NASDAQ OMX BX TotalView-ITCH 4.1

For BX Trading Venue and BX Listing Market

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NASDAQ OMX BX TotalView-ITCH 4.1

1 Overview

1.1 Product Description

NASDAQ OMX BX TotalView-ITCH ("BX TotalView-ITCH") is a direct data feed product offered by NASDAQ OMX BX.

BX TotalView-ITCH 4.1 is being released in association with the equity symbology initiative and will support issue symbols up to 8 characters in total length.

BX TotalView-ITCH features the following data elements that support trading on the BX exchange in all exchange-listed equities securities:

- o **Order level data with attribution:** The BX TotalView-ITCH 4.1 data feed provides its full order depth using the standard ITCH format. ITCH uses a series of messages of order messages to track the life of a customer order.[1] As an added feature, the message formats will support market participant attribution. BX TotalView-ITCH 4.1 carries order level data for all U.S. exchange-listed equities.

- o **Trade messages:** To ensure that customers have complete information about BX market order flow, NASDAQ OMX BX TotalView-ITCH 4.1 supports a trade message to reflect a match of a non-displayable order in the BX system.

- o **Administrative messages**, such trading actions and symbol directory messages:

  - o Trading action messages are used to inform market participants when a security is halted or released for trading.

  - o Symbol Directory messages provide basic security data such as the market tier and Financial Status Indicator.

  - o Market participant position message carries the Primary Market Maker status, Market Participant status and Market Maker mode fields used by some firms to comply with market regulations.

- o **Event controls,** such as start of day, end of day and emergency market halt/resume.

1.2 Upcoming Product Enhancements

As noted above, the BX TotalView-ITCH 4.1 feed is designed to support the expanded equity symbols up to 8 characters in total length.

In addition, the BX TotalView-ITCH 4.1 is designed to support BX listing market functionality. NASDAQ OMX has filed with the U.S. Securities and Exchange Commission (SEC) to establish listing standards for the BX exchange.

All new values and enhanced functionality to support the BX Listing Market is highlighted in blue to assist subscribing customers in identifying the changes.

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

With the introduction of the BX Listing Market, NASDAQ OMX will enhance the BX trading system to support an opening and closing cross process. In addition, NASDAQ OMX will introduce the following enhancements to the BX TotalView-ITCH 4.1 data feed product:

o **Symbol Directory messages:** NASDAQ OMX will add a new Market Category Code of "B" to clearly identify securities listed on the BX Listing Market.
o **Net Order Imbalance Indicator (NOII) messages:** In the minutes leading up to the new opening and closing crosses, BX TotalView-ITCH will disseminate the indicative clearing price and net order imbalance for BX-listed securities only.   Because the calculation includes non-displayable as well as displayable order types in the BX market system, the Net Order Imbalance Indicator (NOII) is the best predictor of the BX opening and closing prices available to the public for BX-listed securities.

o **Cross Trade messages:**   The BX TotalView-ITCH data feed will also support a separate Cross Trade message format to clearly denote the price and volume executed during the opening and closing cross process in the BX system for BX-listed securities only.

2   Architecture

The NASDAQ BX TotalView-ITCH 4.1 feed is made up of a series of sequenced messages. Each message is variable in length based on the message type. The messages that make up the NASDAQ BX TotalView–ITCH 4.1 protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

This data feed will be offered in three protocol options:

- SoupBINTCP
- Compressed via SoupTCP
- MoldUDP64

3   Data Types

All integer fields are unsigned big-endian (network byte order) binary encoded numbers.

All alpha fields are left justified and padded on the right with spaces.

Prices are integer fields. When converted to a decimal format, prices are in fixed point format with 6 whole number places followed by 4 decimal digits. The maximum price in NASDAQ BX TotalView-ITCH 4.1 is 200,000.0000 (decimal, 77359400 hex).

4   Message Formats

The BX TotalView-ITCH 4.1 feed is composed of a series of messages that describe orders added to, removed from, and executed on NASDAQ OMX BX as well as disseminate Cross and Stock Directory information.

