

SPECIFICATION

BIVA X-STREAM EXTERNAL OUCH SPECIFICATION

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1 Context

1.1 Intended Audience

Star PX and NASDAQ OMX.

1.2 Business Context

The X-stream will provide support for the standard protocols. The document will cover order management via the OUCH protocol.

1.3 Requirements

X-stream must provide an order management interface that is commonly used by high frequency trading applications.

The OUCH protocol is widely used and considered an industry standard. This standard is designed for a low latency messaging. X-stream will adhere, as closely as possible, to the latest published version of this fixed width message definitions.

The point-to-point transport layer for OUCH payloads will be SoupBinTCP3.0.

SoupBinTCP is required as it supports binary types in the payload. Binary types are employed in the latest OUCH standards so required for X-stream.

2 Data Types

Table 1 – OUCH Data Types

DATA TYPE	DESCRIPTION
Alpha	Left justified and right padded.
Integer	Unsigned big-endian binary encoded.

Table 2 – OUCH Compound Data Types

DATA TYPE	LEN	DESCRIPTION
Token	4	An Integer that must be increased for each inbound OUCH message. Tokens must be unique per OUCH port for each trading cycle. Unsigned big-endian binary encoded.

3 Inbound Unsequenced Messages

Table 3 – OUCH Enter Order Message [O]

NAME	OFFSET	LEN	VALUE/TYPE	NOTES
Type	0	1	"O"	Enter Order Message Id.
Order Token	1	4	Token	Token must be unique for each OUCH user per trading cycle.
Account Type	5	1	Alpha	"C" – Client "H" – House "O" – Other "Y" – Strategy "M" – Market Maker "S" – Stabilisation
Account Id	6	4	Integer	Assigned by the Participant. This field is forwarded to the clearing and settlement venues. There is no validation of this field, it is simply passed through to the depended systems.
Order Verb	10	1	Alpha	"B"uy "S"ell Shor"T" Sell
Quantity	12	8	Integer	Total number of shares. Maximum value 0x7FFFFFFFFFFFFFFF
Orderbook	19	4	Integer	Unique orderbook identifier. Unsigned big-endian binary encoded.
Price	23	4	Integer	The price of this order. The price is 0x7FFFFFFF for a 'market' order. Only positive value and maximum price for a 'limit' order is 0x7FFFFFFF -1
Time in Force	27	4	Integer	0 – immediate 99997 – session 99998 – day Any other values are not supported (order will be rejected). Both session and day orders on OPEL-B will have an implied duration of five minutes.
Client Id	31	4	Integer	The Client Identifier for this order. It is not checked but returned via the Accepted or Replaced sequenced messages and also forwarded to the downstream systems.
Minimum Quantity	35	8	Integer	Minimum number of shares to execute for an IOC order (TIF = 0).

Table 4 – OUCH Replace Order Message [U]

Note: The Account Id, Orderbook, Client Id and Order Verb fields cannot be changed with the replace order message. They will be inherited from the original order.

NAME	OFFSET	LEN	VALUE/TYPE	NOTES
Type	0	1	"U"	Replace Order Message Id.
Existing Order Token	1	4	Token	The token to match exactly with the original Enter Order or Replace Order Message.
Replacement Order Token	5	4	Token	Token must be unique for each OUCH user per trading cycle.
Quantity	9	8	Integer	Total number of shares liable, inclusive of previous executions on this order chain. The maximum in the chain being 0x7FFFFFFFFFFFFFFF.
Price	17	4	Integer	The price of the replacement order. The price is 0x7FFFFFFF (hex) 2147483647 (dec) for a 'market' order. Only positive value and maximum price for a 'limit' order is 0x7FFFFFFF -1

Table 5 – OUCH Cancel Order Message [X]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"X"	Cancel Order Message Id.
Order Token	1	4	Token	The exact match for the original order token from the Order Entry message.

