The Real-Time velocity output for LV410 and LV420 using IMU 7 have been augmented through filter tuning. The Real-Time velocity output is now more accurate.

13.   POS Software 9.0 (Firmware 9.03 and POSView 9.02)

Release date December 2016

- **Perpetual Firmware License**

  A new POS software option has been implemented that when enabled allows all future firmware upgrades to be installed without an authorization code. The option can be ordered with a new system from the factory, or it can be enabled on existing systems in the field via POS Config with an appropriate authorization code. To use this feature you need to have POS firmware 9.0, POS Loader 3.0 and POS Config 2.7, or higher.

- **UDP Unicast for Real-Time Output**

  The capability of the Ethernet Real-Time Output has been enhanced by providing a choice of 3 internet protocols; TCP, UDP and UDP Unicast.

  The Real-Time Output is designed to provide data with minimal latency. UDP is good for this as it has low overhead, but it can flood a network with packets. POS previously implemented TCP to create a point to point connection but at the expense of additional overhead impacting latency. With the addition of UDP Unicast it is possible to configure a point to point data connection with minimal overhead. With these choices POS can be configured to use the protocol that best suits a particular installation.

- **RTK Corrections Via Ethernet**

  RTK base station corrections can now be input into POS via Ethernet. The interface is configured from the IO Settings window on POSView in a similar way to the COM port interface.

  Since much of the Ethernet setup structure is common with COM port input selections the COM port setup message 34 was used to convey the Ethernet input information along with messages 37 and 38. These changes are transparent with POSView but users who write their own interfaces should refer to the Interface Control Document (PUBS-ICD-003759).

- **Aux GNSS**

  Aux GNSS processing has been corrected. In previous releases there were instances where Aux GNSS input was not being used although the input data stream was correct.

- **Faster CMR RTK Fix**

  CMR 94 is required for "RTK Fixed" but the base station information is spread over several sub messages transmitted once each epoch. Intelligent selection of the required information results in a much faster RTK Fix.

- **Parameter Setting in Standby**

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GAMS installation parameters (message 21) and DMI measurement control (message 93) will now be accepted in Standby mode. This means the system does not need to be initialized with GNSS before these inputs will be accepted.

- **Better Base GNSS Diagnostics**

  The Base GNSS diagnostics window is more informative as to what data is received and processed.

- **Manual Updates**

  The User Manual and ICD have received a number of minor updates. For users that write their own POS interface software it is important to review the changes in the ICD.

14.   POS Software 8.6 (Firmware 8.64 and POSView 8.60)

Release date July 2016

- **RTCM 3.2 Support**

  POS will now process RTCM 3.2 corrections. When the corrections are passed to the GNSS receiver it will also process QZSS in LTC mode.

- **Antenna Types Expanded**

  Expanded the list of available GNSS antenna types that can be selected.

- **Data Port Improvement**

  Implemented significant reduction in jitter on the real-time Ethernet Data Port output.

15.   POS Software 8.5 (Firmware 8.53 and POSView 8.51)

Release date April 2016

- **RTK Improvement in Difficult Environments**

  Performance improvement achieved through modifications to LTC mode handling and filter tuning. This is a work in progress and further enhancements will appear in subsequent firmware releases.

- **Beidou Satellite Display**

  Restored the display of Beidou satellites with GNSS receiver firmware 5.03. That version of GNSS firmware incorporated the latest satellite enumerations which were incompatible with POSView.

- **Correct SV Decoding**

  Expanded the internal capability to handle GPS, GLONASS, Beidou, QZSS and SBAS. Previously GNSS data decoding could fail if a large variety of satellites were being tracked.

- **Regional Setting on PC**

  Corrected handling of "." versus "," in POSView. This problem arose in POSView version 8.45 because it was reading an internal string with a decimal point and the PC regional setting was affecting the conversion.

- **Correct AP10 and LV120 Position Holding**

  The threshold for AP10 and LV120 position holding was adjusted to better match the IMU performance so position holding won't be lost when system is stationary.

- **Correct DMI Scale Factor Setting**

  Fixed the case where DMI scale factor was not set internally although POS reported the user entered value.

- **Dual DMI Logging**

  Added ICD groups 18 and 10013 for second DMI logging.

16.   POS Software 8.4 (Firmware 8.47 and POSView 8.45)

Release date December 2015

- **GNSS Heading**

  Utilize the dual antenna heading output of the GNSS receiver to improve GAMS performance and implement new GAMS calibration procedure. This required a change to ICD message 21.

