

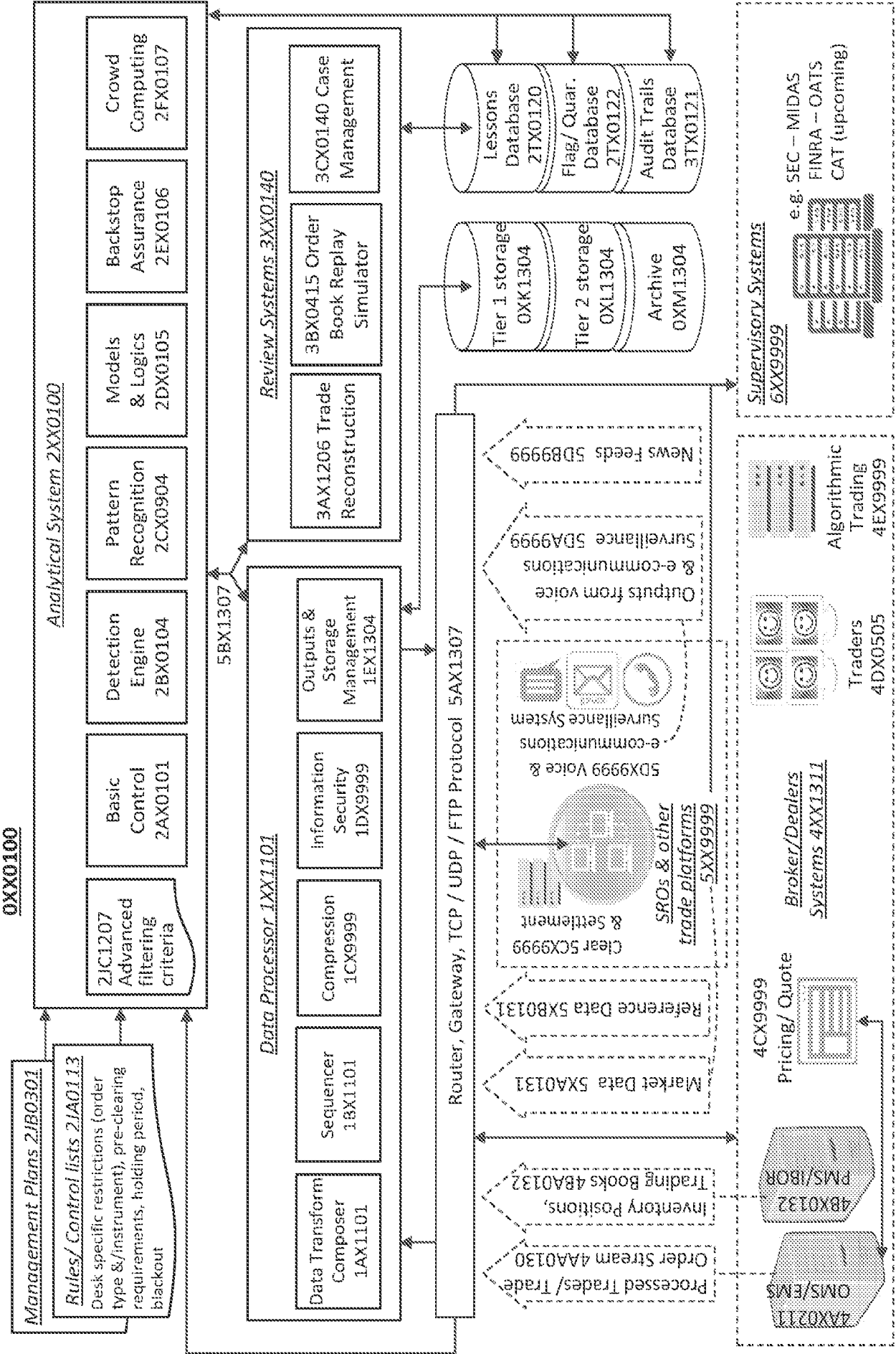


FIG. 1

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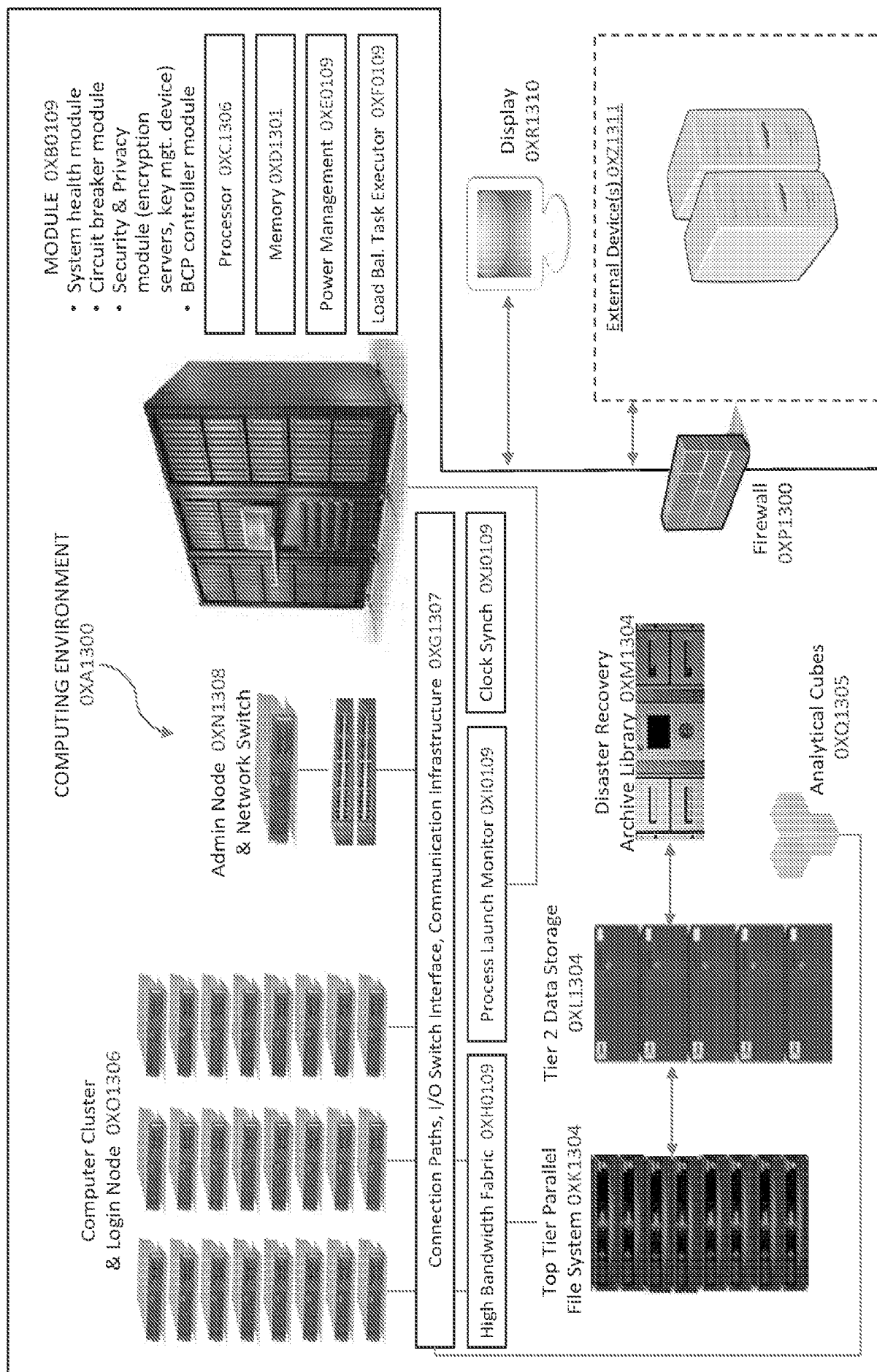
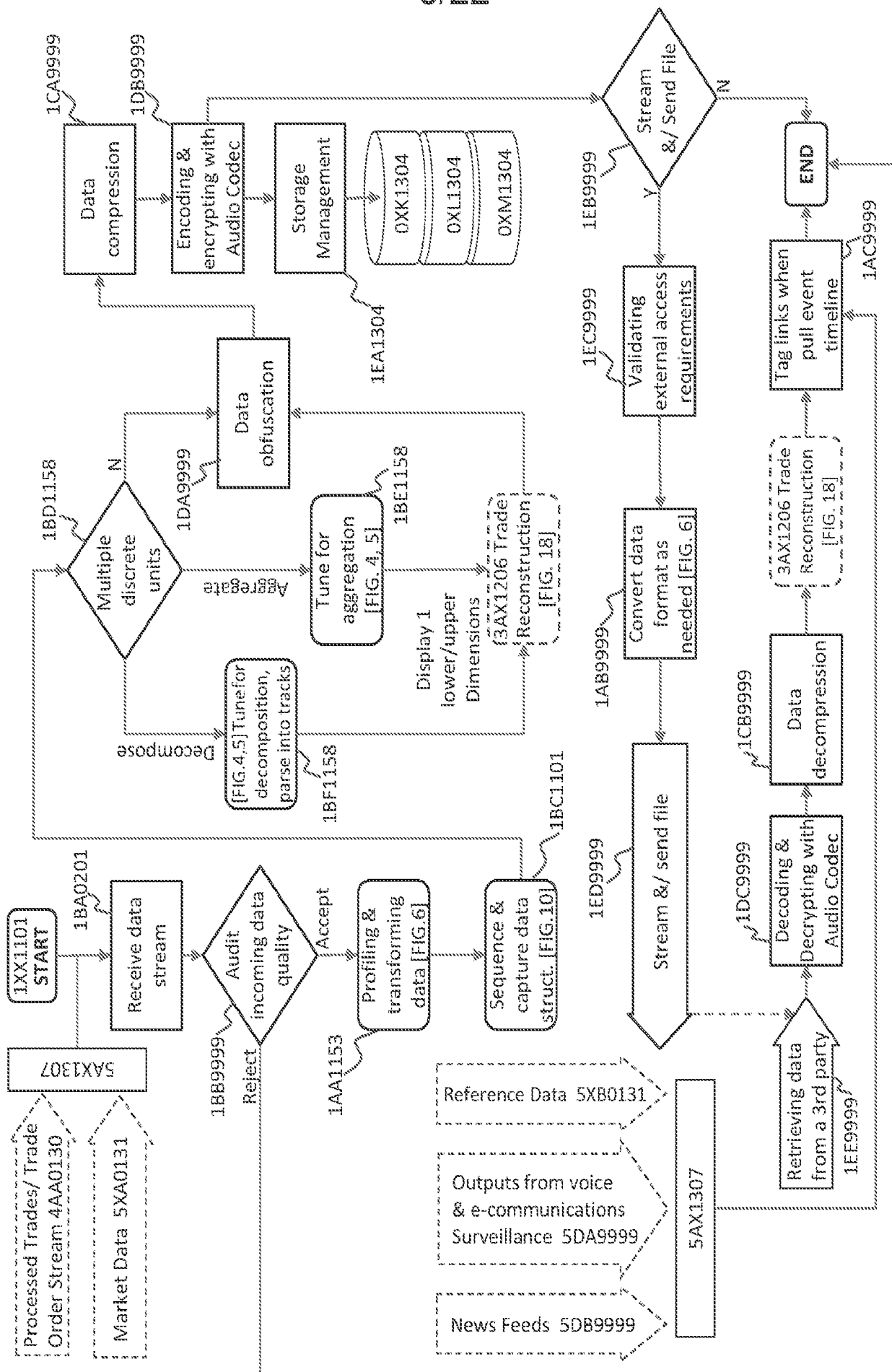


