ISE, GEMX & MRX Top Combo Quote Feed

VERSION 1.0

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Top Combo Quote Feed – Version 1.0

Nasdaq ISE Top Combo Quote Feed
Nasdaq ISE Glimpse for Top Combo Quote Feed

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1. Overview

Top Quote Combo Feed is a direct data feed product in the Nasdaq ISE (ISE) system offered by Nasdaq® that features the following:

o Best Bid and Offer (BBO) Quotations for complex strategies: The options system will calculate and disseminate its best bid and offer position, with aggregated size, based on displayable order and quote interest for the options strategies. The BBO is shown when complex instruments are pre-open and open trading states.

o Ticker Messages: Displays complex last trade information along with opening price, cumulative volume, high and low prices for the day.

o Administrative and market event messages including:

- Complex Strategy Directory messages to be disseminated to relay complex instrument definitions.

- Trading action messages to inform market participants when a specific complex instrument is halted or released for trading on the options market.

o A separate connection for obtaining snapshots, called Glimpse, enabling the user to reconnect intra day and be current with the live stream. Connecting to Glimpse intra day obtains a snapshot of all System Events, Complex Instrument definitions, Complex Instrument Trading States, Quotes and Tickers. The snapshot of the stream is taken at the point in time when the user connects and logs in to Glimpse. The snapshot is tagged with a sequence number, the point at which one can listen to the live stream.

2. Architecture

The feed will be made up of a series of sequenced messages. Each message is variable in length based on the message type and is composed of binary and alphanumeric data. The messages that make up this protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.
The options system offers the data feed in two protocol options:

Protocol Option	Number of Outbound Channels
SoupBinTCPv3.00	Multiple output channels, each channel supporting a subset of securities, the range defined by first letter of underlying
MoldUDP64v1.00	Multiple output channels, each channel supporting a subset of securities, the range defined by first letter of underlying

The feed is composed of a Multicast and Soup channel.
Please note that Nasdaq provides local redundancy in the NY Metro Area (local "A" and "B" feeds), as well as the remote Chicago Region ("C" and "D" feeds). The secondary "C" and "D" feeds are available for general use, however please note that performance characteristics will be reduced due to the remote location of these feeds.

Both the local primary ("A feed") and local secondary ("B feed") will be hosted by servers co-located with the local trading system and will have identical performance characteristics. The remote primary ("C feed") and remote secondary ("D feed") will be hosted by servers co-located with the remote trading system and will have identical (but reduced) performance characteristics. The messages in each of the "A", "B", "C" and "D"feeds are identical: Mold or Soup messages will have the same Mold or Soup sequence numbers across all of the streams.

The Glimpse snapshot is available in Soup connections only. Just like in the real-time stream, there are two local "A" and "B" connections as well as two remote "C" and "D" connections.

In the event of disaster recovery, the "C" and "D" feeds should be used as primary feeds when order entry is switched from the NY Metro Area to the Chicago Region.

3. Data Types

All Alpha or Alphanumeric fields are left justified and padded on the right with spaces.

All Integer fields are unsigned big-endian (network byte order) binary encoded numbers unless otherwise specified. Integers may be 1, 2, 4 or 6 bytes long.

Prices are 2 , 4 or 8 byte Integer fields. When an 8 byte price is converted to a decimal format, prices are in fixed point format with 12 whole number places followed by 8 decimal digits. When a 4 byte price is converted to a decimal format, prices are in fixed point format with 6 whole number places followed by 4 decimal digits. When a 2 byte price is converted to a decimal format, prices are in fixed point format with 3 whole number places followed by 2 decimal digits.

Negative prices will be indicated with a negative integer at the start of the price field.

Time is expressed as a 6 byte Integer, representing the number of nanoseconds past midnight of the current day.

Note, all complex instrument prices will be signed integers.

4. Message Formats

This feed supports four basic types of messages:

- o   System Events

- o   Administrative Data and Market Events

- o   Best bid and offer updates

- o   Ticker information

Within the system event and administrative types, the options system may support multiple message formats as outlined below.

