MIAX Express Interface for Quoting and Trading Options

MEI Interface Specification

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1 Overview

MIAX Express Interface (**MEI**) is a messaging interface that MIAX members that are approved as Market Makers use to submit quotes for trading on the MIAX Options Market. Market Makers are only allowed to submit quotes in the products of underlying instruments to which they are assigned.

MEI Features:

MEI messaging and the system architecture is designed for low latency and high throughput messaging. Some of the key features of the interface are:

- MEI uses binary numeric fields, fixed length ASCII fields and variable length bulk messages in order to utilize bandwidth efficiently and assist in achieving **low latency**.
- MEI allows for bulk quoting, fast enhanced-quote entry, multiple connections per firm and the mixing of series of various underlying instruments available on each matching engine in a single bulk quote messages in order to facilitate **high throughput**. MEI supports single sided quotes in bulk quote there by allowing firms to **prioritize** the important quotes and sides ahead of other quote updates.
- MEI requires the use of TCP IP protocol in order to provide a **guaranteed delivery** mechanism for the quote packets. Quote acknowledgements and Quote Cancel acknowledgements come directly from the engine allowing for **enhanced determinism** of delivery and processing.
- Message formats are designed to use **minimal bandwidth**. Use of Product IDs in place of a full canonical symbol is an example.
- MIAX engine atomically cancels simple quotes of an MPID for all series of a given underlying instrument when the MPID reaches *Aggregate Risk Management (ARM)* threshold.
- Upon MEI disconnect, the MIAX Engine cancels all simple quotes, simple eQuotes and Complex eQuotes from the system.
- The MIAX ARM^2 protection mechanism provides additional protections on top of the ARM functionality:
    - The ARM^2 Firm Level Protection, once configured, will cancel all simple quotes and disallow automatic reset/reentry, on a best effort basis, if the number of unique classes that trigger ARM protections reach a configured threshold within a configurable amount time across the entire trading system environment for a given firm.
    - The ARM^2 Underlying Level Protection, once configured, will atomically disallow automatic reset/reentry if the number of ARMs reach a configured threshold within a configurable amount time for a given underlying for a given firm.

  Once either the Firm Level or Underlying Level ARM^2 protection is engaged, automatic reset/reentry is disallowed until the firm requests a manual reset for the effected underlyings via MIAX Trading Operations. ARM and ARM^2, coupled with atomic immediate quote protection offered for all mass quote cancels, provides one of the **industry's best risk protection mechanisms**.

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- MEI notifications provide current **electronic system status** allowing the firms to take necessary actions immediately.

This specification is intended for the use for MIAX Market Makers only.

1.1 Exchange related information

1.1.1 Hours of operation for MIAX Options Exchange

Please visit MIAX website at http://www.MIAXOptions.com for details about the times for each of these events/periods.

Note: Times specified in the website are in United States Eastern Time zone.

7:00 am	**Firm Interface Start up time** Firms are allowed to connect to MEI and send test quotes.
9:25 am	**Live Quote Window (LQW)** Start of Quoting. Quotes received at or after this time will be used in MIAX Opening.
9:30 am	**Opening Process** Start of MIAX Opening process.
9:30 am to 4:00 pm	**Trading Session for Equity Options** (ends at 1:00 pm on early closing days) MIAX stops accepting quotes in these classes at the end of this trading session. MIAX may send trade related data following the end of the trading session for various operational reasons as needed.
9:30 am to 4:15 pm	**Trading Session for ETF and Index Options** (ends at 1:15 pm on early closing days) MIAX stops accepting quotes in these classes at the end of this trading session. MIAX may send trade related data following the end of the trading session for various operational reasons as needed.
5 pm (approx)	**End of Session** (ends at 2 pm on early closing days) MEI has completed sending all messages and Firms will soon be disconnected

1.1.2 Obtaining more information

Information such as (but not limited to) membership, rules, fees and support can be obtained by sending an email to Trading Operations or by visiting MIAX website at http://www.MIAXOptions.com.

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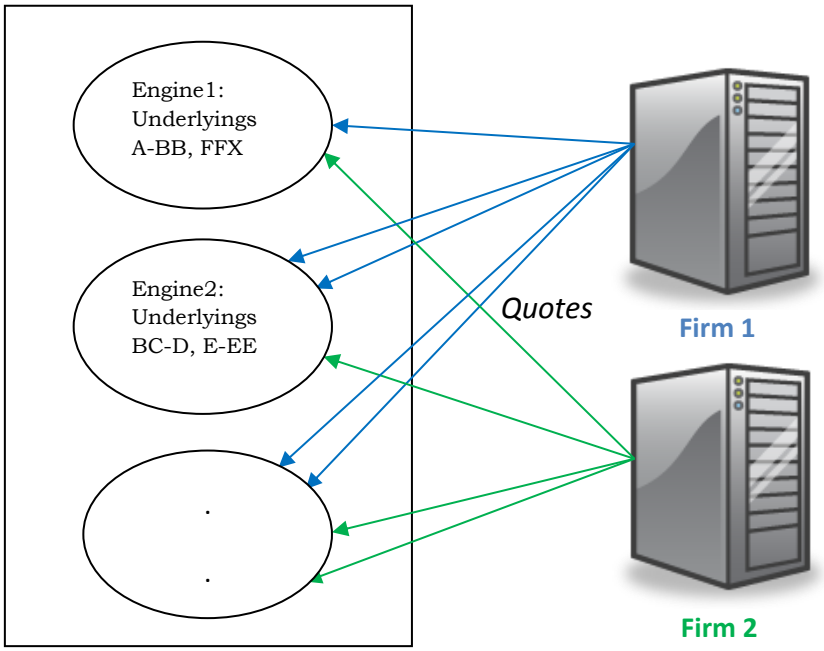
1.2 MEI Architecture



MIAX Matching Engines

Highlights:

- MIAX trading architecture is highly scalable and consists of multiple trade matching environments (clouds). Each cloud handles trading for all options for a set of underlying instruments. The underlying sets may not be contiguous ranges of underlyings and could be organized in any manner as assigned by the exchange. For the most part, the underlying assignments will be static in terms of allocation to a trading environment. However, if reallocation of underlyings to various trading environments is needed, such changes would be communicated to the firms with ample notice prior to the actual implementation.
- Market Maker firms can connect to one or more pre-assigned servers on each cloud. This will require the firm to connect to more than one cloud in order to quote in all underlying instruments they are approved to make markets in.
- This architecture offers low latency, high throughput, small fault domains and high resiliency.

1.3 Certification for trading via MEI

Please contact MIAX Trading Operations to obtain more information about certification testing and the details about the test environment.

When the Market Maker firms are ready with their application, they must certify their application with MIAX. This certification testing is a manual process. In order to schedule a certification test, please email Trading Operations.

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1.4 Hot Topics

Membership: Contact Member services for details about membership. As a part of the on-boarding process, each Market Maker will be assigned a unique MPID and that ID will have to be sent in every message.

Live Quote Window (LQW): Official quoting starts at 9:25 am. Any quotes entered before that will be acknowledged and discarded immediately. All quotes received after 9:25 am will be in-play for opening processing.

Liquidity Type: Member firms are allowed to send FIX orders via the FIX interface. Market making members are allowed to send Bulk quotes and Enhanced quotes via the MEI interface.

- *Simple Bulk Quotes*: MEI provides a simple bulk quote message that can be used to quote with low latency and high throughput. A bulk quote message carries many **standard quotes** that replace existing standard quotes for the MPID.
- *Enhanced Quotes (eQuotes)*: MEI provides an enhanced quote (eQuote) entry mechanism. An eQuote message carries a single instruction such as **Immediate or cancel quote, Fill or Kill quote, Intermarket Sweep quote, Auction or cancel quote, or Opening only quote** (refer to the Business rules for a complete list of instructions allowed). Thus eQuote provides firms some flexibility and control over the quote. A new eQuote does not replace an existing eQuote or standard quote. Market Maker firms can cancel or replace an eQuote using an indicator in the eQuote message.
- *Complex Enhanced Quotes*: MEI provides complex enhanced quote entry mechanism. This liquidity provides firms with flexibility to interact with complex order markets or to participate in complex order auctions. A new complex eQuote does not replace an existing complex eQuote. Market Maker firms can cancel complex eQuotes using an indicator in the complex eQuote message.

Port Setup: Member firms have flexibility in setting up MEI ports to cater to their architecture.

- *Port Types*: MEI supports the concept of a full service port (all input message types supported) and a limited service port that supports input of all messages except bulk quotes. Firms are limited to 2 full service ports and 4 limited service ports per cloud. Limited service ports are optional.
- *Port Grouping*: MEI allows firms to define port groups to control the “cleanup on disconnect” feature.

Cleanup on Disconnect:

- *Default Setup*: All the simple quotes and simple/complex eQuotes entered by a firm to an engine will be removed upon disconnect of that firm’s last MEI connection to that engine. Eg: Let us say Firm1 has two connections to cloud1 and Firm1 uses MPID1 and MPID2 on both of these connections. When connection1 of Firm1 goes down, it can still use connection2 to submit quotes and cancels. But, when both connections go down, MEI cancels all simple quotes and simple/complex eQuotes for MPID1 and MPID2 on that engine.

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- *Port Grouping Setup*: Separate port groups can be defined for full service ports and limited service ports. Firms can have MIAX setup a limited service port group to not clean up on disconnect. If the cleanup-on-disconnect feature is enabled on the full service port group, upon disconnect of all ports in that group, all simple quotes and simple/complex eQuotes entered by the firm will be removed regardless of the port group source. Please refer to the examples in the Appendix D.

Data feeds: MIAX has several value-adding data feeds. Details of the feeds and their content can be obtained by visiting http://www.MIAXOptions.com or emailing Trading Operations.

Symbol and Strategy management: Firms will get the list of all option symbols and strategies that will be traded via MEI at the start of every session. The MIAX assigned Product ID or Strategy ID of each option/strategy will be sent in every message so that firms can tie each message to an option symbol or strategy.

Simple Bulk quote blocking, latency & throughput: Densely packaged quote blocks leads to high throughput and less bandwidth usage. Firms are encouraged to consider packaging the quote block as densely as possible. Additionally, Firms can package more than one quote block in a single MTU to more effectively use I/O bandwidth.

Flow control: Upon receipt of a simple bulk quote or mass quote cancel request, MEI will not read the firm facing port until it sends out the response. Firms that do not strictly follow a one-in-flight paradigm are advised to limit the number of in-flight quote blocks to less than 20 for optimal TCP protocol performance; i.e. under certain limited circumstances, exceeding this limit could result in shrinking window size and/or dropped packets.

