NASDAQ OMX BX TotalView-ITCH 5.0

For BX Trading Venue and BX Listing Market

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ITCH is the revolutionary NASDAQ OMX outbound protocol

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 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 5.0 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 5.0 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 5.0 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.

2 Architecture

The NASDAQ BX TotalView-ITCH 5.0 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 5.0 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 SoupBINTCP
- • MoldUDP64

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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.

In the market data messages, instruments are identified by a stock locate code – a low lying integer employed with the intent of serving as an array index for rapidly looking up instrument details. The locate codes are dynamically assigned each day, starting with a value of 1, and communicated via the Stock Directory message. An instrument's locate code will not change intraday; however, there should be no expectation that the assignment will be the same across multiple days. The Stock Locate code appears all messages, and at the same position in all messages to support efficient filtering. A default value of 0 will be applied to messages which are not stock dependent.

3   Data Types

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

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

Prices are integer fields, supplied with an associated precision. When converted to a decimal format, prices are in fixed point format, where the precision defines the number of decimal places. For example, a field flagged as Price (4) has an implied 4 decimal places.. The maximum value of price (4) in NASDAQ BX TotalView-ITCH is 200,000.0000 (decimal, 77359400 hex).

Timestamps are represented as nanoseconds since midnight

4   Message Formats

The BX TotalView-ITCH 5.0 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 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.
Stock Locate	1	2	Integer	Always 0
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Event Code	11	1	Alpha	See System Event Codes below.

NASDAQ OMX BX supports the following event codes on a daily basis on the BX TotalView-ITCH 5.0 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.

4.2 Stock Related Messages

4.2.1 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
Stock Locate	1	2	Integer	Locate Code uniquely assigned to the security symbol for the day.
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Time at which the directory message was generated. Refer to Data Types for field processing notes.
Stock	11	8	Alpha	Denotes the security symbol for the issue in the feed.
Market Category	19	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	20	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.

<table>
<tr><th>Code</th><th>Definition</th></tr>
<tr><td colspan="2">NASDAQ-Listed Instruments</td></tr>
<tr><td>D</td><td>Deficient</td></tr>
<tr><td>E</td><td>Delinquent</td></tr>
<tr><td>Q</td><td>Bankrupt</td></tr>
<tr><td>S</td><td>Suspended</td></tr>
<tr><td>G</td><td>Deficient and Bankrupt</td></tr>
<tr><td>H</td><td>Deficient and Delinquent</td></tr>
<tr><td>J</td><td>Delinquent and Bankrupt</td></tr>
</table>

4

				K	Deficient, Delinquent and Bankrupt
				C	Creations and/or Redemptions Suspended for Exchange Traded Product
				N	Normal (Default): Issuer Is NOT Deficient, Delinquent, or Bankrupt
				<space>	Company is in compliance, if NASDAQ-listed or BX-listed issue
				Non-NASDAQ-Listed Instruments	
				<space>	Not available. Firms should refer to SIAC feeds for code if needed.
Round Lot Size	21	4	Integer	Denotes the number of shares that represent a round lot for the issue	
Round Lots Only	25	1	Alpha	Indicates if NASDAQ system limits order entry for issue	

Round Lots Only:

Code	Definition
Y	NASDAQ OMX system only accepts round lots orders for this security.
N	NASDAQ OMX system does not have any order size restrictions for this security. Odd and mixed lot orders are allowed.

Issue Classification	26	1	Alpha	Identifies the security class for the issue as assigned by NASDAQ. See Appendix for allowable values.
Issue Sub-Type	27	2	Alpha	Identifies the security sub-type for the issue as assigned by NASDAQ. See Appendix for allowable values.
Authenticity	29	1	Alpha	Denotes if an issue or quoting participant record is set-up in NASDAQ systems in a live/production, test, or demo state. Please note that firms should only show live issues and quoting participants on public quotation displays.

Authenticity:

Code	Definition
P	Live/Production
T	Test

Short Sale Threshold Indicator	30	1	Alpha	Indicates if a security is subject to mandatory close-out of short sales under SEC Rule 203(b)(3).