4 Outbound Sequenced Messages

Table 6 – OUCH System Event Message [S]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"S"	System Event Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as number of nanoseconds past midnight.
Event Code	9	1	Alpha	"S" start of day "E" end of day

Table 7 – OUCH Accepted Message [A]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"A"	Accepted Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as number of nanoseconds past midnight.
Order Token	9	4	Token	The order token field as entered
Account Type	5	1	Alpha	"C" – Client "H" – House "O" – Other "Y" – Strategy "M" – Market Maker "S" – Stabilisation
Account Id	13	4	Integer	The Account Id field as entered
Order Verb	17	1	Alpha	"B"uy "S"ell Shor"T" Sell
Quantity	18	8	Integer	Total number of shares accepted.
Orderbook	26	4	Integer	Unique orderbook identifier as entered.
Price	30	4	Integer	The accepted price of the order. The price is 0x7FFFFFFF (hex) or 2147483647 (dec) for a 'market' order.
Time in Force	34	4	Integer	0 – immediate 99997 – session 99998 – day Any other values are not supported
Client Id	38	4	Integer	The Client Id from the order entry message.
Order Reference Number	42	8	Integer	Day unique order reference number.

NAME	OFFSET	LEN	VALUE	NOTES
Minimum Quantity	50	8	Integer	Minimum number of shares to execute for an IOC order (TIF = 0)
Order State	58	1	Alpha	"L"ive or "D"ead. Order Accepted message is sent with value "Dead" for an IOC order which is accepted but fails to execute. No further Canceled message will be received for the accepted order.

Table 8 – OUCH Replaced Message [U]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"U"	Replaced Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as number of nanoseconds past midnight.
Replacement Order Token	9	4	Token	The Replacement Order Token field.
Order Verb	13	1	Alpha	"B"uy "S"ell on original order.
Quantity	14	8	Integer	The accepted quantity of the replacement.
Orderbook	22	4	Integer	Unique orderbook identifier as entered on the replace message.
Price	26	4	Integer	The accepted price of the replacement. 0x7FFFFFFF (hex) or 2147483647 (dec) for a 'market' order.
Order Reference Number	30	8	Integer	Day unique order reference number.
Order State	38	1	Alpha	"L"ive or "D"ead. If the replaced quantity is equal to the executed quantity, OrderReplaced message is sent with value "Dead". OrderReplaced message is also sent with value "Dead" for an IOC order which fails to execute. No further Canceled message will be received for the replaced order.
Previous Order Token	39	4	Token	The Order Token of the order that was replaced.

Table 9 – OUCH Canceled Message [C]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"C"	Canceled Order Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as the number of nanoseconds past midnight
Order Token	9	4	Token	The Order Token of the order being canceled.
Quantity	13	8	Integer	Number of shares canceled. This is balance of the order when the cancel transaction was processed.
Reason	21	1	Alpha	Reason the order was cancelled. Refer to Cancelled Reasons below.

Table 10 – Cancelled Reasons

REASON	EXPLANATION	IN RESPONSE TO
'U'	User requested the order to be cancelled. Sent in response to a Cancel Order message or a Replace Order Message.	Cancel Order
'I'	Immediate (order was originally sent with Time In Force of 0)	Cancel Order
'T'	Timeout. Session/day order got expired.	Cancel Order
'S'	Supervisory. For example, emergency withdraw or the user got suspended.	Cancel Order
'L'	User logged off.	Cancel Order
'Z'	Invalid quantity or quantity exceeds maximum limit.	Replace Order
'R'	The order is not allowed at this time.	Replace Order
'X'	Invalid price.	Replace Order
'N'	Invalid minimum quantity.	Replace Order
'Y'	Invalid Order Type. For example, amending a limit order to a market order.	Replace Order
'F'	Flow control in place for user. A throttle is active for this OUCH port.	Replace Order
'W'	Unknown. Contact support for further information.	Replace Order

Table 11 – OUCH Executed Order Message [E]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"E"	Order Executed Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as the number of nanoseconds past midnight.
Order Token	9	4	Token	The Order Token of the executed order.
Executed Quantity	13	8	Integer	Incremental quantity executed, i.e. the quantity for this execution only.
Executed Price	21	4	Integer	The executed price for executed quantity.