Quotes that are locking or crossing BBOs: If a quote locks or crosses the opposite side interest (quote, equote, order) of the same Market Maker for the same product, it will be accepted and the contra side will be canceled. In the interest of achieving the best performance for quoting latency and throughput, firms can consider avoiding the latency of such cancel processing by changing the side being moved into first. E.g. if the Bid is edging toward the offer, firms can move the offer first and then the bid. This can be accomplished within the same quote block. Ultimately, the Firms should consider the functional impact of this approach, or variants like it, and determine if it meets their functional needs. If a quote is locking or crossing the ABBO, that quote will be re-priced and managed such that the MBBO does not lock or cross the ABBO. Such a quote will be re-priced towards its limit price when the ABBO fades. Once posted at a price, it will not be re-priced when the ABBO moves into its posted price.

Size decrementing: When trades occur against quotes, quote size will automatically be decremented. Market Makers are responsible for re-quoting when quote size is depleted.

ARM Risk protection: Firms can set up their ARM settings at MIAX and MIAX will use those settings every day. Firms can change their settings electronically throughout the day. Only simple quote executions are counted towards ARM protection. Executions of simple/complex eQuotes and FIX orders are not counted towards ARM protection. ARM protection scope encompasses all options of the underlying including those of various security symbols that are mapped to the underlying such as mini options.

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ARM^2 Risk protection: provides an additional protection mechanism on top of ARM.

- Firm Level ARM^2 protections can be set up by contacting MIAX Trading Operations. The ARM^2 Firm Level Protection, once configured, will cancel all simple quotes and disallow automatic reset/reentry, on a best effort basis, if the number of unique classes that trigger ARM reach a configured threshold within a configurable amount time across the entire trading system environment for a given firm.
- ARM^2 Underlying Level protection settings can be set up by the firms via MEI. Firms can change their settings for the Underlying Level protections electronically throughout the day. The ARM^2 Underlying Level protection, once configured, will atomically disallow automatic reset/reentry if the number of ARMs reach a configured threshold within a configurable amount time for a given underlying for a given firm.

Once ARM^2 is triggered, Firms must call MIAX Trading Operations to reset the ARM^2 trigger for the effected underlyings which in turn will allow the firm to perform a quote reset and resume quoting.

Backup Ports: Firms will be assigned backup MEI ports on backup infrastructure. These are slated to be used in the event of failure of primary MEI infrastructure. Firms are required to test connectivity to these backup MEI ports every day. These backup MEI ports will not accept any messages while operating in the backup mode and are solely used for connection verification while in this mode.

Executions/Busts/Adjustments: All executions are conveyed to firms via MEI. Trade busts (cancels) and adjustments (corrections) are NOT conveyed to firms via MEI. Firms interested in getting this information can refer to the Clearing Trade Drop (CTD) interface specification.

1.5 Data Types

The following table describes the data types used in MEI messaging:

Note: Time fields in all messages are as per timings of United States Eastern Time zone.

Data Type	Description
BinaryU	Unsigned, Intel x86 byte-ordered (**little-endian**), binary encoded numbers
BinaryS	Signed, Intel x86 byte-ordered (**little-endian**), binary encoded numbers
BinaryPrc4U	BinaryU Field with the last 4 (right most) digit places being decimal places
BinaryPrc4S	BinaryS Field with the last 4 (right most) digit places being decimal places
NanoTime	BinaryU field that contain transaction time in nanoseconds since past midnight
Alphanumeric	Each place can contain characters or numbers. Left justified and space-padded on to the right

1.6 Configuration

Notifications: All the notifications listed in this specification are enabled on each MEI connection/port. While requesting MEI ports, Firms can request MIAX to disable some or all the notifications on each port.
Notes:

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- MIAX requires that each notification, with the exception of the cancel notification, be received on at least 1 port per cloud.
- Firms can choose to disable cancel notifications or enable limited cancel notifications on all of their ports. The limited cancel notifications feature filters out option level cancel notifications due to the following underlying level protections: Firm or Exchange initiated mass cancel, trading halts and ARM protection initiated mass cancels. Underlying level notifications of these events are conveyed via the quote protection notification.
- Receiving each notification on multiple ports can achieve required resiliency, but result in duplicate notifications. Firms are advised to take that into consideration while deciding on their port set up.

Port type: MEI supports the concept of a full service port (all input message types supported) and a limited service port that allows input of all messages except bulk quotes.

Port groups: Firms can chose to have MIAX configure their ports into one or more groups. For example, separate port groups can be defined for full service ports and limited service port. Each port group can have unique or shared MPIDs. Each group can be configured to cleanup on disconnect.

Cleanup on disconnect feature: Firms opting for port group setup can chose to disable cleanup on disconnect feature for the limited service port group. By default, the full service port group will have the cleanup on disconnect feature enabled.

ARM Settings: Although the preferred method for setting up the ARM parameters is to use ARM messages supported by the MEI Interface, MIAX will allow Market Maker firms to email their ARM settings in an Excel sheet. Please refer to Appendix B for the Excel sheet format and instructions for sending in ARM settings. All subsequent firms' settings messages received from MEI will overwrite the corresponding manual settings for the current trading session. **Note: The latest settings at the end of each trading session will be carried over to the next trading session.**

ARM^2 Settings: ARM^2 Underlying Level protections settings can be sent via MEI. The Underlying Level ARM^2 configuration settings work similarly to that of the ARM settings above. The ARM^2 Firm Level protection settings must be set up manually via coordination with MIAX Trading Operations.

2 Session Management Messages

Please refer to latest TCP Session Management document (available at MIAX website at http://www.MIAXOptions.com) for details about **SesM-TCP (MIAX proprietary session management Protocol)**. This protocol layer offers session management capabilities such as authentication, application messaging over TCP/IP, sequencing of messages, heartbeats and gap fills. Some of the messages that are sent over MEI are considered to not be of any value for refreshing after reconnecting and hence those are unsequenced messages.

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Note: Upon receipt of an unknown, malformed or illegal application message or session message, MEI will send a SesM "Goodbye Packet" with a human readable reason text string and MEI will disconnect the line.

3 Administrative Messages

This section consists of administrative messages such as those that are used to send Options Product list and synchronize ARM settings.

3.1 Simple Series Update

This is the message format that will be used to disseminate all Option series traded on MIAX for the current session on the cloud associated for this connection.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"SU"
Product Add/Update Time	8	NanoTime	Time at which this product is added/updated on MIAX system today.
Product ID	4	BinaryU	MIAX Product ID mapped to a given option. It is assigned per trading session and is valid for that session.
Underlying Symbol	11	Alphanumeric	Stock Symbol for the option.
Security Symbol	6	Alphanumeric	Option Security Symbol
Expiration Date	8	Alphanumeric	Expiration date of the option in YYYYMMDD format
Strike Price	4	BinaryPrc4U	Explicit strike price of the option. Refer to data types for field processing notes
Call or Put	1	Alphanumeric	Option Type "C" = Call "P" = Put
Opening Time	8	Alphanumeric	Expressed in HH:MM:SS format. Eg: 09:30:00
Closing Time	8	Alphanumeric	Expressed in HH:MM:SS format. Eg: 16:15:00
Restricted Option	1	Alphanumeric	"Y" = MIAX will accept position closing orders only "N" = MIAX will accept open and close positions
Long Term Option	1	Alphanumeric	"Y" = Far month expiration (as defined by MIAX rules) "N" = Near month expiration (as defined by MIAX rules)
Active on MIAX	1	Alphanumeric	Indicates if this symbol is tradable on MIAX in the current session: "A" = Active (tradable) on MIAX "I" = Inactive (not tradable) on MIAX

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<table>
<tr><th>Field Name</th><th>Length</th><th>Data Type</th><th>Notes</th></tr>
<tr><td>MIAX BBO Posting Increment Indicator</td><td>1</td><td>Alphanumeric</td><td>This is the Minimum Price Variation as agreed to by the Options industry (penny pilot program) and as published by MIAX
<table>
<tr><th rowspan="2">Indicator</th><th colspan="2">BBO Increments</th></tr>
<tr><th>Price <= $3</th><th>Price > $3</th></tr>
<tr><td>“P”</td><td>Penny (0.01)</td><td>Penny (0.01)</td></tr>
<tr><td>“N”</td><td>Penny (0.01)</td><td>Nickel (0.05)</td></tr>
<tr><td>“D”</td><td>Nickel (0.05)</td><td>Dime (0.10)</td></tr>
</table></td></tr>
<tr><td>Quote Acceptance Increment Indicator</td><td>1</td><td>Alphanumeric</td><td>This is the Minimum Price Variation for Quote acceptance as per MIAX rules
<table>
<tr><th rowspan="2">Indicator</th><th colspan="2">Quoting Increments</th></tr>
<tr><th>Price <= $3</th><th>Price > $3</th></tr>
<tr><td>“P”</td><td>Penny (0.01)</td><td>Penny (0.01)</td></tr>
<tr><td>“N”</td><td>Penny (0.01)</td><td>Nickel (0.05)</td></tr>
<tr><td>“D”</td><td>Nickel (0.05)</td><td>Dime (0.10)</td></tr>
</table></td></tr>
<tr><td>Opening Underlying Market Code</td><td>1</td><td>Alphanumeric</td><td>Options opening will be triggered on receipt of Opening quote/trade from this Underlying market:
<table>
<tr><th>Market Code</th><th>Description</th></tr>
<tr><td>A</td><td>NYSE Amex</td></tr>
<tr><td>B</td><td>NASDAQ OMX BX</td></tr>
<tr><td>C</td><td>National Stock Exchange</td></tr>
<tr><td>D</td><td>FINRA ADF</td></tr>
<tr><td>E</td><td>Market Independent (Any market that opens first)</td></tr>
<tr><td>I</td><td>International Securities Exchange</td></tr>
<tr><td>J</td><td>EDGA Exchange, Inc</td></tr>
<tr><td>K</td><td>EDGX Exchange, Inc</td></tr>
<tr><td>M</td><td>Chicago Stock Exchange</td></tr>
<tr><td>N</td><td>NYSE Euronext</td></tr>
<tr><td>P</td><td>NYSE Arca Exchange</td></tr>
<tr><td>Q</td><td>NASDAQ OMX (via UTP Feed)</td></tr>
<tr><td>T</td><td>NASDAQ OMX (via CTA Feed)</td></tr>
<tr><td>W</td><td>Chicago Board Options Exchange</td></tr>
<tr><td>V</td><td>IEX</td></tr>
<tr><td>X</td><td>NASDAQ OMX PHLX</td></tr>
<tr><td>Y</td><td>BATS Y-Exchange, Inc</td></tr>
<tr><td>Z</td><td>BATS Exchange Inc</td></tr>
</table></td></tr>
<tr><td>Priority Quote Width</td><td>4</td><td>BinaryPrc4U</td><td>Maximum allowable width for a quote for this Option during regular trading in order to be considered as Priority Quote.
0 when Priority Quote Width is not applicable.</td></tr>
<tr><td>Reserved</td><td>8</td><td>BinaryU</td><td>** Reserved for future use **</td></tr>
</table>

Points to note:

- This is a sequenced message and hence these messages can be replayed upon reconnection.