4.1. System Event Message

The system event message type is used to signal a market or data feed handler event.
The format is as follows:

System Event Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"S" = System Event Message
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Event Code	7	1	Alpha	Refer to System Event Codes below
Current Year	8	2	Integer	The current calendar year (example: 2016).
Current Month	10	1	Integer	The current calendar month, with values 1 to 12 inclusive, January=1, etc.
Current Day	11	1	Integer	The current calendar day, with values 1 to 31 inclusive.
Version	12	1	Integer	Version of this interface. Currently set to 1.
Sub-version	13	1	Integer	Sub-version of this interface. Currently set to 0.

System Event Codes		
Code	*Explanation*	*When (typically)*
"O"	*Start of Messages.* This is always the first message sent in any trading day.	After ~12:30am
"S"	*Start of System Hours.* This message indicates that the options system is open and ready to start accepting orders.	3:00am
"F"	*Start of Currency Opening Process.* This message is intended to indicate that the options system has started its opening auction process for currency options.	7:30:00am

"Q"	*Start of Opening Process.* This message is intended to indicate that the options system has started its opening auction process.	9:30:00am
"N"	*Start of Normal Hours Closing Process.* This message is intended to indicate that the options system will no longer generate new executions for options that trade during normal hours.	4:00:00pm
"L"	*Start of Late Hours Closing Process.* This message is intended to indicate that the options system will no longer generate new executions for options that trade during extended hours.	4:15:00pm
"E"	*End of System Hours.* This message indicates that the options system is now closed.	~5:15pm
"C"	*End of Messages.* This is always the last message sent in any trading day.	~5:20pm
"W"	***End of WCO Early closing. This message is intended to indicate that the exchange will no longer accept any new orders or changes to existing Orders on last trading date of WCO options.***	**12:00 Noon**

4.2. **Complex Strategy Directory Message**

Whenever a complex order is added in the system for an underlying, the order is normalized and results in either the creation of a new complex strategy or is added to an existing strategy. A Complex Strategy Message containing the strategy definition
will be sent. For GTC orders, these will be assigned each trading day and will not be persistent across trading days. Complex Strategy Directory messages for complex instruments with GTC orders from previous day are sent once per instrument, typically before the "Start of System Hours" System Event. The Strategy ID assigned for a new complex strategy is
unique for a particular complex instrument for a trading session.

Complex Strategy Directory Message				
Name	Offset	Length	Value	Notes
Message Type	0	1	Integer	"R" = Complex Strategy Directory Message
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Strategy ID	7	4	Integer	ISE's Strategy ID assigned daily, valid while there are any open complex orders for the day
StrategyType	11	1	Alpha	"V" = Vertical Spread "T" = Time Spread "D" = Diagonal Spread "S" = Straddle "G" = Strangle "C" = Combo "R" = Risk Reversal "A" = Ratio Spread "U" = Custom
Source	12	1	Integer	Identifies the source of the Strategy, valid for the trading day
Underlying Symbol	13	13	Alphanumeric	Underlying Symbol for the strategy. All legs in this strategy belong to this Underlying
Number of Legs	26	1	Integer	Number of legs in the strategy **NOTE:** Leg field offsets below are an equation, where "n" is the zero based leg number (0, 1, …)
Option ID	$22n + 27$	4	Integer	ISE's Option ID for this leg, valid for the trading day. The same ID as the corresponding Option in the Options Directory Message. Zero (0) for Stock Leg.
Security Symbol	$22n + 31$	6	Alphanumeric	Denotes the option root symbol (security symbol)
Leg ID	$22n + 37$	1	Integer	Leg identifier within this strategy. This is an exchange-assigned 0-based index. E.g. Nth leg has $LegId=N-1$.
Expiration Year	$22n + 38$	1	Integer	Last two digits of the year of the option expiration
Expiration Month	$22n + 39$	1	Integer	Expiration Month of the option (1-12)
Expiration Day	$22n + 40$	1	Integer	Day of the Month of expiration (1-31)
Explicit Strike Price	$22n + 41$	8	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes. Zero (0) for Stock Leg.
Option Type	$22n + 49$	1	Alpha	Option Type: "C" = Call "P" = Put Blank (" ") for Stock Leg.
Side	$22n + 50$	1	Alpha	Indicates the side of the leg: "B" = Leg is on Buy side "S" = Leg is on Sell side
Leg Ratio	$22n + 51$	4	Integer	Leg Ratio

Strategy Directory Notes:
1) Firm should note that they will only receive Strategy Directory messages for the symbol range associated with the matching engine serving that connection.
2) The Underlying Symbol is in most cases the same as the industry standard ticker underlying. In rare cases, such as a special settlement symbol, the exchange assigns unique underlying symbols.
3) This is a sequenced message and therefore can be replayed upon re-connection.

