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G604.09.04kX – June 21, 2021

1. Implement Airplane mode and PDP activation requirements on GNX firmware for Rogers Network and LARA-R202 modem combination.
2. Allow GNX to update the LARA_R202 firmware from 30.44 to 30.55.
3. Apply AT command configuration patch for LARA_R202 units with Rogers SIM and U-Blox Rev 30.55.
4. Includes SPN filter for Australian Truck Gateway.
5. Fix for Fuel Level 2 not reported.
6. Filter out errant ECM Odometer values on Dodge RAM vehicles.

G604.09.03kX – Feb 12, 2021

1. Includes Support for Bluetooth module PAN1026 and PAN1026A.
2. Includes 16 user configurable PGN/SPN reporting (originally intended for VECIMA).
3. Includes user configurable AirLink Serial Number column to Activity Report.
4. Includes new SPN reporting: PTO Gov State, Accel pedal low idle speed, Accel pedal kickdown switch, Turbo Oil Temperature, Average Fuel Economy.

G604.09.02kX – Nov 30 2020

1. Adds "ltemobile.apn" to the APN huntlist for Rogers.
2. Fix for GNX not properly detecting J1939 zero DTC in G604_08_09kX and later.
3. Fix for handle of END_ROM_ADDR section, includes Companion PRI.
4. Improvement for GNX reporting momentary invalid ECM odometer value close to ignition on/off.
5. Creates a label to indicate if the executing firmware is an official release or a pre-release.
6. Fix for GNX-5P incorrectly reporting 4 relay output.
7. Fix for Fleet Complete APN name in Mexico, make APN check case-agnostic.
8. Fix for PVTQ points removed incorrectly.
9. Fix for false SIM removal event on device reset.
10. Fix for unintended Relay 2 output On.
11. Adds Support for modem LARA-R202 and HL7800-M, Detailed list bellow:
    - LARA-R202: Use ATI0 vs AT+GMM to get full uBlox model number. Ex: LARA-R202-02B-03
    - LARA-R202: Use the "-0x" number in the full model version to determine which FOTA delta file (.upd) to request from GNX server.
    - HL7800-M: Add configured bands (+KBNDCFG) to DIAG MODEM response.
    - HL7800-M: Add active band (+KBND) to DIAG MODEM response.
    - HL7800-M: Fixed APN cycling and Telus/Bell attachment APN detection.
    - HL7800-M: Fixed +CEREG handling. HL7800 reports different number of arguments for solicited and unsolicited responses..

- HL7800-M: Removed -128dbm RSSI limit from COLUMN_MODEM_RSSI(44) value. LTE RSSI can report to -141dbm.
- HL7800-M: Added "CLEARAPN" feature. Setting param 18=CLEARAPN clears the module's internal manual APN setting (using +CGDCONT=1), to allow carrier "pushed" APN to function after reboot. After the APN is cleared, param 18 is reset to "18=;"
- HL7800-M: Improved module APN setting scheme in GXSetGPRSAPN().
- HL7800-M: Added HomeMCC_MNC of 30276 to ModemUsingAttachmentAPN()
- HL7800-M: Appended active LTE band to COLUMN_MODEM_ECI0(128). So now ULF:Band. Ex: 700:12
- Corrected 4 vs 2 relay outputs for GNX-5P/6. Created NumRelaysSupported()

G604.08.13kX – Nov 4 2020

1. Adds Support for Modem response parsing, Modem power up. Ported from 9.02.
2. Adds "ltemobile.apn" to the APN huntlist for Rogers.
3. Fix for GNX not properly detecting J1939 zero DTC in G604_08_09kX and later.
4. Fix for handle of END_ROM_ADDR section, includes Companion PRI.
5. Potential fix for GNX reporting momentary invalid ECM odometer value close to ignition on/off.
6. Potential fix for GNX reporting invalid ECM odometer values
7. Creates a label to indicate if the executing firmware is an official release or a pre-release.
8. Fix for GNX-5P incorrectly reporting 4 relay output.
9. Fix for Fleet Complete APN name in Mexico, make APN check case-agnostic.

G604.08.11kX – May 2020

Fixed the selection of either PVT, journey summary, or message points to be removed from queue after they are ACKed
Fixed false SIM REMOVED event by sending event 43 immediately after the modem response shows that the SIM is not inserted (CME 10)
Fixed an issue where Relay 2 is turned on unexpectedly after reboot or firmware update.

G604.09.01kX – April 30 2020

HL7800-M: Added active APN and IP address to bottom of DIAG MODEM response. Comes from +CGCONTRDP response.
HL7800-M: Fixed issue with setting manual APN. HL7800-M can't handle multiple AT commands in a single command. ex: "AT+CFUN=4;+CGDCONT=1,"IP",<APN>
HL7800-M: Use Vgpio and CTS lines to determine when module power-up is completed.
HL7800-M: Use ATI8 to query module firmware version vs. ATI0 to get shortened RMFW version (requested by cert team).
HL7800-M: Fixed RSRQ scaling error (factor of 2) in +CESQ response.
HL7800-M: Added query of +KCARRIERCFG and +KBNGFG to modem logging stream.

G604.09.01kX – April 7 2020

Added support for CATM variants of GNX6 and GNX5P.

Fixed an issue where Relay 2 is turned on unexpectedly after reboot or firmware update.

G604.08.10kX – February 2020

Improved performance of rapid brief reports (see parameters REPORT_INTERVAL, BRIEF_REPORT_COLUMNS) by allowing brief reporting to continue concurrently when the GNX is waiting for the acknowledgement to an acknowledged event, diagnostics, or resyncing. This is most noticeable when the update rate is rapid (< 5 seconds) and the server is delayed in sending UDPACK.

Added capture of tire pressure and temperature using PGN 65268 on J1939 equipped vehicles. New parameter TPT_INTERVAL (579) specifies how often tire data should be sent using new event 131 (TPT). Tire pressure data is appended to the reason code 131 (the tire data is a string of up to 10 temperature and pressure values, so too long to be a report column in every event).

Added capture of current transmission gear using J1939 PGN 61445. Gear is displayed in new report column 117 as a single ASCII character, 'R','P', 'D','0'-'9','a'-'h', where 'a' = 10 and 'h' = 18. There is also an option to use broadcast data on OBD vehicles but this must be reverse engineered on a per-vehicle basis.

Fixed bug where a modem FOTA session log would lock the JLOG buffer, preventing any !GXDIAG STARTJLOG operations until a RESETGNX CLEARNV was performed. (No Jira – discovered while bench testing)

Override modem data hangup due to spam TCP connections (PKT_CALL_IDLE parameter second value) if the GNX is in the middle of an OTAP.

Increased TCP MTU to 1226 bytes from 512 to improve data throughput. Application still restricts UDP MTU to 512 bytes for all functions except PAD.

Added new UART/Bluetooth commands DRLOGIN DRLOGOUT (and fixed bugs in IBLOGIN, IBLOGOUT which did not update column 82). DRLOGIN, DRLOGOUT allow a free-format string up to 30 characters, generate events 36 (smart card read), and 122 (DLO – driver log out).

e.g.
AT!GXAPP IBLOGIN 9876543210ABCDEF
AT!GXAPP IBLOGOUT
AT!GXAPP DRLOGIN DriverNumber1
AT!GXAPP DRLOGOUT

Added currently associated driver ID to DIAG STATE response (DRID:). Driver ID could be ibutton, DOTELD command assigned, or new UART command DRLOGIN.

Added GNX FSN to DIAG HARDWARE response and ATI1 UART response.

Added initial support for HL7800-M LTE CAT-M modem.

If bit 0x02 is set in CAN_ENABLE[1] AND CAN_ENABLE[5] then J1939 will autobaud if pin 7 is open or ground (i.e. J1939 type 1 or 2, but not OBD). (Universal J1939 autobaud setting). E.g. CAN_ENABLE=1.xFF.0.0.30.x42;

In switched modem / safety build G604.08.10kS the Bluetooth to remain on when the cellular modem is powered off if parameter MODEM_REENABLE=x.x.x.1;

Added option to restart APN hunting if there are many successive failed data transfers (prolonged 4-2 error). This is disabled by default, but can be enabled by setting APN_CYCLING_RATE[2] > 0. For example, if APN_CYCLING_RATE=0.20.40; then APN cycling will be disabled, but will reenable if there are 20 successive failures to establish a data connection OR 40 successive data transfer failures.

Fixed bug of event code 47 (JDTC) with no appended J1708 DTCs. This was caused when the J1708 bus is only reporting inactive DTCs. The fix involves reporting inactive DTCs since these may be of interest to customers for maintenance purposes. The status of the J1708 DTC is contained within the DTC and may be determined by the server (see SAEJ1587, heading “A.194 Transmitter System Diagnostic Code and Occurrence Count Table”).

DOTELD – added ability for Bluetooth client to trigger Type/Code x71-x74 so that attached client can log malfunction and diagnostic events (previously only the GNX could log these).

Added support for MC7455 modem FOTA (added in the .09kU release for the GNX6-MC7455).

Improved GNX device security by restricting over the air programming (OTAP) to only use encrypted binary images (.gxe). Unencrypted binaries can now only be programmed via the UART.

G604.08.09kX – September 2019

Reduced napping mode power consumption by approximately 10mA @12v on OBD vehicle installations (not on J1939/1708 heavy duty). (LTE hardware only).

Fixed bug in G604.08.08 where parking brake status(column 182) is incorrectly always shown as ‘B’ (applied). (No Jira – discovered during regression test).

New configuration option to allow VIN, Engine serial number etc to be re-read and reported at ignition on. CAN_ENABLE[6] sets time in minutes since prior VIN report. If 0 then VIN is not re-read (to match prior firmware). If > 0 the VIN is reread if that number of minutes have elapsed since the last VIN report. Range 1-254 minutes. E.g. CAN_ENABLE=x.x.x.x.x.x.30; will cause the VIN to be reread at ignition on if it is > 30 minutes since the last VIN reading/reporting.

Improved J1939 DTC reading and reporting – reduced probability of corrupted DTCs due to interleaved CAN transport frames, and increased responsiveness for reporting cleared DTCs.

Improved handling of J1939 source address handling to allow coexistence with 3rd party J1939 devices that do not support address discovery.

Improved AT!GXSTREAMON=CAN logging to allow logging of J1939 traffic without UART buffer overflow – helpful when troubleshooting.

Content of AAVSTAT report column modified to include vehicle speed limiter information

SpeedLmt SPN74 | CCSS SPN 86 | ParkBrake/VDCMsb | VDC | VDCLsb | ASRABS | CCVSMsb | CCVSLsb

For all 2 bit fields 11=unknown, 10=error, 01=on, 00=off

SpeedLmt SPN 74 – km/h
CCSS (Cruise Control Set Speed) SPN 86 - km/h

VDC (3 bytes) includes the following SPNs (each 2 bits, starting with LSB) (all 00=off, 01=on, 10,11=undefined

1.1 1813 VDC Information Signal
1.3 1814 VDC Fully Operational
1.5 1815 VDC brake light request
2.1 1816 ROP Engine Control active
2.3 1818 ROP Brake Control active
2.5 1817 YC Engine Control active
2.7 1819 YC Brake Control active
3.1 5624 Trailer-VDC Active

ParkBrake SPN 70 - 2 bits is in the lower 2 bits of the upper nibble of the VDC Msb
VDCMsbyte bit usage: xxPBxxTV where PB = SPN70, TV = SPN 5624

ASRABS and CCVS are unchanged – see description in G604.08.08 firmware below.

