

Options Depth of Market Feed

Version 2.1

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1. Overview

Nasdaq MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options Depth of Market Feeds (MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth) are direct data feed products offered by the Nasdaq MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options Markets, which feature the following data elements:

- Order and Quote data: For MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options, Nasdaq will provide full order and quote updates using the standard MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth feed format. MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth use a series of order and quote messages to track the life of an order and quote.¹
- Trade messages: To ensure that customers have complete information about the Nasdaq MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options order books, MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth will support a trade message to reflect a match of an order in the Nasdaq MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options systems but not already sent on the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth feeds.
- Net Order Imbalance Data: In the minutes leading up to the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options Opening Auctions, Nasdaq disseminates the indicative opening price and net order imbalance in the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options systems. Because the calculation includes orders that not booked, the Net Order Imbalance Indicators, included in the Auction Notification Message, are the best indicator of the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options opening prices available to the public.
- Administrative messages: messages that will reflect general instrument information:
 - 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.
 - Derivative Directory Messages provide basic option data.
- A separate connection for obtaining snapshots, called Glimpse for MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth of Market is also available, 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 MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth of Market Feeds 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. MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth are outbound market data feeds only. The MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth protocol does not support order or quote entry.

The MRX, GEMX, ISE, Nasdaq Texas Options and PHLX options systems offer the data feeds 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 |

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.

¹ MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Depth is an outbound market data feed only. The protocol does not support order or quote entry. For information on order/quote entry protocols for Nasdaq MRX, GEMX, ISE, Nasdaq Texas Options and PHLX , please refer to the Trading Services section of the Nasdaq Trader website.

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
- Derivative Directory Messages
- Trading Action Messages
- Announcements of order/quotes and cancels/modifications on the book
- Announcements of NOII opening auction information
- Announcements of trades/executions
- 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 |

System Event Codes

| Code | Explanation | When (typically) |
|------|--|------------------|
| "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) |

Derivative Directory Message

| Name | Offset | Length | Value | Notes |
|-----------------------|--------|--------|---------|---|
| 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 |
| 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. |

Trading Action Message

| Name | Offset | Length | Value | Notes |
|-----------------------|--------|--------|-------|---|
| Current Trading State | 15 | 1 | Alpha | <p>Reflects the current trading state for the options security in the options market. The allowable values are:</p> <p>"B" = Buy Side Suspended "S" = Sell-Side Suspended "H" = Halt in effect "T" = Continuous Trading "P" = Pre-Open "O" = Opening Auction "R" = Re-Opening "X" = Closed</p> |

4.3. Add Order Message

An Add Order Message indicates that a new order has been accepted by the Nasdaq MRX, GEMX or ISE system and was added to the displayable book. The message includes a day-unique Order Reference Number used by MRX, GEMX or ISE to track the order.

For bandwidth efficiency reasons, this message can be published in either short or long format.

Add Order Message – Short Form

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|---|
| Message Type | 0 | 1 | Alpha | "r" = Add Order 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. |
| Order Reference Number | 15 | 8 | Integer | The unique reference number assigned to the new order. The order reference number is Increasing, but not necessarily sequential |
| Side | 23 | 1 | Alpha | <p>Indicates the side of the order: "B" = buy "S" = sell "M" = buy implied "N" = sell implied</p> |
| Order Capacity | 24 | 1 | Alpha | <p>Indicates whether this is a: "C" = Customer Order "F" = Firm Order "M" = Nasdaq registered Market Maker Order "B" = Broker Dealer Order "P" = Professional Order "O" = Other exchange registered Market Maker Order "J" = JBO (Joint Back Office, only PHLX) " " = N/A (For Implied Order)</p> |
| Price | 25 | 2 | Integer | <p>The display price of the new order being added to the book. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.</p> |
| Volume | 27 | 2 | Integer | The total quantity of the new order being added to the book |
| Reserved | 29 | 4 | Alpha | Reserved for future use |