4.3. **Strategy Trading Action Message**

ISE uses this administrative message to indicate the current trading status of a strategy within the ISE Market.

Whenever a strategy is created and assigned a Strategy ID, ISE will send a Strategy Trading Action Message with current trading state "T" (Trading) or "H" (Halted) soon after the Complex Strategy directory message is sent. Trading firms should assume that all strategies are eligible for trading. ISE will send out a Trading Action message with "H"(HALTED) when a strategy is halted for trading. Thereafter throughout the trading day the Trading Action message is used to relay changes in trading status for the strategy. Messages will be sent when the strategy is halted or is released for trading.

Complex Trading Action Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	Integer	"H" = Strategy Trading Action Message
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Strategy ID	7	4	Integer	ISE's Strategy ID assigned daily, valid while there are any open complex orders for the day
Current Trading State	11	1	Integer	Reflects the current trading state for the strategy on the ISE market. The allowable values are: H = Halt in effect T = Trading Resumed

Please note that recipients should continue to process the Trading Action message in order to determine if a strategy is in a Halt state during the day.

4.4. **Strategy Open/Closed Message**

The options system uses this administrative message to indicate when an strategy has completed the opening process and is now available for auto execution or when the option has closed and is no longer available for auto execution.

The system disseminates the Strategy Open/Closed Message for each complex strategy as soon as the opening is completed. Upon receipt of the message with "Open State" = "Y", the recipient is advised that the strategy denoted in the message is now available for auto execution within the options system. Upon receipt of the message with "Open State" = "N", the recipient is advised that the strategy is no longer eligible for auto-execution within the options system.

Security Open/Closed Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"O" = Security Open/Closed
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Strategy ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Open State	11	1	Alpha	Reflects the current eligibility for auto execution of the options security in the options market. The allowable values are: Y = Open for auto execution N = Closed for auto execution

Note: Recipients should continue to process the Strategy Trading Action message in order to determine if a contract is in a Halt state for the day. A strategy Open message should **not** override the Strategy Trading action message indicating if an index or equity option is halted. Recipients should use both messages in tandem to indicate if the issue is halted and/or or open for auto execution.

4.5. Strategy Best Bid AND Ask Update

The options system will continuously calculate its best bid and ask position for active strategies on the options market during the trading day. Whenever the best bid and ask position changes on both sides, the options system will send its best bid and ask update via the data feed for the affected security. A change in bid or ask implies a change in price and/or sizes. The quote will reflect the highest price displayable in the options system for buy orders/quotes and the lowest price displayable in the options system for sell orders/quotes. Customer and ProCust sizes are displayed as well.

If only one side of the quote changes, Best Bid OR Ask Update message will be sent for bandwidth efficiency reasons.

The Quote Condition applies to both the bid and ask sides.

Best Bid AND Ask Update – Long Form Message				
Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"C" = Strategy Best bid AND ask update
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Strategy ID	7	4	Integer	Integer ID of the strategy, as defined in the Strategy Directory Message.
Quote Condition	11	1	Alpha	<space> = regular quote/autox eligible "X" = Pre-Open/Halted
Bid Price	12	4	Integer	Best bid price in fixed point format with 6 whole number places followed by 4 decimal digits.
Bid Size	16	4	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Bid Cust Size	20	4	Integer	Customer quantity on the bid side.
Bid ProCust Size	24	4	Integer	Customer professional quantity on the bid side.
Bid NTT Size	28	4	Integer	Limit Bid size that can't be traded through.
Bid Market Size	32	4	Integer	The aggregate market size on Bid side.
Bid NTT Market Size	36	4	Integer	The aggregated NTT Market Size on Bid Size.
Ask Price	40	4	Integer	Best ask price in fixed point format with 6 whole number places followed by 4 decimal digits.
Ask Size	44	4	Integer	Aggregated number of contracts on the ask side being displayed in the options market at the current time.
Ask Cust Size	48	4	Integer	Customer quantity on the ask side.
Ask ProCust Size	52	4	Integer	Customer professional quantity on the ask side.
Ask NTT Size	56	4	Integer	Limit Ask size that can't be traded through.
Ask Market Size	60	4	Integer	Aggregate market quantity on Ask side.
Ask NTT Market Size	64	4	Integer	The aggregated NTT Market Size on Ask Size.

