

Specialized Quote interFace
Interface Specification



Specialized Quote Interface – Version 6.4

Specialized Quote Interface

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1 Overview

Specialized Quote Interface (SQF) provides a low latency, high throughput mechanism for streaming quoters to enter their markets into the PHLX XL/NOM/BX Options Markets.

SQF features the following data elements:

- Low latency, high throughput, robust streaming quote interface.
 - Low Latency
 - The quote interface server is directly on matching engine infrastructure
 - Smaller bandwidth profile by making use of
 - Binary Data
 - Option ID vs. specifying full canonical symbology
 - High Throughput
 - The firms can have multiple connections for increased quoting throughput
 - Bulk quoting
 - Quoting of up to 200 quotes per quote block message.
 - Robust features
 - Enhanced Determinism
 - Quote acknowledgement = Quote is processed by matching engine! Each Quote Acknowledgement provides exact sequence of the quote from the matching engine.
 - Rapid Fire Risk Protection
 - Purging of quotes for a given underlying based on firm specified execution parameters
 - Purging on Disconnect
 - Purging of quotes when port(s) disconnects
 - Purging of quotes by specifying the
 - Badge
 - Underlying
 - Option symbol
 - Sweep mechanisms
 - One sided IOC Quote
 - Used to hit a market or to respond to an auction
- Auction information for securities traded on the PHLX/NOM/BX Options Markets.
- COLA Notification Messages, which is a message for reporting a Complex Order Live Auction (COLA) taking place on the PHLX Options Market (Available on PHLX only).
- Purge Notification messages, for reporting purges on options quoted on this interface.
- Execution Notification messages, for reporting executions on quotes and sweep requests sent by this interface. See "Processing Hints and Tips" section for more details.
- Administrative and market event messages including:
 - Trading action messages to inform market participants when a specific option or strategy is halted or released for trading.
 - Options Directory messages to relay basic option symbol and contract information for traded options.
 - Complex Order Strategy Messages to relay information for those strategies traded on the PHLX Options Market (Available on PHLX only).

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2 Architecture

The PHLX XL/NOM/BX Options trading infrastructures may consist of multiple matching engines. Each engine trades all of the options for a range of underlyings. For example, options having underlyings with first characters of 'A-H' may be traded on matching engine #1, underlyings 'I - O' may be traded on matching engine #2, etc. Any change to symbol range boundaries would be communicated to firms in the form of a technical alert at least 2 weeks prior to the event.

The SQF infrastructure is such that the firms connect to one or more servers residing directly on the matching engine infrastructure. Since there may be multiple matching engines, firms will need to connect to each engine's infrastructure in order to establish the ability to quote the symbols handled by that engine.

The advantage to connecting directly to the engine's infrastructure is one of reduced latency for quote and sweep updates. Additionally, all acknowledgement messages inherently indicate that the quote(s) or sweep being acknowledged is processed by the matching engine.

Lines can be configured to either purge all actual line's quotes immediately on disconnect or participate in a pool of lines where purge is only initiated if disconnect resulted in the inability for the firm to send Quotes for certain badge/underlying combinations. For more information, refer to "Purge on Disconnect" description in Processing Hints & Tips section.

The Specialized Quote Interface uses the in the following communication protocol:

Protocol Option	
SoupBinTCP Version 4.00	TCP Interface

* Please note that firms are encouraged to provide local redundancy in the NY Metro Area, while using the Mid-Atlantic Region for disaster recovery in the event XL II order entry is switched from the NY Metro Area.

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3 Data Types

All integer fields are unsigned big-endian (network byte order) binary encoded numbers. Note that integers may be one, two, four or eight bytes in length. The size is specified for each message field.

All alphanumeric 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. Sub-penny prices are automatically rounded to the nearest penny. Quote bids are rounded down, quote asks are rounded up. Buy sweeps are rounded up, sell sweeps are rounded down.

Message Id, Quote Id and Execution Id fields are binary. There is no restriction on the content of these fields.

Timestamp reflects the system time at which various event occur. For every message, the timestamp is expressed in two fields: "Seconds", which is the number of whole seconds after midnight of the day that the message is sent; and "Nanoseconds", which is the sub-second portion of the time which represents the integer number of nanoseconds. The "Seconds" field will have a range of 0 to 86399 (i.e. 12:00:00am to 11:59:59pm) and "Nanoseconds" will have a range of 0 to 999999999. All times in this protocol are U.S. Eastern Time zone.

4 Messaging

Message Delivery

Some messages sent from the SQF interface host to the client are assumed to be sequenced and their delivery must be guaranteed by the lower level Soup protocol. An example of this is an execution notification. The SoupBinTCP is the typical lower level protocol used to guarantee the delivery and sequencing of SQF messages sent from the SQF interface host to the client. Details on requesting a resend of sequenced messages can be found in the SOUP specification. Appendix A summarizes which host to client messages are sequenced or unsequenced.

Some other messages sent from the SQF interface host are considered to be of short term value and are therefore unsequenced. Delivery of unsequenced messages is not guaranteed. Quote Message Responses are an example of an unsequenced message.

All message transmissions originating from PHLX XL/NOM/BX Options via SQF have their sequences/unsequenced identification notes within this specification.

Messages sent from the client to the SQF interface host are inherently non-guaranteed... even if they are carried by a lower level protocol that guarantees delivery (like TCP/IP sockets). Therefore, all host-bound messages are designed so that they can be benignly resent for robust recovery from connection and application failures.

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5 Processing Hints & Tips

Determining when a Quote is processed by the Matching Engine

Upon receipt of a quote response message for a given quote block, all of the firm's quotes for that block have been processed by the matching engine (assuming that the quote was sent after receipt of the "Start of Quote" System Event Message). In addition, the order in which the matching engine processed individual quotes can be determined by the sequence number provided for each quote in the acknowledgement response.

Determining when a Purge takes Quotes out of Play

Upon receipt of a purge response message for a given purge, the firm's quotes are guaranteed to be out of the market. The firm can use sequence number as well to determine sequencing of purges in relation to quotes.

Determining when a Sweep is processed by the Matching Engine

Upon receipt of a sweep response message for a given sweep, the firm's sweep is guaranteed to be processed by the matching engine.

Sending a Sweep which cancels or cancel replaces a previous Sweep

A Sweep (Auction Response) with a size of zero effectively cancels a prior Sweep for an option at a given price and side. A Sweep with a size differing from the size of a prior Sweep for an option at a given price and side is considered a cancel replace. Note, a sweep can be canceled or replaced by the originating port only. All the outstanding sweeps received by a given port are automatically canceled by the system if connection to that port is lost regardless of the existence of other connections to the system.

Maximizing Throughput

Quote block messages can contain up to 200 quotes. Densely packing quotes in each quote block increases throughput. However, firms must be aware that there is an inherent trade-off in terms of cost to latency. That is, when densely packaging quotes in a quote block message, processing the block will take longer than processing a less densely packaged quote block. The firms must manage this dynamic to their own preference.

Minimizing Latency

To minimize latency in getting a quote processed by the matching engine, firms can position quotes for more sensitive symbols in the front of each quote block message sent to XL.

Additionally, firms should take advantage of the synchronous nature of the SQF protocol and, while waiting for a quote response from XL, overwrite older quotes in their system waiting to be sent as badge/symbol pairs are repriced. In this way, when the quote response is received from XL, the most recent quotes for each badge/symbol pair can be sent.

Avoiding Queuing

SQF is strictly one-in-flight protocol on a given port. As a best practice, after submitting any request on a given port, regardless of the participant badge to the XL system, the client should wait for the arrival of either ACCEPT or REJECT response. Arrival of the ACCEPT/REJECT message indicates that the next request can be submitted. Not adhering to this practice can lead to unintentional queuing in the TCP stack.

Avoiding Timing Issues/Race Conditions

Firms may load balance badge/symbol combinations across multiple ports on the same engine infrastructure. However, they should wait until either an ACCEPT or REJECT response is received for a given badge/symbol combination quote or purge in order to avoid race conditions for subsequent quote blocks. If a firm incidentally creates a race condition, the unique engine

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sequence number returned in the quote response message identifies which quote is in play by virtue of it having a higher engine sequence number.

Race Condition Resolution

Firms may resolve possible race conditions by comparing the Sequence field in quote responses, purge responses and purge notifications. An event with a higher Sequence value was processed by the matching engine after an event with a lower Sequence value. Possible race conditions are quotes for the same badge/symbol sent simultaneously across different connections, system initiated purges near the time of a quote being submitted, etc..

Reentry Indicator

With the exception of a Purge on Disconnect, whenever a Quote for a badge/symbol combination is purged, the next Quote for that badge/symbol combination sent to the exchange must have the "Reentry Indicator" field set to "R" for the Quote to be accepted by the matching engine regardless of which port is used. Quotes can be purged in several ways:

- by the firm entering a 0 x 0 quote
- by the firm sending a purge request (Underlying Purge Message)
- by the system. In this case the firm will receive an Option Symbol Purge Notification or Underlying Purge Notification message

Given the scenario when the firm sends a Quote unaware of the previous Quote having been purged on the system (the Purge Notification sent by XL is in flight to the firm and not yet processed), the sent Quote will be rejected with "Quote Status Code" set to "I" (reentry required). In this case the firm will receive the notification and rejected quote, will be aware of the scenario, and can take appropriate action, such as re quoting with reentry indicator "on".

Badge

A badge identifies a participant in the book.

Purge on Disconnect

An SQF port can be configured to behave in two different ways on disconnect:

1. As soon as disconnect is detected all badge / underlying combinations that have been quoted on the affected port since the start of session are immediately purged from all ports unless there were no quotes received on the affected port since last connect. In other words, if a port disconnects, all badge/underlying combinations that have been sent on the disconnected port in that session will be purged from all ports in which they are present.
2. If all connections are lost, then all Quotes for badge/underlying combinations configured will be purged within the system.

Unlike Quotes the Auction Sweeps are always canceled immediately if the connection to the originating port is lost regardless which of the above two modes is used for quote purging.

Sweep Notifications

Executions and cancels from Sweep Requests are always returned. Notification of Executions from Quotes is a subscription option.

Notification Ports

The SQF connection (port) can be configured as a "Notification Port". A Notification Port is an SQF Port which can receive notification messages, in particular: Purge Notifications and Execution Notifications are sent to SQF lines configured as Notification Ports. Notification ports can concurrently be used for sending quotes as well.

Purge-only Ports

An SQF connection (port) can be configured as a "Purge-only" port. Purge-only port allows entry of underlying-level purges only. Underlying can be specified as a wildcard. Requests of any other

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type cause Purge-only port to immediately terminate its connection. Purge-only port responds to underlying-level purges with the usual responses specified by the SQF protocol. No notifications are disseminated on Purge-only ports. Underlying-level purge requests received by Purge-only ports are handled by the system in a way that ensures minimum possible latency.