Fixed bug in CAN_ENABLE=x17 (J1708 only) where the GNX would still preferentially read RPM from the J1939 bus. Added "PoweredOff" to DIAG CAN to show when J1939 is powered off either due to J1708 being preferred or napping / power saving. (No Jira – discovered during regression test).

Extra array for parameter MOVE_SPEED to prevent premature end/restart of idle timer due to GPS speed fluctuations, position jumps in idling vehicles.
MOVE_SPEED=x.1 - prevents premature end of idle due to GPS lat/lon movement when idling
MOVE_SPEED=x.2 - as above plus prevents end of idle until BEGIN_MOVE event generated

New option to detect wired ignition: FAKE_IGNITION=x.x.x.2 – if the GNX sees >=5 ignition transitions (ON->OFF or OFF->ON) in the ignition wire it will reset FAKE_IGNITION=0; This could be used as the basis for a universal configuration for a mixed install fleet. Not thoroughly tested – customer test and experimentation strongly recommended.

Improved switch debounce / reporting for rapid PTO changes. (SWITCH_ON_TIME=0, SWITCH_OFF_TIME=0). Bluetooth BLE HOS GEN reporting of switch state is much more responsive to be able to report transitions of ~100ms. PVT events 20-28 are less sensitive (previously they were excessively sensitive and could generate a slew of events when not debounced) – they are now based on 50ms sampling of the PTOs so they will only detect/report switch transitions of > 50ms duration.

Improved handling of BLE client to catch corner case where client disconnects during the attach (which would previously leave the GNX thinking a client is attached, preventing reattachment).

Added feature to allow selective delete of CRCs from VALID_IB_CRC array. A new "parameter" VALID_IN_CRC_DEL , which can take up to 10 CRCs is available. All matching CRCs are deleted from VALID_IB_CRC. E.g. SETPARAM VALID_IB_CRC_DEL=x1111.x2111.x3111.x4111.x5111;

New report column 192 which reports number of seconds RPM above parameter RPM_THRESHOLD in event 121. If an RPM excursion is short (> 2s, < 5s) then the single RPM event will contain a non-zero duration 2-5 seconds. If the RPM excursion is > 5 seconds then the first event will contain a 0 in this column and the second event will contain the true duration of the time above the RPM threshold. The server can generate the cumulative time that RPM was above RPM_THRESHOLD by adding all of the values in column 192 for event codes 121 during the time period in question

GNX automatically clears nxtgenphone APN from GNX6-LTE external antenna when AT&T (or related MVNO) SIM is detected to allow automatic APN detection.

Changed boundary configuration from 10 boundaries with up to 50 vertices each to 20 boundaries with up to 30 vertices each.

Introduced limit of +/- 52 to parameter GMT_OFFSET(121) – this also fixes a bug where OTAP from pre-08 to 08 or newer can cause the GMT_OFFSET to be set to a huge value (due to bug in GMT_OFFSET parameter reading in pre-08 firmware), which subsequently corrupts parameters 137 (TIMEZONE_NAME) and 239 (SPEED_THRESHOLDS).

Added support for OTAP of larger .gxe binary images > 0x70000 bytes (448kBytes). This means that OTAP of all future firmware releases will require the GNX to first be OTAPd to G604.08.09kX.

G604.08.08kX – May 2019

Improved handling of J1939 DTCs. DTCs that are not received for > 110 seconds of engine on time are internally deleted. DTCs with the STOP or PROTECT lamps marked as active are prioritized within the limit of 6 stored / reported DTCs so that the server will always be alerted if the truck has critical DTCs hiding among multiple non-critical emissions related DTCs.

J1939 DTC reporting interval, set by CAN_ENABLE[4] can be set to 2 minutes by setting CAN_ENABLE=x.x.x.x.120.x; For values of CAN_ENABLE[4] > 120 the reporting interval is interpreted as seconds. If CAN_ENABLE[4] < 12 it is hours, if >12 and < 120 it is minutes, and if > 120 it is seconds.

New report column DTCC(55) contains a current count of active DTC codes on the vehicle) (max 6). This is a single unsigned byte,

Fixed bug in GNX6 (and ARM GNX5P) real time clock that could cause time to jump backward by 24 hours in the first hour after UTC midnight. This condition occurs if the GNX is not able to track any satellites (e.g. parked under cover) or if GPS_CYCLING_PERIOD is set. The longer GPS_CYClING_PERIOD the more likely this error will occur. (Jira ALGNX-19 & ALGNX-52 & ALGNX-56)

Fixed bug with DUMPQ STARTTIME ENDTIME (bug originated in G604.08.02) where STARTTIME and ENDTIME cannot be used together (only 1 or 0 lines of data are output). (Jira ALGNX-48).

Fixed bug in parameter GMT_OFFSET setting and reporting. (No Jira – discovered during regression test).

Fixed bug where J1708 age would not exceed 10 seconds if it became disconnected, causing columns 56 and 88 to report misleading status. (No Jira – discovered during regression test).

USE_VEHICLE_SPEED=x.x.3; will make the GNX update report columns 23/24 based on (in order of preference) dash odometer, derived bus odometer, or GPS odometer, depending upon availability. This in effect makes column 23/24 a best estimate odometer under all conditions.

Added null '\0' terminator to journey summary in case the server is receiving data over a socket and sees the journey summary and location data concatenated.

New parameters to allow OBD speed/RPM to be parsed based on broadcast data on vehicles where active OBD reading either causes issues with the vehicle (failure to regenerate DPF) or results in occasional missed drives. Contact SierraWireless for further details if you think some vehicles in your fleet are affected.

OBD ISO15765-2 flow control handling refined so that the GNX will only send CAN-TP flow message if it is actively reading a multi-frame CAN message (DTC, VIN, odometer). Also single frame broadcast non-OBD standard CAN frames for speed, RPM, seatbelt not subjected to check of first data byte since they are often not ISO15765-2 compliant.

New Bluetooth parameter to allow optional BLE pairing BLE_PAIRING_OPT[3]:[0] – 0 – no pairing,1-pairing enforced, [1] – if this value is non-zero, it specifies a period of time after ignition when new devices can pair with GenX.[2] – whether or not GenX will request Central to start pairing. (0=no, 1=yes).

Longitudinal component of total acceleration is reported in events 61,62,100,101 and in the accident report. Longitudinal component is positive for vehicle acceleration and negative for vehicle deceleration. The lateral acceleration component can be calculated using Pythagoras' theorem. $TotalAcceleration^2=LongitudinalAcceleration^2+LateralAcceleration^2$.E.g.
ACCEL:317:283 – total force of 317mG of which 283mG is longitudinal acceleration (lateral is 143mG)
DECEL:230:-170 – total force of 230mG of which -170mG is longitudinal deceleration (lateral is 155mG)
HARSH_TURN:288:85 – total force of 288mG of which 85mG is longitudinal acceleration(lateral is 275mG)
LARGE_G:611:113 – total force of 611mG of which 113mG is longitudinal acceleration (lateral is 600mG)

Improved accident buffer contains lat,lon, speed, heading, PDOP, total accel, longitudinal accel, and on J1939 vehicles records state of ABS and stability control (report column 189)

J1939 only – added monitoring of ABS and stability control activations (PGN 61441, SPN 561,562,563,1243, PGN 65103, SPNs1815-1819). Two new report columns added: AAVCNT (188), is a two byte (4 ASCII hex characters for csv) summary count of transitions in the status of ABS and stability control. The information is divided into nibbles, each being a count modulo 16: NotUsed|StabilityEvents|ASR events|ABS events.

The second new report column, AAVSTAT (189) is an instantaneous capture of multiple SPNs that might be used in accident reconstruction: not recommended for general use but may be useful for LARGE_G events (including the pre and post event LARGE_G events). It is transmitted as 16 bytes of ASCII hex when the GNX is configured for csv reporting and 8 bytes of data when configured for binary reporting.

Content of AAVSTAT report column bytes

ParkBrake | CCSS SPN 86 | VDCMsb | VDC | VDCLsb | ASRABS | CCVSMsb | CCVSLsb

For all 2 bit fields 11=unknown, 10=error, 01=on, 00=off
ParkBrake SPN 70 - 2 bits
CCSS (Cruise Control Set Speed) SPN 86 - km/h

VDC (3 bytes) includes the following SPNs (each 2 bits, starting with LSB) (all 00=off, 01=on, 10,11=undefined

1.1 1813 VDC Information Signal
1.3 1814 VDC Fully Operational
1.5 1815 VDC brake light request
2.1 1816 ROP Engine Control active
2.3 1818 ROP Brake Control active
2.5 1817 YC Engine Control active
2.7 1819 YC Brake Control active
3.1 5624 Trailer-VDC Active

ASRABS byte includes the following SPNs (each 2 bits, starting with LSB)

1.1 561 ASR Engine Control Active
1.3 562 ASR Brake Control Active
1.5 563 Anti-Lock Braking (ABS) Active
6.1 1243 ABS Fully Operational must be 01

CCVS bytes includes the following SPNs (each 2 bits, starting with LSB)

4.1 595 Cruise Control Active
4.3 596 Cruise Control Enable Switch
4.5 597 Brake Switch
4.7 598 Clutch Switch
5.1 599 Cruise Control Set Switch
5.3 600 Cruise Control Coast (Decelerate) Switch
5.5 601 Cruise Control Resume Switch
5.7 602 Cruise Control Accelerate Switch

New event – ABSVDC (130)– triggered by a change in the vehicle stability control or ABS SPNs (not by ASR – that is just wheel slip under load). Vehicle must be traveling > 5km/h so we don't get false alerts if the ABS/VDC do self-tests on powerup.

Fixed column 177 (throttle position) to report SPN91 (was reporting SPN51 by mistake). SPN51 is now in column 78 – Engine throttle position.

LTE builds – APN hunting is reenabled after modem FOTA in case the modem loses its APN during FOTA.

PVT_USAGE (119) is sent immediately on expiry of MAXDATAUSAGE, even if the position queue contains a large amount of unsent data. This event could arrive out of chronological order at the server, but this is done so that the expiry of MAXDATAUSAGE is known when it occurs, and not when the data usage is refreshed, either due to resync or after 24 hours have elapsed.

Added support for Telus Jasper V2 LTE SIM cards.

