NASDAQ OMX ℠
PHLX

Market Data Feed – Version 1.50

PHLX Depth of Market

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1. Overview

PHLX Depth is a direct data feed product offered by NASDAQ OMX PHLX^{SM} (referred as PHLX ®) that features the following data elements:

- o **Order and Quote level data** PHLX ® will provide its full order and quote depth to subscribers. . PHLX Depth uses a series of order and quote messages to track the life of an order and quote[1].

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

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

- o **Administrative messages**, such trading actions and symbol directory messages:
    - Trading action messages are used to inform market participants when an option is halted or released for trading.
    - Symbol Directory messages provide basic option data
    - Option Opening messages provide a option opening time

2. Architecture

PHLX Depth will be made up of a series of sequenced messages. Each message is variable in length based on the message type and is composed of binary bytes. The messages that make up the protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees. PHLX Depth is an outbound market data feed only and the protocol does not support order or quote entry.

PHLX ® plans to offer the PHLX Depth data feed in two protocol options:

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

Both the primary ("A feed") and secondary ("B feed") will be hosted by servers co-located with the trading system and will have identical performance characteristics. In fact the "A" and "B" feeds are logically identical: Mold or Soup messages will have the same Mold or Soup sequence numbers across all the streams.

Please note that NASDAQ OMX PHLX^{SM} has determined to provide local redundancy in the NY Metro Area ("A" and "B" feeds), while using the Mid-Atlantic Region ("C" feed) for disaster recovery in the event order entry is switched from the NY Metro Area.

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

A complete set of alternate connection parameters are available for each Multicast Channel and TCP Connection in the event of a failure in any of the primary connections.

3. Data Types

All Alpha or Alphanumeric fields are left justified and padded on the right with spaces.

All Integer fields are unsigned big-endian (network byte order) binary encoded numbers unless otherwise specified. Integers may be 1, 2 or 4 bytes long.

Prices are 2 byte or 4 byte Integer fields. When a 4 byte price is converted to a decimal format, prices are in fixed point format with 6 whole number places followed by 4 decimal digits. When a 2 byte price is converted to a decimal format, prices are in fixed point format with 3 whole number places followed by 2 decimal digits.

4. Message Formats

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

4.1. Time Messages

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

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

4.1.1. Seconds Message

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

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

4.2. System Event Message

The system event message type is used to signal a market or data feed handler event.
The format is as follows:

SYSTEM EVENT MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"S" = System Event Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Event Code	5	1	Alpha	Refer to System Event Codes below

SYSTEM EVENT CODES		
Code	*Explanation*	*When (typically)*
"O"	*Start of Messages.* This is always the first message sent in any trading day.	After ~4:00am
"S"	*Start of System Hours.* This message indicates that PHLX ® is open and ready to start accepting orders.	7:00am
"Q"	*Start of Opening Process.* This message is intended to indicate that PHLX ® has started its opening auction process.	9:30:00am
"N"	*End of Normal Hours Processing* - This message is intended to indicate that PHLX ® 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 PHLX ® 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 PHLX ® options system is now closed.	~5:15pm
"C"	*End of Messages.* This is always the last message sent in any trading day.	~5:20pm
"W"	*End of WCO Early closing. This message is intended to indicate that the exchange will no longer accept any new orders or changes to existing Orders on last trading date of WCO options.*	12:00 Noon

4.3. Administrative Data

4.3.1. Base Reference Message:

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

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

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

4.3.2. Option Directory Message

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

OPTIONS DIRECTORY				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"R" = Options Directory Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Security Symbol	9	6	Alphanumeric	Denotes the security symbol.
Expiration Year	15	1	Integer	Last two digits of the year of the option expiration
Expiration Month	16	1	Integer	Expiration Month (1-12)
Expiration Date	17	1	Integer	Day of the Month of expiration (1-31)
Explicit Strike Price	18	4	Integer	Explicit strike price. Refer to Data Types for field processing notes.
Option Type	22	1	Alpha	"C" = Call option "P" = Put option
Source	23	1	Integer	Identifies the source of the Option, valid for the trading day
Underlying Symbol	24	13	Alphanumeric	Denotes the unique symbol assigned to the underlying security within exchange.
Options Closing Type	37	1	Alphabetic	Denotes which System Event is used to trigger the option closing process. "N" = Normal Hours "L" = Late Hours "W" = WCO Early Closing at 12:00 Noon.
Tradable	38	1	Alpha	Denotes whether or not this option is tradable at the exchange. The allowable values are: "Y" = Option is tradable "N" = Option is not tradable
MPV	39	1	Alpha	Minimum Price Variation for this option. See Notes below for further explanation: "E" = penny Everywhere "S" = Scaled "P" = penny Pilot

Symbol Directory Notes:
1) The options directory messages are sent once per symbol, typically before the "Start of System Hours" System Event. Should it be necessary, intra-day updates to this message will be sent as they occur. In the case of an intra-day update, for a given Option Id, the canonical information for the option is invariant (will not change). The canonical information consists of Security Symbol, Expiration Year Month and Day, Strike Price and Option Type. Other attributes for the Option may change.
2) Firm should note that they will only receive Option Directory messages for the symbol range associated with the matching engine serving that connection.