4.6. Strategy Best Bid OR Ask Update

The options system will continuously calculate its best bid and offer position for active strategies on the options market during the trading day. Whenever the best bid or ask position changes on one side but not the other side, the options system will send its best bid or ask update via this feed for the affected security. A change in bid or ask implies a change in price and/or size. The quote will reflect the highest price displayable in the options system for buy orders/quotes and the lowest price displayable in the options system for sell orders/quotes.

For the bid or ask update received, the data feed recipient firm should adjust the quotation bid or ask side *only* for the market side indicated in the message. Implicitly the opposite side has the same price and size as previously displayed.

If *both* bid and ask change as *one update*, the Best Bid AND Ask Update message will be sent, displaying both sides of the quote simultaneously.

Strategy Best Bid OR Ask Update Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	Strategy Best bid OR ask update: "D" = Quote update bid side "E" = Quote update ask side
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Strategy ID	7	4	Integer	Integer ID of the strategy, as defined in the Strategy Directory Message.
Quote Condition	11	1	Alpha	<space> = regular quote/autox eligible "X" = Pre-Open/Halted
Price	12	4	Integer	Best bid or ask price in fixed point format with 6 whole number places followed by 4 decimal digits, the side determined by Message Type.
Size	16	4	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.
Cust Size	20	4	Integer	Customer Quantity on the bid or ask side.
ProCust Size	24	4	Integer	Customer professional quantity on the bid or ask side.
NTT Size	28	4	Integer	Limit size that can't be traded through
Market Size	32	4	Integer	The aggregate market size.
NTT Market Size	36	4	Integer	The aggregated NTT Market Size.

4.7. **Complex Strategy Ticker Message**

The ticker message is used to send real time trade information. The format is as follows:

Ticker Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"t" = Strategy Ticker Message
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Strategy ID	7	4	Integer	Integer ID of the strategy, as defined in the Complex StrategyDirectory Message.
Last Price	11	8	Integer	Most recent price.
Size	19	4	Integer	Last traded quantity.
Volume	23	4	Integer	Total traded quantity.
High	27	8	Integer	High price for the day.
Low	35	8	Integer	Low price for the day.
First	43	8	Integer	Opening price for the day
Trade Condition	51	1	Alpha	Same value as the Trade Condition sent to OPRA for this trade. To obtain a list of Trade Conditions, refer to the NOTES below.

NOTES:
- o All prices in this message are in fixed point format with with 12 whole number places followed by 8 decimal digits
- o The Trade Condition is the same as defined in the OPRA specification: http://www.opradata.com/specs/opra_input_binary_part_spec.pdf. The OPRA Trade Condition is enumerated in the "Message Type" field of the "Equity and Index Last Sale" message (Category "a") in the specification document. The specification has a table of the possible Message Types (Trade Condition) along with a detailed description of each type. Always refer to the www.opradata.com website to ensure the possible Trade Conditions sent out by this feed, which are consistent with the Trade Conditions defined by OPRA

5. Glimpse for Top Combo Quote Feed

Top Combo Quote Feed has a mechanism for out-of-band recovery: Glimpse for Top Combo Quote Feed. Connecting to Glimpse intra day obtains a snapshot of all System Events, Option definitions, Option states, Quotes and Tickers. The snapshot of the live stream is taken at the point in time when the user connects and logs in to Glimpse. The snapshot is tagged with a sequence number, the point which one can listen to the live stream.

The Glimpse connection is available in the SoupBinTCPv3.00 protocol.

