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ETH Ticker

Features and how they work — firmware v9.5.0 for the Waveshare ESP32-S3-Touch-AMOLED-1.75C

Overview

ETH Ticker turns the round 1.75" AMOLED board into a live ETH/USDT ticker. It shows the price, candles, the day's change, a 24-hour floor and ceiling estimate, order-book walls, crypto news and alerts with sound. Everything is computed on the device itself: there is no server and no account, the device talks directly to public market and news sources over Wi-Fi.

The network work (price stream, order book, analytics, news, Wi-Fi) runs on one processor core, the screen and touch on the other, so the interface never waits for the network.

Controls

Input	Action
PWR, short press	Screen off / on. Data and alerts keep running while the screen is off.
PWR, hold 4 s	Power off.
BOOT, single press	Open / close the clock and settings panel.
BOOT, double press	Play the video; double press again to go back.
BOOT, hold	Walls screen, shown while the button is held.
Swipe up from the bottom	News. Close: swipe down, tap the top tab, or it closes by itself after 30 s.
Swipe down from the top	Clock and settings panel. Close: swipe up on its red bottom.
Tap 1h / 1d	Chart of 24 hourly or 31 daily candles.

Screens

Loading screen

At power-on a red and light screen with "0x513" shows the real loading progress: Wi-Fi 10 %, live price 20 %, candle history 15 %, walls 25 %, analytics 30 %. At 100 % the two halves slide apart over the already live ticker. If a source does not answer, the screen opens after 60 s once the price is live, and the rest keeps loading in the background. News and the time zone are not waited for.

Main screen

- **Price** — updated about once a second from the Binance stream; green after an upward tick, red after a downward one.
- **Day's change** (e.g. +2.58 %) — Binance's own rolling 24-hour change, the same number the Binance app shows next to the price. A green or red glow behind the news tab follows it; near 0 % the glow changes colour only after the new sign has held for 10 s.
- **Chart** — hourly or daily candles with a price column on the right and a live price tag; the timer shows the time until the current candle closes.
- **Floor and ceiling** — the 24-hour estimate (see Price analysis). Under each: 1d = lowest / highest price of the last 24 h, 1m = of the last 31 daily candles.

- **Top edge** — battery arc (red to green, a bolt while charging), Wi-Fi state and local time.
- **Connection** — when offline a red “connecting” pill with a countdown appears; the device reconnects by itself (see Wi-Fi).
- **News tab** — a light icon means new stories, a dark one means everything was read.

Walls screen (hold BOOT)

The chart zoomed between the nearest walls: up to three ceilings above (green) and three floors below (red) on their true price lines, candles never squeezed. A money bag marks the top, a crying face the bottom.

News

The 10 most important crypto stories of the last 24 hours, newest first, with local date and time. Tap the red counter (1/10) or swipe to flip. See News below for how they are chosen.

Clock and settings panel

- **Clock** — time, date, month calendar, battery percentage and the current Wi-Fi network.
- **Settings** — screen brightness (10–100 %) and sound volume, kept in flash; the button to the Wi-Fi networks.
- **Wi-Fi networks** — nearby 2.4 GHz networks with signal strength and a lock for protected ones; the refresh icon scans again (grey while scanning). Tap a network to connect; protected ones open the keyboard.
- **Saved** — up to 10 saved networks, the one in use marked with a green check; the red icon forgets a network.

Charging screen

When the USB cable goes in, a black screen with a white tab and a red bolt appears; a green glow with the ETH logo fades in, holds and fades out (3 s), then the previous screen returns. With the screen off it comes on for those 3 s and goes off again.

Market data

- **Price** — Binance WebSocket stream: the ETHUSDT ticker (about once a second) plus live hourly and daily candles. If the stream goes silent, the price falls back to REST requests and gets priority over every other download, so it recovers within seconds.
- **History** — 24 hourly and 31 daily candles loaded at start.
- **Order book** — Binance spot (5000 levels) and USDT-M futures (1000 levels).
- **Derivatives and sentiment** — funding rate, long/short account ratio, taker buy/sell flow, open interest (Binance futures); implied volatility DVOL (Deribit); BTC trend.

Price analysis: the 24-hour floor and ceiling

Every 5 minutes the device estimates a range the price is likely to stay within over the next 24 hours. It is a probabilistic range, not a promise and not financial advice.

