



Keystone Finance

The On-Chain Asset Manager for Solana Capital

Whitepaper

Version 1.0 · April 2026

Multi-strategy on-chain hedge fund built for any market cycle.

*One deposit; allocation across all three sleeves. One share: **ksCORE**.*

<https://github.com/kamwithak/keystone-contracts>

All simulated performance figures are illustrative estimates derived from historical data and documented strategy mechanics — not actual returns. Keystone Finance is not a registered investment adviser. Nothing herein constitutes investment advice.

1. Abstract

Keystone Finance is the on-chain asset manager for Solana capital: a **permissionless, multi-strategy on-chain hedge fund**. It runs three sleeves in parallel — directional LST accumulation, delta-neutral basis and funding carry, and crisis-period yield — and reallocates among them using on-chain state and fixed rules. Depositors pick a risk profile once and hold `ksCORE` as a single share in the combined book. No off-chain fund admin; execution is entirely in programs.

Under a 38-month historical simulation (January 2023 – March 2026, including the 2025 drawdown), each risk profile exhibited annualised returns between roughly 17% and 21% and a Sharpe ratio above 1.0. These are model outputs, not realised performance.

2. Problem Statement

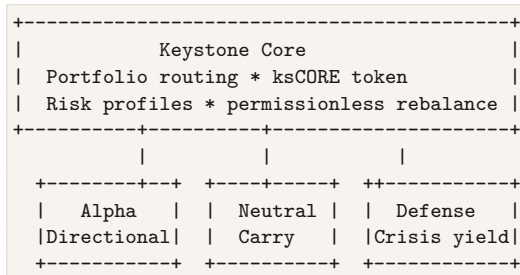
Single-strategy or manually rotated portfolios face three structural issues:

- **Regime dependence.** Return drivers that dominate in one market state often underperform or fail in another; human rebalancing introduces delay and judgment error.
- **Non-overlapping yield sources.** Directional LST accumulation, basis carry, and dislocation trades activate under different conditions; capturing all three typically requires parallel sleeves, not one static book.
- **Inventory extremes.** Unhedged stablecoin balances forgo return; concentrated leverage raises tail risk from liquidations and correlation breaks.

Keystone responds with a **multi-strategy on-chain hedge fund** model: public rules, on-chain execution, and no discretionary portfolio manager.

3. Architecture

Alpha, Neutral, and Defense are three on-chain Funds — the sleeves of the hedge fund. Each has its own program, share token, and NAV. Keystone Core is the master layer: it holds those Fund shares for depositors, mints and burns `ksCORE`, and routes new capital (or fixes drift) by risk profile.



4. The Three Funds

4.1 Alpha Fund — Directional Accumulation

The Alpha Fund scales liquid SOL exposure through `jitoSOL`. Target portfolio weight in `jitoSOL` increases as spot SOL falls relative to its all-time high (ATH) and decreases as price approaches the ATH. The mapping is piecewise linear between 20% and 80% `jitoSOL`:

$$\text{target}(p) = \begin{cases} 80\% & p \leq 25\% \text{ of ATH} \\ 20\% + \frac{p_{\text{high}} - p}{p_{\text{high}} - p_{\text{low}}} \times 60\% & 25\% < p < 80\% \text{ of ATH} \\ 20\% & p \geq 80\% \text{ of ATH} \end{cases}$$

Rebalancing is step-limited per event (for example, up to 3 percentage points in normal volatility, 0.75 in a deep-bear regime) across four volatility states, and is suspended when realised volatility exceeds 10%. Idle USDC is deployed to Marginfi lending; `jitoSOL` accrues staking yield.

4.2 Neutral Fund — Basis and Funding Carry

The Neutral Fund targets zero net SOL delta while harvesting basis and funding. Leg selection is rule-based: when the sign of the funding rate changes, the Fund switches between two hedged constructions.

Standard basis (funding > 0): long jitoSOL (Drift spot) paired with a short SOL perpetual. The long leg earns LST staking yield; the short leg receives positive funding when shorts pay longs.

Reverse basis (funding < 0): short jitoSOL via Kamino borrow (USDC collateral) paired with a long SOL perpetual, so negative funding flows to the long perp position.

Parking mode: if expected carry falls below transaction and funding costs, inventory rotates into jitoSOL for staking yield only.

Risk controls include Drift health monitoring with deleverage below 1.2×, funding and volatility filters on position size, and NAV guardrails. **Indicative blended yield** when the perpetual leg is active has been estimated at 11–21% APY (illustrative, not guaranteed).

Operational incident — Drift Protocol (April 2026). Drift suffered a large loss (reported ~\$286M) attributed to a compromised administrative key. The Neutral Fund’s perpetual hedge is **suspended**; the Fund currently operates in **parking mode** (jitoSOL staking) until a replacement venue is integrated and tested.