G604.08.07kX March 2019

Functionally identical build to G604.08.06kX which defaults to the new Sierra Wireless hosted configuration server after factory reset. Older firmware can use DNS lookup to find the new hosted server, but in case DNS is not accessible on a wireless network or custom APN this firmware removes the need for DNS.

G604.08.06kX February 2019

Functionally identical build to G604.08.05kX containing a fix for the April 2019 GPS week rollover bug, which adversely affects all prior firmware for the one week period from April 7-April 14 2019.

In GNX6 LTE internal antenna builds .06kX also contains logic to simplify modem firmware update over the air (FOTA) campaigns, by leveraging the existing OTAP logic to determine when the GNX is stationary, and also auto populate the APN.

G604.08.05kX November 2018

New command modifier “CMDSEQNO <0-65535>”. If added to a command sent to the GNX it causes the GNX to examine the supplied sequence number relative to the highest previously received command sequence number. If the numbers match (i.e. the command is a repeat of a prior command) the GNX will discard the command but send an ACK. This could be useful in preventing multiple relay activations when only a single one is desired. If the sequence number in the new command is non-zero, but less than the sequence number from a prior command the GNX will discard the command and send a NAK containing the current sequence number. If the sequence number in the new command is 0 or 1 or greater than the existing sequence number stored in the GNX the GNX will process the command and set its internal sequence number equal to the new value. It is recommended to put this at the start of a command so that it is included in the ACK/NAK.

Added feature to backup and restore all parameters (except for ibutton CRC – this may be handled in a future firmware release) during OTAP. Note that this feature will only work when OTAPing from G604.08.05kX to future firmware. To enable this feature please set parameter PRESERVE_CONFIG=x00550000; (or PRESERVE_CONFIG=x00555D1D).

Improved CAN driver throughput, and improved J1939-21 CAN multi-frame filtering to reduce probability that interleaved multiframe messages could lead to corrupted VIN or DTC.

Added second fuel level reading to J1939 (was previously J1708 only).

Changed J1939 default source address from 249 (Off board diagnostic tool #1) to 250 (Off board diagnostic tool #2) – added detection of duplicate source address to restart the address claim process. This should make the GNX better coexist with other bus connected devices. Added current source address in DIAG CAN (SA:).

Added rudimentary decoding of J1939 and J1708 DTCs to the DIAG CAN response. E.g.:

J1939DTC(SA,IL,SPN,FMI,OC)
43FF9A0C0A01,0,MP,3226,10,1

43FF9A0C0C2F,0,MP,3226,12,47
SA-source address, IL-illuminated lamps, SPN, FMI, OC=occurrence count.

New parameter OBD_BACKOFF=<time in seconds> - will make the GNX stop transmitting on the OBD bus for the specified number of seconds if another test device is transmitting on the bus using the CAN identifier for functionally addressed request messages (see ISO 15765-4). Recommended setting

New option added to parameter HEADING_CHANGE enables a multi-second breadcrumb trail prior to the heading event. This may allow the server to better map the true path of the GNX as it navigates heading changes. E.g. HEADING_CHANGE=25.1.1.3; would send up to 4 positions for each turn, 3 prior to the turn and the turn itself. The breadcrumbs may be at greater than 1 second intervals and the breadcrumb may be shortened if there was a prior event with 30 second of the turn.

New parameter SPEED_THRESHOLDS=20.25.30.40.45.50 can be configured with up to 10 speed thresholds in km/h. As the vehicle speed passes each threshold, either increasing or decreasing an event SPEED(52) is sent to the server. This can help the server more accurately identify where the vehicle may have been violating local speed limits. When the events are generated the MOVE_INTERVAL and I_ON_INTERVAL counters are reset to reduce the overall data usage.

New parameters ENGINE_SECONDS, IDLE_SECONDS, enable setting of derived engine hours and idle hours (in seconds to allow fractional hours). Note that when reading these parameters their values will be multiplied by 10. E.g. ENGINE_SECONDS=86400; to set the derived engine hours to 24hours.

New parameter RPM_THRESHOLD=<RPM value>.<EngineLoadValue> to provide explicit control over the event RPM-LOAD(121). If neither value is set event 121 is generated when the RPM exceeds twice the average RPM or the reported engine load exceeds 80%. This is intended to be a fleet-wide setting that could be used if the engine characteristics are widely varying. If the first value is set (RPM) then the engine load reporting is disabled and the explicit RPM threshold is used. If both values are set then reporting based on RPM and load are both based on the stated thresholds. Note that when reporting RPM the GNX will report up to two events in the event that the RPM threshold is exceeded for more than 5 seconds, marking the start and end of the event. For excursions of less than 5 seconds duration only a single event is sent. Each event captures the peak RPM during the event.

3G/GPRS only – fixed bug in G604.08.04 that would not initialize the APN on a brand new GNX from the factory. This bug does not affect LTE or previously deployed GNX.

LTE only – added support for external antenna GNX6-LTE. Also added support for Telus and Bell mobility.

POLL/POLLQ EVENTCODE <value> added to simplify testing of different event codes.

Bug fixed in column 112 (EngTotalHours). This column shows derived hours if total hours is not available from the vehicle and column 115 (BusDerivedHours) is not confiugured in REPORT_COLUMNS(24) parameter. In G604.08.03 and 04 this only worked for ASCII csv data and not binary data. In 05 firmware this function applies to binary and ASCII data.

Added !GXDIAG STARTJLOG <mode><size><address><address mask>
e.g. !GXDIAG STARTJLOG3 4096,x00FEC100,x00FFFF00 to log PGN 65217

Fixed vulnerability in DOTELD that caused AT!GXAPP DOTELD READ to get stuck and return misformatted responses if there are journey summary entries in the position queue.

G604.08.04kX August 2018

Fixed bug in modem APN handling present in 02kX and 03kX that could cause the GNX to lock on to the wrong APN if the SIM contains no phone number and the modem already has the correct APN set.

J1939 supports capture of SPNs 586,587,588 (engine make, model, serial number). This is transmitted in event ESN(126). On some vehicles this is broadcast, but on most it must be requested explicitly. To enable this set J1939_TX_REQ[0] bit 0x00008000. Note that this has not been tested on a wide variety of vehicles so please test carefully before wide deployment.

J1939 address filters and duplicate packet detection improved to reduce the chance of overload and message dropping (which was not observed, but it was observed that the message receive buffers were sometimes close to filling).

Added filtering to reduce multiple engine on/off that can be reported on some J1939/J1708 vehicles due to rapid reporting of fluctuating RPM at engine startup and shutdown.

J1708 read timing adjusted – may result in better ability to read non-broadcast J1708 parameters (e.g. VIN, total engine hours – see J1708_TX_REQ parameter).

Parameter 563 (CAN_PREFERRED_ECU) expanded to 3 entries, in descending order of preference. Based on analysis of hundreds of bus logs we have found that if the J1939 dash odometer does not match the value in the vehicle instrument cluster setting CAN_PREFERRED_ECU=238.23.49; should make the GNX select a value more likely to match the instrument cluster. This saves the effort of taking a bus log and setting CAN_PREFERRED_ECU to match the specific vehicle. Note on OBD vehicles only the first value of the arrays is used.

CAN_ENABLE=1.xFF will now only activate baud rate hunting on J1939. On OBD, where baud hunting is not usually needed set CAN_ENABLE=1.xFF.0.0.0.41; to enable baud hunting – note that this setting is not recommended unless you are reasonably sure that the OBD vehicle runs a 250kHz CAN bus.

Improved report column BusStatus(56) so that it correctly reports whether a JBus is J1708 only (7), J1939 only (9) or dual (J). Previously the GNX would continue to report J even if the J1939 bus had stopped reporting.

Improved DIAG CAN to show source addresses on OBD, and on J1939 PGNs are shown as stale (s) if they have not been received for more than 30 seconds.

Second array entry added to parameter BT_ENABLE – if set to 1 the BLE advertising name will not have LE appended.

Second array entry added to LANDMARK_ALERT_TIME – in seconds – delays event 13, DEPARTED, allowing for brief excursions from the landmark radius without triggering event 13. E.g. LANDMARK_ALERT_TIME=30.30; delays entry and exit from landmark by 30 seconds.

New parameter LARGEG_REPORT(174)=<FreezeBufferDuration>.<1/2/3>.<rate of report post large G event>.<duration of report port large G event>. This parameter can be used to trigger the dumping of the pre-accident data (see DIAG ACCIDENT) into the position queue to be sent as regularly formatted location data. (Note TAMPER_DETECT[2] is deprecated in favor of this new parameter.) The first value is how long the accident buffer (DIAG ACCIDENT) is frozen for following the event in seconds. The second number in this parameter is 1 to send only DIAG ACCIDENT, and 2 to put the pre-event RAM buffer into the position queue and send it as regular locations (all with event code 101), and 3 to do both. The third and fourth numbers are the rate at which to continue to send LARGE_G after the event, and for how long this should be continued.

For example, LARGEG_REPORT=240.3.5.60; would cause the GNX to send DIAG ACCIDENT, copy the pre-event locations into the PVTQ with event code 101, and then capture event 101 every 5 seconds for the next 60 seconds. The DIAG ACCIDENT response would be frozen for 240 seconds to allow the server to query the values (though if copying to the position queue is enabled this in effect freezes the buffer, so a shorter period could be selected) Note that the pre-accident report column data is limited to latitude, longitude, speed, heading, measured G force, RPM and engine load. All other columns will be zerod out.

Improved sensitivity for short duration (< 1 second) spikes in acceleration, e.g. due to swerves, harsh lane changes.

New parameter RESETVBUS_DISCONNECT(570) is used when the GNX detects that it has been disconnected from power. Previously disconnect from power was equivalent to RESETCAN3 – erasing all CAN data including odometer. By setting RESETVBUS_DISCONNECT=1 the GNX will retain CAN bus data across power disconnections, which is particularly helpful in vehicles with kill switches.

New parameter CAN_SUSPEND(571) = <time to suspend CAN in seconds>.<number of ignition ON->OFF transitions to reenable bus>. For example CAN_SUSPEND=7200.2; sets the CAN bus into silent mode for the next two hours or until two ignition transitions from ON->off are detected (using voltage). This setting could be used to perform vehicle maintenance or testing without interference from the GNX. New command SUSPENDCANBUS=<time to suspend CAN in seconds>.<number of ignition ON->OFF transitions to reenable bus> sets the same parameter and allows setting by a Bluetooth client (Bluetooth clients cannot set parameters). DIAG PARAMS=CAN_SUSPEND shows the number of remaining seconds & ignition transitions.

AT!GXCANLOOPBACKNOFILT disables address filtering prior to performing CAN loopback – may be used for CAN bus diagnostics.

Modem switching build for explosive/hazardous environments – Bluetooth is now powered off in addition to the modem when conditions are met (contact Sierra for details of this custom build)

Fixed bug where after power cycle or OTAP on a J1708 only vehicle the derived odometer would stop incrementing.

If J1708_TX_REQ=<bitmap>.1 then J1708 data is preferred over J1939 data on dual bus vehicle.

