High Speed Vendor Feed

SOLA HSVF Unicast Specifications Guide for BOX

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HSVF-BX-001E
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Document History

VERSION	DATE	CHANGE DESCRIPTION
1.0	2002-04	Document based on SAM-HSVF Specification v1.32
1.1	2002-11	• Insertion of marker 6.4 in messages type "H" for "number of bid/ ask"/ Insertion of section 2.2 ("Connection Generalities") / Insertion of section 7 (Strategies) / New strike price code tables for bond options Modification of message type J, JB, JF, JS • Modification of marker 6.2 (Instrument status), Creation of marker 6.5 (Currency codes), Creation of marker 6.6 (Market feed Indicators) • Insertion of a price threshold fraction Indicator (J's type messages) • Threshold price now 6 bytes (not 8) • The "Expiry year" field in message type J moved • Tick increment is alphanumeric • Modification of marker 4.2 (negative F.I) • Name of marker 6.2 (Status marker) Creation of Tick table (5.1) • Modification of marker 6.5 (USD instead of US)
1.40	2003-01	• Insertion of expiry day, month and expiry year for message type JS • Creation of a section on Strategies • "Trade only" a new option in connection message RS • Instrument Group added in the Instrument keys messages (J's type messages) • Price Indicator marker in message CS
2.0	2003-07-01	• New function 'Option class requested in connection message RS • Insertion of expiry year in all options messages, "Deletion Type" added in message T & TS, New message type 'W' for 'GAP sequence', 'Optimization Broadcast Level' replaced by 'GAP Control' in message RS • Modifications to messages or functionality Symbol switch from 3 to 5 characters / Sequence number from 7 to 8 numbers / BCC character removed / Strike price switched from 6 to 7 characters / Bid size & ask size from 3 to 5 characters / The 'Instrument Key ' (J*) messages will be disseminated before the 'Summary' (N*) messages / 'Amount assured to Initial Order' is replaced by 'Percentage assured to Initial Order' in message M & MS / The diffusion of Intra-Day Instrument Key messages (J-JS) / "Frozen" status removed in sec 6.2 / Status Marker 'H' added in sec 6.2 / Removal of 'Instrument External ID' in message T & TS / Type of Order in message O & OS changed (to 'A','B','C') /Modification of the US and Canadian currency (sec 6.1) • Update of Fraction Indicator in tick table 5.1 / Number of bytes in message type L (Type 1 & 2) / Field name changed in 'Instrument Keys' messages (J-JS) / 'Bid Price' & 'Ask Price' field in alphanumeric / ISIN (first 3 characters) in message J-JS / New strike price table (sec 6.2) / Expiry Month Codes for Strategies sec 7.1.2 / All fields 'not used' are now labeled 'filler' / Modification to sec. 8

VERSION	DATE	CHANGE DESCRIPTION
2.1	2003-08-01	• Update of exposed order part of Price Improvement messages (message type O* and T*) • Type of data in the connection message RS (PIP & Exposed order only) / Message type 'U' now 17 bytes / Marker 6.1 (US Dollar, Canadian Dollar and Japanese Yen) / 'Type of Order' in message O & OS / Filler in message type 'L' / Price indicator marker in sec 6.3 / 3. Modification to the content of the specs Note in sec 2.6 / Note in 'Basic conventions' in sec 3.2.1 / Information on Connection generalities (sec 2.2.2, 2.2.3 & 2.2.4) / Name of the 'Threshold Fraction Indicator' field changed in message J & JS / 'Improvement Phase Expiry Time' & 'Improvement Process Expiry Duration' format now Numeric / Modification to the Option Strike Price Code table in sec 7.3.1
2.2	2004-09	• New Price Indicator marker ('L' for 'Late Trade') in sec 6.3 2. • Status markers added/modified in sec 6.2 'Order Side' field in message T/TS can now be blank • Modification to the content of the specs Bulleting message type 2 (message type 'L') type 2 • removed Section on BOX products removed Section 9.1 on BOX Operating Sequence modified • Modification to section 6.3
2.3	2005-02	Modifications of messages or functionalities (Sequence number 9 bytes)
2.4	2005-07-18	Inserted HSVF modifications to allow more than 100 000 000 messages
2.5	2005-08-03	Created a group status called Beginning of day inquiries identified as 'B' in section 3.2.8 and 6.2.
2.6	2005-08-11	• Modification to include Order Origin Code for 'O' and 'OS' messages related to the Market Sheet Initial and Improvement Orders (removed blank) in sections 3.2.21 and 3.2.22. • Changes to Order Origin Codes in 'O' and 'OS' messages field values (X, Y, Z) in sections 3.2.21 and 3.2.22.
2.7 2.8 2.9	2005-09-26 2005-11-03 2005-11-15	• Modification added for Order Entry Message in O and OS • Modified the bandwidth requirements • Modified the bandwidth requirements to 16 Mbps and 20 Mbps
2.10 2.11 2.12	2006-03-20 2006-03-20 2006-12-06	Updated Sections 3.2.21 and 3.2.22 according to BX05-0016 and BX05-0029 Removed modifications that are not applicable to the current version of the application. Re-inserted previously removed Account Clearing Type codes of V, W, X, Y, Z in sections 3.2.21, and 3.2.22 Updates as per RFC BX05-0019, Opening Broadcast. Modification to sections 2.7, 3.1.12, 3.2.8 (new section), and 3.2.26 Reformat section 3.2 tables
2.13	2006-12-15	Latest mods as per LECC memo of 12-08-06

VERSION	DATE	CHANGE DESCRIPTION
2.15	2007-03-12	• Removed list of messages in section 3.1 • Removed all messages and mention to strategies -Removed second instance of RS message (described twice) • Modified table title to use "l" for Length and "T" for type and mentioned this in section 3.1.1 Basic Conventions • 2007-02-27 In section 2.7, modified HSVF Protocol Version line in Connection Message - RS Message Type. • 2007-02-07 - Removed section 2.2.3 Bandwidth Requirements • Added Message Type A • UPIP Process Beginning Message • Added section 3.1.2 Instrument Description and removed this information from the individual messages • 2007-03-07 Minor formatting corrections
2.16	2007-04-13	Correction of Cross-Reference errors in section 3.1.2
2.17	2007-05-25	• Updates for Protocol Version behaviour. • Inserted new table in section 2.7 and modified A, J, & N messages
2.18	2009-02-16	• Impacts of Options Symbology Initiative: Instrument Description, used in the following HSVF messages, has been updated: Type J - Option Instrument key, Type A - UPIP Process Beginning Message, Type C - Option Trade, Type D - Option Request for Quote (RFQ), Type F - Option Quote, Type H - Option Market Depth, Type I - Option Trade Cancellation, Type M -Improvement Process Beginning Message (Option), Type N -Option Summary, Type O - Market Sheet Initial and Improvement Order (Options) / Exposed Order (Options), Type T - Initial and Improvement Order (Options) / Exposed Order (Options), Type - GC - Group Opening Time, Type - GR - Group Status, Type - RS - Connection Messages, • Message Type - GC: In Group Status field, replaced Value is B with Value is O • Message Type - GR - Group Status: Deleted Value is B and modified the reference to point to section 6.2 - Status Marker Fixed the total number of bytes for messages that have been modified. • Updated Section 2.8 Protocol Version Behavior Table with C1 Protocol Version and its behavior. • For Message Type O: Field name: “Type of Order to be processed at trading system member” has been replaced with”Filler”, Update Definition Field to “Default value space” • In Section 6.1: Deleted Marker D: Trading in German Mark • Symbology updates: note after Table 2.8 indicating HSVF format applies to Protcol Version C1. • Section 2.2.2 Updated Hub Contacts • Section 3.1.3 Removed message type A - UPIP Order • Appendix A, updated Contacts, removed Technical Help Desk section and updated MOC Support
2.19	2009-04-27	• HSVF modifiers for trade through exemptions • ISO Inbound implementation • PIP duration provided with 1/100e second accuracy • Protocol Versions A0, A1, B, B0, and B1are no longer supported.