FIG. 2



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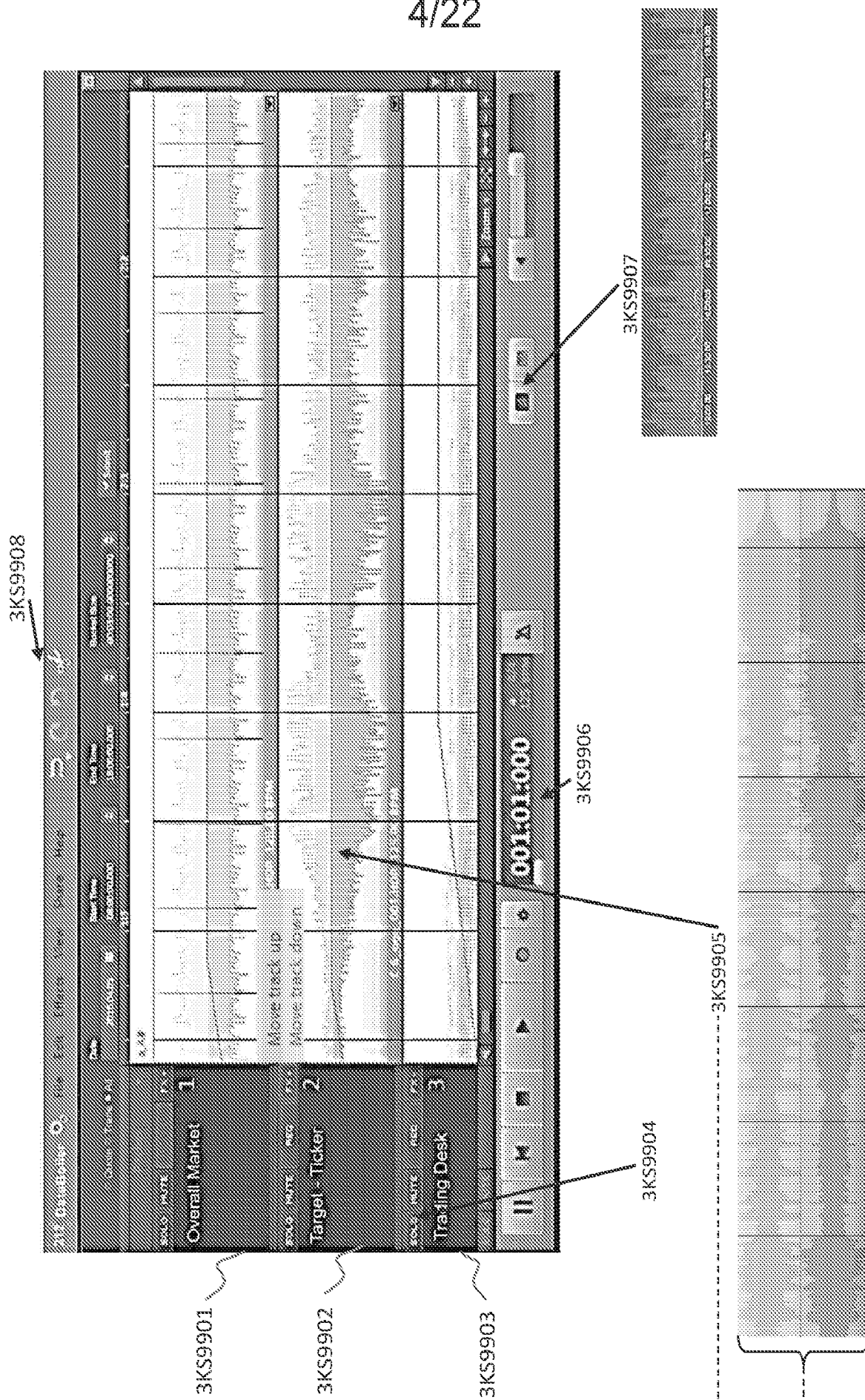
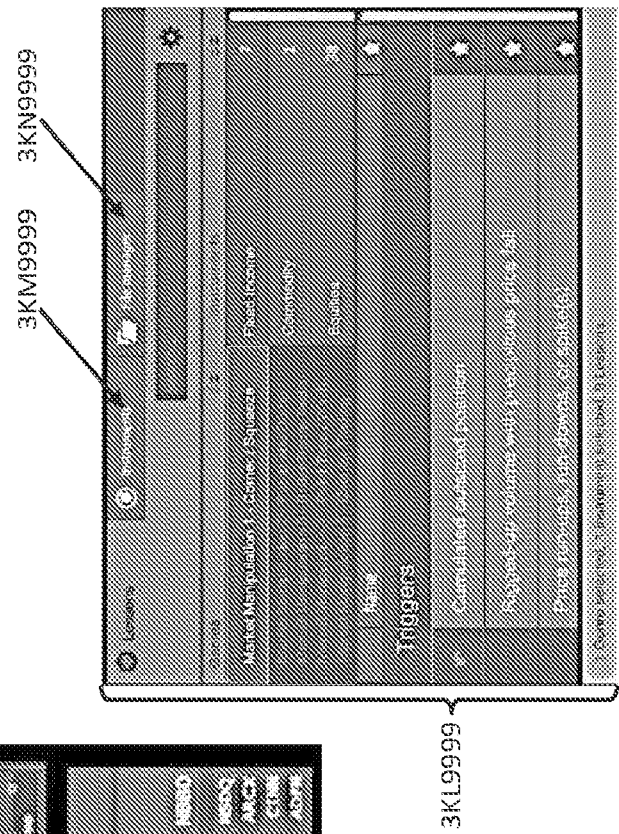
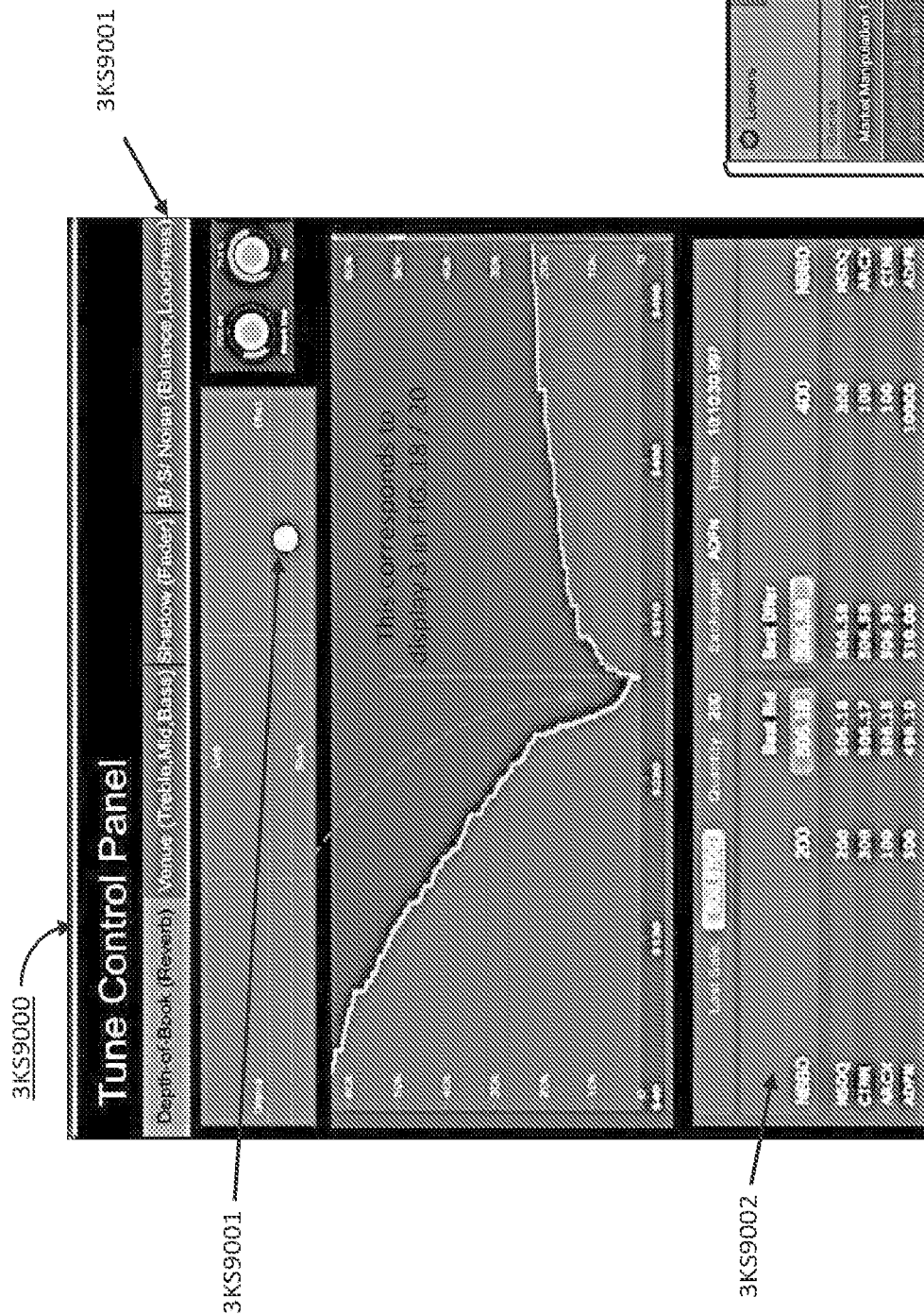


