Actisense

Actisense PRO range firmware v3.111 Release Notes, issue 2

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Contents

PRO-BUF-2, PRO-MUX-2, PRO-NDC-1E & PRO-NDC-1E2K Firmware — Release Notes

Changes from v3.107 to v3.111

IEC 61162

- No test clause behavioural changes.

New Features

- Configuration backups now always include the device's network settings, and Import Settings can optionally apply them. Ticked, the device may come back at a different address; left unticked, an import behaves exactly as before.
- Actisense Toolkit and similar applications can now read all of the device's analogue inputs in a single request.

Improvements

- The transmit statistics for an output now add up – bytes sent, bytes dropped and bytes removed as duplicates account for everything offered to that port. Expect the dropped and duplicate figures to read slightly higher than before.
- Data the device receives but has nowhere to send is now included in the count of messages forwarded nowhere, instead of going uncounted.
- **PRO-NDC-1E2K**: Lower processing load when receiving NMEA 2000 data, with the biggest gain on busy networks carrying many devices.
- More memory is available for day-to-day work, giving the device more headroom under load.
- The Serial page now shows how far an output is overloaded, not just that it is busy, along with how much data was discarded and how much was removed as duplicates.
- The Status page now accounts for every byte arriving on a serial port, showing whether data was discarded by the port, not understood, or filtered out by your own settings.
- Actisense Toolkit now shows live supply and NMEA 2000 bus voltage readings from the device.

Bug Fixes

- "Reset Current Operating Mode to Defaults" now also restores the serial Mode (auto baud) and Speed, which previously kept whatever they were set to.
- An Internet Time (NTP) server address containing an invalid character is now refused with an error, instead of reporting success and quietly keeping the previous server.
- **PRO-NDC-1E2K**: Fixed NMEA 0183 sentences sent in one large 1400+ byte burst being lost on their way to the NMEA 2000 bus, prevented them from being converted to PGNs.
- When a storage drive fails at start-up, the device now reports the fault that actually caused it, so a failing unit can be diagnosed from what it reports.
- The device now records why it ran out of memory and restarts cleanly – and carries on without restarting where it can.
- Fixed the Web Socket entry on the Status → Data Stats page showing a rate of 0 until the device was restarted. A rate of 0 is still correct on a device with nothing routed to the Web Socket.
- Fixed a request for a pair of analogue gauge readings stopping after its first cycle.
- Fixed alarm settings saved for a predefined operating mode being lost when the device was quickly switched to another mode and back again.
- Fixed other per-mode settings – Routing, Autoswitch, Output Formats, PGN and Sentence Filters, the Alarm Relay, baud-rate following and the Data Server enables – being lost in the same way, with a quick mode change.
- Fixed incorrect replies to NMEA 2000 "Read Fields" and "Write Fields" requests (PGN 126208) that list more than one field, or fields larger than a single byte.
- **NMEA 2000 transmission**: Fixed the sequence number that ties together readings taken at the same moment freezing, and the Heartbeat message (PGN 126993) counter never advancing.
- Downloaded log files no longer show an unknown modification date.
- Fixed certain characters in text you type in – an operating mode description, a port's friendly name, a boat name – stopping a web interface page from loading. Names containing quotes and backslashes are now refused when you enter them.
- **PRO-MUX-2, PRO-NDC-1E, PRO-BUF-2**: The Serial page no longer offers the "Can ASCII" and "Can Actisense" Tx formats, which these products cannot produce. A device already set to one of them returns to NMEA 0183 when it is updated.

Security

- Hardened the handling of Actisense binary messages against malformed data.
- Hardened the handling of NMEA 2000 group function requests (PGN 126208) against malformed or oversized messages from other devices on the network.
- Added length validation to NMEA 2000 fast-packet transmission, so a message whose declared size does not match its contents is rejected.

Known Issues

- Importing a settings file with the network settings option ticked does not automatically switch the device into the imported user mode, and can report the import as failed, even though the settings were successfully stored. Reconnect at the device's new IP address, and then select the mode from the Operating Modes page.
- **PRO-MUX-2**: The Status page's Data Stats and Detailed Stats tabs list fourteen Data Servers instead of the expected four. The ten extra entries are always idle and can be ignored.

Changes from v3.082 to v3.107

IEC 61162

- No test clause behavioural changes.