VERSION	DATE	CHANGE DESCRIPTION
		• Message 'W' length changed from 19 to 20 bytes. • Root Symbol has been changed from A to X in sections 3.1.2, 3.1.6 and 3.1.7
2.20	2010-02-04	• Changed X = Alphabetic to Alphanumeric • Changed Symbol Root to Root Symbol • Inserted text in section 3.1.1 listing exceptions to the format convention for Alphanumeric fields
3.0	2010-06-23	• 2.6: Update RS message examples with protocol C2 • 2.8: Update protocol description • 3.1.13: Message length fixed • 3.1.15: Message length fixed
3.1	2011-11-01	• Added Solicitation/Facilitation information in message types: M, T, and O • Added new protocol version C3.
3.2	2012-02-21	• Added protocol version C4 and removed all older ones • Added Complex Order and Implied price features • Message type CS, FS, GS, HS, IS, JS, MS, NS, OS, QS, TS added. • Message types H and RS modified to include Complex Order and Implied prices • Updated Price Indicator Markers list of values
3.3	2012-05-22	• 2.7: Change value of "Type of Market Data" to receive Implied Prices. • 3.1: Fixed wrong message title. 3.1.4, 3.1.16, 3.1.20, 3.1.22, 3.1.24 • 3.1.29: Modified message format. • 5.1: Add more details on how to interpret the table. • 8.1: Update table values
3.4	2012-08-07	Correction to position of field 'Ask Price Sign' in Message HS
3.5	2013-09-20	• 2.2.2: Updated POP location addresses • 2.7: Added details on parameters 'I' and 'G'. Added table with most popular RS parameters combinations • 3.1.18: Removed '1' message type
4.0	2014-05-28	• 2.7: Added new message type "Z" • 2.8: Added new protocol version C5 • 3.1.6 / 3.1.7: Added 2 fields for showing the Public Customer orders volume (Bid/Ask) • 3.1.11 / 3.1.12: Added new level "P" for Public Customer volume. Expanded number of level from 5 to 9 • 3.1.22 / 3.1.23: Updated description of the "Account Type" field • 3.1.32: Added new message type "Z" • 3.1.30: Updated description of "V" message type • 8.1: Updated schedule times

VERSION	DATE	CHANGE DESCRIPTION
4.1	2014-09-03	• Section 3.1.1: Added field 'Instrument Description' in the list of exceptions • Sections 3.1.22/23: Updated values of fields 'Type of Clearing Account' and 'Type of Order'.
4.2	2016-12-20	• Section 3.3.1 Added Protocol Version C6 • Sections 3.4.23 and 3.4.24 Updated O and OS messages: added 2 fields (FirmId and CMTA) • General editing and reorganization to align with HSVF-BX-002E
4.3	2018-09-20	• Protocol Version C7 • Section 2.2: Replaced NY Site by CH site • Serction 2.5: Replaced C4 by C7 • Section 3.2.1: Strike Price Code replaced by Filler • Sections 3.4.11 and 3.4.13: Update of Messages JS and NS • Sections 3.4.16, 3.4.21, 3.4.24, 3.4.25: Update of Messages GC, M, T, and TS • Sections 3.4.21 and 3.4.23: Update to Instrument Description field of Messages M and O • Sections 3.4.2, 3.4.5, 3.4.6, 3.4.7, 3.4.9, 3.4.11, 3.4.22, 3.4.25, 3.4.26 (Messages CS, FS, H, HS, IS, JS, MS, T, TS): Update of Instrument Description field • Section 4.1: Note added • Section 6.3 Option Strike Price Codes removed
4.4	2020-06-29	This document version has been rolled-back. HSVF Protocol Version C8 is under review and will be published at a later date. ~~• Protocol Version C8~~ ~~• Deleted all document history prior to v3.0~~ ~~• Updated section 5.3 Price Indicator Markets~~ ~~• Moved sections 6.1 & 6.2 into section 5 Marker Codes~~
4.5	2021-02-02	• Roll-back of Protocol C8 described in document version 4.4 • As of this version, the latest HSVF protocol is C7 • Sequence Number roll-over 1 billion messages (Table 1 – Message Header) • Gap message with Sequence Number roll-over 1B messages (Section 3.3.4) • Added new section 6.2 – Complex Order (Strategy) Instrument Month Code

4.51	2021-03-15	• Updated Section 5.3
		  ○ Added Late Trade 'A'
		  ○ Removed Volume Adjustment 'V'

Table of Contents

Section 1 Introduction

The BOX Exchange-High Speed Vendor Feed (HSVF) User Unicast was developed by the Information Technology (IT) division of the Montréal Exchange Inc. (MX), a member of the TMX Group Inc.

The HSVF is comprised of Trades, Quotes, Market Depth, Strategies, Bulletins, Summaries and other Statistics. Information is provided on all BOX listings.

The current Protocol version is C7.

1.1 Objective

The main objective of the Specifications Guide is to provide information to HSVF Participant in the functional design of their application intended to receive the HSVF feed.

1.2 Scope

This Specifications Guide defines the communications interface and message formats for the high speed transmission which broadcasts real-time trading and statistical information from BOX.

1.3 BOX Contact

Market Operation Center Support / Technical Help Desk
Toll Free: 1-866-768-8845
boxmoc@boxoptions.com

Section 2 Trading Overview

All messages which comprise the BOX-HSVF are transmitted to the user on a dedicated line. Each message type is fixed in format and messages are not blocked. Re-transmission of any data is available on the transmission line.

2.1 Connection

BOX Exchange broadcasts the HSVF feed using a TCP/IP broadcast interface.

2.2 Hub/POP Facilities

SECAUCUS - EQUINIX NY4 SITE	CHICAGO – EQUINIX CH1 SITE
BOX Exchange C/o Equinix 755 Secaucus Road Secaucus, NJ, 07094 NPA-NXX: 201-864 *Support 1 gigabit and 10 gigabit connections*	BOX Exchange C/o Equinix 350 East Cermak Road, 6th Floor Ste 650 Chicago, IL, 60616 NPA-NXX: 312-225 Support 1 gigabit and 10 gigabit connections

2.3 Transmission Format

Each message is framed by an STX and an ETX character. The format used is:

HSVF Message			
STX	Message Header	Message Body	ETX

STX and ETX indicate the beginning and the end of the record being transmitted.

2.4 Data Format

Each message consists of a standard message header followed by the message body, which varies in format according to the message type.

Table 1: Message Header

The standard message header attached to all messages has the following format:

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Sequence Number	9	N	Each message is assigned a sequence number starting at '000000001' every day and incremented by 1 for each message sent. **Note:** Message sequencing is per Line. There is no validation of message sequence for incoming messages. The sequence numbers will range from 000000001 to 999999999 (decimal, ASCII). Retransmitted messages will contain the original sequence numbers. Sequence Number greater than 999999999 (decimal, ASCII) will be reset back and re-start at Sequence Number 000000000 and increment by 1 for each new message sent.
Message Type	2	X	Identifies the type of message being sent. Format is left-aligned, right 'blank' filled (if necessary).

