

Pixel HUB75 Marine Display User Manual (v3.24)

Setup, daily use, and troubleshooting for your Pixel marine display.

Язык: [Русская версия →](#)

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1. Introduction

The Pixel Marine Display shows live navigation and instrument data from your boat on a high-visibility 64×128 LED matrix. It joins your onboard WiFi, listens for NMEA 0183 sentences over UDP, smooths the values, and renders six configurable data lines plus a tactical wind-shift bar at the bottom.

Key features

- Six data lines, each independently configurable (type + color).
 - Live True Wind calculation (TWA / TWS / TWD) when boat speed is available.
 - Wind-shift bar showing current TWD vs. a rolling median.
 - Automatic brightness via a built-in light sensor.
 - Readable through polarized sunglasses — the LED panel emits its own un-polarized light, so it stays legible from any angle behind polarized lenses, even in direct sun.
 - Per-channel averaging (vector for angles, linear for speeds) for stable readings.
 - Web-based configuration — no special software, works from any phone/laptop.
 - Over-the-air firmware updates from an update server — checked automatically, **applied on your command** (no surprise reboots while racing).
 - On-demand **debug-log capture** — send a 5-second NMEA recording to the server for support.
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2. First-time setup

1. **Power the display.** It briefly shows the Pixel logo while scanning for known WiFi networks.
2. With no saved networks, the display brings up its own setup network:
 - SSID: `PixelConf`
 - Password: `12345678`
3. Connect to `PixelConf` from a phone or laptop. A captive page opens automatically — if not, visit `http://192.168.4.1`.
4. Enter your boat's WiFi name and password, hit save. The display reboots and joins the chosen network.
5. After reconnect, open `http://pixel.local/` from any device on the same WiFi. (If `.local` doesn't resolve on your network, the display also prints its IP on the screen during boot — use `http://<that-ip>/`.)

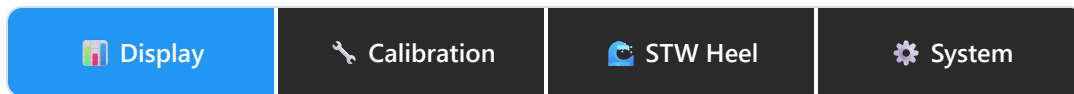
Up to three networks can be saved (System tab → WiFi Networks). The display connects to the strongest reachable one on boot.



Boot sequence: the Pixel logo with the firmware version, then the assigned IP address.

3. The web interface

`http://pixel.local/` — four tabs:



The tab bar across the top of the configuration page.

Tab 1 — Display

- **Six data-line slots.** For each slot pick a Data Type and a Color.
- **Brightness** — manual slider, or tick "Auto" to follow the LDR sensor.
- **Averaging windows** (seconds) per channel: AWA, AWS, SOG, STW. Larger = smoother, smaller = more responsive.
- **Bar mode** — what the bottom bar shows (wind shift, rudder, etc.).
- **Use STW for True Wind** — when ticked, True Wind is computed against Speed Through Water (preferred for sailing). Otherwise SOG is used.
- **Calculate True Wind locally** — tick if your instruments don't already broadcast TWD/TWS.
- **UDP port** — default 2000.

Tab 2 — Calibration

- **AWA offset** — small wind-vane correction (degrees).
- **STW factor** — paddlewheel calibration (%).

Tab 3 — STW Heel

Per-tack STW correction based on boat heel angle (from NMEA `$XDR` Roll). When the paddlewheel underreads at heel, this lets you compensate independently for port and starboard tack.

- **Live row at the top:** current Roll, raw STW (after the uniform STW factor), and corrected STW. Updates every 2 s while the tab is open.
- **Grid of 2 × 10 inputs:** ten heel angles (0°, 4°, 8°, 12°, 16°, 20°, 24°, 28°, 32°, 35°), each with a Port and Starboard correction in percent (-100 .. +100). Values between grid points are linearly interpolated. Above 35° the 35° value is used.
- Each cell auto-saves when you tab/click away.
- Roll convention: positive = heeled to starboard (so right-column = starboard tack), negative = heeled to port (left column).

