Options Top of Market Feed

Version 2.1

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1. Overview

Nasdaq MRX, GEMX, ISE, BX and PHLX Top of Market Feed (MRX, GEMX, ISE, BX and PHLX Top) are direct data feed product offered by The Nasdaq MRX, GEMX, ISE, BX and PHLX Options Market®, which features the following data elements:

- 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. These messages are only disseminated when the option is in a continuous trading state. For bandwidth efficiency reasons, the feed will display Quotes as two sided if the bid and ask sides change, one sided if only one side changes.
- Administrative messages: such trading actions and symbol directory messages:
  - Trading action messages are used to inform market participants when an option is halted or released for trading and the current state of the option.
  - Symbol Directory messages provide basic option data.

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 MRX, GEMX, ISE, BX and PHLX 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 2 groups of Multicast or Soup channels: the “Q” Group, for Quote related information; and the “T” Group, for Trade related information.

Both the primary (“A feed”) and secondary (“B feed”) will be hosted by servers co-located with the trading system and will have identical performance characteristics. In fact the “A” and “B” feeds are logically identical: Mold or Soup messages will have the same Mold or Soup sequence numbers across all the streams.

Please note that Nasdaq has determined to provide local redundancy in the NY Metro Area (“A” and “B” feeds), while using the Mid-Atlantic Region (“C” feed) for disaster recovery in the event order entry is switched from the NY Metro Area. A complete set of alternate connection parameters are available for each Multicast Channel and TCP Connection in the event of a failure in any of the primary connections.

The SoupBinTCP channel will be available only for replaying messages. Upon client login, the channel will replay all messages until it is ready to stream live data. Once the replay is complete, it will publish an "End Of Replay Sequence" message with the sequence number that allows the client to resume receiving real-time messages from the Mold channel. The client connection on the replay channel will stay up with just the soup heartbeats. The client can then disconnect and ask for another replay if necessary.

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 8 bytes long.

Prices are 2 byte or 4 byte Integer fields. 2 byte Price fields are unsigned positive numbers. 4 byte Price fields are signed positive numbers. 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.

4. Message Formats

This feed supports the following types of messages:

- System Events including Administrative Messages and market events
- Best bid and offer updates
- Opening/Re-opening Auction 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
Tracking Number	1	2	Integer	Internal system tracking number
Timestamp	3	8	Integer	Nanoseconds since midnight.
Event Code	11	1	Alpha	Refer to System Event Codes below

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.	After Start of Messages and before Start of Currency Opening Process
"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. Administrative Messages

4.2.1. Derivative Directory Message

At the start of each trading day, Nasdaq disseminates options symbol directory messages for all active options symbols in the system. Notes on the Derivative Directory Messages:

- The Derivative 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.
- Firms should note that they will only receive Derivative Directory messages for the symbol range associated with the matching engine serving that connection.
- 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.
- If an Option is removed from the system intra-day, a new options directory message will be sent with "Tradable" field set to "N".

Any Quotes sent for this removed Option will be rejected. All existing quotes for this option will be purged.

- The Minimum Price Variation (MPV) has the following values:
  - "E" – All prices are in penny increments
  - "S" – Prices below $3.00 are in increments of $0.05, prices above $3.00 are in increments of $0.10
  - "P" – Prices below $3.00 are in increments of $0.01, prices above $3.00 are in increments of $0.05

Derivative Directory Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"m" = Directory Message
Tracking Number	1	2	Integer	Internal System tracking number
Timestamp	3	8	Integer	The time, expressed as the number of nanoseconds after midnight.
Instrument ID	11	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Security Symbol	15	8	Alphanumeric	Denotes the option root symbol (security symbol)
Expiration Year	23	1	Integer	Last two digits of the year of the option expiration
Expiration Month	24	1	Integer	Expiration Month of the option (1-12)
Expiration Day	25	1	Integer	Day of the Month of expiration (1-31)
Explicit Strike Price	26	4	Integer	Explicit strike price. Refer to Data Types for field processing notes.
Option Type	30	1	Alpha	"C" = Call option "P" = Put option "N" = Not Applicable
Underlying Symbol	31	13	Alpha	Denotes the unique symbol assigned to the underlying security within the Exchange System.
Closing Type	44	1	Alpha	Denotes which System Event is used to determine when trading ceases in this symbol. "N" = Normal Hours "L" = Late Hours "W" = WCO Early Closing at 12:00

Derivative Directory Message

Name	Offset	Length	Value	Notes
Tradable	45	1	Alpha	Denotes whether or not this option is tradable at the exchange: "Y" = Option is tradable "N" = Option is not tradable
MPV	46	1	Alpha	Minimum Price Variation for this option: "E" = penny Everywhere "S" = Scaled "P" = penny Pilot
Reserved	47	16	Alpha	Reserved for future use.

