Market Data Feed – Version 1.3

BX Options Depth of Market

1. Overview

Nasdaq BX Options Depth of Market (BX Depth) is a direct data feed product offered by The Nasdaq BX Options Market®, which features the following data elements:

- o **Order and Quote level data:** For Nasdaq Option System, Nasdaq will provide its full order and quote depth using the standard BX Depth format. BX Depth uses a series of order and quote messages to track the life of an order and quote[1].

- o **Trade messages:** To ensure that customers have complete information about the Nasdaq order book, BX Depth will support a trade message to reflect a match of an order in the Nasdaq Option system but not already sent on the BX Depth feed. BX Depth also supports a trade message to reflect Nasdaq auction transactions.

- o **Net Order Imbalance Data:** In the minutes leading up to the Nasdaq Option Opening Auction, Nasdaq disseminates the indicative clearing price and net order imbalance in the Nasdaq Option System. Because the calculation includes orders that are not booked, the Net Order Imbalance Indicator (NOII) is the best indicator of the Nasdaq Option opening prices available to the public.

- o **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.
  - Symbol Directory messages provide basic option data
  - Option Opening messages provide a option opening time

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[1] BX Depth is an outbound market data feed only. The protocol does not support order or quote entry. For information on NASDAQ order/quote entry protocols, please refer to the Trading Services section of the NASDAQ Trader website.

2. Architecture

The BX Depth 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 bytes. The messages that make up the BX Depth protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees. BX Depth is an outbound market data feed only. The BX Depth protocol does not support order or quote entry.

Nasdaq plans to offer the BX Depth data feed in two protocol options:

Protocol Option	Number of Outbound Channels
SoupBinTCPv3.00	Single outbound channel for all securities
MoldUDP64v1.00	Single outbound channel for all securities

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.

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 or 4 bytes long.

Prices are 2 byte or 4 byte Integer fields. 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

The BX Depth feed is composed of a series of messages that describe orders/quotes added to, removed from, modified and executed on the BX Options Market as well as disseminate Auction and Option Symbol Directory information.

4.1. Time Messages

For bandwidth efficiency reasons, timestamp will be separated into two pieces:

Time Stamp Portion	Message Type	Notes
Seconds	Standalone message	Reflects the number of seconds past midnight (U.S. Eastern Time) that the Time Stamp message was generated. Note: A Time Stamp – Seconds message will be disseminated for every second for which there is at least one data message.
Nanoseconds	Field within individual data message	Reflects the number of nanoseconds since the most recent Time Stamp – Seconds message

4.1.1. Seconds Message

This message is sent every second for which at least one BX Depth message is being generated.

SECONDS MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"T" = Seconds Message
Second	1	4	Integer	Number of seconds since midnight

4.2. 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	4	Integer	Nanoseconds portion of timestamp
Event Code	5	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 ~2:00am
"S"	*Start of System Hours.* This message indicates that BX is open and ready to start accepting orders.	7:00am
"Q"	*Start of Opening Process.* This message is intended to indicate that BX has started its opening auction process.	9:30:00am
"N"	*End of Normal Hours Processing* - This message is intended to indicate that BX will no longer accept any new orders or changes to existing orders for options that trade during normal trading hours.	4:00:00pm
"L"	*End of Late Hours Processing* - This message is intended to indicate that BX will no longer accept any new orders or changes to existing orders for options that trade during extended hours.	4:15:00pm
"E"	*End of System Hours.* This message indicates that BX options system is now closed.	~5:15pm
"C"	*End of Messages*. This is always the last message sent in any trading day.	~5:20pm

4.3. Administrative Data

4.3.1. Base Reference Message

This message indicates the base reference number to which all the order/quote/trade reference number deltas must be added to obtain the absolute order/quote BX reference number. As such this message is sent prior to any order, quote and trade messages. BX Depth subscribers always get the reference number delta in the order, quote and trade messages.

BX assigns a unique sequence number to an active order and quote. However for performance reasons BX Depth publishes only the incremental value from the base reference number in the order, quote and trade messages.

BASE REFERENCE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"L" = Base Reference Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Base Reference Number	5	8	Long Integer	The base reference number.

4.3.2. Option Directory Message

At the start of each trading day, BX disseminates options symbol directory messages for all active options symbols in the BX option system.