2.5 TCP Transmission Capability

ACTION	PARTICULARS
Normal Connection (Start of Day @ 1:35 a.m. EST)	1. Participant connects to specified port 2. Participant sends RS message type ex. 000000001RS0000000000YNYYN0C7000 3. Exchange sends data to Participant with: • Starting sequence number 000000001 • Regular market messages on options 4. Market depth for all trading instruments • Complex Order messages • Summary messages • GAP Control: 0 (will receive GAP messages) • All options classes

ACTION	PARTICULARS
Retransmission –A- (Requesting to receive from beginning of the day)	1. Participant connects to specified port 2. Participant sends RS message type ex. 000000001RS0000000000YNYYN0C7000 3. Exchange resends all messages disseminated so far through out the day
Retransmission –B- (Requesting the next message in line)	1. Participant connects to specified port 2. Participant sends RS message type ex. 000000001RS9999999999YNYYN0C7000 3. Exchange sends the next message to Participant
Retransmission –C- (From a specific sequence number)	1. Participant connects, if disconnected, to specified port 2. Participant sends RS message type ex. 000000001RS0000013247YNYYN0C7000 3. Exchange sends all messages with sequence numbers greater than 13247 **Note:** If the Exchange's sequence number is lower than Participant's, transmission will begin with the next message.
Disconnection	1. Participant disconnects from port.

Note 1: For a retransmission (type 'A' or 'C'), Participants should keep the same parameters (Type of market data / GAP Control / Option classes requested).
Note 2: Participants need to reconnect every day after 1:35 a.m. EST. Their connections are disabled by BOX at 5:55 p.m. EST.
Note 3: The messages start at "000000001" every day. Sequence number is reset to 0 past the sequence 999999999 and increment by 1 for each new message sent.

Additional Information concerning Retransmission past 1billion messages:

- If HSVF Sequence is past the billion-message mark, a Retransmission from a Start Sequence less than 999999999 will result in retransmission from that start sequence up to 999999999, roll-over to 0 and continue to the current sequence
- If HSVF Sequence is past the billion-message mark, and Participant wishes to have sequence number from a Start sequence greater than 1 billion, then Participant can only request retransmission as of 999999999

2.6 HSVF Feed Schedule of a Typical Day

During a typical day, all messages that comprise the BOX-HSVF are transmitted following the schedule illustrated here.

Table 2: HSVF Schedule – Information broadcasted at each trading phase

EVENTS	APPROXIMATE TIME	HSVF MESSAGES DISSEMINATED
DICTIONARY IS SENT	**1:35 a.m. EST**	Q, QS, J, JS, N, NS
INSTRUMENT OPEN INTEREST FOR THE DAY	**5:00 a.m. EST**	N
MARKET GOES INTO PRE-OPENING	**7:00 a.m. EST**	GR, GS, F or H
MARKET GOES INTO OPENING/TRADING	**9:30 a.m. EST**	GR, GS
MARKET CLOSING ON EQUITY OPTIONS	**4:00 p.m. EST**	GR, GS
MARKET CLOSING ON ETF AND INDEX OPTIONS	**4:15 p.m. EST**	GR, GS
END OF DAY SUMMARIES	**4:40 p.m. EST**	Q, QS, J, JS, N, NS
END OF DAY FOR HSVF	**4:40 p.m. EST**	S, U
DISCONNECTION OF CLIENTS	**5:55 p.m. EST**	

Section 3 Messages

3.1 Message Types

This section lists a summary of all HSVF message types.

Note: HSVF users must have the ability to skip and ignore any message that is not defined below. MX may introduce new message types to support extended functions in the future. Because new message types may be defined in future versions of the protocol, anyone using this version of the HSVF protocol must be able to avoid impact of undefined new messages types they may receive.

3.1.1 Technical Messages

CONNECTION MESSAGE		
RS	Connection	3.3.1
OTHER MESSAGES		
U	End of Transmission	3.3.2
V	Circuit Assurance	3.3.3
W	Gap Sequence	3.3.4
Z	System Time Stamp	3.3.5

3.1.2 Business Messages

TRADE MESSAGES		
C	Option Trade	3.4.1
CS	Complex Order Instrument Trade	3.4.2
REQUEST FOR QUOTES MESSAGES (RFQ)		
D	Option Request for Quote (RFQ)	3.4.3

QUOTE MESSAGES		
F	Option Quote	3.4.4
FS	Complex Order	3.4.5
MARKET DEPTH MESSAGES		
H	Option Market Depth	3.4.6
HS	Complex Order Market Depth	3.4.7
TRADE CANCELLATION MESSAGES		
I	Option Trade Cancellation	3.4.8
IS	Complex Order Trade Cancellation	3.4.9
INSTRUMENT KEYS MESSAGES		
J	Option Instrument Keys	3.4.10
JS	Complex Order Instrument Keys	3.4.11
SUMMARY MESSAGES		
N	Option Summary	3.4.12
NS	Complex Order Summary	3.4.13
BEGINNING OF SUMMARY MESSAGES		
Q	Beginning of Options Summary	3.4.14
QS	Beginning of Complex Order Summary	3.4.15
GROUP MESSAGES		
GC	Group Opening Time	3.4.16
GR	Group Status	3.4.17
GS	Complex Order Group Status	3.4.18

OTHER MESSAGES		
L	Bulletins	3.4.19
S	End of Sales	3.4.20
IMPROVEMENT MESSAGES		
M	Improvement Process Beginning Message	3.4.21
MS	Improvement Process Beginning Message (Complex Order)	3.4.22
O	Market Sheet Initial and Improvement Order (Options)/Exposed Order (Options)	3.4.23
OS	Market Sheet Initial and Improvement Order (Complex Order)/Exposed Order (Complex Order)	3.4.24
T	Initial and Improvement Order (Options)/Exposed Order (Options)	3.4.25
TS	Initial and Improvement Order (Complex Order)/Exposed Order (Complex Order)	3.4.26

3.2 Conventions

In the following tables, the **L** column represents the length in bytes of the described field, and the **T** column ('Data Type') will be represented by the following characters: **A** = Alphabetic, **N** = Numeric, **X** = Alphanumeric.

- Whenever a field is indicated as being blank, it contains the ASCII space character (hex 20).
- **Alphabetic fields – A**: letters (A to Z) left justified, blank filled unless stated otherwise.
- **Numeric fields – N**: numbers (0 to 9), right justified, zero filled with a possibility to see a '.' (ASCII character hex 2).
- **Alphanumeric fields – X**: all characters possible (numbers, letters, others), right justified, zero filled, with the exception of the following fields, which are left justified, and blank filled:
    - Instrument External Code
    - Root Symbol (Options related messages)
    - Symbol (Strategy related messages)
- The 'Filler' field can have any format; numeric, alphanumeric, ASCII space character (hex 20).

3.2.1 Instrument Description – 20 Bytes

The Instrument is identified when needed by the following fields:

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Root Symbol	6	X	Symbol for the Option series
Expiry Month Code	1	A	Delivery month for the contract
Filler	1		Filler
Strike Price	7	N	Strike Price of the option in full
Strike Price Fraction Indicator	1	X	Defines the number of decimal places or fraction positions
Expiry Year	2	N	Last 2 digits of the option expiry year
Expiry Day	2	N	Delivery day for the contract

3.3 Technical Messages

This section includes the following messages.