Code	Definition
Y	Issue is restricted under SEC

5

				Rule 203(b)(3)	
				N	Issue is not restricted
				<space>	Threshold Indicator not available
IPO Flag	31	1	Alpha	Indicates if the NASDAQ security is set up for IPO release. This field is intended to help NASDAQ market participant firms comply with FINRA Rule 5131(b).	
				Code	**Definition**
				NASDAQ-Listed Instruments	
				Y	NASDAQ listed instrument is set up as a new IPO security
				N	NASDAQ listed instrument is not set up as a new IPO security
				Non-NASDAQ-Listed Instruments	
				<space>	Not available
LULD Reference Price Tier	32	1	Alpha	Indicates which Limit Up / Limit Down price band calculation parameter is to be used for the instrument. Refer to LULD Rule for details.	
				Code	**Definition**
				1	Tier 1 NMS Stocks and select ETPs
				2	Tier 2 NMS Stocks
				<space>	Not applicable
ETP Flag	33	1	Alpha	Indicates whether the security is an exchange traded product (ETP):	
				Code	**Definition**
				Y	Instrument is an ETP
				N	Instrument is not an ETP
				<space>	Not available
ETP Leverage Factor	34	4	Integer	Tracks the integral relationship of the ETP to the underlying index. Example: If the underlying Index increases by a value of 1 and the ETP's Leverage factor is 3, indicates the ETF will increase/decrease (see Inverse) by 3. Note: Leverage Factor of 1 indicates the ETP is NOT leveraged. This field is used for LULD Tier I price band calculation purposes.	
Inverse Indicator	38	1	Alpha	Indicates the directional relationship between the ETP and underlying index.	
				Code	**Definition**
				Y	ETP is an Inverse ETP
				N	ETP is not an Inverse ETP

6

| | | | | Example: An ETP Leverage Factor of 3 and an Inverse value of 'Y' indicates the ETP will decrease by a value of 3. |

4.2.2 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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Stock	11	8	Alpha	Stock symbol, right padded with spaces
Trading State	19	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	20	1	Alpha	Reserved.
Reason	21	4	Alpha	Trading Action reason.

4.2.3 Reg SHO Short Sale Price Test Restricted Indicator

In February 2011, the Securities and Exchange Commission (SEC) implemented 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.

For NASDAQ-listed issues, NASDAQ supports 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 also sends the Reg SHO Short Sale Price Test Restricted Indicator message in the event of an intraday status change.

For other exchange-listed issues, NASDAQ relays the Reg SHO Short Sale Price Test Restricted Indicator message when it receives an update from the primary listing exchange.

NASDAQ processes orders based on the most recent 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
Locate Code	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Stock	11	8	Alpha	Stock symbol, right padded with spaces
Reg SHO Action	19	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

4.2.4 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
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
MPID	11	4	Alpha	Denotes the market participant identifier for which the position message is being generated
Stock	15	8	Alpha	Stock symbol, right padded with spaces
Primary Market Maker	23	1	Alpha	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	24	1	Alpha	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	25	1	Alpha	Indicates the market participant's current registration status in the issue "A" = Active "E" = Excused/Withdrawn "W" = Withdrawn "S" = Suspended "D" = Deleted

4.2.5 Market-Wide Circuit Breaker (MWCB) Messaging

4.2.5.1 MWCB Decline Level Message

Informs data recipients what the daily MWCB breach points are set to for the current trading day.

MWCB Decline Level Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"V"	Market wide circuit breaker Decline Level Message.
Stock Locate	1	2	Integer	Always set to 0
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Time at which the MWCB Decline Level message was generated
Level 1	11	8	Price (8)	Denotes the MWCB Level 1 Value.
Level 2	19	8	Price (8)	Denotes the MWCB Level 2 Value.
Level 3	27	8	Price (8)	Denotes the MWCB Level 3 Value.

4.2.5.2 MWCB Status Message

Informs data recipients when a MWCB has breached one of the established levels

MWCB Breach Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"W"	Market-Wide Circuit Breaker Status message
Stock Locate	1	2	Integer	Always set to 0
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Time at which the MWCB Breaker Status message was generated
Breached Level	11	1	Alpha	Denotes the MWCB Level that was breached.

				"1" = Level 1
				"2" = Level 2
				"3" = Level 3

4.3 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.

4.3.1 Add Order – No MPID Attribution

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

ADD ORDER MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"A"	Add Order – No MPID Attribution Message.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	8	Integer	The unique reference number assigned to the new order at the time of receipt.
Buy/Sell Indicator	19	1	Alpha	The type of order being added. "B" = buy order. "S" = sell order.
Shares	20	4	Integer	The total number of shares associated with the order being added to the book.
Stock	24	8	Alpha	Stock symbol, right padded with spaces
Price	32	4	Price (4)	The display price of the new order. Refer to Data Types for field processing notes.

4.3.2 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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	8	Integer	The unique reference number assigned to the new order at the time of receipt.
Buy/Sell Indicator	19	1	Alpha	The type of order being added.

				"B" = buy order. "S" = sell order.
Shares	20	4	Integer	The total number of shares associated with the order being added to the book.
Stock	24	8	Alpha	Stock symbol, right padded with spaces
Price	32	4	Price (4)	The display price of the new order. Refer to Data Types for field processing notes.
Attribution	36	4	Alpha	NASDAQ OMX BX market participant identifier associated with the entered order.

4.4 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 5.0 subscribers must deduct the number of shares stated in the Modify message from the original number 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.