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- Entire Options list will be disseminated at the start of day.
- In each connection, firms will only receive the series associated with the Engine that is servicing that connection.
- Intra-day updates will also be published as they occur.
- In case of an intra-day reconnection, Firms can replay all sequenced messages starting at a specified SesM sequence number.
- When an active series is made inactive:
  - All simple quotes and simple/complex eQuotes for the series will be canceled by MIAX.
  - All complex strategies containing this product will become non-tradable and result in MIAX canceling all complex eQuotes for these strategies.
- The Priority quote width specified in this message is not applicable to Opening. Please refer MIAX rules and circulars for details about priority quote width applicable during Opening.

3.2 Simple ARM Settings Update Request

Firms can use this message format to set up their ARM protection settings for each session. Changes to these settings can be made throughout the day.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"AS"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Action	1	Alphanumeric	Valid values: 'S' – Set (add or update) ARM settings 'D' – Delete ARM settings
Underlying Symbol	11	Alphanumeric	Underlying symbol for which this ARM protection is applicable **Optional:** If this is filled with spaces, this ARM protection setting will be used as a default setting for this MPID.
Allowable Engagement Percentage	4	BinaryU	Percentage of quote size at which the Market Maker wants MIAX to trigger ARM protection for this underlying. Please refer to the rules for details of ARM. Maximum value is 65,535 (65,535%). See note below on minimum value.
Counting Period	2	BinaryU	Duration (in number of milliseconds) in which Engagement percentage is calculated in order to determine if the MPID should be put on ARM protection for this underlying. Allowable Range: 100 to 15,000 milliseconds Must be a multiple of 100 milliseconds.

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Points to note:

- Initially, executions of eQuotes and FIX orders are not counted towards ARM protection. Only executions resulting from standard quotes are counted towards ARM protection. MIAX may in the future allow for the submission by Market Makers of Day eQuotes, executions of which may be counted towards ARM protection.
- The minimum value of Allowable Engagement Percentage can be found in the MIAX Rule Book and via MIAX Regulatory Circulars.
- As of the date of this spec release, MIAX will have an ARM setting global default of
  - Allowable Engagement Percentage = 105%
  - Counting Period = 1,000 milliseconds (1 seconds)

  Important: Firms are advised to utilize the default ARM settings published for the given trading session via the ARM Protection Notification message.
- Eg: If the setting is 100%, IBM Jan 50 Call quote size is 100 and IBM Jan 60 Call quote size is 10, execution of 70 (+70%) of the IBM Jan 50 Calls and 3 (+30%) of the IBM Jan 60 Calls, within the Counting period, triggers ARM protection.
- **MIAX will carry over all ARM settings across trading sessions. If firms desire a different setting, they must reset their ARM settings.**
- MIAX will use the following priority for ARM settings:
  - Use MPID's ARM setting for the underlying
  - If that is not set, use MPID's default setting
  - If that is not set, use MIAX global default setting

  Therefore, if a firm deletes a setting, other remaining MPID settings or MIAX settings apply.
- These settings are applicable for the entire trading session and hence the firm does not have to set these up with intra-day reconnections for the same trading session.
- Settings changes does not trigger ARM recalculation or ARM protection. Subsequent trades will take the new settings into consideration.
- ARM protection scope encompasses all options of the underlying including those of various security symbols that are mapped to the underlying such as mini options. For example, for underlying AAPL which has security symbols AAPL and AAPL7, ARM protection is both calculated and triggered under the scope of the underlying which includes AAPL and AAPL7. Once ARM protection is triggered, it would cancel all simple quotes for both AAPL and AAPL7.

3.3 Simple ARM Settings Update Response

MIAX uses this format to respond to the firm with a status of their ARM protection settings request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"AA"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker

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Field Name	Length	Data Type	Notes
Underlying Symbol	11	Alphanumeric	Underlying sent in the request. Firms can use this to know which underlying setting did not take into effect in case of an error.
ARM Settings Update Status	1	Alphanumeric	" " = Settings applied successfully "A" = Invalid Action "P" = Invalid Allowable Engagement Percentage "D" = Invalid Counting Period "M" = Unknown MPID "U" = Invalid Underlying "X" = Not permitted "N" = No such ARM settings "Z" = Undefined error

Points to note:

- This is not a sequenced message
- If the firm did not get a response due to disconnect, firm is encouraged to send the setting request again after connecting.

3.4 ARM^2 Underlying Level Protection Settings Update Request

Firms can use this message format to set up their ARM^2 Underlying Level protection settings for each session. Changes to these settings can be made throughout the day.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"2S"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Action	1	Alphanumeric	Valid values: 'S' – Set (add or update) ARM^2 settings 'D' – Delete ARM settings
Underlying Symbol	11	Alphanumeric	Underlying symbol for which this ARM^2 protection is applicable
ARM Threshold Count	4	BinaryU	Number of ARM triggers for the Counting Period for the specified underlying that will trigger ARM^2 Underlying level protection. Minimum: 3 Maximum: 99
Counting Period	4	BinaryU	Duration (in number of milliseconds) for which ARM triggers are counted in order to determine if they don't exceed the specified ARM^2 Threshold. Allowable Range: 1000 to 24,300,000 milliseconds

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Field Name	Length	Data Type	Notes
			Must be a multiple of 1,000 milliseconds.

Points to note:

- ARM^2 is built upon the ARM protection mechanism. That is, the ARM^2 Underlying Level and Firm Level protections are triggered based on the number of ARM triggers for each underlying the firm trades.
- As of the date of this spec release, there are no default settings for ARM^2. Firms must configure the ARM^2 settings in order for the functionality to operate. Note: ARM and ARM^2 settings require explicit configuration for each feature.
- **MIAX will carry over all ARM^2 settings across trading sessions. If firms desire a different setting, they must reset their ARM^2 settings.**
- These settings are applicable for the entire trading session and hence the firm does not have to set these up with intra-day reconnections for the same trading session.
- Intraday setting changes do not trigger ARM^2 recalculation or ARM^2 Protection. Subsequent trades will take the new settings into consideration.
- ARM^2 protection scope encompasses all options of the underlying including those of various security symbols that are mapped to the underlying such as mini options. For example, for underlying AAPL which has security symbols AAPL and AAPL7, ARM^2 protection is triggered under the scope of the underlying which includes AAPL and AAPL7. Once ARM^2 protection is triggered, it would be engaged for both AAPL and AAPL7.

3.5 ARM^2 Underlying Level Protection Settings Update Response

MIAX uses this format to respond to the firm with a status of their ARM^2 Underlying level protection Settings Update Request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"2R"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	Underlying sent in the request. Firms can use this to know which underlying setting did not take into effect in case of an error.
ARM Settings Update Status	1	Alphanumeric	" " = Settings applied successfully "A" = Invalid Action "P" = Invalid ARM Threshold "D" = Invalid Counting Period "M" = Unknown MPID "U" = Invalid Underlying "X" = Not permitted

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Field Name	Length	Data Type	Notes
			"N" = No such ARM^2 setting "E" = Feature not supported "Z" = Undefined error

Points to note:

- This is not a sequenced message
- If the firm did not get a response due to disconnect, firm is encouraged to send the setting request again after connecting.

3.6 Valid Quote Width for Opening

This message format will be used to convey to the firms the *Valid Quote Width* settings applicable to the Opening process of MIAX Options market.

Each message describes a row of the *Valid Quote Width* table with a low end of the applicable price range and corresponding maximum quote width. The high end of the applicable price range is up to, but not including the next row's low end applicable price range if provided or infinity for the last row. If the table has to be reloaded, all rows will be resent. **Refer to Appendix C for an example**.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"QW"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPV Class	1	Alphanumeric	This valid width record is applicable for Options in this MPV class <table><tr><th rowspan="2">Indicator</th><th colspan="2">MPV Class</th></tr><tr><th>Price <= $3</th><th>Price > $3</th></tr><tr><td>"P"</td><td>Penny (0.01)</td><td>Penny (0.01)</td></tr><tr><td>"N"</td><td>Penny (0.01)</td><td>Nickel (0.05)</td></tr><tr><td>"D"</td><td>Nickel (0.05)</td><td>Dime (0.10)</td></tr></table>
Low End of Applicable Range	4	BinaryPrc4U	Low end of the price range for which this valid width is applicable. The high end of the price range is up to, but not including the low end of next row or infinity for last row.
Maximum Quote Width	4	BinaryPrc4U	Quote width applicable for this range for Options that are not Long Term Options.
Long Term Option Multiplier	4	BinaryPrc4U	Multiplier of the maximum quote width (specified in the previous field) for this range applicable for Long Term Options.

Points to note:

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- This is a sequenced message
- This width is only applicable for the current trading session.
- These messages are sent out at the beginning of day. There can be midday changes to this and firms need to be able to process them throughout the trading day.
- Long term option multiplier is a BinaryPrc4U type field in which a multiplier of 1.5 will be sent as 15000. Eg: If maximum quote width is $0.30 for a price in the range of $0 to $1.99 and long term option multiplier for this range is 1.5, the applicable width for long term option is $0.45.

4 Application Messages

This section consists of application messages such as Quote, eQuote messages and notifications.

4.1 Liquidity Messages

4.1.1 Simple Bulk Quote Message

Firms can use this message format to send up to 50 single sided quotes. Single sided quotes enables the firms to prioritize the update of more important quotes and sides ahead of other quotes.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"QM"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Quote Count	1	BinaryU	Number of quotes in this bulk quote message.
1 to 50 single-side quotes consisting of the following fields:			
Product ID	4	BinaryU	Product ID assigned by MIAX for the current session
Price	4	BinaryPrc4U	Quote price. Max Price: Is defined in Technical Circular
Size	4	BinaryU	Quote size (number of option contracts). Max Size: 999,999
Side	1	Alphanumeric	"B" = Bid "A" = Ask

Points to note:

- A single *Bulk quote* message can have quotes for any underlying supported by the Engine servicing the connection through which the quote was sent.
- MEI is a synchronous quoting interface.
- MIAX recommends that the Firms use unique *Client Message IDs* for all bulk quotes and eQuotes so as to map execution and cancel notifications back to the corresponding liquidity.

