Goldman Sachs Electronic Trading
FIX Specification
Equities North America

November 2009

Confidential

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Notes on General Requirements

1. **Default Values** – Default values are specified in this document. These values are supplied by the algorithmic engine and are not required to be sent by OMS vendors. **Vendors should display the Init Values as defined in the specification.**

2. **FIX Versions** – This specification includes tags from versions 4.0 through 4.4. Vendors or clients who cannot support some tags are encouraged to contact the GSET FIX team to arrange alternative tag numbers.

3. **Order Amendment and Cancel/Replace** – Algorithmic parameters can be cancel/replaced with some exceptions. Consult with your GS representative for details.

4. **Order Entry Time Restrictions** - Algorithmic orders are worked during each exchange's standard hours of continuous operation. Orders may be entered prior to the markets' open times. Orders entered after the exchange's trading hours will be rejected. DMA orders can be traded during pre and post market sessions provided the OMS can support the tags needed to specify that on the order.

   Note: All time-related parameter values must be expressed in the GMT time zone, UTC format.

5. **Order Size Restrictions** – the Goldman Sachs FIX network enforces maximum order size restrictions on a per-client basis to help prevent erroneous orders. Orders which exceed the maximum size will be rejected.

6. **Parameter Details and Reuse of FIX Tags** – Detailed descriptions of the parameters are included in this document. Multiple parameter names may be mapped to a single custom FIX tag, but never within the same algorithm.

7. **Rejects** – Invalid orders will be rejected with a FIX Execution message (Tag 35=8) with order status of Rejected (Tag 39=8)

8. **Required and Default Values** – Most parameters are either optional or have the algorithm-supplied defaults shown in the FIX specification. Fields labeled as (Required) in the algorithm specification must be sent in the FIX order message. Note that text values are case sensitive.

9. **Short Sale Locates** – Shares must be "Located" to borrow for short sale orders in U.S. stocks. Goldman Sachs will perform the Locate automatically on behalf of GSET clients. If the client has done a Locate prior to sending the order, Tag 114 "Locate Required" can be set to "N" and Tag **5700 or 8025** should contain the "MPID" (Market Participant ID) of the broker where the stock was located.

10. **Storing Algorithm Parameter Values** – It is recommended that vendors store the algorithm name and other parameter values selected for each order sent to GSET so that traders can see these values on the GUI when orders are re-displayed. Retention of the algorithm parameters is also necessary for order amendments.

11. **Tags Required on GSET**
    - **Currency**: Tag 15. All orders should contain the ISO currency code for the primary market of the security.
    - **Product Symbols**:
      - **US Products**:
        - Tag 55 = Ticker symbol (preferred)
        - **OR** Tag 22 = 5 (RIC)
        - Tag 48 = RIC ID
      - **Canadian, European or Asian Products**: Tag 22 and Tag 48.
        - Valid values for Tag 22 are:
        - 5 = RIC (preferred for Canadian orders)
        - Tag 48 = Security ID.
    - **DeliverToLocationID**: Tag 145 Location (US, Canada, Europe, Asia)
      - The value for Tag 145 should be set accordingly:
        - US = 1 GSET (Goldman Sachs Execution and Clearing Broker-Dealer – U.S. markets)
        - Canada = 22 and **11007=3*

- **Side**: Tag 54
  - Valid values for Tag 54 are:
    - 1 = Buy
    - 2 = Sell
    - 5 = Sell Short
    - 6 = Sell Short Exempt
- **Quantity**:
  - Tag 38 = number of shares

- **Exchange Destination:**
  - All orders should be sent with a Tag100 value in accordance with the destination of the order. There destinations for US GSET orders are; algorithms, Sigma/Stealth/SOR (smart router) and SIGMAX/XCROSS (crossing engine). The tag 100 values for each are:
    - Algorithms=**6**
    - SOR/SIGMA/STEALTH/DMA=**;**
    - SIGMAX/XCROSS=**47**

12. **Text Instructions** – GSET algorithms ignore anything sent in the Text field (Tag 58). Users should be warned if they attempt to enter instructions in this field.