3.3.1 Message Type RS - Connection Message

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Reset Sequence	10	N	Indicates the last message received. Messages restart at "000000001" every day.
System Default	1	A	Y
System Default	1	A	N
Type of Market Data	1	A	Y: Client wants to receive the market depth messages (types H and HS) on the top 5 bids/asks for the type of trading instruments chosen. N: Client wants to receive the best bid/ask message (types F and FS) for the type of trading instrument chosen. T: Client only wants to receive trade messages (types C and CS) without quotes or market depth messages. P: Client only wants to receive Price Improvement and Exposed order messages (M, MS, O, OS, T, TS). I: Client wants to receive market depth messages (types H and HS) on the top 5 Bids/Asks **and** the calculated Implied best limit. Implied limits are disseminated in H and HS message types. G: Client wants to receive Quote message (types F and FS) on the first Bid/Ask **and** the calculated Implied best limit. Implied limits are disseminated in H and HS message types.
Complex Order	1	A	Y: Client wants to receive all messages, on both option and Complex Order instrument types N: Client wants to receive messages on option instruments only (no Complex Order)
Market Summaries	1	A	Y: Client wants to receive ONLY the market summaries and the Instrument key messages N: Client wants to receive the regular market messages WITH the summaries and the Instrument key messages
Gap Control	1	N	Applicable only if 'Number of options classes requested' is greater than 000 0: Will receive GAP messages 1: Will not receive GAP messages (the sequence number will not be in an n+1 order)

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
HSVF Protocol	2	X	Current HSVF Protocol version (C7)
Number of Option Classes Requested	3	N	000: Client wants to receive messages on all option classes 001 to 999: Client wants to receive messages on XXX (between 001 to 999) option classes
Option Classes Requested	Up to 5994 bytes	X	Options classes requested (using the 6 character Root Symbol, right padded with blanks) Maximum: 999 option classes Ex : to request for classes ABC and DEF: ABC<blank><blank><blank>DEF<blank><blank><blank>

Messages Types Broadcasted according to RS Message

The following table shows all message types sent based on the different options selected in the RS message.

- Shaded boxes mean that the corresponding messages are broadcasted.
- Empty boxes mean that the corresponding messages are not broadcasted.
- Example: For the RS parameters 'Type of Market Data = Any', 'Complex Order = N', 'Market Summaries = Y' and 'Gap Control = 0', the following message types are broadcast: J, N, Q, S, U, V and Z.
- These combinations represent only a sample of all possibilities.

RS PARAMETERS		COMBINATIONS											
Type of Market Data		Y	Any	Any	N	N	T	P	P	I	I	G	G
Complex Order		Y	N	Y	Y	N	Y	N	Y	N	Y	N	Y
Market Summaries		N	Y	Y	N	N	N	N	N	N	N	N	N
Gap Control		0	0	0	0	0	0	0	0	0	0	0	1
MESSAGE TYPES													
	C	■			■	■	■			■	■	■	■
	CS	■			■		■				■		■
	D	■			■	■	■	■	■	■	■	■	■
	F				■	■						■	■
	FS				■								■
	GC	■			■	■	■	■	■	■	■	■	■
	GR	■			■	■	■	■	■	■	■	■	■
	GS	■			■		■		■		■		■
	H	■							■	■	■	■	■
	HS	■									■		■
	I	■			■	■	■			■	■	■	■
	IS	■			■		■				■		■
	J	■	■	■	■	■	■	■	■	■	■	■	■
	JS	■		■	■		■		■		■		■
	L	■			■	■	■	■	■	■	■	■	■
	M	■			■	■		■	■	■	■	■	■
	MS	■			■				■		■		■
	N	■	■	■	■	■	■	■	■	■	■	■	■

	NS												
	O												
	OS												
	Q												
	QS												
	S												
	T												
	TS												
	U												
	V												
	W												
	Z												

3.3.2 Message Type U – End of Transmission – 18 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Time	6	N	Time at which the message is transmitted HHMMSS

This message will be sent to indicate that the day's transmission is complete. This message will be sent at approximately 5:15 p.m. daily. After this hour, no HSVF messages will be transmitted. Transmission will resume the following day at 1:00 a.m.

3.3.3 Message Type V – Circuit Assurance – 17 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Time	6	N	Time at which the message is transmitted HHMMSS

This message is sent out if no messages are sent by BOX for more than one second after the broadcast has started (i.e. at the termination of the Test Loop message). This will be an assurance that the line is up.

This message will continue to be sent until the client disconnection. The Circuit Assurance message will repeat the sequence number of the previous record transmitted (except if it is a re-transmit message) i.e. it will not increase the sequence number.

3.3.4 Message Type W – Gap Sequence – 20 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Sequence Numbers Skipped	9		Sequence numbers skipped. (Sequence number of the actual W message) +1 up to the 'Sequence numbers skipped' value Has to be greater than the sequence number of the actual W message

The Gap message signals the beginning and ending sequence numbers of messages relating to classes different from those subscribed to during the connection message.

LOG WITH ALL THE INSTRUMENTS		IF A CLIENT WANTS TO RECEIVE ONLY THE MARKET DATA ON YYY, HE WILL RECEIVE	
SEQUENCE NUMBER	INSTRUMENT	SEQUENCE NUMBER	INSTRUMENT
00007393C	0BYYY	**00007393C**	0BYYY
00007394H	0BZZZ	**00007394W**	0B0007397
00007395C	0BXXX		
00007396C	0BZZZ		
00007397H	0BFFF		
00007398N	0BYYY	**00007398N**	0BYYY
00007399H	0BZZZ		

Note:

- The HSVF Sequence Number past 999999999 is reset to 000000000 and increment by 1 for each new message. Consequently, HSVF Clients should expect to receive a smaller gap sequence number when the HSVF Sequence Number rolls over 999999999.

3.3.5 Message Type Z – System Time Stamp – 20 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Trading Engine TIme Stamp	9	N	Time stamp generated by the SOLA® Trading Engine (HHMMSSmmm)

This message is sent out every second and contains the time stamp when it was originally transmitted by the trading engine. Broadcast starts during the pre-opening and continues until the end of day disconnection of all clients (currently 5:55 p.m. EST). The sequence number in the message header is incremented by 1 for each message sent.

3.4 Business Messages

3.4.1 Message Type C – Option Trade – 76 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the trade occurred Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Volume	8	X	Number of contracts for the trade Refer to Indicator Code
Trade Price	6	N	Price at which the transaction took place
Trade Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Net Change Sign +/-	1	X	For the net change field
Net Change	6	N	Net change = last trade price - previous close
Net Change Fraction Indicator	1	X	Fraction indicator for the net change price Refer to Fraction Indicator Code
Filler	6		Filler
Timestamp	6	N	Time of transaction HHMMSS
Open Interest	7	X	Contains the outstanding number of contracts in the series Updated on a trade by trade basis Refer to Indicator Code
Filler	1		Filler
Price Indicator Marker	1	A	Identifies the type of transaction Refer to Price Indicator Markers

3.4.2 Message Type CS – Complex Order Instrument Trade – 79 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange I. D.	1	A	Exchange on which the trade occurred Q by default
Instrument Description	30	X	Complex Order Instrument symbol. The individual legs are defined in message type JS.
Volume	8	X	Total number of contracts traded Refer to Indicator Code
Trade Price Sign +/-	1	X	For Trade Price field (sign)
Trade Price	6	N	Price at which the transaction took place
Trade Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Net Change Sign +/-	1	X	For net change field
Net Change	6	N	Net change = last trade price - previous close
Net Change Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Filler	6		Filler
Timestamp	6	N	Time of transaction HHMMSS
Price Indicator Marker	1	A	Identifies type of transaction Refer to Price Indicator Markers

3.4.3 Message Type D – Option Request for Quote (RFQ) – 40 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange I. D.	1	A	Exchange on which the quote occurred Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Requested Size	8	X	Size of the market requested Refer to Indicator Code