4.1 Time Stamp – Seconds

For bandwidth efficiency reasons, NASDAQ OMX BX will separate the BX TotalView-ITCH 4.1 timestamp into two pieces:

Timestamp Portion	Message Type	Notes
Seconds	Standalone message on BX TotalView-ITCH 4.1 feed	Reflects the number of seconds past midnight that the Timestamp message was generated.

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		Note: A Timestamp – Second message will be disseminated for every second for which there is at least one payload message.
Nanoseconds	Field within individual message formats on BX TotalView-ITCH 4.1 feed	Reflects the number of nanoseconds since the most recent Timestamp-Seconds message that the payload message was generated.

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

TIMESTAMP - SECONDS MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"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	"S"	System Event Message.
Timestamp	1	4	Integer	Nanoseconds portion of the timestamp.
Event Code	5	1	Alpha	See System Event Codes below.

NASDAQ OMX BX supports the following event codes on a daily basis on the BX TotalView-ITCH 4.1 data feed.

SYSTEM EVENT CODES – DAILY	
Code	*Explanation*
"O"	*Start of Messages.* Outside of time stamp messages, the start of day message is the first message sent in any trading day.
"S"	*Start of System hours.* This message indicates that NASDAQ OMX BX is open and ready to start accepting orders.
"Q"	*Start of Market hours.* This message is intended to indicate that Market Hours orders are available for execution.
"M"	*End of Market hours.* This message is intended to indicate that Market Hours orders are no longer available for execution.
"E"	*End of System hours.* It indicates that NASDAQ OMX BX is now closed and will not accept any new orders today. It is still possible to receive Broken Trade messages and Order Delete messages after the End of Day.
"C"	*End of Messages.* This is always the last message sent in any trading day.

In the event of an emergency market condition (EMC), NASDAQ OMX BX will also support the following event codes on BX TotalView-ITCH 4.1.

SYSTEM EVENT CODES – AS NEEDED

Code	Explanation
"A"	*Emergency Market Condition – Halt:* This message is sent to inform NASDAQ OMX BX market participants that the EMC is in effect. No trading is allowed during the EMC.
"R"	*Emergency Market Condition – Quote Only Period:* This message is sent to inform NASDAQ OMX BX market participants that the EMC quotation only period is in effect.
"B"	*Emergency Market Condition – Resumption:* This message is sent to inform NASDAQ OMX BX market participants that EMC is no longer in effect.

4.3 Stock Related Messages

4.3.1 Stock Directory

At the start of each trading day, NASDAQ OMX BX disseminates stock directory messages for all active symbols in the system.

Market data redistributors should process this message to populate the Financial Status Indicator (required display field) and the Market Category (recommended display field) for NASDAQ-listed issues and BX-listed.

STOCK DIRECTORY				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"R"	Stock Directory Message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Stock	5	8	Alpha	Denotes the security symbol for the issue in the feed.
Market Category	13	1	Alpha	Indicates Listing market or listing market tier for the issue "N" = New York Stock Exchange (NYSE) "A" = NYSE Amex "P" = NYSE Arca "Q" = NASDAQ Global Select Market^{SM} "G" = NASDAQ Global Market^{SM} "S" = NASDAQ Capital Market$^{®}$ "Z" = BATS BZX Exchange "B" = BX-Listing Market *Space* = Not available
Financial Status Indicator	14	1	Alpha	For NASDAQ-listed or BX-listed issues, this field indicates when a firm is not in compliance with NASDAQ or BX continued listing requirements. "D" = Deficient "E" = Delinquent "Q" = Bankrupt "S" = Suspended "G" = Deficient and Bankrupt "H" = Deficient and Delinquent "J" = Delinquent and Bankrupt "K" = Deficient, Delinquent and Bankrupt Space = Company is in compliance, if NASDAQ-listed or BX-listed issue

				For NYSE, NYSE Amex, NYSE Arca and BATS issues, this field will also be space-filled. Redistributors should refer to SIAC feeds for code if needed.
Round Lot Size	15	4	Integer	Indicates the number of shares that represent a round lot for the issue
Round Lots Only	19	1	Alpha	Indicates if NASDAQ or BX system limits order entry for issue "Y" = only round lots are accepted in this stock "N" = odd/mixed lots are allowed

4.3.2 Stock Trading Action

NASDAQ OMX BX uses this administrative message to indicate the current trading status of a security to the trading community.