Intraday Session Rollover due to Exchange Application Rollback

In the event of application failure within either the PHLX XL/ NOM/BX Options trading system during trading hours, firms will be asked to reconnect to SQF with a different Soup Session. All information exchanged in the previous session is to be discarded. Firms will be requested to clear the previous session. Administrative messages, such as Options Directory Messages, will be sent for the new session. Quotes sent in the previous session are not present in the new session.

Disaster Recovery (DR) – Alternate Connections

In the event of the primary site becoming inoperable, alternate connectivity to a secondary site will be made available the next trading day. Connectivity parameter information, such as IP Addresses and Ports will be available to firms. The secondary site will be used until a date is announced regarding availability of the primary site.

Options Information before 7am

Firms are encouraged to receive Options information for their use by processing Options Directory Messages. In the event the firm needs this information before "Start of System Hours" (approximately 7:00am); this information may be obtained from the NASDAQ Trader Website.

Release Management

The SQF specification version updates will be conducted such that it remains backward compatible on a Version - n basis. The number of backward compatible releases will be determined by the exchange on a release by release basis.

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6 Message Format Guidelines

All messages described below have byte sizes and offsets.

The Specialized Quote Interface will support these basic types of messages:

- System Events
- Administrative Data
- Quote and Sweep submissions
- Notification information

Within the system event, administrative and notification types, the exchange may support multiple message formats as outlined below.

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7 Administrative Messages

All administrative notification messages are optional. It is possible to configure an SQF port to deliver only certain types of administrative messages.

7.1 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	2	Alpha	"AS" = System Event Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Event Code	10	1	Alpha	Refer to System Event Codes below
Version	11	1	Integer	Version of the SQF Quote Interface. Currently set to 6.
Sub-version	12	1	Integer	Sub-version of the SQF Quote Interface. Currently set to 1.

Notes:

- 1) This is a sequenced message and therefore can be replayed upon re-connection.

System Event Codes		
Code	Explanation	When (typically)
"O"	<i>Start of Messages.</i> This is always the first message sent in any trading day.	After ~6:00am
"S"	<i>Start of System Hours.</i> This message indicates that the system is up and ready to start accepting orders.	~7:00am
"B"	<i>Start of Quote.</i> This message indicates that quotes sent to the sytem will now be added to the book and be considered for execution when trading starts on this option. Quotes sent to the system before this message are not added to the book and will not be considered for execution when the option opens for trading.	9:25:00am
"Q"	<i>Start of Opening Process.</i> This message is intended to indicate that the system has started its opening process.	9:30:00am
"N"	<i>End of Normal Hours Processing.</i> This message is intended to indicate that the system will no longer generate new executions for options that trade during normal hours.	4:00:00pm
"L"	<i>End of Late Hours Processing.</i> This message is intended to indicate that the system will no longer generate new executions for options that trade during extended hours.	4:15:00pm
"E"	<i>End of System Hours.</i> This message indicates that the system is now closed.	~5:30pm

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“C”	End of Messages. This is always the last message sent in any trading day.	~5:35pm
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7.2 Options Directory Message

At the start of each trading day, the system disseminates directory messages for all symbols trading on the system.

Options Directory

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	“AD” = Options Directory Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Option ID	10	4	Integer	Option ID assigned daily, valid for the trading day
Security Symbol	14	5	Alphanumeric	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	19	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	21	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	25	1	Alpha	Option Type: “C” = Call “P” = Put
Source	26	1	Integer	Identifies the source of the Option, valid for the trading day
Underlying Symbol	27	13	Alpha	Denotes the unique underlying stock symbol for the option symbol. Normally matches the stock symbol. The exception is for some corporate actions and underlyings exceeding 5 bytes
Option Closing Type	40	1	Integer	Denotes the closing of the option. “N” = Normal Hours “L” = Late Hours
Tradable	41	1	Integer	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	42	1	Alpha	Minimum Price Variation for this option. See Notes below for further explanation: “E” = penny Everywhere “S” = Scaled “P” = penny Pilot

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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 is in most cases the same as the industry standard ticker underlying except for cases where the industry standard ticker underlying exceeds 5 bytes (internal system limit). The exchange also assigns unique underlyings for special settlement 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
- 7) PHLX XL validates prices against the MPV.
- 8) NOM/BX Options accepts prices in pennies regardless of the MPV.

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7.3 Complex Strategy Message (Specific to PHLX XL only)

Whenever a complex order is added in the system for an underlying, the order is normalized and results in either the creation of a new complex strategy or is added to an existing strategy. A Complex Order Strategy Message containing the strategy definition will be sent when the strategy is created for the first time. For GTC strategies, these will be assigned each trading day and will not be persistent across trading days.

Complex Order Strategy Message

Name	Offset	Length	Value	Notes	
Message Type	0	2	Alpha	"AR" = Complex Order Strategy Message	
Seconds	2	4	Integer	Seconds portion of the timestamp	
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp	
Strategy ID	10	4	Integer	Strategy ID assigned daily, valid while there are any open complex orders for the day	
Source	14	1	Integer	Identifies the source of the Strategy, valid for the trading day	
Underlying Symbol	15	13	Alphanumeric	Denotes the unique underlying stock symbol for the option symbol. Normally matches the stock symbol. The exception is for some corporate actions and underlyings exceeding 5 bytes	
Reserved	28	1	Integer	Reserved field with value zero	
Number of Legs	29	1	Integer	Number of legs in the strategy NOTE: Leg field offsets below are an equation, where "n" is the zero based leg number (0, 1, ...)	
Leg information, legs repeated. n = 0, 1, ...	Option ID	21n + 30	4	Integer	Option ID for this leg, valid for the trading day. The same ID as the corresponding Option in the Options Directory Message. Zero (0) for Stock Leg.
	Security Symbol	21n + 34	5	Alphanumeric	Industry assigned security symbol for the option contract. Blank for Stock Leg. Use Underlying Symbol field.
	Expiration Year, Month and Day	21n + 39	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit Zero (0) for Stock Leg.
	Strike Price	21n + 41	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes. Zero (0) for Stock Leg.
	Option Type	21n + 45	1	Alpha	Option Type: "C" = Call

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					"P" = Put Blank (" ") for Stock Leg.
	Side	21n + 46	1	Alpha	Indicates the side of the leg: "B" = Leg is on Buy side "S" = Leg is on Sell side
	Leg Ratio	21n + 47	4	Integer	Strategy Leg Ratio

Notes:

- 1) Firm should note that they will only receive Complex Strategy messages for the underlying range associated with the matching engine serving that connection.
- 2) The Underlying is in most cases the same as the industry standard ticker underlying except for cases where the industry standard ticker underlying exceeds 5 bytes (internal system limit). The exchange also assigns unique underlyings for special settlement symbols.
- 3) This is a sequenced message and therefore can be replayed upon re-connection.
- 4) All Complex Strategies have Minimum Price Variation of \$0.01. Fractional cents in the Quote is not permitted.

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7.4 Security Trading Action Message

PHLX/NOM/BX Options use this administrative message to indicate the current trading status of an index or equity option within the PHLX/NOM/BX Options Market respectively.

After the start of system hours, the system will use the Trading Action message to relay changes in trading status for an individual security. Messages will be sent when an option is halted or is released for trading.

Trading Action Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AH" = Trading Action Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Option ID	10	4	Integer	Option ID assigned daily, valid for the trading day
Security Symbol	14	5	Alphanumeric	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	19	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31)
Strike Price	21	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	25	1	Alpha	Option Type: "C" = Call "P" = Put
Current Trading State	26	1	Integer	Reflects the current trading state for the option. The allowable values are: H = Halt in effect T = Trading Resumed

Notes:

- 1) At the start of the day, all tradable options are assumed to be trading unless notified by this message.
- 2) This is a sequenced message and therefore can be replayed upon re-connection.

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7.5 Complex Trading Action Message (Specific to PHLX XL only)

PHLX uses this administrative message to indicate the current trading status of a strategy within the PHLX Options Market.

After the start of system hours, PHLX will use the Trading Action message to relay changes in trading status for a strategy. Messages will be sent when a strategy is halted or is released for trading.

Trading Action Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AI" = Strategy Trading Action Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Strategy ID	10	4	Integer	Strategy ID assigned daily, valid while there are any open complex orders for the day
Current Trading State	14	1	Integer	Reflects the current trading state for the strategy. The allowable values are: H = Halt in effect T = Trading Resumed

Notes:

- 1) At the start of the day, the strategy is assumed to be trading unless notified by this message
- 2) This is a sequenced message and therefore can be replayed upon re-connection.

7.6 Underlying Permission Message

This optionally delivered message indicates underlyings permitted to be quoted/swept by individual badges configured for the port.

Underlying Permission Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AP" = Underlying Permission Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Underlying Symbol	14	13	Alphanumeric	Underlying Stock Symbol
Permitted	27	1	Alpha	Y = Permitted N = Not Permitted

Notes:

- 1) The Underlying permission messages are sent once per badge/underlying pair, typically right after Option Directory messages. Should it be necessary, intra-day updates to the permissions will be sent as they occur.

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- 2) Firm should note that they will only receive Underlying Permission messages for the symbol range associated with the matching engine serving that connection.
- 3) This is a sequenced message and therefore can be replayed upon re-connection.
- 4) If a permission pair is removed from the system intra-day, a new Underlying Permission message will be sent with "Permitted" field set to "N". Any new Quotes/Sweeps/Purges sent for the removed badge/underlying will be rejected. All existing quotes for the badge/underlying will be purged.

7.7 Opening Rotation Quote Spread Multiplier Message (PHLX XL only)

This optionally delivered message specifies per underlying quote spread multiplier the system uses to determine validity of quote spreads during opening/reopening rotations. Note, the table itself can be obtained from NASDAQ Web site.

Quote Spread Multiplier Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AM" = Quote Spread Multiplier Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Underlying Symbol	10	13	Alphanumeric	Underlying Stock Symbol
Multiplier	23	1	Integer	Spread Multiplier

Notes:

- 1) Quote spread multiplier message will be sent once per each underlying permitted on the port plus whenever effective multiplier changes intraday
- 2) Disseminated multiplier is not applicable to leaps
- 3) Disseminated multiplier is not applicable to normal continuous trading
- 4) Quote Spread Multiplier messages will be sent only for the symbol range associated with the matching engine serving that connection
- 5) This is a sequenced message and therefore can be replayed upon re-connection

7.8 Rapid-Fire Admin Message

This optionally delivered message specifies firms' per underlying risk mitigation parameters (Rapid Fire settings).

Rapid-Fire Admin Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AF" = Rapid Fire Admin Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Underlying Symbol	14	13	Alphanumeric	Underlying Stock Symbol
Percentage	27	2	Integer	Displayed size percentage (e.g. 100)
Interval	29	2	Integer	Time interval (in milliseconds)

Notes:

- 1) The Rapid-Fire Admin messages are sent per badge/underlying pair, typically after Option Directory messages. Rapid fire parameters are set to system default values unless specifically overridden via SQF message or by NASDAQ operations personnel.