New Features

- **PRO-NDC-1E2K**: The device now transmits its own supply voltage as NMEA 2000 Battery Status (PGN 127508), matching the NGX-1 / WGX-1 / W2K-2.
- **PRO-NDC-1E2K**: The built-in NMEA 0183 to NMEA 2000 conversion database can now be uploaded and downloaded with Actisense Toolkit, so the conversion configuration can be customised. An unprogrammed device converts exactly as before.
- System log files can now be viewed and downloaded from the web interface (Management → System Logs), and retrieved over the API for support cases.
- The Status page gains a **Data Stats** tab showing the per-port counters – bytes received and sent, messages dropped, and receive error counts.
- Connected applications can now ask the device what ports it has – the name printed on the case, connection type, protocol, direction, and the current and next-restart speeds.
- **PRO-MUX-2**: Each operating mode now remembers its own Data Server settings.
- The device now captures a crash record for post-mortem diagnosis after an unexpected restart.

Improvements

- Configuration files are now saved atomically, so an interruption during a save can no longer leave a corrupt configuration behind.
- Faster file downloads from the device.
- Data Servers now combine multiple NMEA 0183 sentences into a single network packet, improving throughput.
- Data Servers now recover on their own if a network socket cannot be opened.
- Predefined operating modes now keep changes made to them.
- The alarm sentence ($MXALR) repeat rate now follows the configured setting.
- Reduced the processing cost of receiving NMEA 0183 and Actisense binary data.
- Web login lockout is far less punitive – the first two failed attempts now incur no delay.
- The NTP server used for network time can now be configured.
- Network and multicast settings now reject invalid IP addresses.
- The device now reports data it had to discard, making overload visible in the statistics.
- Serial baud rate changes now distinguish a temporary (session) change from a saved one, so a temporary change no longer becomes the start-up rate.

Bug Fixes

- Fixed an installed web interface being destroyed at start-up on devices carrying a compressed web app. Affected devices need the web app re-importing once.
- Fixed a corrupt operating-mode configuration file hanging the device at start-up, and fixed the automatic boot recovery that should have caught it.
- Fixed the relay Heartbeat mode firing inconsistently – the configured timeout was ignored for the first period after a restart or a settings change, and some timeout values never tripped at all.
- **PRO-MUX-2**: Fixed TCP data streaming being refused in non-NSI operating modes, and the Data Server enabled/disabled state not being honoured.
- **PRO-MUX-2**: Fixed the Data Server settings page briefly showing the wrong values.
- Fixed receive-only Data Servers still transmitting, and a Data Server not transmitting after its direction was changed to Transmit.
- **PRO-NDC-1E2K**: Corrected the NMEA 2000 PGN list used in conversion mode, including removing Datum (129044) from the transmit list, and fixed an NMEA 2000 certification compliance issue in fast-packet transmission.
- Fixed the device continuing to report its network as up after the link had dropped.
- Fixed a start-up hang that could leave the device unresponsive.
- Improved device stability – a large number of fixes for issues that could cause the device to restart, hang or become unresponsive, particularly during firmware updates, file operations and heavy network use.

Security

- Fixed a critical flaw where a malformed NMEA 0183 sentence could compromise the device.
- Fixed a flaw where a malformed mDNS packet from the network could destabilise the device.
- Hardened the firmware update (.actp) decoder against malformed update files.
- Web login session tokens are now generated with full hardware randomness.
- Applied security patches to the web server component and to configuration storage.

Changes from v3.078 to v3.082

IEC 61162

- No test clause behavioural changes.

Improvements

- Data page can now show multiple instances of the same PGN, e.g. from multiple devices (**PRO-NDC-1E2K** only).
- Data Server TCP connections now use keep-alive to release stale connections that would otherwise hold sockets open.
- Data Servers now retry opening their network sockets if the first attempt fails.
- Serial outputs now discard messages once an output's buffer fills ('Emergency delete'), so message latency stays bounded. Repeated sentences are removed as duplicates first ('Duplicate delete'), and discarding begins only well beyond the output's configured speed — around twice its rate on typical traffic — so neither state arises in normal operation.
- Improved web interface responsiveness.

Bug Fixes

- Data Servers now restart correctly after a failed file upload.
- Fixed web server connections getting stuck if a connection attempt failed.
- Various Data Server and system stability fixes.

Changes from v3.035 to v3.078

IEC 61162 — the witnessed test baseline

Firmware v3.078 is the version submitted for witnessed IEC 61162-1 and IEC 61162-2 testing at TÜV SÜD, against both the 1998/2016 and the 2024 revisions of the standard. The IEC 61162 statements for releases after v3.078 record whether anything has changed since that tested baseline, and it is those statements that carry the test evidence forward.

IEC 61162-1 and IEC 61162-2 are standards for the serial interfaces, and the witnessed testing was conducted on them. Ethernet Data Server behaviour falls under IEC 61162-450 and is outside the scope of these statements.