FIG. 4

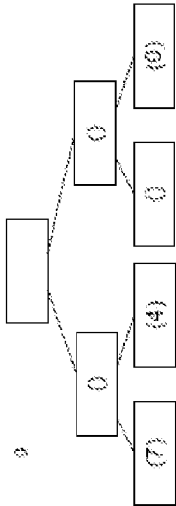
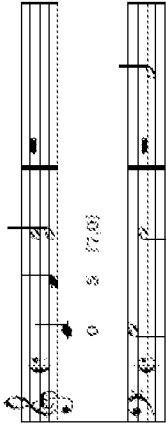
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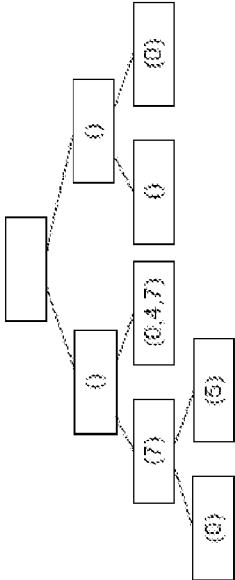
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1BX1154

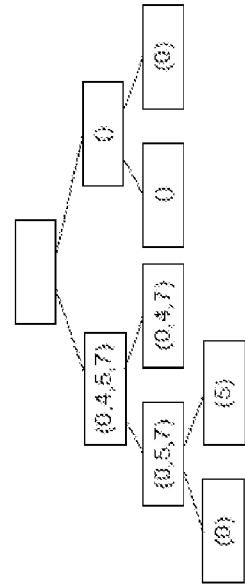


1BX1156 Bottom Voice Representation

1BX1155 Top Voice Representation

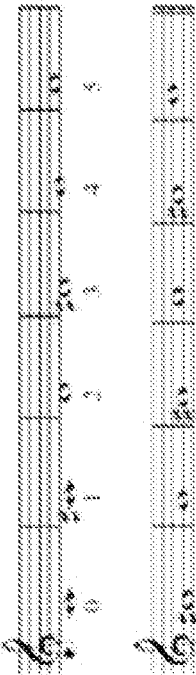


1BX1157 Top and Bottom Voice Representation



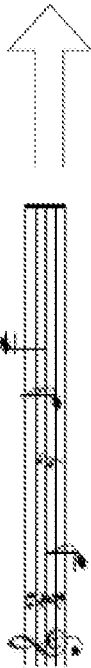
1BX1158 Top and Bottom Voice Representation with Propagation

1AX1150

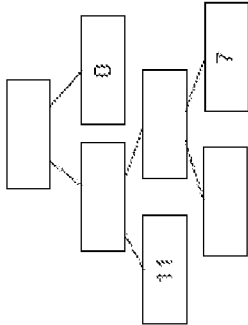


1AX1151

Pitch Class	Tonal Counterparts
0	C (also B $\sharp$, D $\flat$)
1	C $\sharp$, D $\flat$ (also B $\sharp$)
2	D (also C $\sharp$, E $\flat$)
3	D $\sharp$, E $\flat$ (also F $\flat$)
4	E (also D $\sharp$, F $\flat$)
5	F (also E $\sharp$, G $\flat$)
6	F $\sharp$, G $\flat$ (also E $\sharp$)
7	G (also F $\sharp$, A $\flat$)
8	G $\sharp$, A $\flat$
9	A (also G $\sharp$, B $\flat$)
10, f or A	A $\sharp$, B $\flat$ (also C $\flat$)
11, e or B	B (also A $\sharp$, C $\flat$)