- **GGA for VRS**

  Introduce low output rates for GGA to be compatible with VRS position input requirements.

- **Reference frame output**

  Two new ICD groups implemented (401 and 402) to output navigation data and RMS respectively in the reference frame.

- **Correct vehicle rotation bug**

  Corrected the case where a Z axis rotation between the reference and vehicle frame caused an unstable navigation solution.

- **IMU latency compensation**

  Performance was improved by compensating the inherent IMU latency and adjusting the corresponding DMI data.

- **DMI error detection**

  DMI error detection changed from 3D to horizontal so altitude shifts caused by GNSS mode changes don't falsely trigger DMI error.

- **Modified Group 99**

  ICD group 99 was expanded to add a new Options field at the end of the group. The options string which was previously contained in the System Version field and was sometimes truncated has been moved to this dedicated new field.

- **NMEA for Events 3 to 6**

  NMEA output formats have been added to support events 3 to 6.

- **Correct ZDA week bug**

  Corrected the case where NMEA ZDA.week number could be ahead by one week during GNSS outages.

- **AIMU-M5 latency**

  Changes made to ensure run to run IMU latency is consistent and to eliminate data gaps with AIMU-M5.

- **Low elevation GNSS option**

  New option for tracking low elevation satellites.

- **New 620 Model**

  Added support for LV 620 model. GAMS speeds the alignment process without compromising mission performance.

- **Minor enhancements**

  Some additional minor bug fixes and cleanup for POS firmware and POSView.

17.   POS Software 8.3 (Firmware 8.32 and POSView 8.33)

Release date June 2015

- **RTX support**

  Official support for RTX in Land applications.

- **Satellite tracking improvement**

  GNSS receiver configuration changed to track L2C if possible but fall back to L2E if L2C is not available. This ensures the best possible L2 signal form all satellites.

- **Performance improved when DMI disabled**

  Completely ignore DMI measurements if the DMI input is disabled or has failed, thereby removing a negative influence on performance.

- **PPS output always present**

  GNSS configuration change to output PPS indefinitely, even if no satellites are visible.

- **POSView initiated shutdown correction**

  Corrected the occasional situation where POS SA would not power down after receiving a shutdown command from POSView.

18.   POS Software 8.2 (Firmware 8.22 and POSView 8.22)

Release date April 2015

- Added support for new IMU type 69.
- Improved handling of multiple simultaneous and high rate (up to 200Hz) events.
- Corrected sometimes inconsistent IMU latency compensation for IMU types 55, 56 and 57.
- Corrected PASHR heading accuracy field.

19.   POS Software 8.1 (Firmware 8.15 and POSView 8.15)

Release date December 2014

- RTCM 3.0 Supported for RTK operation
- All RTK corrections duplicated internally and passed to primary receiver
- Large number of SVs in view supported
- PPS remains present throughout extensive GNSS gaps
- Improved robustness in handling of IMU-42 data

20.   POS Software 8.01 (Firmware 8.01 and POSView 8.01)

Release date August 2014

- Resolved the occasional occurrence where POS reverts to DR mode when the number of satellites tracked is large especially when multiple BeiDou-2 satellites are tracked

21.   POS Software 8.0 (Firmware 8.0 and POSView 8.0)

Release date July 2014

- Enhancement of precision timing for IMUs 55/56/57
- Enhancement of Navigation algorithm when in RTK mode
- Minor bug fixes

22.   POS Software 7.9 (Firmware 7.92 and POSView 7.92)

Release date April 17, 2014

- AP15 heading initialization improvement

23.   POS Software 7.8 (Firmware 7.82 and POSView 7.82)

Release Date: Dec 12, 2013

23.1.   Firmware & POSView Notes

- Added IMU type 52 to LV220.

- Added IMU type 57 to LV610.

- Added BeiDou (COMPASS) LC support.

- Added IMU Type 55 to model 115 and 125.

- AP15 heading improvements & Added ZVI type 2 to LV115 & LV125.

- Added Omnistar G2 mode.

- Added latency compensation for LV DMI.

24.   POS Software 7.6 (Firmware 7.61 and POSView 7.60)

Release Date: June 20, 2013

24.1.   Firmware & POSView Notes

- Added IMU Type 42 to model 210.

- Added Event Out Trigger (Distance Based).