Releases before v3.078 predate that testing. No witnessed test evidence exists for them, and nothing stated for them is a conformance claim. Each release below, back to v2.525, carries an IEC 61162 note recording what reviewing its changes against the published test clauses has identified, assessed on a device in its default configuration. Releases earlier than v2.525 have not been reviewed.

- This release is the version submitted for witnessed IEC 61162-1 and IEC 61162-2 testing; see note above.

New Features

- User operating mode descriptions can now be edited.
- System time can now be obtained from any input port, with multiple time sources arbitrated automatically.

Improvements

- Improved serial port throughput by up to 20%.
- Increased serial port buffer sizes to better handle bursts of data.
- Data Servers rewritten to use a more efficient network implementation, improving performance and reliability.
- Improved NMEA 2000 performance and reliability on busy networks (**PRO-NDC-1E2K** only).
- Improved speed and reliability of file transfers made through Actisense Toolkit (**PRO-NDC-1E2K** only).
- Improved device discovery (mDNS) reliability, including compatibility with Apple Bonjour.
- Brief Ethernet link drops no longer cause a full network restart.
- Web interface now becomes available sooner after the network connects.
- Serial port settings are now shared across all operating modes.
- Alarm messages are now always routed to the web data view.
- Underscores are now allowed in proprietary NMEA 0183 sentences.
- Numerous web interface performance improvements.

Security

- Applied multiple rounds of security patches to the web server.
- File uploads now require an admin login.
- The backup web page now requires login before firmware upload.

Bug Fixes

- Fixed issue where NMEA 2000 transmission could stop on busy networks (**PRO-NDC-1E2K** only).
- Fixed issue where messages could occasionally be dropped.
- Fixed some NMEA 0183 sentences containing incorrectly ordered data.
- Fixed remote baud rate changes made through Actisense Toolkit.
- Fixed changing the settings of an inactive relay event disabling the active relay event.
- Fixed config upload when it contains serial settings.
- Fixed transmit statistics counting messages that failed to send.
- Fixed device restarting during prolonged data streaming to the web data view.
- Receive-only Data Servers no longer appear as outputs on the routing page.
- Unconfigured Data Servers no longer display an error.
- Numerous stability fixes.

Changes from v3.030 to v3.035

IEC 61162

- Predates the witnessed test baseline; see note above. Reviewed against the IEC 61162 test clauses; no change affecting clause behaviour identified.

Improvements

- Improved stability when changing network settings.

Bug Fixes

- Fixed scenario where alarm settings aren't saved.
- Fixed example alarm messages.

Changes from v2.546 to v3.030

IEC 61162

- Predates the witnessed test baseline; see note above. Reviewed against the IEC 61162 test clauses; no change affecting clause behaviour identified.

New Features

- Added firmware upload button on backup webpage.
- Added config download and upload system for backup.
- Updated to NMEA Message Database v3.000 (**PRO-NDC-1E2K** only).
- WebSocket and data page added to web app to get a live view of PGNs/sentences (**PRO-NDC-1E2K** only).
- Network Page added to web app to list NMEA 2000 devices on network (**PRO-NDC-1E2K** only).
- Added CAN Direct page and Data Server (**PRO-NDC-1E2K** only).

Improvements

- Numerous performance improvements.
- Reduced interface friendly name capacity to 15 chars.
- Login timeout now increases exponentially up to 10 minutes on each failed attempt.

Bug Fixes

- Numerous stability fixes.
- Fixed DHCP clash in AutoIP mode causing instability.
- Fixed some messages being dropped.
- Fixed Data Servers closing when changing operating mode.
- Fixed alarm sentence missing MXALR.

Changes from v2.538 to v2.546

IEC 61162

- Predates the witnessed test baseline; see note above. Reviewed against the IEC 61162 test clauses; no change affecting clause behaviour identified.

New Features

- Added N2K tuning API.

Improvements

- All threads have been moved to run on the internal RAM.
- Improved JSON writing performance.
- Added descriptions to Reset API.
- Changed sentence enable list to a sentence block list.
- User modes now default to Combine Mode.
- Added baudrate list to serial settings.
- Improve performance of REST API.
- Removed web server rate limiter.
- Improve performance of mDNS system.
- UDP sockets are re-opened if an error is encountered.

Bug Fixes

- Fixed saving of sentence and PGN filters on save to user mode.
- Fixed issue with virtual device filters being lost on save to user mode.
- Fixed race condition in routing system.
- Fixed crash for receive only filter requests.
- Fixed issue where output format was forgotten for serial/Data Servers.
- User mode will now reset correctly even when it's the current operating mode.
- Fixed certain PGNs from being blocked over N2K bus.
- Fixed BEM command responses being filtered out.
- Fixed buffer length issue for PARLB responses.