13. **Unique Trader ID** – GSET prefers that all FIX connections supply a Trader ID on each order. This enables traders to receive execution metrics and alert messages for their individual orders.

- SenderSubID: Tag 50 = unique ID for each user at a given client.
  - Trader ID can also be sent in tags:115, 116 and 57

14. **Help Text and Tips** – Vendors are encouraged to provide a Help facility that displays GSET supplied explanations of the algorithms and parameters. The FIX specification contains Help Text for each parameter and a Help Tip, which is a shorter version, designed for tool tips type help.

15. **Algorithm Sequence in Drop Downs** – Please display the algorithm names in the following order on drop down menus so the most popular ones are easiest to find:

- **US**
  - 1CLICK, SONAR, SONARDARK, STEALTH, SIGMAX, PARTICIPATE, IS, VWAP, TWAP, NAVIGATOR, DSCALING, RSCALING, SOR, XCROSS, PORTX
- **Canada**
  - PARTICIPATE, IS, VWAP, TWAP, NAVIGATOR, DSCALING, RSCALING, SOR, PORTX

ALGORITHMS

1CLICK				Tag 8031=1CLICK *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
*Strategy**	8098	*1 (UltraPass)* *2 (Passive)* *3 (Neutral)* *4 (Aggressive)* *5 (SuperAggr)*	None	GUI Control: 5 item dropdown: • UltraPassive • Passive • Neutral • Aggressive • SuperAggr Init Value: Blank ***Required***

DSCALING				Tag 8031=DSCALING
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time cannot be later than End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time cannot be earlier than Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Execution View	8061	1 *(Reversion)* 2 *(Symmetrical)* 3 *(Breakout)* 4 *(Collar)*	1	GUI Control: 4 item dropdown Drop Down • Reversion • Symmetrical • Breakout • Collar Init Value: Reversion
Min % Vol	8047	1- 100	None	GUI Control: Spinner Init Value: Blank *Must be less than Max % Vol*
Start % Vol	849	1-100	None	GUI Control: Spinner Init Value: Blank *Must be between Min and Max % Vol*
Max % Vol	8046	1-100	None	GUI Control: Spinner Init Value: Blank *Must be greater than Min % Vol*

NAVIGATOR				Tag 8031=NAVIGATOR
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Style*	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	None	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral ***Style and Custom should be mutually exclusive.***
Custom	8098	1-10	Blank	GUI Control: 10 item dropdown: •1-10 Init Value: Blank

IS				Tag 8031=IS
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time cannot be later than End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time cannot be earlier than Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Volume Limit %	111	1-100	None	GUI Control: Percent Init Value: Blank
Would If Type	8083	0 *(None)* 7 *(Specify)* 4 *(Mid)* 2 *(Bid)* 3 *(Ask)* 1 *(Last)* 6 *(Market)* 8 *(Close)* 5 *(Passive)*	None	GUI Control: 9 item Drop Down • None • Specify • Mid • Bid • Ask • Last • Market • Close • Passive Init Value: Specify
Would If Price	8057	Price	Blank	GUI Control: Spinner Init Value: Blank
Complete	110	0,100	100 (checked)	GUI Control: Check Box Init Value: Checked

PARTICIPATE				Tag 8031=PARTICIPATE
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time* cannot be later than *End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time* cannot be earlier than *Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Participation Rate*	111	1-100	None	GUI Control: Spinner Init Value: Blank ***Required**
Would If Type	8083	0 *(None)* 7 *(Specify)* 4 *(Mid)* 2 *(Bid)* 3 *(Ask)* 1 *(Last)* 6 *(Market)* 8 *(Close)* 5 *(Passive)*	None	GUI Control: 9 item Drop Down • None • Specify • Mid • Bid • Ask • Last • Market • Close • Passive Init Value: Specify
Would If Price	8057	Price	Blank	GUI Control: Spinner Init Value: Blank