3) The Underlying Symbol is in most cases the same as the industry standard ticker underlying. In rare cases, such as a special settlement symbol, the exchange assigns unique underlying symbols.
4) This is a sequenced message and therefore can be replayed upon re-connection.
5) If an Option is removed from the system intra-day, a new options directory message will be sent with "Tradable" field set to "N". Any Quotes sent for this removed Option will be rejected. All existing quotes for this option will be purged.
6) The Minimum Price Variation (MPV) has the following values:
   a. "E" – All prices are in penny increments
   b. "S" – Prices below $3.00 are in increments of $0.05, prices above $3.00 are in increments of $0.10
   c. "P" – Prices below $3.00 are in increments of $0.01, prices above $3.00 are in increments of $0.05

4.3.3.   Options Trading Action Message

The options system uses this administrative message to indicate the current trading status of an index or equity option within the PHLX ® Options Market.

Prior to the start of system hours, the options system will send out a Trading Action spin. In the spin, it will send out an Option Trading Action message with the "T" (Trading Resumption) for all options contracts that are eligible for trading at the start of the Options Market system hours. If an option is absent from the pre-opening Trading Action spin, firms should assume that the option is being treated as halted in the Options Market at the start of the system hours. Please note that options may be halted in the options system for regulatory or operational reasons.

After the start of system hours, the options system will use the Trading Action message to relay changes in trading status for an individual option. Messages will be sent when an option is halted, is released for quotation, released for trading, or temporarily suspended for trading on the buy or sell side.

Trading Action Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"H" = Trading Action Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Current Trading State	9	1	Alphabetic	Reflects the current trading state for the options security in the Options Market. The allowable values are: H = Halt in effect T = Trading on PHLX ® B = Buy Side Trading Suspended/Exhausted –i.e. Buy orders are not executable and Buy side book is non Firm. S = Sell Side Trading Suspended/Exhausted –i.e. Sell orders are not executable and Sell side book is non Firm.

4.3.4.   Option Open Message:

The options system 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 PHLX ® 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 Options Market System.

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

Please note that recipients should continue to process the Trading Action Spin message in order to determine if a option 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 options system and was added to the displayable book. The message includes a day-unique Order Reference Number used by options system to track the order.
For bandwidth efficiency reasons, this message can be published in either short or long format.

ADD ORDER MESSAGE – SHORT FORM				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	Alpha	"a"=Add Order Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Order Reference Number Delta	5	4	Integer	The unique reference number delta assigned to the new order. The order reference number is Increasing, but not necessarily sequential.
Market Side	9	1	Alpha	The type of order being added. "B" = Buy "S" = Sell "X" = Buy AON "Y" = Sell AON "M" = Buy Implied "N" = Sell Implied Note: AON order is not posted on the option's book. Hence it should not be

Name	Offset	Length	Value	Notes
				used to calculate the best bid/ask.
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.
Order ID	18	4	Integer	PHLX ® assigned order ID.

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 "A" = Buy AON "B" = Sell AON "M" = Buy Implied "N" = Sell Implied Note: AON order is not posted on the option's book. Hence it should not be used to calculate the best bid/ask.
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. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Volume	18	4	Integer	The total number of contracts of the new order being added to the book.
Order ID	22	4	Integer	PHLX ® assigned order ID.

4.5.   Add Quote Message

An Add Quote Message indicates that a new quote has been accepted by the PHLX ®
options system and was added to the displayable book. The message includes a unique
Bid/Ask Reference Numbers used by the options system to track the quote.

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

ADD QUOTE MESSAGE – SHORT FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"j" = New Quote message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Bid Reference Number Delta	5	4	Integer	The bid reference number delta associated with the new quote.
Ask Reference Number Delta	9	4	Integer	The ask reference number delta associated with the new quote
Option ID	13	4	Integer	Option ID assigned daily, valid for trading day.
Bid Price	17	2	Integer	The display bid price of the new quote. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Bid Size	19	2	Integer	The bid contracts of the new quote.
Ask Price	21	2	Integer	The display ask price of the new quote. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Ask Size	23	2	Integer	The ask contracts of the new quote.

