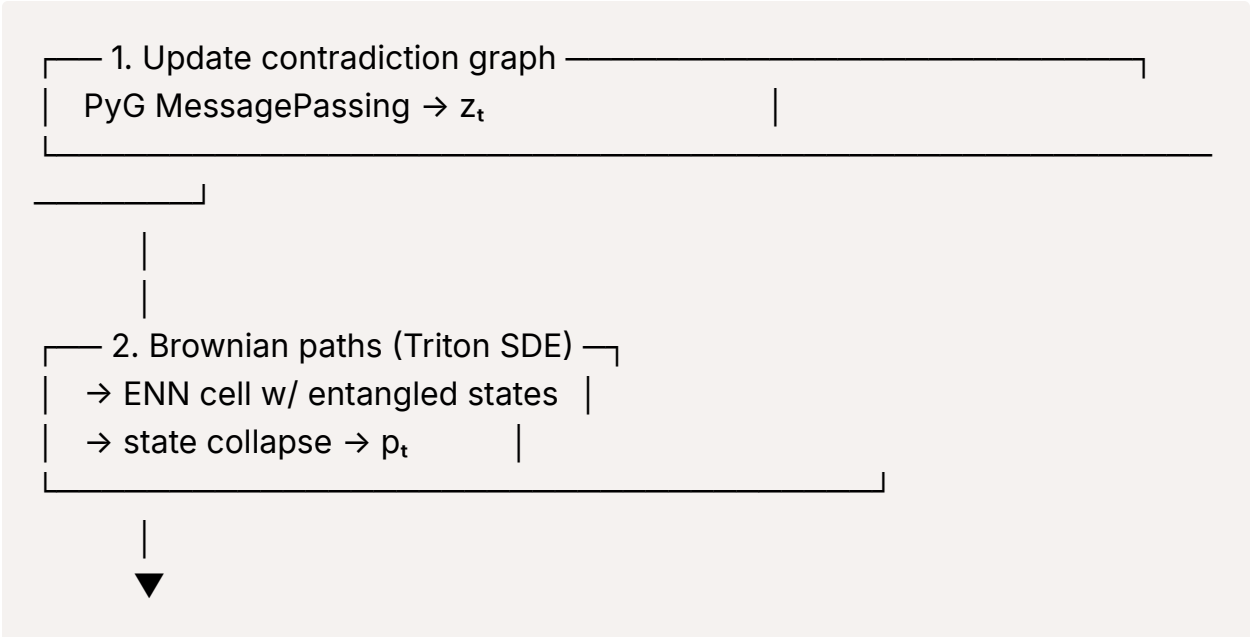
high_level_overview

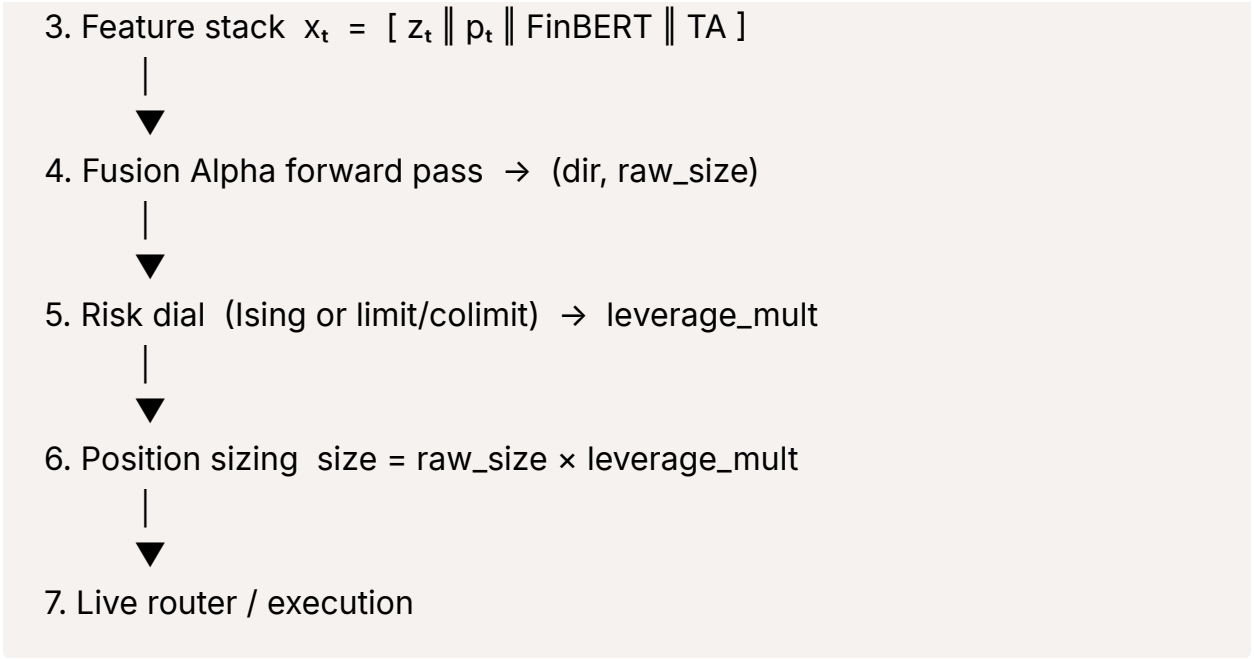
Where each piece lives

Layer	Lives inside	Role
BICEP	“Physics + logic” sandbox	• Generates Brownian path ensemble• Feeds those paths through the **ENN cell** → collapses to the push-out symbol $\mathbf{p_t}$
Fusion Alpha	Master signal head	• Consumes $\mathbf{p_t}$ (from BICEP/ENN)• Consumes $\mathbf{z_t}$ (graph embedding)• Consumes FinBERT sentiment & technicals• Emits directional score + size
Risk dial (Ising or limit/colimit functor)	Parallel overlay	• Reads live micro-/macro-risk gauges• Scales or vetoes the position coming out of Fusion Alpha

> So the ENN stays inside BICEP, upstream of Fusion Alpha — not inside Fusion Alpha itself.

End-to-end inference loop (every tick)





Key points

- **BICEP = "generate context"** – ENN sits here, translating Brownian exploration into the minimal symbol $\mathbf{p_t}$ your theory demands.
- **Fusion Alpha = "decide direction"** – it *needs* both $\mathbf{p_t}$ and $\mathbf{z_t}$ to judge whether the market's outward story and inward crowd-state disagree.
- **Risk dial = "keep you alive"** – whether it's Ising criticality or the category-limit blend of vol / corr / liquidity, it gates the final size.