Add Order Message – Long Form

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "o" = Add Order 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. |
| Order Reference Number | 15 | 8 | Integer | The unique reference number assigned to the new order. The order reference number is Increasing, but not necessarily sequential |
| Side | 23 | 1 | Alpha | Indicates the side of the order: "B" = buy "S" = sell "M" = buy implied "N" = sell implied |
| Order Capacity | 24 | 1 | Alpha | Indicates whether this is a: "C" = Customer Order "F" = Firm Order "M" = Nasdaq registered Market Maker Order "B" = Broker Dealer Order "P" = Professional Order "O" = Other exchange registered Market Maker Order 'J' = JBO (Joint Back Office, only PHLX) " " = N/A (For Implied Order) |
| Price | 25 | 4 | Integer | The display price of the new order being added to the book. NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits. |
| Volume | 29 | 4 | Integer | The total quantity of the new order being added to the book |
| Reserved | 33 | 4 | Alpha | Reserved for future use |

4.4. Add Quote Message

An Add Quote Message indicates that a new quote has been accepted by the MRX, GEMX or ISE Option system and was added to the displayable book. The message includes a unique Bid/Ask Reference Numbers used by MRX, GEMX or ISE to track the quote. The bid/ask sequence numbers can change during the day and will be reflected in the quote update messages.

For bandwidth efficiency reasons, this message can be published in either short or long format.

Add Quote Message – Short Form

| Name | Offset | Length | Value | Notes |
|----------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "j" = New Quote Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Bid Reference Number | 15 | 8 | Integer | The bid reference number associated with the new quote |
| Ask Reference Number | 23 | 8 | Integer | The ask reference number associated with the new quote |

Add Quote Message – Short Form

| Name | Offset | Length | Value | Notes |
|-----------|--------|--------|---------|---|
| Bid Price | 31 | 2 | Integer | The display bid price of the new quote. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits. |
| Bid Size | 33 | 2 | Integer | The bid quantity of the new quote. |
| Ask Price | 35 | 2 | Integer | The display ask price of the new quote. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits. |
| Ask Size | 37 | 2 | Integer | The ask quantity of the new quote. |

Add Quote Message – Long Form

| Name | Offset | Length | Value | Notes |
|----------------------|--------|--------|---------|---|
| Message Type | 0 | 1 | Alpha | "J" = New Quote Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Bid Reference Number | 15 | 8 | Integer | The bid reference number associated with the new quote |
| Ask Reference Number | 23 | 8 | Integer | The ask reference number associated with the new quote |
| Bid Price | 31 | 2 | Integer | The display bid price of the new quote. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits. |
| Bid Size | 35 | 4 | Integer | The bid quantity of the new quote. |
| Ask Price | 39 | 4 | Integer | The display ask price of the new quote. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits. |
| Ask Size | 43 | 4 | Integer | The ask quantity of the new quote. |

4.5. Modify Order/Quote Message

Modify messages always include the Reference Number of the order, one or both sides of the quote to which the update applies. The Reference Numbers on an order/quote will change in the Replace messages. Depth of Market subscribers must track these Reference Number changes to know the current active Reference Number. The Reference numbers must be tracked separately for each side of a quote. To determine the current display contracts for an order or quote, Depth of Market subscribers must adjust the number of contracts stated in the Modify message from the original number of contracts stated in the Add/Replace message with the same reference number.

4.5.1. Single Side Executed Message

A "Side order" represents an order or one side of a quote.

This message is sent whenever a Side order is executed in whole or in part. It is possible to receive several Single Side Executed Messages for the same Side order if that Side order is executed in several parts. The multiple Single Side Executed Messages on the same order are cumulative. By combining the executions received separately via two types of Single Side Executed Messages and Trade Messages, it is possible to build a complete view of all non-auction executions that happen on The MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options Markets. Auction execution information is available in one bulk print via the Trade Message.

Single Side Executed Message

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|---|
| Message Type | 0 | 1 | Alpha | "e" = Single Side Order/Quote Executed Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Strategy ID | 15 | 4 | Integer | Complex Strategy ID in case of a leg execution. Not supported on ISE or MRX Options at this time. Not relevant for GEMX, always set to '0'. |
| Order Reference Number | 19 | 8 | Integer | The order reference number associated with the executed order. The order reference number is Increasing, but not necessarily sequential |
| Executed volume | 27 | 4 | Integer | The total quantity executed |
| Trade Condition | 31 | 1 | Alpha | The Trade Condition is the same as defined in the OPRA specification (OPRA terminology is either "Last Sale" or "Transaction"): https://www.opraplan.com/document-library Always refer to the www.opraplan.com website to ensure the possible Trade Conditions sent out by this feed, which are consistent with the Trade Conditions defined by OPRA. |
| Auction ID | 32 | 4 | Integer | Uniquely identifies the Auction for the trading day. |
| Cross Number | 36 | 4 | Integer | Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine. |
| Match Number | 40 | 4 | Integer | Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message. |

4.5.2. Single Side Executed with Price Message

A "Side order" represents an order or one side of a quote.