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

				NOTE: When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Bid Size	21	4	Integer	The bid contracts of the new quote.
Ask	25	4	Integer	The display ask price of the new quote. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Ask Size	29	4	Integer	The ask contracts of the new quote.

4.6. Modify Order/Quote Message

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

4.6.1. Single Side Executed Message:

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

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

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

4.6.2.   Single Side Executed with Price Message:

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

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

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

SINGLE SIDE EXECUTED WITH PRICE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"C" = Single Side Order/Quote Executed With Price Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The order/quote reference number delta associated with the executed order.
Cross Number	9	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	13	4	Integer	Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message.
Printable	17	1	Alpha	Indicates if the execution should be reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable
Price	18	4	Integer	The execution price.
Volume	22	4	Integer	The execution contracts.

4.6.3. Single Side Cancel **Message:**

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

SINGLE SIDE CANCEL MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"X" = Single Side Cancel Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The order/quote reference number delta associated with the executed order.
Cancelled Contracts	9	4	Integer	The number of contracts to be removed from the display size of the order/quote as the result of a cancellation.

4.6.4. Single Side Replace Message:

This message is sent whenever one side of a quote on the book is replaced. The replacement has a new reference number and replaces the prior reference number.
For bandwidth efficiency reasons, this message can be published in either short or long format.

SINGLE SIDE REPLACE MESSAGE – SHORT FORM				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	Alpha	"u" = Single Side Replace message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Reference Number Delta	5	4	Integer	The original reference number delta associated with the order being replaced.
New Reference Number Delta	9	4	Integer	The new reference number delta associated with the new order.
Price	13	2	Integer	The display price of the replaced order being added to the book. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Volume	15	2	Integer	The total number of contracts of the replaced order being added to the book.

SINGLE SIDE REPLACE MESSAGE – LONG FORM				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	Alpha	"U" = Single Side Replace message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Reference Number Delta	5	4	Integer	The original reference number delta associated with the order being replaced.
New Reference Number Delta	9	4	Integer	The new reference number delta associated with the new order.
Price	13	4	Integer	The display price of the replaced order being added to the book. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Volume	17	4	Integer	The total number of contracts of the replaced order being added to the book.

4.6.5. Order Replace **Message:**

This message is sent whenever an order on the book is replaced. The replacement has a new reference number and replaces the prior reference number.
For bandwidth efficiency reasons, this message can be published in either short or long format.

ORDER REPLACE MESSAGE – SHORT FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"v" = Single Side Replace message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Reference Number Delta	5	4	Integer	The original reference number delta associated with the order being replaced.
New Reference Number Delta	9	4	Integer	The new reference number delta associated with the new order.
Price	13	2	Integer	The display price of the replaced order being added to the book. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Volume	15	2	Integer	The total number of contracts of the replaced order being added to the book.
Order ID	17	4	Integer	PHLX ® assigned order ID.

SINGLE SIDE REPLACE MESSAGE – LONG FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"V" = Single Side Replace message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Reference Number Delta	5	4	Integer	The original reference number delta associated with the order being replaced.
New Reference Number Delta	9	4	Integer	The new reference number delta associated with the new order.
Price	13	4	Integer	The display price of the replaced order being added to the book. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Volume	17	4	Integer	The total number of contracts of the replaced order being added to the book.
Order ID	21	4	Integer	PHLX ® assigned order ID.

4.6.6. Single Side Delete Message:

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

SINGLE SIDE DELETE MESSAGE				
Name	Offset	Length	Value	Notes
Message Type	0	1	Alpha	"D" = Single Side Order/Quote Delete Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Reference Number Delta	5	4	Integer	The order/quote reference number delta associated with the cancelled order.

4.6.7. Single Side Update Message:

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

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

Here are some of the scenarios when a single side update message is generated:
- A user initiated change in order/quote that results in a change in price and/or size.
- System re-prices an order/quote due to the PHLX ® market crossing the away market.
- A tradable order/quote gets suspended if there is no contra interest within Acceptable Quote Range (AQR).
- An order/quote is exhausted as a result of quote exhaust.

4.6.8. Quote Replace Message:

This message is sent whenever a quote on the book is replaced. The replaced quote has new reference numbers on both sides.

