Nasdaq ISE/Nasdaq GEMX Top Quote Feed

Nasdaq ISE/Nasdaq GEMX Glimpse for Top Quote Feed

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1. Overview

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

- Best Bid and Offer Quotations: The options system will calculate and disseminate its best bid and offer position, with aggregated size, based on displayable order and quote interest in the options market system. For bandwidth efficiency reasons, the feed will display Quotes as two sided if both the bid and ask sides change, one sided if only one side changes. Quotes are displayed on this feed once the option has been opened.
- Ticker Messages: Displays last trade information along with opening price, cumulative volume, high and low prices for the day.
- Administrative and market event messages including: • Options Directory messages to be disseminated to relay basic option symbol and contract information for those securities traded on the options market.
  - Security Open Message to be disseminated for each security as soon as the opening auction process is completed to inform recipients that the option symbol denoted in the message is available for auto execution within the options market system.
  - Trading action messages to inform market participants when a specific security is halted or released for trading on the options market.
- 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, Option definitions, Option 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. 2 byte Price fields are unsigned positive numbers. 4 and 8 byte Price fields are signed numbers. 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.

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

4. Message Formats

This feed supports four basic types of messages:

- System Events
- Administrative Data and Market Events
- Best bid and offer updates
- 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 ~ 12:00am
"S"	Start of System Hours. This message indicates that the options system is open and ready to start accepting orders.	After Start of Messages and before Start of Currency Opening Process
"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 lasttradingdate of WCO options.	12:00 Noon

4.2. Option Directory Message

At the start of each trading day, the options system disseminates directory messages for all symbols eligible for trading in the options system.

Options Directory Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"D" = Directory Message
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Option ID for this option, assigned daily, valid for trading day.
Security Symbol	11	6	Alphanumeric	Denotes the option root symbol (security symbol)
Expiration Year	17	1	Integer	Last two digits of the year of the option expiration
Expiration Month	18	1	Integer	Expiration Month of the option (1-12)
Expiration Day	19	1	Integer	Day of the Month of expiration (1-31)
Strike Price	20	8	Integer	Explicit strike price in fixed point format with 12 whole number places followed by 8 decimal digits.
Option Type	28	1	Alpha	"C" = Call option "P" = Put option
Source	29	1	Integer	Identifies the source of the option, valid for the trading day.
Underlying Symbol	30	13	Alpha	Denotes the unique symbol assigned to the underlying security within the Exchange System.
Trading Type	43	1	Alpha	Indicates what kind of option this is: "E" = Equity "I" = Index "F" = ETF "C" = Currency
Contract Size	44	2	Integer	Underlying deliverable size

Options Directory Message

Name	Offset	Length	Value	Notes
Option Closing Type	46	1	Alpha	Denotes which System Event is used to determine when trading ceases in this symbol. "N" = Normal Hours "L" = Late Hours
Tradable	47	1	Alpha	Denotes whether or not this option is tradable at the exchange: "Y" = Option is tradable "N" = Option is not tradable
MPV	48	1	Alpha	Minimum Price Variation for this option: "E" = penny Everywhere "S" = Scaled "P" = penny Pilot
Closing Only	49	1	Alpha	Closing position of the option: "Y" = Option is Closing Position Only. Only Market Maker origin orders can have open position "N" = Option is not Closing Position Only

Options Directory Notes:

1. The options directory messages are sent once per symbol, typically before the "Start of System Hours" System Event. Should it be necessary, intra-day updates to this message will be sent as they occur. In the case of an intra-day update, for a given Option Id, the canonical information for the option is invariant (will not change). The canonical information consists of Security Symbol, Expiration Year Month and Day, Strike Price and Option Type. Other attributes for the Option may change.
2. Firm should note that they will only receive Option Directory messages for the symbol range associated with the matching engine serving that connection.
3. 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.
4. This is a sequenced message and therefore can be replayed upon re-connection.
5. If an Option is removed from the system intra-day, a new options directory message will be sent with "Tradable" field set to "N".
6. The Minimum Price Variation (MPV) has the following values:
   a. "E" – All prices are in penny increments
   b. "S" – Prices below $3.00 are in increments of $0.05, prices above $3.00 are in increments of $0.10
   c. "P" – Prices below $3.00 are in increments of $0.01, prices above $3.00 are in increments of $0.05

4.3. Trading Action Message

Nasdaq uses this administrative message to indicate the current trading status of an index or equity option within Nasdaq' options exchanges.