RSCALING				Tag 8031=RSCALING
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time* cannot be later than *End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time* cannot be earlier than *Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Execution View	8061	1 *(Reversion)* 2 *(Symmetrical)* 3 *(Breakout)*	1	GUI Control: Drop Down Init Value: Reversion
Min % Vol	8047	1-100	None	GUI Control: Percent Init Value: Blank *Must be less than Max % Vol*
Start % Vol	849	1-100	None	GUI Control: Percent Init Value: Blank *Must be between Min and Max % Vol*
Max % Vol	8046	1-100	None	GUI Control: Percent Init Value: Blank *Must be greater than Min % Vol*
Benchmark ID	8699	RIC Code	.SPX, if "Sector" is selected an appropriate sector index will be chosen automatically based upon the order symbol	GUI Control: Drop Down/Combo Init Value:.SPX (Dropdown list including the option to enter any symbol not in the list) All symbols must be valid RIC codes including a period as the first character. North America: S&P 500 .SPX; S&P 400 .MID; S&P 600 .SML; Russell 1000 .RUI; Russell 2000 .RUT; Russell 3000 .RUA; Nasdaq 100 .NDX; Dow Industrials .DJI; TSX 60 .SPTSE; Sector

STEALTH				Tag 8031=STEALTH Day and Limit Orders Only *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Order Classification	11007	1*(US)* 3*(Canada)*	None	**Not a GUI Parameter**
Execution Destination	100	;	None	**Not a GUI Parameter**

SONAR				Tag 8031=SONAR *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank Start Time cannot be later than End Time
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank End Time cannot be earlier than Start Time
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Volume Limit %	111	1-100	None	GUI Control: Spinner Init Value: Blank
Would If Type	8083	0 *(None)* 7 *(Specify)* 4 *(Mid)* 2 *(Bid)* 3 *(Ask)* 1 *(Last)* 6 *(Market)* 8 *(Close)* 5 *(Passive)*	None	GUI Control: 9 item Drop Down • None • Specify • Mid • Bid • Ask • Last • Market • Close • Passive Init Value: Specify
Would If Price	8057	Price	Blank	GUI Control: Spinner Init Value: Blank
Complete	110	0, 100	100	GUI Control: Checkbox Init Value: Checked

SONARDARK				Tag 8031=SONARDARK *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time cannot be later than End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time cannot be earlier than Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral

TWAP				Tag 8031=TWAP
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time cannot be later than End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time cannot be earlier than Start Time*
Volume Limit %	111	1-100	None	GUI Control: Spinner Init Value: Blank
Would If Type	8083	0 *(None)* 7 *(Specify)* 4 *(Mid)* 2 *(Bid)* 3 *(Ask)* 1 *(Last)* 6 *(Market)* 8 *(Close)* 5 *(Passive)*	None	GUI Control: 9 item dropdown • None • Specify • Mid • Bid • Ask • Last • Market • Close • Passive Init Value: Specify
Would If Price	8057	Price	Blank	GUI Control: Spinner Init Value: Blank

VWAP				Tag 8031=VWAP
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time cannot be later than End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time cannot be earlier than Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Volume Limit %	111	1-100	None	GUI Control: Spinner Init Value: Blank
Would If Type	8083	0 *(None)* 7 *(Specify)* 4 *(Mid)* 2 *(Bid)* 3 *(Ask)* 1 *(Last)* 6 *(Market)* 8 *(Close)* 5*(Passive)*	None	GUI Control: 9 item dropdown • None • Specify • Mid • Bid • Ask • Last • Market • Close • Passive Init Value: Specify
Would If Price	8057	Price	Blank	GUI Control: Spinner Init Value: Blank