1. Expected move (sigma)

How far ETH typically moves in a day, blended from three measures: Deribit implied volatility DVOL (weight 50 %), the daily ATR (25 %) and the realised hourly volatility (25 %), multiplied by a self-calibration factor (step 5).

2. Bias from -1 to +1

Which way the evidence leans, combined from these signals:

Signal	What it measures and how it is used
Trend	EMA 20 / 50 on hourly candles.
MACD	Momentum of the trend.
RSI (14, 1h)	Neutral at 45–55, gently to ±0.3 at 70 / 30, full at 100 / 0; damped in strong trends (overbought in a strong trend is mostly a false alarm).
Bollinger %b	Position inside the bands; damped in strong trends.
Order-book imbalance	Bids versus asks in the Binance book (5000 levels).
Funding rate	Who pays whom on perpetual futures: crowded longs or shorts.
Long / short ratio	Taken relative to its 2-day average (it sits near 3 for ETH): the crowd piling into longs is read as contrarian-bearish, and the other way round.
Taker flow	Market buys versus market sells.
Open interest	Change in open futures positions.
BTC trend	Bitcoin's direction, which ETH tends to follow.

3. Corridor

centre = price + 0.3 × bias × sigma; floor and ceiling = centre - / + 0.8 × sigma (0.8 sigma is about the expected one-sided extreme of a day).

4. Snapping to real levels

Each side is pulled toward the strongest level nearby: order-book walls, volume-profile nodes, the previous day's high and low, the 24-hour VWAP and round numbers. A floor that sits on a real support is more useful than one at an arbitrary price.

5. Self-calibration

Every hour the current estimate is stored. 24 hours later it is checked against what the price really did, and sigma is scaled so the corridor is neither too wide nor too narrow. The pending checks are kept in flash, so a restart does not lose a day of waiting. The project's test suite checks the corridor width and this calibration on a simulated 89-day market.

6. VWAP, observed

Where the price sits against the 24-hour VWAP (volume-weighted average price) is computed as a signal of its own, but not yet used in the forecast. Every hour the device notes it and the forecast's bias; 24 hours later it checks which way the price really went and logs how often each was right. It joins the forecast only if real prices show that it helps.

Order-book walls

A wall is a price where unusually many limit orders wait: sellers above the price (a ceiling) or buyers below it (a floor). Price often stalls or turns at walls, and breaking one usually means a strong move.

How walls are found

- The spot and futures books are summed into price bins of about $2 on a fixed grid and averaged over refreshes, so orders that flash in and out count less.
- A bin is a wall when it is a local peak that stands out against its own neighbourhood: at least 2× the median depth of the ±$20 around it. The book is always densest near the price, so walls are judged locally, not against the whole book.
- The market-maker layer around the spread (about 0.25 % from the price) is never counted as a wall.
- The 3 nearest walls above and below are kept, at least about $5 apart, each priced at its volume-weighted centre. Round numbers fill in only if fewer walls are found.

How walls stay stable

- **Hysteresis:** a new wall needs 2× the neighbourhood depth; a wall already shown stays down to 1.4×.
- **Spoof filter:** a new wall is shown only after it has been seen in 3 refreshes in a row (about a minute). Large orders placed for a few seconds to fake support or resistance are ignored.
- **Dropped** after missing 3 refreshes in a row, or at once when the price crosses it, so the next wall takes its place.
- The book is read every 20 s, every 10 s while the walls screen is shown.

Notifications

Alerts appear for 10 s over the bottom of the main screen with an emoji and a row of price pills, with a sound. Thresholds are in percent of the price, so the sensitivity does not change when ETH gets more expensive or cheaper (at about $2,400, 0.4 % is about $10).

Type	Fires when	Shows
Spikes	At least 0.4 % in 10 s, 0.5 % in 30 s, 0.6 % in 1 min, 0.8 % in 3 min or 1 % in 5 min.	Money face (up) or poo (down); the price and the nearest wall.
Steady trend	At least 1 % within 15 min, a smooth move without pullbacks.	As above.
Big moves	At least 1.25 % within 1 h or 1.7 % within 4 h.	As above.
24h high / low	The price breaks the day's peak or bottom that had held for at least 30 min, and no alert went that way in the last 10 min.	As above.
Wall breaks	The price crosses the nearest ceiling or floor and holds, judged by the trading flow of the last hour (below). Normally 0.12 % beyond it, or 3 s beyond it. Straight back is a wick, no alert.	Money bag (up) or crying face (down); the price and the next two walls.