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

UPDATE QUOTE MESSAGE – SHORT FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"k" = New Quote message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Bid Reference Number Delta	5	4	Integer	The original bid reference number delta associated with the order being replaced.
Bid Reference Number Delta	9	4	Integer	The bid reference number delta associated with the new quote.
Original Ask Reference Number Delta	13	4	Integer	The original ask reference number delta associated with the order being replaced.
Ask Reference Number Delta	17	4	Integer	The ask reference number delta associated with the new quote
Bid Price	21	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	23	2	Integer	The bid contracts of the new quote.
Ask Price	25	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	27	2	Integer	The ask contracts of the new quote.

UPDATE QUOTE MESSAGE – LONG FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"K" = New Quote message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Original Bid Reference Number Delta	5	4	Integer	The original bid reference number delta associated with the order being replaced.
Bid Reference Number Delta	9	4	Integer	The bid reference number delta associated with the new quote.
Original Ask Reference Number Delta	13	4	Integer	The original ask reference number delta associated with the order being replaced.
Ask Reference Number Delta	17	4	Integer	The ask reference number delta associated with the new quote

Bid	21	4	Integer	The display bid price of the new quote. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Bid Size	25	4	Integer	The bid contracts of the new quote.
Ask	29	4	Integer	The display ask price of the new quote. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Ask Size	33	4	Integer	The ask contracts of the new quote.

4.6.9. Quote Delete Message:

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

QUOTE DELETE MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"Y" = Quote Delete message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Bid Reference Number Delta	5	4	Integer	The bid reference number delta associated with the delete
Ask Reference Number Delta	9	4	Integer	The ask reference number delta associated with the delete

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

4.6.10. Block Single Side Delete Message:

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

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

4.7.   Options Trade Messages

4.7.1.   Options Trade (Non-Auction) Message:

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

Since no Add Order/Quote Message is generated when a non-displayed or a complex order is initially received, PHLX ® cannot use the Modify Order/Quote message for all matches. This message is transmitted each time a non-displayable order is executed in whole or in part. It is possible to receive multiple messages for the same Side order if that order is executed in several parts. These messages should be included in PHLX ® time-and-sales displays as well as volume and other market statistics. Since Trade Messages do not affect the book, however, they may be ignored by firms just looking to build and track the PHLX® Option System display.

Options Trade (Non-Auction)				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"P" = Trade Message Identifier
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Trade Indicator	5	1	Alpha	"O" = Non displayable simple order cross. "C" = Complex order cross. "P" = PIXL auction cross.
Option ID	6	4	Integer	Option ID assigned daily, valid for trading day.
Cross Number	10	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	14	4	Integer	Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message.
Price	18	4	Integer	The execution price.
Volume	22	4	Integer	The execution contracts.

4.7.2. Cross Trade Message:

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

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

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

Options Cross Trade				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"Q" = Auction Trade Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Option ID	5	4	Integer	Option ID assigned daily, valid for trading day.
Cross Number	9	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	13	4	Integer	Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message.
Cross Type	17	1	Alpha	The PHLX® auction session for which the message is being generated. "O" = Opening/Reopening Auction
Price	18	4	Integer	The cross price in the auction.
Volume	22	4	Integer	The contracts executed in the auction.

4.7.3. Broken Trade/Order Execution Message:

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

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

BROKEN TRADE/ORDER EXECUTED MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"B"=Broken Trade/Order Executed Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Cross Number	5	4	Integer	Trade Group Id. Ties together all trades of a given atomic transaction in the matching engine.
Match Number	9	4	Integer	Execution Id. Identifies the component of an execution. Unique for a given day. The match number is also referenced in the Trade Break Message.

4.8. Auction Notification

PHLX [®] disseminates opening imbalance data periodically in the minutes leading up to the Opening Auction events.

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

This message is also sent as notification that there is an exposed buy (sell) order available for execution at the National Best Offer (Bid).

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

5. Support

o For general product support for NASDAQ OMX data feeds, please contact NASDAQ Market Data Distribution at 301.978.5307 or dataproducts@nasdaqomx.com.

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

Appendix A

Documentation Revision Control Log

November 30, 2015: PHLX Depth 1.50
- 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.

Aug 10, 2015: PHLX Depth 1.4
- Added WCO Early Close Time 'W' for Option Directory Message.
- Added WCO Early Close Event 'W' for System Event Message.

Jun 26, 2014: PHLX Depth 1.3
- Updated the Auction Notification message for Order Exposure notification. Added new field Customer/ Firm Indicator. Also added 3 reserve bytes for consistency with other feeds.

October 25, 2013: PHLX Depth 1.2
- Updated the Add Order message for Implied orders.

October 24, 2012: PHLX Depth 1.1
- Renamed the NOII notification message to Auction notification message.
- Added support for Order Exposure in the Auction notification message

April 27, 2012:   PHLX Depth 1.00
- The initial draft specification for PHLX Depth feed.