3.4.4 Message Type F – Option Quote – 68 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange I. D.	1	A	Exchange on which the quote occurred Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Bid Price	6	X	Bid price for the option series
Bid Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Bid Size	5	X	Number of option contracts represented by the Bid Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
Ask Price	6	X	Ask price for the option series
Ask Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Ask Size	5	X	Number of option contracts represented by the Ask Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
Filler	1	X	Filler

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Instrument Status Marker	1	A	Indicates instrument status Refer to Status Markers
Public Customer Bid Size	5	X	Number of option contracts represented by Public Customer orders on the bid side
Public Customer Ask Size	5	X	Number of option contracts represented by Public Customer orders on the ask side

3.4.5 Message Type FS – Complex Order Quote – 79 bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the quote occurred Q by default
Instrument Description	30	X	Complex Order Instrument Symbol The legs (underlying) are defined in message type JS.
Bid Price Sign +/-	1	X	For Bid Price field
Bid Price	6	X	Bid price for the option series
Bid Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Bid Size	5	X	Number of option contracts represented by the Bid Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
Ask Price sign +/-	1	X	For Ask Price field
Ask Price	6	X	Ask price for the options series
Ask Price Fraction Indicator	1	N	Defines number of decimal places or fraction positions. Refer to Fraction Indicator Code
Ask Size	5	X	The number of option contracts represented by the Ask Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Instrument Status Marker	1	A	Indicates instrument status Refer to Status Markers
Public Customer Bid Size	5	X	Number of option contracts represented by Public Customer orders on the bid side
Public Customer Ask Size	5	X	Number of option contracts represented by Public Customer orders on the ask side

3.4.6 Message Type H – Option Market Depth – up to 208 Bytes

FIELD NAME		L	T	DEFINITION / VALIDATION RULES
Message Header		11	X	Refer to Message Header
Exchange ID		1	A	Exchange on which the quote occurred Q by default
Instrument Description		20	X	Refer to Instrument Description – 20 Bytes
Instrument Status Marker		1	A	Instrument status Refer to Status Markers
Number of Level		1	N	Number of level for the trading instrument 1 to 6
Up to 6 times	Level of Market Depth	1	X	Level of market depth 1 to 6: for regular market depth A (Implied): for implied prices P: Public Customer volume
	Bid Price	6	X	Bid price for the option series
	Bid Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
	Bid Size	5	X	Number of option contracts represented by the Bid Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
	Number of Bid Orders	2	X	Number of bid orders, present at a given moment, in the order book If greater than 99-> the 2nd character becomes an exponent. Refer to Indicator Code

FIELD NAME		L	T	DEFINITION / VALIDATION RULES
	Ask Price	6	X	Ask price for the option series
	Ask Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
	Ask Size	5	X	Number of option contracts represented by the Ask Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
	Number of Ask Orders	2	X	Number of Ask Orders, present at a given moment, in the order book If greater than 99-> the 2nd character becomes an exponent Refer to Indicator Code

3.4.7 Message Type HS – Complex Order Market Depth – up to 230 Bytes

FIELD NAME		L	T	DEFINITION / VALIDATION RULES
Message Header		11	X	Refer to Message Header
Exchange ID		1	A	Exchange on which the quote occurred Q by default
Instrument Description		30	X	Complex Order Instrument symbol. Individual legs are defined in message type JS.
Instrument Status Marker		1	A	Instrument status Refer to Status Markers
Number of Level		1	N	Number of level for the trading instrument 1 - 6
Up to 6 times	Level of Market Depth	1	X	Level of market depth 1 to 6: for regular market depth A: for Implied prices P: for Public Customer volume
	Bid Price Sign +/-	1	X	For the Bid Price field
	Bid Price	6	X	Bid price for option series

	FIELD NAME	L	T	DEFINITION / VALIDATION RULES
	Bid Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
	Bid Size	5	X	Number of option contracts represented by the Bid Price If size is greater than 99999, the 5th character becomes an exponent
	Number of Bid Orders	2	X	Number of Bid Orders, present at a given moment, in the order book If greater than 99-> the 2nd character becomes an exponent
	Ask Price Sign +/-	1	X	For the Ask Price field
	Ask Price	6	X	Ask price for the option series
	Ask Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
	Ask Size	5	X	The number of option contracts represented by the Ask Price If size is greater than 99999, the 5th character becomes an exponent
	Number of Ask Orders	2	X	Number of Ask Orders, present at a given moment, in the order book If greater than 99-> the 2nd character becomes an exponent

3.4.8 Message Type I – Option Trade Cancellation – 68 Bytes

A cancellation will reduce the total volume, value and transactions by the amount of the cancelled trade. A cancellation message is followed by an Option Summary message (message type N) which will reflect the corrected market.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the trade occurred Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Volume	8	X	Number of contracts being cancelled

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
			Refer to Indicator Code
Trade Price	6	N	Price at which the transaction took place
Trade Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Filler	6		Filler
Timestamp	6	N	Time of cancellation transaction HHMMSS
Open Interest	7	N	Open long position of the option series, as of the trade Refer to Indicator Code
Filler	1		Filler
Price Indicator Marker	1	X	Identifies the type of transaction Refer to Price Indicator Markers

3.4.9 Message Type IS – Complex Order Trade Cancellation – 71 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the trade occurred Q by default
Instrument Description	30	X	Complex Order Instrument symbol. The individual legs are defined in message type JS
Volume	8	X	Number of contracts being cancelled Refer to Indicator Code
Trade Price sign +/-	1	X	For the Trade Price field
Trade Price	6	N	Estimated price at which the transaction took place
Trade Price Fraction Indicator	1	X	Defines the number of decimal places or fraction positions. Refer to Fraction Indicator Code
Filler	6		Filler
Timestamp	6	N	Time of cancellation transaction HHMMSS
Price Indicator Marker	1	A	Identifies the type of transaction Refer to Price Indicator Markers

3.4.10 Message Type J – Option Instrument Keys – 119 Bytes

The Option Instrument Keys messages are sent:

- At the beginning and the end of the day with associate Summary message
- Anytime during the day if a threshold limit was changed for an instrument

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the trade occurred Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Strike Price Currency	3	X	Currency used for the Option Strike Price Refer to Strike Price Currency Codes
Maximum Number of Contracts per Order	6	X	Maximum authorized number of contract per order Refer to Indicator Code
Minimum Number of Contracts per Order	6	X	Minimum authorized number of contract per order Refer to Indicator Code
Maximum Threshold Price	6	X	Maximum threshold price authorized for an option contract Refer to Indicator Code
Maximum Threshold Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Minimum Threshold Price	6	X	Minimum threshold price authorized for an option contract Refer to Indicator Code
Minimum Threshold Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Tick Increment	6	X	Precision with which the price of an order limit can be expressed Refer to Tick Table (Price Fraction Rules)
Tick Increment Fraction Indicator	1	N	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Option Type	1	X	Type of option A = American E = European

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Market Flow Indicator	2	X	Defines the type of instruments Refer to Market Feed Indicators
Group Instrument	2	X	Group of the instrument
Instrument	4	X	Instrument
Instrument External Code	30	X	External identifier used by traders when entering an order
Option Marker	2	A	Refer to Markers for Options
Underlying Symbol Root	10	X	Symbol root for the underlying security

3.4.11 Message Type JS – Complex Order Instrument Keys – Up to 591 Bytes

Complex Order Instrument Keys messages will be sent:

- At the beginning and the end of the day with his associate Summary message;
- Also when a Complex Order instrument is created during trading hours.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	30	X	Complex Order Instrument symbol. The individual legs are defined in this message.
Expiry Year	2	N	Expiration year of the leg of the Complex Order Instrument expiring first. Format is YY.
Delivery Month	1	A	Delivery month code of the leg of the Complex Order Instrument expiring first Refer to Complex Order Instrument (Strategy) month code
Expiry Day	2	N	Expiry day of the leg of the Complex Order Instrument expiring first
Max Number of Contracts per Order	6	X	Maximum authorized number of contract per order Refer to Indicator Code
Min Number of Contracts per Order	6	X	Minimum authorized number of contract per order Refer to Indicator Code

Field Name	L	T	Definition / Validation Rules
Max Threshold Price Sign	1	X	+ or - sign
Max Threshold Price	6	X	Maximum threshold price authorized for an option contract Refer to Indicator Code
Max Threshold Price Fraction Indicator	1	X	Number of decimal places or fraction positions Refer to Fraction Indicator Code
Min Threshold Price Sign	1	X	+ or - sign
Min Threshold Price	6	X	Minimum threshold price authorized for an option contract Refer to Indicator Code
Min Threshold Price Fraction Indicator	1	X	Number of decimal places or fraction positions Refer to Fraction Indicator Code
Tick Increment	6	X	Precision used when expressing the price of an order limit Refer to Tick Table (Price Fraction Rules)
Tick Increment Fraction Indicator	1	N	Defines the number of decimal places or fraction positions Refer to Fraction Indicator Code
Filler	2	X	
Group	2	X	Group of the instrument
Instrument	4	X	Code identifying the instrument
Instrument External Code	30	X	External identifier used by traders when entering an order
Complex Order Instrument Allow Implied	1	A	Complex Order Instrument support of Implied Price N: No C: Continuous Implied S: Snapshot Implied
Number of Legs	2	N	Number of legs in the Complex Order Instrument 2 to 12
From 2 Leg Ratio Sign	1	X	+ : Buy the leg - : Sell the leg

Field Name		L	T	Definition / Validation Rules
	Leg Ratio	8	N	Quantity (bought or sold) 1 to 99999999
	Leg Symbol	30	X	Trading symbol of the leg

3.4.12 Message Type N – Option Summary – 127 Bytes

Option Summary messages are sent:

- At the beginning of the day. The first Option Summary message sent defines the instruments traded on that day, and contain the closing/reference price in the 'Last Price' field. All other price fields, with the exception of open interest, contain zero values. Any other message sent during the day contain details of the last trade.
- Any option summary sent after the BEGINNING OF OPTIONS SUMMARY message (Message Type = Q) contains the list of trading instruments for the day (sent prior to market opening) or the summaries after the close of the market for BOX options (sent at 5:10 p.m. EST).
- After a trade cancellation if extreme values have been changed (Open/High/Low/Last).
- At the end of the day with relevant data such as the Open/High/Low/Last/Volume
- During the day when new instruments are added.

Field Name	L	T	Definition / Validation Rules
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Identifies the exchange for the option Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Bid Price	6	N	Closing or most recent bid price
Bid Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Bid Size	5	X	Number of contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
Ask Price	6	N	Closing or most recent ask price
Ask Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Ask Size	5	X	Number of contracts represented by the Ask Price If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
Last Price	6	N	Closing or most recent trade price
Last Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Open Interest	7	X	This field contains current outstanding number of contracts in the series. Updated on a trade by trade basis. Refer to Indicator Code
Tick	1	X	Determined by the difference between last price and the previous different trade price '+' = uptick '-' = downtick
Volume	8	N	Total number of contracts traded or current volume if sent after a cancellation
Net Change Sign	1	X	+ or - sign
Net Change	6	N	Net change = last trade price - previous close Net change will be zero if the option did not trade on the last business day or did not trade today
Net Change Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Open Price	6	N	Price of the first trade of the day
Open Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
High Price	6	N	Highest trade price of the day or current high price if sent after a cancellation
High Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Low Price	6	N	Lowest trade price of the day or current low price if sent after a cancellation
Low Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Option Marker	2	A	Refer to Markers for Options
Underlying Symbol	10	X	Symbol root for the underlying security
Reference Price	6	N	Reference Price of the Option
Reference Price Fraction Indicator	1	X	Number of decimal places or fraction positions Refer to Fraction Indicator Code

3.4.13 Message Type NS – Complex Order Summary – 116 Bytes

Complex Order Summary messages will be sent:

- At the beginning of the day. The first Complex Order Summary message sent defines the instruments traded on that day, and contain the closing price in the 'Last Price' field. All other price fields contain zero values. Any other message sent during the day contain details of the last trade.
- Any Complex Order Summary sent after the BEGINNING OF COMPLEX ORDER SUMMARY message (Message Type = QS) contains the list of trading Complex Order instruments for the day (sent prior to market opening) or the summaries after the close of the market for BOX options (sent at 5:10 p.m. EST).
- After a trade cancellation if extreme values have been changed (Open/High/Low/Last).
- At the end of the day with relevant data such as the Open/High/Low/Last/Volume
- During the day when new instruments are added.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Identification of the exchange for the future Q by default
Instrument Description	30	X	Complex Order Instrument symbol
Bid Price Sign +/-	1	X	For the Bid Price field
Bid Price	6	N	Closing bid or most recent bid if sent after a cancellation
Bid Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Bid Size	5	X	Number of contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Ask Price Sign	1	X	+ or - sign
Ask Price	6	N	Closing ask or most recent ask if sent after a cancellation
Ask Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Ask Size	5	X	Number of contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Indicator Code
Last Price Sign +/-	1	X	For the Last Price field
Last Price	6	N	Last Trade Price for the contract or the current price if sent after a cancellation
Last Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Open Price Sign	1	X	+ or - sign
Open Price	6	N	Price of the first trade of the day
Open Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
High Price Sign	1	X	+ or - sign
High Price	6	N	Highest trade price of the day or current high price if sent after a cancellation
High Price Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Low Price Sign	1	X	+ or - sign
Low Price	6	N	Lowest Trade Price of the day or current low price if sent after a cancellation
Low Price Fraction Indicator	1	X	Defines number of decimal or fraction positions Refer to Fraction Indicator Code
Net Change Sign	1	X	+ or - sign
Net Change	6	N	Net change = last trade price - previous close If no previous settlement price (new series) then net change is zero

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Net Change Fraction Indicator	1	X	Defines number of decimal places or fraction positions Refer to Fraction Indicator Code
Volume	8	X	Total number of contracts traded or current volume if sent after cancellation Refer to Indicator Code

3.4.14 Message Type Q – Beginning of Options Summary – 12 Bytes

This message indicates that the beginning and the end of day option summaries (message type N) are to follow. Other messages (such as bulletins) can be interspersed with the summaries.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Identifies the exchange Q by default

3.4.15 Message Type QS – Beginning of Complex Order Summary – 12 Bytes

This message indicates that the beginning or the end of day Complex Order summaries (message type NS) are to follow. Other messages can be interspersed with the summaries.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Identifies the exchange; Q by default

3.4.16 Message Type GC – Group Opening Time – 25 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the quote occurred Q by default
Root Symbol	6	X	Root of the instrument group
Group Status	1	A	Value is O

Scheduled Time	6	N	Opening time of the instrument group (HHMMSS)

3.4.17 Message Type GR – Group Status – 19 Bytes

This message will be sent when a group of trading instruments enters a new status. Refer to BOX Website (https://boxoptions.com) for a complete list of the trading hours schedule for BOX products.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11		Refer to Message Header
Exchange ID	1	A	Exchange on which the quote occurred Q by default
Root Symbol	6	X	Root of the instrument group
Group Status	1	A	Group status of the trading instrument Refer to Status Markers

3.4.18 Message Type GS – Complex Order Group Status – 15 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Exchange on which the quote occurred Q by default
Group of the Complex Order Instrument	2	X	Group of the Complex Order Instrument
Group Status	1	A	Group status of the trading instrument Refer to Status Markers

3.4.19 Message Type L – Bulletins – 93 Bytes

Bulletins will be sent throughout the trading day. More than one message will be used if the bulletin is longer than 79 characters. The continuation character "0" indicates that the bulletin continues to the next record.