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- 2) Default Rapid-Fire parameters are not disseminated
- 3) Intra-day updates to the rapid-fire settings will be sent out as soon as the changes initiated via mechanisms mentioned above take effect.
- 4) Firm should note that they will only receive Rapid-Fire configuration messages for the symbol range associated with the matching engine serving that connection.
- 5) This is a sequenced message and therefore can be replayed upon re-connection.
- 6) Rapid-Fire Admin messages are only disseminated for permitted badge/underlying combinations.

7.9 Rapid-Fire Configuration Control

SQF clients can change their risk-protection parameters using Rapid-Fire Control message. Rapid-Fire control changes can be issued any time after the start of system hours and take effect immediately.

7.9.1 Rapid-Fire Control Request Message

Rapid-Fire Change Request Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AF" = Rapid Fire Change Request Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Underlying Symbol	6	13	Alphanumeric	Underlying Stock Symbol
Percentage	19	2	Integer	Displayed size percentage (e.g. 100). Maximum allowed value is 1000
Interval	21	2	Integer	Time interval (in milliseconds)

Notes:

- 1) A valid Rapid Fire Change Request Message results in a Rapid-Fire Admin message sent out to all "notification" ports configured for the same badge/underlying pair.
- 2) Rapid Fire Change causes system to reset the ongoing trade volume accumulation for the specified badge/underlying pair. New parameters take effect immediately.
- 3) Rapid Fire Change settings are maintained for the duration of the current trading session. System reverts to the default as well as the settings maintained by NASDAQ personnel at the beginning of every trading day.

7.9.2 Rapid-Fire Control Reply Message

This message is sent as a response to the Rapid-Fire Control Request Message (AF) and indicates the validity of the request.

Rapid-Fire Change Reply Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"AA" = Admin Control Reply Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Status Code	6	1	Alphanumeric	" " = valid request "A" = invalid badge "B" = invalid underlying "C" = not permitted "R" = market closed "Y" = invalid block

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				"Z" = system unavailable
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Notes:

- 1) This is an unsequenced message and therefore cannot be replayed upon re-connection.

8 Quote Messages

NASDAQ supports four different message formats for quote submission. It is possible to receive a "regular" (PHLX/NOM/BX Options) or "detailed" (NOM/BX Options only) reply message (acknowledgment) for each of the quote request types. Detailed replies contain system assigned unique sequence numbers for the Bid and Ask parts of the quote. The reply format is controlled by the case of the quote message subtype – upper case subtype requests are replied with regular acknowledgments, lower case subtype requests are replied with detailed acknowledgments. E.g. "QQ" quote is responded with regular reply, "Qq" is responded with the detailed one.

8.1 Short Quote Block Message

The Short Quote Block message is used to submit quotes. It can contain a variable number of quotes... up to 200... within a single application level message. The Short Quote Block message utilizes the exchange assigned Option ID to specify the option contract that is being quoted. The Option ID for each option contract can be obtained from the Option Directory message. The Short Quote Block message contains a Message ID field to provide the firm with a means to uniquely identify the quote block.

Short Quote Block Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"QQ" = Short Quote Block (Results in a Regular Reply) "Qq" = Short Quote Block (Results in a Detailed Reply, NOM/BX Options only)
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique quote message identifier reported on clearing executions
Quote Count	14	2	Integer	Number of quotes in the message
<i>1 – 200 quotes comprised of the following fields...</i>				
Option ID		4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Bid Price		4	Integer	
Bid Size		4	Integer	
Ask Price		4	Integer	
Ask Size		4	Integer	
Reentry Indicator		1	Alpha	'N' = Normal 'R' = Re-entry Note: The re-entry indicator must be set on the first quote following all purge events in order to re-enter the market.

Notes:

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- 1) 0 x 0 quotes are accepted and are processed as a purge of that symbol. The firms are required to specify the re-entry indicator on the first quote following a 0 x 0 quote. A purge (0 x 0 quote) may be submitted with Reentry Indicator set to 'N' or 'R'.
- 2) The Message ID contents will appear in the Quote ID field in the Execution Notification messages and the Clearing Trade Interface (CTI) trade messages. In the short quote block message above, this field uniquely identifies the quote block, not the individual quote within the block which may be executed against.
- 3) See the Processing Hints and Tips Section for tips on quote message processing.
- 4) Both bid and ask must be provided for each quote submitted.

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8.2 Long Quote Block Message

The Long Quote Block message is used to submit quotes. It can contain a variable number of quotes... up to 200... within a single application level message. The Long Quote Block message utilizes the exchange assigned Option ID to specify the option contract that is being quoted. The Option ID for each option contract can be obtained from the Option Directory message. The Long Quote Block message contains a Message ID field to provide the firm with a means to uniquely identify the quote block. The Long Quote Block message differs from the Short Quote Block message as it includes a Quote ID field to provide the firms with a means to uniquely identify each quote within the block.

Long Quote Block Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"QL" = Long Quote Block (Results in a Regular Reply) "QI" = Long Quote Block (Results in a Detailed Reply, NOM/BX Options only)
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Quote Count	14	2	Integer	Number of quotes in the message
<i>1 - 200 quotes comprised of the following fields...</i>				
Quote ID		8	Binary	Firm defined unique quote identifier reported on clearing executions. Overrides the message identifier on clearing executions.
Option ID		4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Bid Price		4	Integer	
Bid Size		4	Integer	
Ask Price		4	Integer	
Ask Size		4	Integer	
Reentry Indicator		1	Alpha	'N' = Normal 'R' = Re-entry Note: The re-entry indicator must be set on the first quote following all purge events in order to re-enter the market.

Notes:

- 1) 0 x 0 quotes are accepted and are processed as a purge of that symbol. The firms are required to specify the re-entry indicator on the first quote following a 0 x 0 quote. A purge (0 x 0 quote) may be submitted with Reentry Indicator set to 'N' or 'R'.
- 2) The Quote ID contents will appear in the Quote ID field in the Execution Notifications and the Clearing Trade Interface (CTI) trade messages. In the long quote block message above, this field uniquely identifies the individual quote within the block which may be executed against.
- 3) See the Processing Hints & Tips Section for tips on quote message processing. Both bid and ask must be provided for each quote submitted.

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8.3 Short Quote Block (Full Symbology) Message

The Short Quote Block (Full Symbology) message is used to submit quotes. It can contain a variable number of quotes... up to 200... within a single application level message. The Short Quote Block (Full Symbology) message utilizes the canonical symbol information to specify the option contract that is being quoted. It contains a Message ID field to provide the firm with a means to uniquely identify the quote block.

Short Quote Block (Full Symbology) Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"QF" = Short Quote Block (Full Symbology, Results in a Regular Reply) "Qf" = Short Quote Block (Full Symbology, Results in a Detailed Reply, NOM/BX Options only)
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique quote message identifier reported on clearing executions.
Quote Count	14	2	Integer	Number of quotes in the message
<i>1 - 200 quotes comprised of the following fields...</i>				
Security Symbol		5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day		2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price		4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type		1	Alpha	Option Type: "C" = Call "P" = Put
Bid Price		4	Integer	
Bid Size		4	Integer	
Ask Price		4	Integer	
Ask Size		4	Integer	
Reentry Indicator		1	Alpha	'N' = Normal 'R' = Re-entry Note: The re-entry indicator must be set on the first quote following all purge events in order to re-enter the market.

Notes:

- 1) 0 x 0 quotes are accepted and are processed as a purge of that symbol. The firms are required to specify the re-entry indicator on the first quote following a 0 x 0 quote. A purge (0 x 0 quote) may be submitted with Reentry Indicator set to 'N' or 'R'.

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- 2) The Message ID contents will appear in the Quote ID field in the Execution Notifications and the Clearing Trade Interface (CTI) trade messages. In the short quote block message above, this field uniquely identifies the quote block, not the individual quote within the block which may be executed against.
- 3) See the Processing Hints & Tips Section for tips on quote message processing.
- 4) Both bid and ask must be provided for each quote submitted.

8.4 Long Quote Block (Full Symbology) Message

The Long Quote Block (Full Symbology) message is used to submit quotes. It can contain a variable number of quotes... up to 200... within a single application level message. The Long Quote Block (Full Symbology) message utilizes the canonical symbol information to specify the option contract that is being quoted. It contains a Message ID field to provide the firm with a means to uniquely identify the quote block. The Long Quote Block (Full Symbology) message differs from the Short Quote Block (Full Symbology) message as it includes a Quote ID field to provide the firms with a means to uniquely identify each quote within the block.

Long Quote Block (Full Symbology) Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"QT" = Long Quote Block (Full Symbology, Results in a Regular Reply) "Qt" = Long Quote Block (Full Symbology, Results in a Detailed Reply, NOM/BX Options only)
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Quote Count	14	2	Integer	Number of quotes in the message
<i>1 – 200 quotes comprised of the following fields...</i>				
Quote ID		8	Binary	Firm defined unique quote identifier reported on clearing executions. Overrides the message identifier on clearing executions.
Security Symbol		5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day		2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price		4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type		1	Alpha	Option Type: "C" = Call "P" = Put
Bid Price		4	Integer	
Bid Size		4	Integer	
Ask Price		4	Integer	
Ask Size		4	Integer	

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Reentry Indicator		1	Alpha	'N' = Normal 'R' = Re-entry Note: The re-entry indicator must be set on the first quote following all purge events in order to re-enter the market.
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Notes:

- 1) 0 x 0 quotes are accepted and are processed as a purge of that symbol. The firms are required to specify the re-entry indicator on the first quote following a 0 x 0 quote. A purge (0 x 0 quote) may be submitted with Reentry Indicator set to 'N' or 'R'.
- 2) The Quote ID contents will appear in the Quote ID field in the Execution Notifications and the Clearing Trade Interface (CTI) trade messages. In the long quote block message above, this field uniquely identifies the individual quote within the block which may be executed against.
- 3) See the Processing Hints & Tips Section for tips on quote message processing.
- 4) Both bid and ask must be provided for each quote submitted.

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8.5 Quote Reply Message

This message is a response to "QQ", "QL", "QF" and "QT" requests.

The Quote Reply message is used to inform the firm of the status of the quotes sent to the matching engine. A quote may be rejected by the matching engine, in which case a quote status code states the reason why the quote was rejected. Sequencing information for valid quotes is returned which may be used to determine the relative order of quotes or purges processed by the matching engine.