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- Bulk quote will be rejected if the quote count is different than actual number of quotes in the *Bulk quote* message. Such a bad quote block will result in MIAX disconnecting the client session on which such quote was received.
- A standard quote update for a series replaces the previous quote on the specified side of the market.
- A quote with a price of zero **and** size of zero cancels the existing quote for the Market Maker for the specified side of that option. Market Makers can remove their quote for the option by sending both bid and offer with a zero price and zero size.
- MIAX will internally assign a ***Bulk Quote Index*** (1 byte binary field) starting with 0 for each quote in this Bulk quote message (meaning Bulk Quote Index is unique in a single Bulk quote message and not across different bulk quote messages). Both the *Bulk Quote Index* and the *Client Message ID* will be reflected in *cancel notification* and *execution notification.* Firms can use the IDs together as a unique ID for each quote. This can help in identifying two different quotes for the same product in a single bulk quote message.

4.1.2 Simple Bulk Quote Response

This message format will be used to inform the firm of the status of quotes sent in the bulk quote request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"QR"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Bulk Quote Status	1	Alphanumeric	" " = Bulk quote block is valid "R" = Invalid bulk quote block "Z" = Undefined error
Quote Count	1	BinaryU	Number of quotes that were submitted in the Bulk quote block
Invalid Quote Count	1	BinaryU	Number of quotes that were rejected (quotes with status other than " ")
Quote Ack Time	8	NanoTime	Time at which MIAX engine generated this response.
1 to 50 single-side quote responses consisting of the following fields:			
Quote status	1	Alphanumeric	" " = quote successfully accepted "T" = Test quote successfully accepted prior to LQW, but not placed on MIAX book "C" = MIAX closed for trading of this product; request cannot be completed "O" = Invalid Product ID "P" = Invalid Price "Q" = Invalid Size "S" = Invalid Side

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Field Name	Length	Data Type	Notes
			"U" = Unknown MPID "X" = Not permitted "M" = Quote size < minimum required size "R" = Rejected due to quote protection "D" = Rejected due to self-crossing PRIME agency order "Z" = Undefined error
Engine Sequence Number	8	BinaryU	Unique Sequence number, assigned by the MIAX Matching Engine, for quotes processed successfully and zero if rejected.

Points to note:

- This is not a sequenced message
- If the quote block is rejected, Quote status and Engine Sequence Number must be ignored. MIAX will populate Quote status of space.

4.1.3 Simple Enhanced Quote (eQuote) Message

This is the format for an eQuote message that can be sent either to match with orders and quotes on the MIAX book or when responding to a liquidity seeking event.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"EQ"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker This cannot be changed in a replacement eQuote.
Product ID	4	BinaryU	Product ID mapped to a given option assigned by MIAX for the current session This cannot be changed in a replacement eQuote.
eQuote Action	1	Alphanumeric	"N" – New eQuote "C" – Cancel eQuote "R" – Replace eQuote
eQuote Type	1	Alphanumeric	Type of eQuote "O" – OPG (good for Opening transaction only) "A" – AOC (good for specified Event only) "I" – IOC (Immediate match or cancel) "F" – FOK (Fill-Or-Kill; IOC+All-or-None) "S" – ISO (IOC; Ignore ABBO and match) This cannot be changed in a replacement eQuote.
Event ID	4	BinaryU	**When eQuote Type = "O":** - Event ID must be zero. Otherwise, eQuote will be rejected. **When eQuote Type = "A":**

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Field Name	Length	Data Type	Notes
			- For Opening event, Event ID must be zero. Otherwise, eQuote will be rejected. - For other Auction/Timer events, Event ID must match the Event ID of the event in progress (MIAX Event ID that was published in the Liquidity seeking event notification) **When eQuote Type = "I", "F" or "S":** MIAX will ignore Event ID. Firms can send an Event ID of zero. This can be changed in a replacement eQuote.
Target Message ID	4	BinaryU	Zero if this is a new request. Otherwise, *Client Message ID* of the pending eQuote that is being replaced.
Price	4	BinaryPrc4U	Price up to which the Market Maker is willing to match. Max Price: Defined in Technical Circular This can be changed in a replacement eQuote. This is ignored for eQuote cancels.
Size	4	BinaryU	Number of contracts. Max Size: 999,999 This can be changed in a replacement eQuote. Not applicable for eQuote cancel because eQuote cancel request will result in entire remaining size to be canceled.
Side	1	Alphanumeric	Side of this eQuote: "B" = Bid (Buy) "A" = Ask (Sell) This <u>cannot</u> be changed in a replacement eQuote.

Points to note:

- None of the currently supported eQuote types are posted to the MIAX BBO.
- *Client Message ID* has to be unique for each firm on each cloud. MIAX will check the Client Message ID against open eQuotes for the Product for that MPID and reject duplicates.
- A single eQuote request can execute at multiple price levels with resting orders and/or quotes. Separate executions will be sent for each such execution. The firm will be notified with a *Cancel notification* message for any unexecuted part of each eQuote request.
- When using eQuotes to respond to liquidity seeking events, in order to avoid race-condition issues, firms are advised to wait for responses before sending in cancels or replaces on a connection other than the one through which the original eQuote request was sent.
- *Cancel/replacement behavior*:
    - When the request is intended to replace a pending eQuote, the quantity specified in the *Size* field will be the new open contracts after replacement. MIAX will **not** subtract the executed contracts of the pending eQuote from the size in the replace request.

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- There will be no "too late to cancel" message generated if requested size is less than the executed size.
- A *cancel notification* will not be generated for any open volume of pending eQuote that got canceled due to an eQuote cancel request. The eQuote cancel response must be deemed as a confirmation.
- Replaced eQuotes will always have new timestamp on the book.

- *Responding to Liquidity seeking events:*
  - Firms can submit multiple eQuotes.
  - *Target message ID* must be present for canceling or replacing a pending eQuote
  - Cancel/replacement behavior stated above remains.

4.1.4 Simple Enhanced Quote (eQuote) Response

This message indicates if the eQuote was accepted or rejected. Note that this message does not report executions. For executions, please refer to the *Execution notification*. For the unexecuted part that gets canceled, please refer to the *Cancel notification*.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"ER"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
eQuote ID	8	BinaryU	MIAX assigned ID for eQuote if accepted; Zero if eQuote was rejected. Replaced eQuote will have the same eQuote ID as original.
eQuote Request Status	1	Alphanumeric	" " = Request accepted successfully "I" = Invalid Product ID "A" = No event with such Event ID "B" = Invalid eQuote Action "V" = Invalid Size "M" = eQuote size < minimum required size "P" = Invalid Price "T" = Invalid eQuote Type "S" = Invalid Side "1" = eQuote not permitted for this price "2" = eQuote not permitted for this side "3" = eQuote represented by *target message ID* was not found "4" = Client message ID not unique "U" = Unknown MPID "5" = Rejected due to quote protection "X" = Not permitted "K" = Test eQuote successfully accepted prior to LQW, but not placed on MIAX book "C" = MIAX closed for trading of this product;

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Field Name	Length	Data Type	Notes
			request cannot be completed "D" = Rejected due to self-crossing PRIME agency order "Z" = Undefined error "*" – Downgraded from older version

Points to note:

- This is a sequenced message

4.1.5 Complex Enhanced Quote (eQuote) Message

This is the format for a Complex eQuote message that can be sent either to match with complex book or when responding to a complex auction liquidity seeking event.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"CE"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm for this request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Strategy ID	4	BinaryU	MIAX Strategy ID is assigned per trading day and is valid only for that day. ID is not unique between Series Product ID.
eQuote Action	1	Alphanumeric	"N" – New complex eQuote "C" – Cancel pending complex eQuote "R" – Replace complex eQuote
eQuote Type	1	Alphanumeric	Type of complex eQuote "A" – AOC (good for specified Event only) "I" – IOC (Immediate match or cancel) This cannot be changed in a replacement eQuote.
Complex Event ID	4	BinaryU	**When complex eQuote Type = "A":** For Auction events, Event ID must match the Event ID of the event in progress (MIAX Event ID that was published in the Complex Liquidity seeking event notification) **When complex eQuote Type is other than "A":** MIAX will ignore Event ID. Firms can send an Event ID of zero.
Target Message ID	4	BinaryU	Zero if this is a new request. Otherwise, *Client Message ID* of the pending eQuote that is being replaced.
Price	8	BinaryPrc4S	The net limit price for the strategy If Side is "B":

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Field Name	Length	Data Type	Notes
			• Positive number represents net debit • Negative number represents net credit If Side is "A": • Positive number represents net credit • Negative number represents net debit Price of zero is net neutral transaction for either side.
Size	4	BinaryU	Number of times to execute the specified strategy. NOTE: Highest Leg Ratio of the strategy (its absolute value) multiplied by complex eQuote size must be less than or equal to 999,999
Side	1	Alphanumeric	Side of this complex eQuote: "B" = Bid (Buy) "A" = Ask (Sell)
Reserved	16	Alphanumeric	Reserved

Points to note:

- Complex IOC eQuote will not trade during complex auction events and will be immediately canceled by MIAX
- Complex AOC eQuote can only be a response to the auction.
- Complex eQuote can only trade against complex order book and will not leg against simple liquidities.
- When using complex eQuotes to respond to liquidity seeking events, in order to avoid race-condition issues, firms are advised to wait for responses before sending in cancels or replaces on a connection other than the one through which the original complex eQuote request was sent.
- *Cancel/replacement behavior*:
    - When the request is intended to replace a pending complex eQuote, the quantity specified in the *Size* field will be the new open contracts after replacement. MIAX will **not** subtract the executed contracts of the pending complex eQuote from the size in the replace request.
    - There will be no "too late to cancel" message generated if requested size is less than the executed size.
    - A *cancel notification* will not be generated for any open volume of a pending complex eQuote that was canceled due to an eQuote cancel request. The complex eQuote cancel response should be deemed as a confirmation.
    - Replaced complex eQuotes will always have new timestamp on the book.
- *Responding to Liquidity seeking events:*
    - Firms can submit multiple complex eQuotes.
    - *Target message ID* must be present for canceling or replacing a pending complex eQuote
    - Cancel/replacement behavior stated above remains.

