

# Coinbase Tradebot

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 *Naval Command Edition — Captain, Skipper, Commodore, Navigator, and Crew Coordination*

## Overview

Naval Command Edition presents the most stable and feature-rich release of the Coinbase Tradebot. This version refines operational hierarchy — each trading subsystem now carries a naval rank, reflecting its strategic importance and role in coordinated market maneuvers. Together, these officers ensure balanced, adaptive, and profitable operations under all sea conditions.

Edition: Naval Command Series

Version: v1.1.2 (October 2025)

Mode: Live & Dry-run supported (WS or Local aggregation)

TradeBot is a modular, self-regulating trading system for Coinbase Advanced. It operates as a disciplined fleet: each module represents a crew role within a naval hierarchy, ensuring strategy, risk, and maintenance remain in balance.

## Core Architecture

1. Load configuration and credentials from APIkeys.env and config.py.
2. Initialize Candle Engine: WS mode for feed or Local mode for ticker aggregation (150 ms settle delay).
3. Seed indicators (EMA, RSI, MACD) with 200 backfill candles.
4. Initialize Advisors and Quartermaster modules.
5. Start WebSocket client and monitor ticker/candles.
6. Run AutoTune to determine regime (uptrend, downtrend, choppy, blend).
7. Monitor Captain (EMA) for crossovers and confirmed signals.
8. Evaluate Quartermaster exits for take-profit or stagnation.
9. Persist all trades to trades.csv, portfolio.json, and fills.json.

## Crew Hierarchy and Responsibilities

- **Captain** (EMA): Determines overall market direction using short and long exponential moving averages.
- **Navigator** (Autotune): Adjusts tactical parameters in response to changing seas (market regimes).
- **Commodore** (MACD): Oversees momentum and signal crossovers, confirming the fleet's directional intent.
- **Skipper** (RSI): Monitors overbought/oversold waters to identify favorable entry or exit zones.
- **Quartermaster** (Take-Profit & Stagnation Officer): Manages exits, profit captures, and stale position clearance.
- **Deckhand** (24 h, ±2%): Handles daily maintenance — pruning, log management, and light telemetry duties.
- **Swab**: Keeps the decks clean by pruning processed fills and maintaining state efficiency.
- **Watchdog**: provides vigilance to ensure API connectivity.

## Navigator (Autotune) Enhancements

The Navigator steers the fleet based on changing market currents. It fine-tunes each officer's parameters to ensure the Captain, Skipper, and Commodore remain coordinated during volatile or choppy conditions. Key enhancements:

- Adaptive alpha curve for smoother yet more decisive BLEND transitions.
- Per-knob learning rates for nuanced tuning across all officers.
- Quantized, weighted, and bounded adjustments (0.5 bps steps, 2 bps max per vote).
- BLEND gently shifts settings toward the winning regime, while SNAP enforces full preset alignment.
- Optional drift telemetry showing deviation from the golden CHOPPY preset baseline.
- Preserves the CHOPPY regime as the calm-sea anchor baseline.

## Navigator Modes of Operation

The Navigator determines operational mode based on regime vote share:

- SNAP:  $\geq 70\%$  vote share — immediately adopts the winning regime preset.
- BLEND: 55–69% vote share — gradually aligns tactical knobs toward the winner using smoothing and quantization.
- CHOPPY:  $< 55\%$  vote share — maintains the golden CHOPPY preset without deviation.

## Parameters Adjusted by the Navigator (Autotune)

The Navigator dynamically adjusts the following operational knobs:

- `ema_deadband_bps` — Captain's sensitivity to short/long EMA convergence.
- `rsi_buy_max / rsi_sell_min` — Skipper's buy/sell confirmation thresholds.
- `macd_buy_min / macd_sell_max` — Commodore's trend validation parameters.
- `confirm_candles` — Number of confirmations before acting on signals.
- `per_product_cooldown_s` — Time buffer before the next maneuver in a given pair.

EMA periods (Captain's `short_ema=40`, `long_ema=120`) remain fixed unless optional tuning is enabled (`autotune_tune_ema_periods=True` in `config.py`).

## Reconcile Cadence

Reconcile synchronizes past fills, positions, and P&L. At startup, a full reconcile runs before Autotune for accurate telemetry. During the session, automatic sweep reconcilers run every 60 minutes by default (configurable). When enabled, SELL operations perform a quick validation reconcile just before placing the order.

## Key Settings (`config.py`)

Setting	Default (example)	Purpose
<code>dry_run</code>	True	Simulation mode (no live orders).
<code>autotune_enabled</code>	True	Enable Autotune at startup.
<code>autotune_lookback_hours</code>	18	Candle window hours for regime voting.
<code>autotune_vote_interval</code>	15m	Dedicated timeframe for regime voting.
<code>autotune_vote_min_candles</code>	72	Minimum number of vote candles (~18h at 15m).
<code>lookback_hours</code>	48	Reconcile horizon for fills and KPI sync.
<code>mid_reconcile_enabled</code>	True	Enables periodic mid-session reconcile sweeps.
<code>mid_reconcile_interval_minutes</code>	90	Time interval for mid-session reconcile (minutes).
<code>autotune_preview_only</code>	True	Preview tuning suggestions without applying changes.
<code>autotune_elapsed_refresh_hours</code>	4	Hours between optional elapsed Autotune refreshes.

## Telemetry and Logbook Entries

The Commodore's telemetry records each decision in real-time — including regime votes, parameter changes, and fleet readiness. An optional drift summary shows how far the ship's settings have deviated from the golden CHOPPY baseline:

*[AUTOTUNE DRIFT] ema\_deadband\_bps:-0.50, rsi\_buy\_max:+1.00, ...*

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## Quartermaster Module (Take-Profit & Stagnation Officer)

The Quartermaster safeguards profits and eliminates idle trades.