This message is sent whenever an incoming Side order is executed against the book in whole or in part at a price different from the initial display price. Since the execution price is different than the display price of the original Add/Replace, MRX, GEMX, ISE, Nasdaq Texas Options and PHLX include a price field within this execution message. It is possible to receive multiple Single Side Executed and Single Side Executed with Price messages for the same Side order if that Side order is executed in several parts. The multiple Single Side Executed messages on the same Side order are cumulative.

These executions may be marked as non-printable. If the execution is marked as non-printed, it means that the contracts will be included into a later bulk print (e.g., in the case of auction executions). If a firm is looking to use the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options Depth data in time-and-sales displays or volume calculations, Nasdaq recommends that firms ignore messages marked as non- printable to prevent double counting.

Single Side Executed With Price Message

| Name | Offset | Length | Value | Notes |
|-------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "c" = Single Side Order/Quote Executed With Price |
| Message Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Strategy ID | 15 | 4 | Integer | Complex Strategy ID in case of a leg execution. Not supported on MRX, GEMX or ISE Options at this time. Always set to '0'. |

Single Side Executed With Price Message

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|---|
| Order Reference Number | 19 | 8 | Integer | The order reference number associated with the executed order. The order reference number is Increasing, but not necessarily sequential |
| Cross Number | 27 | 4 | Integer | Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine. |
| Match Number | 31 | 4 | Integer | Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message. |
| Printable | 35 | 1 | Alpha | Indicates if the execution should be reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable |
| | | | | The execution price. |
| Price | 36 | 4 | Integer | NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits. |
| Volume | 40 | 4 | Integer | The execution quantity. |
| Trade Condition | 44 | 1 | Alpha | The Trade Condition is the same as defined in the OPRA specification (OPRA terminology is either "Last Sale" or "Transaction"): https://www.opraplan.com/document-library Always refer to the www.opraplan.com website to ensure the possible Trade Conditions sent out by this feed, which are consistent with the Trade Conditions defined by OPRA. |
| Auction ID | 45 | 4 | Integer | Uniquely identifies the Auction for the trading day. |

4.5.3. Order Cancel Message

This message is sent whenever an order on the book is modified as a result of a partial cancellation.

Order Cancel Message

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "X" = Order Cancel Message |
| 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 |
| Order Reference Number | 15 | 8 | Integer | The unique reference number associated with the order Integer being cancelled. The order reference number is Increasing, |
| Cancelled Volume | 23 | 4 | Integer | Volume to be removed from the display size of the order as the result of a cancellation. |

4.5.4. Single Side Replace Message

This message is sent whenever an order or one side of a quote on the book is replaced. The replacement has a new sequence number and replaces the prior sequence number.

For bandwidth efficiency reasons, this message can be published in either short or long format.

Single Side Replace Message – Short Form

| Name | Offset | Length | Value | Notes |
|-----------------|--------|--------|---------|-----------------------------------|
| Message Type | 0 | 1 | Alpha | "u" = Single Side Replace Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |

Single Side Replace Message – Short Form

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|---|
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Order Reference Number | 15 | 8 | Integer | The unique reference number associated with the order being replaced. The order reference number is Increasing, but not necessarily sequential |
| New Reference Number | 23 | 8 | Integer | The new reference number associated with the new order |
| Price | 31 | 2 | Integer | The display price of the replaced order being added to the book. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits |
| Volume | 33 | 2 | Integer | The total quantity of the replaced order being added to the book |

Single Side Replace Message – Long Form

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|---|
| Message Type | 0 | 1 | Alpha | "U" = Single Side Replace Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Order Reference Number | 15 | 8 | Integer | The unique reference number associated with the order being replaced. The order reference number is Increasing, but not necessarily sequential |
| New Reference Number | 23 | 8 | Integer | The new reference number associated with the new order |
| Price | 31 | 4 | Integer | The display price of the replaced order being added to the book. NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits |
| Volume | 35 | 4 | Integer | The total quantity of the replaced order being added to the book. |

4.5.5. Single Side Delete Message

The message is sent when an order or a side of a quote is being cancelled. All remaining contracts are no longer accessible so the side should be removed from the book.