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4.1.6 Complex Enhanced Quote (eQuote) Response

This message indicates if the complex eQuote was accepted or rejected. Note that this message does not report executions. For executions, please refer to the *Execution notification*. For the handling of any unexecuted portion that was canceled, please refer to the *Cancel notification*.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"CR"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
eQuote ID	8	BinaryU	MIAX assigned ID for complex eQuote if accepted; Zero if eQuote was rejected.
eQuote Request Status	1	Alphanumeric	" " = Request accepted successfully "I" = Invalid Strategy ID "A" = No event with such Event ID "B" = Invalid complex eQuote Action "V" = Invalid Size "P" = Invalid Price "T" = Invalid complex eQuote Type "S" = Invalid Side "2" = Complex eQuote not permitted for this side "3" = Complex eQuote represented by *target message ID* was not found "4" = Client message ID not unique "J" = Outside Price Range for Strategy "U" = Unknown MPID "5" = Rejected due to quote protection "X" = Not permitted "K" = Test complex eQuote successfully accepted prior to LQW, but not placed on MIAX book "C" = MIAX closed for trading of this strategy; request cannot be completed "G" = Complex Feature is disabled "Z" = Undefined error "*" – Downgraded from older version

Points to note:

- This is a sequenced message

4.1.7 Simple Mass Quote Cancel Request

Firms can use this message format to request the cancelation of

all simple quotes and eQuotes for an MPID

all simple quotes and eQuotes for an MPID for all series for an underlying

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Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"XQ"
Client Message ID	4	BinaryU	Unique message ID assigned for the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	If filled with valid underlying, cancel request applies to the entire series of this underlying. If filled with spaces, MIAX will proceed to cancel quotes and eQuotes for all series in all underlying instruments that the MPID is eligible to trade.

Points to note:

- Upon receiving a Mass Quote Cancel request to remove all simple quotes and simple eQuotes for an MPID, MIAX will carry out the cancel request for all the series that the MPID is eligible for on the engine to which this Mass Quote Cancel was submitted. Separate cancel requests have to be sent to other engines to cancel quotes for products serviced by those engines.
- A mass quote cancel request will require a *Quote protection reset,* when the Market Maker is ready, in order to resume submitting quotes.
- MEI will not read any other messages from the firm on this connection until the processing of this request is complete.
- *Method for individual quote cancels*:
  Simple Quotes – Firms can send a bid or offer with a zero price and zero size in order to remove a single quote side. Sending a price and size of zero for both bid and offer will remove the entire quote for that option or strategy. Such a quote does not cancel simple Quote sent by the firm for that option symbol.
  Simple eQuotes – Firms can also cancel an eQuote using Simple eQuote message.
- The Mass Liquidity Cancel Request/Response messages can be used as a replacement for this message to cancel both simple and complex liquidity (detailed in Mass Liquidity Cancel Request)

4.1.8 Simple Mass Quote Cancel Response

This message format will be used to inform the firm about the status of their previous simple mass quote cancel request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"XR"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Simple Mass Quote Cancel Status	1	Alphanumeric	" " = Cancel successful "U" = Invalid Underlying

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Field Name	Length	Data Type	Notes
			"I" = Mass quote cancel still in progress "H" = Halt triggered cleanup of quotes still in progress "N" = All quote have already been canceled "X" = Not permitted "M" = Unknown MPID "C" = MIAX closed, request cannot be completed "Z" = Undefined error

Points to note:

- This is not a sequenced message
- *Cancel notification* will be generated for every pending simple eQuote in the system as per the request.
- *Cancel notifications* will be sent on all ports set up to receive these notifications

4.1.9 Mass Liquidity Cancel Request – Simple and Complex

Firms can use this message format to request the cancelation of

all simple quotes and simple/complex eQuotes for an MPID

all simple quotes and simple/complex eQuotes for an MPID for all series and/or strategies for an underlying

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"XK"
Client Message ID	4	BinaryU	Unique message ID assigned for the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	If filled with valid underlying, cancel request applies to the entire series of this underlying. If filled with spaces, MIAX will proceed to cancel quotes and eQuotes for all series in all underlying instruments that the MPID is eligible to trade.
Simple Mass Cancel	1	Alphanumeric	Request to mass cancel all simple liquidities. "Y" – Yes "N" – No
Complex Mass Cancel	1	Alphanumeric	Request to mass cancel all complex liquidities. "Y" – Yes "N" – No
Reserved	8	Alphanumeric	Reserved for future use

Points to note:

- Fields "Simple Mass-Cancel" and "Complex Mass-Cancel" cannot be both set to 'N' (No) values.

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- Upon receiving a Mass Liquidity Cancel request to remove all simple quotes and simple/complex eQuotes for an MPID, MIAX will carry out the cancel request for all the series and strategies that the MPID is eligible for on the engine to which this Mass Liquidity Cancel was submitted. Separate cancel requests have to be sent to other engines to cancel quotes for products serviced by those engines.
- A mass liquidity cancel request will require a *Liquidity protection reset,* when the Market Maker is ready, in order to resume submitting liquidities.
- MEI will not read any other messages from the firm on this connection until the processing of this request is complete.
- *Method for individual quote cancels*:
  Simple Quotes – Firms can send a bid or offer with a zero price and zero size in order to remove a single quote side. Sending a price and size of zero for both bid and offer will remove the entire quote for that option or strategy. Such a quote does not cancel simple/complex eQuote sent by the firm for that option symbol or strategy.
  Simple/Complex eQuotes – Firms can also cancel an eQuote using Simple/Complex eQuote message.

4.1.10 Mass Liquidity Cancel Response

This message format will be used to inform the firm about the status of their previous Mass Liquidity Cancel Request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"XP"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Simple Mass Liquidity Cancel Status	1	Alphanumeric	" " = Simple Mass Liquidity Cancel successful "U" = Invalid Underlying "I" = Simple Mass liquidity cancel still in progress "H" = Halt triggered cleanup of Liquidities still in progress "N" = All liquidities have already been canceled "X" = Not permitted "M" = Unknown MPID "C" = MIAX closed, request cannot be completed "J" = Invalid Request "E" = Feature not supported "Z" = Undefined error "Q" = Not Requested "*" – Downgraded from older version
Complex Mass Liquidity Cancel	1	Alphanumeric	" " = Complex Mass Liquidity Cancel successful "U" = Invalid Underlying "I" = Complex Mass Liquidity cancel still in progress

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Field Name	Length	Data Type	Notes
Status			"H" = Halt triggered cleanup of liquidities still in progress "N" = All liquidities have already been canceled "X" = Not permitted "M" = Unknown MPID "C" = MIAX closed, request cannot be completed "J" = Invalid Request "E" = Feature not supported "Z" = Undefined error "Q" = Not Requested "*" – Downgraded from older version

Points to note:

- This is not a sequenced message
- *Cancel notification* will be generated for every pending complex eQuote in the system as per the request.
- *Cancel notifications* will be sent on all ports set up to receive these notifications

4.1.11 Simple Quote Protection Reset Request

Following a quote protection being engaged for a given MPID and underlying, firms must use this message format to reset their Quote Protection in order to start quoting for any option of the specified underlying.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"PX"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	Must be filled with a valid underlying. MIAX will remove (reset) the Quote protection for this MM for entire series of this underlying.

Points to note:

- This is not a sequenced message
- The Liquidity Protection Reset Request/Response messages can be used as a replacement of this message to reset quote protection for simple option and complex strategies.
- Each type of simple quote protection and the corresponding system behavior and expectations are listed below:
    - Simple Quote protection due to ARM
        - ✓ All standard simple quotes are cancelled
        - ✓ Simple Quote protection reset is required to start sending simple quotes again.
        - ✓ Simple Quotes sent before resetting will be rejected.

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- ✓ Simple eQuotes are not cancelled
- ✓ Firms can send Simple eQuotes (new, cancel, replace) without resetting quote protection

- Simple Quote protection due to Firm Level ARM^2 Protection
  - ✓ All simple quotes are cancelled across all trading environments for the firm's assigned underlyings.Firms must call MIAX Trading Operations to manually reset ARM^2 protection. Then, a Simple Quote protection reset is required to start quoting again.
  - ✓ Simple quotes sent before resetting will be rejected.
  - ✓ Simple Quote protection reset sent before manual ARM^2 reset will be rejected.
  - ✓ Simple eQuotes are not cancelled.
  - ✓ Firms can send eQuotes (new, cancel, replace) without resetting quote protection.
- Simple Quote protection due to Underlying Level ARM^2 Protection
  - ✓ Firms must call MIAX Trading Operations to manually reset ARM^2 protection. Then, a Quote protection reset is required to start quoting the effected underlying again.
  - ✓ Simple Quotes sent for the effected underlying before resetting will be rejected.
  - ✓ Simple Quote protection reset sent for the effected underlying before manual ARM^2 reset will be rejected.
  - ✓ Firms can send simple eQuotes (new, cancel, replace) for the effected underlying without resetting quote protection.
- Simple Quote protection due to Exchange initiated manual mass quote cancel
  - ✓ All standard simple quotes and simplex eQuotes are cancelled
  - ✓ Simple Quote protection reset is required to start sending simple quote or simple eQuotes again
  - ✓ Simple Quotes and Simple eQuote sent before resetting will be rejected.
- Simple Quote protection due to System initiated mass cancel when all lines of the Firm disconnect
  - ✓ All standard simple quotes and simple eQuotes are cancelled
  - ✓ Simple Quote protection reset is required to start sending simple quote or simple eQuotes again
  - ✓ Simple Quotes and simple eQuote sent before resetting will be rejected.
- Simple Quote protection due to Firm initiated mass quote cancel
  - ✓ All standard simple quotes and simple eQuotes are cancelled
  - ✓ Simple Quote protection reset is required to start sending simple quote or simple eQuotes again
  - ✓ Simplex Quotes and Simple eQuote sent before resetting will be rejected.
- Simple Quote protection due to Underlying Trading halt
  - ✓ All standard simple quotes and simple eQuotes are cancelled
  - ✓ Simple Quote protection reset is required to start sending simple quote or eQuotes again
  - ✓ Simple Quotes and Simple eQuote sent before resetting will be rejected.

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4.1.12 Simple Quote Protection Reset Response

This message format is used to inform the firms of the status of their Simple Quote Protection Reset Request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"PR"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Quote Protection Reset Status	1	Alphanumeric	" " = Quote Protection reset successful "U" = Invalid Underlying "I" = Mass quote cancel still in progress "H" = Halt triggered cleanup of quotes still in progress "M" = Unknown MPID "X" = Not permitted "C" = MIAX closed, request cannot be completed "A" = ARM[2] Underlying level protection is in effect "F" = ARM[2] Firm level protection is in effect "K" = Kill Switch Protection is in effect "Z" = Undefined error "*" – Downgraded from older version

Points to note:

- This is not a sequenced message
- A simple quote protection reject due to ARM[2] or Kill Switch reject reasons requires a manual reset by MIAX Trading Operations.

4.1.13 Liquidity Protection Reset Request

Following a quote protection being engaged for a given MPID and underlying, firms must use this message format to reset their Complex Liquidity Protection and/or Simple Liquidity Protection in order to start submitting new simple or complex liquidities for any strategy of the specified underlying and/or products of the specified underlying.