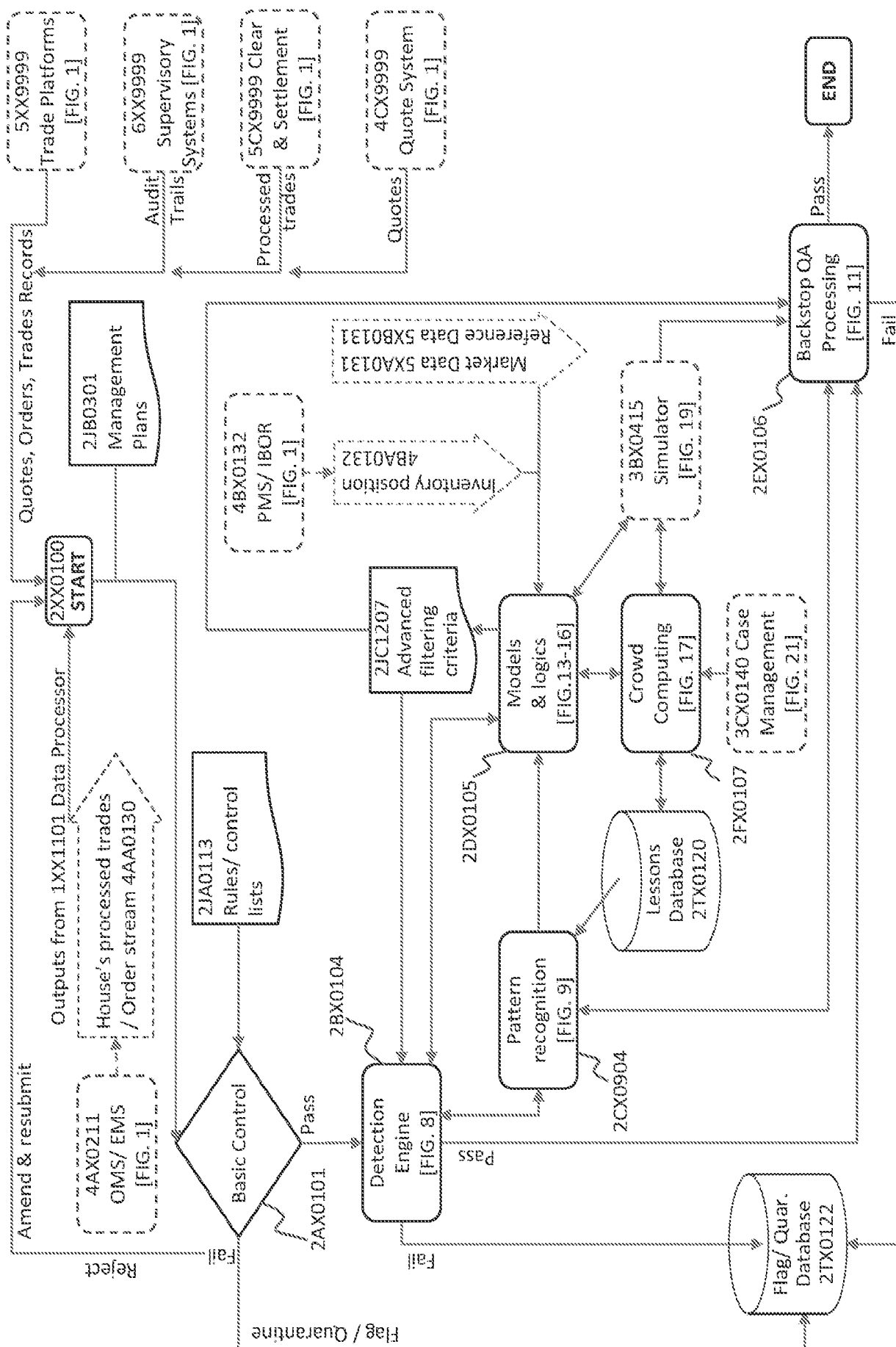
1AX1152



1AX1153

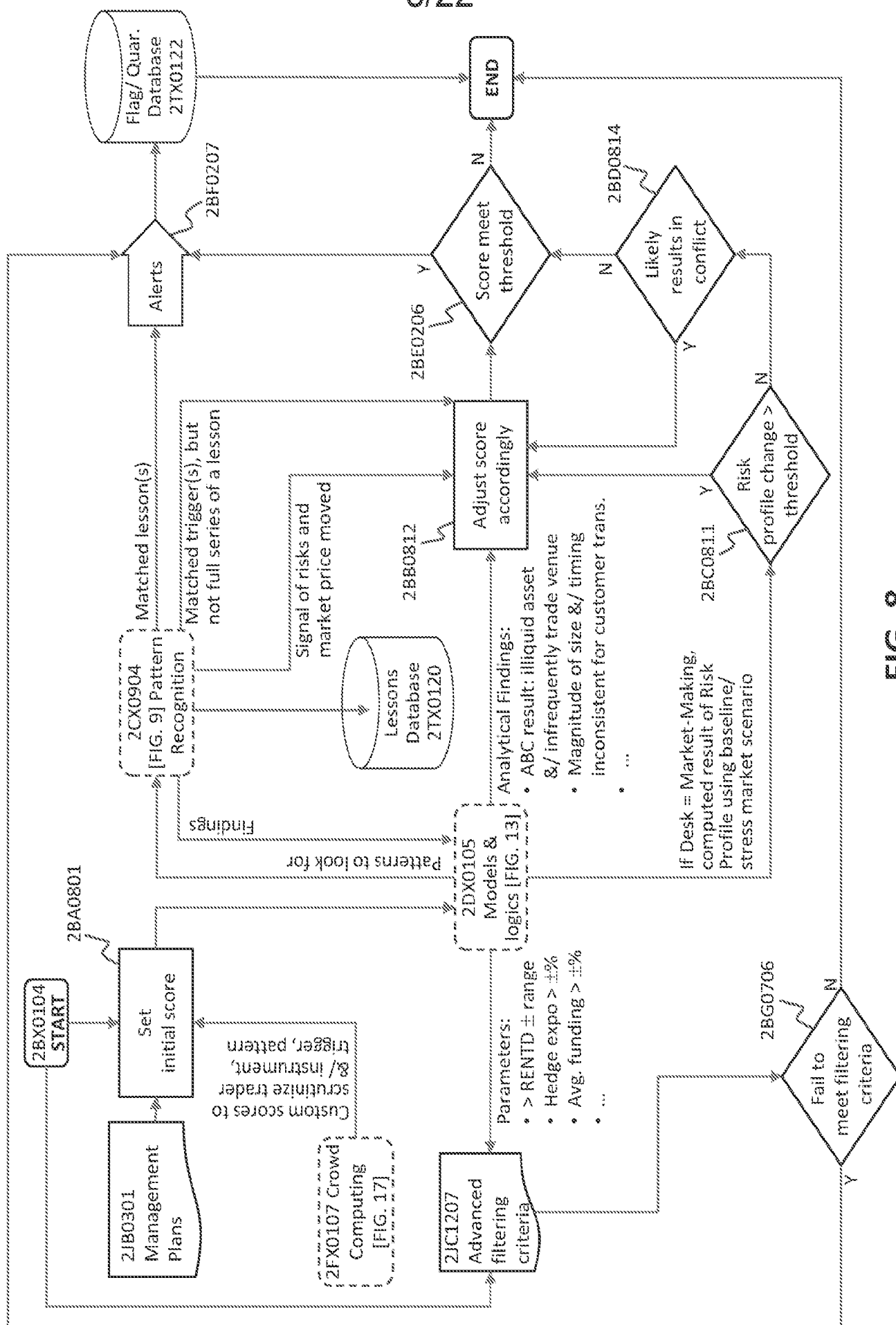
FIG. 6

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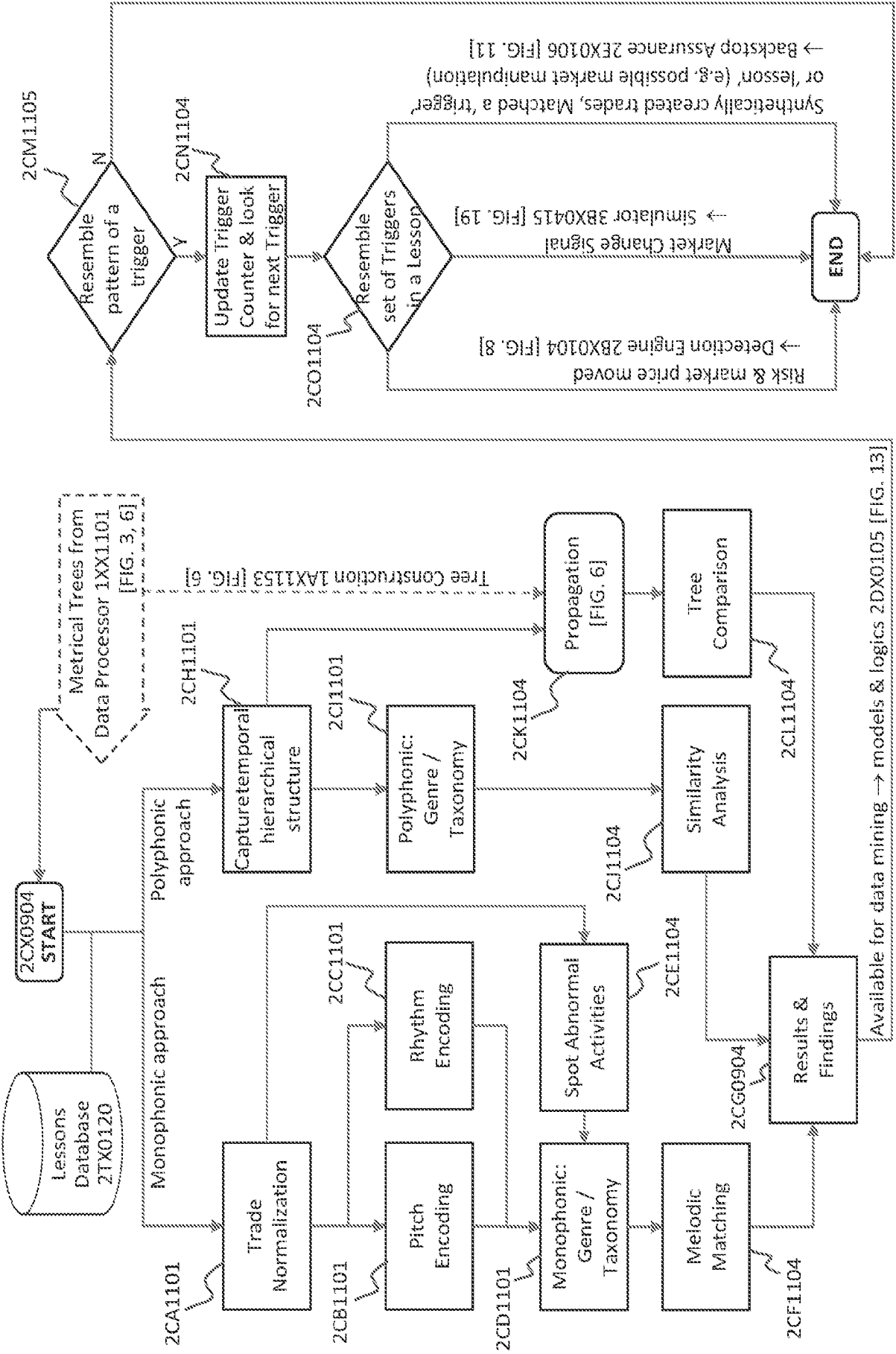


FIG. 9

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Table 1

	Manipulation	Pattern	Flag / Quarantine & / skew scores
(i)	Corner/ squeeze	jbeno	Stop trades that will impair clients with squeezed prices
(ii)	Pump and dump scheme	bcine	Stop heavy sell orders
(iii)	Boiler room tactics	lim bcne	Stop further sales of poor perform asset to retail
(iv)	Paint the tape/ wash trade	fbd	Stop further sales of poor perform asset to retail
(v)	Circular trading/ primary dealer scheme	ghica	Stop trades that will impair clients with discriminated prices
(vi)	Forced liquidity scheme	kjunot	Stop strong buy orders
(vii)	Stock bashing/ reverse corner/squeeze	kpcq	Stop strong buy orders
(viii)	Manipulate price to prevent margin call	arce	Stop the related call option / synthetic call order
(ix)	Spoofing/ layering/ stuff quote	vuce	Stop further cancel/amend activities
(x)	Marking the close	fgdc	Stop trades that will destabilize price
(xi)	Manipulated trade spikes	scuv	Stop quick reverse direction trades

FIG. 10

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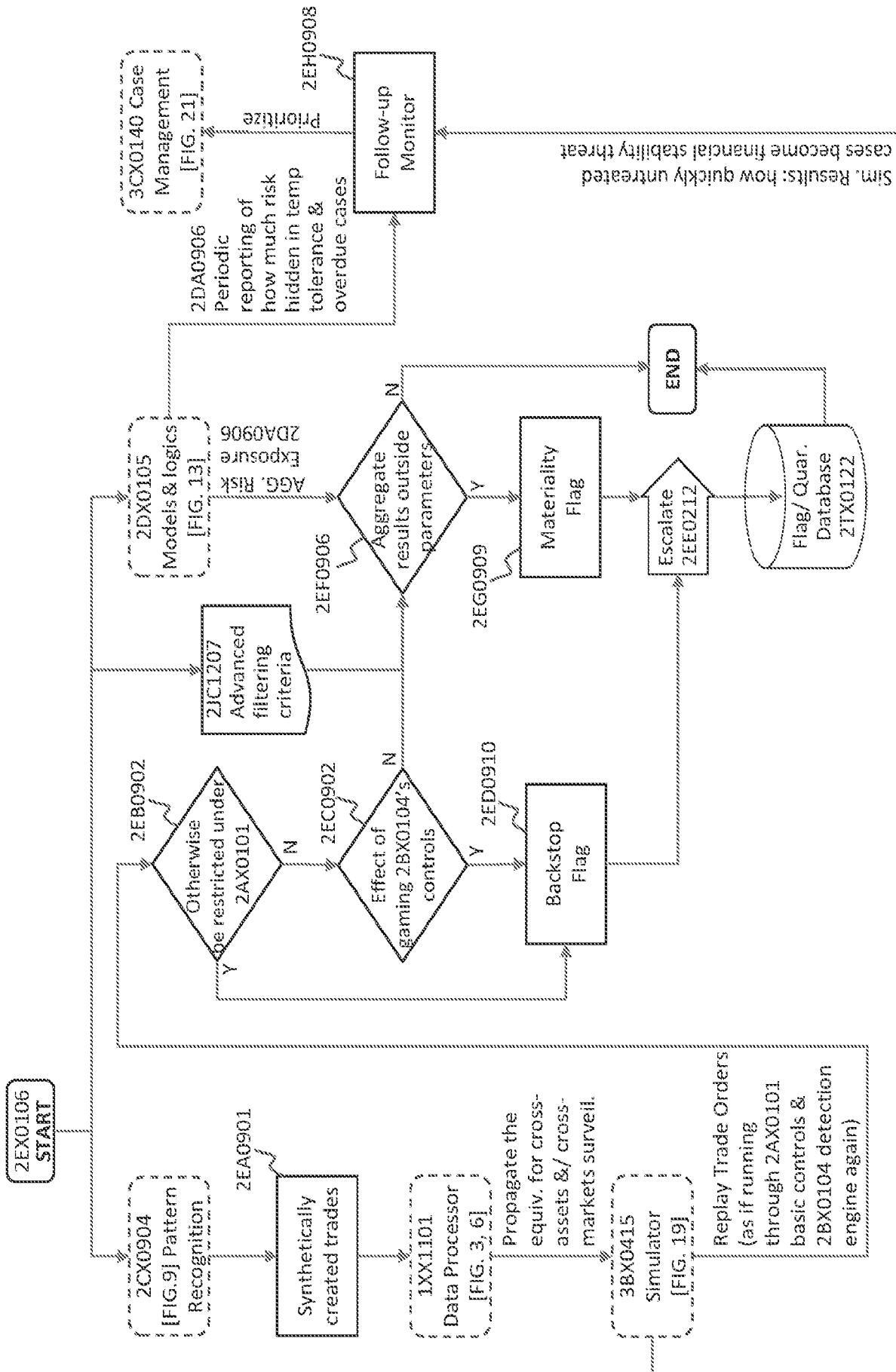