Single Side Delete Message

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|---|
| Message Type | 0 | 1 | Alpha | "D" = Single Side Order/Quote Delete Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Order Reference Number | 15 | 8 | Integer | The unique reference number associated to the order being deleted. The order reference number is Increasing, but not necessarily sequential |

4.5.6. Single Side Update Message

This message is sent whenever an order or a side of a quote is being updated for price and (or) contracts. The reference number associated with the order quote is unchanged.

Single Side Update Message

| Name | Offset | Length | Value | Notes |
|------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "G" = Single Side Order/Quote Update message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Order Reference Number | 15 | 8 | Integer | The unique reference number associated to the order being updated. The order reference number is Increasing, but not necessarily sequential |
| Change Reason | 23 | 1 | Alpha | 'U' - User 'R' - Reprice 'S' - Suspend |
| Price | 24 | 4 | Integer | The display price of the replaced order being added to the book. NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits |
| Volume | 28 | 4 | Integer | The total quantity of the replaced order being added to the book |

4.5.7. Quote Replace Message

This message is sent whenever a quote on the book is replaced. The replaced quote has new sequence numbers on both sides. These new sequence numbers replace the prior sequence numbers on the quote.

For bandwidth efficiency reasons, this message can be published in either short or long format.

Quote Replace- Short Form

| Name | Offset | Length | Value | Notes |
|-------------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "k" = Quote Replace Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Original Bid Reference Number | 15 | 8 | Integer | The original bid reference number associated with the order being replaced. |
| Bid Reference Number | 23 | 8 | Integer | The bid reference number associated with the replaced quote |
| Original Ask Reference Number | 31 | 8 | Integer | The original ask reference number that is replaced |
| Ask Reference Number | 39 | 8 | Integer | The ask reference number associated with the replaced quote |
| | | | | The display bid price of the replaced quote. |
| Bid Price | 47 | 2 | Integer | NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits. |
| Bid Size | 49 | 2 | Integer | The display bid quantity of the replaced quote. |

Quote Replace– Short Form

| Name | Offset | Length | Value | Notes |
|-----------|--------|--------|---------|--|
| Ask Price | 51 | 2 | Integer | The display ask price of the replaced quote. NOTE: When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits. |
| Ask Size | 53 | 2 | Integer | The display ask quantity of the replaced quote |

Quote Replace– Long Form

| Name | Offset | Length | Value | Notes |
|-------------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "K" = Quote replace long message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Original Bid Reference Number | 15 | 8 | Integer | The original bid reference number associated with the order being replaced. |
| Bid Reference Number | 23 | 8 | Integer | The bid reference number associated with the replaced quote |
| Original Ask Reference Number | 31 | 8 | Integer | The original ask reference number that is replaced |
| Ask Reference Number | 39 | 8 | Integer | The ask reference number associated with the replaced quote |
| | | | | The display bid price of the replaced quote. |
| Bid Price | 47 | 4 | Integer | NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits. |
| Bid Size | 51 | 4 | Integer | The display bid quantity of the replaced quote. |
| | | | | The display ask price of the replaced quote. |
| Ask Price | 55 | 4 | Integer | NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits. |
| Ask Size | 59 | 4 | Integer | The display ask quantity of the replaced quote |

4.5.8. Quote Delete Message

The message is sent when a single quote is being cancelled. All remaining contracts are no longer accessible so the quote should be removed from the book.

Quote Delete Message

| Name | Offset | Length | Value | Notes |
|----------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "Y" = Quote Delete Message |
| Tracking Number | 1 | 2 | Integer | Internal system tracking number |
| Timestamp | 3 | 8 | Integer | Nanoseconds since midnight |
| Instrument ID | 11 | 4 | Integer | Integer ID of the option, as defined in the Options Directory Message. |
| Bid Reference Number | 15 | 8 | Integer | The bid reference number associated with the deleted quote |
| Ask Reference Number | 23 | 8 | Integer | The ask reference number associated with the deleted quote |

4.6. Trade Messages

4.6.1. Options Trade Message

This Options Trade Message is designed to provide execution details for normal match events involving non-displayable order types. All Flex Trades will be reported using Trade message.

Since no Add Order/Quote Message is generated when a non-displayed order is initially received, the venue cannot use the Modify Order/Quote message for all matches. Nasdaq therefore developed this message to indicate when a match occurs between non- displayable order types.