Changes from v2.536 to v2.538

IEC 61162

- Predates the witnessed test baseline; see note above. Reviewed against the IEC 61162 test clauses; no change affecting clause behaviour identified.

Improvements

- The sentence filter no longer suppresses proprietary sentences — any sentence beginning `$P` now passes regardless of the filter.
- The internal copies of the non-volatile store taken automatically around a firmware update are no longer kept. These were used only for the device's own recovery if the store came up incomplete, and are not a user-accessible configuration backup.

Changes from v2.525 to v2.536

IEC 61162

- Predates the witnessed test baseline; see note above. Reviewed against the IEC 61162 test clauses; no change affecting clause behaviour identified.

Improvements

- Advanced routing rules are reset for all data receivers, including Autoswitch and Data Servers.
- An operating mode can now be set to its current value to force a refresh.
- Reset web access API is also available if external pin is reset.
- Increased maximum number of web server connections from 15 to 20.
- Added data filtering API.
- Added Sentence Filtering to Serial Port & Data Servers.
- Reinitialise network stack if DHCP lease has expired.
- Added analogue API.
- Enable all rx/tx sentence filters for predefined modes.
- Numerous performance enhancements.
- Various bug fixes.
- The known issue of DHCP issues in v2.525 is fixed in v2.536.

Changes from v2.524 to v2.525

Improvements

- Added a second timeout to WebServer connections to force them to close if they take too long draining any remaining data.

Changes from v2.508 to v2.524

New Features

- Added NMEA 2000 support for **PRO-NDC-1E2K**.
- Added default password detection and force change on first use to comply with UK PSTI.
- Added ability to use random default password in place of "admin" to comply with UK PSTI.

Improvements

- Fixed txStats showing twice the value transmitted.
- Fixed AutoIP in DHCP mode.
- Updated web app to v1.083.
- Web server HTTP connections now time out to free up sockets, set to 1 minute.
- Data Servers will reject connection if there are no available sockets.
- Data Server TCP connections will now timeout after 5 minutes.
- Fixed default routes for Buffer3 mode.
- FileList API now returns date modified.
- Network adapter now acquired by searching for type.
- IP address, Subnet mask, Default gateway, DNS & MAC address are now acquired from network adapter.
- Block access to secure API if default password used.
- Reset Data Server stats on change of output.
- Network stack now suspends/resumes instead of stopping/starting when changing settings.
- mDNS thread now suspends/resumes instead of stop/starts.
- Reset web access API is only available if the device has been physically power-cycled.
- Added GET handler to reset-web-access API that returns an access flag and a countdown to indicate how long it is available after a hard restart.
- Fixed duplicate output when in Autoswitch operating mode.
- Fixed missing serial input stats in Autoswitch operating mode.
- Prevent autobaud from setting OM to modified when baud rate changes.
- Default password is auto copied back to NVS to allow automated testing to detect and program random password if required.

Changes from v2.506 to v2.508

Improvements

- Double web server event capacity.
- Fixed mutex deadlock in network stack.
- Revert file system to format blank boards instead of erasing them — used in production only.

Changes from v2.489 to v2.506

New Features

- Event Relay plugin and API.
- Added MDT based file upload system.
- Added RxAll/Rx filtered modes.
- RX/TX pgn lists save/load for all modes.
- Added data overload alarm when Data Server data rate exceeds fastest connected serial port.

Improvements

- Increased number of Data Servers to 4 for PRO-MUX (1 and 2). By default, only 1 server is active.
- Fixed malformed JSON resulting from edge case API calls.
- Compressed web files.
- Raised minimum admin password length from 2 to 5.
- Raised maximum admin password to 30 characters.
- Improved PGN interval rate by processing all available messages each app thread loop.
- Allow all ASCII characters in admin password.
- Fixed Postman/firmware interactions.
- Fixed storing of updates.
- Fixed missing received stats details.
- Fixed Data Server settings being overridden with defaults.
- Fixed UDP broadcast address.
- Added minimum rollback feature when upgrading with reduced metadata (minimum version is now 2.500).
- Data Server config is stored for user operating modes.
- Data Server config persists across restarts for default operating modes.

Changes from v2.006 to v2.489

New Features

- Added Data Server streaming.
- Added support for **PRO-NDC-1E**.