Message Direction: Firm to MIAX

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"PC"
Client Message ID	4	BinaryU	Unique message ID assigned by the firm
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	Must be filled with a valid underlying. MIAX will remove (reset) the Quote protection for this MM for options and/or strategies of this

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Field Name	Length	Data Type	Notes
			underlying.
Simple Liquidity Reset	1	Alphanumeric	Request to reset simple liquidities protection: "Y" – Yes "N" – No
Complex Liquidity Reset	1	Alphanumeric	Request to reset complex liquidities: "Y" – Yes "N" – No
Reserved	8	Alphanumeric	Reserved for future use

Points to note:

- This is not a sequenced message.
- Simple Liquidity Reset and Complex Liquidity Reset fields cannot be both set to 'N' (No)

4.1.14 Liquidity Protection Reset Response

This message format is used to inform the firms of the status of their Liquidity Protection Reset request.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"PK"
Client Message ID	4	BinaryU	Unique message ID sent by the firm in the request
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Simple Liquidity Protection Reset Status	1	Alphanumeric	" " = Simple Liquidity Protection Reset successful "U" = Invalid Underlying "I" = Simple Mass Liquidity cancel still in progress "H" = Halt triggered cleanup of liquidates still in progress "M" = Unknown MPID "X" = Not permitted "C" = MIAX closed, request cannot be completed "A" = ARM[2] Underlying level protection is in effect "F" = ARM[2] Firm level protection is in effect "K" = Kill Switch Protection is in effect "E" – Feature not supported "Z" = Undefined error "J" = Invalid Request "Q" = Not Requested "*" – Downgraded from older version
Complex Liquidity Protection Reset Status	1	Alphanumeric	" " = Complex Liquidity Protection Reset successful "U" = Invalid Underlying "I" = Complex Mass Liquidity cancel still in progress "H" = Halt triggered cleanup of liquidities still in

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Field Name	Length	Data Type	Notes
			progress "M" = Unknown MPID "X" = Not permitted "C" = MIAX closed, request cannot be completed "A" = ARM[2] Underlying level protection is in effect "F" = ARM[2] Firm level protection is in effect "K" = Kill Switch Protection is in effect "E" – Feature not supported "Z" = Undefined error "J" = Invalid Request "Q" = Not Requested "*" – Downgraded from older version

Points to note:

- This is not a sequenced message
- Liquidity Protection reject due to ARM[2] or Kill Switch reject reasons requires a manual reset by MIAX Trading Operations.

4.2 Notifications

4.2.1 System State Notification

This message format is used to notify the firms of the state changes of the system. This is an exchange-wide notification and not a symbol or member based notification.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"SN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MEI Version	8	Alphanumeric	Eg:MEIX.X (where is 'X' is MEI version i.e.1.1 or 1.6)
Session ID	1	BinaryU	MIAX assigned ID for the current trading session
System Status	1	Alphanumeric	Current system status: "S" = Firm interface start up time (Ready to accept application messages) "P" = LQW (Ready to accept official quotes) "C" = End of System hours "L" = Pre-LQW (Not Ready to accept official quotes) "X" = System currently not accepting messages "1" = Start of Test Session (sent before tests). "2" = End of Test Session.

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* The specific times for each of these system statuses are on the MIAX website

Points to note:

- This is a sequenced message
- From time to time, MIAX will conduct off-hours testing. Such tests will be preceded by a System State Message indicating the start of test and close with a System State Message indicating the end of the test. Firms must ensure that messages sent on this feed from the beginning of "start of test session" to the end of "end of test session" will not affect their production systems.
- MIAX will disconnect the connection through which the firm sends an application message before MIAX disseminates this message with system status of "S".
- A System Status of "X" is only published when MIAX is experiencing system issues.
- A System Status of "L" is only published when "P"(LQW) is published earlier than planned.

4.2.2 Product Trading Status Notification

This message format will be used to notify the firms of changes to the trading status of an option.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"TN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
Product ID	4	BinaryU	MIAX Product ID mapped to a given option. It is assigned per trading session and is valid for that session.
Trading Status	1	Alphanumeric	Current trading status: "H" = MIAX has halted trading for this Product ID "C" = MIAX has initiated Closing rotation for this Product ID "R" = MIAX will resume trading (reopen) for this product ID
Expected Event Time	8	NanoTime	Expected time of start of the event as specified below: When trading status="H", this will be 0 (zero). When trading status ="C", this will be the time at which Closing rotation will start for this Product When trading status = "R", this will be the time at which the reopening process will start for this Product

Points to note:

- This is a sequenced message
- Trading Status "H" (Halt) Notification is sent for each product of the underlying when there is a halt.

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- When an individual product is made non-tradable/inactive, Trading Status "H" (Halt) notification will NOT be sent. Inactive products notification will be disseminated via Simple Series Update Notification (See 3.1 section of this document).
- Trading Status "R" (Reopen) Notification will only be sent when MIAX begins the reopening process after a manual underlying halt. It is not sent for the reopening after an automatic underlying halt.

4.2.3 Underlying Trading Status Notification

This message format will be used to notify the firms of changes to the trading status of all the options of an underlying.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"UN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
Underlying Symbol	11	Alphanumeric	Underlying Symbol
Trading Status	1	Alphanumeric	"H" = MIAX has halted trading for this Underlying Symbol "R" = MIAX will resume trading (reopen) for this Underlying Symbol "O" = MIAX will open trading for this Underlying Symbol
Event Reason	1	Alphanumeric	"A" = This event resulted from automatic/market driven event "M" = MIAX manually initiated this event
Expected Event Time	8	NanoTime	Expected time of start of the event as specified below: When underlying trading status="H", this will be 0 (zero). When underlying trading status = "R" or "O", this will be the time at which the opening/reopening process will start for this Underlying Symbol

Points to note:

This is a sequenced message

4.2.4 Quote Width Relief Notification

This message format will be used to notify the firms if and when MIAX grants relief to the valid quote width parameters for Opening as specified in the rules and regulatory circulars of MIAX Options market.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes

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Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"QN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
Underlying Symbol	11	Alphanumeric	If filled with valid underlying, relief applies to all options symbols of this underlying. **If filled with spaces, relief is an exchange-wide relief**
Relief Multiplier	4	BinaryPrc4U	Relief is the multiplier times the regular acceptable quote width. Eg: For a series with quote width of $0.25, a relief multiplier of 2 implies that the acceptable quote width is $0.50.

Points to note:

- This is a sequenced message
- This relief is only applicable for the current trading session.
- Permitted quote width is defined as the wider of applicable quote width and underlying quote width (applicable to in-the-money Options only).
  Applicable quote width = exchange-wide relief * underlying relief * Long Term Option relief (if applicable) * valid quote width.
  Refer to MIAX rules as to the details and exceptions to this rule.
- For a Relief multiplier setting of 1.50 in MIAX, MEI will send out the value 15000 in the Relief multiplier field as required by the BinaryPrc4U data format.

4.2.5 Simple ARM Protection Settings Notification

This message format will be used to notify firms of their ARM settings. All the ARM settings will be published upon system initialization and each subsequent change will also be published.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"AN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker. MPID will be spaces for MIAX global default settings.
Underlying Symbol	11	Alphanumeric	Underlying symbol for which this ARM protection is applicable If this is filled with spaces and MPID is filled with valid MPID, this ARM protection setting acts as the global default setting for this MPID. If this is filled with spaces and MPID is filled with spaces, this ARM protection setting acts as the

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Field Name	Length	Data Type	Notes
			MIAX global default settings. Note that the underlying ARM setting will override the global setting.
Allowable Engagement Percentage	4	BinaryU	Percentage of quote size at which MIAX must trigger ARM protection for this MPID and underlying. Please refer to the rules for details of ARM.
Counting Period	2	BinaryU	Duration (in number of milliseconds) for which trades are considered for Engagement percentage calculation in order to determine if the MPID should be put on ARM protection for this underlying.
Action	1	Alphanumeric	Valid values: 'S' – Set (added or updated) ARM settings 'D' – Deleted ARM settings
Source	1	Alphanumeric	Valid values: 'T' – Changes carried out by the Firm (via MEI) 'E' – Changes carried out by the Exchange (Global default changes or firm requested settings applied manually)

Points to note:

- This is a sequenced message

4.2.6 ARM^2 Underlying Level Protection Settings Notification

This message format will be used to notify firms of their ARM^2 Underlying Level protection settings. All the latest ARM^2 Underlyings settings will be carried over to the next trading session and will be published upon system initialization and each subsequent change will also be published.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"A2"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Action	1	Alphanumeric	Valid values: 'S' – Set (add or update) ARM^2 settings 'D' – Delete ARM settings
Underlying Symbol	11	Alphanumeric	Underlying symbol for which this ARM^2 protection is applicable
ARM Threshold Count	4	BinaryU	Number of ARM triggers for the Counting Period for the specified underlying that will trigger ARM^2

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Field Name	Length	Data Type	Notes
			Underlying Level protection.
Counting Period	4	BinaryU	Counting Period in milliseconds in which the number of unique ARM triggers cannot exceed the configured ARM Threshold Count specified for ARM[2] protection.
Reserved	16	Alphanumeric	Reserved for future use

Points to note:

- This is a sequenced message

4.2.7 Simple Quote Protection Trigger Notification

This message format will be used to notify firms when an MPID is placed under simple quote protection. Simple Quote protection can be triggered due to any one of the reasons listed in the message below.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"QP"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	Underlying for which this MPID is placed in Quote protection
Trigger Reason	1	Alphanumeric	"E" = Exchange initiated mass quote cancel "U" = Firm initiated mass quote cancel "R" = ARM triggered protection "T" = Trading halt "K" = Kill Switch Protection is in effect (Future Use) "F" = ARM[2] Firm level protection initiated mass quote cancel 'J' = Reserved for future use "*" – Downgraded from older version

Points to note:

- This is a not a sequenced message
- Please refer to Simple Quote Protection Reset Request for details about requirements for resetting quote protection.
- All simple quotes and eQuotes will be canceled due to
  - Firm/Exchange initiated mass quote cancel
  - Trading Halt
    - NOTE: PRIME Auction timer will terminate and the PRIME Agency Order, Contra Order and any AOC responses will trade contemporaneously with the Halt.
- All simple quotes will be canceled due to ARM triggered protection.

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- NOTE: simple eQuotes will not be canceled due to ARM triggered protection.