Prior to the start of system hours, Nasdaq will send out a Trading Action spin. In the spin, Nasdaq will send out an Option Trading Action message with the "T" (Trading Resumption) for all options contracts that are eligible for trading at the start of the Nasdaq's Options exchanges system hours. If an option is absent from the pre-opening Trading Action spin, firms should assume that the option is being treated as halted in the Nasdaq Options platform at the start of the system hours. Please note that options may be halted in the Nasdaq system for regulatory or operational reasons.

After the start of system hours, Nasdaq will use the Trading Action message to relay changes in trading status for an individual option. Messages will be sent when an option is halted, is released for quotation, or released for trading.

Trading Action Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"H" = Trading Action
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Current Trading State	11	1	Alpha	Reflects the current trading state for the options security in the options market. The allowable values are: "H" = Halt in effect "T" = Trading on the options system

4.4. Security Open/Closed Message

The options system uses this administrative message to indicate when an option 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 Security Open/Closed Message for each option as soon as the opening is completed. Upon receipt of the message with "Open State" = "Y", the recipient is advised that the option 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 option 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.
Option 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 Trading Action message in order to determine if a contract is in a Halt state for the day. A security open message should not override the 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. Opening Imbalance Message

Nasdaq disseminates Opening Imbalance information at regular intervals in the time leading up to the Nasdaq Opening Auction events. For the Nasdaq Opening Auction, Nasdaq will begin the dissemination of Opening Imbalance messages for a put or call option prior to the start of the opening process event and also prior to the halt resumption (reopening) process event.

Opening Imbalance Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"N" = Opening Imbalance
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Paired Contracts	11	4	Integer	The total number of contracts that are eligible to be matched at the Current Reference Price.
Imbalance Direction	15	1	Alpha	Indicates the market side of the imbalance: "B" = buy imbalance "S" = sell imbalance
Imbalance Price	16	4	Integer	The imbalance price in fixed point format with 6 whole number places followed by 4 decimal digits.
Imbalance Volume	20	4	Integer	The imbalance volume.

4.6. Best Bid AND Ask Update – Short Form Message

The options system will continuously calculate its best bid and offer position for active options contracts 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.

There are two forms of the Best Bid AND Ask Update, the Short Form has Prices and Sizes in 2 byte Integer fields. Note that 2 byte Prices are in pennies and does not imply a loss of precision in the price.

NOTE: Quotes are displayed on this feed prior to the open and may be displayed crossed before the market for Option is open. Additionally, market order quantity that can rest pre-open will be included in the Bid and Ask Size fields.

Best Bid AND Ask Update – Short Form Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"q" = Best bid AND ask update
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	11	1	Alpha	<space> = regular quote/autox eligible "X" = not autox eligible
Bid Market Order Size	12	2	Integer	Number of market order contracts on the bid side
Bid Price	14	2	Integer	Best bid price in fixed point format with 3 whole number places followed by 2 decimal digits

Best Bid AND Ask Update – Short Form Message

Name	Offset	Length	Value	Notes
Bid Size	16	2	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Bid Cust Size	18	2	Integer	Customer quantity on the bid side.
Bid ProCust Size	20	2	Integer	Customer professional quantity on the bid side.
Ask Market Order Size	22	2	Integer	Number of market order contracts on the ask side
Ask Price	24	2	Integer	Best ask price in fixed point format with 3 whole number places followed by 2 decimal digits
Ask Size	26	2	Integer	Aggregated number of contracts on the ask side being displayed in the options market at the current time.
Ask Cust Size	28	2	Integer	Customer quantity on the ask side.
Ask ProCust Size	30	2	Integer	Customer professional quantity on the ask side

4.7. Best Bid AND Ask Update – Long Form Message

This message is the same as the Best Bid AND Ask Update Message – Short Form described above except that Prices and Sizes are 4 byte Integers, the price having 4 implied decimal places.