Training pipeline (offline)

1. **Pre-compute contradiction graphs** for each training window.
2. **Sample Brownian paths → ENN collapse** to generate $\mathbf{p_t}$ sequences.
3. Build training tuples (z_t , p_t , FinBERT, TA) → future returns.
4. **Train Fusion Alpha** (with dropout, attention, etc.).
5. Separately fit / tune the **risk dial** on out-of-sample periods.
6. Optionally fine-tune ENN + graph encoder jointly once Fusion Alpha stabilises.

Why keep ENN inside BICEP?

- **Separation of concerns** – BICEP handles stochastic information discovery; Fusion Alpha focuses on exploiting contradictions for alpha.
- **Latency neutrality** – ENN's 0.7 ms forward pass is amortised *before* Fusion Alpha, so the head model stays lightweight.
- **Modularity** – you can iterate on BICEP (e.g., new path kernels) without touching the trained Fusion Alpha weights.

If you ever want to experiment with an *all-in-one* super-net, you can splice an ENN layer directly into Fusion Alpha, but the current architecture keeps debugging, risk controls, and theory alignment far cleaner.

TL;DR – Ordering is:

1️⃣ Contradiction-graph encoder → 2️⃣ BICEP + ENN → 3️⃣ Fusion Alpha → 4️⃣ Risk dial → 5️⃣ Execution.