Quote Reply Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"QR" = Quote Reply Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Block Status Code	14	1	Alphanumeric	" " = valid "A" = invalid badge "Y" = invalid block "Z" = system unavailable
Quote Count	15	2	Integer	The number of quotes in the submitted quote block
Valid Quote Count	17	2	Integer	The number of valid quotes in the submitted quote block. A valid quote is defined as a quote or purge (0 x 0 quote) that has a Quote Status Code of " "
<i>1-200 quote responses comprised of the following fields...</i>				
Quote Status Code		1	Alphanumeric	" " = valid quote "B" = invalid option "C" = not permitted "E" = invalid size "F" = invalid price "G" = invalid spread "H" = invalid indicator "I" = reentry required "J" = book frozen "R" = market closed "Z" = post only reprice reject
Sequence		8	Integer	Relative sequence of the valid quote processed by the matching engine. Quotes/purges with higher sequence number occur after quotes/purges with lower sequence number. This field is zero if the request was invalid. Unique across all ports connected to a matching engine.

Notes:

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- 1) The Quote Reply message is used by XL to respond to all submitted quote block message types.
- 2) Subtracting the Valid Quote Count field from the Quote Count field yields the number of invalid quotes and purges (0x0 quotes) in the quote block.
- 3) The Quote Reply message is assumed to apply to the last quote block message that has yet to be responded to for a given port. However, it does include the Message ID of the referenced quote block for convenience.
- 4) As a best practice, for a given port, firms should wait until the quote block response is received prior to sending another quote block to avoid unintentionally queuing within the TCP stack.
- 5) If firms load balance symbols across multiple connections, the firm is advised to wait for the quote response prior to submitting a new quote for a given symbol down a different connection to avoid timing issues/race conditions.
- 6) This is an unsequenced message and therefore cannot be replayed upon re-connection.
- 7) It is recommended that the firm send one quote per badge/option combination in one block for a given symbol. If more than one quote is sent in a block, each quote will be processed by the matching engine in the order that they appear in the quote block.
- 8) A "book frozen" Quote Status Code means that the option is opening. The book is momentarily locked and the quote cannot be accepted by the matching engine.

8.6 Detailed Quote Reply Message (NOM and BX Options only)

This message is a response to "Qq", "Ql", "Qf" and "Qt" requests.

This reply is identical in circumstance and behavior to the Quote Reply Message described in the previous chapter. The only difference is inclusion of individual Bid/Ask sequence numbers.

Detailed Quote Reply Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"Qr" = Detailed Quote Reply Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Block Status Code	14	1	Alphanumeric	" " = valid "A" = invalid badge "Y" = invalid block "Z" = system unavailable
Quote Count	15	2	Integer	The number of quotes in the submitted quote block
Valid Quote Count	17	2	Integer	The number of valid quotes in the submitted quote block. A valid quote is defined as a quote or purge (0 x 0 quote) that has a Quote Status Code of " "
<i>1-200 quote responses comprised of the following fields...</i>				
Quote Status Code		1	Alphanumeric	" " = valid quote "B" = invalid option "C" = not permitted "E" = invalid size "F" = invalid price "G" = invalid spread "H" = invalid indicator

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				"I" = reentry required "J" = book frozen "R" = market closed "Z" = post only reprice reject
Sequence		8	Integer	Relative sequence of the valid quote processed by the matching engine. Quotes/purges with higher sequence number occur after quotes/purges with lower sequence number. This field is zero if the request was invalid. Unique across all ports connected to a matching engine.
Bid Sequence		8	Integer	Day-unique order reference number assigned by NASDAQ to the Bid side of the quote
Ask Sequence		8	Integer	Day-unique order reference number assigned by NASDAQ to the Sell side of the quote

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9 Purge / Reentry Messages

9.1 Underlying Purge Message

The Underlying Purge message is used to pull all quotes from the market for all options contracts of the specified underlying symbol. It contains a Message ID field to provide the firm with a means to uniquely identify the purge.

Underlying Purge Message				
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Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"PU" = Underlying Purge Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Underlying Symbol	14	13	Alphanumeric	Denotes the unique underlying stock symbol. Normally matches the stock symbol. The exception is for corporate actions assigned by the exchange and underlyings exceeding 5 bytes. If the field is "*" (blank padded on the right), then all underlyings for this badge will be purged.

Notes:

- 1) Purges require firms to specify the re-entry indicator on the first quote following a purge.
- 2) The exchange Underlying is in most cases the same as the industry standard ticker underlying except for cases where the industry standard ticker underlying exceeds 5 bytes (internal system limit). The exchange also assigns unique underlyings for special settlement symbols. The underlying associated with each option is accompanied with each option in the Option Directory message.
- 3) See the Processing Hints & Tips Section for tips on purge message processing.
- 4) Underlying Purge Notification Messages will be sent to all SQF connections configured as Notification Ports. If a wildcard underlying purge is submitted (Underlying Symbol field with "*" blank padded on the right), an Underlying Purge Notification Message for each of the badge's underlyings will be sent to all Notification Ports.

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9.2 Underlying Purge Reply Message

The Underlying Purge Reply message is used to inform firms of the validity of an underlying purge request.

Underlying Purge Reply Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"PR" = Underlying Purge Reply Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Purge Status Code	14	1	Alphanumeric	" " = valid purge "A" = invalid badge "B" = invalid symbol "C" = not permitted "R" = market closed "Y" = invalid block "Z" = system unavailable
Sequence	15	8	Integer	Relative sequence of the underlying purge processed by the matching engine. Quotes/purges with higher sequence number occur after quotes/purges with lower sequence number. This field is zero if the request was invalid. If the Underlying Purge Request was a wildcard purge (all valid underlyings for a badge), this field is set to zero (XL only, NOM and BX Options systems will supply sequence in this case). Note that sequencing information for each underlying purged is returned in the Underlying Purge Notification Messages. Unique across all ports connected to a matching engine.

Notes:

- 1) The Underlying Purge Reply message is used by XL to respond to all submitted purge message types.
- 2) The Underlying Purge Reply message is assumed to apply to the last underlying purge message that has yet to be responded to for a given port. However, it does include the Message ID of the referenced purge for convenience.
- 3) As a best practice, for a given port, firms should wait until the purge response is received prior to sending another purge to avoid
 - a. confusing responses with sent purges
 - b. unintentionally queuing within the TCP stack
- 4) If firms load balance symbols across multiple connections, the firm is advised to wait for the purge response prior to submitting a new quote and/or a purge for a given symbol down a different connection to avoid timing issues/race conditions.
- 5) This is an unsequenced message and therefore cannot be replayed upon re-connection.

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9.3 Market Reentry Message

Market Reentry message is used to reset risk protection that has previously been triggered by either a system Rapid-Fire or a user Purge event. This message provides a larger scope alternative to specifying reentry indicator on individual quotes. Once a Reentry request has been successfully handled by the system it is no longer necessary to set reentry indicator on individual quotes to 'R'.

Market Reentry Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"RU" = Market Reentry Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Underlying Symbol	14	13	Alphanumeric	Denotes the unique underlying stock symbol. Normally matches the stock symbol. The exception is for corporate actions assigned by the exchange and underlyings exceeding 5 bytes. If the field is "*" (blank padded on the right), then all underlyings for this badge will be reset for reentry.

Notes:

- 1) Market Reentry does not restore the quotes that have been removed from the system due to purge or rapid-fire.

9.4 Market Reentry Reply Message

This message informs user of the completion and validity of the previously submitted Market Reentry request.

Market Reentry Reply Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"RR" = Market Reentry Reply Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier
Status Code	14	1	Alphanumeric	" " = valid reentry "A" = invalid badge "B" = invalid symbol "C" = not permitted "R" = market closed "Y" = invalid block "Z" = system unavailable
Reserved	15	8		Unused

Notes:

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- 1) The Market Reentry Reply message is assumed to apply to the last Market Reentry request that has yet to be responded to for a given port. However, it does include the Message ID of the referenced request for convenience.
- 2) When load balancing symbols across multiple connections, the firm is advised to wait for the Market Reentry response prior to submitting new quotes for the related symbols down a different connection to avoid timing issues/race conditions.
- 3) This is an unsequenced message and therefore cannot be replayed upon re-connection.

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10 Market Sweep and Auction Responses

10.1 Market Sweep and Auction Response Functionality

Market Sweep

A Market Sweep (Sweep submitted during free trading... that is, not during an auction) can execute against any marketable interest including both orders and quotes. A Market Sweep can hit multiple price levels of orders, but only one quote level. A Sweep Accept or Reject message indicates that the Sweep Request was accepted or rejected by the matching engine respectively. For each Market Sweep Execution, one Sweep Notification will be sent, displaying an execution price and number of contracts traded. Since Market Sweeps are handled as an IOC, the unexecuted balance of a Market Sweep will be cancelled prior to a subsequent trade. The unexecuted portion of the Sweep Request will be indicated with a Sweep Notification Message having a Price field of zero, the Contracts field with the remaining unexecuted volume and a notification type of cancelled.

A Market Sweep is done on the top of the market on the side on which the request is sent. The price at the top of the market on the side the Sweep is requested has to be at or better than the Sweep price i.e. If Buy (Sell) side of the market is being swept, the top of market price has to be at or greater (less) than the Sweep price.

The Specialist and Market Maker can specify the number of contracts at the defined price.

The quoter can receive the Order and Book information in real time using Order feeds available via TOPO+ on PHLX XL, ITTO on NOM and BX Depth at BX Options. Price details on all executions resulting from Market Sweeps are available via

- PHLX XL
 - o SQF 6.x
 - o The Clearing Trade Interface (CTI).
- NOM
 - o SQF 6.x
 - o OTTO Drop
 - o FIX Drop
 - o The Clearing Trade Interface (CTI)
- BX Options
 - o SQF 6.x
 - o The Clearing Trade Interface (CTI)
 - o FIX Drop

Auction Response

There are various auction mechanisms supported by PHLX XL/NOM/BX Options. When an auction is to commence, the SQF will publish an auction notification message. The quoter can enter multiple Auction Response requests at various price points to layer prices in the auction. An Auction Response can be sent for the following auctions:

- An Opening/Reopening Auction Response allows quoters to enter multiple Auction Response requests at various price points to layer prices in the Opening auction. An Opening/Reopening Auction Response can execute against any marketable interest

Specialized Quote interFace Interface Specification

trading at the opening, including orders and quotes; and may trade at multiple price levels.

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- A PIXL Auction Response allows quoters to enter multiple Auction Response requests at various price points to layer prices in the PIXL auction. The PIXL Auction will be commenced when a two-sided order is entered. Auction notification will be received via an Auction Notification message with the Stop Price, Size and Side of the agency order.
- A Solicitation Auction Response allows quoters to enter multiple Auction Response requests at various price points to layer prices in the Solicitation auction. The Solicitation Auction will be commenced when a two-sided order is entered. Auction notification will be received via an Auction Notification message with the Stop Price, Size and Side of the agency order masked.

Note:

NOM/BX Options support Opening/Reopening Auctions only.