Best Bid AND Ask Update – Long Form Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	“Q” = Best bid AND ask update
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	11	1	Alpha	<space> = regular quote/autox eligible “X” = not autox eligible
Bid Market Order Size	12	4	Integer	Number of market order contracts on the bid side
Bid Price	16	4	Integer	Best bid price in fixed point format with 6 whole number places followed by 4 decimal digits.
Bid Size	20	4	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Bid Cust Size	24	4	Integer	Customer quantity on the bid side.
Bid ProCust Size	28	4	Integer	Customer professional quantity on the bid side.
Ask Market Order Size	32	4	Integer	Number of market order contracts on the ask side
Ask Price	36	4	Integer	Best ask price in fixed point format with 6 whole number places followed by 4 decimal digits.
Ask Size	40	4	Integer	Aggregated number of contracts on the ask side being displayed in the options market at the current time.
Ask Cust Size	44	4	Integer	Customer quantity on the ask side.
Ask ProCust Size	48	4	Integer	Customer professional quantity on the ask side.

4.8. Best Bid OR Ask Update – Short Form Message

The options system will continuously calculate its best bid and offer position for active options contracts 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.

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

There are two forms of the Best Bid OR Ask Update; the Short Form has Price and Size in 2 byte Integer fields. Note that 2 byte Price is in pennies and does not imply a loss of precision in the price.

Best Bid OR Ask Update – Short Form Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	Best bid OR ask update: "b" = Quote update bid side "a" = Quote update ask side
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	11	1	Alpha	<space> = regular quote/autox eligible "X" = not autox eligible
Market Order Size	12	2	Integer	Number of market order contracts on the bid or ask side
Price	14	2	Integer	Best bid or ask price in fixed point format with 3 whole number places followed by 2 decimal digits
Size	16	2	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.
Cust Size	18	2	Integer	Customer quantity on the bid or ask side.
ProCust Size	20	2	Integer	Customer professional quantity on the bid or ask side.

4.9. Best Bid OR Ask Update – Long Form Message

This message is the same as the Best Bid OR Ask Update Message – Short Form described above except that Prices and Sizes are 4 byte Integers, the price having 4 implied decimal places.

Best Bid OR Ask Update – Long Form Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	Best bid OR ask update: "B" = Quote update bid side "A" = Quote update ask side
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	11	1	Alpha	<space> = regular quote/autox eligible "X" = not autox eligible

Best Bid OR Ask Update – Long Form Message

Name	Offset	Length	Value	Notes
Market Order Size	12	4	Integer	Number of market order contracts on the bid or ask side
Price	16	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	20	4	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.
Cust Size	24	4	Integer	Customer quantity on the bid or ask side.
ProCust Size	28	4	Integer	Customer professional quantity on the bid or ask side.

4.10. 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" = Ticker
Timestamp	1	6	Integer	The time, expressed as the number of nanoseconds after midnight.
Option ID	7	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Last Price	11	4	Integer	Most recent price.
Size	15	4	Integer	Last traded quantity.
Volume	19	4	Integer	Total traded quantity.
High	23	4	Integer	High price for the day.
Low	27	4	Integer	Low price for the day.
First	31	4	Integer	Opening price for the day
Trade Condition	35	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:

- All prices in this message are in fixed point format with 6 whole number places followed by 4 decimal digits
- 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 Quote Feed

Top Quote Feed has a mechanism for out-of-band recovery: Glimpse for Top 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 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 Quote Feed sequence number when the Glimpse snapshot was taken. To keep the stream current, process the Top Quote Feed messages beginning with the message sequence number in this snapshot message. Note: While Top 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

- For general product support for Nasdaq data feeds, please contact Nasdaq Market Data at clientsuccess@nasdaq.com.
- 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;
- 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 – Options Directory Message

At 6:30:00.234567891 am, the system sends an Options Directory message describing a tradable option having ID 85393 with the following properties: security symbol "OIH1", equity option, expiration date 1/20/2017, strike price $29.10000000, type call option, underlying symbol "OIH", contract size 100, Option is Closing Position Only, normal closing hours, "Scaled" MPV, trading on the exchange on source 2.