4.4.1 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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	8	Integer	The order reference number associated with the executed order.
Executed Shares	19	4	Integer	The number of shares executed.
Match Number	23	8	Integer	The BX generated day-unique Match Number of this execution. The match number is also referenced in the Trade Break Message.

4.4.2 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.

11

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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	8	Integer	The reference number of the order that was executed.
Executed Shares	19	4	Integer	The number of shares executed.
Match Number	23	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	31	1	Alpha	Indicates if the execution should be reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable
Execution Price	32	4	Price (4)	The price at which the order execution occurred. Refer to Data Types for field processing notes.

4.4.3 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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	8	Integer	The reference number of the order being reduced.
Canceled Shares	19	4	Integer	The number of shares being removed from the display size of the order as the result of a cancellation.

4.4.4 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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	8	Integer	The reference number of the order being canceled.

4.4.5 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.

ORDER REPLACE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"U"	Order Replace Message
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Original Order Reference Number	11	8	Integer	The original reference number of the order being replaced.
New Order Reference Number	19	8	Integer	The new reference number for this order at time of replacement. Please note that the system will use this new order reference number for all subsequent updates.
Shares	27	4	Integer	The new total displayed quantity.
Price	31	4	Price (4)	The new display price for the order. Refer to Data Types for field processing notes.

4.5 Trade Messages

4.5.1 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.)

13

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.

TRADE MESSAGE (NON-CROSS)				
Name	Offset	Length	Value	Notes
Message Type	0	1	"P"	Trade Message
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Order Reference Number	11	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	19	1	Alpha	Always "B" regardless of resting side
Shares	20	4	Integer	The number of shares being matched in this execution.
Stock	24	8	Alpha	Stock symbol, right padded with spaces
Price	32	4	Price (4)	The match price of the order. Refer to Data Types for field processing notes.
Match Number	36	8	Integer	The NASDAQ OMX BX generated session-unique Match Number for this trade. The Match Number is referenced in the Trade Break Message.

4.5.2 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 and Closing 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
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Shares	11	8	Integer	The number of shares matched in the BX Cross.
Stock	19	8	Alpha	Stock symbol, right padded with spaces
Cross Price	27	4	Price (4)	The price at which the cross occurred. Refer to Data Types for field processing notes.
Match Number	31	8	Integer	The BX generated day-unique Match Number of this execution.
Cross Type	39	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

4.5.3 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 5.0 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.
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Match Number	11	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.

4.6 *Price Improvement Indicator (PII)*

Indicates price improving interest of the Bid, Ask or both the Bid and Ask for a security.

Price Improvement Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	"N"	Price Improvement (PI) message
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Stock	11	8	Alpha	Stock symbol, right padded with spaces
Interest Flag	19	1	Alpha	"B" = PI orders available on the buy side "S" = PI orders available on the sell side "A" = PI orders available on both sides (buy and sell) "N" = No PI orders available

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
Stock Locate	1	2	Integer	Locate code identifying the security
Tracking Number	3	2	Integer	NASDAQ OMX internal tracking number
Timestamp	5	6	Integer	Nanoseconds since midnight.
Paired Shares	11	8	Integer	The total number of shares that are eligible to be matched at the Current Reference Price.
Imbalance Shares	19	8	Integer	The number of shares not paired at the Current Reference Price.
Imbalance Direction	27	1	Alpha	The market side of the order imbalance. "B" = buy imbalance "S" = sell imbalance

				"N" = no imbalance "O" = Insufficient orders to calculate
Stock	28	8	Alpha	Stock symbol, right padded with spaces
Far Price	36	4	Price (4)	A hypothetical auction-clearing price for cross orders only. Refer to Data Types for field processing notes.
Near Price	40	4	Price (4)	A hypothetical auction-clearing price for cross orders as well as continuous orders. Refer to Data Types for field processing notes.
Current Reference Price	44	4	Price (4)	The price at which the NOII shares are being calculated. Refer to Data Types for field processing notes.
Cross Type	48	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	49	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

December 5, 2014: BX TotalView-ITCH Version 5.0
Released a new version of BX TotalView-ITCH documentation to include missing Issue Sub-Type Codes (Appendix E):
- AI – Alpha Indexes ETNs
- CO – Collateralized Mortgage Obligation
- EU – Equity Units
- F – HOLDRS
- IR – Interest Rate
- IW – Index Warrant
- J – Corporate Backed Trust Security
- PP – Poison Pill
- Q – Closed -End Funds
- RT – REIT
- SC – Spot Rate Closing
- SI – Spot Rate Intraday
- WC – World Currency Option
- X – Trust
- Y – Other
- Z – NA

July 2, 2014: BX TotalView-ITCH Version 5.0
Released a new version of BX TotalView-ITCH documentation to support the following change:
- Per Data Technical News #2014-18, added the PII message (Message Type "N")