PHLX XL supports
Opening/Reopening
PIXL/Solicitation

An Auction Response Accept or Reject message indicates that the Auction Response was accepted or rejected by the matching engine respectively. Executions resulting from an Auction Response will include the execution price and the number of contracts traded. Once the auction is completed, the unexecuted balance of an Auction Response will be cancelled prior to a subsequent trade. The unexecuted portion of the Auction Response will be indicated with a Sweep Notification Message having a Price field of zero, the Contracts field with the remaining unexecuted volume and a notification type of cancelled. Quoters must have a valid resting quote in the system in order to be able to submit an Auction Response (PHLX XL only, NOM and BX Options allow Auction Responses regardless)

The quoter can enter multiple Auction Response requests at various price points to layer prices in the auction.

An Auction Response with a size of zero effectively cancels a prior Auction Response for an option at a given price and side. An Auction Response with a size differing from the size of a prior Auction Response for an option at a given price and side is considered a cancel replace. For an Auction Response that has been cancelled or cancel replaced, the unexecuted portion of the previous Auction Response will be indicated with a Sweep Notification Message having a Price field of zero, the Contracts field with the remaining unexecuted volume and a notification type of cancelled.

Auction notification messages are sent via the SQF feed.

The quoter can receive the Order and Book information in real time using the Order feeds available via TOPO+ on PHLX XL, ITTO on NOM and BX Depth on BX Options. Price details on all executions resulting from Market Sweeps are available via

- PHLX XL
 - o SQF 6.x
 - o The Clearing Trade Interface (CTI).
- NOM
 - o SQF 6.x
 - o OTTO Drop

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- FIX Drop
- The Clearing Trade Interface (CTI)
- BX Options
 - SQF 6.x
 - The Clearing Trade Interface (CTI)
 - FIX Drop

Considerations

Some things to consider when sending Auction or Market Sweeps:

- Market Sweeps cannot be sent before opening, because the option is not in free trading
- To submit a sweep before opening, send an Auction Sweep with Auction Id = 0. Auction Sweeps can be replaced any time until start of free trading
- Auction sweeps can be submitted with Auction Id = 0 while an option is Halted. These Auction Sweeps can be replaced any time until re-start of free trading
- Market sweeps cannot be sent while Halted, because the option is not in free trading
- Market sweeps may be sent during a PIXL auction and cannot be sent during Opening/Reopening auctions.

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10.2 Market Sweep/Auction Response Message

The Market Sweep/Auction Response message is used to submit sweeps. The Market Sweep/Auction Response message utilizes the exchange assigned Option ID to specify the option contract that is being swept. The Option ID for each option contract can be obtained from the Option Directory message. It contains a Message ID field to provide the firm with a means to uniquely identify the book sweep message.

Market Sweep/Auction Response Message
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Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SB" = Market Sweep/Auction Response Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Option ID	14	4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Sweep Type	18	1	Alpha	"A" = Auction Response "M" = Market Sweep
Auction ID	19	4	Integer	The exchange assigned Auction ID as provided in the Auction Notification message if applicable.
Price	23	4	Integer	Price at which to sweep
Side	27	1	Alphanumeric	"B" = Buy side sweep "S" = Sell side sweep
Contracts	28	4	Integer	Volume of contracts to sweep

Notes:

- 1) For Opening/Reopening auctions, the quoter can enter multiple auction responses at various price points to layer the auction.
- 2) Market sweeps are submitted during free trading and will attempt to sweep the market and are treated as immediate or cancel (IOC).
- 3) The quoters can cancel an auction response by entering a response at the original price with a volume of zero.
- 4) The quoters can replace an auction response by entering a response at the original price with the changed volume.
- 5) For Market Sweeps (Sweep type 'M' = Market Sweep), the Auction ID field must be set to zero else it will reject.
- 6) If a Market Sweep (Sweep type 'M' = Market Sweep) is received while an auction is in progress, it will get rejected.
- 7) For Auction Responses (Sweep type 'A' = Auction Response), the Auction ID is: optional for Opening/Reopening auctions; mandatory for PIXL/Solicitation auctions. If an Auction ID is provided in this message, it must match the current auction in progress to participate in the auction. If the Auction ID is not supplied (i.e. Auction ID = 0), the sweep will participate in whatever Opening/Reopening auction is currently in progress.

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10.3 Market Sweep/Auction Response (Full Symbology) Message

The Market Sweep/Auction Response (Full Symbology) message is used to submit sweeps. The Market Sweep (Full Symbology) message utilizes the canonical symbol information to specify the option contract that is being swept. It contains a Message ID field to provide the firm with a means to uniquely identify the book sweep message.

Market Sweep/Auction Response (Full Symbology) Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SF" = Market Sweep/Auction Response (Full Symbology) Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Security Symbol	14	5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	19	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	21	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	25	1	Alpha	Option Type: "C" = Call "P" = Put
Sweep Type	26	1	Alpha	"A" = Auction Response "M" = Market Sweep
Auction ID	27	4	Integer	The exchange assigned Auction ID as provided in the Auction Notification message if applicable.
Price	31	4	Integer	Price at which to sweep
Side	35	1	Alphanumeric	"B" = Buy side sweep "S" = Sell side sweep
Contracts	36	4	Integer	Volume of contracts to sweep

Notes:

- 1) For Opening/Reopening auctions, the quoter can enter multiple auction responses at various price points to layer the auction.
- 2) Market sweeps are submitted during free trading and will attempt to sweep the market and are treated as immediate or cancel (IOC).
- 3) The quoter can cancel an auction response by entering a response at the original price with a volume of zero.
- 4) The quoter can replace an auction response by entering a response at the original price with the changed volume.
- 5) For Market Sweeps (Sweep type 'M' = Market Sweep), the Auction ID field must be set to zero else it will reject.

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- 6) If a Market Sweep (Sweep type 'M' = Market Sweep) is received while an auction is in progress, it will get rejected.
- 7) For Auction Responses (Sweep type 'A' = Auction Response), the Auction ID is: optional for Opening/Reopening auctions; mandatory for PIXL/Solicitation auctions. If an Auction ID is provided in this message, it must match the current auction in progress to participate in the auction. If the Auction ID is not supplied (i.e. Auction ID = 0), the sweep will participate in whatever Opening/Reopening auction is currently in progress.

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10.4 Market Sweep/Auction Response Accept Message

The Market Sweep/Auction Response Accept message is used to inform firms that a sweep is valid and accepted.

Market Sweep/Auction Response Accept Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SA" = Market Sweep/Auction Response Accept Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Option ID	14	4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Security Symbol	18	5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	23	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	25	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	29	1	Alpha	Option Type: "C" = Call "P" = Put
Sweep Type	30	1	Alpha	"A" = Auction Response "M" = Market Sweep
Auction ID	31	4	Integer	The exchange assigned Auction ID as provided in the Auction Notification message
Price	35	4	Integer	Price at which to sweep
Side	39	1	Alphanumeric	"B" = Buy side sweep "S" = Sell side sweep
Contracts	40	4	Integer	Volume of contracts to sweep

Notes:

- 1) The Market Sweep Accept/Auction Response message is used by XL to respond to all submitted sweep message types except Complex Order Sweep (These have their own response message types).
- 2) The Market Sweep/Auction Response Accept message is assumed to apply to the last sweep message that has yet to be responded to for a given port. However, it does include the Message ID of the referenced Market sweep for convenience.
- 3) This is a sequenced message and therefore can be replayed upon re-connection.

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10.5 Market Sweep/Auction Response Reject Message

The Market Sweep/Auction Response Reject message is used to inform firms that a sweep is invalid and therefore rejected.

Market Sweep/Auction Response Reject Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SR" = Market Sweep/Auction Response Reject Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Market Sweep/Auction Response Reject Code	14	1	Alphanumeric	"A" = invalid badge "B" = invalid symbol "C" = not permitted "D" = invalid side "E" = invalid size "F" = invalid price "N" = Too late to replace "P" = not in free trading "Q" = invalid auction "R" = market closed "Z" = system unavailable

Notes:

- 1) The Market Sweep/Auction Response Reject message is used by XL to respond to all submitted sweep message types except Complex Order Sweep (These have their own response message types).
- 2) The Market Sweep/Auction Response Reject message is assumed to apply to the last book sweep message that has yet to be responded to for a given port. However, it does include the Message ID of the referenced Market sweep for convenience.
- 3) This is a sequenced message and therefore can be replayed upon re-connection.

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10.6 Complex Book Order Sweep/COLA Response Functionality (PHLX XL only)

The Complex Book Order Sweep/COLA/PIXL/Solicitation Response is a means for the Specialist and Market maker to participate in the COLA (Complex Order Live Auction)/PIXL/Solicitation auctions for a given complex order Strategy, or to sweep the complex order book if no COLA is in progress for that strategy when the Complex Book Sweep/COLA/PIXL/Solicitation Response is received. COLA is an auction that provides an opportunity for price improvement for an incoming order. COLA provides a brief period in which Complex Book Sweep/COLA Response requests (as well as other complex orders sent in response to the COLA notification) may be submitted for inclusion in the auction to improve the COLA-initiating order price. A PIXL/Solicitation Auction Response allows quoters to enter multiple Auction Response requests at various price points to layer prices in the PIXL/Solicitation auction. The auction will be commenced when a two-sided order is entered. Auction notification will be received via a Complex Auction Notification message with the Stop Price, Size and Side of the agency order. The Price, Side and Size are masked for a Solicitation auction.

The PHLX-XL exchange rules should be consulted for details of trading complex orders.

Complex Order and COLA Information

The Firm will receive COLA notifications via SQF. Firms also has access to COLA notifications using the PHLX Order feed available with TOPO+. This information can be used by the Firm to become aware that a new COLA has been initiated.

The COLA notification due to a new incoming complex order will identify the strategy and indicate the volume available due to the initiating complex order, but will not provide information on side (buy/sell) or price. The participant can provide Complex Book Sweep/COLA Response requests for both buy and sell. Complex Book Sweep/COLA Responses that are opposite the side of the COLA initiating order will be considered for COLA and the others will be ineffectual (both will receive appropriate responses at the end of the COLA). If any Complex Book Sweep/COLA Responses are received after the COLA has completed, they will both be evaluated against the complex order book and responses sent to each after this evaluation against the book.

Sweep/COLA Response Request Attributes

The Sweep/COLA Response request must specify the side to sweep, number of contracts to sweep and the sweep price. If the volume specified in the request exceeds the volume available to be traded, the sweep will only trade up to the available volume. The Sweep/COLA Response may trade at multiple price points, but never at a price worse than the specified sweep price (again, reference PHLX-XL Complex Order rules for details).

The price and debit/credit indicator in the request is the limit price of the sender's Complex Book Sweep/COLA Response.

For Strategies with a stock component, Sweep values of 'T' (buy book side - short) and 'X' (buy book side - short exempt) represent sweep order on the buy side with a sell short or sell short exempt stock order, respectively. Similarly, Sweep values of 'Y' (sell book side - short) and 'Z' (sell book side - short exempt) represent sweep order on the sell side with a sell short or sell short exempt stock order, respectively. If a sweep request is sent with a buy short or sell short indicator and the stock component of the complex order is calculated to be a net buy, the sweep is rejected with "invalid side" reason.