Options Directory Message

Name	Offset	Value	Hex Value
Message Type	0	"D"	44
Timestamp	1	6:30:00.234567891	15 48 4A AB 48 D3
Option Id	7	85393	00 01 4D 91
Security Symbol	11	"OIH1"	4F 49 48 31 20 20
Expiration Year	17	2017	11
Expiration Month	18	1	01
Expiration Day	19	20	14
Strike Price	20	29.10000000	00 00 00 00 AD 73 13 80
Option Type	28	Call	43
Source	29	2	02
Underlying Symbol	30	"OIH"	4F 49 48 20 20 20 20 20 20 20 20 20 20

Options Directory Message

Name	Offset	Value	Hex Value
Trading Type	43	“E”	45
Contract Size	44	100	00 64
Option Closing Type	46	“N”	4E
Tradable	47	“Y”	59
MPV	48	“S”	53
Closing Only	49	“Y”	59

Network byte stream (in hex):

- 44 15 48 4A AB 48 D3 00 01 4D 91 4F 49 48 31 20 20 11 01 14 00 00 00 00 AD 73 13 80 43 02 4F 49 48 20 20 20 20 20 20 20 20 20 20 45 00 64 4E 59 53 59

Example 3 – Trading Action Message

At 1:51:45.234567891 pm, the system sends a Trading Action message indicating that option with id 85393 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
Option Id	7	85393	00 01 4D 91
Current Trading State	11	“H”	48

Network byte stream (in hex):

- 48 2D 63 77 C7 62 D3 00 01 4D 91 48

Example 4 – Security Open/Closed Message

At 9:30:00.345678912 am, the system sends a Security Open/Closed message indicating that option with id 85393 is open for auto execution.

Security Open/Closed Message

Name	Offset	Value	Hex Value
Message Type	0	“”	4F
Timestamp	1	9:30:00.345678912	1F 1A E3 74 94 40
Option Id	7	85393	00 01 4D 91
Open State	11	“Y”	59

Network byte stream (in hex):

- 4F 1F 1A E3 74 94 40 00 01 4D 91 59

Example 5 –Opening Imbalance Message

At 9:28:35.987654321 am, the system sends an Opening Imbalance message indicating that option with id 85393 has 35 paired contracts with imbalance on the buy side with imbalance price of $1.0000 and imbalance volume of 10 contracts.

Opening Imbalance Message

Name	Offset	Value	Hex Value
Message Type	0	"N"	4E
Timestamp	1	9:28:35.987654321	1F 07 3F 53 46 B1
Option Id	7	85393	00 01 4D 91
Paired Contracts	11	35	00 00 00 23
ImbalanceDirection	15	"B"	42
Imbalance Price	16	1.0000	00 00 27 10
Imbalance Volume	20	10	00 00 00 0A

Network byte stream (in hex):

- 4E 1F 07 3F 53 46 B1 00 01 4D 91 00 00 00 23 42 00 00 27 10 00 00 00 0A

Example 6 – Best Bid AND Ask Update – Short Form Message

At 10:35:21.456789123 am, the system sends a Best Bid AND Ask Update - Short Form message representing a $2.5000(200) x $2.6000(300) quote with regular condition for option with id 85393. The bid and ask market order sizes were 50 and 75 contracts, respectively. The bid and ask Cust sizes were 75 and 137 contracts, respectively. The bid and ask ProCust sizes were 50 and 70 contracts, respectively.