Calibration procedure (one possible workflow, on a calm day with steady wind):

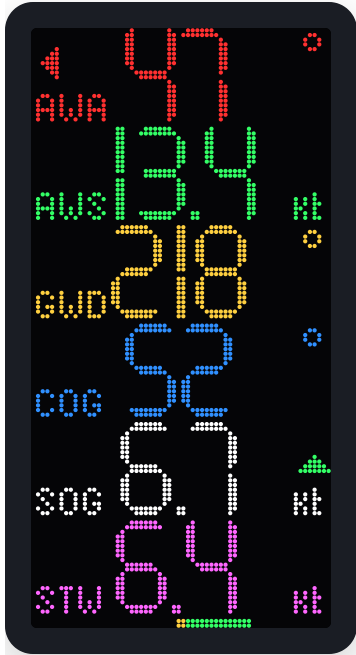
1. Set all 20 cells to 0 to start clean.
2. Sail steady upwind on starboard tack at a known reference (motoring baseline STW, or matching SOG when there's no current). Note your current heel (e.g. 12°).
3. The "Raw STW" on the page is your uncorrected reading. Bump the **Starboard** cell at that heel angle by + or - % until "Corrected STW" matches your reference.
4. Repeat on port tack and at other heel angles.
5. At low heel (0–8°) start with small values; corrections grow at higher heel.

If the `$XDR` Roll feed isn't connected, the heel correction is automatically skipped and STW remains uncorrected.

Tab 4 — System

- **Device name** — mDNS hostname. Default `pixel` (so the display answers at `pixel.local`).
- **WiFi networks** — list, add, delete up to 3 saved networks.
- **Update URL** — where the display pulls OTA firmware. Default `http://pixel1.tplinkdns.com/pixel/`.
- **Check for updates** — polls the server's `version.txt`. If a newer build is published, the status line reports it and an **Apply update** button appears (see Section 7). Checking never reboots the display by itself.
- **Apply update vX.YY** — appears only when an update is waiting. Press it to download, flash, and reboot into the new firmware.
- **Send debug log** — captures ~5 seconds of incoming raw NMEA so a problem with the data feed can be reviewed for support later. Useful when numbers look wrong (see Troubleshooting).
- **Info** — running firmware version, free heap, largest free block.
- **Factory reset** — wipes all user settings and WiFi credentials (see Section 6).

4. Data types



What you see on the panel. Six lines, each a data type you pick, in the colour you pick. Every line shows a small 3-letter tag, the value in the large display font, and the unit.

- **Wind angle (AWA/TWA)** — a red ◀ on the left means port, a green ▶ on the right means starboard.
- **SOG** — a green ▲ means accelerating, a red ▼ means slowing.
- **Bottom bar** — the wind-shift indicator: green to the right = wind shifted to starboard, red to the left = shifted to port (see Section 5).

Example layout — your six lines and colours are fully configurable.

Each of the six display lines can show any of the following:

Type	Name	Notes
HDM	Heading (Magnetic)	Bow direction relative to Magnetic North.
COG	Course Over Ground	Direction of travel over the seabed (GPS).
HDT	True Heading	Bow direction relative to True (geographic) North.
AWA	Apparent Wind Angle	0–180°. Red ◀ arrow = port, green ▶ = starboard.
AWS	Apparent Wind Speed	From masthead.
TWA	True Wind Angle	0–180°, same arrow convention as AWA.
TWS	True Wind Speed	Computed if not received.
SOG	Speed Over Ground	GPS speed. Trend arrows: green ↑ accelerating, red ↓ decelerating.
STW	Speed Through Water	Paddlewheel log.
DPT	Depth	Below transducer, meters.
GWS	Ground Wind Speed	Instantaneous True Wind Speed — same calc as TWS but from raw, un-averaged apparent wind; reacts immediately to gusts and lulls (TWS is smoothed).
GWD/TWD	Ground/True Wind Dir	0–359°.
RSA	Rudder Angle	Used by the bottom bar indicator.

Units shown on screen — ° for degrees, **kn** for knots, **m** for meters.

Supported NMEA 0183 sentences

Pixel listens for these standard NMEA 0183 sentences (any talker ID). Send whichever ones your gear produces — the display extracts the fields it needs.

Sentence	Name	What Pixel reads from it
MWV	Wind Speed & Angle	Apparent wind angle (AWA) and speed (AWS). The relative/apparent form is used; the true (,T,) form is ignored.
MWD	Wind Direction & Speed	Ground/true wind direction (GWD/TWD) and speed.
VHW	Water Speed & Heading	Speed through water (STW).
VTG	Course & Speed over Ground	Course (COG) and speed (SOG) over ground.
RMC	Recommended Minimum GPS data	Position, SOG, COG and time (GPS).
HDG	Heading — Deviation & Variation	Magnetic heading (with deviation/variation if present).
HDM	Heading, Magnetic	Magnetic heading.
HDT	Heading, True	True heading.
DPT	Depth of Water	Depth below the transducer.
MTW	Water Temperature	Sea-water temperature.
XDR	Transducer Measurements	Roll (heel) — feeds the STW heel correction (Section 3); pitch if present.
RSA	Rudder Sensor Angle	Rudder angle — drives the bottom-bar rudder indicator.