PORTX				Tag 8031=PORTX
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Start Time	168	YYYYMMDD-HH:MM:SS	Time when order is received or market open.	GUI Control: Time Init Value: Blank *Start Time cannot be later than End Time*
End Time	126	YYYYMMDD-HH:MM:SS	Market close	GUI Control: Time Init Value: Blank *End Time cannot be earlier than Start Time*
Style	8042	1 *(Passive)* 2 *(Neutral)* 3 *(Aggressive)*	Neutral	GUI Control: 3 item dropdown • Passive • Neutral • Aggressive Init Value: Neutral
Volume Limit %	111	1-100	None	GUI Control: Spinner Init Value: Blank
Ratio	8096	0,1	Unchecked	GUI Control: Checkbox Init Value: Checked
Max Imbalance	8054	$$.cc		GUI Control: Input Init Value: Blank
Beta Hedge Index	8067	Index RIC Code	None If no value is sent, portfolio will be cash balanced.	GUI Control: Combo dropdown/Input Init Value: Blank .DJI , .IXIC, .MID, .NDX, .NYA, .OEX, .RUA .RUI, .RUT, .SML, .SPX, .BKX, .OSX, .SOXX, .DJU, XLU.A, XLE.A
Benchmark Type	8094	1 *(Last)* 9 *(Close)* 5 *(Passive)* 6 *(Market)* 2 *(Bid)* 3 *(Ask)*	Blank	GUI Control: 6 item dropdown • Last •Close •Passive •Market •Bid •Ask Init Value: Blank
Benchmark Offset	8095	Integer	Blank	GUI Control: Spinner Init Value: Blank
Complete	110	0, 100	100 (Checked)	GUI Control: Check Box Init Value: Checked
Custom	8098	1-10	Blank	GUI Control: Combo Init Value: Blank
*Group id**	66	N/A	N/A	**Not a GUI Parameter** **Required*
*ListSeqNo**	67	N/A	N/A	Sequence of individual order within list. **Not a GUI Parameter** **Required*
*Num Sub Contexts**	68	N/A		**Not a GUI Parameter** Number of orders in the basket **Required*.
Alpha	8062	-50 – 50	N/A	This Parameter is not exposed in the GUI *The alpha value would be entered or uploaded on a per order basis and sent in tag 8062 for each order of the list* **Not a GUI Parameter**

SOR				Tag 8031=SOR
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Discretion	389	Float	None	GUI Control: Input Init Value: Blank
Display	111	Integer	None	GUI Control: Input Init Value: Blank *Display Qty* cannot exceed *Order Quantity* ***Not available for Canada***
Order Type	40	1=Market 2=Limit 5=MOC B=LOC 3=Stop 4=Stop Limit	None	Order Types supported by GS Smart Router
Time In Force	59	0 (Day) 2 (At the Open)	None	TIF Supported by the GS Smart Router
Stop	99	$$.cc	None	GUI Control: Spinner Init Value: Blank
Order Classification	11007	1-US 3-Canada	None	**Not a GUI Parameter**
Execution Destination	100	;	None	**Not a GUI Parameter**

XCROSS (Single)				Tag 8031=XCROSS *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Order Type	40	1=Market 2=Limit	None	GUI label: Order Type Init Value: None
Time In Force	59	0	None	GUI label: Time In Force Init Value: Day **Day Orders Only**
Execution Destination	100	47	N/A	**Not a GUI Parameter**

XCROSS (List)				Tag 8031=XCROSS *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Constraint Type	8073	0 *(None)* 1 *(Net Cash)*	None	GUI Control: Dropdown Init Value: None Only actionable if a list is being sent.
Constraint Value	8054	Integer	See Notes	GUI Control: Input Init Value: Blank Basket constraint indicating maximum imbalance value dollar value Required if Constraint Type is set to something other than none. Only actionable if a list is being sent. If possible please include the following text as a tool tip or next to the Constraint Value. (If the submitted imbalance is less than the net notional, the imbalance will be set to the net notional value.)
ListID	66	String	None	**Not a GUI Parameter** Wave Identifier. Indicates a basket/list of symbols.
Number of Symbols	68	Integer	None	**Not a GUI Parameter** Number of symbols in the basket/list.