Prior to the start of system hours, NASDAQ OMX BX will send out a Trading Action spin. In the spin, NASDAQ OMX BX will send out a Stock Trading Action message with the "T" (Trading Resumption) for all NASDAQ- and other exchange-listed securities that are eligible for trading at the start of the system hours. If a security is absent from the pre-opening Trading Action spin, firms should assume that the security is being treated as halted in the NASDAQ OMX BX platform at the start of the system hours.   Please note that securities may be halted in the NASDAQ OMX BX system for regulatory or operational reasons.

After the start of system hours, NASDAQ OMX BX will use the Trading Action message to relay changes in trading status for an individual security. Messages will be sent when a stock is halted or paused, is released for quotation, or is released for trading.

STOCK TRADING ACTION				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"H"	Stock Trading Action Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Stock	5	8	Alpha	Stock symbol right padded with spaces.
Trading State	13	1	Alpha	Indicates the current trading state for the stock. Allowable values: "H" = Halted or paused on across all U.S. equity markets "Q" = Quotation only period for cross-market halt or pause "T" = Trading on BX
Reserved	14	1	Alpha	Reserved.
Reason	15	4	Alpha	Trading Action reason. For the list of reason codes, please refer to Appendix C.

4.3.3 Reg SHO Short Sale Price Test Restricted Indicator

In November 2010, the Securities and Exchange Commission (SEC) will implement changes to Rule 201 of the Regulation SHO (Reg SHO).   For details, please refer to SEC Release Number 34-61595. In association with the Reg SHO rule change, NASDAQ will introduce the following Reg SHO Short Sale Price Test Restricted Indicator message format.

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For NASDAQ-listed issues, NASDAQ will support a full pre-opening spin of Reg SHO Short Sale Price Test Restricted Indicator messages indicating the Rule 201 status for all active issues. NASDAQ will also send the Reg SHO Short Sale Price Test Restricted Indicator message in the event of an intraday status change.

For other exchange-listed issues, NASDAQ will relay the Reg SHO Short Sale Price Test Restricted Indicator message when it receives an update from the primary listing exchange.
NASDAQ will process orders based on the most updated Reg SHO Restriction status value.

REG SHO RESTRICTION				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"Y"	Reg SHO Short Sale Price Test Restricted Indicator
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Stock	5	8	Alpha	Stock symbol right padded with spaces.
Reg SHO Action	13	1	Alpha	Denotes the Reg SHO Short Sale Price Test Restriction status for the issue at the time of the message dissemination. Allowable values are: "0" = No price test in place "1" = Reg SHO Short Sale Price Test Restriction in effect due to an intra-day price drop in security "2" = Reg SHO Short Sale Price Test Restriction remains in effect

4.3.4 Market Participant Position

At the start of each trading day, NASDAQ OMX BX disseminates a spin of market participant position messages. The message provides the Primary Market Maker status, Market Maker mode and Market Participant state for each NASDAQ OMX BX market participant firm registered in an issue. Market participant firms may use these fields to comply with certain marketplace rules.

Throughout the day, NASDAQ OMX BX will send out this message only if NASDAQ Operations changes the status of a market participant firm in an issue.