New event DSCC(127) is sent at the same rate as configured for DTCs (CAN_ENABLE[4] – default 4 hours) if the GNX6 is configured to base an OBD vehicle dash odometer on the Distance Since Codes Cleared

PID and the DSCC is above 60,000km. On receiving this event the vehicle owner should have the engine codes professionally cleared to keep DSCC incrementing.

DSCC event is also sent if the GNX6 is configured to base an OBD vehicle dash odometer on the Distance Since Codes Cleared PID and the GNX detects vehicle speed for more than 1 hour with no increase in the DSCC PID.

Added new mechanism to catch GPS position jumps in idling vehicles. If USE_VEHICLE_SPEED[0] >= 200km/h then if the vehicle bus speed is < 3km/h any GPS fixes with speed > 10km/h will be discarded. GPSSTAT column gets a new bitmap x80 to signal this condition.

G604.08.03kX April 2018

Added SKU number to DIAG HARDWARE. Fixed GNX-5P to read GNX-6 when running on GNX6 hardware.

Added Bluetooth logging for advanced remote troubleshooting of Bluetooth issues. Key Bluetooth events are continuously logged to RAM and can be dumped out by TFTP/FTP by Sierra engineers for troubleshooting.

Fixed vulnerability where Bluetooth client could disconnect due to pairing error and GNX would be unaware of disconnection (and this would not return to advertising for new connections).

Improved report columns 112(EngTotalHours),113(EngIdleHours) so that they will show absolute (bus read) values if available else derived values if the absolute values are not available. Previously this functionality worked only in the main reports to the server, but not in DUMPQELD.

Fixed bug in report columns 115(EngTotalHours),116(EngIdleHours) on OBD vehicles. Previously there were serious errors that rendered these columns useless.

Fixed bug in report column 109 (total NG fuel) : this column previously reported incorrect values.

Fixed bug in ibutton relay drive handling which would leave the driver alert relay activated after a valid ibutton was presented.

Improved DUMPQ VIAEMAIL so that binary format data can be sent as a MIMEattachment.

Added new setting J1708_TX_REQ=xDEADDEAD; to selectively disable J1708 data while leaving J1939 running. This setting can be used for troubleshooting discontinuities in reported JBus data.

Potential improvement for J1939 VIN reading by reducing vulnerability to VIN corruption or truncation due to a concurrent CAN multi frame broadcast from a different ECU. It was not possible to test that this would fix VIN corruptions (because they occur sporadically and rarely), but it was tested to verify that no new error was introduced.

J1939 now captures the source address (ECU address) of all DTCs and will report these as a 7th byte in the DTC if parameter SEND_DTC_CODES=2;

Fixed bug that could cause frequent sending of event 47 if a J1939 vehicle had many diagnostic trouble codes.

G604.08.02kX February 1 2018

J1708 updated to use Brake/Power ECU in addition to Engine ECU, but default to engine ECU where data is available from the engine. This may help increase the number of 2000-2005 heavy duty vehicles that can be made ELD compliant.

Improved J1708 diagnostics so most recent values are shown even if the bus is not currently communicating along with information on checksum failures and dropped frames.

Bug fixed in J1939 multi-ECU filtering that could cause the GNX to ignore the odometer (and fall back to using the J1708 odometer, if supported) if it is only reported by a non-engine ECU.

J1939/J1708 DIAG CAN response now shows PECU: if a preferred ECU has been explicitly configured, and shows OdoOff: if a dash odometer offset has been calculated due to the command SETPARAM ODOMETER_KM=< value in km>.1;

Added command SETVEHICLEODOMETER_KM=<value>, SETVEHICLEODOMETER_MILES=<value> to allow the Bluetooth client to set the vehicle odometer, bypassing the block on the Bluetooth client setting any parameters.

Fixed several bugs related to setting odometer offsets to the dash odometer with ODOMETER_KM=<value_in_km>.1 – previously this didn't work with J1708 and would generate spurious results if set more than once on J1939 or OBD.

Fixed vulnerability in OBD where if vehicle outputs an odometer value of 0 at ignition off the GNX would overwrite the true odometer value.

Improved tracking of (derived) total engine hours and trip hours on OBD vehicles.

New report column TripHours(196) shows actual or derived duration of current trip in fractional hours (2 decimal places).

New report column BusAge(187), age of vehicle bus data in seconds 0-240, 255=unknown

Reporting of state PARKED, MOVING, IDLING in DIAG PVT, and report column 31 unified and based on vehicle ECU information if parameter USE_ECU_SPEED_RPM (167) is set.

New parameter HOS_USE_WIRED_IGN (569). If set to 1 the GNX will ignore any sources of RPM from the vehicle and will use the ignition wire for engine on/off transitions. This may allow ELD compliant operation for some 2000-2005 heavy duty vehicles where RPM is not reported on the vehicle bus, or if the vehicle is reporting correct speed, but 0 RPM on the bus.

Fixed bugs in DOTELD ACKID and CLAIMID – previously if the ID ackd/claimed started with a hex letter the GNX would not correctly parse the hex number.

Improved function in DOTELD READ/ACKID/CLAIMID

1. READUD / READUA / READAL commands will only output 10 events at a time – the client can then request the next 10 events. To make this work the firmware adds an optional start event sequence number to the READ commands : READALNA 789a : read all events with no acknowledgement starting from event sequence ID 0x789a.

2. ACKID/CLAIMUD can now acknowledge or claim a range of IDs:
   ACKID 7890-789a - acknowledge all events from sequence number 0x7890 through 0x789a inclusive.
3. Because of the reduced numbers of events output at a time READxxNA can send one event per 0.1 seconds – three times faster than previous firmware.

DUMPQ responses finish with diagnostic that gives information about the number of positions, the unique ID range and the current max/min Unique ID in the position queue:
DUMPQ:17,63,1,63,1,1512681019
DUMPQ: <NumberofEvents>,<MaxUniqueIDinDUMPQ>,<MinUniqueIDinDUMPQ>,< MaxUniqueIDinQ>,< MinUniqueIDinQ >,<EpochTimeofDUMPQ>

NumberofEvents: the number of PVT events in this DUMPQ
MaxUniqueIDinDUMPQ: the maximum Unique ID in this DUMPQ
MinUniqueIDinDUMPQ: the minimum Unique ID in this DUMPQ
MaxUniqueIDinQ: the UniqueID of the head of the most recent event
MinUniqueIDinQ: the UniqueID of the head of the oldest event still in GNX memory
EpochTime: timestamp when this DUMPQ was generated

New DUMPQ option: DUMPQ ENDID <UniqueID> MAXPOINTS <max events> will output events in reverse chronological order starting with the specified ENDID.

Updated processing of DriverAlert relay so that DriverID and speeding alerts do not cancel each other out and so that beep patterns can complete before being overwritten / returning to the former relay state

If REPORT_INTERVAL=<time>.x02; then the GNX will send short form updates for DISTANCE events in addition to PERIODIC events.

Added “broadband” APN to the hunting list for AT&T SIMs.

G604.08.01kX December 20 2017

Fixes bug where DIAG HOS PVT (TIME) could overflow a buffer and cause a reset if the vehicle is reporting many trouble codes.

Improved UART / Bluetooth AT command watchdog function can be used to prevent a non-ELD client from connecting to the Bluetooth, preventing the legitimate client from doing so. If AT command watchdog is tripped the Bluetooth client is forced off and the Bluetooth immediately starts advertising with no dead time (previously there were several seconds of dead time on the bluetooth).

Added DIAG FWVER to allow Bluetooth client to discover the firmware version of the GNX with which it is communicating.

Improved function of USE_VEHICLE_SPEED parameter so the GNX will always override the GPS speed with the ECU speed provided it has received at least one non-zero speed from the ECU. Previously the GNX would only override GPS speed if the ECU speed was non-zero, leaving the possibility of speed jumps when the vehicle is idling.

Fixed bug in parameter ODOMETER_KM, ODOMETER_M when used to calculate an offset to the bus absolute odometer – previously if the command was sent twice the offset would be subtracted. In the new firmware SETPARAM ODOMETER_KM=<value>.<minimum offset> will always calculate the correct offset and apply it to future position reports and in DIAG HOS.

Fixed vulnerability where setting too many values in REPORT_COLUMNS, BRIEF_REPORT_COlUMNS, IRIDIUM_REPORT_COLUMNS or ELD_REPORT_COLUMNS could cause corrupted report data.

Improved vehicle bus logging with !GXDIAG STARTJLOG7 which disables CAN address filtering prior to logging and reenables the filters after logging.

Improved ELD function by not assuming engine off event indicates the end of vehicle movement (e.g. on hybrid vehicles).

G604.08.66kX November 20 2017

Parameter STOP_SPEED second value which used to be interpreted as a Boolean now interprets a value greater than 1 as the speed threshold (in km/h) below which the GNX will record a BEGIN_STOP event immediately before recording either IGNITION_OFF(2) or ENGINE_OFF (63). This may be useful in fine tuning the GNX to always report BEGIN_STOP before IGNITION_OFF/ENGINE_OFF but not if there is a spurious IGNITION/ENGINE_OFF. It may also help with hybrid vehicles, where the engine can turn off while the vehicle is driving. The new feature is fully backward compatible with prior configuration settings of STOP_SPEED=<speed>.1; A bug was also fixed so that this logic is applied to all ENGINE_OFF events, (previously this feature only worked if the ECU stopped communicating, and not if the RPM explicitly went to 0).

Fixed a bug in ELD which caused repeated type/code 71 and malfunction'E' if the GNX is disconnected from the vehicle bus with the ignition on for more than 30 minutes.

Fixed bug where PRESERVE_CONFIG=x00005D00 the parameter REPORT_FORMAT(129) was not preserved.

Improved ability to recover CAN bus connectivity if the GNX is disconnected from the bus (and power – e.g. yanking the cable) and then quickly reconnected. Previously RESETCAN was needed, but now the GNX recovers autonomously.

Fixed serious vulnerability in J1939 CAN interface where setting CAN_ENABLE=1.xFD; while the GNX is communicating with the vehicle would cause a baud mismatch and vehicle interference for a period of around 60 seconds.

DIAG UARTSTATE now shows BTIsOff if Bluetooth is powered off for any reason (including parameter BT_ENABLE not being set).

Improved Bluetooth data throughput from GNX to client to reduce probability of buffer overflows.

Improved DIAG CAN response for heavy duty vehicles to continue to report most recent J1939 and J1708 diagnostics when the ignition is turned off. Previously DIAG CAN would show NotFound after parameter JBUS_TIMEOUT(184).

Fixed vulnerability where vehicle reporting all zero VIN would overwrite the parameter VBUS_VIN.

Fixed bug where If a J1939 vehicle reported a vehicle speed of exactly zero the GNX would report -1 in column 75. The same bug applied to throttle position (177) and brake application pressure (183) which are also fixed.

The Bluetooth low energy MAC address is fixed if BT_ENABLE=2. A random MAC address is used for low energy advertisements only if BT_ENABLE=3 (low energy and classic supported simultaneously).