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Multiple Sweep/COLA Response Requests

A participant may specify multiple Complex Book Sweep/COLA Response requests for a given strategy and side, as long as each request is at a different price than all other requests. Each request will be considered during the COLA; if a COLA is not in progress the requests will sweep the complex order book in the order each request was received.

If a participant submits multiple Complex Book Sweep/COLA Response requests for a given strategy with the same price and side, the more recent request will effectively replace the preceding request if and only if the preceding Complex Book Sweep/COLA Response request happened to be waiting for the COLA time period to expire at the moment the more recent request is received. A Complex Book Sweep/COLA Response with a size of zero effectively cancels a prior Complex Book Sweep for a strategy at a given price and side.

PIXL/Solicitation Information

The Firm will receive PIXL/Solicitation notifications via SQF (also available via TOPO+).

The Solicitation notification will identify the strategy, but will not provide information on price, side (buy/sell) and volume available in the auction. The participant can provide Solicitation Response requests for both buy and sell. The Responses that are on opposite side of the Solicitation initiating order will be considered for the auction and the others will be ineffectual (both will receive appropriate responses at the end of the Solicitation auction).

The PIXL Auction notification will identify the strategy, stop price and side of the agency order that started the auction. The participant can only provide Responses on the auction side, which indicates the PIXL initiating order.

Considerations

Some things to consider when sending Complex Book Order or COLA/PIXL/Solicitation Response Sweeps:

- Complex Book Sweeps or COLA/PIXL/Solicitation responses cannot be sent before opening or during a halt, because the option is not in free trading
- For Strategies with a stock component, a Sweep value of 'T' (buy book side - short) represents a sweep order on buy side with a sell short stock order. Similarly, a Sweep value of 'Y' (sell book side - short) represent a sweep order on sell side with a sell short stock order. If a sweep request is sent with a sell short indicator and the tied to stock strategy leg is not for short positioning, the sweep will be rejected by the PHLX system with Book Sweep/COLA/PIXL/Solicitation Response Reject Code value of "Invalid Side".
- Simultaneous sweeps for a given strategy, price and side are not allowed.
- For Strategies with a stock component, simultaneous sweeps for a given strategy, price, side and short/not short positioning is not allowed. (Example: A Sweep for a given strategy, price, side and short positioning cannot be followed by a Sweep for the same strategy, price, side and not short positioning, the second sweep will be rejected with "invalid side").

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10.7 Complex Book Sweep/COLA/PIXL/Solicitation Response Message

The Complex Book Sweep/COLA/PIXL/SolicitationResponse message is used to submit sweeps intended to participate in a COLA, PIXL or Solicitation auction. The Complex Book Sweep/COLA/PIXL/Solicitation Response message utilizes the PHLX assigned Strategy ID to specify the option contract that is being swept. The Strategy ID for each complex order can be obtained from the Complex Order Strategy message. The Complex Book Sweep/COLA PIXL/Solicitation Response contains a Message ID field to provide the firm with a means to uniquely identify the complex book sweep message.

Complex Book Sweep/COLA Response Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SX" = Complex Book Sweep/COLA/PIXL/Solicitation Response Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Strategy ID	14	4	Integer	Exchange assigned Strategy ID uniquely identifying the complex order strategy and provided in the Complex Order Strategy message
Sweep Type	18	1	Alpha	"A" = Auction Response "M" = Market Sweep
Auction ID	19	4	Integer	The exchange assigned Auction ID as provided in the Complex Auction Notification message if applicable.
Price	23	4	Integer	Price at which to sweep
Side	27	1	Alphanumeric	"B" = Buy book side "T" = Buy book side (short) "X" = Buy book side (short exempt) "S" = Sell book side "Y" = Sell book side (short) "Z" = Sell book side (short exempt)
Debit/Credit Indicator	28	1	Alphanumeric	Indicates whether the specified sweep price is debit or credit: "D" - Sweep Price is Debit "C" - Sweep Price is Credit " " - Sweep Price is 0.0
Contracts	29	4	Integer	Volume of contracts to sweep

Notes:

- 1) The quoter can enter multiple Complex Order/COLA/PIXL/Solicitation Response sweep requests at various price points to layer the COLA/PIXL/Solicitation.
- 2) Sweeps submitted outside a COLA/PIXL/Solicitation will attempt to sweep the Complex Book and are treated as immediate or cancel.

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- 3) The quoters can cancel a Complex Order Sweep/COLA/PIXL/Solicitation Response request by entering a sweep at the original price with a volume of zero.
- 4) The quoters can replace a Complex Order Sweep/COLA/PIXL/Solicitation Response request by entering a sweep at the original price with the changed volume.
- 5) For Complex Book Sweeps (Sweep type 'M' = Book Sweep), the Auction ID field must be set to zero else it will reject.
- 6) If a Complex Book Sweep (Sweep type 'M' = Book Sweep) is received while an auction is in progress, it will get rejected.
- 7) For COLA/PIXL/Solicitation Auction Responses (Sweep type 'A' = Auction Response), the Auction ID is mandatory. The Auction ID must match the current auction in progress to participate in the auction.

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10.8 Complex Book Sweep/COLA/PIXL/Solicitation Response Accept Message

The Complex Book Sweep/COLA/PIXL/Solicitation Response Accept message is used to inform firms that a sweep is valid and accepted.

Complex Book Sweep/COLA Response Accept Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SY" = Complex Book Sweep/COLA/PIXL/Solicitation Response Accept Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Strategy ID	14	4	Integer	Exchange assigned Strategy ID uniquely identifying the complex order strategy and provided in the Complex Order Strategy message
Sweep Type	18	1	Alpha	"A" = Auction Response "M" = Market Sweep
Auction ID	19	4	Integer	The exchange assigned Auction ID as provided in the Auction Notification message
Price	23	4	Integer	Price at which to sweep
Side	27	1	Alphanumeric	"B" = Buy side sweep "T" = Buy book side (short) "X" = Buy book side (short exempt) "S" = Sell side sweep "Y" = Sell book side (short) "Z" = Sell book side (short exempt)
Contracts	28	4	Integer	Volume of contracts to sweep

Notes:

- 1) The Complex Book Sweep/COLA/PIXL/Solicitation Response Accept message is used by XL to respond to all submitted Complex Order sweep message types.
- 2) The Complex Book Sweep/COLA/PIXL/Solicitation Response Accept message is assumed to apply to the last Complex Order Book Sweep/COLA/PIXL/Solicitation Response message that has yet to be responded to for a given port. However, it does include the Message ID of the referenced book sweep for convenience.
- 3) This is a sequenced message and therefore can be replayed upon re-connection.

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10.9 Complex Book Sweep/COLA/PIXL/Solicitation Response Reject Message

The Complex Book Sweep/COLA/PIXL/Solicitation Response Reject message is used to inform firms that a sweep is invalid and therefore rejected.

Complex Book Sweep/COLA Response Reject Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"SN" = Complex Book Sweep/COLA/PIXL/Solicitation Response Reject Message
Badge	2	4	Alphanumeric	Exchange assigned badge/suffix combination
Message ID	6	8	Binary	Firm defined unique message identifier.
Book Sweep/COLA Response Reject Code	14	1	Alphanumeric	"A" = invalid badge "B" = invalid symbol "C" = not permitted "D" = invalid side "E" = invalid size "F" = invalid price "N" = Too late to replace "P" = not in free trading "Q" = invalid auction "R" = market closed "Z" = system unavailable

Notes:

- 1) The Complex Book Sweep/COLA/PIXL/Solicitation Response Reject message is used by XL to respond to all submitted Complex Order Sweep/COLA/PIXL/Solicitation Response message types.
- 2) The Complex Book Sweep/COLA/PIXL/Solicitation Response Reject message is assumed to apply to the last Complex Order book Sweep/COLA/PIXL/Solicitation Response message that has yet to be responded to for a given port. However, it does include the Message ID of the referenced book sweep for convenience.
- 3) This is a sequenced message and therefore can be replayed upon re-connection.

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11 Notifications

11.1 Auction Notifications

11.1.1 Auction Notification Message

When a symbol goes into an auction, an Auction Notification Message is sent. Also if any auction parameters change during the auction, size for example, a new Auction Notification message will be sent for that symbol.

This notification message is also used to inform of orders that are available for execution at the National Best Bid/Offer. Such notification is called "Order Exposure Alert" and is indicated by Auction Type value "I". The delivery of this alert is optional and must be specifically requested.

Auction Notification Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"NA" = Auction Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Option ID	10	4	Integer	Exchange Option ID assigned daily, valid for the trading day
Security Symbol	14	5	Alphanumeric	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	19	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	21	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	25	1	Alpha	Option Type: "C" = Call "P" = Put
Auction ID	26	4	Integer	Uniquely identifies the Auction for the trading day.
Auction Type	30	1	Alpha	Type of Auction: "O" = Opening or Reopening "P" = PIXL "S" = Solicitation "I" = Order Exposure Alert
Price	31	4	Integer	Price at which Auction is started: "O"/Opening = potential opening price "P"/PIXL = Price at auction start "S"/Solicitation = zero price "I"/Order Exposure = price at which exposed order is available for

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				execution.
Side	35	1	Alpha	Indicates the side of the auction: "B" = Buy side "S" = Sell side "*" = Solicitation auction
Matched Volume	36	4	Integer	Indicates potential volume that can be traded at a price: "O"/Opening = volume at auction price "P"/PIXL = volume at auction price "S"/Solicitation = zero "I"/Order Exposure = zero
Imbalance Volume	40	4	Integer	Total number of contracts better than Price (includes Orders that cannot be filled) For "I"/Order Exposure indicates the volume of the exposed order.
Reserved	44	4	N/A	Reserved for future use

Notes:

- 1) The Auction ID is tied to the Sweep Functionality. See the Book Sweep section for further details.
- 2) This is an unsequenced message and therefore cannot be replayed upon re-connection.

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11.1.2 Complex Auction Notification Message (PHLX XL Only)

When a Complex Order Live Auction (COLA) or PIXL/Solicitation auction starts for a strategy of an underlying, a COLA/PIXL/Solicitation notification message containing the auction information will be sent.