Best Bad AND Ask Update – Short Form Message

Name	Offset	Value	Hex Value
Message Type	0	"q"	71
Timestamp	1	10:35:21.456789123	22 AB D7 E3 E6 83
Option Id	7	85393	00 01 4D 91
Quote Condition	11	"<space>"	20
Bid Market Order Size	12	50	00 32
Bid Price	14	2.5000	00 FA
Bid Size	16	200	00 C8
Bid Cust Size	18	75	00 4B
Bid ProCust Size	20	50	00 32
Ask Market Order Size	22	75	00 4B
Ask Price	24	2.6000	01 04
Ask Size	26	300	01 2C
Ask Cust Size	28	137	00 89
Ask ProCust Size	30	70	00 46

Network byte stream (in hex):

- 71 22 AB D7 E3 E6 83 00 01 4D 91 20 00 32 00 FA 00 C8 00 4B 00 32 00 4B 01 04 01 2C 00 89 00 46

Example 7 – Best Bid AND Ask Update – Long Form Message

At 11:08:44.567891234 am, the system sends a Best Bid AND Ask Update – Long Form message representing a $2.5000(200) x $2.6000(70000) quote with regular condition for option with id 85393. The bid and ask market order sizes were 50 and 75 contracts, respectively. The bid and ask Cust sizes were 75 and 137 contracts, respectively. The bid and ask ProCust sizes were 50 and 69000 contracts, respectively.

Best Bad AND Ask Update – Long Form Message

Name	Offset	Value	Hex Value
Message Type	0	“Q”	51
Timestamp	1	11:08:44.567891234	24 7E 3A 9D AD 22
Option Id	7	85393	00 01 4D 91
Quote Condition	11	“<space>”	20
Bid Market Order Size	12	50	00 00 00 32
Bid Price	16	2.5000	00 00 61 A8
Bid Size	20	200	00 00 00 C8
Bid Cust Size	24	75	00 00 00 4B
Bid ProCust Size	28	50	00 00 00 32
Ask Market Order Size	32	75	00 00 00 4B
Ask Price	36	2.6000	00 00 65 90
Ask Size	40	70000	00 01 11 70
Ask Cust Size	44	137	00 00 00 89
Ask ProCust Size	48	69000	00 00 0D 88

Network byte stream (in hex):

- 51 24 7E 3A 9D AD 22 00 01 4D 91 20 00 00 00 32 00 00 61 A8 00 00 00 C8 00 00 00 4B 00 00 00 32 00 00 00 4B 00 00 65 90 00 01 11 70 00 00 00 89 00 00 0D 88

Example 8 – Best Bid OR Ask Update – Short Form Message

At 11:08:44.678912345 am, the system sends a best bid or ask update – short form message representing a $2.5500(300) bid side quote with regular condition for option with id 85393 and the ask side the same as the last ask side received. The market order size was 50 contracts. The Cust size was 37 contracts and the ProCust size was 111 contracts.

If the previously received quote for this option was in Example 6, the current two sided quote would be $2.5500(300) x $2.6000(70000), reflecting the last seen ask side for this quote with bid and ask market order sizes of 50 and 75 contracts, respectively. In addition, the ask Cust and ProCust sizes are 137 and 69000 contracts, respectively, as previously reported.

Best Bad OR Ask Update – Short Form Message

Name	Offset	Value	Hex Value
Message Type	0	“b”	62
Timestamp	1	11:08:44.678912345	24 7E 41 3B B9 59
Option Id	7	85393	00 01 4D 91
Quote Condition	11	“<space>”	20
Market Order Size	12	50	00 32
Price	14	2.5500	00 FF
Size	16	300	01 2C

Best Bad OR Ask Update – Short Form Message

Name	Offset	Value	Hex Value
Cust Size	18	37	00 25
ProCust Size	20	111	00 6F

Network byte stream (in hex):