Vulnerability fixed in Bluetooth low energy where if the client disconnects part way through reading a characteristic it could cause the GNX BLE to lock up.

Fixed bug where parameter COUNTDOWN_TIMEOUT(203) would interfere with TURN12VON/OFF command if set, resulting in TURN12VON/OFF only being activated for 1 second.

G604.08.67kX October 11 2017 – Do not use this firmware

Note .69kX, .68kX and .67kX have a serious risk of vehicle interference if used on J1939 vehicles – it is recommended not to use these versions and use .66kX instead. .70kX is not affected, but is vulnerable to cable breakage on OBD vehicles, where it might interfere with the vehicles.

If PRESERVE_CONFIG=x00005D00 the parameters REPORT_FORMAT(129) and PKT_CALL_INTERVAL(2) are preserved during OTAP (in addition to the parameters preserved in G604.08.68kX – see below)

Added OBD odometer parsing for multi-frame odometers.

Broadcast diagnostics can be configured over the air to be broadcast on the wired or Bluetooth UART. A limited set of diagnostics is supported (PVT, TIME, SERNUM, HOS).

Full syntax:

DIAG [PVT][TIME][SERNUM][HOS] REPEAT <interval> [VIAUART <destination>]

<interval> = interval of repeat in seconds
<destination> = MAIN for wired UART, or AUX for Bluetooth UART

If VIAUART is omitted the diagnostic is broadcast to both UARTs.

e.g. DIAG PVT HOS REPEAT 4 VIAUART AUX

Bug fix PVT_RELAY_ON/OFF/OUT now works with event 122 (driver logout)

G604.08.68kX September 21 2017 – Do not use this firmware

Note .69kX, .68kX and .67kX have a serious risk of vehicle interference if used on J1939 vehicles – it is recommended not to use these versions and use .66kX instead. .70kX is not affected, but is vulnerable to cable breakage on OBD vehicles, where it might interfere with the vehicles.

New parameter BT_ENABLE (238) to allow different mode of operations for Bluetooth.

- 0: Bluetooth is disabled.

- 1: Enable Bluetooth Classic functionalities only.
- 2: Enable Bluetooth LE functionalities only.
- 3: Enable Bluetooth Classic and LE functionalities at the same time.

Improved Bluetooth pairing by changing Bluetooth LE device name to the format “GENX_<Serial#>LE”. Bluetooth Classic device name will remain as “GENX_<Serial#>”. This is to work around Android OS pairing issue.

Improvement: The following parameters and the continuity of UniqueId (7) on the report columns can be preserved over OTAP with a new parameter:

- SEND_Q_MODE (5)
- REPORT_COLUMNS (24)
- DATA_SERVER_IP (30)
- DATA_SERVER_NAME (32)

The new parameter PRESERVE_CONFIG (515) can be used to select the type of data to be preserved over OTAP.

- PRESERVE_CONFIG=x00000000;

  This is the default setting where no parameter is preserved during OTAP.
- PRESERVE_CONFIG=x0000001D

  Preserves the continuity of UniqueId (7).
- PRESERVE_CONFIG=x00005D00

  Preserves all the parameters mentioned above.
- PRESERVE_CONFIG=x00005D1D

  Preserves the Unique ID and the all the parameters mentioned above.

Improved odometer handling to accommodate some Subaru and Hino/Volvo trucks that use an OBD connector.

Improved the accuracy of derived total engine hours and derived idle hours.

Improved DOT ELD engine synchronization compliance and malfunction reporting.

Improvement: Extended the timeout to fallback to voltage ignition sense (settings from parameter FAKE_IGNITION (107)) from 24 hours to one week. This is to accommodate vehicles that has an auxiliary power unit that drives up the battery voltage.

Improvement: AT!GXAPP DIAG HARDWARE and AT!GXAPP DIAG HARDWARE BRIEF now shows the KEYCRC to simplify the selection of firmware image for reprograming.

Improvement: Supports multiple ECUs reporting the same attributes (vehicle speed, engine RPM, and odometer/trip distance) on J1708. By default, GNX will use the value broadcasted by the lowest numbered ECU unless a preferred ECU is specified by the parameter J1708_TX_REQ (229).

Bug fix for AT!GXAPP DIAG CAN to show VIN even if it is truncated.

Bug fix for DTC read interval to be based on the 5th array of the parameter CAN_ENABLE (70) instead of a hard-coded value.

Bug fix for non-stop VIN (109) event when GNX sees an invalid or truncated VIN on J1708.

Bug fix for parameter VBUS_VIN (568) where GNX does not use the assigned VIN even when VIN is not available from the vehicle bus.

G604.08.69kX July 25 2017 – Do not use this firmware

Note .69kX, .68kX and .67kX have a serious risk of vehicle interference if used on J1939 vehicles – it is recommended not to use these versions and use .66kX instead. .70kX is not affected, but is vulnerable to cable breakage on OBD vehicles, where it might interfere with the vehicles.

Added +DOTELD:END at the end of AT!GXAPP DOTELD READxx responses so that the client knows when the GNX has finished sending matching data.

Improved vehicle VIN handling. User can set and read new parameter 568 (VBUS_VIN) which the GNX will overwrite with the VIN read from the vehicle, but only if the vehicle VIN is 17 digits long with correct check digit. This will allow a Bluetooth client to read VIN even if the GNX cannot read it from the vehicle. Additionally VIN reading from OBD vehicles improved to prevent VIN truncation when reading from some OBD vehicles (due to vehicle slow response to VIN read request).

GNX will preserve the following information during OTAPs from .69kX to future firmware: dash odometer, bus derived odometer, total fuel, bus total hours, bus idle hours.

New parameter CRASH_DETECT (168) to enable detection of low speed impacts (rear end, side impact) which might not be detected by previous ACCEL_CONFIG[5]. Recommended setting is CRASH_DETECT=3.15.5.25. If a crash is detected the GNX will send event LARGE_G(101). This is an experimental feature: some experimentation may be needed to find settings that eliminate false alarms while still capturing accidents.

Added APN auto set for Airtel, India.

New feature: if REPORT_FORMAT=x.x.x.1; then the GNX will not append any text or data to the reason code or reason text report columns (9/10). This is to simplify parsing at the server.

Improved functions for maintaining communication with hybrid, and stop-start OBD vehicles. CAN_ENABLE[2] redefined:

For stop-start vehicles set CAN_ENABLE=1.xFD.4;

For hybrid vehicles (e.g. Prius) set CAN_ENABLE=1.xFD.6;

For pure electric or aggressive hybrid (e.g. GM volt) please contact GenX Sierra for assistance.

If CAN_ENABLE is set and the GNX does not detect a positive cable detect (either J1939 Type II or OBD) then the GNX will assume J1939 but silently baud hunt so as to not risk interfering with the vehicle and to maximize the chance of finding 500kHz J1939 on GNX6 that are not capable of detecting the type II cable.

CAN_ENABLE=1.xFD is now persistent: it will not be automatically disabled if the GNX fails to find an OBD bus (this can help where voltage fluctuations fool the GNX into searching for the vehicle when the bus is off).

New security options to secure received SMS/text messages. Parameter SMS_FILTER_SENDER can take the following values:

- 0x00000000 – default – all received SMS are parsed and may contain any command
  0xEEEEEEEE – all received SMS are silently discarded
  0xDDDDDDDD – SMS may only contain command RESYNCNOW – all others silently discarded
  0x55555555 - SMS may only contain command RESYNCNOW, LOCATE – all others silently discarded
  0x11111111 – SMS may not contain "GX", "SET", "GET", VIASMS may only specify REPLYTOME. VIAUDP/TCP/FTP/TFTP may only reply to IP address in parameters 7,30,37. VIAEMAIL will only reply to parameter 12.

Fixed bug where improperly formatted !GXDIAG STARTJLOG command could prevent the GNX from being able to parse correct STARTJLOG commands (until the GNX was reset). The GNX is now tolerant of improper formatting and will start new logs if commanded. !GXDIAG STARTJLOG also now forces re-read of VIN and DTCs so they can be easily debugged.

Bug fixed in Bluetooth low energy virtual serial port (BLE VSP) and a second BLE VSP2 added which may give faster throughput. For further information please see the GNX6 "Guidelines for Bluetooth Operation" version 0.5.

Fixed bug where if GNX receives SMS containing RESETGNX within 60 seconds of powerup it caused a factory reset.

G604.08.70kX April 17th 2017

Fixed bug in feature "DOT ELD AT!GXAPP DOTELD TE51 command with no driver ID supplied (DID) will be interpreted by GNX as implicit driver login" added in G604.08.71kX

GNX6 will now allow full poweroff with the ignition wire connected to +12/24v. This can help reduce power consumption if the GNX6 is installed to the vehicle bus without separately wired ignition and the vehicle is parked for long periods. Note the following restrictions:

- If the GNX6 sees transitions (edges) on the ignition wire input then it disables this feature and will not allow power off when the ignition is on. This is to prevent a race condition where the (wired) ignition goes high just as the GNX6 is powering off.

- If parameter 107(FAKE_IGNITION) is non-zero then parameter ACCEL_WAKE or REPORT_TIME_OF_DAY must be non-zero. i.e. the GNX6 must be configured to wake from off

due to timer and/or accelerometer or it will not power off (because otherwise there may be no stimulus to wake it back up again)

If GNX6 wakes due to accelerometer and there is no subsequent vehicle movement (false alarm) then the GNX6 will power off after POWER_OFF_TIME[3] – the same index that controls power off when waking due to the internal timer /clock.

Improved security for troubleshooting feature to force J1939 baud rate: if the GNX is currently communicating with the vehicle then the setting is ignored and parameter J1939_TX_REQ is reset.

G604.08.71kX April 17th 2017

Fixed bug affecting G604.08.72kX that caused CAN_ENABLE to be reset to 0.0 on powerup regardless of whether BACKUPNVRAM was used.

Changed J1708 so that it remains on in listen only mode when the ignition goes off, rather than turning off completely. This should make the GNX6 detect engine on/ignition on much more quickly in J1708 only vehicles.

New parameter BLE_VSP_MODE (238) (default 0.0) to switch BLE_VSP TX characteristic to unacknowledged.

The first index of BLE_VSP_MODE takes the following values:

0x00 = original VSP operation

0x01 = notification based TX

0x02 = notification based TX (with sequence count in the first byte of the notification).

The second index is the notification interval in milliseconds, with a minimum value of 10ms.

Note that the VSP uses the following UUID for TX when the notification mode is selected:
0x569A2002-B87F-490C-92CB-11BA5EA5167C

New parameters ELD_REPORT_COLUMNS (175), ELD_REPORT_EVENTS (176) – default 0 (off). If set to non-zero (list of report columns, and list of event codes) these parameters configure the events and report columns returned in response to DUMPQELD command.