In addition to all the previously described messages, the Glimpse connection uses an additional message; the Snapshot Message. This message serves two purposes:

- To denote the end of the snapshot;

- To tag the snapshot to a sequence number of the live stream. The sequence number in the message reflects the Top Combo Quote Feed sequence number at the time the Glimpse spin was requested (logged in to the Soup connection).

Snapshot Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"M" = End of Snapshot Message
Sequence Number	1	20	Numeric	Top Combo Quote Feed sequence number when the Glimpse snapshot was taken. To keep the stream current, process the Top Combo Quote Feed messages beginning with the message sequence number in this snapshot message. Note: While Top Combo Quote Feed is a binary data feed, the SoupBINTCP protocol uses ASCII characters for the sequence number in the logon request message format.

6. Support

o   For general product support for NASDAQ data feeds, please contact NASDAQ Market Data Distribution at 301.978.5307 or dataproducts@nasdaqomx.com.

o   For technical support for NASDAQ data feeds, please contact NASDAQ Systems Engineering at devsupport@nasdaq.com.

Appendix A – Sample messages

Each message defined in this protocol has an example to clarify how the message is parsed. Some points to consider:

- The encapsulating protocol defines the message length, in bytes. This can be used as an aid to parsing the messages, since many of the messages are not fixed length by message type. For example, the best bid or ask update message varies in length from 9 to 15 bytes depending on the encoding of the PriceSize data type;
- The first byte of the message is always message type. Once the type of the message is known, the rest of the message can be parsed from the definitions of the messages.

Each message defined in this protocol has an example to clarify how the message is parsed. Some points to consider:

- The encapsulating protocol defines the message length, in bytes. This can be used as an aid to parsing the messages;
- The first byte of the message is always message type. Once the type of the message is known, the rest of the message can be parsed from the definitions of the messages.

Example 1 – System Event Message

At 9:30:00.123456789 am, the system sends a *System Event* message which announces a Start of Opening Process event for date April 23, 2017. The version of this interface is 1.0.

System Event Message			
Name	**Offset**	**Value**	**Hex Value**
Message Type	0	"S"	53
Timestamp	1	9:30:00.123456789	1F 1A D6 35 BD 15
Event Code	7	"Q"	51
Current Year	8	2017	07 E1
Current Month	10	4	04
Current Day	11	23	17
Version	12	1	01
Sub-Version	13	0	00

Network byte stream (in hex):
- 53 1F 1A D6 35 BD 15 51 07 E1 04 17 01 00

Example 2 – Complex Strategy Directory Message

At 6:30:00.234567891 am, the system sends an *Options Directory* message describing a strategy having ID 3000000 with the following properties: leg 1: equity option, expiration date 1/20/2017, strike price $29.10000000, type call option to buy , leg 2: equity option, expiration date 3/20/2017, strike price $29.10000000, type call option to buy in ratio 1:1.

Complex Strategy Directory Message			
Name	**Offset**	**Value**	**Hex Value**
Message Type	0	"R"	52
Timestamp	1	6:30:00.234567891	15 48 4A AB 48 D3
Strategy Id	7	3000000	00 2D C6 C0
StrategyType	11	"T" = Time Spread	54
Source	12	2	02
Underlying Symbol	13	"OIH"	4F 49 48 20 20 20

				20 20 20 20 20 20 20
Number of Legs		26	2	02
Leg 1	>OptionID	27	85393	00 01 4D 91
	> Security Symbol	31	"OIH1"	4F 49 48 31 20 20
	> LegID	37	0	00
	> Expiration Year	38	2017	11
	> Expiration Month	39	1	01
	> Expiration Day	40	20	14
	> Explicit Strike Price	41	$29.1	00 00 00 00 AD 73 13 80
	> Option Type	49	Call	43
	> Side	50	Buy	42
	> Leg Ratio	51	1	00 00 00 01
Leg 2	>OptionID	55	85394	00 01 4D 92
	> Security Symbol	59	"OIH1"	4F 49 48 31 20 20
	> LegID	65	01	01
	> Expiration Year	66	2017	11
	> Expiration Month	67	3	03
	> Expiration Day	68	20	14
	> Explicit Strike Price	69	$29.1	00 00 00 00 AD 73 13 80
	> Option Type	77	Call	43
	> Side	78	Buy	42
	> Leg Ratio	79	1	00 00 00 01