4.2.2. Trading Action Message

The options system uses this administrative message to indicate the current trading status of an index or equity option within the options market.

The Options Trading Action message will be used to indicate the current trading state of the instrument as it transitions through the various states during the trading session. It will begin with Pre Open state if it is eligible for trading. The states Opening and Re-Opening indicate that the instrument is undergoing an auction prior to it moving into Continuous Trading state. Buy Side and Sell Side Trading Suspended states are special cases of Continuous Trading. The instrument transitions to Closed state at the end of trading hours. At any point before the Closed state the instrument can enter the Halted state 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, released for trading, or temporarily suspended for trading on the buy or sell side.

Trading Action Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"H" = Trading Action
Tracking Number	1	2	Integer	Internal System Tracking number
Timestamp	3	8	Integer	The time, expressed as the number of nanoseconds after midnight.
Instrument ID	11	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Current Trading State	15	1	Alpha	Reflects the current trading state for the options security in the options market. The allowable values are: "B"=Buy Side Suspended "S" =Sell-Side Suspended "H" = Halt in effect "T" = Continuous Trading "I" = Pre-Open "O" = Opening Auction "R" = Re-Opening "X" = Closed

4.3. Best Bid AND Ask Update – Short Form

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 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.

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.

Best Bid And Ask Update message will only be sent after an option is open for trading.

Best Bid AND Ask Update – Short Form Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	“q” = Best bid AND ask update
Tracking Number	1	2	Integer	Internal system tracking number
Timestamp	3	8	Integer	Nanoseconds since midnight
Instrument ID	11	4	Integer	Instrument ID assigned daily, valid for trading day
Quote Condition	15	1	Alpha	<space> = regular quote/autox eligible “X” = Ask side not firm bid side firm “Y” = Bid side not firm, ask side firm
Bid Market Order Size	16	2	Integer	Number of market order contracts on the bid side
Bid Price	18	2	Integer	Best bid price in fixed point format with 3 whole number places followed by 2 decimal digits
Bid Size	20	2	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Bid Cust Size	22	2	Integer	Customer quantity on the bid side. Not supported on BX (BX is an anonymous market). Always set to "0".
Bid ProCust Size	24	2	Integer	Customer professional quantity on the bid side. Not supported on BX (BX is an anonymous market). Always set to "0".
Ask Market Order Size	26	2	Integer	Number of market order contracts on the ask side
Ask Price	28	2	Integer	Best ask price in fixed point format with 3 whole number places followed by 2 decimal digits
Ask Size	30	2	Integer	Aggregated number of contracts on the ask side being displayed in the options market at the current time.
Ask Cust Size	32	2	Integer	Customer quantity on the ask side. Not supported on BX (BX is an anonymous market). Always set to "0".
Ask ProCust Size	34	2	Integer	Customer professional quantity on the ask side. Not supported on BX (BX is an anonymous market). Always set to "0".

4.4. Best Bid AND Ask Update – Long Form

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 message will only be sent after an option is open for trading.

Best Bid AND Ask Update – Long Form Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"Q" = Best bid AND ask update
Tracking Number	1	2	Integer	Internal system tracking number
Timestamp	3	8	Integer	Nanoseconds since midnight
Instrument ID	11	4	Integer	Instrument ID assigned daily, valid for trading day
Quote Condition	15	1	Alpha	<space> = regular quote/autox eligible "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Bid Market Order Size	16	4	Integer	Number of market order contracts on the bid side
Bid Price	20	4	Integer	Best bid price in fixed point format with 6 whole number places followed by 4 decimal digits
Bid Size	24	4	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Bid Cust Size	28	4	Integer	Customer quantity on the bid side. Not supported on BX (BX is an anonymous market). Always set to "0".
Bid ProCust Size	32	4	Integer	Customer professional quantity on the bid side. Not supported on BX (BX is an anonymous market). Always set to "0"
Ask Market Order Size	36	4	Integer	Number of market order contracts on the ask side
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. Not supported on BX (BX is an anonymous market). Always set to "0".
Ask ProCust Size	52	4	Integer	Customer professional quantity on the ask side. Not supported on BX (BX is an anonymous market). Always set to "0".