FIG. 11

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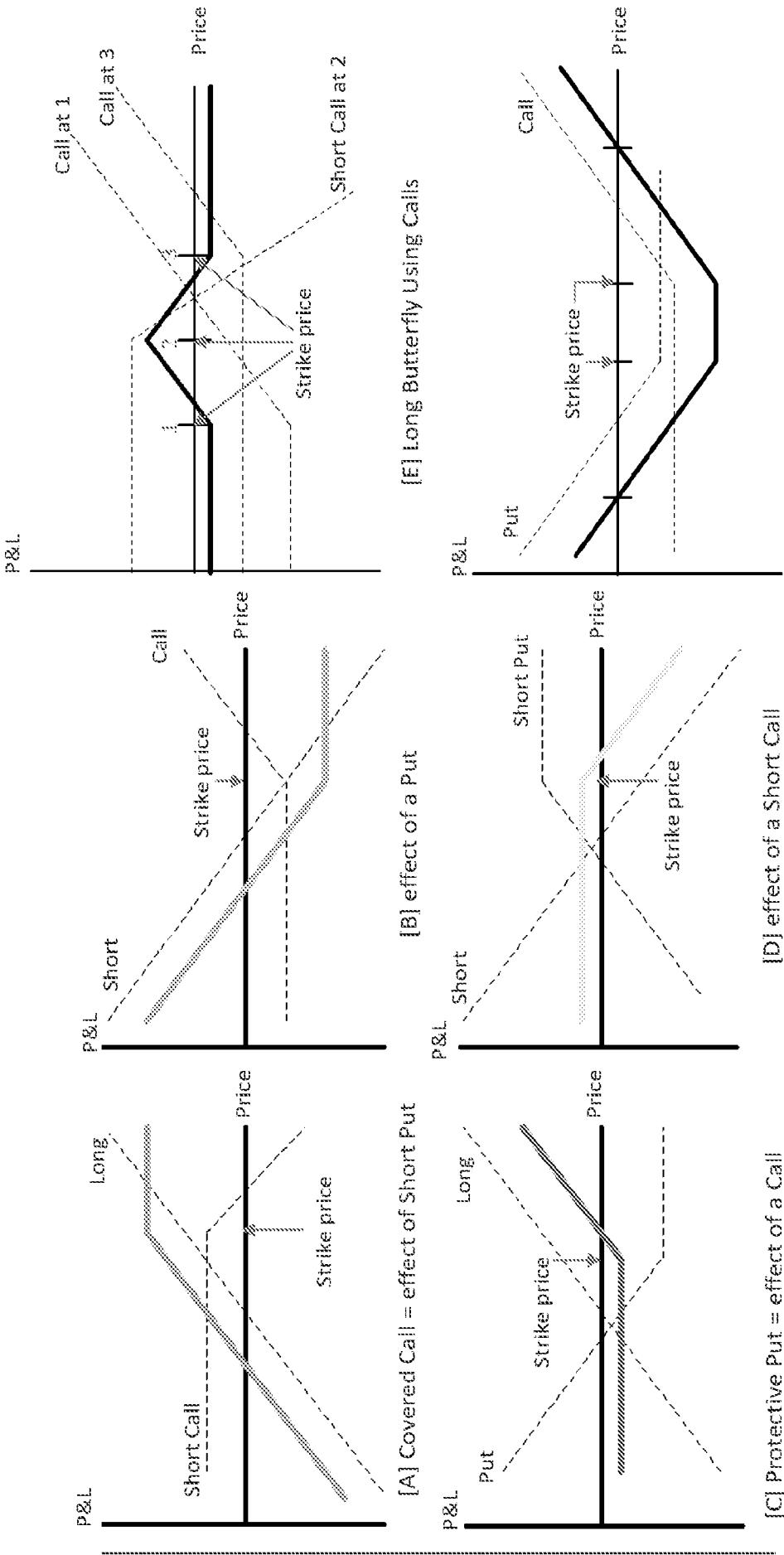


FIG. 12

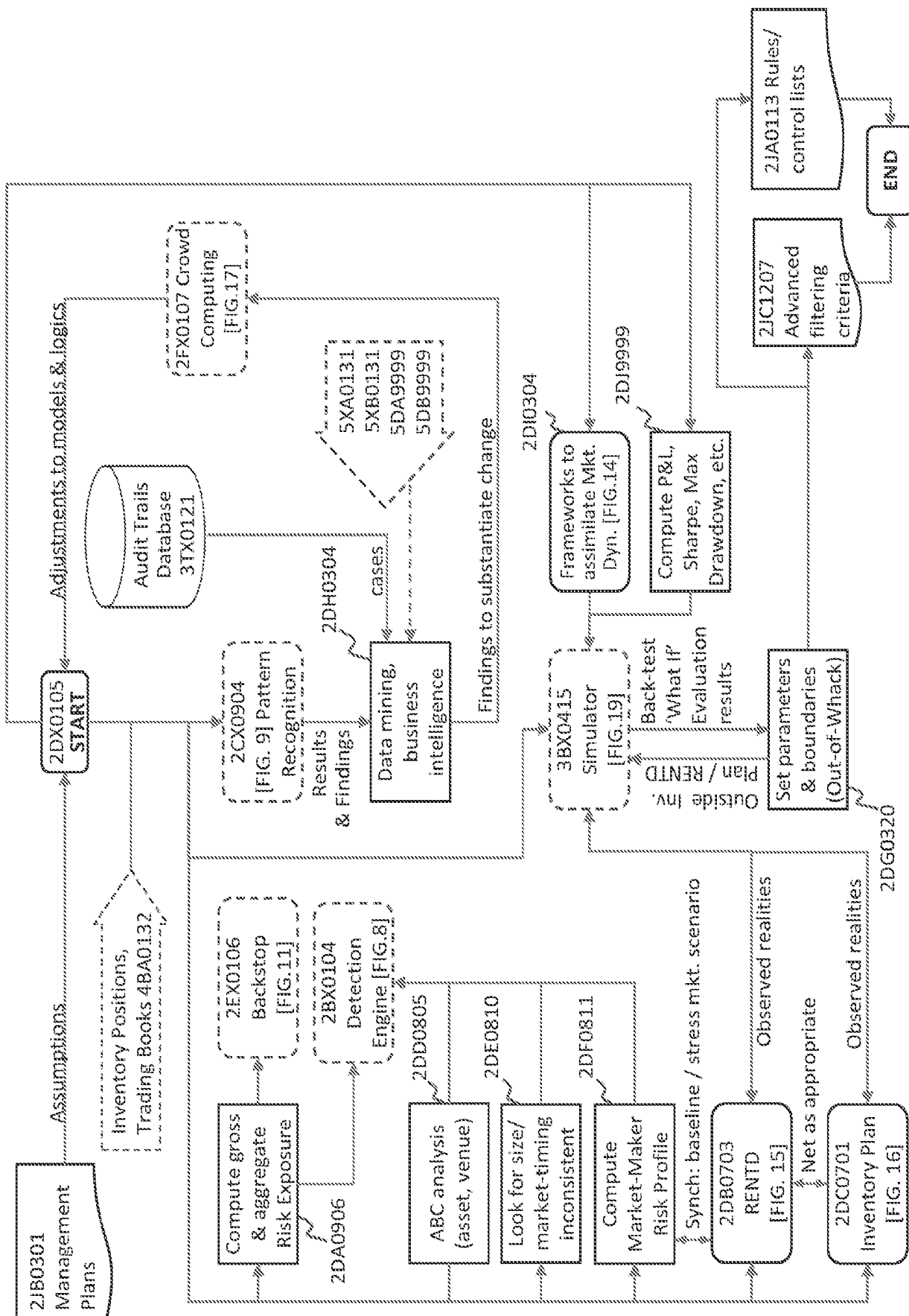


FIG. 13

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<u>Frameworks & Algorithms</u>			
	Market	Clients/ Counterparties	Instruments
Risk	Market depth, Sharpe ratio, imbalance, stress/ baseline scenarios per CCAR/ DFAST/ COREP/ FINREP (e.g. shock on derivatives, significant price decline/ increase in risk premia), flash crash & other events	Likely results in conflict; how much, how quickly, & life of hedges; observed variance on non-informed (noise) traders' inventory & number of core market-makers to gauge price fairness & best execution timing; changes in market-maker's risk profile, etc.	Likely results in risk & price move; materiality, concentration; observed variance on asset payoff; likely losses from non-marketable collaterals; delta hedge of non-linear positions with linear instruments, etc.
Liquidity	Duration gap, portfolio immunization, liquidity coverage, opportunity costs (refinancing), etc.	Client's/own funding stability; initial/ variable margins; end-of-date repo, concentration, > threshold % of capital, etc.	Cross-markets/ venues liquidity sourcing, foreign exposure; contingent liquidity premia, etc.
Inventory	Maker-taker model, trade-through, price/ time/ size priorities; statistical arbitrage vs market making & other roles played in market; meaningful quote vs demand toxicity, etc.	Consistent timing & order size to route/ execute clients' trades; channel strategy/ appetite that maximize P&L and product availability; individual counterparty exposure > threshold; related party trans. > threshold, etc.	ABC analysis (fast/slow); Supply/ demand reliability & elasticity; agent-based model, migration analysis, transaction cost analyzer, net exposure on particular asset class &/ instrument > threshold, etc.