MARKET PARTICIPANT POSITION				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"L"	Market Participant Position message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
MPID	5	4	Alphabetic	Denotes the market participant identifier for which the position message is being generated
Stock	9	8	Alphanumeric	Denotes the security symbol for which the position is being generated
Primary Market Maker	17	1	Alphanumeric	Indicates if the market participant firm qualifies as a Primary Market Maker in accordance with NASDAQ OMX BX marketplace rules "Y" = primary market maker "N" = non-primary market maker
Market Maker Mode	18	1	Alphanumeric	Indicates the quoting participant's registration status in relation to SEC Rules 101 and 104 of Regulation M "N" = normal "P" = passive "S" = syndicate "R" = pre-syndicate "L" = penalty
Market Participant State	19	1	Alphanumeric	Indicates the market participant's current registration status in the issue "A" = Active "E" = Excused/Withdrawn "W" = Withdrawn "S" = Suspended "D" = Deleted

4.4 Add Order Message

An Add Order Message indicates that a new order has been accepted by the system and was added to the displayable book. The message includes a day-unique Order Reference Number used by NASDAQ OMX BX to track the order.

NASDAQ OMX BX will support two variations of the Add Order message format.

4.4.1 Add Order – No MPID Attribution

This message will be generated for unattributed orders in the NASDAQ OMX BX system.

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ADD ORDER MESSAGE				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"A"	Add Order – No MPID Attribution Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The unique reference number assigned to the new order. The order reference number is increasing, but not necessarily sequential.
Buy/Sell Indicator	13	1	Alpha	The type of order being added. "B" = buy order. "S" = sell order.
Shares	14	4	Integer	The total number of shares associated with the order being added to the book.
Stock	18	8	Alpha	The security symbol for which the order is being added.
Price	26	4	Integer	The display price of the new order. Refer to Data Types for field processing notes.

4.4.2 Add Order with MPID Attribution

This message will be generated for attributed orders and quotations entered into the NASDAQ OMX BX system.

ADD ORDER – MPID ATTRIBUTION MESSAGE				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"F"	Add Order with MPID Attribution Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The unique reference number assigned to the new order. The order reference number is increasing, but not necessarily sequential.
Buy/Sell Indicator	13	1	Alpha	The type of order being added. "B" = buy order. "S" = sell order.
Shares	14	4	Integer	The total number of shares associated with the order being added to the book.
Stock	18	8	Alpha	The security symbol for which the order is being added.
Price	26	4	Integer	The display price of the new order. Refer to Data Types for field processing notes.
Attribution	30	4	Alpha	NASDAQ OMX BX market participant identifier associated with the entered order.

4.5 Modify Order Messages

Modify Order messages always include the Order Reference Number of the Add Order to which the update applies. To determine the current display shares for an order, BX TotalView-ITCH 4.1 subscribers must deduct the number of shares stated in the Modify message from the original number

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of shares stated in the Add Order message with the same reference number. NASDAQ OMX BX may send multiple Modify Order messages for the same order reference number and the effects are cumulative. When the number of display shares for an order reaches zero, the order is dead and should be removed from the book.

4.5.1 Order Executed Message

This message is sent whenever an order on the book is executed in whole or in part. It is possible to receive several Order Executed Messages for the same order reference number if that order is executed in several parts. The multiple Order Executed Messages on the same order are cumulative.

By combining the executions from both types of Order Executed Messages and the Trade Message, it is possible to build a complete view of all non-cross executions that happen on NASDAQ OMX BX. Cross execution information is available in one bulk print per symbol via the Cross Trade Message.

ORDER EXECUTED MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"E"	Order Executed Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The order reference number associated with the executed order.
Executed Shares	13	4	Integer	The number of shares executed.
Match Number	17	8	Integer	The BX generated day-unique Match Number of this execution. The match number is also referenced in the Trade Break Message.

4.5.2 Order Executed With Price Message

This message is sent whenever an order on the book is executed 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 Order, NASDAQ OMX BX includes a price field within this execution message.

It is possible to receive multiple Order Executed and Order Executed With Price messages for the same order if that order is executed in several parts. The multiple Order Executed messages on the same order are cumulative.