Network byte stream (in hex):
- 52 15 48 4A AB 48 D3 00 2D C6 C0 54 02 4F 49 48 20 20 20 20 20 20 20 20 20 20 02 00 01 4D 91 4F 49 48 31 20 20 00 11 01 14 00 00 00 00 AD 73 13 80 43 42 00 00 00 01 00 01 4D 92 4F 49 48 31 20 20 00 11 03 14 00 00 00 00 AD 73 13 80 43 42 00 00 00 01

Example 3 – Strategy Trading Action Message
At 1:51:45.234567891 pm, the system sends a *Trading Action* message indicating that complex strategy with id 3000000 has been halted.

Trading Action Message			
Name	Offset	Value	Hex Value
Message Type	0	"H"	48
Timestamp	1	13:51:45.234567891	2D 63 77 C7 62 D3
Strategy Id	7	3000000	00 2D C6 C0
Current Trading State	11	"H"	48

Network byte stream (in hex):
- 48 2D 63 77 C7 62 D3 00 2D C6 C0 48

Example 4 – Strategy Open/Closed Message
At 9:30:00.345678912 am, the system sends a *Strategy Open/Closed* message indicating that strategy with id 3000000 is open for auto execution.

Security Open/Closed Message			
Name	Offset	Value	Hex Value
Message Type	0	"O"	4F

Timestamp	1	9:30:00.345678912	1F 1A E3 74 94 40
Strategy Id	7	3000000	00 2D C6 C0
Open State	11	"Y"	59

Network byte stream (in hex):
- 4F 1F 1A E3 74 94 40 00 2D C6 C0 59

Example 5 – Strategy Best Bid AND Ask Update
At 11:08:44.567891234 am, the system sends a Strategy *Best Bid AND Ask Update* message representing a $2.5000(200) x $2.6000(70000) quote with regular condition for option with id 3000000. The bid and ask Cust sizes were 75 and 137 contracts, respectively. The bid and ask ProCust sizes were 50 and 69000 contracts, respectively.

Strategy Best Bad AND Ask Update			
Name	**Offset**	**Value**	**Hex Value**
Message Type	0	"C"	43
Timestamp	1	11:08:44.567891234	24 7E 3A 9D AD 22
Strategy Id	7	3000000	00 2D C6 C0
Quote Condition	11	"<space>"	20
Bid Price	12	2.5000	00 00 61 A8
Bid Size	16	200	00 00 00 C8
Bid Cust Size	20	75	00 00 00 4B
Bid ProCust Size	24	50	00 00 00 32
Bid NTT Size	28	0	00 00 00 00
Bid Market Size	32	0	00 00 00 00
Bid NTT Market Size	36	0	00 00 00 00
Ask Price	40	2.6000	00 00 65 90
Ask Size	44	70000	00 01 11 70
Ask Cust Size	48	137	00 00 00 89
Ask ProCust Size	52	69000	00 00 0D 88
Ask NTT Size	56	0	00 00 00 00
Ask Market Size	60	0	00 00 00 00
Ask NTT Market Size	64	0	00 00 00 00

Network byte stream (in hex):
- 43 24 7E 3A 9D AD 22 00 2D C6 C0 20 00 00 61 A8 00 00 00 C8 00 00 00 4B 00 00 00 32 00 00 00 00 00 00 00 00 00 00 00 00 65 90 00 01 11 70 00 00 00 89 00 00 0D 88 00 00 00 00 00 00 00 00 00 00 00 00

Example 6 – Strategy Best Bid OR Ask Update
At 11:08:44.789123456 am, the system sends a Strategy *Best Bid OR Ask Update* message representing a $2.5500(300) bid side quote with regular condition for option with id 3000000 and the ask side the same as the last ask side received. The Cust size was 137 contracts and the ProCust size was 68000 contracts.

If the previously received quote for this option was in Example 7, the current two sided quote would be $2.5500(300) x $2.6000(69000), reflecting the last seen ask side for this quote. In addition, the bid Cust and ProCust sizes are 37and 111 contracts, respectively, as previously reported.