- ARM^2 Firm Level protection will cancel all simple quotes for the firm on all clouds.
  - NOTE:
    - Simple eQuote will not be canceled due to ARM^2 triggered protection

4.2.8 Complex Liquidity Protection Trigger Notification

This message format will be used to notify firms when an MPID is placed under complex liquidity protection. Complex Liquidity protection can be triggered due to any one of the reasons listed in the message below.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Unsequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"QC"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	Underlying for which this MPID is placed in Quote protection
Trigger Reason	1	Alphanumeric	"E" = Exchange initiated mass liquidity cancel "U" = Firm initiated mass liquidity cancel "T" = Trading halt "K" = Kill Switch Protection is in effect "F" = ARM^2 Firm level protection initiated mass liquidity cancel "J" = Reserved for future use "R" = Reserved for future use "*" – Downgraded from older version

Points to note:

- This is a not a sequenced message
- Please refer to Liquidity Protection Reset Request for details about requirements for resetting liquidity protection.
- All complex liquidities will be canceled due to
  - Firm/Exchange initiated mass liquidity cancel
  - Trading Halt
- Complex eQuote will not be canceled due to ARM^2 triggered protection

4.2.9 ARM^2 Underlying Level Protection Notification

This message format will be used to notify firms about ARM^2 Underlying Level protection events.

Message Direction: MIAX to Firm

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Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"UP"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Underlying Symbol	11	Alphanumeric	Underlying for which this MPID is placed in ARM^2 underlying level protection.
Notification Type	1	Alphanumeric	"T" - ARM^2 Underlying Level protection Triggered "R" - ARM^2 Underlying Level protection Reset "*" – Downgraded from older version
ARM Threshold Count	4	BinaryU	Number of ARM triggers for the Counting Period for the specified underlying that will trigger ARM^2 Underlying Level protection.
Counting Period	4	BinaryU	Counting Period in milliseconds in which the number of unique ARM triggers cannot exceed the configured ARM Threshold Count specified for ARM^2 protection.
Reserved	16	Alphanumeric	Reserved for future use

Points to note:

- This is a sequenced message

4.2.10 ARM^2 Firm Level Protection Notification

This message format will be used to notify firms about ARM^2 Firm Level protection events.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"FP"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
ARM Threshold Count	4	Binary4U	Number of unique ARM triggers for the Counting Period that will trigger ARM^2 Firm Level protection.
Counting Period	4	Binary4U	Counting Period in milliseconds in which the number of unique ARM triggers cannot exceed the configured ARM Threshold Count specified for ARM^2 protection.
Notification Type	1	Alphanumeric	"T" - ARM^2 Firm Level protection Triggered "R" - ARM^2 Firm Level protection Reset "*" – Downgraded from older version
Reserved	16	Alphanumeric	Reserved for future use

Points to note:

- This is a sequenced message

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4.2.11 Complex Strategy Definition Notification

This is the message format that will be used to disseminate stock option strategies traded on MIAX for the current session. The Strategy ID sent in this message is utilized by the Administrative Information Subscriber (AIS) Feed for Complex Liquidity Seeking Events, the MIAX Order Feed (MOR) for Complex Order dissemination, the Complex Top of Market Feed (cToM) for Complex Trade and Top of Market dissemination and the MIAX Express Interface (MEI) for Complex eQuotes.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"SC"
Notification Time	8	NanoTime	Time at which this Strategy is added/updated on MIAX system today.
Strategy ID	4	BinaryU	MIAX Strategy ID is assigned per trading day and is valid only for that day.
Underlying Symbol	11	Alphanumeric	Underlying Symbol for this strategy
Active on MIAX	1	Alphanumeric	Indicates if this strategy is tradable on MIAX in the current session: "A" = Active (tradable) on MIAX "I" = Inactive (not tradable) on MIAX
Reserved	*1*	*BinaryU*	*** Reserved for future use ***
Update Reason	1	Alphanumeric	"N" – New strategy created "U" – Strategy definition updated "*" – Downgraded for older version
Reserved	*10*	*BinaryU*	*** Reserved for future use ***
Number of Legs	1	BinaryU	Number of Legs. Variable from 2 to 8
2 to 8 legs consisting of the following fields:			
➡ Product ID	4	BinaryU	MIAX Defined Series. See Simple Series Update Message.
➡ Leg Ratio Qty	2	BinaryU	The ratio of this individual leg. Number of contracts for this leg is: LegRatioQty * OrderQty
➡ Leg Side	1	Alphanumeric	The side of this individual leg Valid values are: "B" = Bid "A" = Ask
➡ Reserved	8	BinaryU	** Reserved for future use **

Points to note:

- This is a sequenced message.
- Strategies may be created intra-day as orders are placed at the MIAX Exchange or pre-defined before the market open.
- The length of this message is ***variable*** based on the number of legs.

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- When underlying halts, all strategies for that underlying are in a halted state. Firms should process Underlying Trading Status notification to determine current state of the strategies.
- This message might be published more than once per day. When Update Reason is "U", the only field that can change is "Active on MIAX".
- When Active On MIAX is "I", MIAX will cancel all complex eQuotes for the strategy
- The tradability of a strategy can be tracked with the status of the underlying (message type "H") or the individual series. (message type "P")
- The Strategy ID and Product ID fields are separate and distinct fields with assigned ID's per trading day and valid only for the current day. Their scope is limited to each field.

4.2.12 Cancel Notification

This is the message format that will be used to notify firms about system generated or firm requested simple quote and simple or complex eQuote cancels.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced or Unsequenced Pkts; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"XN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Product ID or Strategy ID	4	BinaryU	MIAX Product ID for Liquidity Types "Q" and "E", and MIAX Strategy ID for Liquidity Type "C" and "X".
Liquidity Type	1	Alphanumeric	"Q" – Simple Quote "E" – Simple eQuote "C" – Complex eQuote "X" – Reserve for future use
Client Message ID	4	BinaryU	Client Message ID supplied by the firm in Simple Bulk quote or Simple/Complex eQuote message
Bulk Quote Index	1	BinaryU	Simple Bulk Quote Index assigned by MIAX to each simple quote in bulk quote (quote position in the simple bulk quote); 0 if status is not for a bulk quote
Quote/eQuote Side	1	Alphanumeric	This is the side of the liquidity that is being canceled "B" = Bid "A" = Ask
Size	4	BinaryU	For Simple Quote Cancels: 0 (zero always) For Simple/Complex eQuote Cancels: Number of contracts Canceled
Engine Sequence number	8	BinaryU	MIAX Engine sequence number of this cancel
Cancel Reason	1	Alphanumeric	"S" = Cancel for unexecuted part of simple/complex

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Field Name	Length	Data Type	Notes
			eQuote "W" = Cancel for quote unused in Opening, Reopening or Closing "C" = Cancel of resting simple quote crossed by opposite side quote of same MPID "K" = Complex Strategy leg has wide MBBO. Only applicable to Complex eQuotes. "L" = Complex Strategy leg has PRIME Auction. Only applicable to Complex eQuotes "M" = Complex Strategy leg has Route Timer. Only applicable to Complex eQuotes. "N" = Complex Strategy leg has Liquidity Refresh Timer. Only applicable to Complex eQuotes. "J" = Complex Strategy Auction in progress. Only applicable to Complex eQuotes. "P" = Reserved "Q" = Reserved

Points to note:

- This is not a sequenced message for quote cancels. This is a sequenced message for simple/complex eQuote cancels.
- When an active series is made inactive, all simple quotes and simple eQuotes for the series will be canceled and the firms will be informed using Simple Series Update (See section 3.1) message format.
- Complex strategies that contain inactive series will become inactive (non-tradable) and MIAX will cancel all complex eQuotes in these strategies.
- All simple quotes and simple/complex eQuotes will be canceled when an MPID is deleted or when underlying permission is deleted. The delete Cancel Notification will not be published by MEI. Firms will be contacted by MIAX Trading Operations personnel upon such event.
- The following events will not result in Cancel Notification being published. Please refer to Simple Quote Protection Notification (See section 4.2.7) and Complex Liquidity Protection Notification (See section 4.2.8) for Quotes and/or eQuotes canceled by MIAX due to
    - Mass Quote Cancel request from the Firm or when manually carried out by MIAX
    - Underlying Halt
    - ARM protection and ARM$^{2\,f}$irm protection
    - OCC Kill switch

4.2.13 Execution Notification

This message format will be used to notify the firms of executions of their simple quotes and simple or complex eQuotes.

Message Direction: MIAX to Firm

Field Name	Length	Data Type	Notes

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Field Name	Length	Data Type	Notes
SesM Protocol Data			*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	2	Alphanumeric	"EN"
Notification Time	8	NanoTime	Time at which this was generated by MIAX system.
MPID	4	Alphanumeric	MIAX assigned ID of the Market Maker
Product ID	4	BinaryU	MIAX Product ID mapped to a given option. It is assigned per trading session and is valid for that session.
Liquidity Type	1	Alphanumeric	"Q" – Simple Quote "E" – Simple eQuote "C" – Complex eQuote "X" –- Reserved for future use
Client Message ID	4	BinaryU	Client Message ID supplied by the firm in simple bulk quote or simple/complex eQuote message
Bulk Quote Index	1	BinaryU	Simple Bulk Quote Index assigned by MIAX to each quote in bulk quote (quote position in the bulk quote); 0 for simple/complex eQuote
Event ID	4	BinaryU	If execution was the result of an liquidity seeking event, Event ID
Trade ID	4	BinaryU	MIAX Trade ID
Execution ID	8	BinaryU	MIAX execution ID
** Reserved **	1	BinaryU	** Reserved for future use **
Trade Status	1	Alphanumeric	"E" – New Execution
Last Price	4	BinaryPrc4U	Price of this execution
Side	1	Alphanumeric	"B" = Bought "S" = Sold
Last Size	4	BinaryU	Number of contracts executed (not cumulative)

Points to note:

- This is a sequenced message.
- A two-sided clearing trade is assigned a Trade ID. Each side of that trade is assigned a unique Execution ID. Therefore, Execution ID uniquely identifies each execution.
- Executions with Liquidity Type "C" are part of the complex strategy transaction in which Client Message ID identifies complex eQuote submitted by the firm for the specific Strategy ID.
- Executions with Liquidity Type "C" are delivered one per leg for each complex trade.

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Appendix A: Contact List

Please visit MIAX website at http://www.MIAXOptions.com for obtaining most up-to-date contact list and other such information.

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Appendix B: ARM Settings Upload File Format

If firms are unable to send ARM settings messages via MEI, they can email their settings to MIAX Operations in an Excel sheet as indicated below. Firms must send an email requesting MIAX Trading Operations to upload their settings and confirm that the file was successfully uploaded.

All ARM settings messages received from firms over MEI will overwrite the manually uploaded settings for the current trading session and vice versa.