These executions may be marked as non-printable. If the execution is marked as non-printed, it means that the shares will be included into a later bulk print (e.g., in the case of cross executions). If a firm is looking to use the data in time-and-sales displays or volume calculations, NASDAQ OMX BX recommends that firms ignore messages marked as non-printable to prevent double counting.

ORDER EXECUTED WITH PRICE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"C"	Order Executed Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The reference number of the order that was executed.

Executed Shares	13	4	Integer	The number of shares executed.
Match Number	17	8	Integer	The NASDAQ OMX BX generated day-unique Match Number of this execution. The match number is also referenced in the Trade Break Message.
Printable	25	1	Alpha	Indicates if the execution should be reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable
Execution Price	26	4	Integer	The price at which the order execution occurred. Refer to Data Types for field processing notes.

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	"X"	Order Cancel Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The reference number of the order being reduced.
Canceled Shares	13	4	Integer	The number of shares being removed from the display size of the order as the result of a cancellation.

4.5.4 Order Delete Message

This message is sent whenever an order on the book is being cancelled. All remaining shares are no longer accessible so the order must be removed from the book.

ORDER DELETE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"D"	Order Delete Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The reference number of the order being canceled.

4.5.5 Order Replace Message

This message is sent whenever an order on the book has been cancel-replaced. All remaining shares from the original order are no longer accessible, and must be removed. The new order details are provided for the replacement, along with a new order reference number which will be used henceforth. The side, stock, and attribution (if any) remain the same as the original order, so they are not given in this message.

Name	Offset	Length	Value	Notes
ORDER REPLACE MESSAGE				
Message Type	0	1	"U"	Order Replace Message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Original Order Reference Number	5	8	Integer	The original reference number of the order being replaced.
New Order Reference Number	13	8	Integer	The new reference number for this order. Note that new reference numbers mean new time priority, so this order belongs below other orders at the same price in priority.
Shares	21	4	Integer	The new total displayed quantity.
Price	25	4	Integer	The new display price for the order. Refer to Data Types for field processing notes.

4.6 Trade Messages

4.6.1 Trade Message (Non-Cross)

The Trade Message is designed to provide execution details for normal match events involving non-displayable order types. (Note: There is a separate message for cross events.)

Since no Add Order Message is generated when a non-displayed order is initially received, the system cannot use the Order Executed messages for all matches. Therefore this message indicates when a match occurs between non-displayable order types. A Trade Message is transmitted each time a non-displayable order is executed in whole or in part. It is possible to receive multiple Trade Messages for the same order if that order is executed in several parts. Trade Messages for the same order are cumulative.

Trade Messages should be included in NASDAQ OMX 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 NASDAQ OMX BX display.

Name	Offset	Length	Value	Notes
TRADE MESSAGE (NON-CROSS)				
Message Type	0	1	"P"	Trade Message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Order Reference Number	5	8	Integer	The unique reference number assigned to the order on the book being executed. Effective December 6, 2010, NASDAQ OMX will populate the Order Reference Number field

				within the Trade (Non-Cross) message as zero. For the binary versions of the TotalView-ITCH data feeds, the field will be null-filled bytes (which encodes sequence of zero).
Buy/Sell Indicator	13	1	Alpha	The type of non-display order on the book being matched. "B" =buy order "S" =sell order
Shares	14	4	Integer	The number of shares being matched in this execution.
Stock	18	8	Alpha	The security symbol associated with the match execution.
Price	26	4	Integer	The match price of the order. Refer to Data Types for field processing notes.
Match Number	30	8	Integer	The NASDAQ OMX BX generated session-unique Match Number for this trade. The Match Number is referenced in the Trade Break Message.

4.6.2 Cross Trade Message

The Cross Trade message is only applicable for eligible BX-listed securities and indicates that BX has completed its cross process for a specific BX-listed security. BX sends out a Cross Trade message for all active BX-listed issues in the system following the Opening, Closing and EMC cross events. Firms may use the Cross Trade message to determine when the cross for each BX-listed security has been completed. (Note: For the halted securities, firms should use the Trading Action message to determine when an issue has been released for trading.)

