Major Firmware Update for Autopilot YDAP-04

A Cumulative firmware update for our YDAP-04 Autopilot was released, which includes a lot of improvement and bug fixes.

We are pleased to announce the release of firmware version 1.06 for the Yacht Devices Autopilot YDAP-04. With more than two years of intensive engineering, sea trials, and valuable feedback from sailors and marine installers worldwide, this firmware release introduces a completely redesigned TRACK algorithm, full remote control over NMEA 2000, a new FOLLOW UP (MANUAL) steering mode, BANG-BANG relay drive support, expanded MFD and sensor compatibility, and major improvements to calibration convenience and steering precision.

Completely New TRACK Algorithm

The TRACK mode algorithm has been rebuilt from the ground up to deliver smoother waypoint navigation and seamless compatibility with a wide range of chartplotters and ECDIS systems:

• **Safer route completion (YD:ARRIVAL)**: During testing with a Garmin GPSMAP 923 chartplotter, we found that some plotters continue sending active route commands even after reaching the final waypoint, which could cause the autopilot to unexpectedly turn back toward a previous waypoint. To eliminate this risk, the YDAP-04 now independently detects the end of a route and automatically switches from TRACK to AUTO mode to safely hold your current course.

While standard chartplotters report route completion via the "Navigation Terminated" flag in PGN 129283 "Cross Track Error", the YDAP-04 now also monitors a configurable arrival radius around the final waypoint YD:ARRIVAL to safely transition to AUTO mode when a plotter omits this flag.

• **Custom track intercept angle** (YD:APPROACH): When engaging TRACK mode from your current position off the route, the vessel will no longer steer perpendicular to the active leg, but instead join it along a smooth, predictable curve. You can configure the initial approach angle using the YD:APPROACH command.

• **Resilient navigation data reception**: PGN 129284 "Navigation Data" handling now includes data validity checks to work reliably with real-world equipment quirks, such as constant zero sequence IDs or mixed Magnetic/True course and bearing references.

Full remote control via NMEA 2000 and new MANUAL (FOLLOW UP) mode

Version 1.06 opens up deep integration for navigation software, custom helm panels, and onboard automation systems:

• **Direct Autopilot Control via PGN 127237 (YD:REMOTE):** Alongside standard Navigation Data PGNs and Digital Switching / CZone integration, the YDAP-04 now supports direct control over NMEA 2000 using the Command Group Function for PGN 127237 "Heading/Track Control". With YD:REMOTE ON, marine apps and external devices can directly switch modes, set target Heading/COG or Wind Angle, and command exact rudder angles, opening the door for custom steering algorithms and math model swapping.

• **New MANUAL (FOLLOW UP) steering mode**: in addition to STANDBY, AUTO, WIND, and TRACK, the autopilot now includes a MANUAL mode for direct rudder angle control via keypad

buttons or NMEA 2000 commands. You can also engage MANUAL mode directly from the buttons by holding X10 and then holding both -1 and +1 until two confirmation beeps sound.

• **Explicit AUTO sub-mode Selection (YD:AUTO)**: the new YD:AUTO setting lets you explicitly define whether engaging AUTO mode steers a compass heading (HEADING) or actively compensates for leeway and drift (NO_DRIFT).

BANG-BANG drive support

• **BANG-BANG (relay ON/OFF) drive mode (YD:BANG)**: alongside proportional PWM motor control, the YDAP-04 now supports "BANG-BANG" drive control for steering systems operated via ON/OFF relays or solenoids. When active, the MOTOR output switches cleanly between full forward, full reverse, and off, full BATTERY voltage will be applied instead of fine PWM.

Enhanced math model fine-tuning

• **Proportional vs. integral control (YD:CONTROL)**: the new YD:CONTROL setting adjusts the ratio between linear and integral steering response, allowing you to fine-tune drive activation delay and responsiveness to course changes.

• **Quantized 10 ms control loop**: target heading, rate of turn (ROT), and rudder angle calculations are now synchronized on a fixed 10 ms cycle rather than running asynchronously on message arrival, ensuring smoother, deterministic steering performance.

• **Optimized turn range and fixed YD:MAX_ROT**: turning aggressiveness is now configured directly in degrees using YD:TURN_RANGE, replacing the legacy YD:TURN_MULT factor. Furthermore, YD:MAX_ROT now properly enforces the maximum rate of turn even when YD:AUTO_ADJUST is enabled.

• **Bad STW data processing**: YD:MIN_STW allows to ignore unreliable paddlewheel speed through water (STW) readings at very low speeds.

Expanded NMEA 2000 MFDs and rudder sensors compatibility

• **Simrad NSX Support**: with YD:SIMRAD ON, the YDAP-04 now emulates a modern Simrad NAC-3 autopilot computer rather than the older AC12, enabling integration with Simrad NSX multifunction displays.

• **Broader rudder sensors compatibility**: the Autopilot now accepts PGN 127245 (Rudder) messages with any valid “Rudder Instance” (all values except reserved 253 and error 254), resolving compatibility quirks with sensors such as the Navico RF-25 (which transmits instance 255).

• **Improved Raymarine compatibility and CAN bus reliability**: NMEA 2000 CAN frame transmission and reception core code has been refactored for higher reliability on busy networks, for example, Raymarine proprietary PGNs sent by the YDAP-04 now are transmitted at higher priority.

Overhauled calibration and support for various drive types

We have significantly improved the calibration routines (CAL2–CAL4) and stall protection so the YDAP-04 works reliably across a wider variety of hydraulic pumps and linear drives:

• **Improved drive parameters learning (CAL2)**: maximum PWM output during CAL2 has been increased from 50% to 100%, minimum PWM pulse width has been doubled, and the calibration timeout has been extended from 7 to 30 seconds.

• **Smarter rudder stall detection**: the rudder stall algorithm now accounts for actual rudder movement speed to prevent false triggers on slower drives. As a last resort, YD:RUDDER_CHECK OFF lets you temporarily bypass stall checks.

• **More accurate compass calibration (CAL3)**: CAL3 now performs ±20-degree turns (increased from ±15 degrees) for higher calibration accuracy.

Keypad enhancements and miscellaneous fixes

• **Customizable +10/-10 step multiplier (YD:X10)**: now you can configure the X10 button step size anywhere from 0.1° to 25.5° using YD:X10 command.

• **Simultaneous button presses**: extending the X10 button release window to 50 ms allows -1 and +1 to be pressed simultaneously with X10 in a "wired AND" setup.

• **Calibration menu lock (YD:CAL_LOCK)**: with YD:CAL_LOCK ON you can now disable entering the calibration menu with buttons.

• **Updated default settings**: default settings have been updated (most notably. YD:AUTO_ADJUST is now OFF, YD:CONTROL set to 3, and YD:DAMP_WIND to 20). Also, YD:RESET now emits an audible confirmation.

Important upgrade notice: because the internal NVRAM memory map for stored settings has been refactored in version 1.06, reverting back to firmware 1.05 or earlier will reset all autopilot settings to factory defaults. Please record your configuration parameters before updating.

Firmware v1.06 for the YDAP-04 is available now in the Downloads section. You can update your autopilot over the NMEA 2000 network using our CAN Log Viewer software and one of our gateways.