FIG. 14

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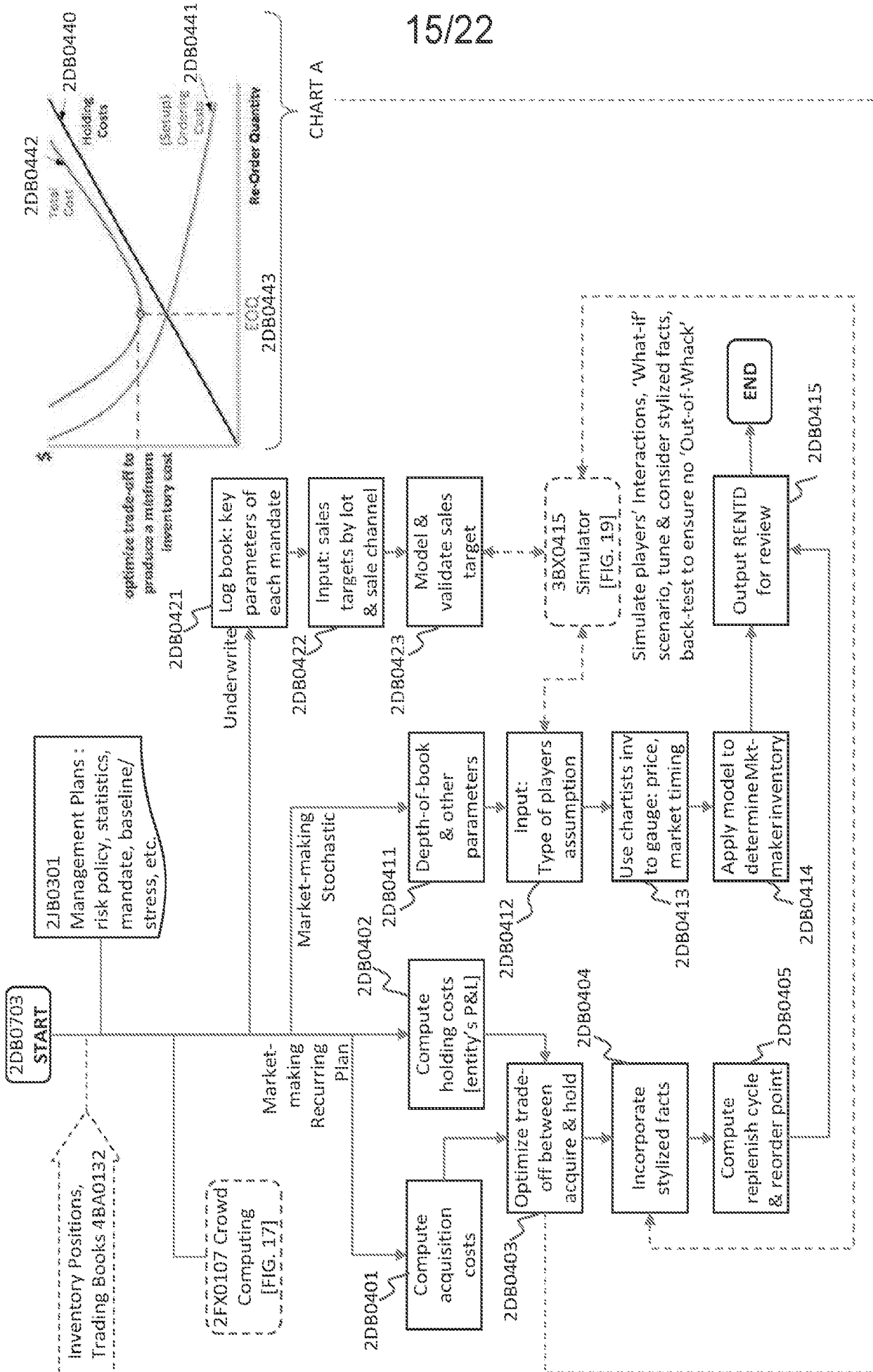


FIG. 15

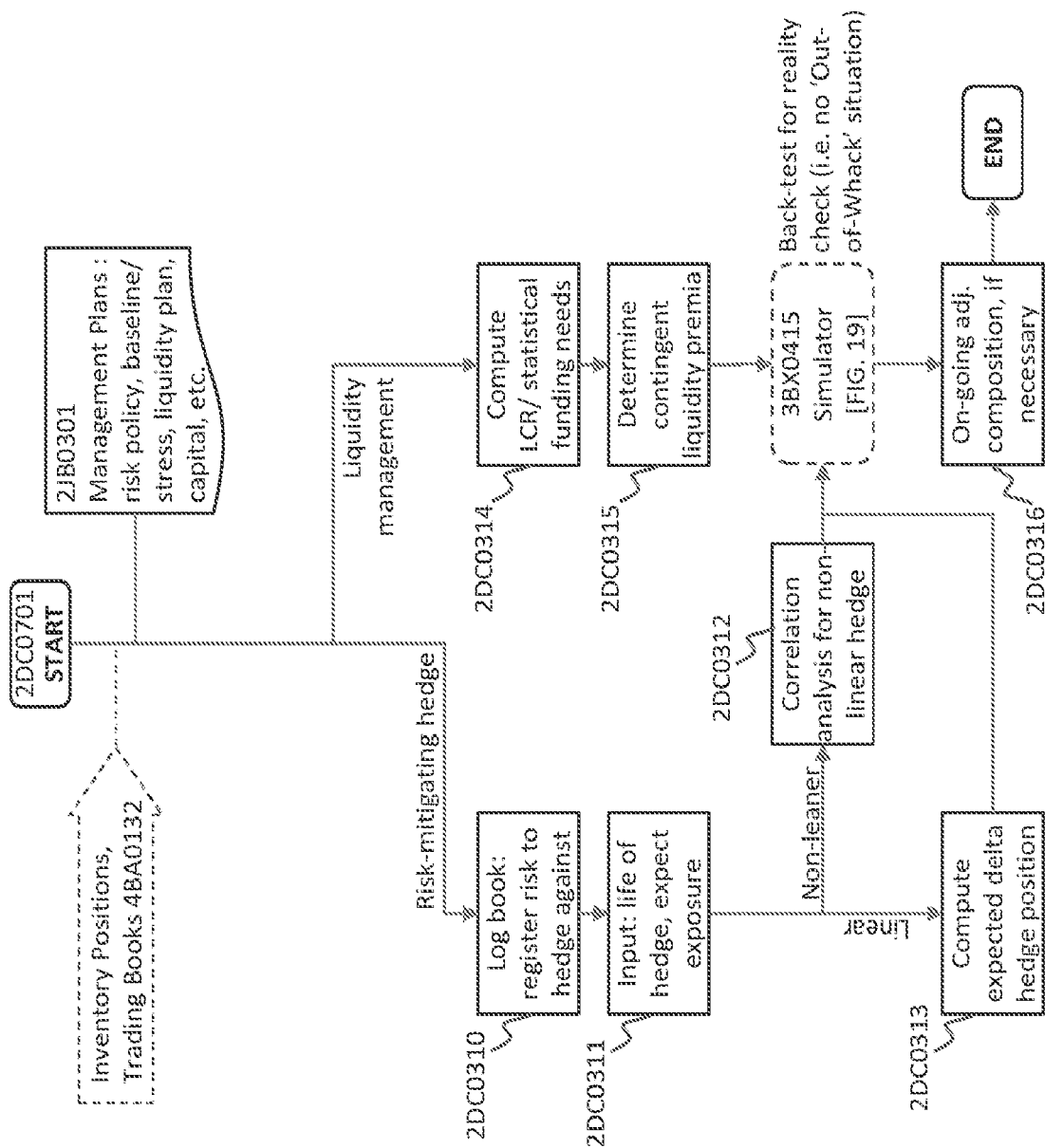
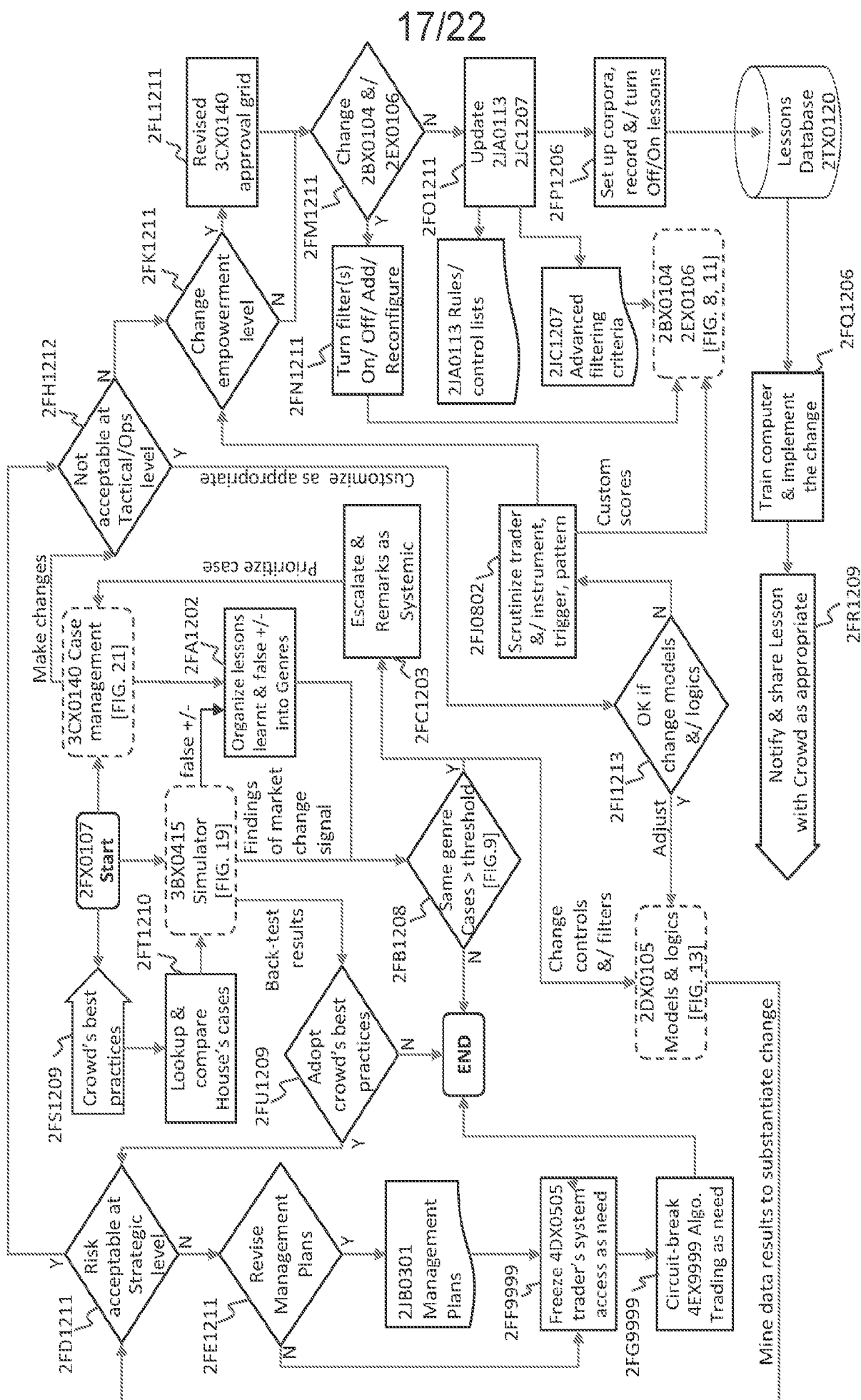