For most BX-listed securities, the Cross Trade message will indicate the bulk volume associated with the cross event. If the order interest is insufficient to conduct a cross in a particular issue, however, the Cross Trade message may show the shares as zero.

To avoid double counting of cross volume, firms should not include transactions marked as non-printable in time-and-sales displays or market statistic calculations.

CROSS TRADE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"Q"	Cross Trade Message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Shares	5	8	Integer	The number of shares matched in the BX Cross.
Stock	13	8	Alpha	The BX-listed security symbol associated with the cross trade message.
Cross Price	21	4	Integer	The price at which the cross occurred. Refer to Data Types for field processing notes.
Match Number	25	8	Integer	The BX generated day-unique Match Number of this execution.
Cross Type	33	1	Alpha	The BX cross session for which the message is being generated. "O" = BX Opening Cross.

				"C" = BX Closing Cross. "H" = Cross for IPO and halted securities. "I" = BX Cross Network: Intraday Cross and Post-Close Cross

4.6.3 Broken Trade / Order Execution Message

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

Firms that use the BX TotalView-ITCH 4.1 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 TotalView-ITCH feed to build a book, however, it may ignore these messages as they have no impact on the current book.

BROKEN TRADE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"B"	Broken Trade Message.
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Match Number	5	8	Integer	The NASDAQ OMX BX Match Number of the execution that was broken. This refers to a Match Number from a previously transmitted Order Executed Message, Order Executed With Price Message, or Trade Message.

4.7 Net Order Imbalance Indicator (NOII) Message

NASDAQ OMX BX disseminates NOII data at 5-second intervals in the minutes leading up to the BX Opening Cross and BX Closing Cross.

- o For the BX Opening Cross, NOII messages will be disseminated during the two minutes leading up to the start of market hours.

- o For the BX IPO and Halt Crosses, NOII messages will be disseminated during the quote only period. The first NOII message will be disseminated approximately five seconds after the Stock Trading Action message with the "B" action value is disseminated.

- o For the BX Closing Cross, NOII messages will be disseminated during the ten minutes leading up to the end of market hours.

Please note that BX generates this message only for those BX-listed securities that are eligible for the BX Opening and Closing Crosses.

NOII MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"I"	NOII Message
Timestamp - Nanoseconds	1	4	Integer	Nanoseconds portion of the timestamp.
Paired Shares	5	8	Integer	The total number of shares that are eligible to be matched at the Current Reference Price.

Imbalance Shares	13	8	Integer	The number of shares not paired at the Current Reference Price.
Imbalance Direction	21	1	Alpha	The market side of the order imbalance. "B" = buy imbalance "S" = sell imbalance "N" = no imbalance "O" = Insufficient orders to calculate
Stock	22	8	Alpha	The BX-listed security symbol for which the NOII message is being generated
Far Price	30	4	Integer	A hypothetical auction-clearing price for cross orders only. Refer to Data Types for field processing notes.
Near Price	34	4	Integer	A hypothetical auction-clearing price for cross orders as well as continuous orders. Refer to Data Types for field processing notes.
Current Reference Price	38	4	Integer	The price at which the NOII shares are being calculated. Refer to Data Types for field processing notes.
Cross Type	42	1	Alpha	The type of BX cross for which the NOII message is being generated. These messages are only applicable for BX-listed securities. "O" = BX Opening Cross "C" = BX Closing Cross "H" = Cross for IPO and halted BX-listed securities
Price Variation Indicator	43	1	Alpha	This field indicates the absolute value of the percentage of deviation of the Near Indicative Clearing Price to the nearest Current Reference Price. "L" = Less than 1% "1" = 1 to 1.99% "2" = 2 to 2.99% "3" = 3 to 3.99% "4" = 4 to 4.99% "5" = 5 to 5.99% "6" = 6 to 6.99% "7" = 7 to 7.99% "8" = 8 to 8.99% "9" = 9 to 9.99% "A" = 10 to 19.99% "B" = 20 to 29.99% "C" = 30% or greater Space = Cannot be calculated

5 Support

- o   For general product support for NASDAQ OMX BX data feeds, please contact NASDAQ OMX Global Data Products at +1 301 978 5307 or dataproducts@nasdaqomx.com.

o   For technical support for NASDAQ OMX BX data feeds, please contact NASDAQ OMX Systems Engineering at devsupport@nasdaqomx.com.