Volume confirmation

A real break comes with volume; a stop run on thin volume comes straight back. The device compares the volume of the last 60 minutes with the hourly average of the 20 hours before, and looks at the share of market buys. Heavy volume (2×) or the takers behind the move (at least 60 % buys up, at most 40 % down): a wall break counts at once. Thin volume (below 0.8×) without them: it must hold 0.25 % beyond the wall or 10 s, and a new 24-hour high or low must clear the old one by 0.15 %. No alert is ever dropped by this, only confirmed sooner or later.

Repeat rules

- The same move is never announced twice just because time passed.
- Same direction again only after another 0.6 % (big moves: 0.8 %), or for a new move that started after the last alert and at least 3 min later (big moves: 1 h).
- A reversal is announced at once: up and down have separate rules.
- The same wall does not repeat for 5 minutes.
- With the screen off the alert lights it up: open panels close, the alert shows for 10 s with its sound and the screen goes dark again unless you touch it or press a button (ALERT_WAKES_SCREEN in config.h: set it to 0 for the sound only). During the video only the sound plays.

Your own alert sounds

Every alert plays a sound: the built-in one, or your own mp3 files. Put them in the sketch's **data** folder with these names and upload that folder to the device (see the installation guide); the firmware itself does not need to be uploaded again.

File	Plays for
up.mp3 / down.mp3	Every rise / every fall that has no file of its own.
spike_up.mp3 / spike_down.mp3	Spikes (10 s to 5 min).
trend_up.mp3 / trend_down.mp3	Steady trend (15 min).

File	Plays for
big_up.mp3 / big_down.mp3	Big moves (1 h, 4 h).
high.mp3 / low.mp3	A new 24-hour high / low.
wall_up.mp3 / wall_down.mp3	A wall broken upwards / downwards.

- For each alert: its own file, else up.mp3 or down.mp3, else the built-in sound. No files: the built-in sounds, as before.
- Any ordinary mp3 works (mono or stereo, any bitrate). Keep each under 6 s; longer files are cut at 6 s.
- The files are decoded once, in the background, right after start; the log lists what was loaded.

News

- **Sources** (RSS, no keys): CoinDesk, Cointelegraph, Decrypt, The Block and CryptoSlate, refreshed every 10 minutes.
- **Importance** = keywords (ETF, SEC, Fed, hacks, liquidations, ETH / BTC, listings, records, crashes and more) plus "hotness": a story carried by several outlets (similar titles) is shown once and ranks higher for each extra outlet.
- **Shown:** the 10 most important of the last 24 hours, newest first; numbers such as 61,800 or $5.7 never break across lines.

Wi-Fi: always online

- Up to 10 saved networks, the most recently used tried first; the radio stays on when the screen sleeps.
- A network is saved only after real internet access was confirmed (a check against connectivitycheck.gstatic.com). Hotel or café login pages are detected: the device shows "no internet" and moves on to the saved networks.
- Wrong password is reported only after two refusals (phone hotspots sometimes refuse once).
- A network picked on the screen gets 12 s for the access point to answer, then one more try on any channel, up to 25 s in all. After 3 failed rounds over all saved networks the radio is restarted.
- Only 2.4 GHz networks are visible to the ESP32-S3. An iPhone hotspot needs "Maximize Compatibility" turned on.

Time zone and clock

The time zone is found from the device's internet address at start and every 6 hours, daylight saving included, and kept in flash. Until the first answer the value from config.h is used.

Reliability and diagnostics

- A memory guard pauses heavy downloads if internal memory runs low and restarts the device safely only as a last resort, while the screen is idle.
- The serial log (115200 baud) explains what the device does: [wifi] connection steps, [walls] current walls, [an] analytics and the 24 h direction check, [flow] the last hour's volume and buys, [alert] notifications, [day] the day's change, [perf] screen frame rate, [app] a status line every 30 s.

ETH Ticker shows market data for information only. Nothing on the device is financial advice.