

Technical Specification Document

Project: Jigsaw Flow - Stock Options Intraday Trading Bot

1. Objective

To design and develop an automated intraday trading algorithm that executes options trades based on price action, multi-timeframe technical confirmation, ETF sector momentum, and compression breakout patterns. The bot will dynamically manage trade entries, stop-losses, and exits with real-time alerting and override functionality.

2. Platform & Broker Integration

Purpose: Establish the technical foundation and integration requirements for data access and order execution.

- **Primary Platform:** Python-based server deployment
 - **Brokerage API:** Schwab or TastyTrade (whichever is more developer-accessible)
 - **Real-Time Market Data:** Integrated via broker or third-party API (used for chart data, indicators, and order routing)
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3. Core Logic Flow

Purpose: Outlines how the bot processes input, confirms signals, and validates a trade setup before placing a trade.

Input Configuration

- User-selectable settings:
 - Number of contracts per trade
 - Ticker list (e.g., SPY, QQQ, TSLA, AAPL)
 - Trailing stop method (Heiken Ashi, EMA, % trail, ATR, fixed ticks)
 - "No-trade" window setting after market open (e.g., skip first 3 minutes, adjustable)
 - "Auto-close" setting to exit all open positions a configurable number of minutes before market close (default: 15 minutes)
 - "Cutoff time for new entries" setting (default: no new trades after 3:15 PM ET)

Data Preprocessing

- Retrieve OHLCV data for 1-minute, 5-minute, and 15-minute timeframes
- Convert to Heiken Ashi candles for better trend clarity
- Pull options chain and filter for:
 - 0DTE or shortest expiry contracts
 - Closest to 0.60 delta
 - Minimum open interest and tight spreads
- Ensure underlying asset meets liquidity criteria:
 - Daily volume > 1M
 - OI > 500 contracts
 - Option bid/ask spread < \$0.10

Sector Confirmation Engine

Purpose: Align trade entries with institutional momentum by confirming that high-weighted SPY sectors are moving in tandem.

- Monitor real-time sector movement of:
 - XLK (Tech ~32%)
 - XLF (Financials ~14%)
 - XLV (Health Care ~11%)
 - XLY (Consumer Discretionary ~11%)
- Confirm that XLK plus one other sector are trending in the same direction
- Combined sector weight should exceed 43% of SPY for trade activation

Compression Detection

Purpose: Identify low-volatility zones primed for explosive breakout moves.

- Use three tools in combination:
 - **Bollinger Band Width** < 0.05 = tight range
 - **Donchian Channel** contraction = consolidation
 - **Volume Squeeze Pro** = volatility compression detected
- Confirm compression occurs:
 - **Above VWAP** for potential long entries
 - **Below VWAP** for potential short entries

Momentum & Trend Confirmation

Purpose: Confirm that there is sufficient directional momentum before taking the trade.

- **Stochastic Oscillator (Barry Burns' method):**
 - K: 5, D: 3, Smooth: 2
 - %K crossing above 20 = bullish signal
 - %K crossing below 80 = bearish signal
 - Interpreted as:
 - %K > 80 = strong bullish momentum

- $\%K < 20$ = strong bearish momentum
- **Trend Alignment Check:**
 - Price must be above both VWAP and EMA for long trades
 - Price must be below both for shorts
 - EMAs: customizable (default: 15, optional: 9, 20, 50, 200)

Entry Trigger

Purpose: Ensure clean and confirmed breakout entry using candle structure and volume.

- Confirm Heiken Ashi candle formation:
 - **Longs:** Flat-bottom, no lower wick = strong bullish candle
 - **Shorts:** Flat-top, no upper wick = strong bearish candle
- Breakout from compression confirmed with volume spike
- Confirm time window:
 - Block new entries after 3:15 PM ET
- Execute trade with SL and trailing stop

Optional Entry Enhancements

Purpose: Add refined or conservative entry variations based on common institutional behaviors.

- **Pivot Zone Continuation:**
 - Re-entry opportunity after a breakout + pullback to pivot
 - Must be supported by renewed momentum and HA confirmation
- **VWAP Reclaim / Rejection Flip:**
 - Strong signal when price reclaims or rejects VWAP with sector alignment
 - Works well for reversals or trend continuations
- **News Filter (Optional):**
 - Blocks trades during scheduled earnings/news events (if API is feasible)

4. Trade Management Logic

Purpose: This section defines how trades are managed after execution, including how stops are placed, adjusted, and exited. It ensures logical trade progression, profit protection, and risk control based on evolving market conditions.

Stop-Loss Management

- SL options:
 - ATR multiple
 - Structure-based (last swing high/low)
 - Fixed % of entry price
- Dynamically adjusted based on:

- Breakout momentum
- Candle structure
- Trailing method selected

Trailing Stop Methods (selectable)

Each of the following methods is designed to manage profits dynamically as the trade progresses, depending on the trader's selected risk tolerance or preferred trailing logic:

1. Heiken Ashi Candle Trail (1–3 candle lookback)
2. EMA Trail (e.g., EMA(9) trailing stop)
3. % Price Trail (e.g., 1.5% below current price)
4. ATR-Based Trail (1.5x ATR)
5. Fixed Tick/Point Trail (custom value)

Exit Conditions

These conditions will trigger an exit from the trade, either because the trade hit a desired target, showed weakness, or met a timed or structural criteria.

- Take-profit reached
- Opposing Stochastic crossover
- Opposing Heiken Ashi reversal
- VWAP or EMA crossover against trade
- Re-entry into compression zone
- **Trend Strength Filter:** Add optional logic to measure strength of the overall trend using ADX (Average Directional Index). Only allow entries when $ADX > 20-25$ to avoid choppy markets.
- **Time-Based Exit Failsafe:** If a trade remains open for more than X minutes (user-defined, e.g., 20 minutes) without hitting SL or TP, the bot will exit the position to reduce stagnation risk.
- **Auto-close condition:** Force-close all open positions a configurable number of minutes before market close (default: 15 minutes)

5. Notifications & Overrides

Purpose: Provide real-time communication and full user control over bot operations.

- **Control Features:**
 - **Pause/Resume Mode:** Temporarily suspend and later resume all automated trading activity without needing to shut down the bot.
 - **Manual Trade Override:** Allow user to take over live trades manually at any point.

- **Kill Switch:** Global stop function to immediately terminate all bot operations and close positions if necessary.
 - **Mobile Access (Optional):** If feasible without significant additional development effort, allow user to pause, resume, and kill the bot via a secure mobile interface or web dashboard.
 - **Alerts:** Real-time alerts via email and/or SMS for:
 - Entry
 - Exit
 - SL adjustments
 - Trade errors
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6. Backtesting Framework

Purpose: Validate strategy logic and performance under historical market conditions.

- Historical market data replay (1m, 5m, 15m)
 - Backtest logic:
 - Heiken Ashi reconstruction
 - Sector direction validation from ETF price history
 - Simulated option pricing using delta + price movement
 - Breakout detection and Stochastic confirmation
 - Metrics to analyze:
 - Win rate
 - Profit factor
 - Max drawdown
 - Optimal trailing method
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End of Technical Specification Document