Best Bad OR Ask Update – Long Form Message			
Name	**Offset**	**Value**	**Hex Value**
Message Type	0	"D"	44

Timestamp	1	11:08:44.789123456	24 7E 47 CD 69 80
Strategy Id	7	3000000	00 2D C6 C0
Quote Condition	11	"<space>"	20
Price	12	2.6000	00 00 65 90
Size	16	69000	00 01 0D 88
Cust Size	20	137	00 00 00 89
ProCust Size	24	68000	00 01 09 A0
NTT Size	28	0	00 00 00 00
Market Size	32	0	00 00 00 00
NTT Market Size	36	0	00 00 00 00

Network byte stream (in hex):
- 44 24 7E 47 CD 69 80 00 2D C6 C0 20 00 00 65 90 00 01 0D 88 00 00 00 89 00 01 09 A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Example 7 – Complex Strategy Ticker Message
At 3:58:44.891234567 pm, the system sends a *Ticker* message for strategy id 3000000, last price $1.1000, size 16, volume 127535, high $1.8000, low $0.9200, first $1.0000.

Ticker Message			
Name	**Offset**	**Value**	**Hex Value**
Message Type	0	"t"	74
Timestamp	1	15:58:44.891234567	34 51 0E B5 31 07
Strategy Id	7	3000000	00 2D C6 C0
Last Price	11	1.10000000	00 00 00 00 06 8E 77 80
Size	19	16	00 00 00 00 10
Volume	23	127535	00 01 F2 2F
High	27	1.80000000	00 00 00 00 0A BA 95 00
Low	35	0.92000000	00 00 00 00 05 7B CF 00
First	43	1.00000000	00 00 00 00 05 F5 E1 00
Trade Condition	51	"<blank>"	20

Network byte stream (in hex):
- 74 34 51 0E B5 31 07 00 2D C6 C0 00 00 00 00 06 8E 77 80 00 00 00 10 00 01 F2 2F 00 00 00 00 0A BA 95 00 00 00 00 00 05 7B CF 00 00 00 00 00 05 F5 E1 00 20

Example 8 – Snapshot Message

The last message of the Glimpse snapshot is a *Snapshot* message to complete the snapshot. In this example the final message of the snapshot indicates that the snapshot is complete and the recipient should process data on the live stream starting at Sequence Number 123456789 (i.e. the snapshot is a picture of the live stream from sequence 1 to 123456788 inclusive).

Snapshot Message			
Name	**Offset**	**Value**	**Hex Value**
Message Type	0	"M"	4D
Sequence Number	1	"00000000000123456789" (zero-padded ASCII number)	30 30 30 30 30 30 30 30 30 30 30 30 31 32 33 34 35 36 37 38 39

Network byte stream (in hex):

- 4D 30 30 30 30 30 30 30 30 30 30 30 31 32 33 34 35 36 37 38 39

Appendix B – Document Revision Control Log

August 23, 2017: ISE Top Combo Feed - Version 1.0

- Adjusting system event enumeration "S" *Start of System Hours* to 3:00 AM

June 13, 2017: ISE Top Combo Feed - Version 1.0

- Adjusting system event enumeration "O" *Start of Messages* to 12:30 AM

May 30, 2017: ISE Top Combo Feed - Version 1.0

- Adding system event enumeration "W" for early close on expiration day of WCO (FX) options

April 19, 2017: Nasdasq ISE Trade Combo Feed – Version 1.0
- Adding Security Symbol to Complex Strategy Directory Message

April 5, 2017: ISE Trade Combo Feed – Version 1.0
- Clarifying all complex instrument prices will be signed integers

March 21, 2017: ISE Trade Combo Feed - Version 1.0
- Corrected System Event message layout.

March 9, 2017: ISE Top Combo Quote Feed - Version 1.0
- Changing *Quote Condition* enumeration to "X" for pre-open/halt in Strategu Best Bid AND Ask Update & Strategy Best Bid OR Ask Update Messages
- Clarifying negative prices will be represented with a negative integer

January 13, 2017: ISE Top Combo Quote Feed - Version 1.0
- Changing *Start of Currency Opening Process* system even enumeration from "W" to "F"

November 29, 2016: ISE Top Combo Quote Feed - Version 1.0
- Initial specification.