June 12, 2014: BX TotalView-ITCH Version 5.0
Released a new version of TotalView-ITCH documentation to support the following change:
- Per Data Technical News #2014-17, Revised the Buy/Sell Indicator value in the Trade Message (Non-Cross) to "Always 'B' regardless of resting side"

October 1, 2013: BX TotalView-ITCH Version 5.0
Released a new version of TotalView-ITCH documentation to support the following change:
- Added stock symbol to several market data messages
- Clarified interpretation of the levels in the MWCB Decline Levels Message

August 2, 2013: BX TotalView-ITCH Version 5.0
Released a new version of the TotalView-ITCH documentation to support the following change:
- Inclusion of the Appendices for Issue Classification and Issue Sub-Type
- Changed length and values of the Levels in the MWCB Decline Level Message
- Updated offsets in the Symbol Directory message
- Revised Timestamp format
- Moved positioning of the Symbol Locate and Tracking Number fields

July 10, 2013: BX TotalView-ITCH Version 5.0
Released a new version of the TotalView-ITCH documentation to support the following change:
- Incorporation of Symbol Locator Codes
- Added Enhanced Symbol Directory
- Added Market-Wide Circuit Breaker (MWCB) Messaging
    - MWCB Decline Level Message
    - MWCB Status Message
- Addition of an internal tracking number to multiple messages
- Addition of 'C' to the Financial Status Indicator field in the Symbol Directory Message

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

For NASDAQ-listed issues, NASDAQ OMX currently restricts its symbol length to a maximum of 8 characters. For common stock issuances, NASDAQ, PSX and BX will only assign root symbols of 1 to 4 characters in length with possible fifth and or sixth character denoting a suffix. In certain instances, a dot "." delimiter may be applied to symbols after the root and between the suffix eg., XXXX.A. For subordinate securities, NASDAQ and BX will assign a 5 character symbol for which the last character relays information about the issue class or issue type. For the current list of fifth and or six character symbol suffixes, please refer to Ticker Symbol Convention page on the NASDAQ OMX Trader website.

For NYSE-, NYSE MKT- and NYSE Arca-listed securities with subordinate issue types, please refer to Ticker Symbol Convention page 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

Appendix D

Issue Classification Values
Identifies the security class for the issue as assigned by NASDAQ

CODES FOR ISSUE CLASSIFICATION VALUES	
Code	**Value**
A	American Depositary Share
B	Bond
C	Common Stock
F	Depository Receipt
I	144A
L	Limited Partnership
N	Notes
O	Ordinary Share
P	Preferred Stock
Q	Other Securities
R	Right
S	Shares of Beneficial Interest
T	Convertible Debenture
U	Unit
V	Units/Benif Int
W	Warrant

Appendix E

Issue Sub-Type Values

CODES FOR ISSUE CLASSIFICATION VALUES	
Code	Value
A	Preferred Trust Securities
AI	Alpha Index ETNs
B	Index Based Derivative
C	Common Shares
CB	Commodity Based Trust Shares
CF	Commodity Futures Trust Shares
CL	Commodity-Linked Securities
CM	Commodity Index Trust Shares
CO	Collateralized Mortgage Obligation
CT	Currency Trust Shares
CU	Commodity-Currency-Linked Securities
CW	Currency Warrants
D	Global Depositary Shares
E	ETF-Portfolio Depositary Receipt
EG	Equity Gold Shares
EI	ETN-Equity Index-Linked Securities
EN	Exchange Traded Notes
EU	Equity Units
F	HOLDRS
FI	ETN-Fixed Income-Linked Securities
FL	ETN-Futures-Linked Securities
G	Global Shares
I	ETF-Index Fund Shares
IR	Interest Rate
IW	Index Warrant
IX	Index-Linked Exchangeable Notes
J	Corporate Backed Trust Security
L	Contingent Litigation Right
LL	Identifies securities of companies that are set up as a Limited Liability Company (LLC)
M	Equity-Based Derivative
MF	Managed Fund Shares
ML	ETN-Multi-Factor Index-Linked Securities
MT	Managed Trust Securities
N	NY Registry Shares
O	Open Ended Mutual Fund
P	Privately Held Security
PP	Poison Pill
PU	Partnership Units
Q	Closed-End Funds
R	Reg-S
RC	Commodity-Redeemable Commodity-Linked Securities
RF	ETN-Redeemable Futures-Linked Securities
RT	REIT
RU	Commodity-Redeemable Currency-Linked Securities
S	SEED
SC	Spot Rate Closing
SI	Spot Rate Intraday
T	Tracking Stock

TC	Trust Certificates
TU	Trust Units
U	Portal
V	Contingent Value Right
W	Trust Issued Receipts
WC	World Currency Option
X	Trust
Y	Other
Z	Not Applicable