COLA Notification Message

Name	Offset	Length	Value	Notes
Message Type	0	2	Alpha	"NC" = Complex Auction Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of timestamp
Strategy ID	10	4	Integer	Exchange Strategy ID assigned daily, valid while there are any open complex orders for the day
Auction ID	14	4	Integer	Uniquely identifies the Auction for the trading day.
Auction Type	18	1	Alpha	Type of Auction: "C" – COLA "P" – PIXL "S" – Solicitation
Price	19	4	Integer	Price at which COLA/PIXL is started. This field is set to zero for COLA initiated due to new Complex Orders and Solicitation auctions.
Side	23	1	Alpha	Indicates the side of the auction: "B" = Buy side "S" = Sell side "*" = COLA initiated due to new Complex Orders and Solicitation auctions
Debit or Credit	24	1	Alpha	Price is: "D" = Net Debit "C" = Net Credit " " = Even (or Market Order) "*" = Anonymous This field will be masked with "*" for new Complex Orders that initiated a COLA and Solicitation auctions
Volume	25	4	Integer	Total volume available in COLA/PIXL auctions. This field will be 0 for Solicitation auction

Notes:

- 1) The Auction ID is tied to the Sweep Functionality. See the Book Sweep section for further details.
- 2) This is an unsequenced message and therefore cannot be replayed upon re-connection.

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11.2 Purge Notifications

11.2.1 Option Symbol Purge Notification Message

The Option Symbol Purge Notification message is used to inform firms that their quote for a given option symbol has been purged/removed from the market. The Option Symbol Purge Notification message utilizes the exchange assigned Option ID to specify the option contract that has been purged. The Option ID for each option contract can be obtained from the Option Directory message. The message contains the full canonical symbol information as well.

Option Symbol Purge Notification Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NP" = Option Symbol Purge Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Option ID	14	4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Security Symbol	18	5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	23	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	25	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	29	1	Alpha	Option Type: "C" = Call "P" = Put
Purge Reason Code	30	1	Alphanumeric	"U" = user requested "S" = system initiated "Q" = Anti-Internalize
Message ID	31	8	Binary	Firm defined unique message identifier. This field is padded with blanks for system initiated purges.
Sequence	39	8	Integer	Relative sequence of the purge processed by the matching engine. Quotes/purges with higher sequence number occur after quotes/purges with lower sequence number. This field is zero if the request was invalid.

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				Unique across all ports connected to a matching engine.
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Notes:

- 1) The Option Symbol Purge Notification Messages is used to notify the firms that their quote for a given symbol has been purged/removed from the market.
- 2) This is an unsequenced message and therefore cannot be replayed upon re-connection.
- 3) An Option Symbol Purge Notification Message is generated upon any asynchronous system generated purge as well as for user requested purges.
- 4) A manual option symbol purge requested by firm and performed by exchange personnel has Purge Reason Code set to "S".

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Interface Specification

11.2.2 Underlying Purge Notification Message

The Underlying Purge Notification message is used to inform firms that their quotes for options associated with the given underlying symbol have been purged/removed from the market.

Underlying Purge Notification Message
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Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NU" = Underlying Purge Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Underlying Symbol	14	13	Alphanumeric	Denotes the unique underlying stock symbol. Normally matches the stock symbol. The exception is for corporate actions assigned by the exchange and underlyings exceeding 5 bytes.
Purge Reason Code	27	1	Alphanumeric	"U" = user requested "S" = system initiated
Message ID	28	8	Binary	Firm defined unique message identifier. This field is padded with blanks for system initiated purges.
Sequence	36	8	Integer	Relative sequence of the underlying purge processed by the matching engine. Quotes/purges with higher sequence number occur after quotes/purges with lower sequence number. This field is zero if the request was invalid. Unique across all ports connected to a matching engine.

Notes:

- 1) The Underlying Purge Notification Messages is used to notify the firms that their quotes for options associated with a given underlying have been purged/removed from the market.
- 2) This is an unsequenced message and therefore cannot be replayed upon re-connection.
- 3) An Underlying Purge Notification Message is generated upon any asynchronous system generated purge as well as for user requested purges.
- 4) A manual underlying purge requested by firm and performed by exchange personnel has Purge Reason Code set to "S".

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11.3 Market Reentry Notification

The Market Reentry Notification message informs that risk protection triggered by rapid fire /purge has been reset for the specified scope.

Market Reentry Notification Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NR" = Market Reentry Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Underlying Symbol	14	13	Alphanumeric	Denotes the unique underlying stock symbol. Normally matches the stock symbol. The exception is for corporate actions assigned by the exchange and underlyings exceeding 5 bytes.
Reserved	27	1	Alphanumeric	Reserved - unused
Message ID	28	8	Binary	Firm defined unique message identifier of the initiating Reentry request.
Reserved	36	8		Reserved - unused

Notes:

- 1) This is an unsequenced message and therefore cannot be replayed upon re-connection.

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11.4 Execution Notifications

11.4.1 Quote Execution Notification Message

The Quote Execution Notification message is used to inform firms that their quote for a given option symbol has been executed in the market. The message contains the full canonical symbol information as well.

Execution Notification Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NE" = Execution Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Option ID	14	4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Security Symbol	18	5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	23	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	25	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	29	1	Alpha	Option Type: "C" = Call "P" = Put
Execution ID	30	8	Binary	Firm defined unique Message ID or unique Quote ID reported on clearing executions. Message ID from Quote Block Message or Quote ID.
Auction ID	38	4	Integer	Uniquely identifies the Auction for the trading day.
Price	42	4	Integer	Execution Price
Side	46	1	Alphanumeric	"B" = Bought "S" = Sold
Contracts	47	4	Integer	Volume of Contracts Traded
Liquidity Indicator	51	1	Alphanumeric	Indicates if this side of the trade is a maker or taker. Possible values are:

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				"A" = Maker "R" = Taker "O" = Opening Trade "N" = None. Maker/Taker not applicable to this side of the trade.
Cross Id	52	4	Integer	Identifies the execution. This can be matched with the Cross Id in the exchange Clearing Trade Interface (CTI) messages
Match Id	56	4	Integer	Identifies the component of an execution

Notes:

- 1) This is a sequenced message and therefore can be replayed upon re-connection.
- 2) This notification is only sent if the firm is subscribed to receive these messages.
- 3) The firm may receive more than one Execution Notification message with the same cross ID.
- 4) It is possible for a Quote to have more than one execution for a given Cross Id. The Cross Id and Match Id combination uniquely identifies the Quote Execution.

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11.4.2 Sweep Notification Message

The Sweep Notification message is used to inform firms that their sweep for a given option symbol has been executed or cancelled in the market.

Sweep Notification Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NS" = Execution Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Option ID	14	4	Integer	Exchange assigned Options ID uniquely identifying the option contract
Security Symbol	18	5	Alpha	Industry assigned security symbol for the option contract
Expiration Year, Month and Day	23	2	Integer	Denotes the explicit expiration date of the option. Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike Price	25	4	Integer	Denotes the explicit strike price of the option. Refer to Data Types for field processing notes.
Option Type	29	1	Alpha	Option Type: "C" = Call "P" = Put
Notification Type	30	1	Alpha	Denotes the type of notification: "E" = Execution "C" = Cancelled
Execution ID	31	8	Binary	Firm defined unique Message ID reported on clearing executions. Message ID from Sweep message.
Auction ID	39	4	Integer	Uniquely identifies the Auction for the trading day if applicable.
Price	43	4	Integer	Execution Price. A price of zero means the sweep is out and Contracts field is the number of cancelled contracts.
Side	47	1	Alphanumeric	"B" = Buy side sweep "S" = Sell side sweep
Contracts	48	4	Integer	Volume of Contracts Traded or number of cancelled contracts for a sweep that is out.

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Liquidity Indicator	52	1	Alphanumeric	Indicates if this side of the trade is a maker or taker. Possible values are: "A" = Maker "R" = Taker "O" = Opening Trade "N" = None. Maker/Taker not applicable to this side of the trade. " " = Sweep is outed
Cross Id	53	4	Integer	Identifies the execution. This can be matched with the Cross Id in the exchange Clearing Trade Interface (CTI) messages. Zero for outed sweeps
Match Id	57	4	Integer	Identifies the component of an execution. Zero for outed sweeps

Notes:

- 1) This is a sequenced message and therefore can be replayed upon re-connection.
- 2) The firm may receive more than one Execution Notification message with the same cross ID.
- 3) It is possible for a Sweep to have more than one execution for a given Cross Id. The Cross Id and Match Id combination uniquely identifies the Sweep Execution.
- 4) For sweep executions and cancel notifications, the Side field reflects the side being swept. If a sweep execution notification has a value of "B", that means you sold and a value of "S" means you bought.

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11.4.3 Complex Sweep Leg Notification Message (PHLX XL Only)

The Complex Sweep Leg Notification message is used to inform firms that their sweep for a given complex strategy has been executed or outed and gives leg-level information regarding the execution/out of the sweep. The Complex Sweep Leg Notification message utilizes the exchange assigned Strategy ID and Strategy Leg to specify the leg of the complex strategy that has been executed. The Strategy Leg information can be obtained from the Complex Order Strategy message with the corresponding Strategy Id.

Complex Sweep Leg Notification Message

Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NL" = Complex Sweep Leg Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Strategy ID	14	4	Integer	Exchange Strategy ID assigned daily, valid while there are any open complex orders for the day
Strategy Leg	18	1	Integer	Leg reference of the strategy involved in the complex sweep execution. The reference is the index of the leg, starting at zero, in the Complex Order Strategy message
Option Id	19	4	Integer	Exchange Option Id of the strategy leg. Options Directory message describes the option. Zero (0) for Stock Leg.
Notification Type	23	1	Alpha	Denotes the type of notification: "E" = Execution "C" = Cancelled
Execution ID	24	8	Binary	Firm defined unique Message ID reported on clearing executions. Message ID from Sweep message.
Auction Id	32	4	Integer	Uniquely identifies the Auction for the trading day.
Price	36	4	Integer	Leg Execution Price. A price of zero means the sweep is out and Contracts field is the number of cancelled contracts.
Side	40	1	Alphanumeric	"B" = Buy side sweep (Strategy) "S" = Sell side sweep (Strategy)
Leg Side	41	1	Alphanumeric	"B" = Buy side sweep (Leg) "S" = Sell side sweep (Leg) (see Notes below)

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Contracts	42	4	Integer	Leg volume of Contracts traded or number of cancelled contracts for a sweep that is out
Liquidity Indicator	46	1	Alphanumeric	Indicates if this side of the trade is a maker or taker. Possible values are: "A" = Maker "R" = Taker "N" = None. Maker/Taker not applicable to this side of the trade.
Cross Id	47	4	Integer	Identifies the execution. This can be matched with the Cross Id in the exchange Clearing Trade Interface (CTI) message. Zero for outed sweeps.
Match Id	51	4	Integer	Identifies the component of the execution. Zero for outed sweeps.
Reserved	55	8	Alphanumeric	Reserved for future use (currently blank padded)

Notes:

- 1) The Complex Sweep Leg Notification Message is used to notify the firms leg related information that their sweep for a given complex strategy has been executed or outed in the market.
- 2) This is a sequenced message and therefore can be replayed upon re-connection.
- 3) The Complex Sweep Leg Notification messages will precede the corresponding Complex Sweep Notification message. These messages will all have the same Cross Id and each Leg Execution will have a unique Match Id, also displayed in the CTI interface.
- 4) Typically one message per leg will be sent. One option leg and a stock leg (for tied to stock) may have 2 messages sent for executions; the two messages differing by price.
- 5) For a Complex Book Sweep/COLA Response Message sent with Side field "B" and with a Complex Order Strategy having two legs, the first leg having Side "B" and second leg with side "S" and there is an Execution on the sweep, three Notifications will be sent. The first message is a Complex Sweep Leg Notification Message will have Strategy Leg = 0, Side = "B" and Leg Side = "B". The second message is a Complex Sweep Leg Notification Message will have Strategy Leg = 1, Side = "B" and Leg Side = "S". The third message will be a Complex Sweep Notification Message with Side = "B".

