Quartz Technical Brief

Automated Trading Platform for S&P 500 Derivatives

Abstract: Quartz is a professional-grade algorithmic trading platform for ES futures. We provide battle-tested strategies, real-time signals, and automated execution against the CME. Trade like an institution without building the infrastructure.

1   Product Overview

Quartz is an automated trading platform designed for the S&P 500 derivatives market. We provide the strategies, the signals, and the execution. You bring the capital. Think of it as a quantitative hedge fund in a box: our team builds and maintains the trading logic, you deploy it against your brokerage account.

2   Market Focus: Why ES?

Quartz ships ES first by design to ensure execution quality matches engine performance.

- **Institutional Liquidity:** ES is the deepest equity index future on the planet. This depth keeps spreads tight and allows strategies to scale without significant slippage.

- **Stable Microstructure:** The ES limit order book is cleaner than fragmented venues, making order-flow patterns more repeatable.

- **SMT Correlation:** While ES and NQ correlate, ES offers superior depth at size. NQ remains a research market until tick-level models are verified.

- **Backtest Completeness:** Strategies are validated on years of ES tick history with deterministic replay before moving to the live environment.

3   System Architecture

The Quartz architecture consists of three core modules wired in a single accountable path.

3.1   Tape Engine

- Ingests CME/IBKR binary feeds and normalizes timestamps.

- Stores ticks in **TimescaleDB** with a **Redis** cache for high-frequency window snapshots.

- Guarantees monotonic sequence and explicit handling of venue anomalies.

3.2   Strategy Engine

- Runs quantitative models built on order flow and price action.

- Supports tick-accurate backtesting using the same logic paths as live execution.

- Enforces guardrails: max position limits, per-session risk caps, and latency budgets.

3.3 Execution Bridge

- Translates strategy intents into broker-specific orders (FIX/REST).

- Tracks execution lifecycle (acknowledgements, fills, cancels) back to the runner loop.

- Maintains a 100% auditable trail from tick arrival to fill notification.

4 Data and Visualization

Quartz combines institutional-grade data with high-performance charting.

- **Real-time Charts:** TradingView-quality candlestick charts with order flow overlays and strategy annotations.

- **Visual Flow:** See exactly what the algorithms are seeing: price action, volume profiles, and execution signals.

5 Risk and Guardrails

- **Pre-trade Constraints:** Rejects intents that violate risk budgets before they reach the gateway.

- **On-tape Invariants:** Enforces circuit-breakers based on volatility and spread thresholds.

- **Post-trade Audit:** Every decision is attributable to the strategy state and tape context at the moment of execution.

6 Security and Operations

- **Data Sovereignty:** Tick data and strategy code stay within the Quartz environment.

- **Segregated Environments:** Logical separation between research, paper, and live trading to prevent cross-wiring.