Market Data Feed – Version 1.2

BX OPTIONS GLIMPSE

1. Overview

A complement to the Nasdaq BX Options Depth of Market (BX Depth) real-time data feed product, Nasdaq BX Options GLIMPSE (BX GLIMPSE) is a point-to-point data feed connection that provides direct data feed customers with the current state of the BX execution system. BX Options GLIMPSE uses the same data formats as the BX Depth data feed product.

**** Please note that the BX Options GLIMPSE specification matches the Nasdaq Options Market GLIMPSE specification.***

2. Architecture

BX Options GLIMPSE is a point-to-point data feed product comprised of a series of sequenced messages. Each message is variable in length based on the message type. The messages that make up the BX Options GLIMPSE protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

BX currently offers the Options GLIMPSE data feed in the SoupBinTCP protocol option only. Please note that GLIMPSE users must login to SoupBinTCP for sequence 1 to correctly receive data.

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

Upon logon to the BX Options GLIMPSE service, firms will receive the following data elements with the relevant system time stamp:

- System Event messages;
- Symbol Directory messages for all security symbols in the BX execution system;
- Trading Action messages with the current trading state value for active security symbol in the BX execution system;
- Option open message if either the opening or closing is done for an option;
- Base reference message;
- Add Quote messages for all the displayable quotes on the BX execution system at the time of login request;
- Add Order messages for all the displayable orders on the BX execution system at the time of login request;
- GLIMPSE Snapshot message that reflects the BX Depth sequence number at the time that the BX GLIMPSE spin was requested.

Please note that BX Options GLIMPSE uses the same Symbol Directory, Trading Action, Option Open, Add Order and Add Quote message formats as the BX Depth data feed.

At the end of the spins, BX Options GLIMPSE will send a Snapshot message to denote where firms should begin processing real-time updates via the BX Depth product.

4.1. Time Messages

For bandwidth efficiency reasons, For BX Options GLIMPSE and BX Depth products, BX disseminates the timestamp into two separate 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

For the standalone Timestamp – Seconds message, the message format will be as follows:

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 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 and quote messages. BX Options GLIMPSE subscribers always get the reference number delta in the order and quote messages.

BX assigns a unique sequence number to an active order and quote. However for performance reasons GLIMPSE publishes only the incremental value from the base reference number in the order and quote 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 GLIMPSE transmission, BX will disseminate option directory messages for all symbols in BX execution system for the current trading day. Please note that the Symbol Directory spin may include halted issues. Firms must process the Trading Action message for current trading state information.

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 DIRECTORY				
Name	***Offset***	***Length***	***Value***	***Notes***
Options Closing Type	37	1	Alpha	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.
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)
5) 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.

In the GLIMPSE transmission, 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 during the current trading session.

For most options, the Trading State would be "T" (Trading Resumption) to reflect the option was released for trading during the current market session.

If the symbol was in a halted state at the time of the GLIMPSE transmission, the Trading State will reflect with the code 'H' as outlined below.

If an option is temporarily suspended on buy or sell side (i.e. all buy orders or all sell orders in a given symbol are not executable), a trading action message with state 'B' (for buy side) or 'S' (for sell side) will be sent.

If the GLIMPSE transmission includes a Option Directory message, but not a Option Trading Action message, for an option, firms may assume that the option was placed in an operational or regulatory trading halt prior to the start of the current trading system.

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.

BX GLIMPSE will send the latest option state message ('Open State' – 'Y' or 'N') at the time of GLIMPSE transmission.

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 the latest day-unique Order Reference Number used by BX to track the order.

For bandwidth efficiency reasons, BX Options GLIMPSE / BX Depth can publish this message 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 the latest unique Bid/Ask Reference Numbers used by BX to track the quote.

For bandwidth efficiency reasons, BX Options GLIMPSE / Depth can publish this message 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.

5. Snapshot Message

The Snapshot message reflects the BX ITTO 3.0 sequence number at the time that the BX GLIMPSE spin was requested.

To maintain a real-time order display, firms should begin to process real-time BX Depth messages beginning with the sequence number stated in this BX GLIMPSE snapshot message

ADD QUOTE MESSAGE – LONG FORM				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"M" = End of Snapshot message
Sequence Number	1	20	Numeric	BX Depth sequence number when the BX GLIMPSE snapshot was taken. To keep the order book current, firms should process real-time BX Depth messages beginning with the message sequence number reflected in this snapshot message. Note: While BX Depth is a binary data feed, the SoupBINTCP protocol uses ASCII characters for the sequence number in the logon request message format

6. Support

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

Appendix A - Document Revision Control Log

November 2, 2017: BX Options GLIMPSE Version - 1.2

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

November 30, 2015: BX Options GLIMPSE Version - 1.10

- 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.

April 10, 2012: BX Options GLIMPSE Version - 1.00

- Nasdaq released the initial BX Options Glimpse data feed specification document to the public. Developed based on BX Options Depth of Market 1.0 specifications