Appendix A

Documentation Revision Control Log

March 11, 2013: BX TotalView-ITCH Version 4.1
NASDAQ OMX added the following Trading Action Reason Code for LULD to reflect when the National Best Bid is below the lower price band and/or the National Best Offer is above than the upper price band and the NMS Stock is not in a Limit State.
- LUDS - Volatility Trading Pause – Straddle Condition

January 9, 2013: BX TotalView-ITCH Version 4.1
NASDAQ OMX added the following Trading Action Reason Code:
- MWC0 - Market Wide Circuit Breaker Halt – Carry over from previous day

January 8, 2013: BX TotalView-ITCH Version 4.1
NASDAQ OMX removed the Trading Action State, "P", from the Stock Trading Message.

November 6, 2012: BX TotalView-ITCH Version 4.1
Released a new version of the TotalView-ITCH documentation to support the following changes:

- Added the "P" value to the Trading State in the Stock Trading Message.
- Modified the values for the Trading Action Reason Codes. Added the following codes:
  - LUDP - Volatility Trading Pause
  - MWC1 - Market Wide Circuit Breaker Halt – Level 1
  - MWC2 - Market Wide Circuit Breaker Halt – Level 2
  - MWC3 - Market Wide Circuit Breaker Halt – Level 3
  - MWCQ - Market Wide Circuit Breaker Resumption
- Removed the Trading Action State, "V", related to the Volatility Guard Program.

November 1, 2011: BX TotalView-ITCH Version 4.1
NASDAQ OMX updated the Market Category message to include the code "Z" for BATS-listed securities.

December 3, 2010: BX TotalView-ITCH Version 4.1
NASDAQ OMX clarifies that the Trade (Non-Cross) message format is accurate and the Timestamp field is applicable to this message. In addition, NASDAQ OMX updated the Regulation SHO Restriction message to include a Timestamp field and adjusted all offsets appropriately.

October 27, 2010: BX TotalView-ITCH Version 4.1
NASDAQ OMX updated the Trade (Non-Cross) message format to remove the Timestamp field as this not applicable to this message. In addition, all offsets were updated appropriately.

October 6, 2010: BX TotalView-ITCH Version 4.1
NASDAQ OMX added a note to Trade (Non-Cross) message format stating that the Order Reference Number would be zero for all transactions as of December 6, 2010.

July 14, 2010: BX TotalView-ITCH Version 4.1
NASDAQ OMX added a new Regulation SHO Short Sale Price Test Restricted Indicator message format to be introduced in the fourth quarter of 2010.

July 2, 2010: BX TotalView-ITCH Version 4.1
NASDAQ OMX added a new Trading State code value of "V" to the Stock Trading Action message to denote a NASDAQ Volatility Guard trading pause.

May 25, 2010: BX TotalView-ITCH Version 4.1
NASDAQ OMX added two new Trading Action Reason code values (T5 and T7) for single security trading pause situations.

January 26, 2010 – BX TotalView-ITCH Version 4.1 (New Symbology)

Released a new version of the BX TotalView-ITCH documentation to support the following changes:

- Increased length of the symbol field from 6 characters to 8 characters in multiple message formats in support of the equity symbology initiative.
- Modified the values for the Market Catetgory field in Symbol Directory messages to delineate among NYSE-, NYSE Amex- and NYSE Arca-listed issues.
- Added note to Appendix B to reflect that NASDAQ OMX is reviewing its stock symbol conventions to determine if changes are needed.