If True Wind (TWA / TWS / TWD) is not received directly, Pixel computes it on-board from apparent wind + boatspeed.

5. The bottom bar

A single configurable indicator bar at the bottom of the display:

- **Wind shift** — based on the rolling median of TWD. **Green bar to the right** = the wind has shifted to starboard; **red bar to the left** = shifted to port. Length is proportional to the size of the shift. (Whether a given shift is a lift or a header depends on the tack you are on.)
- **Rudder** — red bar left = port rudder, green right = starboard rudder. Length is proportional to angle.

Bar mode is set on Tab 1.

6. Factory reset

System tab → **Factory Reset** (red button). Confirms, then:

- Erases all six display-line settings, averaging windows, calibration offsets, device name, update URL.
 - Erases saved WiFi networks. Display will come up as `PixelConf` AP again on next boot.
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7. Firmware updates (OTA)

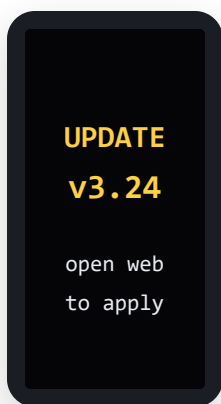
The display pulls firmware from an update server. The default server is

`http://pixel1.tplinkdns.com/pixel/`; you can point it at any compatible server on the **Update URL** field of the System tab.

Updates are checked automatically but never applied without your say-so — the display will not interrupt a race or a delivery with a surprise reboot.

How it works:

1. On boot (and whenever you press **Check for updates** on the System tab) the display polls the server's `version.txt`.
2. If a newer version is published, the display does **not** install it. Instead, for a few seconds after boot it shows an amber notice on the LED panel, and the System tab grows an **Apply update vX.YY** button.



The "update available" notice shown briefly at boot — apply it from the web System tab.

3. Open `http://pixel.local/` → **System** tab and press **Apply update**. The display downloads `firmware.bin`, flashes it, and reboots into the new version. Progress and the final result are shown on the page without it ever reloading (the System tab stays put).

The display refuses to **downgrade** from its own web UI (it only offers updates when the server version is newer). If a downgrade is ever needed for any reason, contact the manufacturer. Failed or interrupted downloads are safe — the old firmware keeps running until a complete one arrives. If an update ever hangs, power-cycle the display and press **Apply** again.

Tip for large jumps: if a very old display fails to update directly to the latest version, update it one small step at a time, power-cycling between attempts.

8. Display indicators reference

- **Unit suffixes:** ° = degrees, kn = knots, m = meters.
- **AWA / TWA arrows:** red ◀ on the left = port wind, green ▶ on the right = starboard.
- **SOG trend:** green ▲ = accelerating, red ▼ = decelerating.
- **Wind-shift bar:** green bar right = wind shifted to starboard, red bar left = shifted to port.
- **Rudder bar:** red left = port, green right = starboard.

9. Troubleshooting

Can't see PixelConf network

- Power-cycle the display and try again. Be within ~10 m.
- Make sure no saved network is in range (the display only opens PixelConf when nothing else connects).

Dashes or blanks instead of numbers

This is almost always a problem with the NMEA data feed. On your NMEA multiplexer / chartplotter / source, verify:

- **Protocol:** must be **UDP**, not TCP.
- **Port:** must be **2000** (or whatever you set on Tab 1).
- **Destination:** the most reliable setup is **UDP broadcast** (e.g. 192.168.1.255 on a 192.168.1.x network). The display will receive without needing to know its IP. If broadcast is unavailable, send unicast directly to the display's IP.
- **Format:** the display only understands **NMEA 0183**. NMEA 2000 / N2K requires a gateway to convert it first.
- **Firewall:** check that nothing on your network is blocking UDP port 2000.

If numbers are still wrong, use **System tab** → **Send debug log** while the data is flowing. This captures ~5 seconds of the raw NMEA the display is actually receiving so the exact sentences can be checked for support.

`http://pixel.local/` won't load

- Use the IP address directly (visible during boot).
- On some networks (and on iOS over hotspot), mDNS `.local` doesn't resolve.
- Try a different browser or device.

Settings look corrupted

- System tab → Factory Reset. Reconfigure from scratch.