Candidate venues: **Jupiter Perps** (primary integration target); **Phoenix** (on-chain CLOB, not yet publicly integratable); **Zeta Markets** excluded (no Solana CPI surface for this use case).

4.3 Defense Fund — Crisis Yield Capture

The baseline allocation is JupSOL staking. Under stress signals, capital may be deployed into:

- **Negative-funding capture:** long SOL perpetual when funding is sufficiently negative (venue-dependent; subject to the same Drift integration pause as Neutral).
- **Liquidation-related trades:** repay under-collateralised Marginfi positions to acquire collateral at a discount, with sizing constrained by on-chain oracle (Pyth) checks.
- **Distressed LST acquisition:** purchase liquid staking tokens trading below model fair value, held until mean reversion or exit rules trigger.

`cascade_mode` temporarily elevates position caps for up to four hours when liquidation-cascade risk is elevated; the flag auto-expires if unused.

5. Keystone Core — Deposits, Withdrawals, Rebalancing

```
deposit(token, profile)    // USDC, SOL, jitoSOL, JupSOL, ...
  -> Jupiter to USDC if needed
  -> split to Alpha / Neutral / Defense per profile
  -> mint ksCORE

withdraw(ksCORE, out_token)
  -> burn ksCORE, redeem from the three Funds pro rata
  -> Jupiter to the token you asked for
```

Accounting denomination is USDC. NAV, share pricing, and inter-Fund routing are computed in USDC. Deposits and withdrawals in other SPL assets are converted at execution time via Jupiter; no prior manual swap is required.

Token	Deposit	Withdraw
USDC	Direct — zero fees	Direct — zero fees
JupSOL	Defense Fund native; rest Jupiter → USDC	Jupiter: USDC → JupSOL
SOL / wSOL / jitoSOL / other	Jupiter: token → USDC	Jupiter: USDC → token

Cost minimisation. USDC deposits and withdrawals avoid aggregator fees. JupSOL reduces swap surface area because the Defense allocation accepts JupSOL directly, saving an estimated 0.3–0.6% versus full two-leg conversion. Other assets typically incur Jupiter fees on both deposit and withdrawal (order 0.1–0.3% per leg, liquidity-dependent).

The `rebalance` instruction is permissionless. When any Fund’s weight deviates beyond a configured band

(default 5%), keepers may sell overweight sleeves and purchase underweight sleeves until portfolio weights realign with the risk profile.

6. Risk Profiles

Profile	Alpha	Neutral	Defense	Character
Conservative	10%	60%	30%	Lowest directional beta; carry-weighted
Balanced	20%	55%	25%	Moderate directional sleeve
Growth	35%	40%	25%	Higher Alpha weight; simulation-optimal Sharpe at 35%

Target weights and bounds are enforced by the programs. The Growth profile caps Alpha at 35% because, in the documented backtest, larger Alpha allocations increased volatility faster than they increased risk-adjusted return.

7. Simulated Performance (January 2023 – March 2026)

Methodology. Results apply published strategy rules to historical SOL prices. Protocol fees are deducted; transaction costs, slippage, and execution latency are not simulated.

Profile	\$100 →	Total Return	Ann. APY	Sharpe	Max DD
Conservative	\$165	+64.7%	17.1%	2.1	−2.7%
Balanced	\$173	+73.4%	19.0%	1.4	−9.0%
Growth	\$184	+83.7%	21.2%	1.0	−17.1%
USDC Lending	\$113	+13.0%	4.1%	—	≈0%
SOL Direct	\$367	+267%	—	<1.0	−70%

Sharpe annualised; USDC risk-free rate ≈4%/yr.

Phase	SOL	Cons.	Balanced	Growth
Bull (Jan 2023 – Jan 2025)	+867%	+56.2%	+76.8%	+105.1%
Bear (Jan 2025 – Mar 2026)	−70% (ATH)	+5.4%	−1.9%	−10.4%

Over the bear sub-period (January 2025 – March 2026), Growth’s maximum drawdown was approximately −17% versus roughly −70% for spot SOL measured from the prior ATH. Buy-and-hold SOL exhibits high terminal return over the full sample but is path-dependent; Growth achieved about +84% cumulative return over the full window with Sharpe above 1 under the stated simulation assumptions.

8. Fees, NAV, and Share Pricing

Fees are settled by minting additional shares to the fee recipient, which dilutes existing holders proportionally; principal balances in USDC are not directly debited. Performance fees apply only above the high-water mark.

Fund	Management	Performance	Rebalancing
Alpha	0.5%/yr	20% above HWM	0.1% per rebalance
Neutral	0.5%/yr	20% above HWM	—
Defense	0%	20% above HWM	—

The Defense Fund charges no management fee while the strategy is predominantly passive staking, to avoid recurring erosion of yield on idle inventory.