Appendix B

Stock Symbol Convention

NASDAQ OMX is in the process of revising its stock symbol suffix plan to accommodate root symbols of up to 5 characters across U.S. equity exchanges.   Once the new plan is confirmed, NASDAQ OMX will post a Data Technical News item on the NASDAQ OMX Trader website with details.

Until further notice, NASDAQ OMX will follow its current practice.

For NYSE-, NYSE Amex- and NYSE Arca-listed securities with subordinate issue types, please refer to the Ticker Symbol Conversion for CQS Securities page on the NASDAQ OMX Trader website.

For NASDAQ-listed issues, NASDAQ OMX currently restricts its symbol length to a maximum of 5 characters.   For common stock issuances, NASDAQ and BX will assigns a symbol of 1 to 4 characters in length. For subordinate securities, NASDAQ and BX will assigns a 5 character symbol for which the last character relays information about the issue class or issue type.   For the current list of fifth character symbol suffixes, please refer to Current List of Fifth Character Symbol Suffixes for NASDAQ-listed Issues on the NASDAQ OMX Trader website.

Appendix C

Trading Action – Reason Codes

For NASDAQ-listed issues, NASDAQ acts as the primary market and has the authority to institute a trading halt in an issue due to news dissemination or regulatory reasons.

For BX-listed issues, NASDAQ OMX BX acts as the primary market and has the authority to institute a trading halt in an issue due to news dissemination or regulatory reasons.

For CQS issues, NASDAQ and BX abide by any regulatory trading halts instituted by the primary or listing market as appropriate.

For all issue types, NASDAQ and/or BX may also halt trading for operational reasons.

NASDAQ and/or BX will send out a trading action message to inform its market participants when the trading status of an issue changes. For informational purposes, NASDAQ and BX also attempt to provide the reason for each trading action update. For bandwidth efficiency reasons, NASDAQ and BX use a 4-byte code for the reason on its outbound data feeds.

REASON CODES FOR TRADING HALT ACTIONS	
Code	**Value**
T1	Halt News Pending
T2	Halt News Disseminated
T5	Single Security Trading Pause In Affect
T6	Regulatory Halt — Extraordinary Market Activity
T8	Halt ETF
T12	Trading Halted; For Information Requested by Listing Market
H4	Halt Non-Compliance
H9	Halt Filings Not Current
H10	Halt SEC Trading Suspension
H11	Halt Regulatory Concern
O1	Operations Halt; Contact Market Operations
LUDP	Volatility Trading Pause
LUDS	Volatility Trading Pause – Straddle Condition
MWC1	Market Wide Circuit Breaker Halt – Level 1
MWC2	Market Wide Circuit Breaker Halt – Level 2
MWC3	Market Wide Circuit Breaker Halt – Level 3
MWC0	Market Wide Circuit Breaker Halt – Carry over from previous day
IPO1	IPO Issue Not Yet Trading
M1	Corporate Action
M2	Quotation Not Available
Space	Reason Not Available

REASON CODES FOR QUOTATION/TRADING RESUMPTION ACTIONS	
Code	**Value**
T3	News and Resumption Times
T7	Single Security Trading Pause / Quotation Only Period
R4	Qualifications Issues Reviewed/Resolved; Quotations/Trading to Resume
R9	Filing Requirements Satisfied/Resolved; Quotations/Trading To Resume
C3	Issuer News Not Forthcoming; Quotations/Trading To Resume
C4	Qualifications Halt ended; Maintenance Requirements Met; Resume
C9	Qualifications Halt Concluded; Filings Met; Quotes/Trades To Resume
C11	Trade Halt Concluded By Other Regulatory Auth.; Quotes/Trades Resume
MWCQ	Market Wide Circuit Breaker Resumption

R1	New Issue Available
R2	Issue Available
IPOQ	IPO Security Released for Quotation (NASDAQ and BX Securities Only)
IPOE	IPO Security — Positioning Window Extension (NASDAQ and BX Securities Only)
Space	Reason Not Available