This message is transmitted each time a non-displayable order is executed in whole or in part. It is possible to receive multiple messages for the same Side order if that order is executed in several parts. Trade Messages for the same Side order are cumulative. These messages should be included in MRX, GEMX, ISE, Nasdaq Texas Options and PHLX time-and-sales displays as well as volume and other market statistics. Since Trade Messages do not affect the book, however, they may be ignored by firms just looking to build and track the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX Options System display.

All Complex Auctions will have the respective Auction Type Reported.

Trade Message

| Name | Offset | Length | Value | Notes |
|-----------------|--------|--------|---------|---|
| Message Type | 0 | 1 | Alpha | "q" = Trade 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. |
| Cross Number | 15 | 4 | Integer | Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine. |
| Match Number | 19 | 4 | Integer | Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message. |
| Strategy ID | 23 | 4 | Integer | Value will always be '0' |
| Cross Type | 27 | 1 | Alpha | The auction session for which the message is being generated. 'B' = Block Auction 'O' = Opening Auction 'R' = Re-Opening Auction 'P' = Price Improvement (PIM) Auction 'C' = Facilitation 'S' = Solicitation 'X' = Flex Auction "N" = None "E" = Complex Exposure Auction |
| Price | 28 | 4 | Integer | The execution Price |
| Volume | 32 | 4 | Integer | The number of contracts executed |
| Trade Condition | 36 | 1 | Alpha | The Trade Condition is the same as defined in the OPRA specification (OPRA terminology is either "Last Sale" or "Transaction"): https://www.opraplan.com/document-library Always refer to the www.opraplan.com website to ensure the possible Trade Conditions sent out by this feed, which are consistent with the Trade Conditions defined by OPRA. |
| Auction ID | 37 | 4 | Integer | Uniquely identifies the Auction for the trading day. |

Trade Message

| Name | Offset | Length | Value | Notes |
|------------|--------|--------|-------|---|
| Printable | 41 | 1 | Alpha | Indicates if the execution should be reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable |
| Trade Type | 42 | 1 | Alpha | Trade Type Identifier "E" = Electronic Trade |
| Reserved | 43 | 16 | Alpha | Reserved for future use. |

4.7. Net Order Imbalance Indicator (NOII)

This message is used to announce opening and re-opening auctions only. Net Order imbalance information will be announced at regular intervals leading up to the MRX, GEMX, ISE, Nasdaq Texas Options and PHLX opening auctions.

Net Order Imbalance Message

| Name | Offset | Length | Value | Notes |
|--------------------------|--------|--------|---------|--|
| Message Type | 0 | 1 | Alpha | "O" = Net Order Imbalance Message |
| 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. |
| Auction ID | 15 | 4 | Integer | Uniquely identifies the Auction for the trading day. |
| Auction Type | 19 | 1 | Alpha | Type of Auction: "O" = Opening "R" = Reopening "P"= Price Improvement (PRISM) Auction "I" = Order Exposure "B"= Block Auction Price Improvement (PRISM) Auction, Order Exposure and Block Auction only pertain to Nasdaq Texas Options |
| Paired quantity | 20 | 4 | Integer | The total amount that are eligible to be matched at the Current Reference Price. |
| Side/Imbalance Direction | 24 | 1 | Alpha | Indicates the market side of the imbalance in case of Opening or the direction of the auction in case of Auction 'B'=Buy or Buy side imbalance 'S'=Sell or sell side imbalance |
| Price/Imbalance Price | 25 | 4 | Integer | Price in fixed point format with 6 whole number places followed by 4 decimal digits. For market orders, the price is zero. Hidden prices are set to zero. Will represent imbalance price for opening auctions |
| Imbalance Volume | 29 | 4 | Integer | Imbalance volume for opening auction. Will be 0 for other auctions |
| Order Capacity | 33 | 1 | Alpha | Will be provided with blank space for opening and reopening Auction. |