New command AT!GXAPP DUMPQELD <STARTID> <ENDID> intended for DOT ELD Bluetooth client to retrieve events and columns specified by above parameters. Data is sent as GNX framed binary (not ASCII hex) to UARt / Bluetooth clent. This may be an alternative to the AT!GXAPP DOTELD READXX commands (which will continue to be supported).

New UART keyword NOOK – the GNX will not send the OK response –e.g. AT!GXAPP DUMPQELD ALLQ NOOK

New event BTD (124) to indicate disconnection of Bluetooth client generated by either a combination of AT_WATCHDOG_STRING(81) and AT_WATCHDOG_TIME(87) (using an explicit string from the Bluetooth

client to reset/maintain the watchdog, or AT_WATCHDOG_TIME[2] alone – just using the status from the GNX6 bluetooth module connectivity status.

Parameter AT_WATCHDOG_TIME extended with 3rd index – if non-zero this will generate BTD(124) event to indicate Bluetooth client disconnection just using the status from the GNX6 Bluetooth module. This provides an alternative to using the (preferred) method of AT_WATCHDOG_STRING and AT_WATCHDOG_TIME and requiring that the Bluetooth client send an explicit keep alive / heartbeat (which can be one of the DIAG commands (e.g. DIAG HOS).

Parameter USE_VEHICLE_SPEED(167) extended to 3 values <speed threshold for replacing GPS with vehicle speed >.< RPM threshold to use for idling>.< use of vehicle odometer/derived odometer instead of GPS for PVT_DISTANCE event (30)>. Recommended setting 167=100.1000.1; to use vehicle bus data for reported speed, idling calculation and PVT_DISTANCE event trigger.

Improved J1939/J1708 bus selection to prevent reported bus data from ping-ponging between (potentially conflicting) values reported by the J1939 and J1708 vehicle buses. Added logic to prevent ping-pong of vehicle bus odometer from causing large erroneous values in the delta odometer column (59).

DOT ELD added new option. If ELD_ENABLE=2 then the +DOTELD unsolicited response code will contain extra data fields:

+DOTELD:< EventSequenceID >,< TypeCode>,<UNIX epoch>,<Malfunction character>,<GPSBad>,<N/A>,<BusOdometer>,<BusDerivedOdometer>,<BusTotalHours><<BusDerivedTotalHours>,<latitude>,<longitude>

See DOT ELD documentation for further details.

DOT ELD AT!GXAPP DOTELD TE51 command with no driver ID supplied (DID) will be interpreted by GNX as implicit driver login. Driver ID of UD will be assigned and GNX logic will behave as if a driver ID was explicitly assigned.

G604.08.72kX March 24th 2017

Improved report column 56 (BusStatus) to show if J1939 bus is intermittent on a dual bus (J1708/J1939) vehicle.

Improved response time to Bluetooth DIAG HOS, TIME, PVT if the GNX is sending data to the server. Previously the Bluetooth responses would be delayed if the GNX did not received a prompt acknowledgement from the server. Note that this is limited to the following diagnostics: PVT, TIME, SERNUM, HOS.

New report columns BusDerivedTotalHours (115) and BusDerivedIdleHours(116) – if these columns are configured then the GNX reports value derived from vehicle bus speed and RPM. If these columns are not configured the GNX will report derived values in columns 112,113 if the absolute values are not available from the vehicle.

Added AT!GXAPP UARTBRIEF to reduce the size of the ACK replies on the UART only which reduces data flow on the BLE Virtual serial port.

Added AA as a short form for AT!GXAPP to reduce byte flow on the Bluetooth SPP and BLE VSP (does not work on wired UART) e.g. AA DIAG HOS PVT instead of AT!GXAPP DIAG HOS PVT

Mechanism for selecting J1939 preferred ECU if multiple bus ECUs are transmitting conflicting data. By default the GNX selects the lowest numbered (Source Address) ECU sending the data, but this can be overridden by setting parameter 563 (CAN_PREFERRED_ECU). This mimics the approach used successfully on OBD vehicles.

Added experimental mechanism for the GNX to know if electric or hybrid (and also stop-start) OBD vehicles are in use, as opposed to parked. Contact GenX Sierra for further details if you are considering testing with one of these vehicles. Also added improved logic for hybrid vehicles using speed and voltage only CAN_ENABLE=1.x.1.x, plus FAKE_IGNITION=x.x.x.x.<speed threshold km/h>: GNX will try to read the CAN bus whenever the ECU or GPS speed is greater than the specified threshold regardless of whether there is RPM.

Mechanism for the GNX to automatically insert its serial number into four consecutive bytes in the BLE advertising data, if parameter BLE_ADDATA is specified. If 4 consecutive bytes in the parameter are assigned the values xEE the GNX will replace these with an unsigned 32 bit integer containing its serial number.

In DIAG CAN response Age:<seconds> added to J1708 and OBD diagnostic to make it easier to see how recently the GNX received data from these buses. (already present in J1939 diagnostic). Also improved error diagnostics in DIAG CAN response

Added command to allow UART/Bluetooth client to simulate ibutton events 65, 66 IBLOGIN [2- 14 ASCII hex digits] / IBLOGOUT

Fixed bug that caused report columns 108, 109 (total fuel used) to not work on heavy duty vehicles (not supported on OBD vehicles).

Improved handling of PVT_RELAY_TIMEOUT so that if multiple events/relays/timeouts are specified there is not a danger of a relay being left on if a new event occurs during the timeout period.

Added option for auto-recovery from CANbus transmit error (experimental – GenX Sierra engineering use only until more fully tested – disabled by default)

G604.08.73kX February 22nd 2017

Added ability to add GNX serial number into BLE advertising data in parameter BLE_ADDATA. Serial number will replace 4 bytes xEE.xEE.xEE.xEE

Added parameters OBD_INUSE_ADDRESS, OBD_INUSE_FORMAT as a placeholder for future testing where GNX could determine vehicle in use status based on broadcast messages from the vehicle (as opposed to RPM and voltage). This may give better results with hybrid and electric vehicles thought this has not yet been tested.

Also added CAN_ENABLE=1.x.1.x as a generic configuration option for hybrid / stop-start vehicles that will keep the GNX talking to the vehicle whenever there is speed reported on either the vehicle bus or the GPS (previously the GNX would stop communicating whenever RPM went to zero).

Added support for external antenna GNX6.

Reduced sensitivity to false towing events caused by jolt/bumping of accelerometer (and not steady acceleration).

Disabled Telnet access to the GNX as default (reduce spam, increase security).

Fixed bug that could keep the ignition on if CAN_ENABLE and FAKE_IGNITION are non zero and the GNX has never communicated with the vehicle.

G604.08.74kX January 20th 2017

Fixed bug present in .79kx through .75kx that prevented reading of odometer in OBD vehicles unless the GNX was configured with an explicit read request.

Modified J1708 to aid in reading VIN number (not tested on vehicle).

G604.08.75kX January 9th 2017

Fixed bug in ISO15765_2 CAN flow control message to enable reading of some new OBD vehicle odometer values.

Fixed bug that caused J1939 engine load column to be always 0.

Second array value (offset) in PARAM_ODOMETER, ODOMETER_KM, ODOMETER_MILES extended to apply to J1708 odometer (previously was only J1939 and OBD).

CAN_ENABLE parameter extended to 5 array entries
- index 0 enables CAN bus
- index 1 is bitmap to control OBD read requests (e.g. xFD)
- index 2 is how often to check RPM if ign off (voltage based) in seconds (default 0)
- index 3 is stuffing byte in OBD CAN transmissions - default 0x00
- index 4 (new in 75kX) selects how often in hours to re-read DTCs (default 4)

CAN_ENABLE=x55….. can now be used to select J1708 ONLY operation.

Column 70 (odometer) should now be maintained when ignition is off on J1708 only vehicles (would previously reset to 0).

DIAG ACCIDENT should now show bus information on J1708 only vehicles (not tested).

Added parameter BLE_ADDDATA to allow configuration of BLE advertising message – recommended NOT to use this parameter unless you are very familiar with the structure of Bluetooth low energy advertising packets.

Fixed bug in Bluetooth classic that would cause bytes of 0x00 to be dropped if sent from GNX to Bluetooth client (e.g. GNX2UART)

Extended DRIVER_ALERT_BEEPS so that it can control the LED output (DRIVER_ALERT_BEEPS=<pattern>.5;

G604.08.77kX 10th November 2016

PARAM_ODOMETER, ODOMETER_KM, ODOMETER_MILES now all have second array value (in meters). If set to non-zero value then the GNX6 will calculate an offset to the absolute (dash) odometer(column 70) reported by the vehicle bus, but only if the offset is larger than the specified value in meters:

ODOMETER_KM=26543.2000; // Set GPS and bus speed derived odometer to 26543km. If 26543 is more than 2000 meters different than the current bus reported odometer (column 70) then calculate an offset and apply to future readings to make the bus odometer (column 70) report 26543km right now.

New report column 141 (BT) single character shows the Bluetooth status, O/off, E/error, I/initializing, N,not connected, C/connected classic, L/connected low energy. This is to help with remote troubleshooting of Bluetooth connectivity.

In Bluetooth low energy HOS GEN characteristic the ignition bit is no longer hard coded to the ignition wire in the wiring harness: it now reflects the ignition "state" of the GNX whether it is derived from the wire, from RPM, voltage or movement, and includes the same debounce logic so that it changes at the same time as ignition events are signaled to the server. In addition bytes 3 to 6 show the Unix epoch time of the most recent ignition transition.

In Bluetooth low energy HOS ECM characteristic bytes 16-19 now contain the Unix epoch time of the most recent engine on/off event.

A new Bluetooth low energy HOS REV is a revolving characteristic that transmits static data including modem IMEI/ESN, ICCID and phone number.

Significant changes/improvements to Bluetooth low energy Virtual Serial Port (VSP). Command echo is disabled and the VSP now sends an explicit buffer empty response.

The GNX6 bluetooth name, which defaults to GENX_*serialnumber* can now be configured to be an arbitrary string up to 17 characters with parameter BT_NAME (237).

For full details of the GNX Bluetooth support please consult the GNX6 bluetooth application note (GNX_BLE_04).

J1939/J1708 odometer now holds its value if the bus stops communicating: previously after 60 seconds it would timeout to the default value of -999 in reported data, DIAG HOS and on BLE HOS ECM.

Fixed bug that was causing J1939 engine oil temperature to not be reported.

Added logic to mitigate false ignition off in GNX using FAKE_IGNITION and CAN_ENABLE where bus connectivity is lost for brief periods (< 30 seconds).

G604.08.78kX 17th October 2016

Bug fix to prevent watchdogs and minor drifting in GPS time (few seconds) from triggering false ignition off events in a driving vehicle that is using bus RPM to determine ignition state.

Added AT!GXCANLOOPBACK command to facilitate sniffing of the CAN bus without any packet dropping.

Added printing of classic Bluetooth key information to DIAG UARTSTATE.

Added first cut DOT ELD supporting function (see GNX DOT ELD application note for details). Note this feature is relatively untested, so expect bugs and changes over the coming months.