When a Trading instrument has been halted by BOX, a Bulletin Message explaining the reason for the halt will be transmitted. When the trading instrument is reinstated, another Bulletin Message explaining the news that accompanied the reinstatement will be transmitted.

All records that make up a particular bulletin will be sent out together. No other message will be interspersed among the records that make up a complete bulletin.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Filler	1		
Bulletin Type	1	X	1 = Regular text bulletin 2 = Special text bulletin
Bulletin Contents	79	X	Bulletin in textual format. Left justified and blank filled
Continue Marker	1	N	0: Bulletin continues in next record 1: Bulletin ended

3.4.20 Message Type S – End of Sales – 18 Bytes

This message is sent when there is no more trading activity to be transmitted. This will occur after the closing of the market.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Reserved	1	A	Reserved for future use
Time	6	N	Time at which the message is transmitted HHMMSS

3.4.21 Message Type M – Improvement Process Beginning Message (Option) – 84 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Improvement Phase Sequential Number	6	N	Indicates the number of an Improvement Phase. Sequential number unique per Instrument and per trading day
Initial Order Price	6	N	Indicates the price of the Initial Order
Initial Order Price Fraction Indicator	1	X	Refer to Fraction Indicator Code
Initial Order Quantity	8	X	Indicates the quantity of the Initial Order
Initial Order Side	1	A	Indicates the dealer side of the Initial Order B for buy S for sell
Improvement Phase Expiry Time	8	A	Indicates the expiry time of the Improvement Phase (value is in HHMMSSCC)
Improvement Process Expiry Duration	4	N	Indicates the expiry duration of the Improvement Phase (value is in SSCC)
Minimum Quantity for Improvement Order	8	X	Enables market makers to know the minimum quantity for an Improvement Order during the Improvement Phase
Percentage Assured to Initial Order	8	X	Indicates the quantity of the Initial Order assured to the dealer side of the IO in case of the Initial Order price is the best limit Ex: 00040.00 stands for 40.00 %
Auction Type	1	X	Indicating the auction type G: Regular PIP B: Solicitation C: Facilitation
Filler	1	A	Default value space

3.4.22 Message Type MS – Improvement Process Beginning Message (Complex Order) – 94 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	30	X	Complex Order Instrument symbol. The individual legs are defined in message type JS.
Improvement Phase Sequential Number	6	N	Indicates the number of an Improvement Phase. Sequential number unique per Instrument and per trading day
Initial Order Price Sign	1	X	+ or - sign
Intial Order Price	6	N	Indicates the price of the Initial Order
Initial Order Price Fraction Indicator	1	X	Refer to Fraction Indicator Code
Initial Order Quantity	8	X	Indicates the quantity of the Initial Order
Initial Order Side	1	A	Indicates the dealer side of the Initial Order B for buy S for sell
Improvement Phase Expiry Time	8	A	Indicates the expiry time of the Improvement Phase (value is in HHMMSSCC)
Improvement Process Expiry Duration	4	N	Indicates the expiry duration of the Improvement Phase (value is in SSCC)
Minimum Quantity for Improvement Order	8	X	Enables market makers to know the minimum quantity for an Improvement Order during the Improvement Phase
Percentage Assured to Initial Order	8	X	Indicates the quantity of the Initial Order assured to the dealer side of the IO in case of the Initial Order price is the best limit Ex: 00040.00 stands for 40.00 %
Auction Type	1	X	Indicating the auction type G: Regular PIP B: Solicitation C: Facilitation

3.4.23 Message Type O – Market Sheet Initial and Improvement Order (Options) / Exposed Order (Options) – 80 Bytes

This message type is not broadcasted for Improvement orders related to Solicitation and Facilitation auction types.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Order Side	1	X	The "must be filled" side ("B" for Buy, "S" for Sell)
Type of Order	1	X	Type of limit entered A: Initial Order P: Exposed Order
Limit Entered for an Order	6	X	For a buy order, represents the highest price that the order issuer is willing to pay For a sell order, represents the lowest price at which the order issuer is willing to sell
Limit Fraction Indicator	1	X	Refer to Fraction Indicator Code
Order Quantity	8	X	Refer to Indicator Code
Order Sequence Number	6	N	Allocated by the Central trading engine at each valid order entry
Improvement Phase Sequential Number	6	N	Indicates the number of an Improvement Phase. Not relevant when the message refers to an Exposed Order. Sequential number unique per instrument and per trading day
Type of Clearing Account for Member that Owns the Order	1	X	Indicates the account type for which an order was entered using the clearing house member's account typology. When “Type of Order” is equal to “A”, the Account Type is for the InitO (Auction initiator or dealer side). 6: Public Customer 7: Broker Dealer 8: Market Maker T: Professional Customer W: Broker Dealer cleared as Customer X: Away Market Maker
Filler	1	A	Default value space

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
End of the Exposition	8	N	HHMMSSCC - '0' filled for PIP messages
Auction Type	1	X	Indicates the auction type G: Regular PIP F: Exposed Order
FirmId	4	X	Indicates the FirmId
CMTA	4	X	Indicates the CMTA

3.4.24 Message Type OS – Market Sheet Initial and Improvement Order (Complex Order) / Exposed Order (Complex Order) – 91 Bytes

This message type is not broadcasted for Improvement orders related to Solicitation and Facilitation auction types.

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	30	X	Complex Order Instrument symbol. The individual legs are defined in message type JS.
Order Side	1	X	The "must be filled" side ("B" for Buy, "S" for Sell)
Type of Order	1	X	Type of limit entered A: Initial Order P: Exposed Order
Limit Entered for an Order sign	1	X	+ or - sign
Limit Entered for an Order	6	N	For a buy order, represents the highest price that the order issuer is willing to pay For a sell order, represents the lowest price at which the order issuer is willing to sell
Limit Fraction Indicator	1	X	Refer to Fraction Indicator Code
Order Quantity	8	X	Refer to Indicator Code
Order Sequence Number	6	N	Allocated by the Central trading engine at each valid order entry
Improvement Phase Sequential Number	6	N	Indicates the number of an Improvement Phase. Not relevant when the message refers to an Exposed

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
			Order. Sequential number unique per instrument and per trading day
Type of Clearing Account for Member that Owns the Order	1	X	Indicates the account type for which an order was entered using the clearing house member's account typology. When “Type of Order” is equal to “A”, the Account Type is for the InitO (Auction initiator or dealer side). 6: Public Customer 7: Broker Dealer 8: Market Maker T: Professional Customer W: Broker Dealer cleared as Customer X: Away Market Maker
Filler	1	A	Default value space
End of the Exposition	8	N	HHMMSSCC - '0' filled for PIP messages
Auction Type	1	X	Indicating the auction type G: Regular PIP F: Exposed Order
FirmId	4	X	Indicates the FirmId
CMTA	4	X	Indicates the CMTA

3.4.25 Message Type T – Initial and Improvement Order (Options) / Exposed Order (Options) – 47 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	20	X	Refer to Instrument Description – 20 Bytes
Deletion Type	1	N	1: Deletion of a precise order 2: Deletion of all previous orders in the specified side 3: Deletion of all orders
Order Sequence Number	6	N	Allocated by the Central trading engine at each valid order entry
Order Side	1	X	B: Buy S: Sell <Blank>: all
Improvement Phase Sequential Number	6	N	Number of an Improvement Phase. Not relevant when the message refers to an Exposed Order. Sequential number unique per Instrument and per trading day
Auction Type	1	X	Auction type or if the message is related to an exposed order. G: Regular PIP B: Solicitation C: Facilitation F: Exposed Order