Improvements

- Rewrote the web-app with a more modern, user friendly system (v1.020).
- Added web browser based file upload system.
- The firmware can now be updated through the web browser.
- Rewrote the device API to conform with the W2K-1.
- NVS data storage is now encrypted for increased security.
- Update process is now more resilient and occurs during device start-up.
- Overall stability and performance improvements.

Known Issues

- Alarm does not repeat sentence at the indicated output rate and instead follows re-arm time.
- Alarm flag colour does not always update correctly.

Changes from v2.005 to v2.006

Bug Fixes

- Fixed issue with Software Resetting back to Bootloader during a firmware update process taking more than 6 seconds.
- Fixed Main Application shutdown prior to a Software Reset to ensure device can connect to Bootloader via Serial port when no Ethernet cable plugged in.

Changes from v2.004 to v2.005

Bug Fixes

- Fixed a Web Interface string termination issue that could cause **PRO-BUF-2** to reset.

Changes from v2.003 to v2.004

Bug Fixes

- Fixed an initialisation bug that caused the **PRO-BUF-2** to reset repeatedly.

Changes from v2.002 to v2.003

Improvements

- Output 1 on PRO-MUX-1 and NDC-5 now defaults to 38400 baud.

Bug Fixes

- Corrected NMEA Product Info response, visible in Actisense Toolkit.
- Custom User Operating Mode names now display correctly.

Changes from v2.001 to v2.002

Improvements

- Improved NMEA 0183 receiver/deserialiser to better cope with garbled data. Prevents bad characters (typically from incorrect baud rate selections) appearing on the NMEA Sentence Stats web page.
- Added Mode descriptions to Status web page.

Bug Fixes

- Fixed "Reformat" REST API command.
- Fixed "Network Settings" REST API command.
- Fixed device shutdown procedure.

Changes from v1.006 to v2.001

New Features

- Restart count log.
- System logging enabled.
- Added button to reset user operating modes.
- Added backup web page that will appear if main web files are lost.

Improvements

- Changed file system from FatFs to LittleFs. This change adds wear levelling to increase the longevity of the Flash ROM SPI drives.
- Added further multi-thread protection to all file system operations to help prevent file corruption.
- Improved CGI processing for multipart web responses.
- Earliest system time is now set as firmware creation time when an NMEA time source cannot be found.
- Web server location was moved to "\web" folder.
- Added support for STM32F417 chip used in PRO-BUF-2.
- Moved system config files to "System" directory inside config directory.
- Anonymous account now uses an empty username parameter.
- Separated out detailed and overall channel stats.

Bug Fixes

- Fixed setup of baud rates issue in serial comms system — removed override that was resetting baud rate of hardware uarts back to defaults.
- Fixed device being overwhelmed by mDNS queries on the Ethernet network.
- FTP fixed allowing fully recursive directory writes.
- Fixed data routing for PRO-BUF-2 Buffer modes 1-3 so that serial port always receives loopback data from inputs 1 & 2.
- User authorisation fixed.
- Fixed block device writing for bootloader overlay programming.
- Fixed NMEA 0183 deserialiser to stop bad characters from incorrect baud rate selections appearing as weird sentences.
- Fixed refresh issue on numerous web pages.
- Sign-in with no credentials error fixed.
- Fixed Mode switching using Mode pins.
- File timestamps now working (JSON timestamp file).
- Fixed bug in capture input sentences JSON.
- Fixed Alarm Settings saving in Setup Wizard.
- Corrected default user routing table.
- Fixed various Device Info responses.

Changes from v1.004 to v1.006

Bug Fixes

- Disabled character detection/counting when serial framing errors occur on input channels, as this was causing the Autoswitch to switch to a channel at the wrong baud rate.
- Fixed "Double sentence" sending that occurred after changing operating mode due to double registration of data observer.
- Updated text on basic routing page to reflect addition of Autoswitch option.

Changes from v1.003 to v1.004

Improvements

- When no data received on any of the virtual Autoswitch input channels, switches to highest enabled priority input channel.

Changes from v1.001 to v1.003

New Features

- Added two user configurable Autoswitch virtual input channels to the Setup Wizard for PRO-MUX-1 and NDC-5 devices.
- Enabled Autoswitch alarm event and its actions (set relay and send message) to be configurable by user.
- Alarm ARL message for Autoswitch event action includes the Autoswitch virtual channel's name that triggered alarm event.

Changes from v1.000 to v1.001

Improvements

- Alarm message no longer uses the 'Rearm time'. A repeat period timer is used to control message repeats for as long as the event condition is met.

Bug Fixes

- Relay will now stay active/on whilst the event condition is being met (Low Voltage or Data overload), and once the 'Rearm time' in seconds has expired after the event condition clears, the relay will become inactive/off.