OPTIONS DIRECTORY				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"R" = Options Directory Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Security Symbol	9	6	Alphanumeric	Denotes the security symbol.
Expiration Year	15	1	Integer	Last two digits of the year of the option expiration
Expiration Month	16	1	Integer	Expiration Month (1-12)
Expiration Date	17	1	Integer	Day of the Month of expiration (1-31)
Explicit Strike Price	18	4	Integer	Explicit strike price. Refer to Data Types for field processing notes.
Option Type	22	1	Alpha	"C" = Call option "P" = Put option
Source	23	1	Integer	Identifies the source of the Option, valid for the trading day
Underlying Symbol	24	13	Alphanumeric	Denotes the unique symbol assigned to the underlying security within exchange.
Options Closing Type	37	1	Alphabetic	Denotes which System Event is used to trigger the option closing process. "N" = Normal Hours "L" = Late Hours
Tradable	38	1	Alpha	Denotes whether or not this option is tradable at the exchange. The allowable values are: "Y" = Option is tradable "N" = Option is not tradable
MPV	39	1	Alpha	Minimum Price Variation for this option. See Notes below for further explanation: "E" = penny Everywhere "S" = Scaled "P" = penny Pilot

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

4.3.3. Options Trading Action Message

BX uses this administrative message to indicate the current trading status of an index or equity option within the BX Options Market.

Prior to the start of system hours, BX will send out a Trading Action spin. In the spin, BX 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 BX Options Market 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 BX Options platform at the start of the system hours. Please note that options may be halted in the BX system for regulatory or operational reasons.

After the start of system hours, BX 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 Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Current Trading State	9	1	Alphabetic	Reflects the current trading state for the options security in the BX Options Market. The allowable values are: H = Halt in effect T = Trading on BX B = Buy Side Trading Suspended –i.e. Buy orders are not executable) S = Sell Side Trading Suspended –i.e. Sell orders are not executable)

4.3.4. *Option Open Message*

BX plans to disseminate the Option Open Message for each option as soon as the opening is completed. Upon receipt of the open state message, firms should be advised that the option denoted in the message is now available for auto execution within the BX Options Market System. Upon receipt of the closed state message, firms should be advised that the option is no longer eligible for auto-execution within the BX Options Market System.

Security Open Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"O"=Open Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Open State	9	1	Alphabetic	The allowable values are: Y = Open for auto execution N = Closed for auto execution

Please note that recipients should continue to process the Trading Action Spin 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.

4.4. Add Order Message

An Add Order Message indicates that a new order has been accepted by the BX Option system and was added to the displayable book. The message includes a day-unique Order Reference Number used by BX 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	"a"=Add Order Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Order Reference Number Delta	5	4	Integer	The unique reference number delta assigned to the new order. The order reference number is Increasing, but not necessarily sequential.
Market Side	9	1	Alpha	The type of order being added. "B" = Buy "S" = Sell
Option ID	10	4	Integer	Option ID assigned daily, valid for trading day.
Price	14	2	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 3 whole number places followed by 2 decimal digits.
Volume	16	2	Integer	The total number of contracts of the new order being added to the book.

ADD ORDER MESSAGE - LONG FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"A"=Add Order Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Order Reference Number Delta	5	4	Integer	The unique reference number delta assigned to the new order. The order reference number is Increasing, but not necessarily sequential.
Market Side	9	1	Alpha	The type of order being added. "B" = Buy "S" = Sell
Option ID	10	4	Integer	Option ID assigned daily, valid for trading day.
Price	14	4	Integer	The display price of the new order being added to the book.
Volume	18	4	Integer	The total number of contracts of the new order being added to the book.

4.5. Add Quote Message

An Add Quote Message indicates that a new quote has been accepted by the BX Option system and was added to the displayable book. The message includes a unique

Bid/Ask Reference Numbers used by BX 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Bid Reference Number Delta	5	4	Integer	The bid reference number delta associated with the new quote.
Ask Reference Number Delta	9	4	Integer	The ask reference number delta associated with the new quote
Option ID	13	4	Integer	Option ID assigned daily, valid for trading day.
Bid Price	17	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	19	2	Integer	The bid contracts of the new quote.
Ask Price	21	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	23	2	Integer	The ask contracts of the new quote.

ADD QUOTE MESSAGE – LONG FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"J" = New Quote message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Bid Reference Number Delta	5	4	Integer	The bid reference number delta associated with the new quote.
Ask Reference Number Delta	9	4	Integer	The ask reference number delta associated with the new quote
Option ID	13	4	Integer	Option ID assigned daily, valid for trading day.
Bid	17	4	Integer	The display bid price of the new quote.
Bid Size	21	4	Integer	The bid contracts of the new quote.
Ask	25	4	Integer	The display ask price of the new quote.
Ask Size	29	4	Integer	The ask contracts of the new quote.

4.6. *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. BX Depth 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, BX Depth 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.

4.6.1. 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 BX. Auction execution information is available in one bulk print via the Auction Trade Message.