ARM settings will persistent across trading sessions.

The ARM settings upload file format is as follows:

- Single work sheet named ARM settings in an XL workbook.
- Cell A1 contains trading date
- Cell B1 contains the number of records
- Subsequent rows are of the format:
  - 1st column: MPID
  - 2nd column: Action: (Set = add or update ARM settings,
    Del = Delete ARM settings,
    DeleteAll = Delete all the ARM settings for this MPID)
  - 3rd column: Underlying symbol
  - 4th column: Allowable engagement percentage (minimum 100%)
  - 5th column: Counting period (in milliseconds, multiples of 100s)

Example:

	A	B	C	D	E
1	6/2/2011	4			
2	ABC1	DeleteAll			
3	ABC1	Set	IBM	100	1500
4	ABC2	Set	GOOG	100	1000
5	ABC2	Del	QQQQ	200	1000

NOTES:

1) Please note that there should be no spaces or unreadable characters anywhere in the file.
2) Rejected records will result in MIAX Operations not loading the file. MIAX Operations will try to reach out to the firms to get the errors fixed. MIAX is not liable for any such delays. The firms are always welcome to use the preferred method of setting up their ARM settings using ARM settings messages via MEI. The firms are strongly encouraged to email Trading Operations to ensure that the settings have been successfully uploaded.

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Appendix C: Messaging for Valid Quote Width for Opening

This appendix illustrates the messaging involved in communicating a sample valid quote width table used for MIAX Opening.

Sample Valid Quote Width for Opening:

MPV Class	Low end of range (bid)	High end of range (bid)	Maximum Quote Width	Long Term Option Multiplier
P (Penny)	$0.00	$1.99	$0.25	2.0X (This means that 0.50 is the applicable Maximum Quote Width for Long Term Options for a Bid at or between $0 and $1.99)
P (Penny)	$2.00	Infinity	$0.40	2.0X (This means that 0.80 is the applicable Maximum Quote Width for Long Term Options for a Bid at or between $2.00 and infinity)

The above sample configuration at MIAX will result in the following "Valid Quote Width for Opening" messages from MEI:

Message 1:

Field Name	Value
SesM Protocol Data	*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	"QW"
Notification Time	Time of message generation
MPV Class	"P"
Low End of Applicable Range	0
Maximum Quote Width	2500
Long Term Option Multiplier	15000

Message 2:

Field Name	Value
SesM Protocol Data	*Sequenced Pkt; Refer to SesM Protocol Specification*
Message Type	"QW"
Notification Time	Time of message generation
MPV Class	"P"
Low End of Applicable Range	20000
Maximum Quote Width	4000
Long Term Option Multiplier	20000

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Appendix D: Multiport MEI setup

Port grouping concept and cleanup on disconnect scoping

Please consider the following examples to help illustrate the port grouping concept and cleanup on disconnect scoping (explained in the Hot Topics section above) as it relates to port grouping.

Example 1: Firm requiring a setup to separate out their eQuotes, Mass-Quote-Cancel or Notifications to separate port

For this example, the group 2 is set up to not cleanup on disconnect. But, the group 1 is set up to cleanup on disconnect.

Assuming that the firm is connected on all ports,
Scenario 1: MEI Port 1 disconnects, no cleanup.
Scenario 2: MEI port 1 and port 2 disconnect, cleanup on disconnect is engaged
Scenario 3: MEI port 3 disconnects, no cleanup
Scenario 4: MEI port 1 and port 3 disconnect, no cleanup

Example 2: Firm requiring a setup to divide the ports on a cloud to separate computer/bins or traders

Group1 MPIDs: MPID1, MPID2, MPID3 **Group2 MPIDs: MPID3, MPID4, MPID5**

For this example, both groups are set up to cleanup on disconnect. MPID3 is shared on both groups. Port 1 and 3 are full service ports. Port 2 and 4 are limited service ports. Please note that in this setup, MPIDs 1, 2, 4 and 5 will not benefit from redundancy. Firms are encouraged to consider such disadvantages with the setup they are requesting.

Assuming that the firm is connected on all ports,
Scenario 1: MEI Port 1 disconnects, no cleanup.
Scenario 2: MEI port 1 and port 2 disconnect, cleanup on disconnect is engaged for MPID1, MPID2, MPID3. But no cleanup is done for MPID4 and MPID5.
Scenario 3: MEI port 3 disconnects, no cleanup
Scenario 4: MEI port 1 and port 3 disconnect, no cleanup

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Appendix E: Messages that will be deprecated

This section will list out all the prior versions of messages that are not supported in the latest version of the MEI specification. All new firms must use the latest version of each message and not use any messages listed in this section.

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Appendix F: Revision History

Revision Date	Version	Author	Description
Sep 29 2011	1.0	Vinay S. Rao	First release.
Apr 11 2012	1.1	Vinay S. Rao	Changes throughout to reflect latest rules.
Aug 27 2012	1.2	Vinay S. Rao	1) Notes clarifications in Bulk Quote Message, eQuote Message, eQuote Response, Liquidity Seeking Event Notification 2) Addition of "L" System Status in System State Notification 3) Fix the length of Message Type field in Mass Quote Cancel Request 4) Bad MPIDs will not cause MEI disconnects 5) Moved Appendix D to E, Appendix E to F and introduced new Appendix D 6) Addition of a new code for Nasdaq OMX Equity market in Series Update message.
Nov 07 2012	1.3	Vinay S. Rao	1) ARM settings request: defaults changed and ARM settings has a maximum percentage 2) Price will not be published in certain Liquidity Event notifications 3) Addition of Priority quote width and reserved fields to Series Update 4) Clarification on permitted quote width in Quote width relief notification
Jan 25 2013	1.3a	Vinay S. Rao	ARM Protection Settings Notification: Deprecated 'F' to provide clarity.
Feb 8 2013	1.3b	Vinay S. Rao	Copyright and page footer updated.
Mar 19, 2013	1.3c	Matt Rotella	Comment in FAQ section regarding ARM protection scope. Comment in ARM Settings Update Request section clarifying the scope of ARM protection as it relates to mini options.
March 28, 2013	1.4	Vinay S. Rao	Added Attributable ID to Liquidity Seeking Event Notification in the reserved bytes making this message backward compatible with v1.3c.
June 25, 2013	1.5	Vinay S. Rao	1) Renamed FAQs section to Hot Topics. 2) Hot Topics Section: Added recommendations to flow control and bulk quote blocking latency and throughput sections. 3) Hot Topics Section: Added port setup section and some clarifications to cleanup on disconnect section. 4) Hot Topics Section: Additional clarifications about quotes that are locking or crossing BBOs. 5) Configuration: Added limited cancel notification

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			feature. 6) Configuration: Added port type and port group features. 7) Trading Status Notification: Added notes to clarify halts and reopening notifications. 8) Quote protection trigger notification: Added clarification to Trading halt trigger reason 9) Liquidity seeking Event notification: Added scope for Event ID 10) Revision history is now Appendix G 11) Messages to be deprecated is now Appendix F 12) Appendix E is now the new Multiport MEI setup illustration
August 15, 2013	1.6	Anatoly Khusid	1) Renamed Trading Status Notification to Product Trading Status Notification 2) Added Underlying Trading Status Notification 3) Reflected Multiple-MPV trading changes in Appendix D (Liq. Seeking Event Notification Details) 4) Product trading status notes updated to reflect that MIAX does not currently halt an individual product other than make it non-tradable.
November 08, 2013	1.6a	Vinay S. Rao	Hot Topics – Port Setup: Updated the number of Limited service ports to 4 per cloud.
March 19, 2014	1.6b	Vinay S. Rao	Appendix D – Free Trading Route Event – Price changed back to zero.
April 08, 2014	1.7	Anatoly Khusid	1) Update to Liquidity Seeking Event Notification for MIAX PRIME. 2) Update Appendix D to reflect MIAX PRIME auction 3) Message Type “QM” and “EQ”: Updated Max Price. 4) Message Type “XN”: updated Cancel Reason Field and Notes section
May 19th, 2014	1.7a	Kevin Mueller	1) Message type “QR”: New Quote Status “D” 2) Message type “ER”: New eQuote Request Status “D”
August 28th, 2014	1.7b	Kevin Mueller	Enhanced Quote (eQuote) Message: Updated Event ID notes
May 14th 2015	1.7c	Vinay S. Rao	Deprecated Liquidity Seeking Event Notification and corresponding Appendix. That notification is only published in AIS feed now.
June 29th 2015	1.8	Vinay S. Rao	Added ARM^2 Functionality support added in the following sections: MEI Features, Hot Topics, Configuration, ARM2 Underlying level protection settings request/response, Quote Protection request/response, ARM2 Underlying settings

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			notification, quote protection notification, ARM2 Underlying and Firm Trigger notifications.
Jan 15th 2016	1.9	Siddharth Sahoo	1) ARM settings request: Updated the minimum value of Allowable Engagement Percentage to 50% 2) Underlying Market Code: Added 'V' for IEX in Series Update message
Feb 1st, 2016	2.0	Anatoly Khusid	Updated for complex orders: • Renamed Bulk Quote Resuest/Response to Simple Bulk Quote Request Response • Renamed Enhanced Quote (eQuote) Message Request/Response to Simple Enhanced Quote (eQuote) Message Request/Respons • Renamed ARM Settings Update Request/Response to Simple ARM Settings Update Request/Response • Renamed Mass Quote Cancel Request/Response to Simple Simple Mass Quote Cancel Request/Response • Renamed Quote Protection Reset Request/Response to Simple Quote Protection Reset Request/Response • Renamed ARM Protection Settings Notification to Simple ARM Protection Settings Notification • Renamed Quote Protection Trigger Notification to Simple Quote Protection Trigger Notification • Added Complex Enhanced Quote (eQuote) Message Request/Response • Added Mass Liquidity Cancel Request/Response • Added Liquidity Protection Reset Request/Response • Added Complex Liquidity Protection Trigger Notification • Added Complex Strategy Definition Notification • Updated Cancel Notification to contain new Liquidity Type and Cancel Reason codes • Updated Cancel Notification Product ID field description to imply Strategy ID or Product ID • Updated Execution Notification to contain new Liquidity Type
Apr 12th, 2016	2.1	Siddharth Sahoo	ARM settings request: Updated the notes related to

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			the minimum value of Allowable Engagement Percentage
June 24th 2016	2.2	Kevin Mueller	Complex eQuote: Changed BMO to IOC in field eQuote Type.
Sept 15th 2016	2.2a	Siddharth Sahoo	Complex eQuote: Changed BMO to IOC in notes section
Feb 27th 2017	2.2b	Vinay S. Rao	System startup time moved up

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