4.8. 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 once the replay is complete. |
| Sequence Number | 1 | 20 | Alpha Numeric | 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 | | <ul style="list-style-type: none">Initial DraftUpdated the Trading Action Message with the following enumerations added to the Current Trading State Field:<ul style="list-style-type: none">"B"=Buy Side Suspended"S" =Sell-Side Suspended<ul style="list-style-type: none">Updated the Add Order Message (Short & Long Form) with the following enumerations added to the Side Field:<ul style="list-style-type: none">"M" = buy implied"N" = sell implied |
| Version 2.01 | June 16, 2022 | | <ul style="list-style-type: none">Correction to offsets on Order Executed Message starting with Order Reference Number to Match Number fieldsCorrection to offsets on Order Executed With Price Message starting with Order Reference Number to Volume fieldsUpdated the Order Change Message with the 'S' – Suspend enumeration added to the Change Reason fieldRemoved "A" = All auctions enumeration from the Trade Message Cross Type fieldUpdated Length to 4 on the Trade Message Volume field.Updated 4.5.1 Single Side Executed Message & 4.5.2 Single Side Executed with Price Message.Included new field "Strategy ID" to match Nasdaq Texas Options Depth of market version of these messages with the same message typeOffset values were updated to keep consistent due to addition of Strategy ID field |
| Version 2.01 | November 3, 2022 | | <ul style="list-style-type: none">Clarifying the message namesVersion updated to 2.02 |
| Version 2.02 | January 9, 2023 | | <ul style="list-style-type: none">Clarifying the Data Types: Added "2 byte Price Fields are unsigned positive numbers. 4 byte Price fields are signed positive numbers." |

| Revision | Published | Author(s) | Summary of Changes |
|--------------|-------------------|-----------|--|
| Version 2.02 | March 31, 2023 | | <ul style="list-style-type: none"> GEMX will adopt Depth of Market v2.0 during the replatform scheduled to complete on November 13, 2023 GEMX RE-platform go live date: NOV 13 |
| Version 2.02 | April 1, 2024 | | <ul style="list-style-type: none"> ISE will adopt Depth of Market v2.0 during the replatform scheduled to complete on September 23, 2024. |
| Version 2.02 | April 15, 2024 | | <ul style="list-style-type: none"> Manual Trade Designation (trade type "M") removed. Broken Trade/Order Execution Message decommissioned. |
| Version 2.1 | August 30, 2024 | | <ul style="list-style-type: none"> Converting the SoupBINTCP Protocol option to a replay without support for Live Market Data Adding the End of Replay Sequence Message only for SoupBINTCP. <p>Directory Message</p> <ul style="list-style-type: none"> Message type changed to 'm' Increase symbol size from 6 characters to 8 characters. Add reserved field of 16 characters e in preparation for Phase 2. <p>Add Order Message</p> <p>Short Form</p> <ul style="list-style-type: none"> Message type changed to 'r' Add reserve field of 4 characters in preparation for Phase 2 <p>Long Form</p> <ul style="list-style-type: none"> Message type changed to 'R' Add reserve field of 4 characters in preparation for Phase 2 <p>Single Side Executed Message</p> <ul style="list-style-type: none"> Message type changed to 'e' Added Trade Condition field of 1 character Added Auction ID field of 4 characters <p>Single Side Executed with Price Message</p> <ul style="list-style-type: none"> Message type changed to 'c' Added Trade condition field of 1 character Added Auction ID field of 4 characters <p>Options Trade Message</p> <p>Added to description of message:</p> <p>"All Flex Trades will be reported using Trade Message"</p> <ul style="list-style-type: none"> Message type changed to 'q' Added Trade condition field of 1 character Added Auction ID field of 4 characters New enum for CrossType "X" for "Flex Auction" New enum for CrossType "E" for "Complex Exposure Auction" Add reserved field of 16 characters e in preparation for Phase 2. |
| Version 2.1 | October 2, 2024 | | <p>Add Order Message - Long Form</p> <ul style="list-style-type: none"> Message type changed from "R" to "o" |
| Version 2.1 | December 19, 2024 | | <p>Appendix A</p> <ul style="list-style-type: none"> Flex Symbology table added |
| Version 2.1 | January 9, 2025 | | |

| Revision | Published | Author(s) | Summary of Changes |
|-------------|--------------------|-----------|--|
| Version 2.1 | May 7, 2025 | | <ul style="list-style-type: none"> Replaced the title to align with the title used for the replatform PHLX to adopt the options depth feed v2.1 during the Replatform. Updated section 4.7 Net order imbalance indicator (NOII) message, Auction Type, to add Price Improvement Auction, Order Exposure, and Block Auction. These additions only pertain to B |
| Version 2.1 | September 15, 2025 | | <ul style="list-style-type: none"> the order capacity messages have been edited to include JBO = Joint Back Office (only PHLX) |
| Version 2.1 | February 13, 2026 | | <ul style="list-style-type: none"> BX Options references have been replaced with Nasdaq Texas Options. |

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 |