G604.08.79kX 4th October 2016

GNX remembers Bluetooth classic keys so that the connection is automatically restored after napping or power off.

If CAN_ENABLE=1.xFF then the setting is persistent in OBD vehicles even if the GNX cannot detect the bus.

G604.08.80kX 26th September 2016

Fixed a bug in DNS lookup (only present in 81kX) that causes DNS to be resolved each time the GNX wakes from napping (every 60 seconds) leading to high data usage when the vehicle is parked.

J1939_TX_REQ-This bug has been in all GNX6 firmware builds: the GNX6 does not reliably cycle through all read items in J1939_TX_REQ: the index moves semi-randomly so some items may only be read very infrequently. This mainly affects the reading of engine hours on the J1939 bus.

G604.08.81kX 24th August 2016

Added Bluetooth watchdog function with two new parameters:
AT!GXAPP SETPARAM AT_WATCHDOG_STRING=HOS; // or pick part of a command you send regularly
AT!GXAPP SETPARAM AT_WATCHDOG_TIME=30.0; // reset if not received for > 30 seconds
The GNX performs a power cycle and reset on the bluetooth using an exponential backoff.
First timeout at 30 seconds, second at 60 seconds, third at 90 seconds, 10+ timeouts - resets the bluetooth every 300 seconds.
The string can be received via bluetooth classic or the BLE VSP (Virtual Serial Port).

The GNX turns off Bluetooth when it starts napping even if this comes before EXT_12V_OFF_TIME has expired. This is done to reduce the chances of Bluetooth communication problems.

Added parameters PVT_UART2_OUTPUT(134), PVT_UART2_OUTPUT_TRIGGER(35) which work the same as pre-existing parameters 89,90 except that they send strings over Bluetooth classic SPP or BLE VSP.

Created new UART diagnostic stream AT!GXSTREAMON=BT for monitoring communication between the GNX6 and its internal Bluetooth module.

Minor bug fix in RTC: does not allow the alarm to be set until the RTC time is set from GPS.

Fixed CAN cable detect to correctly detect OBD and J1939 Type 2 (Green) cables from the state of the cable detect pin (+12v for OBD, ground for Type2 J1939, floating/open for J1939-250kHz).

G604.08.82kX 14th July 2016

Fixed reporting of RPM/ EngineON/OFF in DIAG HOS when vehicle stops reporting RPM (this was a new bug in 83kX).

Fixed reporting of J1939 values in Bluetooth low energy when engine goes off (new bug in 83kX caused by the reporting of default values in location events)

G604.08.83kX 14th July 2016

Added support for multiple SETPARAM-ENDPARAM in a single command / configuration file.

Maintain values in columns 112,113 (total hours, idle hours) when the GNX is disconnected from the vehicle's bus.

Added configurability to allow the bus type to be reported in the ignition off event, even if the bus stops communicating when the ignition is turned off. E.g. SETPARAM JBUS_TIMEOUT=45;IGNITION_DEBOUNCE=30; The extended ignition hysteresis in parameter FAKE_IGNITION=<voltage>.<extended hysteresis minutes>.<acceleration> is ignored and IGNITION_DEBOUNCE (in seconds) is used if the GNX detects a reliable RPM reading from the vehicle bus.

Improved reporting of J1939, J1708 DTCs: DTCs will be reported/updated every 4 hours so long as they are present on the vehicle bus (previously were only updated if they changed, or sometimes sent too frequently depending on how the vehicle reports them). On OBD DTCs will be reported/updated every 4 hours (was previously 24 hours).

G604.08.84kX 1st July 2016

Added parameter PVT_RELAY_TIMEOUT so that a relay output can be activated by PVT_RELAY_ON, PVT_RELAY_OUT, but then will timeout automatically.

OBD_ODO_PARSE_FORMAT extended to allow half bytes to be included in the odometer (lower nibble). e.g. OBD_ODO_PARSE_FORMAT=x83.4.5; takes lower nibble of byte 3 and bytes 4,5.

Parameter USE_VEHICLE_SPEED also now named USE_ECU_SPEED_RPM and is two value array. The first value is the speed difference between ECU speed and GPS speed below which ECU speed is substituted in all speed reporting columns/diagnostics (except DIAG GPS). The second array entry is an RPM threshold above which the GNX will exit the IDLING state (e.g. for heavy duty vehicles where the engine also drives peripheral devices). E.g. USE_ECU_SPEED_RPM=200.1000; Use vehicle speed provided it is within 200km/h of GPS speed (always), only increment idle timers/counters if RPM < 1000 (and vehicle stationary).

G604.08.85kX 21st June 2016

Added extra checking and up to 3 read attempts to reduce incidence of malformed VIN numbers being reported.

Added software revision / date string to Bluetooth low energy device information.

Added type of bus to DIAG HOS for backward compatibility with GNX5P&JBox: BusIsNA/ BusIsJBus/ BusIsOBD

Added support for following UART functions to Bluetooth classic SPP (5,7,8,11). 5,7,8 gather small amounts of data from the Bluetooth "UART" and store and forward to the server in the position data using either event code 36 or 96. 11 is the PAD function, which is bidirectional and can be configured to use UDP or TCP. Parameter UART_FUNCTION=<wired UART function>.<Bluetooth UART Function> controls this feature. UART_BAUD has no effect on the Bluetooth classic SPP. The wired UART and Bluetooth classic SPP UART cannot be configured with the same function (e.g. UART_FUNCTION=8.8, UART_FUNCTION=11.11).

G604.08.86kX 13 June 2016

Improved J1939 address filtering so that more bus data can be captured without needing to set J1939_TX_REQ parameter (and transmit on the bus).

Added option to set J1939_TX_REQ=x250xxxxx; or J1939_TX_REQ=x500xxxxx; to force the bus to 250kHz or 500kHz if baud hunting fails to find the bus or causes vehicle interference.

Improved J1939 baud rate detection and added override capability in case the GNX does not find the bus.

Added setting OBD_ODO_PARSE_FORMAT=xD5.xCC to select OBD PID Distance Since Codes Cleared to populate OBD odometer. By default Distance Since Codes Cleared is not used and OBD odometer will be reported as 0.

Fixed BLE HOS ECM characteristic so that OBD odometer and derived odometer will always match the values in DIAG HOS response.

Fixed DIAG HOS so that bus hours and bus idling hours are shown when connected to a J1939/1708 vehicle that broadcasts this data.

Added total engine hours (in minutes) to BLE HOS-ECM characteristic (see updated characteristics in notes for G604.08.94kX firmware).

Added GNX firmware version to BLE HOS GEN characteristic in bytes 13,14,15 (immediately before the current Epoch time).

Fixed GPS odometer in BLE HOS GPS characteristic to have same 10meter units as ECM absolute and derived odometers.

Command RESETCAN to reset the CANbus connection (was previously called RESETOBD, but it works on J1939, so renamed).

Added new parameter PVT_RELAY_TIMEOUT which gives an optional timeout in seconds 1-255 after which the relay is deactivated. E.g.

AT!GXPOWERDOWN clears RTC alarm (previously only cleared ACCEL_WAKE) for shipping of internal battery devices.

PVT_RELAY_ON=65; // turn on if event 65 (ibutton read)
PVT_RELAY_OFF=2; // turn off if event 2 occurs
PVT_RELAY_OUT=3; // relay 3
PVT_RELAY_TIMEOUT=30; // if relay turned on due to event 65 then go off automatically after 30 seconds

Increased VALID_IB_CRC to hold the CRC of up to 256 ibuttons

Created two extra parameters because 256 ibutton CRCs are too long to be set in a single SETPARAM command for a total of 3 parameter names/numbers:

VALID_IB_CRC (506) - The original parameter - when writing it overwrites the existing parameter, when reading it returns the whole (big) parameter

VALID_IB_CRC_SET (516) - a new parameter for reading DIAG PARAMS=VALID_IB_CRC_SET only returns the array values that have been set.

VALID_IB_CRC_ADD (526) - a new parameter for writing. It appends to the existing VALID_IB_CRC starting at the first zero entry in the array.

These three tags/numbers act on a single parameter array, but allow the user to break the write into multiple setparam statements, with each appending to the last. This will make the SETPARAM more readable as well as allowing the GNX to parse the data. Some examples of using the new parameters:

SETPARAM
VALID_IB_CRC=x0001.x0002.x0003.x0004.x0005.x0006.x0007;
VALID_IB_CRC_ADD=x0011.x0012.x0013.x0014.x0015.x0016.x0017;
VALID_IB_CRC_ADD=x0021.x0022.x0023.x0024.x0025.x0026.x0027;
ENDPARAM

DIAG PARAMS=VALID_IB_CRC_SET
PARAMETERS
526=x0001.x0002.x0003.x0004.x0005.x0006.x0007.x0011.x0012.x0013.x0014.x0015.x0016.x0017.x0021.x0022.x0023.x0024.x0025.x0026.x0027;

Added reporting of maximum measured speed within a landmark/boundary if SPEED_HYSTERESIS_TIME=x.x.1; (previously only captured max speed outside of landmark/boundary).

Periodically re-read OBD PIDS supported from the vehicle in case the vehicle doesn't respond or response is corrupted.

Fixed bug of periodically resent VIN events when J1939 bus is broadcasting the VIN at regular intervals.

G604.08.87kX 18th May 2016

Removed support for external JBox to reduce ROM footprint (and why would you ever use a JBox with the GNX6 ?)

Added support for J1939 / J1708 PTO and ADC report columns (previously excluded to reduce ROM footprint).

Parameter ONE_WIRE_ENABLE extended to 5 values: 5th entry, if non-zero, specifies the minimum time allowed between reading ibuttons to prevent accidental double-read if using tap-in, tap-out configuration.

If ONE_WIRE_ENABLE=a.b.x55; then the ibutton read follows a tap-in, tap-out approach where a second tap of an identical ibutton logs out the current driver (similar to CANCEL_DRIVER_ID parameter). A second beep pattern has been added to DRIVER_ALERT_BEEPS to allow this to be signaled to the driver (to distinguish tap in from tap out).

New event added 122 (DLO – driver log out) – can be optionally triggered by CANCEL_DRIVER_ID or by ONE_WIRE_ENABLE=a.b.x55 – this event is disabled by default for backward compatibility.

For example:

DRIVER_ALERT_BEEPS=x0000000F.x00000002.x00000333; // one long beep tap in, 3 short beeps tap out
PVT_QUALIFIER_0=66; // disable IB_OUT event
PVT_QUALIFIER_37=65.122; // driver alert beeps on IB_IN and DLO events
ONE_WIRE_ENABLE=x10.10.x55.60.10; // x10=ID only, 10s delay before driver warning, x55:second tap creates event 122, 60s driver warning ends, 10 = 1000ms minimum between reads
CANCEL_DRIVER_ID=2; // ignition off logs out the driver automatically

Reworked sample point on CANbus receiver to exactly match the OBD specification ISO15765-4:2011.

