

Project Overview: Advanced Adaptive Grid EA

This document outlines the development specifications for a sophisticated MQL4 Expert Advisor. The EA is designed to be a fully featured, institutional-grade trading tool employing an adaptive grid strategy with advanced risk management and user control.

Core Features

1. Advanced Risk Control:

- **Equity Protection:** Automatically closes all trades and halts trading if drawdown exceeds a user-defined percentage of the account balance.
- **Adaptive Lot Sizing:** Automatically calculates lot sizes based on account equity, a fixed value, or a risk percentage per trade.
- **ATR-Based Stop Loss:** Sets dynamic stop losses based on market volatility using the Average True Range (ATR) indicator.
- **Margin Limit:** Prevents new trades if the used margin percentage exceeds a specified limit.

2. Smarter Grid System:

- **Adaptive Grid Spacing:** Dynamically adjusts the distance between grid orders using ATR or Bollinger Bands, widening the grid in volatile markets and tightening it in calm markets.
- **Asymmetric Spacing:** Allows for different grid spacing for buy and sell trades.

3. Intelligent Exit Logic:

- **Partial Profit-Taking:** Closes a portion of a trade at a preliminary take profit level (TP1), letting the remainder run.
- **Equity-Based Trailing Basket:** Trails a stop loss for the entire basket of trades (buys or sells) based on the total floating profit, locking in gains as the basket becomes more profitable.

4. On-Chart Control & Transparency:

- **Quick Control Panel:** Interactive buttons on the chart to immediately close all buys, close all sells, close all trades, or pause/resume new trading.
- **Expanded Dashboard:** A comprehensive real-time display of account balance, equity, margin usage, floating P/L for buys and sells, current drawdown percentage, and EA status.

5. Dynamic Market Adaptability:

- **Dynamic Slippage Handling:** Automatically increases allowed slippage during periods of high volatility (e.g., news events) to ensure order execution.
- **News & Session Filters:** Avoids trading during high-impact news events (requires external URL) and outside of specified trading sessions.

6. Analysis & Optimization:

- **Detailed Trade Logs:** Exports a detailed CSV log of every trading decision (order open, close, modify), including the reason, for easy performance review and optimization.

Part 1: EA Settings (Global extern Variables)

These inputs provide full control over the EA's behavior.

- **General Settings**
 - MagicNumber: int - Unique identifier for the EA's trades.
 - TradeComment: string - Custom comment for trades.
- **Risk Management**
 - LotSizing_Mode: enum - (EQUITY_BASED, FIXED_LOT, RISK_PERCENT)
 - Equity_Per_Lot: double - (e.g., 10000) Dollars of equity per 1.0 lot.
 - Lot_Size: double - Lot size to use(fixed,Equity percentage)
 - Risk_Percent_Per_Trade: double - Risk % of balance for SL calculation if mode is RISK_PERCENT.
 - Max_Drawdown_Percent: double - The drawdown % of balance at which to close all trades and stop.
 - Stop_Trading_After_DD: bool - If true, the EA will not trade again after hitting the max drawdown.
 - Max_Margin_Usage_Percent: double - Maximum allowed margin level % before new trades are blocked.
 - ATR_SL_Period: int - Period for the ATR indicator for stop loss calculation.
 - ATR_SL_Multiplier: double - Multiplier for the ATR value to set the stop loss distance.
- **Grid Strategy**
 - Grid_Spacing_Mode: enum - (ATR_BASED, BOLLINGER_BANDS, FIXED_POINTS)
 - Grid_ATR_Period: int - Period for the ATR indicator for grid spacing.
 - Grid_ATR_Multiplier_Buy: double - Multiplier for ATR to determine buy grid spacing.
 - Grid_ATR_Multiplier_Sell: double - Multiplier for ATR to determine sell grid spacing.
 - Grid_Fixed_Points: int - Grid spacing in points if mode is FIXED_POINTS.
- **Exit Strategy**
 - Enable_Partial_Close: bool - Master switch for partial closing.
 - Partial_Close_TP1_Points: int - Profit in points to trigger the first partial close.
 - Partial_Close_Percent: double - Percentage of the trade to close at TP1 (e.g., 50.0).
 - Enable_Equity_Trail: bool - Master switch for basket equity trailing.
 - Equity_Trail_Start_Profit: double - Amount of profit in account currency to activate the trail.
 - Equity_Trail_Distance: double - Amount of profit to give back before the trail stops out the basket.
- **Filters & Slippage**
 - Enable_Session_Filter: bool - Enable trading only during specific hours.
 - Session_Start_Hour, Session_End_Hour: int - Trading session hours (server time).
 - Base_Slippage: int - Normal slippage in points.
 - Volatility_Slippage_Multiplier: double - Multiplier for slippage during high volatility.
 - Volatility_ATR_Threshold: double - ATR value (as % of price) to trigger higher slippage.
- **Logging & Dashboard**

- `Enable_CSV_Log`: bool - Enable writing detailed logs to a CSV file.
- `CSV_Log_Filename`: string - Filename for the log.

Part 2: Program Structure

- **OnInit():** Initializes the EA. Creates the on-chart dashboard and control panel buttons. Opens the CSV file for logging if enabled.
- **OnDeinit():** Cleans up resources. Deletes all chart objects and closes the CSV file.
- **OnTick():** The main execution loop. The logic must be ordered carefully:
 1. Check if trading is globally stopped.
 2. Check for and handle any button clicks from the control panel.
 3. Run all safety checks: Max Drawdown, Margin Limit, Session Filter.
 4. Run all exit logic for existing trades: Equity Trailing, Partial Closing.
 5. Run all management for existing trades: Apply ATR-based Stop Losses.
 6. Run logic for placing new grid orders if conditions are met.
 7. Update the on-chart dashboard with the latest information.
- **OnChartEvent(...):** Handles user interaction with the on-chart control panel buttons.

Part 3: Helper Function Implementation

This EA will be composed of many specialized functions to keep the code clean and manageable.

- **Risk & Lot Size Functions:** `CheckMaxDrawdown()`, `CalculateLotSize()`, `IsMarginLevelOK()`.
- **Grid & Order Placement Functions:** `CalculateGridSpacing()`, `PlaceNewGridOrders()`.
- **Trade Management Functions:** `ManageOpenTrades()`, `ApplyATRStopLossToAll()`, `HandlePartialClosing()`, `HandleEquityTrailing()`.
- **Filter Functions:** `IsInTradingSession()`.
- **Dashboard & Control Functions:** `CreateDashboard()`, `UpdateDashboard()`, `CreateControlPanel()`, `HandleButtonClicks()`.
- **Logging Functions:** `InitializeCSVLog()`, `LogTradeAction(...)`.
- **Utility Functions:** `CloseAllByDirection(...)`, `GetBasketProfit(...)`, `GetCurrentDrawdownPercent()`.