FIG. 16



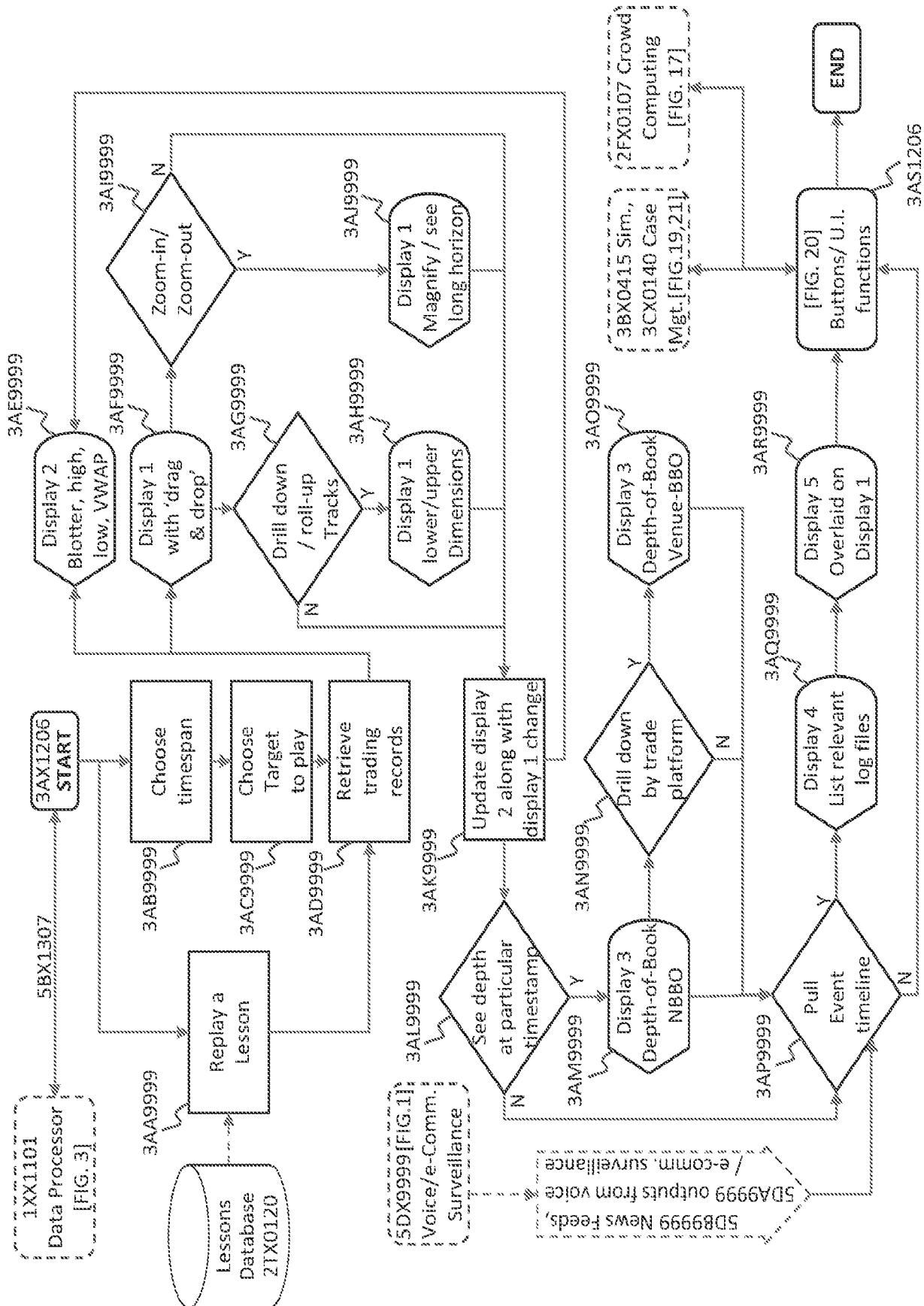
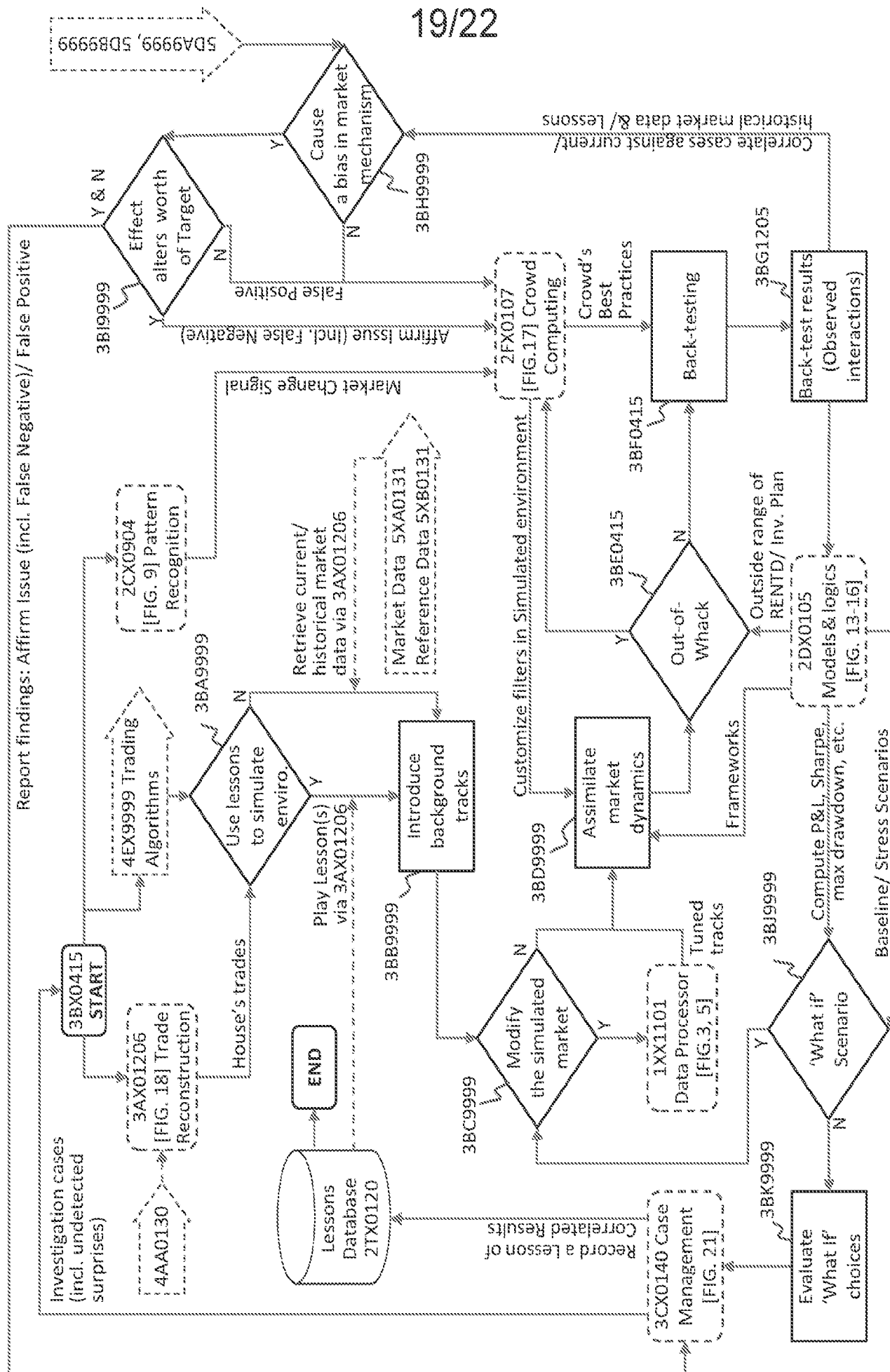