NAME	OFFSET	LEN	VALUE	NOTES
Liquidity Flag	25	1	Alpha	"A"dded for the passive firm (resting order), "R"emoved for the aggressor, "U"ncross for auction executions.
Match Number	26	8	Integer	Match identifier for each trade. Same for buy/sell sides. This is the X-stream trade number.
Counter Party ID	34	4	Integer	Depending on the orderbook setup the counterparty identifier may contain a masking CCP or a trading counterparty.

Table 12 – OUCH Broken Trade Message [B]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"B"	Broken Trade Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as the number of nanoseconds past midnight.
Order Token	9	4	Token	The Order Token of the order for which the given Match Number is being broken.
Match Number	13	8	Integer	Match identifier for each trade. Same for buy/sell sides. This is the X-stream trade number.
Reason	21	1	Alpha	The reason the trade was broken. See currently supported Broken Trade Reasons table below.

Table 13 – OUCH Broken Trade Reasons

REASON	EXPLANATION
'C'	Consent – The two parties mutually agreed to break the trade.
'S'	Supervisory – The trade was manually broken by Star PX Exchange supervisory.

Table 14 – OUCH Rejected Order Message [J]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"J"	Rejected Order Message Id.
Timestamp	1	8	Integer	Timestamp – reflected as nanoseconds past midnight.
Order Token	9	4	Token	Order Token field as was entered.
Reason	13	1	Alpha	The reason the order was rejected. Refer to Rejected Order Reasons below.

Table 15 – Rejected Order Reasons

REASON	EXPLANATION
'H'	The secboard, instrument, board or market is not tradeable.
'Z'	Invalid quantity or quantity exceeds maximum limit.
'S'	Invalid orderbook identifier.
'R'	The order is not allowed at this time.
'X'	Invalid price.
'N'	Invalid minimum quantity.
'Y'	Invalid Order Type. For example, the Time In Force value is not supported in current trading session.
'F'	Flow control in place for user. A throttle is active for this OUCH port.
'W'	Unknown. Contact support for further information.

5 Message Kinematics

5.1 Replace Order Message [U]

The inbound replace message must set the quantity in terms of the total order quantity over the entire amendment chain:

An order is entered with a quantity *100*, it is validated and accepted. A quantity of *25* is then executed.

If the client wishes to replace the order and still be exposed for the balance of *75*, then the Replace Order Message must have a quantity of *100* – the current balance plus the executed quantity.

If the quantity is amended to a new *150*, then the Replace Order Message is sent with a quantity of *175* – the new *150* plus the executed quantity of *25*.

An order may not be replaced with a new quantity less than the total executed quantity, this would result in the deletion of the existing order.

For an order replaced with a new quantity equal to the total executed quantity, the replace is accepted and the response has the state Dead.

5.2 Cancel Order Message [X]

The entire order quantity is removed from the book.

5.3 OUCH Order Tokens

5.3.1 Enter Order Message

The Order Token must be unique for the trading cycle and OUCH account for the Enter Order Message. An Enter Order Message with a previously used Order Token will be silently ignored.

5.3.2 Replace Order Message

The Replace Order Message requires two valid Order Tokens. The first must match an existing order for that account and the second, the replacement token, must be unique as for the Enter Order Message.

The Replace Order Message will be silently ignored if the Previous Order Token is no longer live or the Replacement Order Token is invalid.

If the order, associated to the Previous Order Token, is live but the replace details (except the new Order Token) are invalid the order will be canceled and removed from the book. The Replacement Order Token is not consumed and may be reused.

If an order is amended to an IOC and minimum quantity is specified when the existing order has partially traded, the existing order will be cancelled.

5.3.3 Resiliency

The Token field allows for the benign retransmission of OUCH inbound messages. If a connection fails, pending messages may be resent without generating duplicates.

The mirroring of OUCH ports, across Engine hosts, allows a seamless failover to a second host. Therefore, pending messages may be resent over the second link without generating duplicates.

5.4 System Event Message [S]

Table 16 – OUCH Event Message flow

TRANSITION	SYSTEM EVENT MESSAGE [S] SYSTEM EVENT CODE (System Level)
IPXS-SOD	'S' – "Start of Day"
IPXS-EOD	'E' – "End of Day"