3.4.26 Message Type TS – Initial and Improvement Order (Complex Order) / Exposed Order (Complex Order) – 57 Bytes

FIELD NAME	L	T	DEFINITION / VALIDATION RULES
Message Header	11	X	Refer to Message Header
Exchange ID	1	A	Q by default
Instrument Description	30	X	Complex Order Instrument symbol. The individual legs are defined in message type JS.
Deletion Type	1	N	1: Deletion of a precise order 2: Deletion of all previous orders in the specified side 3: Deletion of all orders
Order Sequence Number	6	N	Allocated by the Central trading engine at each valid order entry
Order Side	1	X	B: Buy S: Sell <Blank>: all
Improvement Phase Sequential Number	6	N	Number of an Improvement Phase. Not relevant when the message refers to an Exposed Order. Sequential number unique per Instrument and per trading day
Auction Type	1	X	Auction type or if the message is related to an exposed order. G: Regular PIP B: Solicitation C: Facilitation F: Exposed Order

Section 4 Price Fields

4.1 Description

The Price field is a six-character numeric field.

Note: The exception to the above is for MarketOnOpen (MOO) orders, where the Price field contains ’000OUV’ with a Fraction Indicator Code of ’0’. ’000OUV’ stands for ’Opening Price’ as calculated by the trading engine during the pre-opening phase.

The delineation of the whole number portion of the price and the decimal/fractional portion of the price will be defined by the Fraction Indicator (FI) Code. Furthermore, the FI indicates the manner in which the price is displayed visually. This implies that all zero fractions may be sent in order to maintain consistency in the visual alignment of the implied decimal places. The all zero fraction is replaced by spaces for visual display.

No truncation of price data is permitted by this Specification, except for high-order zeros for products that trade in fractions of 1/10,000,000 or smaller. Should such a truncation be necessary, then it is implicit from the FI, which is 7, 8, or 9.

4.2 Fraction Indicator Code

All fractions are expressed as fractions or in decimals as defined by the price fraction rules of the particular product (section Tick Table (Price Fraction Rules)). The Fraction Indicator Code is one alphanumeric character as follows:

FRACTION	CODE	FRACTION	CODE
1/1	0	-1/1	A
1/10	1	-1/10	B
1/100	2	-1/100	C
1/1,000	3	-1/1,000	D
1/10,000	4	-1/10,000	E
1/100,000	5	-1/100,000	F
1/1,000,000	6	-1/1,000,000	G
1/10,000,000	7		
1/100,000,000	8		
1/1,000,000,000	9		

4.3 Tick Table (Price Fraction Rules)

This table shows the minimum tick increment for the order prices. For instruments using different minimum tick increments based on the price range, the following values are used:

PRICE RANGE	TICK INCREMENT FIELD VALUE	FRACTION INDICATOR (F.I.)	MINIMUM TICK INCREMENT
Order Price below $3.00	0000T1	2	$0.05
Order Price equal or above $3.00	0000T1	2	$0.10
All PIP, Facilitation and Solicitation orders, at any price	0000T1	2	$0.01

Section 5 Marker Codes

5.1 Markers for Options

FIRST LETTER (CURRENCY OR TYPE OF MARKET)	
Marker	**Description**
B	Trading in British Pound
C	Trading in Canadian Dollar
E	Trading in Swiss Franc
F	Trading in Euro
N	Norwegian Krone
S	Swedish Krona
U	Trading in US Dollar
Y	Trading in Japanese Yen
2ND LETTER (TYPE OF OPTIONS)	
Marker	**Description**
Blank	Regular Options

5.2 Status Markers

STATUS		USED IN	
MARKER	DESCRIPTION	GROUP MESSAGES	INSTRUMENT MESSAGES
Y	Pre-opening phase	X	X
O	Opening phase	X	X
T	Opened for Trading	X	X
F	Forbidden phase	X	X
H	Trading Halted	X	X

Status		Used in	
Marker	Description	Group Messages	Instrument Messages
R	Reserved phase (goes into a state as pre-opening where orders can be sent, modified, or canceled)		X
S	Suspended phase (goes into a state as pre-opening where orders can be sent, modified, or cancelled)		X
Z	Frozen		X
A	Surveillance Intervention phase (Consultation phase)	X	X
C	Closed	X	X
B	Beginning of day inquiries	X	X
BLANK	If not used		

5.3 Price Indicator Markers

Price Indicator		Will Impact The …				
Marker	Description	Opening Price	High Price	Low Price	Last Price	Volume
A	As-Of trades					X
C	Trades performed at the end of a PIP allocation phase	X	X	X	X	X
L	Late trade (Transaction is being reported late and is out of sequence)					X
O	Trades performed during the opening	X	X	X	X	X
S	Reference price (volume field zero filled)					

PRICE INDICATOR		WILL IMPACT THE …				
MARKER	DESCRIPTION	OPENING PRICE	HIGH PRICE	LOW PRICE	LAST PRICE	VOLUME
W	Trades resulting from the transmission of an ISO Inbound order	X	X	X	X	X
X	Trades performed when the market is crossed					X
G	Contingent Trade, price of the trade was not controlled against the NBBO	X	X	X	X	X
I	Trade involving an implied order or Leg Trade of a Complex Order instrument	X	X	X	X	X
P	Trade done on a Complex Order Instrument					X
BLANK	Actual transaction took place	X	X	X	X	X

5.4 Indicator Code

This code is used for Bid/Ask Size, Volume, and Open Interest.

MARKER	DESCRIPTION (THE SIZE OF THE BID/ASK FIELD IS IN …)	
C	100	(Hundreds)
D	1,000	(Thousands)
E	10,000	(Ten-Thousands)
F	100,000	(Hundred-Thousands)
G	1,000,000	(Millions)
H	10,000,000	(Ten-Millions)
I	100,000,000	(Hundred-Millions)
J	1,000,000,000	(Billions)

DATA	MESSAGE SENT	PARTICIPANT SHOULD DISPLAY…
Bid size of 120575	Size field will indicate 1205C	120500
Volume of 258,487,797	Volume will indicate 2584877C	258,487,700

5.5 Strike Price Currency Codes

CURRENCY	
MARKER	DESCRIPTION
USD	US $
CAD	Canadian $
Blank	Not provided

Section 6 Month Codes

6.1 Options

CALL OPTIONS		
A – January	E – May	I – September
B – February	F – June	J – October
C – March	G – July	K – November
D – April	H – August	L – December
PUT OPTIONS		
M – January	Q – May	U – September
N – February	R – June	V – October
O – March	S – July	W – November
P – April	T – August	X – December

6.2 Complex Order Instrument (Strategy) month code

The rule for determining the Month Code of Complex Order Instrument in the JS – Complex Order Instrument is determined from the closest expiry leg(s) as follows:

- If the closest expiry leg(s) have the same option type i.e either all legs are Call Options or all legs are Put Options then the Strategy Month Code is the corresponding month code of any of the leg as defined in the above table (section 6.1)
- If the closest expiry legs have different option type i.e some leg(s) are Call Option and the other leg(s) are Put Options, then the Strategy Month Code is chosen as the month code of the Call Option Leg as defined in the above table (section 6.1)

6.3 Market Feed Indicators

First Letter	Type of Instrument	Second Letter	Type of Underlying
O	Options	X	Index
L	Long Term	E	Equities

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