FIG. 18



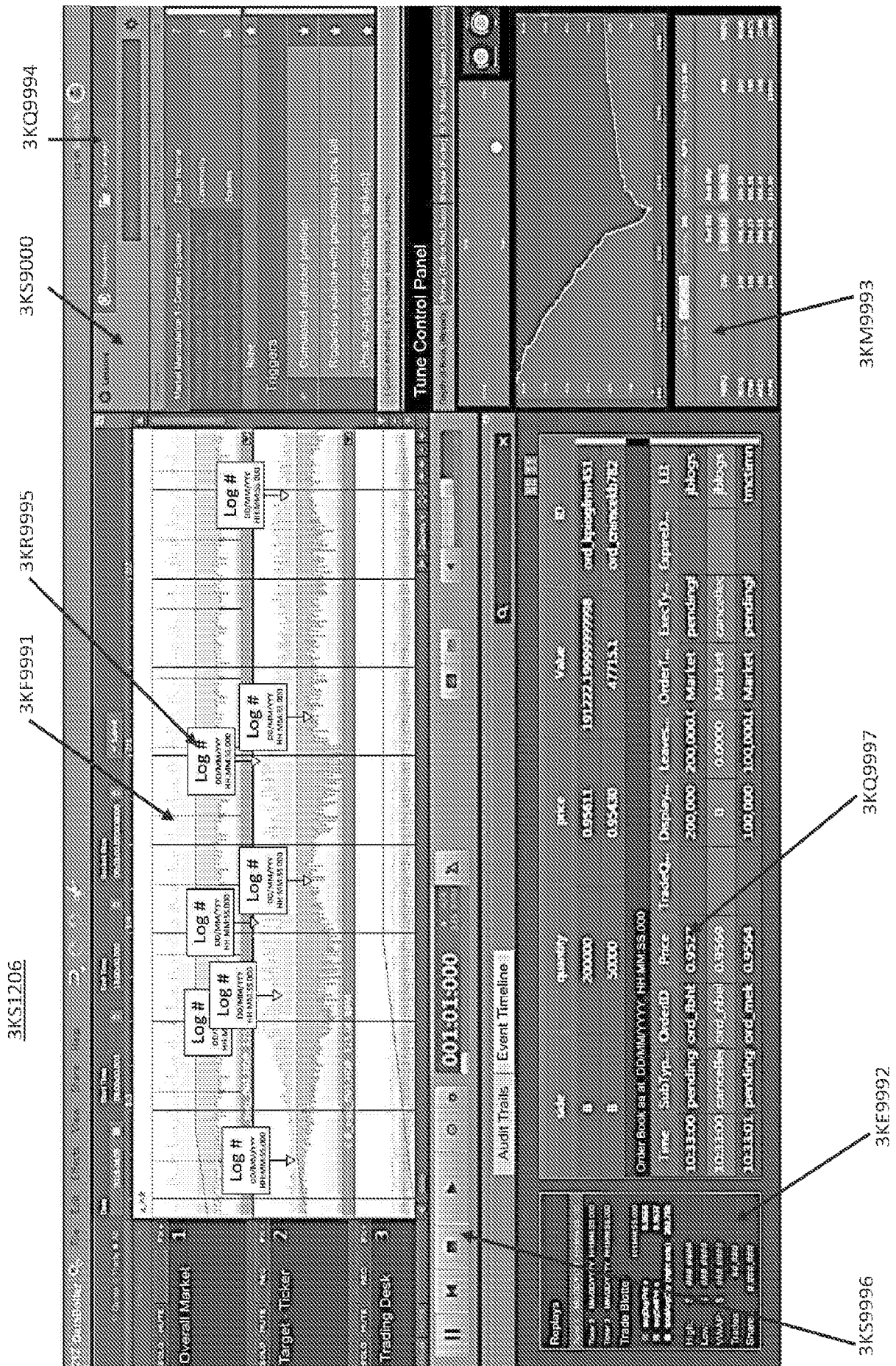
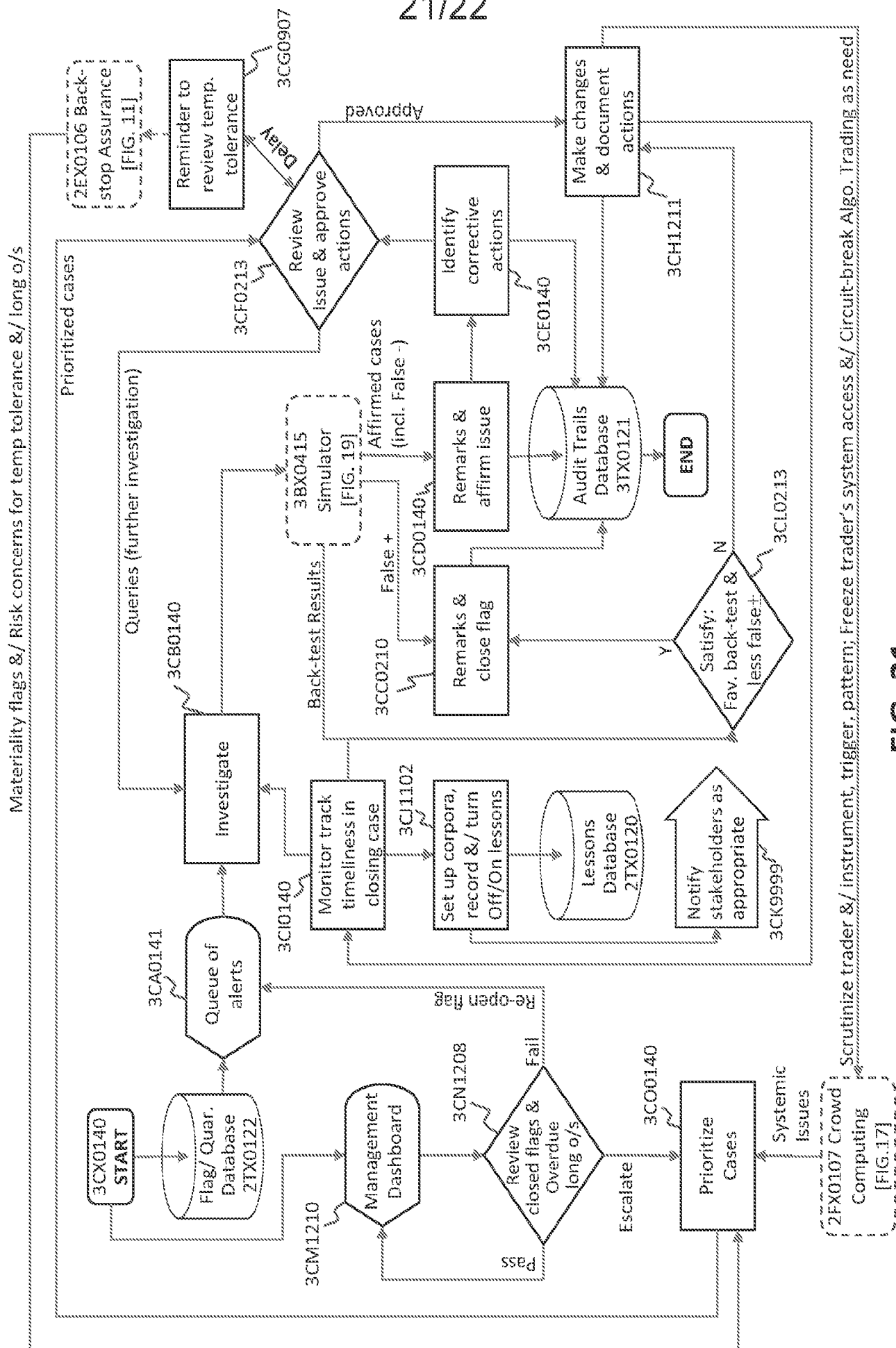


FIG. 20



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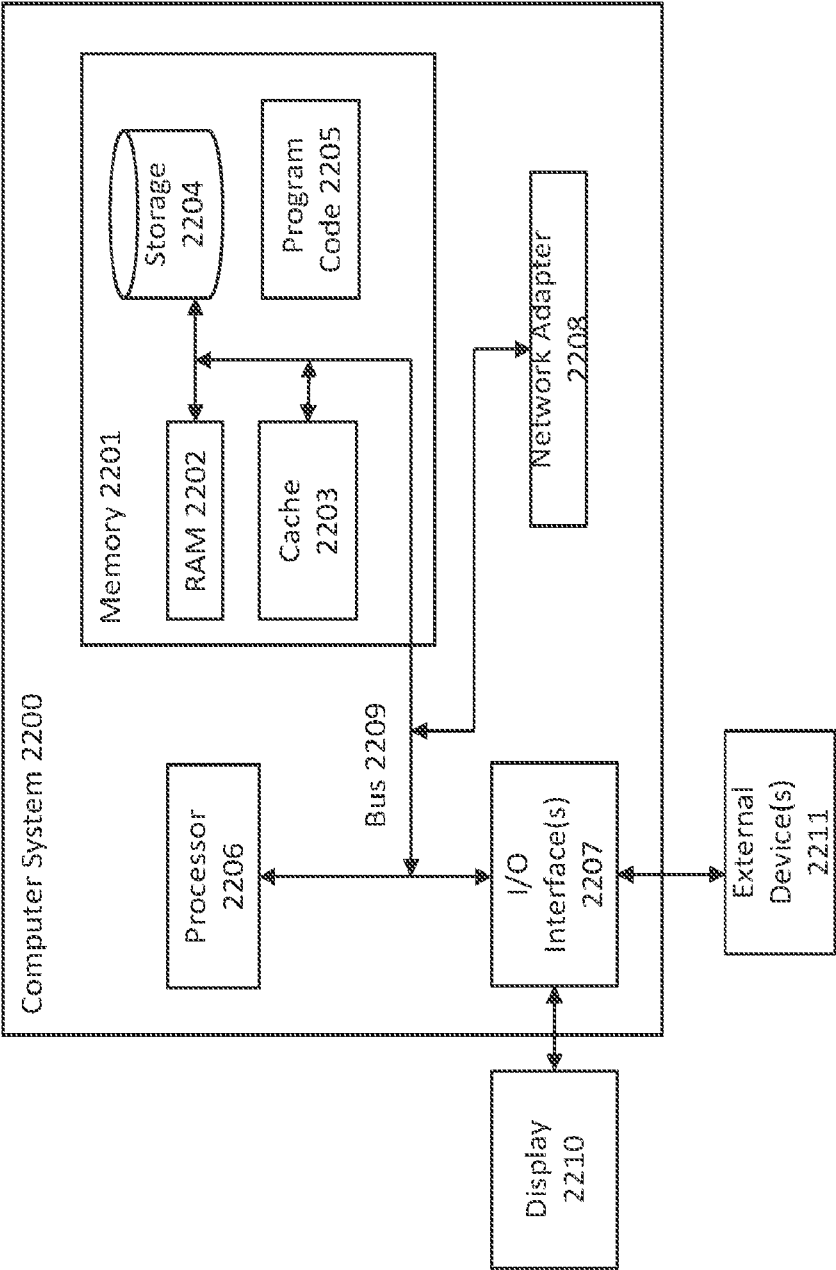


FIG. 22