4.5. Best Bid OR Ask Update – Short Form

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 message will only be sent after an option is open for trading.

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
Tracking Number	1	2	Integer	Internal system tracking number
Timestamp	3	8	Integer	Nanoseconds since midnight
Instrument ID	11	4	Integer	Instrument ID assigned daily, valid for trading day
Quote Condition	15	1	Alpha	<space> = regular quote/autox eligible "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Market Order Size	16	2	Integer	Number of market order contracts on the bid or ask side
Price	18	2	Integer	Best bid or Ask price in fixed point format with 3 whole number places followed by 2 decimal digits
Size	20	2	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.
Cust Size	22	2	Integer	Customer quantity on the bid or ask side. Not supported on BX (BX is an anonymous market). Always set to "0".
ProCust Size	24	2	Integer	Customer professional quantity on the bid or ask side. Not supported on BX (BX is an anonymous market). Always set to "0".

4.6. Best Bid OR Ask Update – Long Form

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 message will only be sent after an option is open for trading.

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
Tracking Number	1	2	Integer	Internal system tracking number
Timestamp	3	8	Integer	Nanoseconds since midnight
Instrument ID	11	4	Integer	Instrument ID assigned daily, valid for trading day
Quote Condition	15	1	Alpha	<space> = regular quote/autox eligible "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Market Order Size	16	4	Integer	Number of market order contracts on the bid or ask side
Price	20	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	24	4	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.
Cust Size	28	4	Integer	Customer quantity on the bid and ask side. Not supported on BX (BX is an anonymous market). Always set to "0".
ProCust Size	32	4	Integer	Customer professional quantity on the bid or ask side. Not supported on BX (BX is an anonymous market). Always set to "0".

4.7. End of Replay Sequence Message (Only for SoupBINTCP)

The End of replay Sequence message reflects the sequence number at the time replay of existing messages is complete.

The firms can then use this sequence number to resume on the real time Mold channel.

End of Replay Sequence Message

Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"M" = End of Replay Sequence Message
Sequence Number	1	20	Alpha Numeric	Sequence number once the replay is complete. Use this sequence number to resume on the real time Mold channel.

Note: This field is ASCII representation of the sequence number.

5. Support

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

6. Document History

Revision	Published	Author(s)	Summary of Changes
Version 2.0	March 16, 2022		• Initial Draft
Version 2.01	June 16, 2022		• Removed NOII message due to no pre-open dissemination. • Updated the Trading Action Message with the following enumerations added to the Current Trading State Field: – "B"=Buy Side Suspended – "S" =Sell-Side Suspended
Version 2.02	January 9, 2023		• Version updated to 2.02 • Clarifying the Data Types: Added "2-byte Price Fields are unsigned positive numbers. 4-byte Price fields are signed positive numbers."
Version 2.02	March 31, 2023		• GEMX will adopt Top of Market v2.02 during the replatform scheduled to complete on November 13, 2023
Version 2.02	April 1, 2024		• ISE will adopt Top of Market v2.02 during the replatform schedule to Complete on September 23, 2024.
Version 2.1	August 30, 2024		• Converting the SoupBINTCP Protocol option to a replay without support for Live Market Data • Adding the End of Replay Sequence Message only for SoupBINTCP.
Version 2.1	October 2nd, 2024		Directory Message • Message type changed to "m" • Increase symbol size from 6 characters to 8 characters. • Add reserved field of 16 characters at the end of the message in preparation for Phase 2.
Version 2.1	January 9, 2025		Appendix A • Flex Symbology table added
Version 2.1	May 7, 2025		• Replaced the title to align with the title used for PHLX replatform • PHLX to adopt the options Top of Market feed v2.1 during the Replatform. • The Best Bid AND Ask Update - Long and Short form message tables were updated to include "Not supported on BX (BX is an anonymous market). Always set to "0"." for pro cust and cust sizes.

Appendix A

Flex Symbology

Underlying Security	Lead Character	Settlement Type	Exercise Style
Index	1	AM	American
Index	2	AM	European
Index	3	PM	American
Index	4	PM	European
Equity/ETF	1	PM	American
Equity/ETF	2	PM	European
ETF Cash	3	PM	American
ETF Cash	4	PM	European