Added CAN error counters to DIAG CAN to better enable remote troubleshooting of CAN physical layer problems. CE:x.x.x.x.x.x.x.x is only for interpretation by GenX Mobile engineers and will not be documented. Non-zero values DO NOT necessarily indicate a problem.

G604.08.88kX 10th May 2016

Constantly re-read PIDs supported in case the initial read fails (observed in some diagnostics)

OBD PAD bytes changed from 0xFF to 0x00 and now possible to reconfigure via 4th parameter value CAN_ENABLE=x.x.x.X (e.g. could change to 0xAA).

Fixed memory vulnerability in J1939 code that could cause resets when reading VIN/DTC.

G604.08.89kX 4th May 2016

RPM added to Bluetooth low energy ECM broadcast data

Major fix to OBD to cope with multiple ECUs sending conflicting data (Chrysler – Distance Since Codes cleared PID). OBD will now "prefer" the Engine ECU (#1) over all other ECUs unless configured to prefer a higher numbered ECU using parameter OBD_PREFERRED_ECU. This change is only lightly tested, so issues may occur, and I recommend not changing this parameter except under the guidance of GenX Mobile engineering.

G604.08.90kX April 2016

Added J1939 VIN reading (OBD VIN reading has always been reliable, but J1939 has not previously worked)

G604.08.91kX April 2016

Fixed major bugs in Bluetooth Low Energy broadcast data

DIAG HOS shows the bluetooth status, to match DIAG HOS using a JBox.

J1939 diagnostics improved and now show baud rate used (both DIAG CAN and remote bus logging).

G604.08.92kX March 2016

- Much improved AT!GXDIAG CAN diagnostics for J1939 /J1708 including showing DTCs, PGNs/MIDs supported etc.
- Added SETPARAM ODOMETER_KM=<value in km>;ODOMETER_MILES=<value in miles>;
  (values must be integer values) to set OBD odometer (column 70)
- Added reporting of OBD, J1939, J1708 DTCs in the location events with SETPARAM SEND_DTC_CODES=1;
- Added facility to log raw data on OBD bus with no address filtering:
AT!GXSTREAMON=CAN
AT!GXAPP SETPARAM CAN_ENABLE=1.1; // must do this first
AT!GXAPP SETPARAM 554=0.xff.xff; // do second to disable address filtering

Bug fixes
=======
- Fixed bug where OBD DTCs would only be read if there were more than 2 codes.
- Fixed bug where DIAG CANNED_MSGS would return CAN bus diagnostics.
- All vehicle bus related report columns now conform to the excel spreadsheet

G604.08.93kX Mid March2016

Fixes to some of the binary report columns to match the Excel spreadsheet.

G604.08.94kX Late February 2016

Added Journey summary reports

New parameters

PVT_JOURNEY_START

PVT_JOURNEY_END

each contain a list of events that cause the start or end of a journey.

for example:

PVT_JOURNEY_START=3;PVT_JOURNEY_END=2;

would start a new journey when the ignition goes on, and end the journey when the ignition goes off.

When the journey end occurs the journey is automatically sent to the server with a format like this:

JStart:110,01/15/2016 14:35:35,37.38333,-121.89350,IGNITION_ON
http://maps.google.com/maps?q=37.3833+-121.8935
JStop:117,01/15/2016 14:40:18,37.40065,-121.89554,IGNITION_OFF
http://maps.google.com/maps?q=37.4006+-121.8955
TotalTime:00:04:43
GPSBadTime:00:00:08
GPSBadDistance:0.012
MovingTime:00:02:42
GPSDistance:1.655
VBusDistance:1.702
VBusFuel:0.347
NoVBusTime:00:00:29

Note the map HTTP link is only inserted if the parameter MAP_HTTP_LINK is defined.

Here is an explanation of the codes.

JStart:<UniqueID>,<Time><Latitude>,<Longitude>,<Event code>
JEnd:<UniqueID>,<Time><Latitude>,<Longitude>,<Event code>
Driver:<driver ID> (optional - if a driver is associated the ibutton ID is shown)
TotalTime:<Elapsed time in HH:MM:SS>
GPSBadTime:<time without GPS HH:MM:SS, including time to first fix>
GPSBadDistance:<driven distance according to JBus with no GPS, including distance to first fix>
MovingTime:<Time vehicle was moving HH:MM:SS>
GPSDistance:<total distance in km>
VBusDistance:<total distance in km> (if available)
VBusNoData:<HH:MM:SS accumulated time that there was no VBus data>

Journey summaries can also be requested retroactively with the command

POLLJ <UniqueID of starting event> <VIAEMAIL xxx@xxx.xxx /VIAUDP x.x.x.x>

OBD support for report column 70 (vehicle odometer)based on "distance since codes cleared" PID

experimental

SETPARAM PARAM_ODOMETER=<your dash odometer converted to meters>; and enable column 70 (absolute vehicle odometer) and the GNX will calculate an offset to the "Distance since codes cleared" and use it to increment column 70, in whole km increments: this could in theory accurately track the dash odometer, even if there are occasional breaks in bus communication (which would cause a loss in the propagated odometer, columns 53,93.

New bluetooth low energy broadcast characteristics
==========

Modifications:

-System ID (2A23): changed to GMI-GNX-5P-66x

New Features:

Primary Service: HOS Update (0x569A1103B87F490C92CB11BA5EA5167C)

* Notification UUID (0x569A3003B87F490C92CB11BA5EA5167C)

-> Sends 0x0001 when HOS Updated

Primary Service: HOS (0x569A1104B87F490C92CB11BA5EA5167C)

* HOS General (0x569A4000B87F490C92CB11BA5EA5167C)
Byte 0: bitmap IGN.0.0.0.SW4.SW3.SW2.SW1
Byte 1: blank
Byte 2: Relay0-Relay3 output state (bitmap)
Byte 13,14,15:Firmware version e.g. 04.08.86 (added in .86kX)
Byte 16-19: Current Time (Unix epoch)

* HOS ECM (0x569A4001B87F490C92CB11BA5EA5167C)
BYTE 0: ECM Speed (km/h)
BYTE 1-4: ECM Odometer (meters x 10)
BYTE 5-8: ECM Derived Odometer (meters x 10)
BYTE 9: ECM Status (same as HOS Diag: 0 = connected, 1=disconnected, 2=error)
BYTE 10-11: ECM RPM (added in .90kX)
BYTE 12-15: ECM total minutes (if available, else RPM derived total minutes) (added in .86kX)

* HOS GPS (0x569A4002B87F490C92CB11BA5EA5167C)
BYTE 0-3: GPS Latitude (milli-arc seconds /degrees * 360 000)
BYTE 4-7: GPS Longitude (milli-arc seconds /degrees * 360 000)
BYTE 8: GPS Altitude (25 meter units 0 – 6375m)
BYTE 9: GPS Speed km/h
BYTE 10: GPS Heading (degrees/2)
BYTE 11: GPS Status (bitmap: see report column 48)
BYTE 12-15: GPS Time of Fix (Unix epoch)
BYTE 16-19: Derived/GPS Odometer (meters x 10)

G604.08.96kX Feb 2016

New parameters
==========

ENGINE_LX10 /551 - engine displacement in litres*10 (e.g. 3.5liter=35) -default 0, only needs to be set for OBD vehicles that report manifold pressure instead of mass airflow (which can be verified by DIAG OBD if no fuel usage data is being generated). If the engine reports MAF then this parameter is ignored.
VBUS_FUEL_CORRECTION/552 - fuel consumption correction factor for all vehicles, since fuel calculation can be inaccurate by 10% or more even on J1939 vehicles. Parameter is percentage with - default 100%
SEND_DTC_CODES/ 553 - default 0, if set to 1 DTCs are included in event code.

PVT_JOURNEY_START/182 : these parameters are for generating journey summary reports
PVT_JOURNEY_END /183 : it would probably be best not to confuse testing until vehicle bus testing is more complete: please request more information if you want to test.
REPORT_FORMAT=0.0.1; less verbose ASCII representation of bus data
REPORT_FORMAT=4.0.1; binary representation of bus data matching the excel spreadsheet.

New event BUS (120) reports changes in vehicle bus status
==========
Enable this event to be alerted when the GNX5P connects or disconnects from the vehicle bus.
Report column 56 can be used to see the new status of the vehicle bus connection.

New report event Peak RPM/Engine Load (PVT 121) (experimental)
==========
This is an attempt to capture large excursions from the mean in RPM and engine load without requiring configuration on a per-vehicle basis (since all vehicles have different RPM ranges). Just enable the

event 121 and it should be sent when the RPM exceeds 2xaverage RPM, or when engine calculated load exceeds 80%: in the event the reported RPM (column 77) and Engine load (column 76) values are the maximum detected during the excursion.

Additions to OBD
==========
OBD vehicles now support fuel consumption calculations and report the data in columns 89 (increasing) and 90 (delta fuel used between events - this is the recommended column to use). Note that this has been tested on gasoline vehicles reporting MAF and MAP, but not on diesel vehicles where the accuracy of the method is unknown.

Note also that the following fuel columns are only J1939/J1708 since they relate to information read directly from the vehicle bus:

NG_FUEL_USED (BYTE)91
NG_FUEL_DUSED (BYTE)92
TRIP_FUEL (BYTE)103
TOTAL_FUEL (BYTE)108
TOTAL_NGFUEL (BYTE)109
TOTAL_IDLE_FUEL (BYTE)110
TOTAL_IDLE_NGFUEL (BYTE)111

Reporting the bus type
==========
- Report column 56 reports bus status AND type of bus.
First digit shows status: N-Not setup, no communication, U-up, D-down(not communicating), E(error)
Second digit (if present) shows bus type O=OBD, 9=J1939, 7=J1708, J=J1939 and J1708

Miscellaneous
==========
SETRELAYDRIVE10<ON/OFF/x12345678> now controls the switched voltage output in the same way as SETRELAYDRIVE<1-4> controls relay driver outputs 1-4.

AT!GXSTREAMON=CAN will now stream diagnostics only related to the vehicle bus and will be used for diagnostic capture on vehicles not functioning as expected.

AT!GXDIAG CAN / DIAG CAN now reports OBD/J1939/J1708 status, so a single diagnostic command can be used for all bus types.

J1708 communication contains a bug fix which would have prevented communication with the vehicle.

J1939 now hunts both 500kHz and 250kHz to find the vehicle bus speed. This is experimental and we may need to restrict this if we find it causes problems on any vehicles.

Explanation of J1939 DTC format

In J1939-73 section 5.7.1 ACTIVE DIAGNOSTIC TROUBLE CODES the message is 6 bytes long, where the first two bytes are "Lamp Status" bytes, and the following 4 bytes are the DTC (SPN, FMI, SPN conversion method, occurrence count).
e.g:
43FFB804038A

43= byte1, Lamp status
FF=byte 2, lamp status (reserved)
B8 04 03 8A = DTC (bytes 3-6)