Per-Fund share prices initialise at 1.00 USDC and mark to NAV. NAV is recomputed on deposits,

withdrawals, and fee minting events:

$$P_{\text{share}} = \frac{\text{total NAV}}{\text{total shares outstanding}} \quad P_{\text{ksCORE}} = \frac{\sum_{i \in \{\alpha, N, D\}} \text{shares}_i^{\text{Core}} \times P_i}{\text{supply}_{\text{ksCORE}}}$$

SOL/USD is supplied by Pyth with a five-minute maximum staleness and a 2% maximum confidence interval; observations outside these bounds cause the instruction to revert.

9. Security Model

Access control. The admin role may update parameters, pause the system, collect fees, and transfer authority. All other instructions — including deposit, withdraw, rebalance, and (where configured) permissionless capital deployment — are open to arbitrary signers subject to program checks. Fund assets are held under program-derived addresses (PDAs); externally owned accounts do not custody portfolio inventory.

Invariants and mitigations. Protocol-wide: emergency pause, deposit caps, oracle staleness and confidence checks, fixed-point integer arithmetic, configurable Jupiter slippage limits, and high-water-mark enforcement for performance fees. Fund-specific: Alpha employs multi-regime volatility logic and step-capped rebalancing; Neutral monitors exchange health, funding filters, and NAV drawdown limits.

9.1 Governance Roadmap — Multisig and Timelock

The current deployment uses a single admin key for development and audit. The intended production configuration combines multisignature approval with timelocked execution for privileged operations.

Multisig. The design target is **3-of-5** approval for routine administrative actions (fund parameter updates, non-emergency pause, fee collection, authority transfer). A **1-of-5 emergency pause** pathway is under evaluation: any authorised signer could halt state transitions during an active incident, with unpauses requiring full quorum.

Timelock. Sensitive parameter changes are planned to observe a fixed delay between proposal acceptance and execution:

Action	Delay	Rationale
Fund parameter update	48 hours	Allows depositors to redeem before new rules take effect
transfer_authority	72 hours	Reduces impact of a single compromised key
collect_fees	24 hours	Observation window before fee mint
Non-emergency pause	12 hours	Short delay; emergency pause bypasses timelock

Proposals are intended to be stored in dedicated accounts with a `not_before` timestamp; after elapse, execution may be triggered by any party. Cancellation would require the same multisig threshold as proposal creation.

Status. Thresholds, delay lengths, and the choice between a native timelock module and an external program (e.g. Squads) remain under design. Configuration will be fixed only after security review prior to mainnet deployment.

10. Protocol Addresses and Risk Disclosures

Program	Network	Address
Keystone Core	Devnet	D6jfzSz51KEvyyW9VSuiQyRNGCbpPVGs7UUE1gZuEvd2
Keystone Alpha	Devnet	GVPEtUHkc99vpezahwP2iBy1gu2DsuNtN3Lfsr5fcYcC
Keystone Neutral	Devnet	6goYYLmBevvp9B83yoVsafCSTd9cRXEV5DfYjvoZfCeU
Keystone Defense	Devnet	In development

External protocols. Pyth (price feeds), Jupiter (aggregation and JupSOL routing), Marginfi (lending and collateral), Kamino (jitoSOL borrow), Drift (perpetuals; see Neutral Fund notice), Jito (jitoSOL).

Mainnet program identifiers will be published following audit completion.

Risk	Description
Smart contract	Programs are unaudited. Bugs or admin key compromise could result in loss of funds.
SOL price	Alpha and Growth carry directional exposure. A multi-year bear (e.g. 2022: -94%) produces significant drawdowns.
Funding rate	When the perp leg is live, Neutral needs funding to clear borrow and costs. Long stretches of flat funding shrink or erase carry.
Liquidation	Leveraged perpetual positions can be liquidated despite health monitoring if prices move faster than margin can be replenished.
Counterparty	Smart-contract failure or insolvency at an integrated protocol can cause partial or total loss of deployed capital. The April 2026 Drift incident illustrates operational and key-management risk; Neutral and Defense perpetual exposures linked to Drift remain paused or under redesign pending alternative venue integration.
LST depeg	jitoSOL and JupSOL can trade below fair value. Circuit breakers activate above 2% deviation but cannot prevent sudden severe depegs.
Keeper	Instructions are permissionless, but if no actor submits transactions during sustained stress, automated position management stalls until activity resumes.
Simulation	All performance figures are simulated. Real execution adds slippage, latency, and liquidity constraints not modelled.

<https://github.com/kamwithak/keystone-contracts> *Not investment advice. Deposit only what you can afford to lose.*