- 62 24 7E 41 3B B9 59 00 01 4D 91 20 00 32 00 FF 01 2C 00 25 00 6F

Example 9 – Best Bid OR Ask Update – Long Form Message

At 11:08:44.789123456 am, the system sends a Best Bid OR Ask Update – Long Form message representing a $2.5500(300) bid side quote with regular condition for option with id 85393 and the ask side the same as the last ask side received. The market order size was 75 contracts. 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 with bid and ask market order sizes of 50 and 75 contracts, respectively. 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	"A"	41
Timestamp	1	11:08:44.789123456	24 7E 47 CD 69 80
Option Id	7	85393	00 01 4D 91
Quote Condition	11	"<space>"	20
Market Order Size	12	75	00 00 00 4D
Price	16	2.6000	00 00 65 90
Size	20	69000	00 01 0D 88
Cust Size	24	137	00 00 00 89
ProCust Size	28	68000	00 01 09 A0

Network byte stream (in hex):

- 41 24 7E 47 CD 69 80 00 01 4D 91 20 00 00 00 4D 00 00 65 90 00 01 0D 88 00 00 00 89 00 01 09 A0

Example 10 – Ticker Message

At 3:58:44.891234567 pm, the system sends a Ticker message for option id 85393, 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"	54
Timestamp	1	15:58:44.891234567	34 51 0E B5 31 07
Option Id	7	85393	00 01 4D 91
Last Price	11	1.1000	00 00 2A F8
Size	15	16	00 00 00 10
Volume	19	127535	00 01 F2 2F
High	23	1.8000	00 00 46 50

Ticker Message

Name	Offset	Value	Hex Value
Low	27	0.9200	00 00 23 F0
First	31	1.0000	00 00 27 10
Trade Condition	35	“<blank>”	20

Network byte stream (in hex):

- 54 34 51 0E B5 31 07 00 01 4D 91 00 00 2A F8 00 00 00 10 00 01 F2 2F 00 00 46 50 00 00 23 F0 00 00 27 10 20

Example 10 – 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 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

September 13, 2016: Nasdaq ISE/Gemini/Mercury Top Quote Feed - Version 1.00

- Initial specification.

October 12, 2016: Nasdaq ISE/Gemini/Mercury Top Quote Feed - Version 1.01

- Fixed Trading Type enumeration in Option Directory Message Added Market Order Sizes to Quotes

December 16, 2016: Nasdaq ISE/Gemini/Mercury Top Quote Feed - Version 1.01

- Adjusted Section 4.7 Title to “Best Bid AND Ask Update – Long Form”

January 13, 2017: Nasdaq ISE/Gemini/Mercury Top Quote Feed - Version 1.01

- Adjusted Start of Currency Opening Process enumeration from “W” to “F” Clarifying intra-day removal of option impact on option directory message

April 19, 2017: Nasdaq ISE/Nasdaq GEMX/Nasdaq MRX Top Quote Feed - Version 1.01

- Clarifying Quote Conditiion enumeration “X” = not autox eligible

May 30, 2017: ISE Top Quote Feed - Version 1.01

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

June 13, 2017: ISE Top Quote Feed - Version 1.01

- Adjusting system event enumeration “O” Start of Messages to 12:30 AM

December 17, 2019: ISE Top Quote Feed - Version 1.02

- Updated the Start of Messages (System Event Code “O”) time to ~2:00 am.

May 20, 2021: ISE Top Quote Feed - Version 1.02

- Clarifying Overview.

November 3, 2022: Nasdaq ISE/Nasdaq GEMX Top Quote Feed - Version 1.02

- Removed any reference to Nasdaq MRX (MRX)

January 9, 2023: Nasdaq ISE/Nasdaq GEMX Trade Feed – Version 1.0.3

- Version updated to 1.0.3
- Clarifying the Data Types: Added “2 byte Price fields are unsigned positive numbers. 4 and 8 byte Price fields are signed numbers.”

June 2, 2023: Nasdaq ISE/GEMX Depth of Market Feed - Version 1.03

- Start of Messages(“O”) event start time changed from “After ~2am” to “After ~12am”