- Take-Profit (10%): Automatically executes a market SELL when unrealized profit reaches 10% ( $\approx 1000$  bps) or higher. This ensures strong moves are captured without relying solely on EMA crossovers.
- Stagnation (36 h,  $\pm 2\%$ ): Detects positions held for more than 36 hours with less than  $\pm 2\%$  movement and a flat MACD histogram. When triggered, the bot performs a stagnation exit to recycle capital into more active opportunities.

Quartermaster logic runs before EMA-based signals each candle close. It will not interfere with active EMA trades and respects cooldown timers to prevent rapid re-entry.

All Quartermaster actions are logged to trades.csv with the exit\_reason field set to 'take\_profit' or 'stagnation'. In dry\_run=True, no trades are written — only simulated.

## Quartermaster Settings (config.py)

Setting	Default (example)	Purpose
<b>enable_quartermaster</b>	True	Enables take-profit and stagnation logic.
<b>take_profit_bps</b>	1000	Trigger threshold (10%) for Quartermaster take-profit exits.
<b>max_hold_hours</b>	36	Hours before stagnation check activates.
<b>stagnation_close_bps</b>	200	$\pm 2\%$ band for stagnant positions.
<b>flat_macd_abs_max</b>	0.40	Defines 'flat' MACD for stagnation detection.

## Technical Parameters

Parameter	Default	Description
<b>short_ema</b>	40	Short-term moving average
<b>long_ema</b>	120	Long-term moving average
<b>confirm_candles</b>	3	Required consecutive confirmations
<b>ema_deadband_bps</b>	6.0	Prevents flapping between cross states
<b>take_profit_bps</b>	800	Quartermaster profit exit threshold (~8%)
<b>daily_spend_cap</b>	120.0	Daily BUY limit to prevent overtrading
<b>local_close_settle_ms</b>	120	Local mode candle close delay

## Operational Summary

Module	Role	Key Function
<b>EMA</b>	Captain	Primary trade signal (crossover logic)
<b>Autotune</b>	Navigator	Regime detection & adaptive tuning
<b>MACD</b>	Commodore	Confirms or vetoes Captain's decision
<b>RSI</b>	Skipper	Overbought/oversold protection
<b>Quartermaster</b>	Officer	Take-Profit & stagnation exits
<b>Deckhand</b>	Support	Capital rotation & cleanup
<b>Swab</b>	Maintenance	File hygiene & log pruning
<b>Watchdog</b>	Connectivity Officer	Monitors connection, pings, reconnects, keeps comms alive

## Threads in This Program

Tradebot runs a compact multi-threaded command loop, designed for stability and low-latency market reaction:

- MainThread — Oversees the startup sequence (*Reconcile* → *AutoTune* → *WebSocket*) and manages session-wide state, acting as the ship's command bridge.
- WebSocket Thread — Manages Coinbase data streams and candle aggregation, performing signal evaluation, Quartermaster exits, and connectivity watchdog tasks. Feeds real-time data to the Captain (EMA), Skipper (RSI), and Commodore (MACD).
- Mid-Session Reconcile Thread — Performs scheduled portfolio synchronization sweeps (every 60 minutes by default) to ensure telemetry accuracy.
- Elapsed AutoTune Thread — Triggers a one-shot market regime analysis (typically after 4 hours) to realign indicator confirmation thresholds based on trend voting.

## Fleet Stability Notes

Optimizations to minimize I/O turbulence, avoid redundant pruning operations, and improve the Swab's cleaning routines. ProcessedFills management has been refactored to ensure smooth sailing, and synchronization routines run efficiently without clogging the bilge (disk).

## Run Settings

Example configurations for running Tradebot in different modes (these are set in config.py):

```
# Dry run with AutoTune preview:  
dry_run = True  
autotune_enabled = True  
autotune_preview_only = True  
  
# Live run with active AutoTune:  
dry_run = False  
autotune_enabled = True  
autotune_preview_only = False  
  
# Static (no AutoTune. Uses Golden Preset Chop settings):  
autotune_enabled = False
```

You can now also override some settings directly in the CLI:

```
# Paper trade without live orders  
  
python main.py --dry-run=true  
  
# Disable Quartermaster exits  
  
python main.py --enable-quartermaster=false  
  
# Adjust per-order size and daily cap  
  
python main.py --usd-per-order=30 --max-spend-cap=300
```

## Risk Controls & Safety Gates

- Daily BUY Cap: Stops BUYs after cap is reached.
- Quartermaster Exits: Enforced via MARKET\_ONLY for deterministic execution.
- Live balance fallback: Prevents portfolio desync on restart.
- Unified state locks: Ensure CSV and portfolio writes are atomic.
- Hard-stop protection: Emergency SELL if price drops >3% from cost basis.

## Technical Summary

- **Execution path:**  EMA captain → advisor veto → maker orders by default; Quartermaster runs **before** EMA and sells **at market** for take-profit/stagnation (with cooldown + dust guard).
- **Loss minimization:**  Optional hard\_stop\_bps; advisors veto bad crosses; per-product cooldown; daily buy cap; maker pricing with offsets to avoid taker fees on routine trades.
- **Spam loops:**  Quartermaster throttled, clamped to held size, and won't fire again within a short window.
- **State safety:**  Fill reconciliation before AutoTune; immediate fill handling under a lock; CSV logging gated off in dry-run.