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11.4.4 Complex Sweep Notification Message (PHLX XL Only)

The Complex Sweep Notification message is used to inform firms that their sweep for a given complex strategy has been executed or cancelled in the market. The Execution Notification message utilizes the exchange assigned Strategy ID to specify the complex strategy that has been executed. The Strategy ID can be obtained from the Complex Order Strategy message.

Complex Sweep Notification Message				
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Name	Offset	Length	Value	Notes
Type/Subtype	0	2	Alpha	"NX" = Complex Sweep Execution Notification Message
Seconds	2	4	Integer	Seconds portion of the timestamp
Nanoseconds	6	4	Integer	Nanoseconds portion of the timestamp
Badge	10	4	Alphanumeric	Exchange assigned badge/suffix combination
Strategy ID	14	4	Integer	Exchange Strategy ID assigned daily, valid while there are any open complex orders for the day
Notification Type	18	1	Alpha	Denotes the type of notification: "E" = Execution "C" = Cancelled
Execution ID	19	8	Binary	Firm defined unique Message ID reported on clearing executions. Message ID from Sweep message.
Auction ID	27	4	Integer	Uniquely identifies the Auction for the trading day.
Price	31	4	Integer	Execution Price. A price of zero means the sweep is out and Contracts field is the number of cancelled contracts.
Side	35	1	Alphanumeric	"B" = Buy side sweep "S" = Sell side sweep
Contracts	36	4	Integer	Volume of Contracts Traded or number of cancelled contracts for a sweep that is out.
Liquidity Indicator	40	1	Alphanumeric	Indicates if this side of the trade is a maker or taker. Possible values are: "A" = Maker "R" = Taker "N" = None. Maker/Taker not applicable to this side of the trade. " " = Sweep is outed
Cross Id	41	4	Integer	Identifies the execution. This can be matched with the Cross

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				Id in the exchange Clearing Trade Interface (CTI) messages. Zero for outed sweeps
Match Id	45	4	Integer	Identifies the component of an execution. Zero for outed sweeps

Notes:

- 1) The Complex Sweep Execution Notification Message is used to notify the firms that their sweep for a given complex strategy has been executed in the market.
- 2) This is a sequenced message and therefore can be replayed upon re-connection.
- 3) It is possible for a Complex Sweep to have more than one execution for a given Cross Id. The Cross Id and Match Id combination uniquely identifies the Complex Sweep Execution.
- 4) For sweep executions and cancel notifications, the Side field reflects the side being swept. If a sweep execution notification has a value of "B", that means you sold and a value of "S" means you bought.

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12 Support

Department	Contact	Phone	Email
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For technical questions please contact devsupport@nasdaqomx.com

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13 Appendix A – SQF Client To Host Messages

The following table summarizes which host to client messages are sequenced or unsequenced.

Message	Notes
System Event Message	Sequenced
Options Directory Message	Sequenced
Complex Strategy Message	Sequenced
Security Trading Action Message	Sequenced
Complex Trading Action Message	Sequenced
Underlying Permission Message	Sequenced
Opening Rotation Spread Multiplier Message	Sequenced
Rapid Fire Admin Message	Sequenced
Rapid Fire Control Reply Message	Unsequenced
Quote Reply Message	Unsequenced
Underlying Purge Reply Message	Unsequenced
Market Sweep / Auction Response Accept Message	Sequenced
Market Sweep / Auction Response Reject Message	Sequenced
Complex Book Sweep / COLA Response Accept Response Message	Sequenced
Complex Book Sweep / COLA Response Reject Message	Sequenced
Auction Notification Message	Unsequenced
Complex Auction Notification Message	Unsequenced
Option Symbol Purge Notification Message	Unsequenced
Underlying Purge Notification Message	Unsequenced
Market Reentry Notification Message	Unsequenced
Execution Notification Message	Sequenced
Sweep Notification Message	Sequenced
Complex Sweep Leg Notification Message	Sequenced
Complex Sweep Notification Message	Sequenced

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14 Appendix B – Revision Control Log

Documentation Revision Control Log

November 26, 2013: Specialized Quote Interface- Version 6.4c

- Added new quote reject code for "Z" (post only reprice reject).

August 19, 2013: Specialized Quote Interface- Version 6.4

- Updated the Complex Auction Notification Message for COLA.

November 26, 2012: Specialized Quote Interface- Version 6.4

- Fixed incorrect Match ID offset of the Complex Sweep Notification message.

October 31, 2012: Specialized Quote Interface- Version 6.4

- Added Order Exposure Alerts

August 10, 2012: Specialized Quote Interface- Version 6.4

- Minor Specification Release.
- Updated fields Auction Type, Price, Side and Volume in Auction Notification Message for Solicitation auctions.
- Updated fields Auction Type, Price, Side, Debit or Credit and Volume in Complex Auction Notification Message for PIXL/Solicitation auctions.
- Removed references to Market Exhaust auction, which is obsolete.

June 26, 2012: Version 6.3

- Introduced new purge-on-disconnect mode

April 15, 2012: Version 6.3

- Included support for BX Options exchange

January 25, 2012: Version 6.3

- Restored short exempt positions to complex sweep requests

November 15, 2011: Version 6.3

- Clarified that the Detailed Quote Reply message is only available on NOM
- Clarified Sweep replace, cancel, and Sweep COD behavior

October 6, 2011: Version 6.3

- Minor Specification Release
- Added Market Reentry Message and Notification
- Added Support for Detailed Quote Reply message
- Added "O" = Opening Trade liquidity code to Quote and Sweep execution notifications

February 23, 2011: Version 6.2

- Added Underlying Permission Admin Notification
- Added Quote Spread Multiplier Admin Notification
- Added Rapid-Fire Request-Reply and Admin messages

January 22, 2011: Specialized Quote Interface- Version 6.1

- Minor Specification Release
- Ported SQF 6.x to support NOM 2.0
- Added "Q" = Anti-Internalize for the Purge Reason Code in the Purge Notification Message
- Edited specification document references to the market centers (NOM & PHLX) to distinguish which SQF features are supported in NOM 2.0 and which are supported in PHLX XL.

November 9, 2010: Specialized Quote Interface- Version 6.1

- Specification Release
- Subversion field in System Event Message has value 1
- Enhanced Notes in Options Directory Message section

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- Added Complex Sweep Leg Notification Message
- Added Complex Sweep Leg Notification Message entry in Table in Appendix A

October 7, 2010: Specialized Quote Interface- Version 6.06

- Minor Specification Release
- Added "C" (not permitted) to Purge Status Code field of Underlying Purge Reply Message
- Added Appendix A – SQF Client To Host Messages section (for convenience)
- Modified Soup Version 4 hyperlink to point to correct specification
- For sweep and complex sweep executions notifications and cancel notifications, the Side field reflects the side being swept. If a sweep execution notification has a value of "B", that means you sold and a value of "S" means you bought.

September 23, 2010: Specialized Quote Interface- Version 6.05

- Minor Specification Release
- Market Sweep and Auction Response Functionality section describes some rules for submitting sweeps
- Market Sweep / Auction Response Reject Message has modified list of Market Sweep/Auction Response Reject Codes
- Complex Book Order Sweep / COLA Response Functionality section describes some rules for submitting sweeps
- Complex Book Order Sweep / COLA Response Reject Message has modified list of Book Sweep / COLA Response Reject Codes
- Updated the description in the Processing Hints and Tips section related to the Re-entry Indicator. The re-entry indicator for quotes does not apply to Purge on Disconnect events.

August 31, 2010: Specialized Quote Interface- Version 6.04

- Minor Specification Release
- Updated Note 1 for Complex Strategy Message
- Sweep Type field in Complex Book Sweep/COLA Response Message values updated.
- Liquidity Indicator, Cross Id and Match Id fields in Sweep Notification and Complex Sweep Notification Messages have values defined for a Sweep that is out.
- 0 x 0 Quotes (purges) may be sent with the Reentry Indicator set to 'N' or 'R'.
- Updated Quote Status Code values in Quote Reply Message
- Updated Market Sweep/Auction Response Reject Codes in Market Sweep/Auction Response Reject Message
- Updated Sweep Type field values in Complex Book Sweep/COLA Response Accept Message
- Updated Book Sweep/COLA Response Reject Codes in Complex Book Sweep/COLA Response Reject Message

June 7, 2010: Specialized Quote Interface- Version 6.03

- Minor Specification Release
- Added "Market Closed" status codes for Quote Reply and Underlying Purge Reply Messages.
- Removed short exempt positions from complex sweep requests and responses.
- Added information regarding PIXL Auctions. Updated Action Notification and Auction Response Messages for PIXL auctions.
- Quote Id, Message Id and Execution Id fields are binary

May 20, 2010: Specialized Quote Interface- Version 6.02

- Minor Specification Release
- Added Valid Quote Count field to Quote Response Message

May 5, 2010: Specialized Quote Interface- Version 6.01

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- Minor Specification Release
- Reference to Soup Connection is updated. The firm should use Soup Version 4, which supports unsequenced Soup Messaging.
- Removed all references to Port Group. Purge on disconnect occurs when all connections for the firm are disconnected.
- Quote Accept and Quote Reject Messages have been replaced with a Quote Reply Message. The Quote Reply Message contains information regarding the status of each quote or purge as well as sequencing information to determine the outcome of race conditions.
- Sequencing information is sent for quotes, purges and underlying purges.
- Single Symbol Purge Message has been removed. Purges at the option level are now sent within a Quote Block (zero by zero quote is a purge).
- Underlying Purge Accept and Underlying Purge Reject Messages have been replaced with an Underlying Purge Reply Message.
- Wildcard purge for all of a badge's configured underlyings is allowed.
- Added more Side field values for a Complex Book Sweep Request message. Two values were omitted.
- Added out for Sweep. The unexecuted portion of any Sweep Request will be indicated with a Sweep Execution Message having a Price field of zero and Contracts field with the remaining unexecuted volume.
- Added Match Id for Quote, Sweep and Complex Sweep Executions.
- Added Message Id and Sequence fields to Option and Underlying Purge Notification Messages.

March 26, 2010: Specialized Quote Interface- Version 6.00

- Major Specification Release.