SIGMAX				Tag 8031=SIGMAX *Not available for Canada*
Parameter Name	**Tag**	**Valid Values**	**Default Value**	**Notes**
Peg Type	18	R *(Primary)* M *(Mid)* P *(Market)*	None	GUI Control: Dropdown Init Value: PegMid **Order Type must be "Pegged" (Tag40=P) if an execution instruction is sent.* **Peg Primary:** Buy orders will track the NBBO bid. Sell orders will track the NBBO ask. **Peg Mid:** Order limit track the NBBO mid. **Peg Market:** Buy orders track the NBBO ask. Sell orders track the NBBO bid.
MXQ	110	Integer	None	GUI Control: Input Init Value: 100 Minimum SIGMA X Quantity (MXQ) defines the lowest number of shares an order will ever print for within SIGMA X. **Note - This attribute is available for all SIGMA X order types.*
MDQ	11100	Integer	None	GUI Control: Input Init Value: Blank ***Note:*** *MDQ can only be used in conjunction with a SIGMA X order that has a defined discretion.*
Discretion	11388	101 *(Bid)* 102 *(Ask)* 103 *(Mid)*	None	GUI Control: Dropdown Init Value: Blank
Order Type	40	2 *(Limit)* P *(Pegged)*	None	SIGMAX will accept Limit orders and or Pegged orders. ****If a valid Execution Instruction is sent in Tag18 the Order Type must be Pegged.***
Price Limit	44	Price	None	
Side	54	1,2,5	None	
Time In Force	59	0*(Day)* 3*(IOC)*	Day	
Execution Destination	100	47	None	**Not a GUI Parameter**

DESCRIPTIONS

DYNAMIC SCALING
Volume Based
Scales with volume @ price. Participates in the market at a specified rate, but scales the rate up or down with changes in ABSOLUTE price.

RELATIVE SCALING
Volume Based
Scales with volume @ price. Participates in the market at a specified rate, but scales the rate up or down with changes in RELATIVE price.

NAVIGATOR
Customized
Designed to segment and route order flow to a specific algorithm, based on a number of customizable real-time and historical order and security specific characteristics.

IS
Implementation Shortfall
The algorithm simultaneously optimizes the trading schedule and order placement. Optimal trading decisions are continuously re-evaluated to react to the momentary changes in spread and book depth.

PARTICIPATE
Volume Based
Participates in the market at a specified rate while maximizing use of dark liquidity.

STEALTH
Liquidity Seeking
Access public and non-public liquidity without displaying the order in the book.

SONAR
Liquidity Seeking –
Access public and non-displayed venues in order to strategically source liquidity and minimize market impact.

SONARDARK
Liquidity Seeking
Interacts with non-displayed liquidity only (option for hidden liquidity on public venues). Completion not guaranteed.

TWAP
Benchmark Matching
Execute an order in a linear fashion over a user-defined time period. Enhanced liquidity access takes advantage of non-displayed pools

VWAP
Benchmark Matching
Minimize shortfall relative to VWAP. Enhanced liquidity access takes advantage of non-displayed pools.

PORTX
Implementation Shortfall
Port-X is an “implementation shortfall” algorithm that attempts to balance trading cost against risk for a basket of securities.

SIGMAX
Liquidity Seeking
SIGMAX is the aggregator of major non-displayed liquidity pools that utilizes the SIGMA smart order router providing users with the opportunity for price improvement, liquidity enhancement, and faster executions while reducing market impact.

SIGMA

SIGMA is Goldman Sachs' Smart Router. SIGMA will break an order up in smaller pieces with the objective of maximizing liquidity at the most favorable prices.

XCROSS

XCROSS is a point-in-time cross. Crossing opportunities are maximized as participants meet on all three trading dimensions: time, size, and price.

Contact Information

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