SINGLE SIDE EXECUTED MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"E" = Single Side Order/Quote Executed Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The order/quote reference number delta associated with the executed order.
Executed Contracts	9	4	Integer	The number of contracts executed.
Cross Number	13	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	17	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.

4.6.2. 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, BX includes 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 BX Depth data in time-and-sales displays or volume calculations, BX 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The order/quote reference number delta associated with the executed order.
Cross Number	9	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	13	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	17	1	Alpha	Indicates if the execution should be reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable
Price	18	4	Integer	The execution price.
Volume	22	4	Integer	The execution contracts.

4.6.3. 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Order Reference Number Delta	5	4	Integer	The order reference number delta associated with the executed order.
Cancelled Contracts	9	4	Integer	The number of contracts to be removed from the display size of the order as the result of a cancellation.

4.6.4. 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Reference Number Delta	5	4	Integer	The original reference number delta associated with the order being replaced.
New Reference Number Delta	9	4	Integer	The new reference number delta associated with the new order.
Price	13	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	15	2	Integer	The total number of contracts 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Reference Number Delta	5	4	Integer	The original reference number delta associated with the order being replaced.
New Reference Number Delta	9	4	Integer	The new reference number delta associated with the new order.
Price	13	4	Integer	The display price of the replaced order being added to the book.
Volume	17	4	Integer	The total number of contracts of the replaced order being added to the book.

4.6.5. 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The order/quote reference number delta associated with the cancelled order.

4.6.6. 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 CHANGE MESSAGE				
Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"G" = Single Side Order/Quote Update message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The reference number delta associated with the update for an order or quote.
Change Reason	9	1	Alpha	'U' - USER 'R' – REPRICE 'S' - SUSPEND
Price	10	4	Integer	The display price of the updated side order on the book.
Volume	14	4	Integer	The total number of contracts of the updated side order on the book.

The order/ bid (ask) quote retains its priority on the book.
Here are some of the scenarios when a single side update message is generated:
- A user updates quote that just decreases the bid (ask) size.
- System re-prices an order/quote due to the BX market crossing the away market.

4.6.7. 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 short message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Bid Reference Number Delta	5	4	Integer	The original bid reference number delta that is replaced
Bid Reference Number Delta	9	4	Integer	The bid reference number delta associated with the replaced quote
Original Ask Reference Number Delta	13	4	Integer	The original ask reference number delta that is replaced
Ask Reference Delta Number	17	4	Integer	The ask reference number delta associated with the replaced quote
Bid Price	21	2	Integer	The display bid 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.
Bid Size	23	2	Integer	The display bid contracts of the replaced quote.
Ask Price	25	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	27	2	Integer	The display ask contracts of the replaced quote.

QUOTE REPLACE - LONG FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"K" = Quote Replace long message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Bid Reference Number Delta	5	4	Integer	The original bid reference number delta that is replaced
Bid Reference Number Delta	9	4	Integer	The bid reference number delta associated with the replaced quote
Original Ask Reference Number Delta	13	4	Integer	The original ask reference number delta that is replaced
Ask Reference Delta Number	17	4	Integer	The ask reference number delta associated with the replaced quote
Bid Price	21	4	Integer	The display bid price of the replaced quote.
Bid Size	25	4	Integer	The display bid contracts of the replaced quote.
Ask Price	29	4	Integer	The display ask price of the replaced quote.
Ask Size	33	4	Integer	The display ask contracts of the replaced quote.

4.6.8. 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
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Bid Reference Number Delta	5	4	Integer	The bid reference number delta associated with the delete
Ask Reference Number Delta	9	4	Integer	The ask reference number delta associated with the delete

Note: A Quote Delete message is sent for an explicit quote purge (two sided). On the other hand a Single Side Delete message is sent for a quote bid (ask) when the quote ask (bid) is completely executed.

4.6.9. Block Single Side Delete Message

This message contains a block of Single Side Deletes. Each reference number inside the block represents an order or a side of a quote that is being cancelled. All remaining contracts are no longer accessible so the side should be removed from the book.

BLOCK DELETE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"Z" = Block Single Side Delete message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Total Number of Reference Number Deltas.	5	2	Integer	The number of single side deletes in this block. Max possible value = 360
Reference Number Delta(n)	7 + 4n	4	Integer	The order/quote side reference number delta associated with the cancelled order/quote. n = 0 to (Total Number – 1)

4.7. Options Trade Messages
4.7.1. Options Trade (Non-Auction)

This Options Trade Message is designed to provide execution details for normal match events involving non-displayable order types. (Note: There is a separate message for BX Option auction events.)

Since no Add Order/Quote Message is generated when a non-displayed order is initially received, BX cannot use the Modify Order/Quote message for all matches. BX 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 BX 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 BX Option System display.