25.   POS Software 7.4 (Firmware 7.43 and POSView 7.40)

Release Date: April 15, 2013

25.1.   Firmware & POSView Notes

- Secondary GNSS Data Gap detection and reporting for all receiver types

- Support for IMU 52

26.   POS Software 7.2 (Firmware 7.21 and POSView 7.22)

Release Date: August 23, 2012

26.1. Firmware & POSView Notes

- Support for initialization at high latitude

- Fix for random Ethernet lockup during Ethernet logging

- Updated max allowed age of corrections for SBAS (WAAS / EGNOS / MSAS) aiding

- Corrections to fields in ICD Groups 11, 12,13, and 20015

- Addition of IMU fault information in POSView

- Ability to enter long filenames for USB/Primary Internal Logging

- Support for LV220 with IMU 42 and GPS 16

- Addition of IMU 17 data status checking and reporting

- Support new IMU type 46

- Ability to disable DMI and save this configuration to User NVM

27.   POS Software 7.0 (Firmware 7.00 and POSView 7.01)

Release Date: Mar 1, 2012

Note: Increased version number from 3 to 7 for internal purposes. No other official releases were made from 3.56 to 7.00

27.1. Firmware & POSView Notes

- IMU type 42
  Add a new IMU type 42: AIMU-M2

- Additional RT port

- Enhanced uSD error handling (Firmware change only)

- Minor bug fixes

28.   Firmware 3.56 - POSView 3.54

Release Date: Feb 2, 2012

28.1. Firmware Notes

- Correction for GNSS configuration problem that was introduced in release 3.54.

29.   Firmware 3.54 - POSView 3.54

Release Date: Jan 13, 2012

29.1. Firmware Notes

- IMU type 40
  Add a new IMU type 40 to LV420 Model.

- Add Model 120

- RTCM v3 Loosely-Coupled
  Allow the decoding of Primary GNSS data when the receiver is directly fed RTCM v3 corrections (loosely-coupled mode) although base station ID is not NMEA compliant.

- GNSS Com Port Control
  Fix the control of the GNSS COM port via POSView so the baud rate can be set. This facilitates connection of external corrections to the receiver.

- IMU type 17
  Fix IMU type 17 random data spikes.

- NMEA PPS time stamp
  Fix NMEA PPS output time stamp to integer value.

- Config corruption
  Minimize the possibility of POS configuration corruption if power cut during critical section soon after power up. In the extremely small chance that corruption does occur the system is recoverable by re-installing the firmware.

29.2. POSView Notes

- Logging disc usage
  Logging disk usage is displayed immediately after POS starts rather than waiting for the user to start logging. Disk usage is also automatically updated when the logging media is changed.

30.   **Firmware 3.42 - POSView 3.42**

Release date: September 2011

30.1.   Firmware Notes

- Minor enhancements to support BD960/BD982 4.43 including bit redefinition for OmniStar VBS

30.2.   POSView Notes

- No change.

31.   **Firmware 3.40 - POSView 3.40**

Release date: July 2011

31.1.   Firmware Notes

- Implement Trimble BD982 receiver support.

31.2.   POSView Notes

- No change.

32.   Firmware 3.33 - POSView 3.33

Release date: April 2011

32.1.   Firmware Notes

- Correct access to logged data from various FTP clients.
- Implement lower latency on Ethernet Real-Time data output.
- Correct problem with IMU type 17 data spikes.
- Add 610 model.
- Correct possibility that PASHR output could cause NMEA process to terminate.
- Correct GGK solution status flag when Primary GNSS in DGNSS mode.
- Implement ability to upgrade CPU boot image in the field.
- Output IP address on COM 4 for Stand-Alone PCS, COM 5 for AP systems.
- Implement PCS Startup Mode control from POSConfig. Note that POSConfig version 2.2 must be used.

32.2.   POSView Notes

- Display correct number of COM port tabs based on system.

32.3.   POSConfig 2.2 Notes

- Includes new drop down menu to control the Startup Mode.
  NB: Changing the mode to CONTROLLED can render the system unusable unless there is a switch connected directly to the POS power control input, as in the Stand Alone products. If in doubt, do not change the mode.

33.   Firmware 3.20 - POSView 3.20

Release date: November 2010

33.1.   Firmware Notes

- Correct DMI scale factor in raw data for POSPac.
- Free up IP address 192.168.x.x for PCS use.
- Add DMI type 1 support.
- Remove erroneous IMU type 17 error messages.
- A number of minor bug fixes in NMEA and Real-time output formats.

33.2.   POSView Notes

- Changed all labels from GPS to GNSS.
- Changed all labels from PC Card to Logging Media.
- Add RTCM Type 20,21,23,24,59 to Base 2 Diagnostic window.

34.   Firmware 3.16 - POSView 2.8.1.0

Release date: August 2010

Initial LV V5 release.