Options Trade (Non-Auction)				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"P" = Trade Message Identifier
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Buy/Sell Indicator	5	1	Alpha	The type of non-display order on the book being matched. "B" =buy order "S" =sell order
Option ID	6	4	Integer	Option ID assigned daily, valid for trading day.
Cross Number	10	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	14	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.
Price	18	4	Integer	The execution price.
Volume	22	4	Integer	The execution contracts.

4.7.2. Cross Trade

Options Auction Trade message is sent for every option when an auction in that option is completed. The message indicates the bulk volume associated with the auction event.

This message will also be used to report all executions within a price improvement (PRISM) auction.
To avoid double counting of auction volume, firms should not include transactions marked as nonprintable in time-and-sales displays or market statistic calculations.

Option auction execution information is only available in this bulk print. It is possible to build a complete list of non-auction executions on BX by combining the executions received separately via Printable Order Executed Messages and Printable Trade Messages.

Options Cross Trade				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"Q" = Auction Trade Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Cross Number	9	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	13	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.
Cross Type	17	1	Alpha	The BX auction session for which the message is being generated. "O" = BX Opening/Reopening Auction "P" = Price Improvement (PRISM) Auction.
Price	18	4	Integer	The cross price in the auction.
Volume	22	4	Integer	The contracts executed in the auction.

4.7.3. Broken Trade/Order Execution Message

The Broken Trade Message is sent whenever an execution on BX is broken. An execution may be broken if it is found to be "clearly erroneous" pursuant to BX's Clearly Erroneous Policy. A trade break is final; once a trade is broken, it cannot be reinstated.

Firms that use the BX Depth feed to create time-and-sales displays or calculate market statistics should be prepared to process the broken trade message. If a firm is only using the BX Depth feed to build a book, however, it may ignore these messages as they have no impact on the current book.

BROKEN TRADE/ORDER EXECUTED MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"B"=Broken Trade/Order Executed Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Cross Number	5	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.

Match Number	9	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.

4.8. Net Order Imbalance Indicator (NOII)

BX disseminates NOII data at 5-second intervals in the minutes leading up to the BX Opening Auction events. This message is also used for price improvement (PRISM) auctions.

- o For the BX Opening Auction, BX will begin the dissemination of NOII messages for a put or a call option five minutes prior to the start of opening process event and two minutes prior to the halt resumption (reopening) process event.

NOII MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"I"=NOII Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Auction ID	5	4	Integer	Uniquely identifies the Auction for the trading day.
Auction Type	9	1	Alpha	Type of Auction: "O" = Opening "R" = Reopening "P" = Price Improvement (PRISM) Auction "I" = Order Exposure
Paired Contracts	10	4	Integer	The total number of contracts that are eligible to be matched at the Current Reference Price. 0 for Price Improvement (PRISM) Auction.
Imbalance Direction	14	1	Alpha	Indicates the market side of the imbalance "B" = buy imbalance "S" = sell imbalance
Option ID	15	4	Integer	Option ID assigned daily, valid for trading day.
Imbalance Price	19	4	Integer	The imbalance price. 0 for Price Improvement (PRISM) Auction
Imbalance Volume	23	4	Integer	The imbalance contracts.
Customer/ Firm Indicator	27	1	Alpha	For Order Exposure (AuctionType=I) only. Indicates the order capacity: "C" = Customer "F" = Firm/ Joint Back Office (JBO) "M" = On-floor Market Maker "P" = Professional Customer "B" = Broker Dealer/ Non Registered Market Maker
Reserved	28	3	N/A	Reserved for future use

5. Support

- o For general product support for Nasdaq data feeds, please contact Nasdaq Global Information Services at 301.978.5307 or dataproducts@nasdaq.com.

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

Appendix A - Document Revision Control Log

November 2, 2017: System Event Message – Version 1.3
- Updated the Start of Messages (System Event Code "O") time to ~2:00 am.

November 30, 2015: System Event Message – Version 1.20
- Updated the Start of Messages (System Event Code "O") time to ~4:00 am.
- Updated the End of System Hours (System Event Code "E") time to ~5:15 pm to more accurately reflect current practice.
- Updated the End of Messages (System Event Code "C") time to ~5:20 pm to more accurately reflect current practice.

May 26, 2015: NOII and Options Cross Trade Message
- Updated the NOII message for Order Exposure notification and price improvement (PRISM) auction.
- Added new field Customer/ Firm Indicator. Also added 3 reserve bytes for consistency with other feeds.
- Updated the Options Cross Trade message for price improvement (PRISM) auction.

April 10, 2012: BX Options Depth of Market - Version 1.00
- Nasdaq released the initial BX Options Depth data feed specification document to the public.